



## REGULAR MEETING OF THE MILPITAS CITY COUNCIL

### AGENDA

TUESDAY, MAY 18, 2021

MILPITAS, CA

6:00 PM (CLOSED SESSION)

7:00 PM (PUBLIC BUSINESS)

For assistance in the following languages, you may call:

Đối với Việt Nam, gọi 408-586-3122

Para sa Tagalog, tumawag sa 408-586-3051

Para español, llame 408-586-3232

City Council meeting is held via teleconference /Zoom webinar only (no physical meeting space).  
You may watch the Council meeting without providing public comment by accessing it via links here.

### Meeting shall be livestreamed - Go to:

Facebook: <https://www.facebook.com/CityofMilpitas/>

YouTube: <https://www.ci.milpitas.ca.gov/youtube>

Web Streaming: <https://www.ci.milpitas.ca.gov/webstreaming>

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### **PUBLIC COMMENT INSTRUCTIONS**

Oral public comments may be provided live during the City Council meeting by first registering for the zoom meeting in advance by providing email address (not disclosed) and a name. To minimize technical difficulties, please make sure that you have the latest version of Zoom Meetings. Here is the link to register for this meeting only:

[https://ci-milpitas-ca-gov.zoom.us/webinar/register/WN\\_5YKU79TQTC6h7IFE1damWQ](https://ci-milpitas-ca-gov.zoom.us/webinar/register/WN_5YKU79TQTC6h7IFE1damWQ)

A link will be sent to you to join the City Council meeting in order to give your comments. All registered meeting attendees who wish to speak must click on the "raise hand" icon when the Mayor calls for public comments. If participating by calling in on your phone, dial \*9 to use the "raise hand" feature, and when you are called upon, hit \*6 to unmute your phone. Your phone number will be displayed in the live meeting. The Mayor or staff will call the speakers to begin.

All comments provided shall be limited to three minutes or less as determined by the Mayor. All members of the public will be limited to one comment per agenda item, and one comment for non-agenda items. online written comment form previously used is no longer available for public comment.

### **MILPITAS CITY COUNCIL CODE OF CONDUCT**

- Be respectful and courteous (words, tone, and body language).
- Model civility.
- Avoid surprises.
- Praise publicly and criticize privately.
- Focus on the issue, not the person.
- Refrain from using electronic devices while on the Council dais.
- Disclose conflicts of interest and affiliations related to agenda items.
- Separate governing from campaigning.
- The Council speaks with one voice after making policy on issues.
- Respect the line between policy and administration.
- Council will hold one another accountable to comply with this Code of Conduct.



**CALL MEETING TO ORDER by Mayor and ROLL CALL by City Clerk**

**ADJOURN TO CLOSED SESSION** (6:00 PM)

**(a) CONFERENCE WITH LEGAL COUNSEL – EXISTING LITIGATION**

Pursuant to Government Code Section 54956.9(d)(1)

City as Plaintiff

County Sanitation District 2-3, West Valley Sanitation District, Burbank Sanitary District, Cupertino Sanitary District, and City of Milpitas v. City of San Jose, City of Santa Clara

**(b) CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION**

Pursuant to Government Code Section 54956.9(d)(2)

Cost Dispute with Tributary Agencies (Burbank Sanitary District, Cupertino Sanitary District, West Valley Sanitation District, County Sanitation District 2-3) Regarding Legal Expenses

**CLOSED SESSION ANNOUNCEMENT:** Report on action taken in Closed Session, if required per Government Code Section 54957.1, including the vote or abstention of each member present

**PLEDGE OF ALLEGIANCE** (7:00 PM)

**INVOCATION** (Councilmember Chua)

**PRESENTATIONS**

- Public Works Week (Proclamation)
- Eritrea Independence Day (Proclamation)
- Memorial Day (Proclamation)

**PUBLIC FORUM**

Those interested are invited to address City Council on any subject not on tonight's agenda, orally via zoom webinar (instructions on page 1). Speakers may provide their name and city of residence for the Clerk's record, and comments may be limited to three minutes or less. As an item not listed on the agenda, no response is required from City staff or the Council and no action can be taken. The City Council may instruct the City Manager to place the item on a future meeting agenda.

**ANNOUNCEMENTS AND FUTURE AGENDA ITEMS** (7:20 PM)

Members of the City Council or City Manager may make brief announcements at this time. Members of the City Council may also suggest future agenda items at this time. For future agenda items, the City Council shall not debate the topic or engage in discussion but shall simply state a "yes" or "no" as to whether to direct the City Manager to place the item on a future meeting agenda. If a majority of the City Council agrees to place an item on a future meeting agenda, the City Manager shall place the item on a subsequent agenda for City Council discussion.

**ANNOUNCEMENT OF CONFLICT OF INTEREST AND CAMPAIGN CONTRIBUTIONS**

**READING OF THE CITY COUNCIL CODE OF CONDUCT**

**APPROVAL OF AGENDA**

**CONSENT CALENDAR** (7:45 PM)

Consent calendar items are considered to be routine and will be considered for adoption by one motion. There will be no separate discussion of these items unless a City Councilmember, member of the audience or staff requests the Council to remove an item from (or be added to) the consent calendar. Any person desiring to speak on any item on the consent calendar should ask to have that item removed from the consent calendar.

**C1. Receive City Council Calendars of Meetings for May and June 2021 (Staff Contact: Wendy Wood, City Clerk, 408-586-3001)**

**C2. Approve City Council meeting minutes of the May 4, 2021, Regular City Council Meeting, May 7, 2021 Special City Council Meeting, and May 11, 2021, City Council Meeting (Staff Contact: Wendy Wood, City Clerk, 408-586-3001)**

Recommendation: Approve meeting minutes of the May 4, 2021, Regular City Council Meeting, May 7, 2021, Special City Council Meeting, and May 11, 2021, Special City Council Meeting.

**C3. Adopt a Resolution Approving the Annual Engineer's Report; Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and Provide Notice of Public Hearing to be held on June 15, 2021 for Landscaping and Lighting Maintenance Assessment District No. 95-1 (LLMD 95-1 McCarthy Ranch) (Staff Contact: Steve Erickson, Engineering Director/City Engineer, 408-586-3301)**

Recommendation: Adopt a Resolution approving the Annual Engineer's Report; adopt a Resolution declaring its Intention to Levy and Collect Assessments; and provide Notice of Public Hearing to be held on June 15, 2021 for LLMD 95-1 McCarthy Ranch.

**C4. Adopt a Resolution Approving the Annual Engineer's Report; Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and Provide Notice of Public Hearing to be held on June 15, 2021 for Landscaping and Lighting Maintenance Assessment District No. 98-1 (LLMD 98-1 Sinclair Horizon) (Staff Contact: Steve Erickson, Engineering Director/City Engineer, 408-586-3301)**

Recommendation: Adopt a Resolution approving the Annual Engineer's Report; adopt a Resolution declaring its Intention to Levy and Collect Assessments; and provide Notice of Public Hearing to be held on June 15, 2021 for LLMD 98-1 Sinclair Horizon.

**C5. Adopt a Resolution Approving Acceptance of Public Improvements and Approving Reduction of Faithful Performance Bond for Public Improvements for the California Circle Residential Project located at 1210 California Circle, Tract 10359 by KB Home South Bay, Inc., and Granting Authorization to the City Engineer to Release the Performance Bond after the One-year Warranty Period (Staff Contact: Steve Erickson, Engineering Director/City Engineer, 408-586-3301)**

Recommendations: Adopt a Resolution: (1) Approving acceptance of public improvements for the California Circle Residential Project located at 1210 California Circle, Tract 10359, Public Improvement Plan 2-1219; and (2) Approving a reduction in the faithful performance bond to \$131,000.00, which shall be subject and in effect for the duration of a one-year warranty period; and (3) Granting authorization to the City Engineer to release the performance bond after the one-year warranty period, without further City Council action provided all required warranty work is completed to the satisfaction of the City Engineer.

**C6. Adopt a Resolution Accepting the 2021 Santa Clara County Multi-Jurisdictional Program for Public Information Program; A Program Under the Community Rating System of the Federal Emergency Management Agency's National Flood Information Program (Staff Contact: Steve Erickson, Engineering Director/City Engineer, 408-586-3301)**

Recommendation: Adopt a Resolution Accepting the 2021 Santa Clara County Multi-Jurisdictional Program for Public Information Program; A Program Under the Community Rating System of the Federal Emergency Management Agency's National Flood Information Program.

- C7. Adopt a Resolution upholding the Appeal of the Planning Commission's Denial and approving a Site Development Permit and Conditional Use Permit Amendment to Demolish an Existing Manual Coin-operated Car Wash and Develop a New, Fully Automatic 3,189-square foot Car Wash with an Additional 2,301-square foot Canopy Area and associated site improvements with an increased front setback of 37 feet-7 inches on a .46 Acre Site Located at 554 S. Main Street Pursuant to CEQA Guidelines 15303 and 15183 (Staff Contact: Rozalynne Thompson, Senior Planner, 408-586-3278)**

Recommendation: Adopt a Resolution upholding the Appeal of the Planning Commission's Denial and approving Site Development Permit SD18-0010 and Conditional Use Permit Amendment UA18-0020 to demolish an existing manual coin-operated car wash and develop a new, fully automatic 3,189-square foot car wash with an additional 2,301-square foot canopy area and associated site improvements with an increased front setback of 37 feet-7 inches.

- C8. Accept Four Donations Totaling \$8,000 and approve a related FY 2021-22 Budget Amendment (Staff Contact: Renee Lorentzen, Director of Recreation and Community Services, 408-586-3409)**

Recommendation: Accept four donations totaling \$8,000 from Gomez Consulting, Morley Bros., Overton Moore Properties, and the Pulte Group for funding temporary housing for unhoused persons and approve an appropriation of \$8,000 to the FY 2021-22 Recreation and Community Services Department Operating Budget.

- C9. Approve the Proposed Legislative Advocacy Policy and Legislative Guiding Principles (Staff Contact: Ashwini Kantak, Assistant City Manager, 408-586-3053)**

Recommendation: Approve the Legislative Advocacy Policy and Legislative Guiding Principles.

- C10. Approve and Authorize the City Manager, or his Designee, to Execute a Memorandum of Understanding (MOU) by and Between the City of Milpitas and the Milpitas Unified School District Regarding the MUSD Alliance Partners for Future-Ready Learners Program (Staff Contacts: Alex Andrade, Director of Economic Development, 408-586-3046; and Renee Lorentzen, Director of Recreation and Community Services, 408-586-3409)**

Recommendation: Approve and authorize the City Manager, or his designee, to execute a Memorandum of Understanding (MOU) by and between the City of Milpitas and the Milpitas Unified School District regarding the MUSD Alliance Partners for Future-Ready Learners Program.

- C11. Consider the Mayor's Recommendation of Vice Mayor Carmen Montano to Serve on the Bay Area Water Supply and Conservation Agency and its Regional Financing Authority Board of Directors a four-year term from July 1, 2021 through June 30, 2025. (Staff Contact: Tony Ndah, Public Works Director, 408-586-2602)**

Recommendation: Consider Mayor's recommendation of Vice-Mayor Carmen Montano to serve on the Board of Bay Area Water Supply and Conservation Agency and its Regional Financing Authority for a four-year term from July 1, 2021 through June 30, 2025.

- C12. Approve and Authorize the City Manager to Enter into a Side Letter to Amend the Memorandum of Understanding between the City and the Milpitas Police Officers Association (MPOA) and between the City and LIUNA/UPEC Local 792, representing the Mid-Management-Confidential Unit (Mid-Con) and the Professional and Technical Unit (ProTech) amending the Vacation Cash Out MOU provisions. (Staff Contact: Jeannine Seher, Director of Human Resources, 408-586-3086)**

Recommendation: Approve and Authorize the City Manager to Enter into a Side Letter to Amend the Memorandum of Understanding between the City and the Milpitas Police Officers Association (MPOA) and between the City and LIUNA/UPEC Local 792, the Mid-Management-Confidential Unit (Mid-Con) and the Professional and Technical Unit (Pro-Tech) relating to the vacation cash-out provisions amending the Vacation Cash Out MOU provisions.

**C13. Accept Youth Advisory Commissioner Resignation (Staff Contact: Wendy Wood, City Clerk, 408-586-3001)**

Recommendation: Accept Resignation of Commissioner Andrea Liu from the Youth Advisory Commission and confirm the noticing of the unscheduled vacancy.

**PUBLIC HEARINGS** (8:00 PM)

**14. Adopt a Resolution Approving Vehicle Miles Traveled Policy to Implement Senate Bill 743 (Staff Contact: Ned Thomas, Director of Planning, 408-586-3273)**

Recommendations: (1) Conduct a public hearing and move to close the hearing following comments; and (2) adopt a resolution for a new citywide policy to establish Vehicle Miles Traveled (VMT) as the standard of measurement for analysis of potential environmental impacts from vehicle traffic under the California Environmental Quality Act (CEQA).

**COMMUNITY DEVELOPMENT** (8:30 PM)

**15. Receive Monthly Report for Unhoused Services (Staff Contact: Sharon Goei, Building Safety and Housing Director, 408-586-3260)**

Recommendation: Receive March 2021 report for unhoused services.

**COMMUNITY SERVICES AND SUSTAINABLE INFRASTRUCTURE** (9:00 PM)

**16. Receive a Presentation on the Draft Milpitas Water Master Plan (Staff Contact: Tony Ndah, Public Works Director, 408-586-2602)**

Recommendation: Receive presentation on the draft Milpitas Water Master Plan and provide feedback to staff.

**17. Receive a Presentation on the Draft Milpitas Sewer Master Plan (Staff Contact: Tony Ndah, Public Works Director, 408-586-2602)**

Recommendation: Receive a presentation on the draft Milpitas Sewer Master Plan and provide feedback to staff.

**LEADERSHIP AND SUPPORT SERVICES** (9:45 PM)

**18. Approve and Authorize the City Manager to Execute a Five-Year Professional Services Agreement with up to two additional two-year options to extend the service with PFM Asset Management LLC to Provide Section 115 Pension Trust Management Services and Establish a Section 115 Pension Trust (Staff Contacts: Walter C. Rossmann, Deputy City Manager, 408-585-3012; and Lauren Lai, Finance Director/Risk Manager, 408-586-3111)**

Recommendations: (1) Approve and authorize the City Manager to execute a Five-Year Professional Services Agreement with PFM Asset Management LLC to Provide Section 115 Pension Trust Management Services. (2) Authorize the City Manager to execute up to two (2) additional two-year

options to extend services without further City Council Action. (3) Authorize the City Manager to execute any Trust related documents after approval as to form by the City Attorney. (4) Adopt the Resolution for the Post-Employment Benefits Trust Agreement between PFM Assets Management LLC ("PFM") as Trust Administrator and Wells Fargo Bank, N.A. ("Wells Fargo") as directed Trustee; approve the Investment Earnings Goal for the Trust; and designate the City Trust Administrators.

**REPORTS OF MAYOR & COUNCILMEMBERS** - from assigned Commissions, Committees and Agencies  
(10:15 PM)

**19.** **Receive and Direct Staff on the List of Agenda Items Requested by City Councilmembers**  
**(Contact: Mayor and City Councilmembers, 408-586-3000)**

**Recommendation:** Review the list of items that have been requested by City Councilmembers at a Council meeting, or through the City Manager. Direct items to be placed onto a specific meeting date, or specify alternate direction to staff. No substantive discussion about any specific item shall occur and the City Council shall hold all debate about the item until it is scheduled as a full agenda item.

**NEXT AGENDA PREVIEW** (10:25 PM)

**20.** **Receive Preview List of Anticipated Items for the Next Regular City Council Meeting Scheduled on Jun 1, 2021 (Staff Contact: Wendy Wood, City Clerk, 408-586-3001)**

**Recommendation:** Receive list of anticipated agenda items for the June 1, 2021 regular City Council meeting.

**ADJOURNMENT** (10:30 PM)

**KNOW YOUR RIGHTS UNDER THE OPEN GOVERNMENT ORDINANCE**

Government's duty is to serve the public, reaching its decisions in full view of the public. Commissions and other City agencies exist to conduct the people's business. This ordinance assures that deliberations are conducted before the people and City operations are open to the people's review. For more information on your rights under the Open Government Ordinance or to report a violation, contact the City Attorney's office at Milpitas City Hall, 455 E. Calaveras Blvd., Milpitas, CA 95035  
e-mail: [cdiaz@ci.milpitas.ca.gov](mailto:cdiaz@ci.milpitas.ca.gov) / Phone: 408-586-3040

*The Open Government Ordinance is codified in the Milpitas Municipal Code as Title I Chapter 310 and is available online at the City's website [www.ci.milpitas.ca.gov](http://www.ci.milpitas.ca.gov) by selecting the Milpitas Municipal Code link.*

Materials related to an item on this agenda submitted to the City Council after initial distribution of the agenda packet are available for public inspection at the City Clerk's office at Milpitas City Hall, 3rd floor 455 E. Calaveras Blvd., Milpitas and on City website. City Council agendas and related materials can be viewed online: [www.ci.milpitas.ca.gov/government/council/agenda\\_minutes.asp](http://www.ci.milpitas.ca.gov/government/council/agenda_minutes.asp) (select meeting date)

**APPLY TO SERVE ON A CITY COMMISSION**

Commission application forms are available online at [www.ci.milpitas.ca.gov](http://www.ci.milpitas.ca.gov) or at Milpitas City Hall. Contact the City Clerk's Office at 408-586-3001 for more information.

*If you need assistance, per the Americans with Disabilities Act, for any City of Milpitas public meeting, please call the City Clerk at 408-586-3001 or send an e-mail to [CityClerk@ci.milpitas.ca.gov](mailto:CityClerk@ci.milpitas.ca.gov) prior to the meeting. You may request a larger font agenda.*

| April 2021 |    |    |    |    |    |    |
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# Milpitas City Council Calendar

## May 2021

| June 2021 |    |    |    |    |    |    |
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| Sunday    | Monday                                                                                                                                    | Tuesday                                                                                                                                    | Wednesday                                                                                                                                 | Thursday                                                                                                                                                                                                             | Friday                                                                      | Saturday  |
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|           |                                                                                                                                           |                                                                                                                                            |                                                                                                                                           |                                                                                                                                                                                                                      |                                                                             | <b>1</b>  |
| <b>2</b>  | <b>3</b><br><b>5:30 PM</b> -Park Marker (PRCR) Subcommittee<br><b>7:00 PM</b> -Parks, Recreation & Cultural Resources Commission (CM)     | <b>4</b><br><b>5:30 PM</b> -Closed Session<br><b>7:00 PM</b> -City Council                                                                 | <b>5</b><br><b>2:00 PM</b> -Santa Clara VTA Monthly Briefing - Northeast Group (CM)<br><b>7:00 PM</b> -Community Advisory Commission (EC) | <b>6</b><br><b>5:30 PM</b> -Santa Clara VTA Board of Directors (CM)<br><b>5:30 PM</b> -Milpitas Chamber of Commerce Board (EC)<br><b>6:00 PM</b> -Climate Action Plan Virtual Workshop                               | <b>7</b><br><b>3:00 PM</b> -Special City Council                            | <b>8</b>  |
| <b>9</b>  | <b>10</b><br><b>4:30 PM</b> -Economic Development and Trade Commission (KD)                                                               | <b>11</b><br><b>4:00 PM</b> -Milpitas HOPE Suicide Prevention Task Force<br><b>5:30 PM</b> -Special Council Meeting – Budget Study Session | <b>12</b><br><b>7:00 PM</b> -Planning Commission<br><b>7:00 PM</b> -Silicon Valley Clean Energy Board of Directors (EC)                   | <b>13</b><br><b>4:00 PM</b> -Santa Clara VTA Policy Advisory Committee (AP)<br><b>5:00 PM</b> -Homelessness Task Force<br><b>7:00 PM</b> -Cities Assoc of SCC (CM)<br><b>7:00 PM</b> -Youth Advisory Commission (EC) | <b>14</b><br><b>*4:30 PM</b> -City Council Finance Subcommittee (RT/CM)     | <b>15</b> |
| <b>16</b> | <b>17</b><br><b>5:30 PM</b> -Science, Technology, and Innovation Commission (RT)<br><b>7:00 PM</b> -Library and Education Commission (EC) | <b>18</b><br><b>6:00 PM</b> -Closed Session<br><b>7:00 PM</b> -City Council                                                                | <b>19</b><br><b>6:00 PM</b> -Energy and Environmental Sustainability Commission (EC)                                                      | <b>20</b><br><b>4:00 PM</b> -Treatment Plant Advisory Committee (CM)<br><b>6:30 PM</b> -Bay Area Water Supply Conserv Agency (CM)<br><b>7:00 PM</b> -Public Safety and Emergency Preparedness Commission (KD)        | <b>21</b>                                                                   | <b>22</b> |
| <b>23</b> | <b>24</b><br><b>5:30 PM</b> -Park Marker (PRCR) Subcommittee<br><b>7:00 PM</b> -Arts Commission (RT)                                      | <b>25</b><br><b>5:30 PM</b> -Affordable Housing and Building Safety Month Virtual Event                                                    | <b>26</b><br><b>5:30 PM</b> -Measure F Oversight Committee<br><b>7:00 PM</b> -Planning Commission                                         | <b>27</b><br><b>4:00 PM</b> -Silicon Valley Regional Interoperability Authority (SVRIA) (KD)<br><b>6:00 PM</b> -Main Street Community Conversations – Conversations about Housing                                    | <b>28</b><br><b>4:00 PM</b> -City/School Collaborative Subcommittee (RT/CM) | <b>29</b> |
| <b>30</b> | <b>31</b><br><br><b>City Hall Closed</b>               |                                                                                                                                            |                                                                                                                                           |                                                                                                                                                                                                                      |                                                                             |           |

*\*Finance Subcommittee will meet only as needed*



| May 2021 |    |    |    |    |    |    |
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| July 2021 |    |    |    |    |    |    |
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| 18        | 19 | 20 | 21 | 22 | 23 | 24 |
| 25        | 26 | 27 | 28 | 29 | 30 | 31 |

# Milpitas City Council Calendar

## June 2021

| Sunday    | Monday                                                                           | Tuesday                                                            | Wednesday                                                                                                                                                                 | Thursday                                                                                                                                                                                                                                               | Friday                                                                                                                               | Saturday  |
|-----------|----------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|
|           |                                                                                  | <b>1</b><br>?:00 PM-Closed Session<br>7:00 PM-City Council         | <b>2</b><br>2:00 PM-Santa Clara VTA<br>Monthly Briefing - Northeast<br>Group (CM)<br>5:30 PM-Veterans Commission<br>(RT)<br>7:00 PM-Community Advisory<br>Commission (EC) | <b>3</b><br>12:00 PM-Santa Clara Library<br>JPA (EC)<br>5:30 PM-Milpitas Chamber of<br>Commerce Board (EC)<br>5:30 PM-Santa Clara VTA Board<br>of Directors (CM)                                                                                       | <b>4</b>                                                                                                                             | <b>5</b>  |
| <b>6</b>  | <b>7</b><br>7:00 PM-Parks, Recreation &<br>Cultural Resources Commission<br>(CM) | <b>8</b><br>4:00 PM-Milpitas HOPE Suicide<br>Prevention Task Force | <b>9</b><br>7:00 PM-Silicon Valley Clean<br>Energy Board of Directors (EC)<br>7:00 PM-Planning Commission                                                                 | <b>10</b><br>4:00 PM-Treatment Plant<br>Advisory Committee (CM)<br>4:00 PM-Santa Clara VTA Policy<br>Advisory Committee (AP)<br>5:00 PM-Homelessness Task<br>Force<br>7:00 PM-Youth Advisory<br>Commission (EC)<br>7:00 PM-Cities Assoc of SCC<br>(CM) | <b>11</b><br>3:00 PM-City Council<br>Transportation Subcommittee<br>(RT/CM)<br>*4:30 PM-City Council Finance<br>Subcommittee (RT/CM) | <b>12</b> |
| <b>13</b> | <b>14</b><br>4:30 PM-Economic Development<br>and Trade Commission (KD)           | <b>15</b><br>?:00 PM-Closed Session<br>7:00 PM-City Council        | <b>16</b><br>6:00 PM-Energy and<br>Environmental Sustainability<br>Commission (EC)                                                                                        | <b>17</b>                                                                                                                                                                                                                                              | <b>18</b>                                                                                                                            | <b>19</b> |
| <b>20</b> | <b>21</b><br>7:00 PM-Science, Technology,<br>and Innovation Commission (RT)      | <b>22</b><br>1:30 PM-Senior Advisory<br>Commission (AP)            | <b>23</b><br>5:30 PM-Cities Assoc. of SCC -<br>Recycling and Waste Reduction<br>Commission (AP)<br>7:00 PM-Planning Commission                                            | <b>24</b><br>6:00 PM- Main Street<br>Community Conversations –<br>History and Culture                                                                                                                                                                  | <b>25</b>                                                                                                                            | <b>26</b> |
| <b>27</b> | <b>28</b>                                                                        | <b>29</b>                                                          | <b>30</b><br>12:00 PM-Santa Clara Valley<br>Water District - Water<br>Commission (CM)                                                                                     |                                                                                                                                                                                                                                                        |                                                                                                                                      |           |

*\*Finance Subcommittee will meet only as needed*

# CITY OF MILPITAS MEETING MINUTES

**Minutes of:** Meeting of the Milpitas City Council  
**Date:** Tuesday, May 4, 2021  
**Time:** 5:30 PM Closed Session  
7:00 PM Open Session  
**Location:** Meeting held via teleconference/zoom webinar online  
Milpitas, CA

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## CALL TO ORDER

Mayor Tran called the regular meeting to order at 5:30 PM. City Clerk Wood called the roll. The meeting took place via teleconference/zoom webinar.

**PRESENT:** Mayor Tran, Vice Mayor Montano, Councilmembers Chua, Dominguez, and Phan (Councilmember Phan arrived at approximately 5:34 PM)

**ABSENT:** None

## CLOSED SESSION

### **CONFERENCE WITH LEGAL COUNSEL – EXISTING LITIGATION**

#### **(a) CONFERENCE WITH LABOR NEGOTIATORS**

Pursuant to Government Code Section 54957.6

Agency designated representative: Jeannine Seher, Human Resources Director

Bargaining Units: LIUNA (MEA, MIDCON, PROTECH), MPOA, IAFF, Unrepresented

One item regarding MEA

One item regarding all groups listed

#### **(b) CONFERENCE WITH LEGAL COUNSEL – EXISTING LITIGATION**

Pursuant to Government Code Section 54956.9(d)(1)

City as Plaintiff

County Sanitation District 2-3, West Valley Sanitation District, Burbank Sanitary District, Cupertino Sanitary District, and City of Milpitas v. City of San Jose, City of Santa Clara

#### **(c) CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION**

Pursuant to Government Code Section 54956.9(d)(2)

Cost Dispute with Tributary Agencies (Burbank Sanitary District, Cupertino Sanitary District, West Valley Sanitation District, County Sanitation District 2-3) Regarding Legal Expenses

#### **(d) CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION**

Pursuant to Government Code Section 54956.9 (d)(2)

One Potential Case

Agenda Item 18 Appeal of Planning Commission's Denial of a Site Development Permit and Conditional Use Permit Amendment for an Automatic Car Wash at 554 South Main Street

#### **(e) CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION**

Pursuant to Government Code Section 54956.9(d)(2)

Legal Risk Associated with Potential Hazard Pay Ordinance

#### **(f) CONFERENCE WITH LABOR NEGOTIATORS**

Pursuant to Government Code Section 54957.6

Agency designated representative: Mayor Rich Tran

Employee: City Attorney

City Council reconvened to the public portion of the meeting at 7:50 PM.

**CLOSED SESSION  
ANNOUNCEMENT**

City Attorney Diaz announced that the City Council provided direction to staff in Closed Session but there was no reportable action.

**PLEDGE**

Mayor Tran led all in the Pledge of Allegiance.

**INVOCATION**

Councilmember Chua introduced Pastor Mike Villanueva from Captive Church, and asked him to lead the Invocation.

**PRESENTATION**

Mayor Tran proclaimed May 2021 as National Mental Health Awareness Month, Older Americans Month, Asian Pacific American Heritage Month, and the week of May 9 – 15, 2021, as Economic Development Week.

**PUBLIC FORUM**

The following spoke during Public Forum:

1. Voltaire Montemayor

**ANNOUNCEMENTS &  
FUTURE AGENDA ITEMS**

City Manager McHarris announced the following:

1. Santa Clara County held its first vaccine clinic in Milpitas on April 28, and all 500 doses were administered. Due to the strong outreach campaign led by City staff, 70% of those vaccinated were Milpitas residents. There were 76 minors vaccinated with 75% of them being Milpitas residents.
2. Milpitas will have two more vaccination clinics this week. One will be at the Milpitas Sports Center on Thursday, May 6, from 1:00 p.m. to 8:00 p.m. The Recreation and Community Services Department will be running another site at the Milpitas Community Center on Friday, May 7, from 12:00 p.m. to 5:00 p.m. For more information on these clinics' residents can call 408-586-3434 or visit the City's website or social media pages.
3. Volunteer Park and Creek Clean-up event will be held on Saturday, May 15, at Higuera Adobe Park, from 11:00 a.m. to 1:00 p.m. Residents can sign up to volunteer by visiting the City's website or social media pages or by calling the Recreation and Community Services Department at 408-586-3206.

Mayor Tran announced that there will be a Neighborhood Beautification day on Saturday, May 22, 2021.

Vice Mayor Montano requested the following:

1. The meeting be closed in memory of Peggy Pecot.
2. A discussion to reduce the City's facilities deposit at the Senior Center to make it more affordable.
3. To bring back the glass display at City Hall with safety glass to showcase the cultural heritage in Milpitas.
4. A report from the City Manager on the Transit Occupational Tax (TOT) status to see how the hotels are doing.
5. Commented on projects that have been approved by the Planning Commission not having art displays and stated that the City has an ordinance for new facilities or projects to have some type of art. She requested information showing that the ordinance is being followed. Mayor Tran added to the request by asking for an update on the Art developer fees.

Mayor Tran requested a discussion in the next fiscal year, for a sliding scale permitting program for seniors and low-income residence for necessary safety renovations.

Councilmember Phan made a request to explore an opportunity to create middle-income workforce housing and spoke about a program through the California Statewide Communities Development Authority that converts market-rate housing to moderate-income housing. He spoke about an opportunity that exists within the Metro Plan area

## ANNOUNCEMENT OF CONFLICT OF INTEREST AND CAMPAIGN CONTRIBUTIONS

## CODE OF CONDUCT

**APPROVAL OF AGENDA**

## CONSENT CALENDAR

Motion carried by a vote of:

AYES: 5  
NOES: 0

City Attorney Diaz confirmed that in approving the agenda it included moving item 21 up to 20, postponing item 24 to the May 11 meeting, and continuing items 16 and 17. He recommended that Council reconsider the motion to make it clear that item 16 involving the CDBG will be continued to May 7 at 3:00 p.m. and item 17 for the Vehicles Miles Traveled policy will be continued to the May 18 meeting.

Motion: to reconsider the motion to approve the agenda.

Motion/Second: Mayor Tran / Vice Mayor Montano

Motion carried by a vote of:

AYES: 5  
NOES: 0

Motion: to approve the agenda continuing items 16, 17, and 24 as stated previously, and move item 21 following the public hearing.

Motion/Second: Mayor Tran / Councilmember Chua

Motion carried by a vote of:

AYES: 5  
NOES: 0

- |                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C1. Council Calendar                                                                                                                                                            | Received the City Council calendar of upcoming meetings for May 2021.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| C2. Meeting Minutes                                                                                                                                                             | Approve meeting minutes of the April 20, 2021, Regular City Council Meeting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| C3. Ordinance – Amending Sections of Chapter 10 of Title XI of the Milpitas Municipal Code                                                                                      | Waived the second reading and adopted <b>Ordinance No. 38.841</b> amending sections of Chapter 10 of Title XI of the Milpitas Municipal Code relating to off-street parking requirements for hotels and other lodging uses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| C4. Ordinance – amending a section of Title XI of the Milpitas Municipal Code                                                                                                   | Waived the second reading beyond the title and adopted <b>Ordinance No. 209.5</b> amending a section of Title XI of the Milpitas Municipal Code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C5. Resolution – Granting Acceptance of Trash Removal Devices, Phase 2, Project No. 3713                                                                                        | Adopted <b>Resolution No. 9059</b> granting acceptance of Trash Removal Devices, Phase 2, Project No. 3713, authorizing the City Engineer to file a Notice of Completion, and authorizing the City Engineer to issue a Notice of Final Acceptance.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| C6. Resolution - Project No. 4298 Street Resurfacing 2020-2021 & Project No. 4303 Street Resurfacing Project 2021-2022                                                          | Adopted <b>Resolution No. 9060</b> designating Project No. 4298 Street Resurfacing 2020-2021 and Project No. 4303 Street Resurfacing Project 2021-2022 to be funded by SB1 The Road Repair and Accountability Act of 2017 Funding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| C7. Resolution - Project Plans and Specifications for Street Resurfacing Project 2021, City Project Nos. 4283 & 4298; Award Construction Contract to DeSilva Gates Construction | Adopted <b>Resolution No. 9061</b> (1) approving Street Resurfacing Project 2021 Plans & Specifications; (2) awarding the construction contract to DeSilva Gates Construction, LP, in the amount of \$2,388,223.00 for the Street Resurfacing Project 2021, City Project Nos. 4283 & 4298, Federal Project No. STPL-5314 (012); (3) authorizing the City Manager to execute the construction contract with DeSilva Gates Construction, LP; (4) authorizing the Engineering Director/City Engineer to negotiate and execute Contract Change Order(s) in an aggregate amount not to exceed \$238,822.30 for the Project; (5) approving \$916,488 budget appropriation of One Bay Area Grant Cycle 2 (OBAG2) to |

- CIP 4298; and (6) approving \$127,586 budget appropriation of Transportation Development Act (TDA) Article 3 Grant to CIP 4283.
- C8. Resolution - To Annex 1380-1400 S. Main St. into Community Facilities District No. 2008-1  
Adopted **Resolution No. 9062**, intent to annex property located at 1380-1400 South Main Street into Community Facilities District No. 2008-1 and set a City Council Public Hearing Date of June 15, 2021, to consider the annexation (Annexation No. 21).
- C9. Amendment No. 2 to the Professional Services Agreement with Municipal Plan Check Services for Building Safety Services  
Approved and authorized the City Manager to execute Amendment No. 2 to the Professional Services Agreement with Municipal Plan Check Services for building safety services, increasing the total not-to-exceed amount from \$95,000 to 295,000.
- C10. Agreements with the County of Santa Clara for collection of AB939 fees & administration of the Countywide (HHW)  
Approved and authorized the City Manager to execute two agreements and related amendments with the County of Santa Clara for (1) collection of AB939 Implementation Fees and for (2) administration of the Countywide Household Hazardous Waste (HHW) Collection Program.
- C11. Amendment No. 1 to the Agreement with Executive Facilities Services for Daytime Custodial Services  
Approved and Authorized the City Manager to execute the amendment with Executive Facilities Services for daytime custodial services in the amount of \$144,000 for daytime custodial services, for a new contract amount not-to-exceed \$239,000 and to extend the agreement term through December 31, 2021.
- C12. Amendment No.2 to the Joint Use Agreement between the Milpitas Unified School District  
Approved and authorized the City Manager to execute Amendment No.2 to the McCandless Property Joint Use Agreement between the Milpitas Unified School District and the City of Milpitas.
- C13. Monthly Report for Unhoused Services  
Pulled off consent by Councilmember Chua.
- C14. City Council's Alcoholic Beverage Purchase and Consumption Policy  
Adopted modifications to the City Council's Alcoholic Beverage Purchase and Consumption Policy.
- C15. Letter Opposing Proposed Increases to Santa Clara Valley Water District's Charges  
Approved and authorized the Mayor to sign a letter of opposition to Santa Clara Valley Water District's increases to groundwater production charges.

## **PUBLIC HEARINGS**

16. Allocation Amounts for FY21-22 Community Development Block Grant Funding and Approve an Amendment to the FY20-21 Annual Action Plan  
This item was continued to May 7, 2021, at 3:00 p.m., during the approval of the agenda and approved as follows.  
Motion/Second: Mayor Tran / Councilmember Chua  
Motion carried by a vote of: AYES: 5  
NOES: 0
17. Vehicle Miles Traveled Policy to Implement Senate Bill 743  
This item was continued to May 18, 2021, during the approval of the agenda and approved as follows.  
Motion/Second: Mayor Tran / Councilmember Chua



Motion carried by a vote of: AYES: 5  
NOES: 0

18. Denying the Appeal and Upholding the Planning Commission's Denial of a Site Development Permit and Conditional Use Permit Amendment to Construct a New Car Wash Located at 554 South Main Street

Planning Director Thomas introduced the item. Senior Planner Thompson presented the item.

Dean Hanson, a representative for the appellant, gave a brief presentation on the proposed project. Appellant Ramesh Sood and representatives Joel Chapin, Gurbir Maroke, and Jaggot Kahlon provided additional information and spoke in favor of the proposed project.

Motion: to open the Public Hearing

Motion/Second: Mayor Tran / Councilmember Dominguez

Motion carried by a vote of: AYES: 5  
NOES: 0

The following spoke during Public Comment:

1. Voltaire Montemayor
2. Rajen Patel

Motion: to close the Public Hearing

Motion/Second: Mayor Tran / Councilmember Chua

Motion carried by a vote of: AYES: 5  
NOES: 0

Council asked clarifying questions and discussed the proposed project. A majority of Council spoke in support of the project.

City Attorney Diaz stated that Council would need to make a motion to direct staff to return with a resolution approving the car wash. If that direction is given to staff and the motion is approved, then staff will bring back a resolution approving the car wash on consent at the next regular meeting on May 18.

Motion: to approve the car wash and bring this item back at the next regular meeting.

Motion/Second: Mayor Tran / Vice Mayor Montano

Motion carried by a vote of: AYES: 3  
NOES: 2 (Phan, Dominguez)

Councilmember Dominguez expressed concerns and left the meeting at 10:19 PM.

19. Resolution - Approving the Fiscal Year 2021-22 Master Fee Schedule

Finance Director/Risk Manager Lai introduced the item. Budget Manager Lei presented the report for the Fiscal Year 2021-22 Master Fee Schedule.

Motion: to open the Public Hearing

Motion/Second: Mayor Tran / Vice Mayor Montano

Motion carried by a vote of: AYES: 4  
NOES: 0  
ABSENT: 1 (Dominguez)

The following spoke during Public Comment:

1. Voltaire Montemayor

Motion: to close the Public Hearing

Motion/Second: Mayor Tran / Councilmember Chua

Motion carried by a vote of: AYES: 4  
NOES: 0  
ABSENT: 1 (Dominguez)

Motion: to adopt **Resolution No. 9063** approving the Fiscal Year 2021-22 Master Fee Schedule.

Motion/Second: Mayor Tran / Councilmember Chua

Motion carried by a vote of: AYES: 4  
NOES: 0  
ABSENT: 1 (Dominguez)

**COMMUNITY SERVICES &  
SUSTAINABLE  
INFRASTRUCTURE**

\*This item was heard out of order after the public hearings.

\*21. Presentation from Santa Clara Valley Water District Staff

Received an update and presentation from Santa Clara Valley Water District representatives Richard Santos, Rechelle Blank, Karl Neuman, and Sunshine Ventura Julian, on the Flood protection projects within the City of Milpitas

No motion was made for this agenda item.

**COMMUNITY DEVELOPMENT**

20. Report on the Community Identification and Brand Study (Phase II)

Assistant City Manager Kantak introduced the item. Public Information Officer Angelo gave a presentation on the Community Identification and Brand Study (Phase II). Economic Development Director Andrade presented the impact on Economic Development, and Planning Director Thomas presented the impact on placemaking. Consultant Katherine Filice presented the proposed branding concepts and staff requested direction from Council on the Community Mark/Logo and the City Seal/The Minuteman.

**LEADERSHIP AND  
SUPPORT SERVICES**

Due to the late hour, Council moved this item to a future meeting.

C22. FY 2020-21 Third Quarter Financial Status Report

Reviewed the FY 2020-21 Quarterly Financial Status Report for the Quarter Ending March 31, 2021.

This item was moved onto the Consent Calendar and approved as follows.

Motion/Second: Mayor Tran / Councilmember Chua

Motion carried by a vote of: AYES: 5  
NOES: 0

C23. List of Agenda Items Requested by City Councilmembers

Reviewed list of items that have been requested by City Councilmembers

This item was moved onto the Consent Calendar and approved as follows.

Motion/Second: Mayor Tran / Councilmember Dominguez

Motion carried by a vote of: AYES: 5

NOES: 0

24. Per Mayor Tran, Discuss and Provide Direction to Staff on Potential Hero/Hazard Pay Ordinance

This item was continued to May 11, 2021, during the approval of the agenda and approved as follows.

Motion/Second: Mayor Tran / Councilmember Chua

Motion carried by a vote of:

AYES: 5

NOES: 0

- C25. Preview Agenda Items

Received list of anticipated agenda items for the April 20, 2021, regular City Council meeting.

This item was moved onto the Consent Calendar and approved as follows.

Motion/Second: Mayor Tran / Councilmember Dominguez

Motion carried by a vote of:

AYES: 5

NOES: 0

**ITEMS PULLED OFF OF  
CONSENT CALENDAR**

13. Receive Monthly Report for Unhoused Services

Due to the late hour, this item was continued to May 11, 2021.

**ADJOURNMENT**

Mayor Tran turned the meeting over to Vice Mayor Montano for the adjournment.

Vice Mayor Montano spoke about Peggy Pecot and stated she would be adjourning the meeting in honor and memory of Peggy. The meeting adjourned at 11:49 PM.

*Draft meeting minutes submitted by City Clerk, Wendy Wood*

## MEETING MINUTES CITY OF MILPITAS

**Minutes of:** Special Meeting of the Milpitas City Council  
**Date:** Tuesday, May 7, 2021  
**Time:** 3:00 PM Open Session  
**Location:** Meeting held via teleconference/zoom webinar online  
Milpitas, CA

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### CALL TO ORDER

Mayor Tran called the virtual special City Council meeting to order at 3:00 PM. City Clerk Wood called the roll. The meeting took place via teleconference/zoom webinar.

**PRESENT:** Mayor Tran, Vice Mayor Montano, Councilmembers Chua, Dominguez, and Phan

**ABSENT:** None

### PLEDGE

Mayor Tran led the pledge of allegiance.

### PUBLIC FORUM

There were no members of the public wishing to speak under public forum.

### ANNOUNCEMENTS & FUTURE AGENDA ITEMS

Vice Mayor Montano spoke about the upcoming clean-up event and commented on a clean-up on Main Street.

Councilmember Chua spoke about the upcoming clean-up event and commented on doing more clean-up events in the future.

### ANNOUNCEMENT OF CONFLICT OF INTEREST AND CAMPAIGN CONTRIBUTIONS

City Attorney Diaz asked the Mayor and City Councilmembers if they had any personal conflicts of interest or reportable campaign contributions. By roll call, no conflicts of interest or contributions were reported.

### CODE OF CONDUCT

City Attorney Diaz read aloud the City Council Code of Conduct.

### APPROVAL OF AGENDA

Mayor Tran stated that if there were no objections from the Council, he would approve the agenda.

### DISCUSSION

1. Discuss Allocation Amounts for FY21-22 Community Development Block Grant Funding and to Approve an Amendment to the FY20-21 Annual Action Plan

Building Safety and Housing Director Goei introduced the item. Housing Authority Administrator Musallam gave an overview on Community Development Block Grant Funding and provided a review of the allocation amounts for FY21-22. Building Safety and Housing Director Goei concluded the presentation by providing information on alternate funding sources and requested that the City Council approve an amendment to the FY20-21 Annual Action Plan to reallocate unused money.

Mayor Tran opened the public hearing.

The following spoke during Public Comment:

1. Teresa Johnson representative for The Health Trust
2. Alaina Purcell representative for Rebuilding Together
3. Georgia Bacil representative for Senior Adults Legal Assistance
4. Urvishkumar Mehta
5. Linda Phillips representative for Sourcewise

6. Kishan representative for Pragnya
7. Jordan Dancer representative for Next Door Solutions to Domestic Violence
8. Adriana Caldera representative for YWCA Silicon Valley
9. Heather Griffin representative for LifeMoves
10. Renee Lorentzen representative for Milpitas Senior Center
11. Michelle Leporini representative for Child Advocates of Silicon Valley
12. Gloria Baxter representative for Lighthouse of Hope
13. Cheryl Jordan representative for Milpitas Unified School District
14. Rebecca Mauerer representative for Terrace Gardens Senior Housing
15. Joy Kim representative for Love for Literacy Program
16. Wanda Hale representative for Catholic Charities of Santa Clara County
17. Denise King representative for Enterprise Foundation/KIVA
18. Anna Navarro representative for the Filipino Chamber of Commerce
19. Ann Marquart representative for Project Sentinel
20. Raquel Kusunoki representative for Milpitas Unified School District
21. Raj Desai representative for India Community Center

Mayor Tran closed the public hearing.

Mayor Tran asked for clarification on the request submitted by the India Community Center in regard to it meeting the Federal Government requirements for the grant.

Raj Desai a representative for India Community Center (ICC), stated that if there is a rejection ICC would reimburse the amount.

Mayor Tran wanted to try to keep the current nonprofit service providers and supported domestic violence programs.

Councilmember Dominguez spoke about domestic violence and would like to continue the levels of service. She stated that because this is an area that the City could use different sources of funds, she would like to consider increasing the funds for this particular service. She stated support of ICC but commented on concerns with using the CDBG funding and would like the City to look at a different funding source. She would like to fund all the services that the City previously funded and requested that staff move the domestic violence activities over to the corona virus-related funding to help fund all the past providers. She would also like to look at the excess funds coming in to help support the new applicants.

Councilmember Phan stated that he is not comfortable granting the request of the ICC because of the risk and is supportive of the staff's recommendation for the funding requests.

Mayor Tran asked for clarification on the risk of granting the ICC request.

Building Safety and Housing Director, Goei stated that the concern is that the applicant needs to demonstrate that they have a system in place that can capture the HUD required data in order to demonstrate that their activity meets the national objective and this may be very challenging to do.

City Attorney Diaz provided additional information on the CDBG funding agreements.

Mayor Tran stated that he would like to see if the ICC application could be moved over to the American Rescue Program Act (ARPA) funding.

Councilmember Chua stated she is supporting all past applicants because they are in line with the City's objectives of assisting domestic violence, the LGBTQ violence, the youth, seniors, residents at risk of eviction, and adding economic development goals by assisting microenterprise and small businesses. She commented on funding the ICC with the ARPA funds and wanted to look at anything else that has the potential of other funding sources. She would like to see if the Milpitas Unified School District request and the City's Senior Center request could be funded with ARPA funds.

Mayor Tran stated that he would like to support the ICC request and would like to look at it next week when the Council reviews the ARPA funds.

Vice Mayor Montano stated that she agrees with the funding of the previous request and would like to increase the domestic violence funding.

Mayor Tran stated that Council is recommending that the ICC item be postponed to a separate agenda item and all other items are agreed upon.

Motion: to approve item number one.

Motion/Second: Mayor Tran / Councilmember Dominguez

Motion carried by a vote of: AYES: 5  
NOES: 0

## ADJOURNMENT

Mayor Tran adjourned the special City Council meeting at 4:53 PM.

*Draft meeting minutes submitted by City Clerk, Wendy Wood*

## MEETING MINUTES CITY OF MILPITAS

**Minutes of:** Special Meeting of the Milpitas City Council  
**Date:** Tuesday, May 11, 2021  
**Time:** 5:00 PM Closed Session  
5:30 PM Study Session  
**Location:** Meeting held via teleconference/zoom webinar online  
Milpitas, CA

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### CALL TO ORDER

Mayor Tran called the virtual special City Council meeting to order at 5:00 PM. City Clerk Wood called the roll. The meeting took place via teleconference/zoom webinar.

**PRESENT:** Mayor Tran, Vice Mayor Montano, Councilmembers Chua, Dominguez, and Phan

**ABSENT:** None

### CLOSED SESSION

#### CONFERENCE WITH LABOR NEGOTIATORS

Pursuant to Government Code Section 54957.6 Agency designated representative: Jeannine Seher, Human Resources Director Bargaining Unit: MEA 2.

#### CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION

Pursuant to Government Code Section 54956.9(d)(2) Legal Risk Associated with Potential Hazard Pay Ordinance

The City Council reconvened to the public portion of the meeting at 6:00 PM.

### CLOSED SESSION ANNOUNCEMENT

City Attorney Diaz announced that the City Council provided direction to staff in Closed Session but there was no reportable action.

### PLEDGE

Mayor Tran led the pledge of allegiance.

### ANNOUNCEMENTS & FUTURE AGENDA ITEMS

Mayor Tran thanked Vice Mayor Montano and Councilmember Chua for their efforts with Beautify Milpitas and spoke about the upcoming event on Saturday.

Councilmember Chua commented on the upcoming clean-up event and requested an update on the City's preparedness for cyber-attacks.

Vice Mayor Montano announced that on Tuesdays, Wednesdays, and Thursdays at Levi Stadium the County is targeting the youth from 5:30 to 7:30 and asked the City Manager to put a flyer on the website. She also spoke about a cyber-attack and supported Councilmember Chua's request.

Councilmember Dominguez spoke about community concerns with how dispatch services are being allocated with County services in regard to potential 51/50 individuals. She requested the support of the Council to have staff come back with a presentation on the process and the systems in place for these calls.

Vice Mayor Montano requested a future agenda discussion to create a special City Council fund to allocate money for benevolence.

**ANNOUNCEMENT OF  
CONFLICT OF INTEREST  
AND CAMPAIGN  
CONTRIBUTIONS**

City Attorney Diaz asked the Mayor and City Councilmembers if they had any personal conflicts of interest or reportable campaign contributions. By roll call, no conflicts of interest or contributions were reported.

**CODE OF CONDUCT**

City Attorney Diaz read aloud the City Council Code of Conduct.

**APPROVAL OF AGENDA**

Mayor Tran stated that item three would be deferred indefinitely.

Motion: to approve the May 11, 2021, special meeting agenda.

Motion/Second: Mayor Tran / Vice Mayor Montano

City Attorney Diaz clarified that the motion would be to approve the agenda with the postponement of item three. He stated that if anyone from the public would like to speak on item three then the public comment would be taken before the Council votes to approve the agenda.

The following spoke during Public Comment:

1. John Gomez
2. Ron Lind

Councilmember Dominguez requested her no vote for deferring item three be noted for the record.

Motion: to postpone item three indefinitely.

Motion/Second: Mayor Tran / Vice Mayor Montano

Motion carried by a vote of: AYES: 4  
NOES: 1 (Dominguez)

Motion: to approve the May 11, 2021, special meeting agenda.

Motion/Second: Mayor Tran / Vice Mayor Montano

Motion carried by a vote of: AYES: 5  
NOES: 0

**PUBLIC FORUM**

The following spoke during the public forum:

1. Voltaire Montemayor

**DISCUSSION**

1. FY 2021-22 Proposed  
City of Milpitas Operating  
Budget

City Manager McHarris provided opening remarks on the economic outlook and highlighted key strategies used to balance the budget. Assistant City Manager Kantak gave a presentation on the key accomplishments in the City service areas for Community Development and Leadership and Support Services. Deputy City Manager Rossmann gave a presentation on the key accomplishments in the City service areas for Public Safety and Community Services & Sustainable Infrastructure. Finance Director Lai gave a presentation on the FY 2021-22 proposed Operating Budget. Assistant City Manager Kantak gave a presentation on the Main Street Revitalization and the Small Business Assistance Program.

Motion: to direct staff to move forward with the Main Street revitalization.

Motion/Second: Mayor Tran / Vice Mayor Montano

Motion carried by a vote of: AYES: 5  
NOES: 0



Council asked clarifying questions regarding staffing, Measure F funding, and FEMA grant funding and stated support for the proposed budget.

The following spoke during Public Comment:

1. Voltaire Montemayor
2. Barbara Navarro

No further motions were made for this item.

## 2. American Rescue Plan Act Update

Assistant City Manager Kantak gave a presentation on the American Rescue Plan Act (ARPA) and noted that the United States Treasury Department issued guidance on May 10, 2021. She further stated that the presentation was based on a preliminary review and staff will need to go back to analyze the interim final rule in more detail.

Mayor Tran requested that the City Manager send more information and the plan guidelines along with recommendations.

Councilmember Chua gave a PowerPoint presentation and requested ARPA funding for the following items:

1. Increase affordable housing and generate property tax revenue by allocating grant funding for Accessory Dwelling Units (ADU) and waiving the fees for plan review and inspection. She requested \$3.13 million for this grant program.
2. Support for Microenterprise & Small Business Round 2 grant funding, focusing on Daycare, restaurants, and small landlords who have rental properties with no more than three units. She requested \$1.5 million for this grant program which includes \$100,000 for hotels.
3. Increase Transient Occupancy Tax (TOT) by providing digital tools for the safety of customers and staff. She requested \$100,000; this amount is part of the \$1.5 million previously stated.
4. Support workforce creation by providing 20 City Interns for four years. She requested \$48,000.
5. Support to the Milpitas Chamber of Commerce with a requested amount of \$100,000.
6. Support for a storefront improvement grant program in line with the revitalization of Main Street. She requested \$100,000.

Councilmember Dominguez requested ARPA funding for the following items:

1. Invest funding to support a mobile crises intervention service know as MCIS to the Milpitas Police Department to address nonviolent calls of service when someone is experiencing a mental health crisis. Have professional licensed clinical social workers with advanced training work with the Police Department in situations where individuals experiencing mental health crises need immediate site assessment and connection to immediate resources. She is requesting \$1 million.
2. Investment into community partnerships to implement yoga, tai chi, art therapy, and healing sessions.
3. Partner with the Santa Clara Behavior Health Services to provide continual care to those in need.
4. Invest in aquatic underwater equipment.
5. Implementing a family camp in Yosemite for children.
6. Reinvest money into broadband infrastructure to revitalize the economy and to attract businesses.
7. Invest in workforce development, education strategies, Economic Development Department, key workforce programs, and the Chamber of Commerce.
8. Consider a temporary limited-term Economic Development specialist that focuses on COVID19 business recovery and assistance for a term of 24 months.

9. Invest in training for law enforcement that is survivor-centered and trauma-informed when responding to calls of service involving domestic violence. She is requesting \$100,000.
10. Invest in training in strangulation response for law enforcement. She is requesting \$50,000.
11. Increase the need for legal services for victims to get restraining orders, food, housing, and shelter. She is requesting \$100,000.
12. LGBT assistance for exiting domestic and partner violence relationships. She is requesting \$100,000.
13. Join a response system such as the Victim Advocacy Program and have the Milpitas Police Department ensure that a victim advocate present before questioning clinical counseling. She is requesting \$100,000.
14. Community solutions to provide coordination support for the South Bay Coalition to end human trafficking and keep accessible data. She is requesting \$50,000.
15. Investment into the Economic Development of \$3 million.
16. Reinvest in a rental assistance program and build a first-time homebuyer's program.

Vice Mayor Montano requested ARPA funding for the following items:

1. Help provide Water Utility assistance and raise the threshold for the Milpitas Assistance Program (MAP), so more residents can qualify for assistance
2. Support small business, restaurants, childcare providers, and nonprofits
3. Include youth sports in the Milpitas Assistance Program
4. City assistance to low-income programs such as "After the Bell," allowing more middle-income people to qualify
5. Rent relief and mortgage relief
6. Direct payment for Childcare
7. Broadband to close the digital divide
8. A pilot program to provide counseling when domestic violence occurs
9. Economic development for the revitalization of Main Street
10. Increase the Library hours or sustain what the City had
11. Provide youth sports and possible use APRA funding for the softball field

Councilmember Phan requested ARPA funding for the following items:

1. Provide funding for the existing nonprofit services proposals
2. Support the at-risk youth
3. Support mental health services
4. Expand existing services and programs such as rent relief and mortgage assistance
5. Funding positions to the extent possible to eliminate layoffs

Councilmember Chua spoke about dumpster days and requested free curbside pick-ups.

No Motion was made for this item.

### 3. Potential Hero/Hazard Pay Ordinance

This Item was deferred indefinitely during the approval of the agenda and approved as follows.

Motion/Second: Mayor Tran / Vice Mayor Montano

Motion carried by a vote of:

AYES: 4

NOES: 1 (Dominguez)

### 4. Discussion to Create Middle-Income Workforce Housing Through the

Councilmember Phan spoke about a proposal to convert existing market-rate housing to middle-income workforce housing. He asked Council to consider engaging an independent consultant to do a study on this and join the JPA as part of the Statewide program allowing municipalities to produce middle-income housing. This program is

California Statewide  
Communities  
Development Authority

called the California Statewide Communities Development Authority and there would be no financial impact to join. He talked about the financing of the bonds and spoke about the benefits of the program. He stated that the City would need to join a JPA and enter a public benefits agreement. He requested to have a study done paid for by the property owner and to explore entering into a public benefits agreement.

Jon Penkower, a representative for California Statewide Communities Development Authority, and Sean Rawson, a representative for Waterford Property Company provided additional information.

The following spoke during Public Comment:

1. Voltaire Montemayor

City Manager McHarris summarized the discussion, stating that the Council is okay with obtaining information at no cost to the City to be distributed to the Council at a future meeting. He stated that he would need direction from the Council to have staff enter into an agreement with a consultant to do the work, not at the City expense. Staff would enter a contract and the consultant would work directly for the City staff to explore the California Statewide Communities Development Authority proposal for a specific site within the Fields Project.

Motion: to approve this item with the direction stated by the City Manager.

Motion/Second: Vice Mayor Montano / Councilmember Dominguez

Motion carried by a vote of:

AYES: 5

NOES: 0

5. Monthly Report for  
Unhoused Services

Due to the late hour, this item was continued to May 11, 2021.

**ADJOURNMENT**

Mayor Tran adjourned the special City Council meeting at 10:12 PM.

*Draft meeting minutes submitted by City Clerk, Wendy Wood*



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                                                                                 |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Adopt a Resolution Approving the Annual Engineer's Report; Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and Provide Notice of Public Hearing to be held on June 15, 2021 for Landscaping and Lighting Maintenance Assessment District No. 95-1 (LLMD 95-1 McCarthy Ranch)</b> |
| <b>Category:</b>       | Consent Calendar-Community Services and Sustainable Infrastructure                                                                                                                                                                                                                                              |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                                                                                                                                                                                                       |
| <b>Staff Contact:</b>  | Steve Erickson, Engineering Director 408-586-3301                                                                                                                                                                                                                                                               |
| <b>Recommendation:</b> | Adopt a Resolution Approving the Annual Engineer's Report; Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and Provide Notice of Public Hearing to be held on June 15, 2021 for LLMD 95-1 McCarthy Ranch                                                                            |

### **Background:**

LLMD 95-1 McCarthy Ranch provides the maintenance and improvement of public landscaping, irrigation systems, pedestrian lighting, gateway columns and entry signs along portions of North McCarthy Boulevard and the Ranch Drive gateway between State Route 237 and Dixon Landing Road in the areas as shown on the attached location map.

### **Analysis:**

Before the City Council may levy the annual assessments for LLMD 95-1 McCarthy Ranch, the Landscaping and Lighting Act of 1972 requires the City Council to adopt a resolution approving the annual Engineer's Report (Report) evaluating the landscape and lighting maintenance district's maintenance and improvement costs for fiscal year 2021-22.

On March 2, 2020, the City Council directed the City Engineer to prepare the Report, which is included in the City Council packet. The proposed total assessment for fiscal year (FY) 2021-22 is \$0.0333 per lot square foot with an assessment rate not exceeding the maximum rate of \$0.04810. The FY 2021-22 rate is approximately 4.50% higher than the previous year FY 2020-22 rate of \$0.03180.

City Council must also adopt:

- Resolution approving the Report, and
- Resolution declaring its intent to levy and collect an assessment and direct publishing a notice of a public hearing to be held on June 15, 2021(collectively the "Resolutions").

### **Policy Alternatives:**

**Alternative 1:** Not adopt the Resolutions for LLMD 95-1 McCarthy Ranch.

Pros: None.

Cons: The Landscaping and Lighting Act of 1972 requires the legislative body to adopt the Resolutions, and if the City Council does not adopt the Resolutions, the City's will not be able to collect assessments for LLMD 95-1 McCarthy Ranch.

Reason Alternative 1 is Not Recommended: To allow for the continued maintenance and service of LLMD 95-1 McCarthy Ranch, staff recommends approving the Resolutions into order to levy and collect assessments for fiscal year 2021-22.

**Fiscal Impact:**

The levy and collection of assessments provides a funding resource for the City to improve and maintain public landscaping, irrigation systems, pedestrian lighting, gateway columns and entry signs within LLMD 95-1 McCarthy Ranch.

**California Environmental Quality Act:**

Levy and collection of assessment is not considered a project under CEQA as there will be no direct or reasonably foreseeable indirect physical change in the environment.

**Recommendation:**

1. Adopt a Resolution Approving the Annual Engineer's Report;
2. Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and
3. Provide Notice of Public Hearing to be held on June 15, 2021 for LLMD 95-1 McCarthy Ranch.

**Attachment:**

1. Resolution Approving Annual Engineer's Report
2. Resolution Declaring Intention to Levy and Collect Assessments
3. Engineer's Report LLMD No. 95-1 McCarthy Ranch
4. Location Map

**RESOLUTION NO. \_\_\_\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS,  
DECLARING ITS INTENTION TO LEVY AND COLLECT ASSESSMENTS FOR  
THE LANDSCAPING AND LIGHTING MAINTENANCE ASSESSMENT DISTRICT NO. 95-1  
FOR FISCAL YEAR 2021/22**

The City Council of the City of Milpitas (hereafter referred to as the “City Council”) does resolve as follows:

**WHEREAS**, the City Council previously completed its proceedings in accordance with and pursuant to the Landscaping and Lighting Act of 1972, Part 2, Division 15 of the California Streets and Highways Code (commencing with Section 22500) (the “Act”) to establish the Landscaping and Lighting Maintenance Assessment District No. 95-1 (the “Assessment District”); and

**WHEREAS**, the City Council has retained NBS for the purpose of assisting with the annual levy of the Assessment District, and the preparation and filing of the report required pursuant to Section 22622 of the Act (the “Annual Report”); and

**WHEREAS**, the City Council adopted a Resolution approving the Annual Report for the Assessment District for Fiscal Year 2021/22.

**NOW, THEREFORE BE IT RESOLVED, DETERMINED, AND ORDERED BY THE  
CITY COUNCIL, AS FOLLOWS:**

1. **Intention:** The City Council hereby declares its intention to levy and collect assessments within the Assessment District to pay the costs of the Improvements for the fiscal year commencing July 1, 2021 and ending June 30, 2022. The City Council finds that the public’s best interest requires such action.
2. **Improvements:** The improvements within the Assessment District include, but are not limited to: operating, maintaining and servicing of all public landscaping improvements, consisting of landscaping and grass. Operating, maintaining and servicing costs include, but are not limited to: personnel, materials, electrical energy and water. Services provided include all necessary service, operations, administration, and maintenance required to keep the improvements in a healthy, vigorous, and satisfactory condition. A project renovating the landscape and irrigation improvements in the Assessment District will be completed in Fiscal Year 2021/22.
3. **Assessment District Boundaries:** The boundaries of the Assessment District are as shown by the assessment diagram filed in the offices of the City Clerk, which map is made a part hereof by reference.
4. **Annual Report:** Reference is made to the Annual Report prepared by NBS, on file with the City Clerk, for a full and detailed description of the improvements, the boundaries of the Assessment District and the zones therein, and the proposed assessments upon assessable lots and parcels of land within the Assessment District.
5. **Notice of Public Hearing:** The City Council hereby declares its intention to conduct a public hearing concerning the levy of assessments in accordance with Section 22629 of the Act. All

objections to the assessment, if any, will be considered by the City Council. The public hearing will be held on **Tuesday, June 15, 2021 at 7:00 pm** or as soon thereafter as is feasible in the meeting place of the City Council located at 455 E. Calaveras Boulevard, Milpitas, CA 95035. The City Council further orders the City Clerk to publish notice of this resolution in accordance with Section 22626(a) of the Act.

- 6. Increase of Assessment:** The maximum assessment is not proposed to increase from the previous year above that was previously approved by the property owners (as “increased assessment” is defined in Section 54954.6 of the Government Code).

PASSED AND ADOPTED this \_\_\_\_ day of \_\_\_\_\_, 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

**RESOLUTION NO. \_\_\_\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS,  
APPROVING THE ANNUAL REPORT FOR  
THE LANDSCAPING AND LIGHTING MAINTENANCE ASSESSMENT DISTRICT NO. 95-1  
FOR FISCAL YEAR 2021/22**

The City Council of the City of Milpitas (hereafter referred to as the “City Council”) does resolve as follows:

**WHEREAS**, the City Council previously completed its proceedings in accordance with and pursuant to the Landscaping and Lighting Act of 1972, Part 2, Division 15 of the California Streets and Highways Code (commencing with Section 22500) (the “Act”) to establish the Landscaping and Lighting Maintenance Assessment District 95-1 (the “Assessment District”); and

**WHEREAS**, the City Council has retained NBS for the purpose of assisting with the annual levy of the Assessment District, and the preparation and filing of and the report required pursuant to Section 22622 of the Act (the “Annual Report”); and

**WHEREAS**, the City Council has, by previous resolution, ordered NBS to prepare and file such Annual Report; and

**WHEREAS**, NBS has prepared and filed such Annual Report with the City Clerk.

**NOW, THEREFORE BE IT RESOLVED, DETERMINED, AND ORDERED BY THE  
CITY COUNCIL, AS FOLLOWS:**

- 1. Approval of Report:** The City Council hereby approves the Annual Report for the Assessment District concerning the levy of assessments as submitted by NBS for the fiscal year commencing July 1, 2021 and ending June 30, 2022.
- 2.** The Assessment District exterior boundaries are as shown by a map filed in the office of the City Clerk, which map is made a part hereof by this reference.



PASSED AND ADOPTED this \_\_\_\_ day of \_\_\_\_\_, 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

# CITY OF MILPITAS

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*Fiscal Year 2021/22 Annual Report For:*

## **Landscaping and Lighting Maintenance Assessment District No. 95-1**

**April 2021**

Prepared by:



Corporate Headquarters  
32605 Temecula Parkway, Suite 100  
Temecula, CA 92592  
Toll free: 800.676.1111

**CITY OF MILPITAS**  
**LANDSCAPING AND LIGHTING MAINTENANCE ASSESSMENT DISTRICT NO. 95-1**  
**455 East Calaveras Boulevard**  
**Milpitas, California 95035**  
**Phone (408) 586-3000**

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**CITY COUNCIL**

Rich Tran, Mayor  
Carmen Montano, Vice-Mayor  
Evelyn Chua, Council Member  
Karina R. Dominguez, Council Member  
Anthony Phan, Council Member

**CITY STAFF**

Steve Erickson, PE, Engineering Director/City Engineer  
Lauren Lai, Finance Director  
Tony Ndah, Public Works Director

**NBS**

Tim Seufert, Client Services Director  
Adina McCargo, Project Manager  
Zaire Marin, Administrator

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# 1. ENGINEER'S LETTER

**WHEREAS**, in 1995 the City Council of the City of Milpitas (the "City"), State of California, under the Landscaping and Lighting Act of 1972 (the "Act"), created the City of Milpitas Landscaping and Lighting Maintenance Assessment District No. 95-1 (the "District") in order to provide for the continued maintenance, operation, and administration of various improvements within the boundaries of the District; and

**WHEREAS**, the City Council has directed NBS to prepare and file a report for Fiscal Year 2021/22 in accordance with Chapter 1, Article 4 of the Act presenting plans and specifications describing the general nature, location and extent of the improvements to be maintained; an estimate of the costs to maintain, operate, and service the improvements for the District for the referenced fiscal year; a diagram for the District showing the area and properties to be assessed; and an assessment of the estimated costs to maintain and service the improvements, stating the net amount to be assessed upon all assessable lots or parcels within the District in proportion to the special benefit received.

**NOW THEREFORE**, the following assessments have been calculated in accordance with the assessment methodology adopted and approved by the City Council at the time of District formation, and are made to cover the portion of the estimated costs of maintenance, operation, and servicing of the improvements, to be paid by the assessable real property within the District in proportion to the special benefit received:

| District   | Parcels | 2021/22<br>Maximum Assessment<br>Rate per Lot Sq. Ft. <sup>(1)</sup> | 2021/22<br>Actual Assessment<br>Rate per Lot Sq. Ft. | 2021/22<br>Net Amount to be<br>Assessed <sup>(2)(3)</sup> |
|------------|---------|----------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| LLMAD 95-1 | 44      | \$0.0480                                                             | \$0.0360                                             | \$425,114.01                                              |

<sup>(1)</sup> The April 1, 2021 CPI was not available at the time of writing of this Report. The Fiscal Year 2021/22 CPI increase was estimated using the February 2021/22 CPI.

<sup>(2)</sup> Amounts placed on the tax roll include the 1% Santa Clara County Collection Fee.

<sup>(3)</sup> This amount is only an estimate and does not reflect the final billed amount with rounding adjustments. Refer to Section 7 for the rounded figure.

I identified all parcels which will have a special benefit conferred upon them from the improvements described in District's Plans and Specifications section of this Engineer's Report (the "Benefited Parcels"). For particulars as to the identification of said parcels, reference is made to the Assessment Diagram, a copy of which is on file in the office of the City Clerk.

I have assessed the costs and expenses of the improvements upon the Benefited Parcels. In making such assessment:

- The proportionate special benefit derived by each Benefited Parcel from the improvements was determined in relationship to the entirety of the maintenance costs of the improvements;
- No assessment has been imposed on any Benefited Parcel which exceeds the reasonable cost of the proportional special benefit conferred on such parcel from the improvements; and
- Any general benefits from the improvements have been separated from the special benefits and only special benefits have been assessed.

I, the undersigned, respectfully submit the enclosed Engineer's Report and, to the best of my knowledge, information and belief, the Engineer's Report, Assessments, and the Assessment Diagrams herein have been prepared and computed in accordance with the order of the City Council of the City of Milpitas, the Act, and Article XIIID.

---

Steven Erickson, PE  
Engineering Director/City Engineer

## 2. PLANS AND SPECIFICATIONS

---

The District provides for the continued administration, maintenance, operation, and servicing of various improvements located within the public right-of-way and dedicated easements within the boundaries of the District.

### 2.1 Location of Improvements

The District is located on the west side of the City of Milpitas, bounded on the east by State Route 880, on the west by Coyote Creek, on the south by State Route 237, and on the north by Dixon Landing Road. The improvements maintained include public landscaping and irrigation improvements, including jogging paths, pedestrian lighting, gateway improvements, and entry signage, which are primarily situated within the public right-of-way and dedicated public easements within the District.

### 2.2 Landscaping Improvements

Landscaping, pedestrian lighting, gateway, and signage improvements were installed along the roadways and sidewalks within the District to enhance the overall visual appearance for adjacent parcels.

The improvements within the District consist of the maintenance and installation of any or all public landscaping and irrigation improvements adjacent to curbs of the following described streets, including jogging paths, planter walls, grass berms, pedestrian lighting and appurtenant irrigation systems, ornamental planting including lawns, shrubs, and trees; installation and maintenance of gateway columns and entry signs. Such maintenance includes all necessary repairs, replacements, water, electric current, spraying, care, supervision, debris removal and all other items of work necessary and incidental for property maintenance and operation thereof. The landscaping, irrigation, pedestrian lighting, gateway, and signage improvements are collectively referred to as “landscaping improvements”. All such work will be performed in the following areas:

#### 2.2.1 N. MCCARTHY BOULEVARD

1. A strip of land including an earth berm approximately 50 feet in width from face of each curb line, from the southerly connection with Ranch Drive northerly 2,400 feet, more or less, to the northerly connection with Ranch Drive. A strip of land including a grass berm approximately 35 feet in width, west of the face of westerly curb, along the West Side of N. McCarthy Boulevard, from the southerly connection with Ranch Drive, northerly 2,400 feet, more or less. The initial phase includes a strip of land 6 feet wide on the west side of McCarthy Boulevard.
2. Commencing at a location approximately 2,400 feet north of State Route 237 thence proceeding north to the northern boundary of Lands of N. McCarthy, 7,800 feet more or less, a strip of land approximately 27 to 34 feet in width on each side along the east and west sides of McCarthy Boulevard between the northerly connection with Ranch Drive and Dixon Landing Road.
3. A median island from the southerly intersection with Ranch Drive northerly to the intersection with Dixon Landing Road.

4. Gateway Improvements, at the southerly intersection of N. McCarthy Boulevard and Ranch Drive and southerly of Bridge No. 1 along N. McCarthy Boulevard, including curved stone planter walls, gateway columns with entry sign appurtenant mounding ornamental plantings including flat work, trees and ground cover, irrigation systems; all as shown on landscape plans.
5. Lighting costs in the District are limited to the supplemental pedestrian lights installed on the east side of McCarthy Boulevard between the two intersections at Ranch Drive and McCarthy Boulevard. The conventional lighting along McCarthy Boulevard is not included. There also exists decorative up-lighting for the Gateway Towers in other areas near the southern Ranch Drive intersection of McCarthy.

### **2.2.2 MILPITAS ENTRY SIGN**

1. City of Milpitas Entry Identification Sign along N. McCarthy Blvd., including walls, columns, lighting and other appurtenances.

### **2.2.3 RANCH DRIVE**

1. Commencing at a Northerly location where the right-of-way of Ranch Drive is contiguous with the right-of-way of Interstate 880, thence southerly, a strip of land approximately 10 feet in width measured from the east face of curb of Ranch Drive, from the northerly connection with Interstate 880 and Ranch Drive, southerly 630 feet, more or less, thence 405 feet south to the southerly end of Gateway location, varying in width from 10 feet to 132 feet, more or less.
2. Gateway Improvements, at the southerly connection of Ranch Drive and Interstate 880, including curved stone planter walls, gateway columns with entry sign appurtenant mounding ornamental plantings including flat work, trees and ground cover, irrigation systems; all as shown on landscape plans (Part A), except the Shopping Center's Monument Sign. As mentioned above, there also exists decorative up-lighting for the Gateway Towers in other areas near the southern Ranch Drive intersection of McCarthy.

## **2.3 Capital Improvements**

The City will initiate the design and construction of landscape and irrigation renovation on N. McCarthy Blvd. between State Route 237 and Dixon Landing Road and a portion of Ranch Drive in Fiscal Year 2021/22. Capital Improvements are scheduled to be complete by June 30, 2022.

## **2.4 Overhead**

In addition to the hard costs of maintaining the improvements mentioned above, the City will incur costs for staff time and expenses related to the management and maintenance of the improvements within the District. Staff time includes oversight and coordination of both City and contractor provided services, annual tax roll preparation, and addressing property owner questions and concerns. These activities are directly related to the maintenance of the improvements, and without them the improvements could not be efficiently completed or properly maintained on an ongoing basis.



### 3. ESTIMATE OF COSTS

The estimated costs of maintenance and servicing of the improvements as described in the Plans and Specifications are summarized below.

#### 3.1 District Budget

The Fiscal Year 2021/22 estimated cost budget for the maintenance and servicing of the improvements is as follows:

| Description                                                 | Fiscal Year 2021/22 Budget |
|-------------------------------------------------------------|----------------------------|
| Maintenance Staff and Contract Services <sup>(1)</sup>      | \$242,000                  |
| Capital Equipment                                           | 0                          |
| Supplies                                                    | 35,800                     |
| Utilities (Water, Electricity)                              | 92,500                     |
| Reserve Fund                                                | 60,000                     |
| Capital Improvement Program                                 | 0                          |
| <b>Maintenance Costs</b>                                    | <b>\$430,300</b>           |
| NBS                                                         | \$11,850                   |
| City Staff District Administration                          | 400                        |
| County Auditor-Controller Fee <sup>(2)</sup>                | 4,251                      |
| <b>District Specific Costs</b>                              | <b>\$16,501</b>            |
| Total District Costs                                        | <b>\$446,801</b>           |
| General Benefit Contribution <sup>(3)</sup>                 | (21,687)                   |
| Operating Reserve Contribution                              | 0                          |
| <b>Net Amount to be Assessed</b>                            | <b>\$425,114</b>           |
| <b>Total District Square Footage<sup>(4)</sup></b>          | <b>11,792,520</b>          |
| <b>Rate per Square Foot<sup>(5)(6)</sup></b>                | <b>\$0.0360</b>            |
| <b>Maximum Rate Per Square Foot – 2021/22<sup>(7)</sup></b> | <b>\$0.0480</b>            |

<sup>(1)</sup> Fiscal 2021/22 Landscape Maintenance Contract Services includes Terracare and Irvine Company.

<sup>(2)</sup> County Auditor-Controller Fee is currently 1% of the total levy submittal.

<sup>(3)</sup> General Benefit Contribution is not applied to District Specific Costs as these are special benefits to the District.

<sup>(4)</sup> Total District Square Footage includes the 50% reduction for Parcel 5-7 (Sewer Main Pump Station) and Parcel 5-3C (Storm Pump Station).

<sup>(5)</sup> The Rate per Square Foot equals the Net Amount to be Assessed / Total District Square Footage.

<sup>(6)</sup> The assessed rate cannot exceed the maximum rate.

<sup>(7)</sup> The April 1, 2021 CPI was not available at the time of writing of this Report. The Fiscal Year 2021/22 CPI increase was estimated by using the February 2021/22 CPI.

### 3.1.1 OPERATING RESERVE

It is the intent of the City to maintain an operating reserve which shall not exceed the estimated costs of maintenance and servicing of the improvements prior to December 10 of the fiscal year, or when the City expects to receive its apportionment of special assessments from the County, whichever is later. The operating reserve balance information for the District is as follows:

|                                                                              |                 |
|------------------------------------------------------------------------------|-----------------|
| Estimated Fiscal Year Ending 6/30/2021 Operating Reserve Cash Balance        | \$28,000        |
| Operating Reserve Collection for Fiscal Year 2021/22                         | 60,000          |
| <b>Estimated Fiscal Year Ending 6/30/2022 Operating Reserve Cash Balance</b> | <b>\$88,000</b> |

### 3.1.2 CAPITAL IMPROVEMENT BUDGET

The City will initiate the design and construction of landscape and irrigation renovation on N. McCarthy Blvd. between State Route 237 and Dixon Landing Road and a portion of Ranch Drive in Fiscal Year 2021/22. As of March 28, 2021, the balance available for the Capital Improvement Project was \$554,436. The City will utilize these funds to finance the project.

Capital Improvements are scheduled to be complete by June 30, 2022.

## 4. SPECIAL AND GENERAL BENEFIT

---

The improvements defined in Section 2 are expected to confer certain special benefits to parcels within the District. The special benefits are described in this section. Figures in this section are derived from a Special v. General Benefit Analysis performed in Fiscal Year 2020/21.

### 4.1 Identification of Benefit

Section 4 of Article XIID of the California Constitution provides that once a local agency which proposes to impose assessments on property has identified those parcels that will have special benefits conferred upon them and upon which an assessment will be imposed, the local agency must next “separate the general benefits from the special benefits conferred,” and only the special benefits can be included in the amount of the assessments imposed.

### 4.2 Special Benefits Identified

The improvements described in Section 2 are expected to confer certain special benefits to parcels within the District. The special benefits conferred to property within the District can be grouped into three primary benefit categories: aesthetic benefit, safety benefit, and economic benefit. The three District benefit categories are further expanded upon below.

- **Improved Aesthetics:** The aesthetic benefit relates to the increase in the overall aesthetics as a result of the ongoing maintenance, servicing, and operation of the improvements within the District. The landscaping improvements enhance the overall image and desirability of the properties within the District. Street landscaping improvements improve the livability, commercial activity, appearance, and desirability for properties within the District. Regular maintenance ensures that the improvements do not reach a state of deterioration or disrepair so as to be materially detrimental to properties adjacent to or in close proximity to the improvements. The overall appeal of the District is enhanced when improvements are in place and kept in a healthy and satisfactory condition. Conversely, appeal decreases when improvements are not well-maintained, unsafe, or destroyed by the elements or vandalism. Streetscapes have a significant effect on how people view and interact with their community.<sup>1</sup> With streetscapes that are safe and inviting, people are more likely to walk, which can help reduce automobile traffic, improve public health, stimulate local economic activity, and attract residents and visitors to the community.<sup>2</sup>
- **Increased Safety:** Well maintained areas mitigate crime, especially vandalism, and enhance pedestrian safety. A recent study found that after landscape improvements were installed, there was a 46% decrease in crash rates across urban arterial and highway sites and a second study reviewed found a 5% to 20% reduction in mid-block crashes after trees and planters in urban arterial roads were put in place. In addition, there is less graffiti, vandalism, and littering in outdoor spaces with natural landscapes than in comparable plant-less spaces.<sup>3</sup> The Victoria

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<sup>1</sup> Victoria Transport Policy Institute. (2011). *Community Livability. Helping to Create Attractive, Safe, Cohesive Communities*. Retrieved from <http://www.vtpi.org/tdm/tdm97.htm>.

<sup>2</sup> Ibid.

<sup>3</sup> Wolf, Kathleen L. (2010). *Safe Streets – A Literature Review*. In: *Green Cities: Good Health* ([www.greenhealth.washington.edu](http://www.greenhealth.washington.edu)). College of the Environment, University of Washington.

Transport Policy Institute has found that streetscapes reduce traffic speeds and when combined with improved pedestrian crossing conditions can significantly reduce collisions.<sup>4</sup>

- **Economic Activity:** Well maintained street landscape improvements not only make adjacent properties appear more stable and prosperous but can spur investment in the property. The National Complete Streets Coalition notes that street design that is inclusive of all modes of transportation, where appropriate, not only improves conditions for existing businesses, but also is a proven method for revitalizing an area and attracting new development.<sup>5</sup> Landscaped sidewalks create an inviting place for customers to shop and do business.<sup>6</sup> Well-maintained and safe District areas will encourage an increase in the overall pedestrian activity. The area will become more pedestrian friendly, thus improving the retail environment by encouraging individuals to shop, dine, and stay within the District boundaries. The District will provide a cleaner more inviting environment to businesses and consumers which will attract, retain and expand the retail and business climate throughout. The effort will reduce vacancy rates and increase lease rates and utilization of property within the District.

### 4.3 General Benefits Identified

Section 4 of Article XIID of the California Constitution provides that once a local agency which proposes to impose assessments on property has identified those parcels that will have special benefits conferred upon them and upon which an assessment will be imposed, the local agency must next “separate the general benefits from the special benefits conferred,” and only the special benefits can be included in the amount of the assessments imposed.

General benefit is an overall and similar benefit to the public at large resulting from the maintenance of the District’s improvements provided by the assessments levied. The improvements to be maintained by the District are located within the District boundaries only. There will be no District maintenance activities provided for improvements located outside of the District boundaries.

The ongoing maintenance of the District improvements will provide aesthetic, safety and economic activity benefits to the property within the District. However, it is recognized that the ongoing maintenance activities will also provide a level of benefit to some property within proximity to the District, as well as individuals passing through. Therefore, the general benefit created as a result of the District maintenance activities has been considered.

### 4.4 Quantification of Benefit

As a result of the maintenance and operation of the improvements, there will be a level of general benefit to people that do not work or intend to conduct business within the District. In order for property within the District to be assessed only for that portion of special benefits received from the district’s maintenance

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<sup>4</sup> Victoria Transport Policy Institute. (2011). *Community Livability. Helping to Create Attractive, Safe, Cohesive Communities*. Retrieved from <http://www.vtpi.org/tdm/tdm97.htm>.

<sup>5</sup> Pugliese, Philip. (2008). *Complete Streets provide all the elements of multi-modal transportation*. Retrieved from <http://www.americantrails.org/resources/trans/completestreets08.html>

<sup>6</sup> U.S Department of Transportation. Federal Highway Administration. (2001). *Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide*. Retrieved from [http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/sidewalk2/](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/)

activities, general benefits provided by the ongoing maintenance of the improvements needs to be quantified. The amount of general benefit that is provided from the District's maintenance activities cannot be funded via property owners' assessments.

Based upon the City's General Plan the streets within the City are classified into one of the following categories: freeway, expressway, arterial, collector or local streets. The landscaping improvements are primarily located along N McCarthy Boulevard and Ranch Drive and situated within the public rights-of-way. The portion of the maintained landscaping that is located along N McCarthy Boulevard (classified as an arterial street) provides some general benefit to pass-through traffic.

Arterial streets are intended to provide a higher degree of mobility and generally serve longer vehicle trips. The landscape improvements within the District boundaries not only serve the parcels in the immediate vicinity, but persons who live outside of the District and are passing by. The City's most recent traffic study<sup>7</sup> completed in 2016 does not identify the percentage of traffic, which is pass-through traffic, but it does provide an estimated number of daily trips for N McCarthy Boulevard at the entrance of the District. However, the daily trip count estimate is lower than the trip count utilized in the 2015 findings report. This would not be expected with the increase in development to this area. Therefore, In the absence of a more recent reading of traffic along N. McCarthy Boulevard, the 2015 average number of daily trips of 35,050 per the General Plan has been utilized for the base trip count.

In order to account for the estimated increase in daily average trips as a result of the increased development, the City commissioned a traffic study for each new development. Per the traffic studies, it is estimated there will be an increase of 9,156 average daily trips. Adding this increase to the 35,050 previously identified above, the estimated number of average vehicles per day is 44,206 as shown below.

| Street Name                                           | Average Number of Vehicles per Day |
|-------------------------------------------------------|------------------------------------|
| N McCarthy Boulevard – between SR 237 and Ranch Drive | 44,206                             |

Before the determination and allocation of the percentage of special and general benefit for the District can be made, the estimated pass-through traffic must be computed. The pass-through trips are vehicles driving along the maintained streets for a portion of their trips, but not working, shopping or conducting business in the District or benefiting from the landscaping improvements in place.

Research consistently shows that developments with multiple land uses that make walking safe and convenient and are near other development, allow residents and workers to drive significantly less if they choose. While this District is not a mixed-use development, there are multiple land uses adjacent to one another. Therefore, treating this development area as though the uses were separated and accessible only by car would result in inflated trip counts in comparison to conventional, single-use developments.

In lieu of having a comprehensive traffic study that identifies the pass-through traffic, the estimated number of special benefit trips for each parcel has been determined using the average daily trips according

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<sup>7</sup> City of Milpitas. (2016 Traffic Study). Retrieved from City's Assistant Traffic Engineer

to the ITE Trip Generation Report, 9<sup>th</sup> Edition<sup>8</sup> and the 2010 NCHRP Report 684 Enhancing Trip Capture Estimation for Mixed-use Developments<sup>9</sup>.

Utilizing the ITE Trip Generation Report, each parcel within the District was assigned an average daily number of special benefit trips using the parcel's land use, building size or number of units. Further, to ensure the number of trips generated by the parcels has not been overstated, the percentage of total trips that are made internally within the development has been considered. Using the 2010 NCHRP Report 684 Enhancing Trip Capture Estimation for Mixed-Use Developments, the total special benefit trips have been reduced by approximately 31% (19,258 trips) to account for internal trips between the various businesses within the District. The total number of special benefit trips is therefore 42,864 as shown below.

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<sup>8</sup> *Trip Generation, 9<sup>th</sup> Edition: An Informational Report of the Institute of Transportation Engineers. (2012) Washington, DC: Institute of Transportation Engineers.*

<sup>9</sup> *Bochner, Brian S., Hooper, Kevin, Sperry, Benjamin and Dunphy, Robert. National Cooperative Highway Research Program, Transportation Research Board of National Academies (2011). NCHRP Report 684 Enhancing Trip Capture Estimation for Mixed-Use Developments. Retrieved from [onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_684.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_684.pdf)*

| Property Type                                         | Combined Trip Generations |
|-------------------------------------------------------|---------------------------|
| Retail (ITE Land Uses 815, 820, 869)                  | 24,978.76                 |
| Office (ITE Land Uses 710, 714, 750)                  | 15,832.41                 |
| Industrial/Warehousing (ITE Land Uses 140, 150, 151)  | 8,660.43                  |
| Fast-Food Restaurant w/ drive thru (ITE Land Use 934) | 3,925.30                  |
| Gas Station (ITE Land Use 945)                        | 3,758.16                  |
| Restaurant (ITE Land Uses 931, 932)                   | 3,710.03                  |
| Hotel (ITE Land Use 310)                              | 1,256.82                  |
| <b>Total Trips</b>                                    | <b>62,121.92</b>          |
| Internal Trip Reduction <sup>1</sup>                  | (19,257.79)               |
| <b>Total Adjusted Special Benefit Trips</b>           | <b>42,864.12</b>          |

(1) The internal trip rate percentage was calculated by using the NCHRP 684 Internal Rate Capture Estimation Tool.<sup>10</sup>

The total of all special benefit trips was removed from the average number of vehicles per day traveling within the District to estimate the number of pass-through trips daily.

| Street Name    | Average Number of Vehicles per Day | Less: Estimated Special Benefit Trips | Estimated Number of Pass Through Trips | Estimated % General Benefit |
|----------------|------------------------------------|---------------------------------------|----------------------------------------|-----------------------------|
| McCarthy Blvd. | 44,206                             | 42,864                                | 1,342                                  | 3.04%                       |

Based on the above calculations, the general benefit portion of the improved aesthetics, increased safety, and economic activity benefits resulting from the landscaping improvements is estimated to be 3.04%.

|                                   |       |
|-----------------------------------|-------|
| Pass-thru Vehicle General Benefit | 3.04% |
|-----------------------------------|-------|

The commonly accepted distance people will walk for public transportation, goods and services is one-quarter mile.<sup>11</sup> However, based on the location of the District, and given that it is bounded by State Route 880 and 237, and Coyote Creek, there is not an efficient or practical means of walking into the District. Although unlikely, a person may decide to use the paths within the District, and as such the general benefit portion of the improved aesthetics, increased safety, and economic activity benefits resulting from the landscaping improvements is estimated to be 1.00%.

|                                   |       |
|-----------------------------------|-------|
| Pass-thru Walking General Benefit | 1.00% |
|-----------------------------------|-------|

An estimated 1% of all US trips are made by bicycle<sup>12</sup>. Although the District is bounded by State Route 880 and 237, and Coyote Creek, there is a bike lane on N McCarthy Boulevard and a bike path along Coyote

<sup>10</sup> Ibid.

<sup>11</sup> Walkscore. (2014). *Walk Score Methodology*. Retrieved from <http://www.walkscore.com/methodology.shtml>

<sup>12</sup> U.S Department of Transportation. Federal Highway Administration. (2011). *Summary of Travel Trends: 2009 National Household Travel Survey*. (Report No. FHWA-PL-11-022). Retrieved from <http://nhts.ornl.gov>

Creek<sup>13</sup>. According to the National Household Travel Surveys, 49% of bike trips are for recreation, exercise, and sports<sup>14</sup>. As result of the District maintenance activities, there will be a level of general benefit to bicycle traffic that is not associated with property in the District. As such the general benefit portion of the improved aesthetics, increased safety, and economic activity benefits resulting from the landscaping improvements is estimated to be .50%, rounded up to 1.00%.

|                                  |       |
|----------------------------------|-------|
| Pass-thru Biking General Benefit | 1.00% |
|----------------------------------|-------|

#### **Collective District-Wide General Benefit**

Since the District is comprised of improved aesthetics, safety, and economic activity benefits resulting from the collective landscaping improvements, the activity of both pedestrians and vehicles must be addressed in a collective form rather than independently. The sum of the calculated general benefits is the total general benefit related to vehicle, walking, and biking pass-thru traffic. This general benefit result is provided in the table below:

|                                   |              |
|-----------------------------------|--------------|
| Pass-thru Vehicle General Benefit | 3.04%        |
| Pass-thru Walking General Benefit | 1.00%        |
| Pass-thru Biking General Benefit  | 1.00%        |
| <b>Total General Benefit</b>      | <b>5.04%</b> |

The general benefit, which is the percentage of the total budget that must be funded through sources other than assessments, is 5.04%. The special benefit then, which is the percentage of the budget that may be funded by assessments, is 95.00%. **This general benefit percentage is in line with the level of general benefit determined by the assessment engineer at formation of the District (less than 10%).**

## **4.5 Special Benefit Trips**

The detailed breakdown of the estimated special benefit trips for each parcel in the District is shown in the following table.

<sup>13</sup> City of Milpitas. (2002). General Plan. Retrieved from <http://www.ci.milpitas.ca.gov>

<sup>14</sup> Pucher, J., Buehler R., Meron, F., and Bauman, A. American Journals of Public Health, Supplement 1, Vol 101, No S1 (2011). Walking and Cycling in the United States, 2001-2009: Evidence from the National Household Travel Surveys. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21551387>



| Assmt ID | Assessor's Parcel Number  | Land Use Description                       | Acreage | Gross Leasable Area | Average Trip Rate <sup>1</sup> | Estimated # of Daily Special Benefit Trips <sup>2</sup> |
|----------|---------------------------|--------------------------------------------|---------|---------------------|--------------------------------|---------------------------------------------------------|
| 1-1A-1   | 022-54-016                | 710 - General office                       | 1.05    | 8,500               | 11.03                          | 93.76                                                   |
| 1-1A-2   | 022-54-017 <sup>(3)</sup> | 310 – Hotel                                | 3.29    | 83,310              | 8.17                           | 680.64                                                  |
| 1-1A-3   | 022-54-018 <sup>(3)</sup> | 310 – Hotel                                | 2.31    | 70,524              | 8.17                           | 576.18                                                  |
| 1-1A-4   | 022-54-019                | 934 - Fast Food                            | 0.19    | 0.00                | 496.12                         | 0.00                                                    |
| 1-1B     | 022-54-008                | 934 - Fast Food                            | 0.78    | 2,912               | 496.12                         | 1,444.70                                                |
| 1-2      | 022-54-002                | 820 - Shopping Center                      | 0.58    | 5,600               | 42.70                          | 239.12                                                  |
| 1-3      | 022-54-003                | 932 - High Vol. Restaurant                 | 1.02    | 5,465               | 127.15                         | 694.87                                                  |
| 1-4A     | 022-54-009                | 869 - Home Superstore                      | 8.47    | 86,250              | 20.00                          | 1,725.00                                                |
| 1-4B     | 022-54-012                | 820 - Shopping Center                      | 3.02    | 15,000              | 42.70                          | 640.50                                                  |
| 1-4C     | 022-54-013                | 820 - Shopping Center                      | 0.23    | 10,000              | 42.70                          | 427.00                                                  |
| 1-4D     | 022-54-015                | 931 - Quality Restaurant                   | 1.78    | 8,285               | 89.95                          | 745.24                                                  |
| 1-4E     | 022-54-014                | 932 - High Vol. Restaurant                 | 0.64    | 3,710               | 127.15                         | 471.73                                                  |
| 1-4F     | 022-54-011                | 820 - Shopping Center                      | 1.31    | 9,100               | 42.70                          | 388.57                                                  |
| 1-4G     | 022-54-010                | 931 - Quality Restaurant                   | 1.03    | 7,476               | 89.95                          | 672.47                                                  |
| 2-1      | 022-53-001                | 931 - Quality Restaurant                   | 0.75    | 6,500               | 89.95                          | 584.68                                                  |
| 2-2      | 022-53-002                | 820 - Shopping Center                      | 1.23    | 15,020              | 42.70                          | 641.35                                                  |
| 2-3      | 022-53-003                | 820 - Shopping Center                      | 0.76    | 12,000              | 42.70                          | 512.40                                                  |
| 2-4      | 022-53-004                | 934 - Fast Food                            | 0.6     | 2,000               | 496.12                         | 992.24                                                  |
| 2-5      | 022-53-005                | 934 - Fast Food                            | 0.74    | 3,000               | 496.12                         | 1,488.36                                                |
| 2-6      | 022-53-006                | 820 – Shopping Center                      | 1.19    | 51,250              | 45.04                          | 2,308.30                                                |
| 2-7      | 022-53-007                | 820 - Shopping Center                      | 21.92   | 187,134             | 42.70                          | 7,990.62                                                |
| 3        | 022-29-016                | 815 - Discount Superstore                  | 14.56   | 125,000             | 50.75                          | 6,343.75                                                |
| 4-1A-1   | 022-56-005                | 714 - Corp Headquarters                    | 2.04    | 115,753             | 7.98                           | 923.71                                                  |
| 4-1A-2   | 022-56-006                | 714 - Corp Headquarters                    | 2.06    | 174,483             | 7.98                           | 1,392.37                                                |
| 4-1A-3   | 022-56-007                | 714 - Corp Headquarters                    | 2.07    | 174,483             | 7.98                           | 1,392.37                                                |
| 4-1A-4   | 022-56-008                | Undeveloped                                | 34.52   | -                   | -                              | -                                                       |
| 4-1A-5   | 022-56-009                | Parking Lot                                | 24.32   | -                   | -                              | -                                                       |
| 4-1B     | 022-29-037                | Undeveloped                                | 6       | -                   | -                              | -                                                       |
| 5-1A-1   | 022-29-034                | 750 - Office Park                          | 36.49   | 572,660             | 11.42                          | 6,539.78                                                |
| 5-2A-1   | 022-29-035                | 750 - Office Park                          | 31.31   | 480,772             | 11.42                          | 5,490.42                                                |
| 5-3A-1   | 022-29-040                | 150 – Warehousing/710 General Office       | 15.55   | 313,978             | 8.87                           | 2,784.67                                                |
| 5-3A-2   | 022-29-041                | 931 – Quality Restaurant                   | 0.14    | 6,015               | 89.95                          | 541.05                                                  |
| 5-3A-3   | 022-29-042                | 150 – Warehousing/710 General Office       | 6.94    | 136,632             | 8.87                           | 1,211.79                                                |
| 5-3A-4   | 022-29-043                | 150 – Warehousing/710 General Office       | 7.36    | 122,208             | 8.87                           | 1,083.86                                                |
| 5-3A-5   | 022-29-044                | 140 - Manufacturing and 710 General Office | 7.73    | 131,331             | 8.87                           | 1,164.77                                                |
| 5-3B-1A  | 022-30-054                | 140 - Manufacturing and 710 General Office | 5.63    | 99,576              | 8.87                           | 883.14                                                  |
| 5-3B-2   | 022-30-038                | Undeveloped                                | 10      | -                   | -                              | -                                                       |
| 5-3B-3   | 022-30-039                | Undeveloped                                | 5       | -                   | -                              | -                                                       |
| 5-3C     | 022-30-035 <sup>4</sup>   | Pump Station                               | 0.19    | -                   | -                              | 1.00                                                    |
| 5-5A-1   | 022-30-055                | 815 - Discount Superstore                  | 5.6     | 74,131              | 50.75                          | 3,762.15                                                |
| 5-5A-2   | 022-30-056                | 915 – Gasoline/Service Station             | 0.59    | 3,182               | 1,181.07                       | 3,758.16                                                |
| 5-5A-3   | 022-30-057                | 151 – Mini-Warehouse                       | 3.15    | 114,707             | 13.34                          | 1,530.19                                                |
| 5-6      | 022-30-041                | Open Space                                 | 0       | -                   | -                              | -                                                       |
| 5-7      | 022-30-049 <sup>4</sup>   | Sewer Pump Station                         | 9.12    | 8,500               | 11.03                          | 1.00                                                    |

|                                                    |                  |
|----------------------------------------------------|------------------|
| <b>Total Estimated Daily Special Benefit Trips</b> | <b>62,121.92</b> |
| Internal Trip Reduction <sup>5</sup>               | (19,257.79)      |
| <b>Total Special Benefit Trips</b>                 | <b>42,864.12</b> |

- (1) Average Trip Rate per Day is from the Institute of Traffic Engineer's, Trip Generation Report. <sup>15</sup>
- (2) Average Number of Special Benefit Trips per Day is the Average Trip Rate times each 1,000 square feet of gross leasable area.
- (3) Average Number of Special Benefit Trips per Day is the Average Trip Rate times number of hotel rooms for this parcel.
- (4) Pump Station trips are an estimate.
- (5) The internal trip rate percentage was calculated by using the NCHRP 684 Internal Rate Capture Estimation Tool. <sup>16</sup>

<sup>15</sup> *Trip Generation, 9<sup>th</sup> Edition: An Informational Report of the Institute of Transportation Engineers. (2012) Washington, DC: Institute of Transportation Engineers.*

<sup>16</sup> *Bochner, Brian S., Hooper, Kevin, Sperry, Benjamin and Dunphy, Robert. National Cooperative Highway Research Program, Transportation Research Board of National Academies (2011). NCHRP Report 684 Enhancing Trip Capture Estimation for Mixed-Use Developments. Retrieved from [onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_684.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_684.pdf)*

## 5. METHOD OF ASSESSMENT

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### 5.1 Introduction

The special benefits that accrue to the properties in the District are limited to those properties that abut an improved public street or which have been obligated by issuance of bonds for necessary public improvements (the “Benefited Parcels”). Other properties in the District receive only a general benefit from the work of the improvements, and there is also some general benefit that accrues to the community as a whole. As outlined in Section 4, the total amount of general benefit from the improvements is determined to be 5.04%.

The Benefited Parcels receive a special benefit proportionate to their net acreage and thus they are assessed on the basis of total net acreage for all costs associated with the maintenance and installation of the District’s improvements, with the following exceptions:

- Of the 9.12 acres of parcel 022-30-049 (sewer pump station), 5.51 acres is the pump station and is not assessable. The remaining 3.61 acres does not benefit from landscaping as much as other Benefited Parcels because it is dedicated to municipal sanitary sewer and storm facilities use and will not otherwise be developed. Therefore, it is assigned a special benefit equal to 50% of other Benefited Parcels.
- Parcel 022-30-035 (storm pump station) does not benefit from landscaping as much as other Benefited Parcels because it is dedicated to municipal sanitary sewer and storm facilities use and will not otherwise be developed. Therefore, it is assigned a special benefit equal to 50% of other Benefited Parcels.
- Parcel 022-29-037 and parcel 022-30-041 are dedicated to open space and therefore do not receive special benefit from the maintenance and improvements.

### 5.2 Method of Assessment Spread

The amount of assessment levied on each Benefited Parcel in the District, for Fiscal Year 2021/22, is \$0.0360 per square foot. The assessment rate was determined by taking the Fiscal Year 2021/22 Net Amount to be assessed (\$425,114) divided by the total net square footage of the District (11,792,520 sq. ft.).

The maximum assessment rate for Fiscal Year 2021/22 is approximately \$0.0480, which is a preliminary number. Each year the maximum assessment rate per square foot is increased by the percentage change from April 1<sup>st</sup> of the prior year to April 1<sup>st</sup> of the current year in the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Indexes, Pacific Cities and U.S. City Average, San Francisco-Oakland-Hayward. The April 1, 2021 CPI was not available at the time of writing of this Report. For purposes of this report, the CPI increase was estimated by using the February 2021/22 CPI.

### 5.3 Maximum Assessment Rates

The following table provides the historical maximum assessment rate for Fiscal Year 2001/02 through the current fiscal year:

| Fiscal Year | CPI     | Percentage Increase <sup>(1)</sup> | Assessment Rate Range <sup>(2)</sup> |          |
|-------------|---------|------------------------------------|--------------------------------------|----------|
| 2001/02     | 189.1   | N/A                                | \$0.0120                             | \$0.0300 |
| 2002/03     | 193.0   | 2.06%                              | 0.0122                               | 0.0306   |
| 2003/04     | 197.3   | 2.23%                              | 0.0125                               | 0.0313   |
| 2004/05     | 198.3   | 0.51%                              | 0.0126                               | 0.0315   |
| 2005/06     | 202.5   | 2.12%                              | 0.0129                               | 0.0321   |
| 2006/07     | 208.9   | 3.16%                              | 0.0133                               | 0.0331   |
| 2007/08     | 215.842 | 3.32%                              | 0.0137                               | 0.0342   |
| 2008/09     | 222.074 | 2.89%                              | 0.0141                               | 0.0352   |
| 2009/10     | 223.854 | 0.80%                              | 0.0142                               | 0.0355   |
| 2010/11     | 227.697 | 1.72%                              | 0.0144                               | 0.0361   |
| 2011/12     | 234.121 | 2.82%                              | 0.0149                               | 0.0371   |
| 2012/13     | 238.985 | 2.08%                              | 0.0152                               | 0.0379   |
| 2013/14     | 244.675 | 2.38%                              | 0.0155                               | 0.0388   |
| 2014/15     | 251.495 | 2.79%                              | 0.0160                               | 0.0399   |
| 2015/16     | 257.622 | 2.44%                              | 0.0163                               | 0.0409   |
| 2016/17     | 264.565 | 2.70%                              | 0.0168                               | 0.0420   |
| 2017/18     | 274.589 | 3.79%                              | 0.0174                               | 0.0436   |
| 2018/19     | 283.422 | 3.22%                              | 0.0180                               | 0.0450   |
| 2019/20     | 294.801 | 4.01%                              | 0.0187                               | 0.0468   |
| 2020/21     | 298.074 | 1.11%                              | 0.0189                               | 0.0473   |
| 2021/22     | 304.387 | 1.57% <sup>(3)</sup>               | 0.0192                               | 0.0480   |

<sup>(1)</sup> Percentage increase from April 1 of the prior year to April 1 of the current year in the US Department of Labor, Bureau of Labor Statistics, Consumer Price Indexes, Pacific Cities and US City Average, San Francisco-Oakland-Hayward.

<sup>(2)</sup> The left and right column indicate the minimum and maximum assessment rate, respectively.

<sup>(3)</sup> The April 1, 2021 CPI was not available at the time of writing of this Report. The Fiscal Year 2021/22 CPI increase was estimated using the February 2021/22 CPI.

### 5.4 Appeals

Any property owner who feels that the amount of their assessment is in error as a result of incorrect information being used to apply the foregoing method of spread may file an appeal with the Finance Director of the City. Any such appeal is limited to the correction of an assessment during the current or, if before July 1, the upcoming fiscal year. Upon the filing of any such appeal, the Finance Director shall promptly review the information provided by the property owner and if he/she finds that the assessment should be modified, he/she shall have the authority to make the appropriate changes in the assessment roll. If any such changes are provided after the assessment roll has been filed with the County for collection, the Finance Director is authorized to refund to the property owner the amount of any approved reduction.

## 6. ASSESSMENT DIAGRAM

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The following page provides a copy of the assessment diagram of the District.

An assessment was levied by the City Council of the City of Milpitas, County of Santa Clara, State of California on the lots, pieces and parcels of land shown on this assessment diagram. Said assessment was levied on the 3rd day of June 2014; said assessment diagram and the assessment roll were recorded in the Office of the Superintendent of Streets of said City on the 3rd day of June 2014. Reference is made to the assessment roll recorded in the Office of the Superintendent of Streets for the exact amount of such assessment levied against each parcel of land shown on this assessment diagram.

*Mary Lavelle*  
City Clerk of the City of Milpitas

Filed in the Office of the City Clerk of the City of Milpitas, County of Santa Clara, State of California this 20th day of May, 2014.

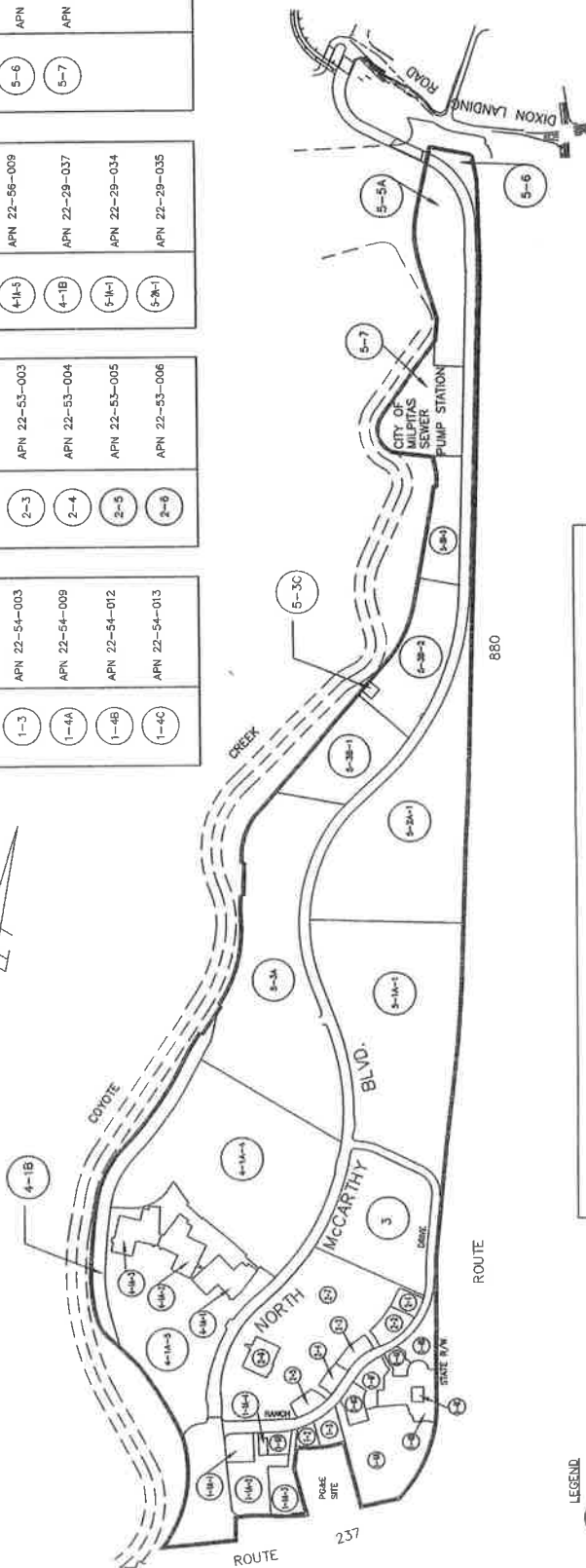
*Mary Lavelle*  
City Clerk of the City of Milpitas

Recorded in the Office of the Superintendent of Streets of the City of Milpitas, County of Santa Clara, State of California, this 3rd day of June 2014.

*Mary Lavelle*  
Superintendent of Streets  
City of Milpitas

Figure 1

| ASSESSMENT NO. | ASSESSOR'S PARCEL NO. | ASSESSMENT NO. | ASSESSOR'S PARCEL NO. | ASSESSMENT NO. | ASSESSOR'S PARCEL NO. | ASSESSMENT NO. | ASSESSOR'S PARCEL NO. |
|----------------|-----------------------|----------------|-----------------------|----------------|-----------------------|----------------|-----------------------|
| 1-1A-1         | APN 22-54-016         | 1-40           | APN 22-54-015         | 2-7            | APN 22-53-007         | 5-3A           | APN 22-29-036         |
| 1-1A-2         | APN 22-54-017         | 1-4E           | APN 22-54-014         | 3              | APN 22-29-016         | 5-3B-1         | APN 22-30-037         |
| 1-1A-3         | APN 22-54-018         | 1-4F           | APN 22-54-011         | 4-1A-1         | APN 22-56-005         | 5-3B-2         | APN 22-30-038         |
| 1-1A-4         | APN 22-54-019         | 1-4G           | APN 22-54-010         | 4-1A-2         | APN 22-56-006         | 5-3B-3         | APN 22-30-039         |
| 1-1B           | APN 22-54-008         | 2-1            | APN 22-53-001         | 4-1A-3         | APN 22-56-007         | 5-3C           | APN 22-30-035         |
| 1-2            | APN 22-54-002         | 2-2            | APN 22-53-002         | 4-1A-4         | APN 22-56-008         | 5-5A           | APN 22-30-048         |
| 1-3            | APN 22-54-003         | 2-3            | APN 22-53-003         | 4-1A-5         | APN 22-56-009         | 5-6            | APN 22-30-041         |
| 1-4A           | APN 22-54-009         | 2-4            | APN 22-53-004         | 4-1B           | APN 22-29-037         | 5-7            | APN 22-30-049         |
| 1-4B           | APN 22-54-012         | 2-5            | APN 22-53-005         | 5-1A-1         | APN 22-29-034         |                |                       |
| 1-4C           | APN 22-54-013         | 2-6            | APN 22-53-006         | 5-1A-2         | APN 22-29-035         |                |                       |



LEGEND  
 6 ASSESSMENT NO.  
 BOUNDARY DISTRICT  
 ASSESSMENT LIMIT

PART I - ASSESSMENT DIAGRAM  
 LANDSCAPING & LIGHTING & MAINTENANCE  
 ASSESSMENT DISTRICT NO. 95-1  
 OF  
 CITY OF MILPITAS  
 COUNTY OF SANTA CLARA - STATE OF CALIFORNIA

Note:  
 Reference is hereby made to the maps and deeds of record in the Office of the Assessor of the County of Santa Clara for a detailed description of the lines and dimensions of any parcels shown hereon. These maps shall govern for all details concerning the lines and dimensions of such parcels. Each parcel is identified in said maps by its distinctive Assessor's Parcel Number.

## 7. ASSESSMENT ROLL

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The assessment roll is a listing of the proposed assessment for Fiscal Year 2021/22 apportioned to each lot or parcel, as shown on the last equalized roll of the Assessor of the County of Santa Clara. The following page shows the assessment roll for Fiscal Year 2021/22.

**City of Milpitas**  
**Landscaping and Lighting Maintenance Assessment District**  
**No. 95-1**  
**Fiscal Year 2021/22 Assessment Roll**

| APN                      | Owner                                              | Net Sq. Ft.          | Fiscal Year<br>21/22 Levy | Rounding<br>Adj. | Fiscal Year<br>21/22 Total |
|--------------------------|----------------------------------------------------|----------------------|---------------------------|------------------|----------------------------|
| 022-29-016               | WAL-MART REAL ESTATE                               | 634,233.60           | \$22,863.78               | \$0.00           | \$22,863.78                |
| 022-29-034               | MCCARTHY CENTER HOLDINGS LLC                       | 1,589,504.40         | 57,300.78                 | 0.00             | 57,300.78                  |
| 022-29-035               | MCCARTHY CENTER HOLDINGS LLC                       | 1,363,863.60         | 49,166.55                 | (0.01)           | 49,166.54                  |
| 022-29-037               | CITY OF SAN JOSE                                   | 0.00                 | 0.00                      | 0.00             | 0.00                       |
| 022-29-040               | CREEKSIDE MILPITAS LLC                             | 677,532.24           | 24,424.67                 | (0.01)           | 24,424.66                  |
| 022-29-041               | CREEKSIDE MILPITAS LLC                             | 43,690.68            | 1,575.03                  | (0.01)           | 1,575.02                   |
| 022-29-042               | CREEKSIDE MILPITAS LLC                             | 302,349.96           | 10,899.55                 | (0.01)           | 10,899.54                  |
| 022-29-043               | CREEKSIDE MILPITAS 2 LLC                           | 320,732.28           | 11,562.23                 | (0.01)           | 11,562.22                  |
| 022-29-044               | CREEKSIDE MILPITAS 2 LLC                           | 336,544.56           | 12,132.25                 | (0.01)           | 12,132.24                  |
| 022-30-035               | MILPITAS CITY OF                                   | 4,138.20             | 149.18                    | 0.00             | 149.18                     |
| 022-30-038               | NEW TREND TECH INC                                 | 435,600.00           | 15,703.15                 | (0.01)           | 15,703.14                  |
| 022-30-039               | MCCARTHY RANCH LP                                  | 217,800.00           | 7,851.57                  | (0.01)           | 7,851.56                   |
| 022-30-041               | CITY OF MILPITAS                                   | 0.00                 | 0.00                      | 0.00             | 0.00                       |
| 022-30-049               | MILPITAS SANITARY DIST                             | 78,625.80            | 2,834.42                  | 0.00             | 2,834.42                   |
| 022-30-054               | CREEKSIDE MILPITAS 2 LLC                           | 245,329.92           | 8,844.01                  | (0.01)           | 8,844.00                   |
| 022-30-055               | SPRIG CENTER LLC                                   | 243,936.00           | 8,793.76                  | 0.00             | 8,793.76                   |
| 022-30-056               | SPRIG CENTER LLC                                   | 25,874.64            | 932.77                    | (0.01)           | 932.76                     |
| 022-30-057               | SPRIG CENTER LLC                                   | 137,039.76           | 4,940.21                  | (0.01)           | 4,940.20                   |
| 022-53-001               | HAM JAYNE Y                                        | 32,670.00            | 1,177.74                  | 0.00             | 1,177.74                   |
| 022-53-002               | TMS MCCARTHY LP                                    | 53,578.80            | 1,931.49                  | (0.01)           | 1,931.48                   |
| 022-53-003               | TMS MCCARTHY LP                                    | 33,105.60            | 1,193.44                  | 0.00             | 1,193.44                   |
| 022-53-004               | HSC ASSOCIATES LP                                  | 26,136.00            | 942.19                    | (0.01)           | 942.18                     |
| 022-53-005               | HSC ASSOCIATES LP                                  | 32,234.40            | 1,162.03                  | (0.01)           | 1,162.02                   |
| 022-53-006               | TMS MCCARTHY LP                                    | 51,836.40            | 1,868.67                  | (0.01)           | 1,868.66                   |
| 022-53-007               | TMS MCCARTHY LP                                    | 954,835.20           | 34,421.30                 | 0.00             | 34,421.30                  |
| 022-54-002               | FIRST CREEKSIDE ASSOC                              | 25,264.80            | 910.78                    | 0.00             | 910.78                     |
| 022-54-003               | LOO YUK LUN TRUSTEE & ET AL & LOO MEI FONG TRUSTEE | 44,431.20            | 1,601.72                  | 0.00             | 1,601.72                   |
| 022-54-008               | IN N OUT BURGERS                                   | 33,976.80            | 1,224.85                  | (0.01)           | 1,224.84                   |
| 022-54-009               | MCCARTHY SHOPPING CTR LP                           | 368,953.20           | 13,300.57                 | (0.01)           | 13,300.56                  |
| 022-54-010               | H & Y NORTHERN CALIFORNIA LLC                      | 44,866.80            | 1,617.42                  | 0.00             | 1,617.42                   |
| 022-54-011               | FIRST CREEKSIDE ASSOC                              | 57,063.60            | 2,057.11                  | (0.01)           | 2,057.10                   |
| 022-54-012               | F&M SORCI LAND COMPANY INC                         | 131,551.20           | 4,742.35                  | (0.01)           | 4,742.34                   |
| 022-54-013               | F&M SORCI LAND COMPANY INC                         | 10,018.80            | 361.17                    | (0.01)           | 361.16                     |
| 022-54-014               | J N C INTERNATIONAL ENTPRS LLC                     | 27,878.40            | 1,005.00                  | 0.00             | 1,005.00                   |
| 022-54-015               | PACIFIC MERITAGE LLC                               | 77,536.80            | 2,795.16                  | 0.00             | 2,795.16                   |
| 022-54-016               | HOURET FAM LP                                      | 46,173.60            | 1,664.53                  | (0.01)           | 1,664.52                   |
| 022-54-017               | BRE SELECT HOTELS PROPERTIES LLC                   | 143,312.40           | 5,166.34                  | 0.00             | 5,166.34                   |
| 022-54-018               | LL MILPITAS, L P                                   | 100,623.60           | 3,627.43                  | (0.01)           | 3,627.42                   |
| 022-54-019               | IN N OUT BURGERS                                   | 8,276.40             | 298.36                    | 0.00             | 298.36                     |
| 022-56-005               | HUDSON CAMPUS CENTER LLC                           | 88,426.80            | 3,187.74                  | 0.00             | 3,187.74                   |
| 022-56-006               | HUDSON CAMPUS CENTER LLC                           | 89,733.60            | 3,234.85                  | (0.01)           | 3,234.84                   |
| 022-56-007               | HUDSON CAMPUS CENTER LLC                           | 90,169.20            | 3,250.55                  | (0.01)           | 3,250.54                   |
| 022-56-008               | HUDSON CAMPUS CENTER LLC                           | 1,503,691.20         | 54,207.26                 | 0.00             | 54,207.26                  |
| 022-56-009               | HUDSON CAMPUS CENTER LLC                           | 1,059,379.20         | 38,190.05                 | (0.01)           | 38,190.04                  |
| <b>Total: 44 Parcels</b> |                                                    | <b>11,792,519.64</b> | <b>\$425,114.01</b>       | <b>(0.25)</b>    | <b>\$425,113.76</b>        |



CITY OF MILPITAS  
LANDSCAPING MAINTENANCE DISTRICT (LMD) 95-1  
(N.T.S.)



2021-2022 FISCAL YEAR LANDSCAPE AREA FUNDED FOR MAINTENANCE



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                                                                                   |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Adopt a Resolution Approving the Annual Engineer's Report; Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and Provide Notice of Public Hearing to be held on June 15, 2021 for Landscaping and Lighting Maintenance Assessment District No. 98-1 (LLMD 98-1 Sinclair Horizon)</b> |
| <b>Category:</b>       | Consent Calendar-Community Services and Sustainable Infrastructure                                                                                                                                                                                                                                                |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                                                                                                                                                                                                         |
| <b>Staff Contact:</b>  | Steve Erickson, Engineering Director 408-586-3301                                                                                                                                                                                                                                                                 |
| <b>Recommendation:</b> | Adopt a Resolution Approving the Annual Engineer's Report; Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and Provide Notice of Public Hearing to be held on June 15, 2021 for LLMD 98-1 Sinclair Horizon                                                                            |

### **Background:**

LLMD 98-1 Sinclair Horizon provides the maintenance and improvement of public landscaping, irrigation systems, and pedestrian walking path adjacent to Sinclair Frontage Road and Los Coches Creek abutting the Sinclair Horizon residential subdivision in the areas as shown on the attached location map.

### **Analysis:**

Before the City Council may levy the annual assessments for LLMD 98-1 Sinclair Horizon, the Landscaping and Lighting Act of 1972 requires the Council to adopt a resolution approving the annual Engineer's Report (Report) evaluating the landscape and lighting maintenance district's maintenance and improvement costs for fiscal year 2021-22.

On March 2, 2020, the City Council directed the City Engineer to prepare the Report, which is included in the City Council packet. The proposed total assessment for fiscal year (FY) 2021-22 is \$495.19 per lot, with an assessment rate not exceeding the maximum assessment rate of \$496.05. The FY 2021-22 rate is approximately 5.45% higher than the previous year FY 2020-22 rate of \$468.21.

City Council must also adopt:

- Resolution approving the Report, and
- Resolution declaring its intent to levy and collect an assessment and direct publishing of a notice of a public hearing to be held on June 15, 2021 (collectively the "Resolutions").

### **Policy Alternatives:**

**Alternative 1:** Not adopt the Resolutions for LLMD 98-1 Sinclair Horizon.

Pros: None.

Cons: The Landscaping and Lighting Act of 1972 requires the legislative body to adopt the Resolutions, and if the City Council does not adopt the Resolutions, the City will not be able to collect assessments for LLMD 98-1 Sinclair Horizon.

Reason Alternative 1 is Not Recommended: To allow for the continued maintenance and service of LLMD 98-1 Sinclair Horizon, staff recommends approving the Resolutions in order to levy and collect assessments for fiscal year 2021-22.

**Fiscal Impact:**

The levy and collection of assessments provides a funding resource for the City to improve and maintain public landscaping, irrigation systems, pedestrian lighting, gateway columns and entry signs within LLMD 98-1 Sinclair Horizon.

**California Environmental Quality Act:**

Levy and collection of assessment is not considered a project under CEQA as there will be no direct or reasonably foreseeable indirect physical change in the environment.

**Recommendation:**

1. Adopt a Resolution Approving the Annual Engineer's Report;
2. Adopt a Resolution Declaring Its Intention to Levy and Collect Assessments; and
3. Provide Notice of Public Hearing to be held on June 15, 2021 for LLMD 98-1 Sinclair Horizon.

**Attachment:**

1. Resolution Approving Annual Engineer's Report
2. Resolution Declaring Intention to Levy and Collect Assessments
3. Engineer's Report LLMD No. 98-1 Sinclair Horizon
4. Location Map



**RESOLUTION NO. \_\_\_\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS, APPROVING THE  
ANNUAL REPORT FOR THE LANDSCAPING AND LIGHTING MAINTENANCE  
ASSESSMENT DISTRICT NO. 98-1 FOR FISCAL YEAR 2021/22**

**WHEREAS**, the City Council previously completed its proceedings in accordance with and pursuant to the Landscaping and Lighting Act of 1972, Part 2, Division 15 of the California Streets and Highways Code (commencing with Section 22500) (the “Act”) to establish the Landscaping and Lighting Maintenance Assessment District 98-1 (the “Assessment District”); and

**WHEREAS**, the City Council has retained NBS for the purpose of assisting with the annual levy of the Assessment District, and the preparation and filing of the report required pursuant to Section 22622 of the Act (the “Annual Report”); and

**WHEREAS**, the City Council has, by previous resolution, ordered NBS to prepare and file such Annual Report; and

**WHEREAS**, NBS has prepared and filed such Annual Report with the City Clerk.

**NOW, THEREFORE**, the City Council of the City of Milpitas hereby finds, determines, and resolves as follows:

1. **Approval of Report:** The City Council hereby approves the Annual Report for the Assessment District concerning the levy of assessments as submitted by NBS for the fiscal year commencing July 1, 2021, and ending June 30, 2022.
2. The Assessment District exterior boundaries are as shown by a map filed in the office of the City Clerk, which map is made a part hereof by this reference.

PASSED AND ADOPTED this \_\_\_\_\_ day of \_\_\_\_\_, 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

RESOLUTION NO. \_\_\_\_\_

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS,  
DECLARING ITS INTENTION TO LEVY AND COLLECT ASSESSMENTS FOR THE  
LANDSCAPING AND LIGHTING MAINTENANCE ASSESSMENT DISTRICT NO. 98-1  
FOR FISCAL YEAR 2021/22**

**WHEREAS**, the City Council previously completed its proceedings in accordance with and pursuant to the Landscaping and Lighting Act of 1972, Part 2, Division 15 of the California Streets and Highways Code (commencing with Section 22500) (the “Act”) to establish the Landscaping and Lighting Maintenance Assessment District No. 98-1 (the “Assessment District”); and

**WHEREAS**, the City Council has retained NBS for the purpose of assisting with the annual levy of the Assessment District, and the preparation and filing of the report required pursuant to Section 22622 of the Act (the “Annual Report”); and

**WHEREAS**, the City Council adopted a Resolution approving the Annual Report for the Assessment District for Fiscal Year 2021/22.

**NOW, THEREFORE**, the City Council of the City of Milpitas hereby finds, determines, and resolves as follows:

1. **Intention:** The City Council hereby declares its intention to levy and collect assessments within the Assessment District to pay the costs of the improvements for the fiscal year commencing July 1, 2021 and ending June 30, 2022. The City Council finds that the public’s best interest requires such action.
2. **Improvements:** The improvements within the Assessment District include, but are not limited to: operating, maintaining and servicing of all public landscaping improvements, consisting of landscaping and grass. Operating, maintaining and servicing costs include, but are not limited to: personnel, materials, electrical energy and water. Services provided include all necessary service, operations, administration, and maintenance required to keep the improvements in a healthy, vigorous, and satisfactory condition. A project renovating the landscape and irrigation improvements in the Assessment District will be initiated in Fiscal Year 2021/22 and completed in Fiscal Year 2025/26.
3. **Assessment District Boundaries:** The boundaries of the Assessment District are as shown by the assessment diagram filed in the offices of the City Clerk, which map is made a part hereof by reference.
4. **Annual Report:** Reference is made to the Annual Report prepared by NBS, on file with the City Clerk, for a full and detailed description of the improvements, the boundaries of the Assessment District and the zones therein, and the proposed assessments upon assessable lots and parcels of land within the Assessment District.
5. **Notice of Public Hearing:** The City Council hereby declares its intention to conduct a public hearing concerning the levy of assessments in accordance with Section 22629 of the Act. All objections to the assessment, if any, will be considered by the City Council. The public hearing will be held on **Tuesday, June 15, 2021 at 7:00 pm** or as soon thereafter as is feasible in the meeting place of the City Council located at 455 E. Calaveras

Boulevard, Milpitas, CA 95035. The City Council further orders the City Clerk to publish notice of this resolution in accordance with Section 22626(a) of the Act.

6. **Increase of Assessment:** The maximum assessment is not proposed to increase from the previous year above that was previously approved by the property owners (as “increased assessment” is defined in Section 54954.6 of the Government Code).

PASSED AND ADOPTED this \_\_\_\_ day of \_\_\_\_\_, 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

# CITY OF MILPITAS

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*Fiscal Year 2021/22 Annual Report For:*

## **Landscaping and Lighting Maintenance Assessment District No. 98-1**

**April 2021**

Prepared by:



Corporate Headquarters  
32605 Temecula Parkway, Suite 100  
Temecula, CA 92592  
Toll free: 800.676.6161



**CITY OF MILPITAS**  
**LANDSCAPING AND LIGHTING MAINTENANCE ASSESSMENT DISTRICT NO. 98-1**  
**455 East Calaveras Boulevard**  
**Milpitas, California 95035**  
**(408) 586-3000**

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**CITY COUNCIL**

Rich Tran, Mayor  
Carmen Montano, Vice-Mayor  
Evelyn Chua, Council Member  
Karina R. Dominguez, Council Member  
Anthony Phan, Council Member

**CITY STAFF**

Steve Erickson, PE, Engineering Director/City Engineer  
Lauren Lai, Finance Director  
Tony Ndah, Public Works Director

**NBS**

Tim Seufert, Client Services Director  
Adina McCargo, Project Manager  
Zaire Marin, Administrator

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# 1. ENGINEER'S LETTER

**WHEREAS**, in 1998 the City Council of the City of Milpitas (the "City"), State of California, under the Landscaping and Lighting Act of 1972 (the "Act"), created the City of Milpitas Landscaping and Lighting Maintenance Assessment District No. 98-1 (the "District") to provide for the continued maintenance, operation, and administration of various improvements within the boundaries of the District; and

**WHEREAS**, the City Council has directed NBS to prepare and file a report for Fiscal Year 2021/22 in accordance with Chapter 1, Article 4 of the Act presenting plans and specifications describing the general nature, location and extent of the improvements to be maintained; an estimate of the costs to maintain, operate, and service the improvements for the District for the referenced fiscal year; a diagram for the District showing the area and properties to be assessed; and an assessment of the estimated costs to maintain and service the improvements, stating the net amount to be assessed upon all assessable lots or parcels within the District in proportion to the special benefit received.

**NOW THEREFORE**, the following assessments have been calculated in accordance with the assessment methodology adopted and approved by the City Council at the time of District formation, and are made to cover the portion of the estimated costs of maintenance, operation, and servicing of the improvements, to be paid by the assessable real property within the District in proportion to the special benefit received:

| District   | Parcels | 2021/22<br>Maximum Assessment<br>Rate per Lot <sup>(1)</sup> | 2021/22<br>Actual Assessment<br>Rate per Lot | 2021/22<br>Net Amount to be<br>Assessed <sup>(2)(3)</sup> |
|------------|---------|--------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------|
| LLMAD 98-1 | 98      | \$496.05                                                     | \$495.19                                     | \$48,528.62                                               |

<sup>(1)</sup> The April 1, 2021 CPI was not available at the time of writing of this Report. The Fiscal Year 2021/22 CPI increase was estimated using the February 2021/22 CPI.

<sup>(2)</sup> Amounts placed on the tax roll include the 1% Santa Clara County Collection Fee.

<sup>(3)</sup> This amount is only an estimate and does not reflect the final billed amount with rounding adjustments. Refer to Section 7 for the rounded figure.

I identified all parcels which will have a special benefit conferred upon them from the improvements described in District's Plans and Specifications section of this Engineer's Report (the "Benefited Parcels"). For particulars as to the identification of said parcels, reference is made to the Assessment Diagram, a copy is on file in the office of the City Clerk.

I have assessed the costs and expenses of the improvements upon the Benefited Parcels. In making such assessment:

- The proportionate special benefit derived by each Benefited Parcel from the improvements was determined in relationship to the entirety of the maintenance costs of the improvements;
- No assessment has been imposed on any Benefited Parcel which exceeds the reasonable cost of the proportional special benefit conferred on such parcel from the improvements; and
- Any general benefits from the improvements have been separated from the special benefits and only special benefits have been assessed.

I, the undersigned, respectfully submit the enclosed Engineer's Report and, to the best of my knowledge, information and belief, the Engineer's Report, Assessments, and the Assessment Diagrams herein have been prepared and computed in accordance with the order of the City Council of the City of Milpitas, the Act, and Article XIIID.

---

Steven Erickson, PE  
Engineering Director/City Engineer

## 2. PLANS AND SPECIFICATIONS

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The District provides for the continued administration, maintenance, operation, and servicing of various improvements located within the public right-of-way and dedicated easements within the boundaries of the District.

### 2.1 Location of Improvements

The District is located in the City of Milpitas, bounded on the east by Sinclair Frontage Road, on the west by Berryessa Creek, and on the north by Los Coches Street. The improvements maintained include public landscaping and irrigation improvements, including jogging paths, planter walls, grass berms, and ornamental planting, which are primarily situated within the public rights-of-way and dedicated public by easements within the District.

### 2.2 Landscaping Improvements

The landscaping and irrigation improvements were installed within the District in order to enhance the overall visual appearance for adjacent parcels. The improvements consist of the maintenance and operation of any or all public landscaping and irrigation improvements adjacent to curbs, including asphalt concrete jogging paths, planter walls, grass berms, and appurtenant irrigation systems; ornamental planting including lawns, shrubs, and trees, including necessary repairs, replacements, water, electric current, spraying, care, supervision, debris removal and all other items of work necessary and incidental for proper maintenance and operation thereof. The landscaping and irrigation improvements are collectively referred to as “landscaping improvements”. All such work will be performed in the following areas:

#### 2.2.1 BERRYESSA CREEK

Due to the widening of the creek, improvements in Berryessa Creek were removed. Any improvements maintained in this reach (asphalt concrete jogging path, exercise equipment, planting, and irrigation) will no longer be maintained or improved.

#### 2.2.2 LOS COCHES CREEK

1. A strip of land 812 feet long, 14 feet in width along the south bank of Los Coches Creek adjacent to Tract 9018. The improvements include an asphalt concrete jogging path, exercise equipment, planting, and irrigation.
2. A strip of land 5.5 feet wide within the Los Coches Street right-of-way between the back of sidewalk and the right-of-way along the south side of Los Coches Street between Berryessa Creek and Sinclair Frontage Rd. The improvements include planting and irrigation.

## **2.3 Capital Improvements**

The City will initiate the design and construction of landscape and irrigation renovation along portions of Los Coches Street and Sinclair Frontage Road in Fiscal Year 2021/22. Capital Improvements are scheduled to be complete by June 30, 2026.

## **2.4 Overhead**

In addition to the hard costs of maintaining the improvements mentioned above, the City will incur costs for staff time and expenses related to the management and maintenance of the improvements within the District. Staff time includes oversight and coordination of both City and contractor provided services, annual tax roll preparation, and addressing property owner questions and concerns. These activities are directly related to the maintenance of the improvements, and without them the improvements could not be efficiently completed or properly maintained on an ongoing basis.

### 3. ESTIMATE OF COSTS

The estimated costs of maintenance and servicing of the improvements as described in the Plans and Specifications are summarized below.

#### 3.1 District Budget

The Fiscal Year 2021/22 estimated cost budget for the maintenance and servicing of the improvements is as follows:

| Description                                         | Fiscal Year 2021/22 Budget |
|-----------------------------------------------------|----------------------------|
| Maintenance Staff <sup>(1)</sup>                    | \$30,000                   |
| Capital Equipment                                   | 0                          |
| Supplies                                            | 1,800                      |
| Utilities (Water, Electricity)                      | 19,000                     |
| Reserve Fund                                        | 10,000                     |
| <u>Capital Improvement Program</u>                  | <u>4,000</u>               |
| <b>Maintenance Costs</b>                            | <b>\$64,800</b>            |
| NBS                                                 | \$3,450                    |
| City Staff District Administration                  | 400                        |
| <u>County Auditor-Controller Fee<sup>(2)</sup></u>  | <u>485</u>                 |
| <b>District Specific Costs</b>                      | <b>\$4,335</b>             |
| Total District Costs                                | <b>\$69,135</b>            |
| General Benefit Contribution <sup>(3)</sup>         | (20,606)                   |
| Operating Reserve Contribution                      | 0                          |
| <u>Capital Improvement Fund Contribution</u>        | <u>0</u>                   |
| <b>Net Amount to be Assessed</b>                    | <b>\$48,529</b>            |
| <b>Total District Lots</b>                          | <b>98</b>                  |
| <b>Rate per Lot<sup>(4)</sup></b>                   | <b>\$495.19</b>            |
| <b>Maximum Rate Per Lot – 2021/22<sup>(5)</sup></b> | <b>\$496.05</b>            |

(1) The City's Department of Public Works is the provider of Maintenance Services.

(2) County Auditor-Controller Fee is currently 1% of the total levy submittal.

(3) General Benefit Contribution is not applied to District Specific Costs as these are special benefits to the District.

(4) The Rate per lot equals the Net Amount to be Assessed / Total District Lots. The Rate cannot exceed the maximum rate.

(5) The April 1, 2021 CPI was not available at the time of writing of this Report. The Fiscal Year 2021/22 CPI increase was estimated by using the February 2021/22 CPI.

### 3.1.1 OPERATING RESERVE

It is the intent of the City to maintain an operating reserve which shall not exceed the estimated costs of maintenance and servicing of the improvements prior to December 10 of the fiscal year, or when the City expects to receive its apportionment of special assessments from the County, whichever is later. The operating reserve balance information for the District is as follows:

|                                                                              |                 |
|------------------------------------------------------------------------------|-----------------|
| Estimated Fiscal Year Ending 6/30/2021 Operating Reserve Cash Balance        | \$3,946         |
| Operating Reserve Collection for Fiscal Year 2021/22                         | 10,000          |
| <b>Estimated Fiscal Year Ending 6/30/2022 Operating Reserve Cash Balance</b> | <b>\$13,946</b> |

### 3.1.2 CAPITAL IMPROVEMENT BUDGET

The City will initiate the design of landscape and irrigation renovation along portions of Los Coches Street and Sinclair Frontage Road in Fiscal Year 2021/22. As of March 28, 2021, the balance available for the Capital Improvement Project was \$172,100. The City will utilize these funds, along with an annual collection of \$4,000 via the District from Fiscal Year 2021/22 to Fiscal Year 2025/26, to finance the project.

Capital Improvements are scheduled to be complete by June 30, 2026.



## 4. SPECIAL AND GENERAL BENEFIT

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The improvements defined in Section 2 are expected to confer certain special benefits to parcels within the District. The special benefits are described in this section. Figures in this section are derived from a Special v. General Benefit Analysis performed in Fiscal Year 2014/15.

### 4.1 Introduction

Pursuant to Article XIID, all parcels that receive a special benefit conferred upon them as a result of the installation, implementation and maintenance of the improvements, services and activities shall be identified, and the proportionate special benefit derived by each identified parcel shall be determined in relationship to the entire costs of the installation, implementation and maintenance of the improvements, services and activities.

Article XIID, Section 4(a) of the California Constitution limits the amount of any assessment to the proportional special benefit conferred on the property. Proposition 218 requires that the City separate the general benefit from special benefit, so that only special benefit may be assessed to properties within the District. Furthermore, Article XIID also provides that publicly owned properties must be assessed unless there is clear and convincing evidence that those properties receive no special benefit from the assessment.

### 4.2 Special Benefits Identified

The improvements described in Section 2 are expected to confer certain special benefits to parcels within the District. The special benefits conferred to property within the District can be grouped into two primary benefit categories: aesthetic benefit and safety benefit. The two district benefit categories are further expanded upon below.

- **Improved Aesthetics:** The aesthetic benefit relates to the increase in the overall aesthetics as a result of the ongoing maintenance, servicing and operation of the improvements within the District. Street landscaping improvements improve the livability, commercial activity, appearance and desirability for properties within the District. Regular maintenance ensures that the improvements do not reach a state of deterioration or disrepair so as to be materially detrimental to properties adjacent to or in close proximity to the improvements. The overall appeal of the District is enhanced when improvements are in place and kept in a healthy and satisfactory condition. Conversely, appeal decreases when improvements are not well-maintained, unsafe, or destroyed by the elements or vandalism. Streetscapes have a significant effect on how people view and interact with their community<sup>1</sup>. With streetscapes that are safe and inviting, people are more likely to walk, which can help reduce automobile traffic, improve public health, stimulate local economic activity and attract residents and visitors to the community<sup>2</sup>.
- **Increased Safety:** Well maintained areas mitigate crime, especially vandalism, and enhance pedestrian safety. A recent study found that after landscape improvements were installed, there

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<sup>1</sup> Victoria Transport Policy Institute. (2011). *Community Livability. Helping to Create Attractive, Safe, Cohesive Communities*. Retrieved from <http://www.vtpi.org/tm/tm97.htm>.

<sup>2</sup> *Ibid.*

was a 46% decrease in crash rates across urban arterial and highway sites and a second study reviewed found a 5% to 20% reduction in mid-block crashes after trees and planters in urban arterial roads were put in place. In addition, there is less graffiti, vandalism, and littering in outdoor spaces with natural landscapes than in comparable plant-less spaces<sup>3</sup>. The Victoria Transport Policy Institute has found that streetscapes reduce traffic speeds and when combined with improved pedestrian crossing conditions can significantly reduce collisions<sup>4</sup>.

### 4.3 General Benefits Identified

Section 4 of Article XIID of the California Constitution provides that once a local agency which proposes to impose assessments on property has identified those parcels that will have special benefits conferred upon them and upon which an assessment will be imposed, the local agency must next “separate the general benefits from the special benefits conferred,” and only the special benefits can be included in the amount of the assessments imposed.

General benefit is an overall and similar benefit to the public at large resulting from the maintenance of the District’s improvements provided by the assessments levied. The improvements to be maintained by the District are located within the District boundaries only. There will be no District maintenance activities provided for improvements located outside of the District boundaries.

The ongoing maintenance of the District improvements will provide aesthetic and safety benefits to the property within the District. However, it is recognized that the ongoing District maintenance activities will also provide a level of benefit to some property within proximity to the District, as well as individuals passing through. Therefore, the general benefit created as a result of the District maintenance activities has been considered.

### 4.4 Quantification of Benefit

As a result of the maintenance and operation of the improvements, there will be a level of general benefit to people that do not live in or intend to conduct business within the District. In order for property within the District to be assessed only for that portion of special benefits received from the district’s maintenance activities, general benefits provided by the ongoing maintenance of the improvements needs to be quantified. The amount of general benefit that is provided from the District’s maintenance activities cannot be funded via property owners’ assessments.

The landscaping improvements are primarily located along Los Coches Street and Sinclair Frontage Road and within the subdivision along Los Coches Creek and Berryessa Creek. A portion of the maintained landscaping provides some general benefit to pass-thru traffic. Per the City, there is 52,912 square feet of landscaping being maintained.

#### Los Coches Creek and Berryessa Creek

As result of the District maintenance activities, there will be a level of general benefit to pedestrians and vehicular traffic that are not associated with property in the District. As expressed by the Court in *Beutz v. County of Riverside* (2010), “... courts of this state have long recognized that virtually all public improvement

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<sup>3</sup> Wolf, Kathleen L. (2010). *Safe Streets – A Literature Review*. In: *Green Cities: Good Health* ([www.greenhealth.washington.edu](http://www.greenhealth.washington.edu)). College of the Environment, University of Washington.

<sup>4</sup> Victoria Transport Policy Institute. (2011). *Community Livability. Helping to Create Attractive, Safe, Cohesive Communities*. Retrieved from <http://www.vtpi.org/tadm/tadm97.htm>.

*projects provide general benefits."* A route beginning or ending with a parcel within the District does not include the "general public" for purposes of determining general benefit. The landscaping improvements along the south side of Los Coches Creek and Berryessa Creek are local in nature, however even though they are intended primarily for localized access, there is some portion of pedestrian traffic that may not be accessing the adjacent properties. The landscaping improvements are located adjacent to the backyard of homes, and access is only available by walking or bicycling. There is no vehicular access to these improvements.

The Summary of Travel Trends, 2009 National Household Travel Survey (NHTS) prepared by the U.S. Department of Transportation Federal Highway Administration analyzed the number of person trips by various modes of transportations such as private vehicle, transit, walking or some other means of transportation. According to the Pacific Division data extracted from the 2009 NHTS database, of the annual 181,703 (in millions) total person trips, 21,252 (in millions) or 11.70% of those person trips were made by using walking as their mode of transportation, and 2,066 (in millions) or 1.14% of those person trips were made by bicycling<sup>5</sup>.

According to the U.S. Census Bureau (2010), the average household size in the City is 3.34 persons<sup>6</sup>. Based on this average household size, and considering there are 98 residential units within the District, there are approximately 327 people residing within the District boundaries. There are an estimated 163 residential units in close proximity, but outside of the District boundaries. Based on the City's average household size, there are approximately 544 persons residing outside of the District boundaries, but have access to the landscaping improvements.

| Community                           | Estimated Number of Residential Units | Estimated Number of Persons <sup>(1)</sup> |
|-------------------------------------|---------------------------------------|--------------------------------------------|
| District                            | 98                                    | 327                                        |
| Sundrop Subdivision                 | 83                                    | 277                                        |
| Sinclair Renaissance Subdivision    | 80                                    | 267                                        |
| <b>Total Residential Population</b> | <b>261</b>                            | <b>871</b>                                 |

<sup>(1)</sup> U.S. Census Bureau (2010) average household size in the City is 3.34 persons.<sup>7</sup>

In order to determine the estimated total number of persons who are within close proximity to the landscaping improvements, and would utilize walking or bicycling as their mode of transportation, we applied the 12.84% (11.70% walking, 1.14% bicycling) of person trips reported from the NHTS Pacific Division study, to the total nearby residential population (871). There are approximately 112 people within close proximity of the District that utilize walking or bicycling as their mode of transportation.

In order to determine the portion of the 112 persons that reside within the District, we applied the 2009 NHTS walking trip percentage (12.84%) to the District population (327). Approximately 42 people within the District boundaries use walking or bicycling as their primary mode of transportation. Therefore, the total

<sup>5</sup> U.S. Department of Transportation. Federal Highway Administration. (2011). *Summary of Travel Trends: 2009 National Household Travel Survey*. (Report No. FHWA-PL-11-022). Retrieved from <http://nhts.ornl.gov>

<sup>6</sup> U.S. Census Bureau. (2010). *Profile of General Population and Housing Characteristics: 2010, 2010 Demographic Profile Data. Milpitas, C.A.* Retrieved March 23, 2015, <http://quickfacts.census.gov/qfd/states/06/0647766.html>

<sup>7</sup> Ibid.

surrounding neighborhood area population, located outside of the District boundaries, but in close proximity the landscaping improvements, that uses walking or bicycling as their primary mode of transportation is estimated to be 70 people.

| Community                              | Estimated Number of Persons |
|----------------------------------------|-----------------------------|
| District                               | 42                          |
| Sundrop Subdivision                    | 36                          |
| Sinclair Renaissance Subdivision       | 34                          |
| <b>Walking or Bicycling Population</b> | <b>112</b>                  |

In order to obtain a better picture of the overall level of general benefit provided by the landscaping improvements, the pedestrian traffic that utilizes walking or bicycling as the mode of transportation that will seek out and use the District improvements, but live outside of the District, must be considered. The 2009 NHTS further details the purposes of the reported walking (21,252 in millions) and bicycling (2,066 in millions) trips; based on the property types people entering the District would most likely do so for social or recreational activities.

The following details the number of walking and bicycling trips, based on the 2009 NHTS study, for each of the activities that are the most likely reasons people outside of the District would use the landscaping improvements:

| Trip Purpose        | Number of Walking or Bicycling Trips (in millions) |
|---------------------|----------------------------------------------------|
| Social/Recreational | 6,442                                              |
| <b>Total</b>        | <b>6,442</b>                                       |

Of the total number of walking and bicycling trips reported, 6,442 (in millions) or 27.63% are for purposes that persons outside of the District may use the landscaping improvements. Applying this percentage (27.63%) to the number of people walking or bicycling as their mode of transportation and that reside outside of the District (70), there are approximately 19 people (general benefit) that may use the landscaping improvements, but do not reside within the District. Taking the 19 people that may walk or bicycle, but reside outside of the District, divided by total residential population with access to the landscaping improvements (871), the estimated percentage of persons, engaging in what is considered general benefit because they do not reside within the District, represents 2.21%.

#### Los Coches Street and Sinclair Frontage Road

The City does not have a study showing traffic volume along Los Coches Street and Sinclair Frontage Road along the District boundaries. The portion of the maintained landscaping that is located along Los Coches Street and Sinclair Frontage Road provides some general benefit to pass-through traffic. Before the determination and allocation of the percentage of special and general benefit for the District can be made, the estimated pass-through traffic must be computed. The pass-through trips are vehicles driving along the maintained streets within the District for a portion of their trips, but not living or conducting business in the District and benefiting from the landscaping improvements in place.

The Sundrop and Sinclair Renaissance residential communities are located directly across the street and next to the District, and vehicles entering and/or exiting these communities in all likelihood are passing by a portion of the landscaping improvements for a portion of their trip. In lieu of having a study that identifies the pass-through traffic, the estimated number of trips generated for each community has been calculated based on the number of units and average number of trips per dwelling unit.

| Community                        | Number of Residential Units <sup>(1)</sup> | Estimated Number of Daily Vehicle Trips <sup>(2)</sup> | % of Total Daily Vehicle Trips <sup>(3)</sup> |
|----------------------------------|--------------------------------------------|--------------------------------------------------------|-----------------------------------------------|
| District                         | 98                                         | 933.0                                                  | 44.34%                                        |
| Sundrop Subdivision              | 83                                         | 790.2                                                  | 37.56%                                        |
| Sinclair Renaissance Subdivision | 80                                         | 380.8                                                  | 18.10%                                        |
| <b>Total</b>                     | <b>261</b>                                 | <b>2,104.0</b>                                         | <b>100.00%</b>                                |

<sup>(1)</sup> Number of Residential Units is from the City's Approved Projects map.<sup>8</sup>

<sup>(2)</sup> Per the ITE Trip Generation Report a single family residence generates an average of 9.52 trips per dwelling unit.<sup>9</sup>

<sup>(3)</sup> Number of daily trips has been reduced by 50% to account for vehicles entering and exiting the community from the opposite direction on Sinclair Frontage Road, and not driving along the portion of Los Coches Street and Sinclair Frontage Road with landscaping improvements maintained by the District.

As detailed above, based on the average number of daily vehicle trips generated for the communities in close proximity to the District, 1,171 (55.66%) are generated by residential units located outside of the District (general benefit).

#### All Locations and Landscaping Improvements – Residential Pass-thru Benefit

The general benefit percentages determined in the previous sections for Los Coches Creek and Berryessa Creek (2.21%) and Los Coches Street and Sinclair Frontage Road (55.66%) were then applied to each corresponding location with landscaping improvements. The landscaping square footage being maintained by the District was provided by the City's Public Works Department. The general benefit percentage for each street type was multiplied by the total square footage being maintained for such street. The general benefit square footage was summed for all street segments and divided into the total square footage of all landscaping maintenance. The result is the combined general benefit percentage. The following table details this calculation.

| Street Name                        | Total Square Footage | General Benefit Percentage | General Benefit Square Footage |
|------------------------------------|----------------------|----------------------------|--------------------------------|
| Los Coches Creek                   | 4,572                | 2.21%                      | 101                            |
| Berryessa Creek                    | 21,025               | 2.21%                      | 465                            |
| Los Coches Street                  | 24,747               | 55.66%                     | 13,773                         |
| Sinclair Frontage                  | 2,568                | 55.66%                     | 1,429                          |
| <b>Totals:</b>                     | <b>52,912</b>        |                            | <b>15,768</b>                  |
| <b>Landscaping General Benefit</b> |                      |                            | <b>29.80%</b>                  |

Based on the above calculations, the general benefit portion of the improved aesthetics and increased safety resulting from the landscaping improvements is estimated to be 29.80%.

<sup>8</sup> City of Milpitas. (2013). Approved Development Projects. Retrieved from [http://www.ci.milpitas.ca.gov/government/planning/proj\\_approved.asp](http://www.ci.milpitas.ca.gov/government/planning/proj_approved.asp)

<sup>9</sup> Trip Generation, 9<sup>th</sup> Edition: An Informational Report of the Institute of Transportation Engineers. (2012). Washington, DC: Institute of Transportation Engineers.

#### Public at Large General Benefit

Given the location and nature of the improvements, it is very unlikely the public at large would seek out or use the landscaping improvements within the District. In addition, there are more direct routes to access the industrial complexes/businesses located to the south of the District than the 2 lane Los Coches Street and Sinclair Frontage Road. Nevertheless, it is perceivable that members of the public at large may pass-thru a portion of the landscaping improvements, even if it's lost or leisure traffic. As such, general benefit of 2.00% has been assigned for the landscaping improvements to the public at large

#### **4.4.1 COLLECTIVE DISTRICT-WIDE GENERAL BENEFIT**

Since the District is comprised of improved aesthetics and increased safety benefits resulting from the collective landscaping improvements, the activity of both pedestrians and vehicles, and the public at large must be addressed in a collective form rather than independently. The sum of the calculated general benefits is the total general benefit related to all pass-thru traffic. This general benefit result is provided in the table below:

|                                       |               |
|---------------------------------------|---------------|
| Residential Pass-thru General Benefit | 29.80%        |
| Public at Large General Benefit       | 2.00%         |
| <b>Total General Benefit</b>          | <b>31.80%</b> |

The general benefit, which is the percentage of the total budget that must be funded through sources other than assessments, is 31.80%. The special benefit then, which is the percentage of the budget that may be funded by assessments, is 68.20%.

## 5. METHOD OF ASSESSMENT

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### 5.1 Method of Assessment Spread

All parcels in the District on which residential dwellings will be constructed specially benefit from the improvements to an equivalent extent. These parcels are therefore assessed on a per lot basis for the maintenance and operation of the District, including incidentals and appurtenances, and will include all the costs of maintenance and/or operating the improvements. As outlined in Section 4, the total amount of general benefit from the improvements is determined to be 31.80%.

The preliminary maximum assessment rate for Fiscal Year 2021/22 is \$496.05. The actual assessment rate levied on each taxable parcel for Fiscal Year 2021/22 is \$495.19.

Each year the maximum assessment rate shall be increased by the percentage change from April 1st of the prior year to April 1st of the current year by the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Indexes, Pacific Cities and U.S. City Average, San Francisco-Oakland-Hayward. The April 1, 2021 CPI was not available at the time of writing of this Report. For purposes of this report, the CPI increase was estimated by using the February 2021/22 CPI.

## 5.2 Maximum Assessment Rates

The following table provides the historical maximum assessment rates for Fiscal Year 2000/01 through the current fiscal year:

| Fiscal Year | CPI     | Percentage Increase <sup>(1)</sup> | Maximum Rate |
|-------------|---------|------------------------------------|--------------|
| 2000/01     | 178.7   | N/A                                | \$292.803    |
| 2001/02     | 189.1   | 5.82%                              | 309.844      |
| 2002/03     | 193.0   | 2.06%                              | 316.234      |
| 2003/04     | 197.3   | 2.23%                              | 323.280      |
| 2004/05     | 198.3   | 0.51%                              | 324.918      |
| 2005/06     | 202.5   | 2.12%                              | 331.800      |
| 2006/07     | 208.9   | 3.16%                              | 342.286      |
| 2007/08     | 215.842 | 3.32%                              | 353.661      |
| 2008/09     | 222.074 | 2.89%                              | 363.872      |
| 2009/10     | 223.854 | 0.80%                              | 366.789      |
| 2010/11     | 227.697 | 1.72%                              | 373.086      |
| 2011/12     | 234.121 | 2.82%                              | 383.611      |
| 2012/13     | 238.985 | 2.08%                              | 391.581      |
| 2013/14     | 244.675 | 2.38%                              | 400.904      |
| 2014/15     | 251.495 | 2.79%                              | 412.079      |
| 2015/16     | 257.622 | 2.44%                              | 422.118      |
| 2016/17     | 264.565 | 2.70%                              | 433.494      |
| 2017/18     | 274.589 | 3.79%                              | 449.919      |
| 2018/19     | 283.422 | 3.22%                              | 464.392      |
| 2019/20     | 294.801 | 4.01%                              | 483.037      |
| 2020/21     | 298.074 | 1.11%                              | 488.400      |
| 2021/22     | 304.387 | 1.57% <sup>(2)</sup>               | 496.054      |

<sup>(1)</sup> Percentage increase from April 1 of the prior year to April 1 of the current year in the US Department of Labor, Bureau of Labor Statistics, Consumer Price Index, Pacific Cities and US City Average, San Francisco-Oakland-Hayward.

<sup>(2)</sup> The April 1, 2021 CPI was not available at the time of writing of this Report. The Fiscal Year 2021/22 CPI increase was estimated using the February 2021/22 CPI.

## 5.3 Appeals

Any property owner who feels that the amount of their assessment is in error as a result of incorrect information being used to apply the foregoing method of spread, may file an appeal with the Finance Director of the City. Any such appeal is limited to correction of an assessment during the current or, if before July 1, the upcoming fiscal year. Upon the filing of any such appeal, the Finance Director shall promptly review the information provided by the property owner and if he/she finds that the assessment should be modified, he/she shall have the authority to make the appropriate changes in the assessment roll. If any such changes are provided after the assessment roll has been filed with the County for collection, the Finance Director is authorized to refund to the property owner the amount of any approved reduction.



## 6. ASSESSMENT DIAGRAM

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The following page provides a copy of the assessment diagram of the District.



## 7. ASSESSMENT ROLL

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The assessment roll is a listing of the proposed assessment for Fiscal Year 2021/22 apportioned to each lot or parcel, as shown on the last equalized roll of the Assessor of the County of Santa Clara. The following pages show the assessment roll for Fiscal Year 2021/22.

**City of Milpitas**  
**Landscaping and Lighting Maintenance Assessment District**  
**No. 98-1**  
**Fiscal Year 2021/22 Assessment Roll**

| APN        | Assessment ID | Owner                                                                   | Fiscal Year<br>21/22 Levy | Rounding<br>Adj. | Fiscal Year<br>20/21 Total |
|------------|---------------|-------------------------------------------------------------------------|---------------------------|------------------|----------------------------|
| 086-48-001 | 1             | HUYNH CONNIE C AND NGUYEN HUNG                                          | \$495.19                  | (0.01)           | \$495.18                   |
| 086-48-002 | 2             | BHAT BALASUBRAMANYA AND RAMANANDA RAMYA N                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-003 | 3             | SANTIAGO SIMON AND RACHEL                                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-004 | 4             | GDK ENTERPRISE LLC                                                      | 495.19                    | (0.01)           | 495.18                     |
| 086-48-005 | 5             | NOGUERA ALEX D AND GUTIERREZ-NOGUERA MARLI                              | 495.19                    | (0.01)           | 495.18                     |
| 086-48-006 | 6             | KEMPIS BENJAMIN S AND EVANGELINE Q TRUSTEE                              | 495.19                    | (0.01)           | 495.18                     |
| 086-48-007 | 7             | SHILEDAR ADITYA AND BADHE PRIYA P                                       | 495.19                    | (0.01)           | 495.18                     |
| 086-48-008 | 8             | XU JIANZHONG AND WANG XIAOMIN                                           | 495.19                    | (0.01)           | 495.18                     |
| 086-48-009 | 9             | LAM TUAN AND NGUYEN YEN N                                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-010 | 10            | VU JOSEPH ANH AND TRAN YENLINH T                                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-011 | 11            | GUTIERREZ ALEJANDRO J TRUSTEE & ET AL & GUTIERREZ-NOGUERA MARLI TRUSTEE | 495.19                    | (0.01)           | 495.18                     |
| 086-48-012 | 12            | ECAL ERLINDA E AND GEORGE E                                             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-013 | 13            | DELA CRUZ DALE E AND JEANETTE M                                         | 495.19                    | (0.01)           | 495.18                     |
| 086-48-014 | 14            | TRINH DANH XUAN                                                         | 495.19                    | (0.01)           | 495.18                     |
| 086-48-015 | 15            | NGUYEN TUNG K AND LAC V                                                 | 495.19                    | (0.01)           | 495.18                     |
| 086-48-016 | 16            | LADLE GORDON B AND MARICAR C                                            | 495.19                    | (0.01)           | 495.18                     |
| 086-48-017 | 17            | JACKSON PAUL K AND BRITTON-JACKSON VIVIAN                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-018 | 18            | CAO MICHAEL T AND TAM VUONG                                             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-019 | 19            | MIGUELINO OSCAR T JR AND JUDY Y                                         | 495.19                    | (0.01)           | 495.18                     |
| 086-48-020 | 20            | BUI THUAN AND NGUYEN HA TRUSTEE                                         | 495.19                    | (0.01)           | 495.18                     |
| 086-48-021 | 21            | TRAN KENNETH L AND LENA L TRUSTEE                                       | 495.19                    | (0.01)           | 495.18                     |
| 086-48-022 | 22            | AGBUYA ALBERT P AND AMORFINA G TRUSTEE                                  | 495.19                    | (0.01)           | 495.18                     |
| 086-48-023 | 23            | PATEL BHUSHAN AND AARTI M                                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-024 | 24            | KOH CHENG-CHEE ET AL & KOH KEWSEK                                       | 495.19                    | (0.01)           | 495.18                     |
| 086-48-025 | 25            | GADIGE BHASKAR V AND HIMABINDU                                          | 495.19                    | (0.01)           | 495.18                     |
| 086-48-026 | 26            | AGARWAL SHIV AND TAYAL MANISHA TRUSTEE                                  | 495.19                    | (0.01)           | 495.18                     |
| 086-48-027 | 27            | NARVAEZ HOWARD M TRUSTEE & ET AL & CHU FONDA W TRUSTEE                  | 495.19                    | (0.01)           | 495.18                     |
| 086-48-028 | 28            | LEUNG PAUL K AND NANCY M                                                | 495.19                    | (0.01)           | 495.18                     |
| 086-48-029 | 29            | TRAN MICHAEL AND TIFFANY                                                | 495.19                    | (0.01)           | 495.18                     |
| 086-48-030 | 30            | WU XILONG AND YU ZHEBIN TRUSTEE                                         | 495.19                    | (0.01)           | 495.18                     |
| 086-48-031 | 31            | WONG IRENE TRUSTEE                                                      | 495.19                    | (0.01)           | 495.18                     |
| 086-48-032 | 32            | BAKHURU SUDHIR AND MULLASSERY DIVYA                                     | 495.19                    | (0.01)           | 495.18                     |
| 086-48-033 | 33            | RAGHUNATHA SWAROOP AND PADUBIDRI LALITHA TR                             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-034 | 34            | GUDURI VINOD AND LAKMA SHAILAJA                                         | 495.19                    | (0.01)           | 495.18                     |
| 086-48-035 | 35            | YAU TIMOTHEUS AND PEGGY                                                 | 495.19                    | (0.01)           | 495.18                     |
| 086-48-036 | 36            | VOLADRI RAMA K AND GURJAL MANI R                                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-037 | 37            | CHU WEI MUN                                                             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-038 | 38            | AGRAWAL RAKESH AND KANSAL ESHA TRUSTEE                                  | 495.19                    | (0.01)           | 495.18                     |
| 086-48-039 | 39            | DUNN ERIC J AND BUI TRANG THI THUY                                      | 495.19                    | (0.01)           | 495.18                     |
| 086-48-040 | 40            | MUNE DEREK AND LEE TERRI L                                              | 495.19                    | (0.01)           | 495.18                     |
| 086-48-041 | 41            | AGGARWAL RAHUL AND SHELLY                                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-042 | 42            | RAO QIZHOU AND SHAN MENGWEN                                             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-043 | 43            | LOW NEE-LOONG AND OH BEE-BEE                                            | 495.19                    | (0.01)           | 495.18                     |
| 086-48-044 | 44            | VOGETY RAMANAGOPAL V AND VEDANTAM KANYALAKS                             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-045 | 45            | MAI KENNY CHI AND PAULINE                                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-046 | 46            | DO KHAN AND NGUYEN THU K TRUSTEE                                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-047 | 47            | TSAI JULIE Y ET AL & TSAI CHRISTINE P                                   | 495.19                    | (0.01)           | 495.18                     |
| 086-48-048 | 48            | GDK ENTERPRISES LLC                                                     | 495.19                    | (0.01)           | 495.18                     |
| 086-48-049 | 49            | PEI NICHOLAS                                                            | 495.19                    | (0.01)           | 495.18                     |
| 086-48-050 | 50            | WANG YUN AND TONG MIN                                                   | 495.19                    | (0.01)           | 495.18                     |
| 086-48-051 | 51            | LY PETER T                                                              | 495.19                    | (0.01)           | 495.18                     |
| 086-48-052 | 52            | WONG JAMES                                                              | 495.19                    | (0.01)           | 495.18                     |
| 086-48-053 | 53            | FANG XIONG AND WANG QING                                                | 495.19                    | (0.01)           | 495.18                     |
| 086-48-054 | 54            | LAN DI AND CAO RONG TRUSTEE                                             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-055 | 55            | LAM RONNY AND JULIE TRAN TRUSTEE                                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-056 | 56            | ZHOU GUO QUAN AND LIU XIN                                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-057 | 57            | LI HONG AND TU MINGHU                                                   | 495.19                    | (0.01)           | 495.18                     |
| 086-48-058 | 58            | DUGYALA ANURADHA TRUSTEE                                                | 495.19                    | (0.01)           | 495.18                     |
| 086-48-059 | 59            | AU JONSON C AND OR SOPHIA YUK YU                                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-060 | 60            | TRUONG MAI C ET AL                                                      | 495.19                    | (0.01)           | 495.18                     |
| 086-48-061 | 61            | BASANI SHAILESH KUMAR AND SUPRIYA TRUSTEE                               | 495.19                    | (0.01)           | 495.18                     |

**City of Milpitas**  
**Landscaping and Lighting Maintenance Assessment District**  
**No. 98-1**  
**Fiscal Year 2021/22 Assessment Roll**

| APN                      | Assessment ID | Owner                                                | Fiscal Year<br>21/22 Levy | Rounding<br>Adj. | Fiscal Year<br>20/21 Total |
|--------------------------|---------------|------------------------------------------------------|---------------------------|------------------|----------------------------|
| 086-48-062               | 62            | LEE ANDREW AND LIU LISA                              | 495.19                    | (0.01)           | 495.18                     |
| 086-48-063               | 63            | AZALI ALBERTUS H AND TUNGGAL WENDA TRUSTEE           | 495.19                    | (0.01)           | 495.18                     |
| 086-48-064               | 64            | NIGAM AJAY AND ANJULA TRUSTEE                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-065               | 65            | KOMATSU HIROYUKI AND MIKA                            | 495.19                    | (0.01)           | 495.18                     |
| 086-48-066               | 66            | NAIR SEEMA                                           | 495.19                    | (0.01)           | 495.18                     |
| 086-48-067               | 67            | BIALA CHARITO M TRUSTEE & ET AL & BIALA FE T TRUSTEE | 495.19                    | (0.01)           | 495.18                     |
| 086-48-068               | 68            | NITAFAN DEMETRIO B AND CECILIA C                     | 495.19                    | (0.01)           | 495.18                     |
| 086-48-069               | 69            | NGUYEN TANYA VINH ET AL & NGUYEN STEVEN D            | 495.19                    | (0.01)           | 495.18                     |
| 086-48-070               | 70            | HUYNH QUANG AND VO JASMINE TRUSTEE                   | 495.19                    | (0.01)           | 495.18                     |
| 086-48-071               | 71            | PATEL GITA V TRUSTEE                                 | 495.19                    | (0.01)           | 495.18                     |
| 086-48-072               | 72            | FENG HAIJUN AND ZHONG WEIHONG                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-073               | 73            | XUE WEI AND SUN LI                                   | 495.19                    | (0.01)           | 495.18                     |
| 086-48-074               | 74            | GANGAIAH MAHENDRA AND VENKATARAMU CHANDRIKA          | 495.19                    | (0.01)           | 495.18                     |
| 086-48-075               | 75            | PRABHU VIVEK R AND PRADHU SUNITA T TRUSTEE           | 495.19                    | (0.01)           | 495.18                     |
| 086-48-076               | 76            | HSIAO JEFF C AND NGUYEN ANGELA T TRUSTEE &           | 495.19                    | (0.01)           | 495.18                     |
| 086-48-077               | 77            | CHIN MICHAEL AND MARY TRUSTEE                        | 495.19                    | (0.01)           | 495.18                     |
| 086-48-078               | 78            | TRUONG PHILLIP TRUSTEE                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-079               | 79            | XIONG XIANG D AND YEE VICKY TRUSTEE & ET AL          | 495.19                    | (0.01)           | 495.18                     |
| 086-48-080               | 80            | REDDY SAMINA AGUTHU ET AL & DESAI NIRAJ SHIRISH      | 495.19                    | (0.01)           | 495.18                     |
| 086-48-081               | 81            | ARUNACHALAM SARAVANAN AND KRISHNAMOORTHY SA          | 495.19                    | (0.01)           | 495.18                     |
| 086-48-082               | 82            | MA NAN                                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-083               | 83            | BUKIN KONSTANTIN V AND HSIEH PING                    | 495.19                    | (0.01)           | 495.18                     |
| 086-48-084               | 84            | DESAI RAJENDRA J AND PRATIMA R                       | 495.19                    | (0.01)           | 495.18                     |
| 086-48-085               | 85            | ZHAO QIANG JIMMY AND YUO JENNY BIN                   | 495.19                    | (0.01)           | 495.18                     |
| 086-48-086               | 86            | TAN ALICIA SHUFANG TRUSTEE                           | 495.19                    | (0.01)           | 495.18                     |
| 086-48-087               | 87            | PIERCE BRAD A AND KOH CHENG-CHEE TRUSTEE             | 495.19                    | (0.01)           | 495.18                     |
| 086-48-088               | 88            | AHUJA SUMEET AND RUCHI                               | 495.19                    | (0.01)           | 495.18                     |
| 086-48-089               | 89            | DEVADAS MANJUNATH AND KARVETI HEMALATHA              | 495.19                    | (0.01)           | 495.18                     |
| 086-48-090               | 90            | LIEU TONY AND TIFFANY                                | 495.19                    | (0.01)           | 495.18                     |
| 086-48-091               | 91            | KRISHNAN ANANTA AND KUMAR MAYA                       | 495.19                    | (0.01)           | 495.18                     |
| 086-48-092               | 92            | LIM PERRY F AND DIXIE M TRUSTEE                      | 495.19                    | (0.01)           | 495.18                     |
| 086-48-093               | 93            | LU COURTNIIE TU TRINH                                | 495.19                    | (0.01)           | 495.18                     |
| 086-48-094               | 94            | QUANG TONY D                                         | 495.19                    | (0.01)           | 495.18                     |
| 086-48-095               | 95            | SINGLA SANJEEV K AND ANITA                           | 495.19                    | (0.01)           | 495.18                     |
| 086-48-096               | 96            | PAL SHIRISH C AND DAS SUJATA S                       | 495.19                    | (0.01)           | 495.18                     |
| 086-48-097               | 97            | ANNADATA ANIL K AND VEEPURI SRAVANTHI                | 495.19                    | (0.01)           | 495.18                     |
| 086-48-098               | 98            | ONG PHILIP J JR AND UYEN T TRUSTEE                   | 495.19                    | (0.01)           | 495.18                     |
| <b>Total: 98 Parcels</b> |               |                                                      | <b>\$48,528.62</b>        | <b>-\$0.98</b>   | <b>\$48,527.64</b>         |



CITY OF MILPITAS  
LANDSCAPING MAINTENANCE DISTRICT (LMD) 98-1  
(N.T.S.)



2021-2022 FISCAL YEAR LANDSCAPE AREA FUNDED FOR MAINTENANCE



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | Adopt a Resolution Approving Acceptance of Public Improvements and Approving Reduction of Faithful Performance Bond for Public Improvements for the California Circle Residential Project located at 1210 California Circle, Tract 10359 by KB Home South Bay, Inc., and Granting Authorization to the City Engineer to Release the Performance Bond after the One-year Warranty Period.                                                                                                                                                                                                                                                                                                          |
| <b>Category:</b>       | Consent Calendar-Community Development                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Staff Contact:</b>  | Steve Erickson, 408-586-3301                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Recommendation:</b> | <p>Adopt a resolution:</p> <ol style="list-style-type: none"><li>1. Approving acceptance of public improvements for the California Circle Residential Project located at 1210 California Circle, Tract 10359, Public Improvement Plan 2-1219; and</li><li>2. Approving a reduction in the faithful performance bond to \$131,000.00, which shall be subject and in effect for the duration of a one-year warranty period; and</li><li>3. Granting authorization to the City Engineer to release the performance bond after the one-year warranty period, without further City Council action provided all required warranty work is completed to the satisfaction of the City Engineer.</li></ol> |

### **Background:**

On February 17, 2017 the City Council approved the Final Map, public improvement plans and the Subdivision Improvement Agreement ("Agreement") for Tract 10359 for the California Circle Residential Project located at 1210 California Circle by KB Home South Bay, Inc. ("Developer").

Public improvements included installation of sidewalk; curb and gutter; curb ramps; median island; pavement; pavement striping; utility services; landscaping; streetlights; 800 linear feet of 42-inch diameter sanitary sewer pipe lining; and other miscellaneous items of work for the project along the California Circle project frontage. A mid-block decorative crosswalk with raised pedestrian refuge island and dual flashing beacons was also constructed across California Circle as part of the public improvements.

### **Analysis:**

The public improvement work has been successfully completed in accordance with the approved plans, and specifications, and the work is ready for acceptance and commencement of the 1-year warranty period. Staff recommends the City Council adopt a resolution to accept the public improvements, reduce the performance bond to \$131,000.00, which is 10% of the security's original value, and authorize to the City Engineer to release the performance bond after the one-year warranty period once all required warranty work is satisfactorily completed.

### **Policy Alternatives:**

#### **Alternative 1:**

Do not approve resolution granting acceptance of installed public improvements.

Pros: None

Cons: The Subdivision Improvement Agreement between the City and Developer requires the City to accept successfully installed public improvements that have passed inspection and meet the requirements of the Agreement and the approved plans and specifications. Not accepting the completed public improvements as required by the Subdivision Improvement Agreement would delay the project and may subject the City to a claim by the Developer.

Reason not recommended: Granting acceptance of installed public improvements would allow the City to own and maintain the improvements and would ensure the City is in compliance with the terms of the agreement with the Developer.

**Fiscal Impact:**

The public improvements have been constructed by the Developer as a requirement of the Subdivision Improvement Agreement. The City will have perpetual maintenance responsibilities for the improvements following completion of the 1-year warranty period.

**California Environmental Quality Act:**

Granting acceptance of public improvements and reducing faithful performance bond for public improvements are not considered projects under CEQA as there will be no direct or reasonably foreseeable indirect physical change in the environment.

**Recommendation:**

**Adopt a resolution:**

1. Approving acceptance of public improvements for the California Circle Residential Project located at 1210 California Circle, Tract 10359, Public Improvement Plan 2-1219; and
2. Approving a reduction in the faithful performance bond to \$131,000.00, which shall be subject and in effect for the duration of a one-year warranty period; and
3. Granting authorization to the City Engineer to release the performance bond after the one-year warranty period, without further City Council action provided all required warranty work is completed to the satisfaction of the City Engineer.

**Attachments:**

Resolution



**RESOLUTION NO. \_\_\_\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS APPROVING ACCEPTANCE AND REDUCING PERFORMANCE BOND OF CALIFORNIA CIRCLE RESIDENTIAL PROJECT, TRACT 10359 AND GRANTING AUTHORIZATION TO THE CITY ENGINEER TO RELEASE THE PERFORMANCE BOND AFTER THE ONE-YEAR WARRANTY PERIOD**

**WHEREAS**, the City Council of the City of Milpitas on February 17<sup>th</sup>, 2017 approved the plans and specifications for the California Circle Residential Project, Tract No. 10359, (the “Project”) to be completed by KB Home South Bay, Inc. as part of its residential development on 1210 California Circle; and

**WHEREAS**, the City of Milpitas has heretofore entered into a subdivision improvement agreement on February 17<sup>th</sup>, 2017 with KB Home South Bay, Inc., for the California Circle Residential Project; and

**WHEREAS**, KB Home South Bay, Inc., as Principal, and Westchester Fire Insurance Company, as Surety, executed and posted a certain Performance Bond No. K09266963 conditioned upon the faithful performance of the provisions of said subdivision improvement agreement and upon the faithful performance of all improvement work required thereunder; and

**WHEREAS**, said public improvements for California Circle Residential Project have been completed and the subdivision improvement agreement provides that the security shall extend for a period of one year after the date of acceptance of said improvements to cover the warranty period of said improvements under said agreement; and

**WHEREAS**, the City Council is willing to consent to a reduction in the penal sum of said security during said one year warranty period; and

**WHEREAS**, the City Engineer of the City of Milpitas has made a final inspection of said improvements for the California Circle Residential Project and recommends that the City Council of the City of Milpitas accept the same as constructed in accordance with the approved plans and specifications.

**NOW, THEREFORE**, the City Council of the City of Milpitas hereby finds, determines, and resolves as follows:

1. The City Council has considered the full record before it, which may include but is not limited to such things as the staff report, testimony by staff and the public, and other materials and evidence submitted or provided to it. Furthermore, the recitals set forth above are found to be true and correct and are incorporated herein by reference.
2. Those certain public improvements constructed as part of the California Circle Residential Project, Tract No. 10359, are hereby accepted as constructed in accordance with the approved plans and specifications upon recommendation of the City Engineer of the City of Milpitas.
3. The penal sum of the faithful performance bond securing said improvements may be reduced to the sum of \$131,000.00, upon request of Principal and Surety, with said penal sum as reduced to apply from the date of completion and acceptance of said improvements and to extend for the balance of the term of one year of said security. Provided, however, that nothing herein contained shall in any way be deemed to be a waiver, release or relinquish by City of any obligations imposed upon the developer or his surety, or sureties, by law or by the above referend subdivision improvement agreement, save and except as expressly set forth herein.
4. The City Council grants authorization to the City Engineer to release the performance bond after the one-year warranty period without further City Council action provided all required warranty work is completed to the satisfaction of the City Engineer.

PASSED AND ADOPTED this \_\_\_\_\_ day of \_\_\_\_\_, 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | Adopt a Resolution Accepting the 2021 Santa Clara County Multi-Jurisdictional Program for Public Information Program; A Program Under the Community Rating System of the Federal Emergency Management Agency's National Flood Information Program. |
| <b>Category:</b>       | Consent Calendar-Community Development                                                                                                                                                                                                             |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                                                                                                                                          |
| <b>Staff Contact:</b>  | Steve Erickson, 408-586-3301                                                                                                                                                                                                                       |
| <b>Recommendation:</b> | Adopt a Resolution Accepting the 2021 Santa Clara County Multi-Jurisdictional Program for Public Information Program; A Program Under the Community Rating System of the Federal Emergency Management Agency's National Flood Information Program. |

### **Background:**

The City of Milpitas participates in the National Flood Insurance Program (NFIP) and the Community Rating Service (CRS) programs which help provide lower cost flood insurance to residents living within the FEMA designated Special Flood Hazard Areas (SFHA). Participation in the programs requires the City to enforce the Federal floodplain development regulations, complete various public outreach tasks, and improve the storm drain systems to prevent flooding.

The Programs also require communities to approve a 5-year Multi-Jurisdictional Program for Public Information (PPI). The PPI allows communities to share a common vision to improve the efficiency of a collective outreach effort and to tailor outreach messages better to local needs that will help communities maintain or improve their individual CRS ratings by encouraging the purchase of flood insurance and promoting best practices that reduce flood risk.

The Valley Water District Board adopted the original PPI for use by communities within Santa Clara County that participate in the NFIP and CRS programs. The PPI is required to be updated every 5-years to evaluate the public outreach messaging and to adjust the PPI as needed.

### **Analysis:**

The Valley Water District worked with Santa Clara County communities to update the PPI, and the draft 2021 PPI was reviewed by FEMA to ensure its provisions fully comply with FEMA requirements. Valley Water approved the updated 2021 5-Year PPI Plan on April 27, 2021 and provided the document to participating jurisdictions for approval and implementation with the existing CRS programs.

In addition to FEMA's standard flood hazard messages, two new messages were determined to be important to Santa Clara County residents and are included in the updated Plan. The first is encouraging residents and workers to create a personal family emergency plan. The second new message urges drivers to slow down on wet roads and to avoid driving through ponded water to reduce traffic accidents.

The approval of the updated 2021 PPI is required by FEMA, and it benefits the Milpitas Community in that it allows the City to maintain its good standing in the NFIP and CRS Programs and it provides low cost flood insurance to Milpitas residents. Staff recommends the City Council adopt a resolution accepting the 2021 Santa Clara County Multi-Jurisdictional Program for Public Information (PPI).

### **Policy Alternatives:**

**Alternative:**

Do not approve resolution granting acceptance of the 2021 Santa Clara Multi-Jurisdictional Program for Public Information as required by the Federal Emergency Management Agency.

Pros: None

Cons: A denial would result in a significant loss of points within the Community Rating System (CRS) which FEMA uses to classify the City's flood-risk rating and would result in higher cost flood insurance for Milpitas residents.

Reason not recommended: FEMA requires jurisdictions participating on the NFIP and CRS Programs to adopt the multi-jurisdictional PPI, and continued participation in the Programs is recommended to ensure Milpitas residents receive the benefits of lower cost flood insurance.

**Fiscal Impact:**

There is no financial impact associated with this item.

**California Environmental Quality Act:**

Granting acceptance of this resolution is not considered a project under CEQA as there will be no direct or reasonably foreseeable indirect physical change in the environment.

**Recommendation:**

Adopt a Resolution Accepting the 2021 Santa Clara County Multi-Jurisdictional Program for Public Information Program; A Program Under the Community Rating System of the Federal Emergency Management Agency's National Flood Information Program.

**Attachments:**

Attachment 1: Resolution

Attachment 2: 2021 SC County Multi-Jurisdictional PPI

**RESOLUTION NO.**

**ADOPT A RESOLUTION ACCEPTING THE 2021 SANTA CLARA COUNTY MULTI-JURISDICTIONAL PROGRAM FOR PUBLIC INFORMATION PROGRAM; A PROGRAM UNDER THE COMMUNITY RATING SYSTEM OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S NATIONAL FLOOD INFORMATION PROGRAM**

**WHEREAS**, in 1968, the United States Congress passed the National Flood Insurance Act creating the National Flood Insurance Program (NFIP). The NFIP was designed to reduce future flood losses through local floodplain management programs and provision of flood insurance to those most in need. The NFIP requires that participating communities adopt certain minimum requirements intended to reduce future flood losses; and

**WHEREAS**, in 1990, the National Flood Insurance Program implemented the Community Rating System (CRS) as a voluntary program for recognizing and encouraging community floodplain activities that exceed the minimum NFIP standards; and

**WHEREAS**, in 1991, the City of Milpitas was admitted to the Community Rating Program (CRS). The City's participation in the CRS program gives flood insurance policy holders a discounted premium; and

**WHEREAS**, in 2013, the Federal Emergency Management Agency (FEMA), the agency responsible for implementing the NFIP, updated the CRS program by adding new elements to encourage each participating community to increase efforts in promoting CRS goals; and

**WHEREAS**, one of the elements of the CRS program is the formation of a multi-jurisdictional Program for Public Information (PPI) that will encourage targeted outreach to a larger regional area; and

**WHEREAS**, in 2021, the City of Milpitas, along with other communities in Santa Clara County, worked with the Valley Water District to create a local PPI. The PPI was developed jointly and must be approved individually by each community's elected body into order to provide enhancement to the local agency's CRS program; and

**WHEREAS**, in each subsequent year an annual report must be submitted to FEMA to describe PPI implementation and every five years, the legislative bodies of all participating communities must re-approve the plan in order to continue receiving CRS credit.

**NOW, THEREFORE**, the City Council of the City of Milpitas hereby finds, determines, and resolves as follows:

1. The City Council has considered the full record before it, which may include but is not limited to such things as the staff report, testimony by staff and the public, and other materials and evidence submitted or provided to it. Furthermore, the recitals set forth above are found to be true and correct and are incorporated herein by reference.
2. The City Council hereby approves the 2021 Santa Clara County Multi-jurisdictional Program for Public Information, a copy of which is attached hereto as **Exhibit A**.

PASSED AND ADOPTED this 18<sup>th</sup> day of May, 2021, by the following vote:

AYES: (0)

NOES: (0)

ABSENT: (0)

ABSTAIN: (0)

ATTEST:

\_\_\_\_\_  
Wendy Wood, City Clerk

APPROVED:

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM: \_\_\_\_\_  
Christopher J. Diaz, City Attorney

# Santa Clara County Multi-Jurisdictional Program for Public Information 2021 (5-Year Plan)



April 2021

Prepared by:

Santa Clara Valley Water District

and

Participating County of Santa Clara Communities

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## List of Abbreviations

| <b>Abbreviation</b> | <b>Description</b>                              |
|---------------------|-------------------------------------------------|
| AFN                 | Access and Functional Needs                     |
| ALERT               | Automated Local Evaluation in Real Time         |
| ARES                | Amateur Radio Emergency Services                |
| CADRE               | Collaborating Agencies' Disaster Relief Effort  |
| CAL                 | Communities at Large                            |
| CCD                 | Coastal Clean-Up Day                            |
| CERT                | Community Emergency Response Team               |
| CFM                 | Certified Floodplain Manager                    |
| CFPW                | California Flood Preparedness Week              |
| CIP                 | Capital Improvement Projects                    |
| COVID               | Corona Virus Disease                            |
| CP                  | Coverage Improvement Plan                       |
| CPI                 | Coverage Improvement Plan Implementation        |
| CPRU                | Community Project Review Unit                   |
| CRS                 | Community Rating System                         |
| CUP                 | City of Cupertino                               |
| CWM                 | Countywide Mailer                               |
| DFH                 | Disclosure of Flood Hazard                      |
| DWR                 | Department of Water Resources                   |
| ECHO                | Executive Council of Homeowners                 |
| EOC                 | Emergency Operations Center                     |
| ED                  | Earth Day                                       |
| ESV                 | Emergency Services Volunteers                   |
| FAA                 | Financial Assistance Advice                     |
| FEMA                | Federal Emergency Management Agency             |
| FIRM                | Flood Insurance Rate Map                        |
| FPM                 | Floodplain Manager or Floodplain Mailer         |
| FRP                 | Flood Response Preparations                     |
| GIL                 | City of Gilroy                                  |
| GIS                 | Geographic Information System                   |
| GF                  | Gilroy Garlic Festival                          |
| HOA                 | Homeowners Association                          |
| ISO                 | Insurance Services Office                       |
| JPA                 | Joint Powers Authority                          |
| LA                  | City of Los Altos                               |
| LAH                 | Town of Los Altos Hills                         |
| LG                  | Town of Los Gatos                               |
| MS4s                | Municipal Separate Storm Sewer Systems          |
| NFIP                | National Flood Insurance Program                |
| NOAA                | National Ocean & Atmospheric Administration     |
| NPDES               | National Pollutant Discharge Elimination System |



|          |                                                              |
|----------|--------------------------------------------------------------|
| NRCD     | National River Clean-Up Day                                  |
| OA       | Operational Area                                             |
| OEM      | Office of Emergency Management                               |
| OES      | Office of Emergency Services                                 |
| O&M      | Operations & Maintainance                                    |
| OP       | Outreach Project                                             |
| MCOH     | Municipal Corporation Open House                             |
| MIL      | City of Milpitas                                             |
| MH       | City of Morgan Hill                                          |
| MV       | City of Mountain View                                        |
| MVA&WF   | Mountain View Art & Wine Festival                            |
| PA       | City of Palo Alto                                            |
| PE       | Professional Engineer                                        |
| PG&E     | Pacific Gas & Electric                                       |
| PPA      | Property Protection Advice                                   |
| PPI      | Program for Public Information                               |
| PPV      | Protection Advice Provided after a Site Visit                |
| PWWCOH   | Public Works Week Community Open House                       |
| RACES    | Radio Amateur Civil Emergency Service                        |
| ReadySCC | Ready Santa Clara County                                     |
| REB      | Real Estate Agent Brochure                                   |
| RL       | Repetitive Loss                                              |
| SAR      | City of Saratoga                                             |
| SC       | City of Santa Clara                                          |
| SCC      | Santa Clara County                                           |
| SCVURPP  | Santa Clara Valley Urban Runoff Pollution Prevention Program |
| SFHA     | Special Flood Hazard Area                                    |
| SJ       | City of San José                                             |
| SU       | City of Sunnyvale                                            |
| TA       | Target Audience                                              |
| TNL      | Thursday Night Live                                          |
| TP       | Town Picnic                                                  |
| USACOE   | United States Army Corps of Engineers                        |
| USGS     | United States Geological Survey                              |
| VW       | Valley Water                                                 |
| WDR      | Waste Discharge Requirements                                 |
| WEB      | Flood Protection Website                                     |

## I. BACKGROUND

Santa Clara County is located at the south end of San Francisco Bay and has come to be known as Silicon Valley. Currently, eleven (11) of the seventeen (17) communities in Santa Clara County participate in the Federal Emergency Management Agency's (FEMA), National Flood Insurance Program (NFIP), Community Rating System (CRS), a program to provide discounts on flood insurance premiums. Santa Clara Valley Water District (Valley Water), the water management agency for Santa Clara County, participates as one of the few fictitious communities in the nation. This unique arrangement was set up with FEMA in 1998 so participating Santa Clara County CRS communities could take advantage of Valley Water's point-earning efforts. Essentially, this allows Valley Water's activities to provide a foundation of points with simplified bookkeeping, since FEMA has already approved the activities through Valley Water's 5-year verification visits and subsequent annual recertifications.

Flooding in Santa Clara County comes from heavy local rainstorms that occur during the winter months of December through March. Occasionally, the rainy season extends into April, but little rain falls between May to October. Valley Water designs and carries out extensive flood protection outreach programs. For example, Valley Water shares social media videos and postings, digital banners, newspaper advertorials, radio, and television/mobile ads targeted by area and language and maintains an extensive website of flood protection information. Communities have augmented Valley Water's efforts through other efforts targeted within their specific jurisdiction. Until the Program for Public Information (PPI) process started, there had been little discussion between the communities and Valley Water about the effectiveness of these programs and if they contained the most significant messages.

Since becoming part of the program, Valley Water has led meetings to educate participating communities floodplain managers and increase participation in CRS. In 2012, Valley Water hosted a 5-day FEMA class on Floodplain Management, to help prepare staff from local cities for the Certified Floodplain Manager (CFM) exam. Based on the high number of participants, it was clear that local communities were interested in working with their counterparts in other communities to understand the CRS program better and maximize their own jurisdiction's CRS points.

The California Department of Water Resources (DWR) provides statewide NFIP workshops that are designed to interpret and explain the NFIP regulations and to give an overview of the need for community-based floodplain management. DWR and FEMA conduct workshops for floodplain management agencies, including State and local officials. The workshops allow floodplain management officials to have a greater understanding of FEMA's minimum regulation requirements and how to meet them. Valley Water continues to coordinate with the DWR to ensure these trainings and workshops can be offered locally to our area's CFMs and floodplain management officials by hosting these events, at a minimum, every other year.

The new Program for Public Information (PPI) introduced in the *FEMA NFIP CRS Coordinator's Manual (Edition 2013)* was recognized as an excellent project to work on jointly with the CRS communities of Santa Clara County. As stated in the example PPI from Snohomish County, Washington:

*The Program for Public Information is a planning tool to provide a step-by-step coordinated approach to flood hazard outreach. The PPI can be developed and implemented by a single community or with other communities as a multi-jurisdictional effort. The purpose is the same: to improve communication with citizens, and to provide information about flood hazards, flood safety, flood insurance and ways to protect property and natural floodplain functions to those who can benefit from it. The intent of the CRS program, and the PPI, is to reduce injury to people and damage to property from future floods. Coordination between jurisdictions through a Multi-Jurisdictional Program for Public*

*Information further increases efficiency in resources and improves communication with citizens.*

Additionally, developing a Multi-Jurisdictional PPI in Santa Clara County was a way to earn significant CRS points, which may translate into greater discounts on flood insurance premiums for our policy holders. The Multi-Jurisdictional PPI rewards participants for developing messages that are tailored to local needs.

In November 2013, Valley Water proceeded to convene a meeting of all the CRS coordinators in the county to explain the PPI process and gauge interest for developing a Multi-Jurisdictional PPI for Santa Clara County. Although Valley Water offered to host the process and provided staffing, it was understood that for the 2015 PPI development each participating community would be required to: 1) conduct the CRS Self-Assessment; 2) recruit a non-governmental stakeholder; 3) participate in the PPI Committee meetings and 4) bring the PPI to their elected body for approval. With the enthusiastic support of the CRS coordinators, the PPI process was started.

In 2015, twelve (12) communities agreed to develop the PPI. These communities were comprised of the ten (10) incorporated cities, County of Santa Clara, and Valley Water. For the original twelve (12) communities, several factors encouraged development of the PPI in 2015. First, the California Department of Water Resources (DWR) *Flood Futures Report*, released in November of 2013, took a comprehensive look at flood risk across the entire state. Santa Clara County was listed second in California in two important flood risk categories: most-people-exposed-to-flooding and most-property-exposed-to-flooding. Additionally, the threat of sea-level rise and increases in storm intensity expected from climate change may make flooding more severe locally. Finally, the local Insurance Service Office (ISO) CRS Specialist brought it to Valley Water's attention as something that would work well with the agency's role as a fictitious community.

The six priority topics of the revised CRS program are essentially best management practices for households but are not necessarily focused on businesses. The major employers of Silicon Valley form a ring around the edge of the bay, located in areas subject to tidal flooding. As sea levels rise due to climate change, these industrial parks will be subject to more frequent flooding. Although the buildings may be designed to withstand floods, issues associated with flooded roads may create problems for thousands of workers getting to and from work. Each person who works in the tidal flooding zone will need to develop emergency plans for getting home before freeways flood, communicate with their families, and take care of them.

In Santa Clara County, most of the flood risk to households is from fluvial flooding (creek flooding). Since Santa Clara County is adjacent to San Francisco Bay, tidal and fluvial flooding both pose risks. Historically, fluvial flooding has caused most of the flood damage that has occurred here, but in the future, the risk of tidal flooding is expected to increase due to climate change-induced sea-level rise. The PPI Committee meetings have provided an opportunity for staff from the various cities and Valley Water, who work on CRS regularly, to talk about what the local flood messages really need to say and what aspects of the extensive public outreach plan are already in place and are working well. As electronic forms of communication become more and more a part of daily living, information is expected to be just a few clicks away. The role of local flood professionals is to make sure that the information is in place for people to find when they need it. In the PPI meetings, discussions have occurred as to what makes up that "needed information."

## II. GOALS

The PPI participants share a vision to improve the efficiency of the communities' collective outreach efforts and to tailor outreach messages better to local needs. The participants also see the PPI as the backbone activity of an ongoing CRS Users Group that will help the local governments maintain or improve their individual CRS ratings by encouraging the purchase of flood insurance and promoting best practices that reduce flood risk.

At the beginning of the PPI process, it was recognized that getting the twelve (12) communities to meet all the FEMA requirements for participation would be a challenge. Consequently, the goal was set for the first year's PPI as getting the process going with as many communities as possible and developing a track record of success. Given that Valley Water has had an extensive public outreach program for many years, the goal was not to increase the size and scope of the program but to tailor the existing programs to be more effective and efficient.

Through discussions with stakeholders during the PPI meetings, the PPI process was determined to be a good way to evaluate the existing outreach system and build on what works well. The cities' staff had good insight about what aspects of Valley Water's program were well-received with their residents through questions, complaints, and comments they have gotten from the public over the years. The stakeholders shared reactions to various components of past outreach efforts and their effectiveness in conveying the message.

Several messages relating to public safety came out of the discussions as messages that need to be stressed. One was to "*slow down on wet roads*" and the other is "*never drive through water.*" Even though these are common sense messages, there are accidents every rainy season because some people do not follow them.

The lack of personal emergency plans was also seen as an ongoing problem. Although it is easy to prepare these plans, many families do not get around to it until after the emergency has already happened. For the most part, the family emergency plan is the same for a whole range of emergencies. Locally, the most likely emergencies are related to fire, earthquake, or flooding.

Another goal that surfaced through the discussions is collaborating with non-governmental organizations like American Red Cross and Pacific Gas & Electric (PG&E), who conduct their own outreach. A few slides will be added to the standard American Red Cross and/or PG&E presentations on flooding and encouraging people to purchase flood insurance. The PPI participants may send speakers with knowledge of flooding to appropriate groups.

## III. PPI COMMITTEE

### 2015 PPI Committee

FEMA requires that each community provide at least two representatives to the regional PPI Committee, with at least half of the representatives from outside of the local government. Additionally, at least half of the representatives must attend all the meetings of the regional committee. The past 2015 PPI Committee is listed in Appendix C.

Each PPI Committee member was asked to share their perspectives on flood information needs and how the existing programs worked.

The meetings were organized to follow the example in the FEMA report *Developing a Program for Public Information (March 2013)* which breaks the process into the following seven (7) steps:

- Step 1: Establish a PPI Committee.
- Step 2: Assess the community's public information needs and inventory existing public information and outreach efforts.
- Step 3: Formulate messages.
- Step 4: Identify outreach projects to convey the messages.
- Step 5: Examine other public information initiatives.
- Step 6: Prepare the PPI document.
- Step 7: Implement, monitor, and evaluate the program.

The process was designed to be accomplished in four meetings to allow time for a wide range of discussions. Between the third and the fourth meeting, a subgroup worked on drafting the PPI for the rest of the committee members to review. The dates were set at the beginning of the process for participants to arrange their schedules accordingly. Even with a lot of lead time, getting participation was challenging. Part of the issue may have been local weather conditions. Severe drought made planning for flood protection seem less relevant than normal.

The first stakeholder meeting was held on February 12, 2014. Communities were asked to complete FEMA's self-assessment before the meeting. The participants got to know each other by sharing the flood risk characteristics and flood insurance statistics identified from the self-assessments. These characteristics were translated into the public information needs (Step 2) and target audiences. Step 3 was started by formulating messages and Step 4 by identifying projects for the PPI.

The second meeting was held on March 27, 2014. The information from the previous meeting had been captured in a draft of the PPI worksheet and it was agreed to use this draft worksheet as minutes of the discussion. A presentation was given on the outreach program operated by Valley Water and discussion ensued regarding the effectiveness of these programs based on perceptions of the stakeholders. Significant progress was made on Steps 3, 4, and 5. In addition to outreach projects, the importance of other public information initiatives (Step 5) was discussed. As our society gets more web-based, people expect to find the information they seek at any time day or night within a few clicks. The consensus was that as the flood protection professionals for the county, it is our job to make sure that the information is available on our websites for our residents to find when they need it.

The third meeting was held on April 24, 2014. The American Red Cross presented their outreach programs, which are designed for disaster planning in general, not necessarily for flooding disasters. PG&E also briefly presented. This finished Step 2. The PPI worksheet was updated again.

During the April meeting, a sub-committee was convened to draft the PPI. Three working meetings were held to work through issues related to the draft. Writing assignments were shared to produce a draft for the full PPI Committee to review. Messages were formulated (Step 3) and outreach projects to convey the messages (Step 4) were identified.

The fourth meeting was held on June 26, 2014, to discuss the draft of the PPI and to finish filling out the assignments for the PPI worksheet. Based on the comments received at the meeting, another draft was circulated by email for the PPI stakeholders to approve.

### **2021 PPI Committee**

Every five years, the PPI Committee reconvenes to review and revise the PPI document. The 2021 PPI Committee (see Table 1) initially met on February 27, 2020, to update the 2015 PPI; due to sunset in April 2020. The meeting outcomes included: 1) gathering communities' input on how the 2015 PPI worked in FY20; 2) planning and confirming the PPI messages to finalize the Annual Evaluation Report for FY20 (Year 5), and 3) reviewing and updating the 2015 PPI to develop the 2021 PPI in accordance with the *FEMA NFIP CRS Coordinator's Manual (Edition 2017)*.

Shortly after the meeting, on March 4, 2020, Governor Gavin Newsom issued a Proclamation of a State of Emergency in the State of California in response to the COVID-19 pandemic. On March 16, 2020, the County of Santa Clara Public Health Officer issued a legal order directing all residents to shelter-in-place starting March 17, 2020. In compliance with the Public Health Order, all upcoming Santa Clara County PPI Meetings were postponed until further notice.

On October 29, 2020, the PPI Committee reconvened virtually to discuss the revisions on the 2015 PPI. It was the consensus of the committee to amend the existing 2015 PPI, rather than create a new document.

On December 11, 2020, the PPI Committee met virtually to review the newly drafted 2021 PPI. During the meeting, Valley Water's 2020-21 Flood Awareness Campaign was discussed, including Valley Water's Annual Floodplain Mailer. The committee also reviewed the previous year's 2019-20 Flood Awareness Campaign survey data results. Valley Water shared the 'Social Media Resource Guide' available to all Santa Clara County cities and the county.

The PPI Committee reviewed the additional outreach projects for Activity 360 - Flood Protection Assistance and outreach projects for Activity 370 - Flood Insurance Promotion. Additionally, the PPI Committee agreed to create two Appendices. Appendix A documents the creditable CRS activities each community will report on during their verification cycle visit and Appendix B documents the non-creditable Activity 330 Outreach Projects conducted in the community. The non-creditable CRS activities are other additional flood preparedness outreach efforts the community undertakes; however, outreach projects identified in Appendix B may be creditable under other CRS activities/element, such as Activity 350, c). Flood protection website (WEB).

For the benefit of communities/representatives who were unable to join the PPI meetings scheduled on February 27, 2020, October 29, 2020, or December 11, 2020, Zoom videos of the October and December meetings were shared with PPI Committee members following each meeting.

For the 2021 PPI Committee, there are 15 participating communities, 11 (eleven) participating CRS communities and four (4) communities who are showing an interest in applying to become a CRS community. These four communities are the County of Santa Clara, the Town of Los Altos Hills, the Town of Los Gatos, and the City of Saratoga.

### **Stakeholder Definition and Responsibilities**

According to the *FEMA NFIP CRS Coordinator's Manual (Edition 2017)* (page 330-23), "a stakeholder can be any agency, organization, or person (other than the community itself) that supports the message." For example, a city resident or floodplain resident, business leader, insurance agent, civic group, academia, a non-profit organization, major employers, managers of critical facilities, farmer, landowner, developer, and other participants with no attachment to the local government can be a stakeholder.

The responsibilities of a stakeholder are as follows:

Annually:

- 1) Attend Santa Clara County PPI Committee Meetings (internal/external stakeholder) meetings (typically two (2) meetings a year); and
- 2) Provide input on the development of the Annual Evaluation Report for the PPI.

Every Five Years:

- 1) Provide input on the development of the Santa Clara County Multi-Jurisdictional Program for Public Information (PPI) with the perspective of a resident/business/organization (typically 2-4 meetings every five (5) years).



**Table 1. Members of the Santa Clara County Multi-Jurisdictional 2021 PPI Committee**

| <b>Community</b>      | <b>Local Government Representative and Alternates</b>                                                                                                                                                                                                           | <b>External Stakeholders</b>                                                                                                 |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| County of Santa Clara | <b>Chris Freitas</b> , Sr. Civil Engineer<br><b>Neville R. Pereira</b> , PE, Development Services Manager, Department of Planning and Development, Floodplain Manager                                                                                           | <b>Marsha Hovey</b> , CADRE Board Chair                                                                                      |
| Cupertino             | <b>Chad Mosley</b> , Assistant Public Works Director/City Engineer, Public Works Department, Floodplain Manager<br><b>Jennifer Chu</b> , Senior Civil Engineer Public Works Department                                                                          | <b>Jim Oberhofer</b> , Emergency Coordinator Cupertino ARES/RACES                                                            |
| Gilroy                | <b>Gary Heap</b> , City Engineer Public Works Department<br><b>Jorge Duran</b> , Senior Civil Engineer, Floodplain Manager Public Works Department                                                                                                              | <b>Merna Leal</b> , City of Gilroy resident                                                                                  |
| Los Altos             | <b>Steven Golden</b> , Senior Planner, Floodplain Manager<br><b>Andrea Trese</b> , Associate Civil Engineer                                                                                                                                                     | <b>Christopher Wilson</b> , Operations Manager, Los Altos Suburban District, California Water Company                        |
| Los Altos Hill        | <b>Carl Cahill</b> , City Manager, Floodplain Manager<br><b>Nichol Bowersox</b> , Public Works Director/ City Engineer<br><b>Christine Hoffmann</b> , Assistant Engineer (DPW)                                                                                  | <b>Phil Witt</b> , General Manager Purissima Hills Water District                                                            |
| Los Gatos             | <b>WooJae Kim</b> , P.E, Town Engineer Parks and Public Works, Floodplain Manager                                                                                                                                                                               | <b>Annamaria Swardenski</b> , Swardenski Consulting                                                                          |
| Milpitas              | <b>Steven Erickson</b> , City Engineer/Engineering Director, Floodplain Manager<br><b>Brian Petrovic</b> , Associate Civil Engineer Engineering Land Development Section<br><b>Elizabeth Koo</b> , Administrative Analyst, Engineering Land Development Section | <b>Warren Wettenstein</b> , President of the Milpitas Chamber                                                                |
| Morgan Hill           | <b>Maria Angeles</b> , Senior Civil Engineer, Floodplain Manager, CFM<br><b>Charlie Ha</b> , Supervising Civil Engineer Engineering & Utilities Department                                                                                                      | <b>Swanee Edwards</b> , City of Morgan Hill resident                                                                         |
| Mountain View         | <b>Renee Gunn</b> , Senior Civil Engineer, Public Works Department<br><b>Gabrielle Abdon</b> , Assistant Engineer, CFM                                                                                                                                          | <b>Kevin Conant</b> , PG&E                                                                                                   |
| Palo Alto             | <b>Rajeev Hada</b> , Project Engineer, CFM Public Works Department, Engineering Services Division, Floodplain Manager                                                                                                                                           | <b>Dan Melick</b> , CERT Volunteer City of Palo Alto resident                                                                |
| San José              | <b>Arlene Lew</b> , Principal Engineering Technician<br><b>Vivian Tom</b> , Senior Transportation Specialist Department of Public Works Development Services Division                                                                                           | <b>Shari Carlet</b> , City of San José resident, certified Floodplain Manager                                                |
| Santa Clara           | <b>Evelyn Liang</b> , Senior Civil Engineer<br><b>Falguni Amin</b> , Principal Engineer Public Works – Engineering                                                                                                                                              | <b>Kevin Moore</b> , Retired City Council member                                                                             |
| Saratoga              | <b>David Dorcich</b> , PE, QSP/D, Associate Civil Engineer, Community Development Department, Floodplain Manager                                                                                                                                                | <b>Rebecca Gallardo</b> , Real Estate Agent for Interio, a Berkshire Hathaway Affiliate, servicing all areas of the Bay Area |
| Sunnyvale             | <b>Tamara Davis</b> , Senior Management Analyst                                                                                                                                                                                                                 | <b>Jeff Holzman</b> , Director, Real Estate District Development Google<br><b>Agnes Veith</b> , City of Sunnyvale resident   |
| Valley Water          | <b>Trisha Howard</b> , Program Administrator<br><b>Paola Giles</b> , Public Information Representative III<br><b>Sherilyn Tran</b> , Office of Civic Engagement Unit Manager                                                                                    | <b>Nikki Rowe</b> , American Red Cross                                                                                       |



#### IV. COMMUNITIES' FLOOD HAZARD AREAS

The sections below provide a description of each participating community and their flood hazard areas. In Santa Clara County, careful attention needs to be paid to flood protection for the businesses that make up Silicon Valley. Many of these large employers are located in a ring of office parks near the edge of the San Francisco Bay in areas subject to both fluvial and tidal flooding. This is particularly true for the communities of Palo Alto, Mountain View, Sunnyvale, Santa Clara, San José, and Milpitas.

##### **Data Sources for Individual Community Sections:**

Community Description: The introductory community description sections were provided by each community.

Population Data: In the below individual city/county pages, the population data were obtained from the US Census Bureau population estimates dated July 1, 2019:  
<https://www.census.gov/quickfacts/fact/table>.

Flood Hazard Data: The Flood Hazard Data was provided by each community.

Flood Insurance Data: The Flood Insurance Data was provided by the CRS Technical Reviewer, ISO representative Dave Arkens on November 15 and 18, 2020, from the FEMA Community Information System (CIS) database. These estimates are dated as of November 2, 2020.

The insurance occupancy zone data indicates residential land use. The insurance flood zone data indicates policies in different flood zones, including non-flood zones.

For the definitions of the FEMA flood zone designations in the insurance occupancy and flood zone, please see Appendix D.

FEMA Flood Hazard Area Maps: The FEMA Flood Hazard Area Maps were provided by Valley Water's Geographic Information System (GIS) team through the Flood Insurance Rate Map (FIRM) database and are dated as of November 2020.

The FIRM is the basis for floodplain management, mitigation, and insurance activities for the NFIP. Insurance applications include enforcement of the mandatory purchase requirement of the Flood Disaster Protection Act, which "... requires the purchase of flood insurance by property owners who are being assisted by Federal programs or by Federally supervised, regulated or insured agencies or institutions in the acquisition or improvement of land facilities located or to be located in identified areas having special flood hazards, " Section 2(b)(4) of the Flood Disaster Protection Act of 1973.

In addition to the identification of SFHAs, the risk zones shown on the FIRMs are the basis for the establishment of premium rates for flood coverage offered through the NFIP. The FIRM Database presents the flood risk information depicted on the FIRM in a digital format suitable for use in electronic mapping applications. The FIRM Database serves to archive the information collected during the Flood Risk Project.

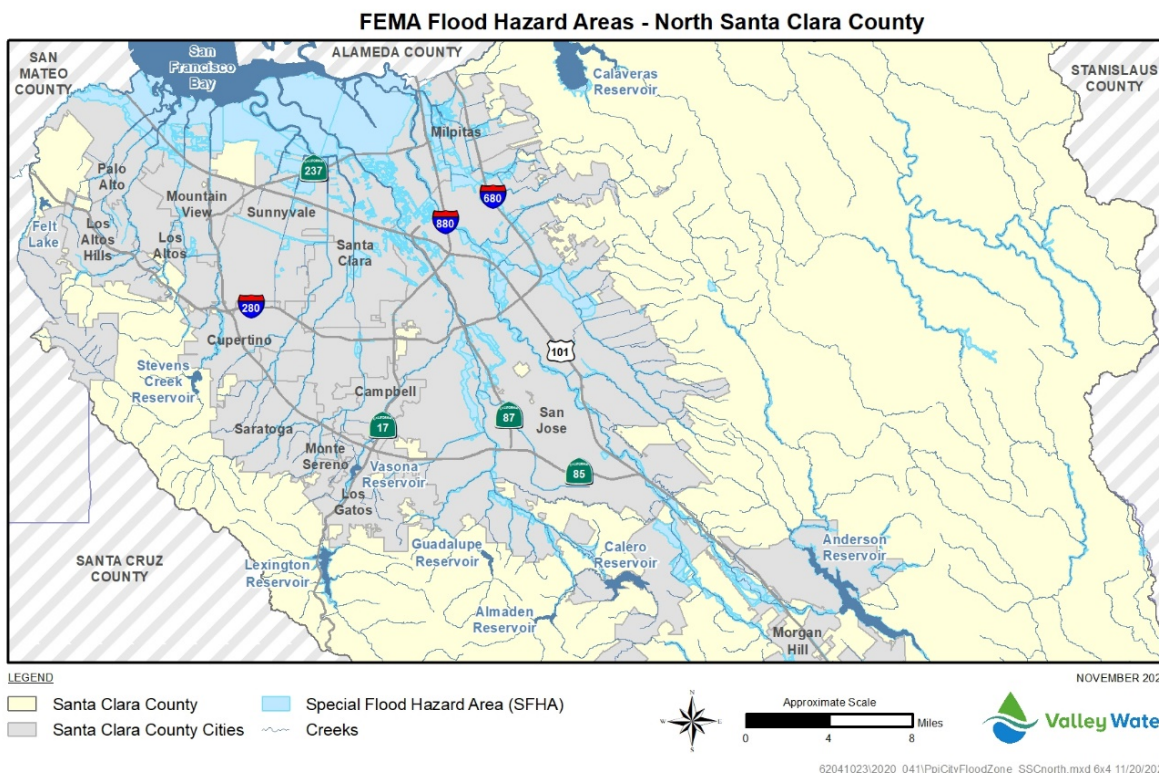
## County of Santa Clara, Unincorporated Areas

The County of Santa Clara is located at the south end of San Francisco Bay between Alameda and San Mateo counties. The county has a population of about 1,927,852 residents. There are 13 incorporated cities and two (2) incorporated towns located in Santa Clara County. Most are concentrated in the northern half of the county near San Francisco Bay and these cities are jointly known as Silicon Valley. Gilroy and Morgan Hill are located in the southern half of the county. Santa Clara County also falls in two (2) major watersheds. The northern section flows to San Francisco Bay through Coyote Creek, the Guadalupe River, Stevens Creek, San Francisquito Creek, and a few smaller creeks. The southern section flows to Monterey Bay through the Pajaro River.

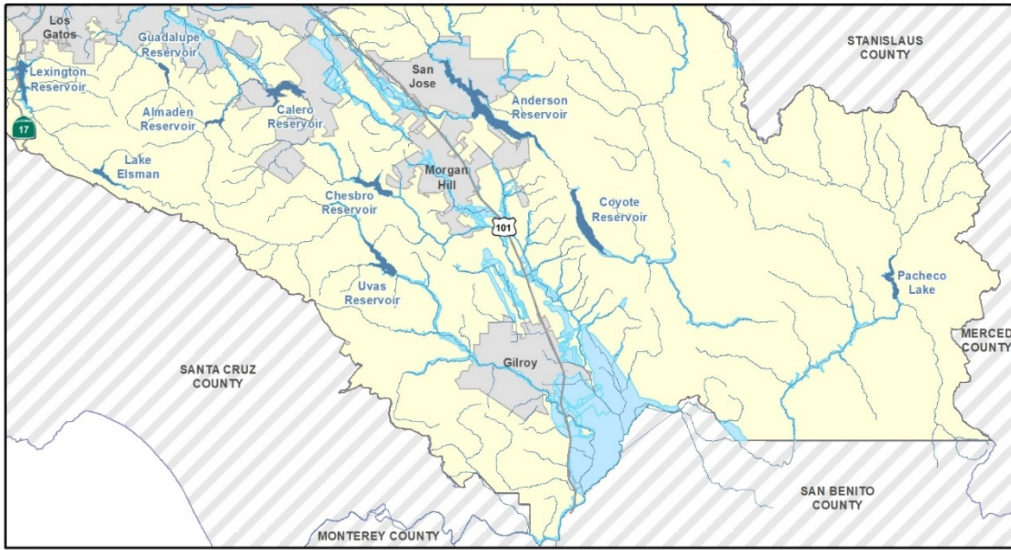
Although 73 percent of the land is unincorporated or not included within any city; only five (5) percent of the County's population lives outside of the cities. Most of the unincorporated land is used for agriculture (63 percent), 19 percent is in low-density residential, 17 percent is in parks and open space preserves with about one (1) percent in commercial and industrial uses.

**Flood Hazard** On the FEMA floodplain maps, four (4) Special Flood Hazard Area (SFHA) zones are identified. They are A, AE, AO, and AH. The number of structures in the SFHA is unknown, but most are included in low-density residential zones except for eight (8) trailer parks in the unincorporated County. Most of the flooding in the unincorporated County occurs along Llagas Creek between Morgan Hill and Gilroy, flowing south to and along the Pajaro River which forms

part of the southern boundary of the County. There are levees included in the SFHA and they have been re-certified within the last seven years. Though the county has experienced isolated local flooding events in the last ten years, no events of note have been experienced since the storm events of 1995, 1997, and 1998 (Disaster DR-1046, DR-1155, and DR-1203, respectively).



### FEMA Flood Hazard Areas - South Santa Clara County



**Repetitive Loss Properties** The unincorporated section in the areas of County of Santa Clara have three (3) repetitive loss properties.

### County of Santa Clara Flood Insurance Data (as of 11/02/20)

#### Insurance by Occupancy

|                       | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 338               | \$517,704 | \$88,651,200       | 124                          | \$1,586,157.90           | \$71,472.81        |
| 2-4 Family            | 5                 | \$8,006   | \$1,250,000        | 2                            | \$2,520.04               | \$425.00           |
| All Other Residential | 4                 | \$8,173   | \$1,785,900        | 6                            | \$144,245.01             | \$3,425.00         |
| Non Residential       | 38                | \$122,904 | \$7,434,600        | 9                            | \$126,397.89             | \$3,385.00         |
| Total                 | 385               | \$656,787 | \$99,121,700       | 141                          | \$1,859,320.84           | \$78,707.81        |

#### Insurance by Zone

|                   | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 123               | \$222,993 | \$30,144,600       | 50                           | \$869,607.32             | \$32,150.78        |
| A Zones           | 104               | \$259,113 | \$24,952,100       | 40                           | \$180,129.76             | \$11,820.00        |
| AO Zones          | 57                | \$62,601  | \$15,199,500       | 16                           | \$306,699.26             | \$14,577.03        |
| AH Zones          | 10                | \$10,640  | \$2,544,600        | 2                            | \$14,080.36              | \$370.00           |
| AR Zones          | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 41                | \$76,355  | \$10,485,300       | 15                           | \$421,076.92             | \$14,065.00        |
| B, C & X Zone     |                   |           |                    |                              |                          |                    |
| Standard          | 21                | \$15,307  | \$7,393,100        | 4                            | \$15,559.56              | \$1,925.00         |
| Preferred         | 11                | \$4,307   | \$3,850,000        | 2                            | \$0.00                   | \$495.00           |
| Total             | 367               | \$651,316 | \$94,569,200       | 129                          | \$1,807,153.18           | \$75,402.81        |

## City of Cupertino

The City of Cupertino is located at the southern end of San Francisco Bay, on the western edge of the Santa Clara Valley. It is approximately ten (10) miles southwest of the Mineta San José International Airport with convenient freeway access via State Route 85 and Interstate 280. The city, home of Apple's corporate headquarters and De Anza College, has a population of over 59,276 residents and encompasses 11.3 square miles or 7,230 acres.

**Flood Hazard** Under the current FIRMs, the City of Cupertino has 130 structures in the Special Flood Hazard Area (SFHA). The city's SFHAs consist solely of designated zones A and AE. Of the total number of structures in the SHFA, 80 percent are single-family (1-4 units), one (1) percent is multi-family (5 or more units), and 19 percent are commercial or non-residential. Several streams run through Cupertino that flow into the San Francisco Bay, including Calabazas Creek, Saratoga Creek, Stevens Creek, Regnart Creek, Heney Creek, Prospect Creek and Permanente Creek. Specific areas that are susceptible to flooding are near Stevens Creek and Heney Creek. The city had experienced flooding around Calabazas Creek in 1998, but flood protection projects completed by Valley Water have decreased the risk of flooding significantly.

**Repetitive Loss Properties** There are currently no repetitive loss properties in the city. The city had one (1) repetitive loss property within its jurisdiction and the property was purchased by the city in 2014.





## City of Cupertino Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 66                | \$65,619 | \$19,769,000       | 11                           | \$56,103.61              | \$3,130.00         |
| 2-4 Family            | 5                 | \$1,584  | \$1,352,400        | 1                            | \$751.13                 | \$225.00           |
| All Other Residential | 4                 | \$11,089 | \$2,400,000        | 7                            | \$755,315.99             | \$23,069.98        |
| Non Residential       | 4                 | \$7,797  | \$2,200,000        | 1                            | \$0.00                   | \$275.00           |
| Total                 | 79                | \$86,089 | \$25,721,400       | 20                           | \$812,170.73             | \$26,699.98        |

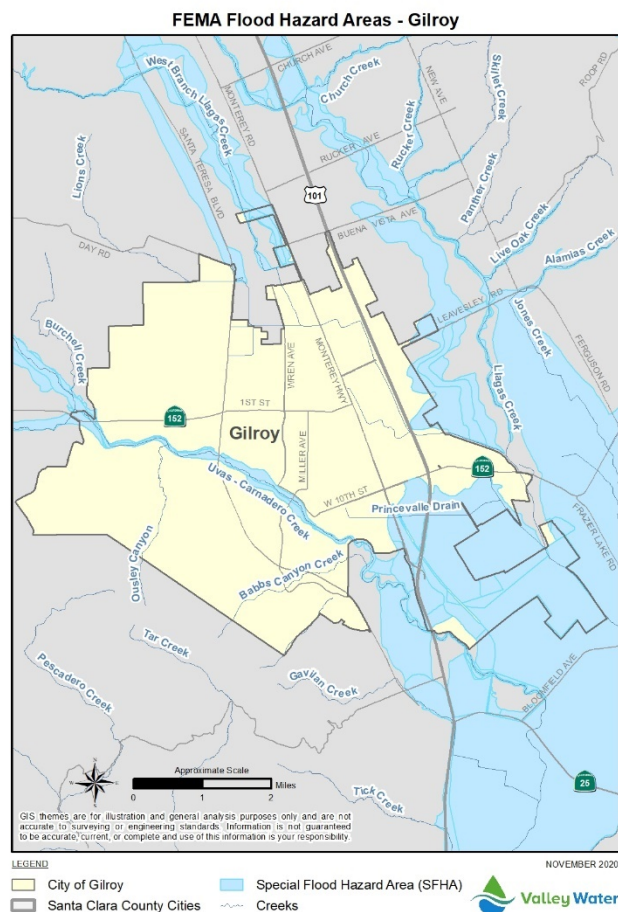
### Insurance by Zone

|                   | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 23                | \$38,838 | \$5,767,400        | 4                            | \$7,595.12               | \$975.00           |
| A Zones           | 1                 | \$1,918  | \$250,000          | 2                            | \$49,259.62              | \$1,750.00         |
| AO Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AH Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 4                 | \$6,475  | \$788,500          | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |          |                    |                              |                          |                    |
| Standard          | 11                | \$21,342 | \$4,680,500        | 6                            | \$38,500.00              | \$1,810.00         |
| Preferred         | 37                | \$16,618 | \$13,235,000       | 7                            | \$716,815.99             | \$22,094.98        |
| Total             | 76                | \$85,191 | \$24,721,400       | 19                           | \$812,170.73             | \$26,629.98        |

## City of Gilroy

The City of Gilroy is situated in South Santa Clara County at the crossing of U.S. Highway 101 and State Highway 152. The city is located approximately 16 miles south of San José to Monterey/Day Road on U.S. Route 101 and 19 miles inland from the Pacific Coast. The city has a population of about 59,032 residents and has a total area of 10,340 acres or approximately 16.156 square miles. Approximately seven (7) percent of this area in parks and preserves and another 29 percent consists of agriculture and other open space uses. The remaining area is nearly completely developed, with the predominance of single-family residences. The City of Gilroy has about 19 percent of vacant areas (developable land).

**Flood Hazard** Under the current FIRMs, the City of Gilroy has 96 structures in the Special Flood Hazard Area (SFHA). The SFHAs are mainly in FEMA designated Zones A, AE, AH, and AO. Of the total structures in the SFHA, 26 percent are single-family (1-4 units), none are multi-family (5 or more units), and four (4) percent are commercial or non-residential. The City of Gilroy receives waters from Lions, Llagas, Uvas, North and South Morey Creek. Specific areas that are susceptible to flooding are around Uvas Creek. The levee on Uvas Creek has been certified by FEMA. The City of Gilroy experienced flooding during the storms of December 14 to 28 in 1955. The heaviest precipitation occurred during the 3-day period ending December 23<sup>rd</sup>. The 12.9 inches of rain reported in the Gilroy area resulted in the Uvas and Carnadero Creeks creating a flow of 14,000 cubic feet per second (CFS) at U.S. Highway 101. Miller Slough was the principal flood problem in January 1963. A rainfall of 3.21 inches for 24 hours caused severe flooding of Forest Street, Church Street, and Sixth Street, with all the water flowing from Miller Slough.



**FEMA Flood Hazard Areas** Some zone designation areas in Gilroy are being reviewed. Please contact the city's Floodplain Manager for information regarding the zones that are being reviewed.

**Repetitive Loss Properties** There are no repetitive loss properties in Gilroy.

## City of Gilroy Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 52                | \$27,172  | \$15,989,900       | 27                           | \$211,308.55             | \$7,395.00         |
| 2-4 Family            | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 10                | \$2,502   | \$1,040,000        | 3                            | \$0.00                   | \$210.00           |
| Non Residential       | 74                | \$145,420 | \$37,758,200       | 5                            | \$90,808.78              | \$4,995.00         |
| Total                 | 136               | \$175,094 | \$54,788,100       | 35                           | \$302,117.33             | \$12,600.00        |

### Insurance by Zone

|                   | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 42                | \$34,114  | \$18,928,800       | 4                            | \$6,014.40               | \$785.00           |
| A Zones           | 14                | \$49,594  | \$5,054,700        | 12                           | \$70,557.19              | \$2,520.00         |
| AO Zones          | 1                 | \$3,290   | \$722,200          | 1                            | \$0.00                   | \$70.00            |
| AH Zones          | 18                | \$40,754  | \$7,461,000        | 1                            | \$52,940.47              | \$800.00           |
| AR Zones          | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 2                 | \$4,786   | \$700,000          | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |           |                    |                              |                          |                    |
| Standard          | 12                | \$22,353  | \$5,550,000        | 16                           | \$174,799.72             | \$8,575.00         |
| Preferred         | 34                | \$15,064  | \$11,535,000       | 0                            | \$0.00                   | \$0.00             |
| Total             | 123               | \$169,955 | \$49,951,700       | 34                           | \$304,311.78             | \$12,750.00        |

## City of Los Altos

The City of Los Altos is located at the base of the San Francisco Peninsula, 40 miles south of San Francisco. The approximately 6.3 square-mile city is developed primarily for single-family residential with small businesses, schools, libraries, and churches. According to the 2019 census, it has a population of 30,089, with a population density of 4,466.8 people per square mile, and an average household size of 2.61 people.

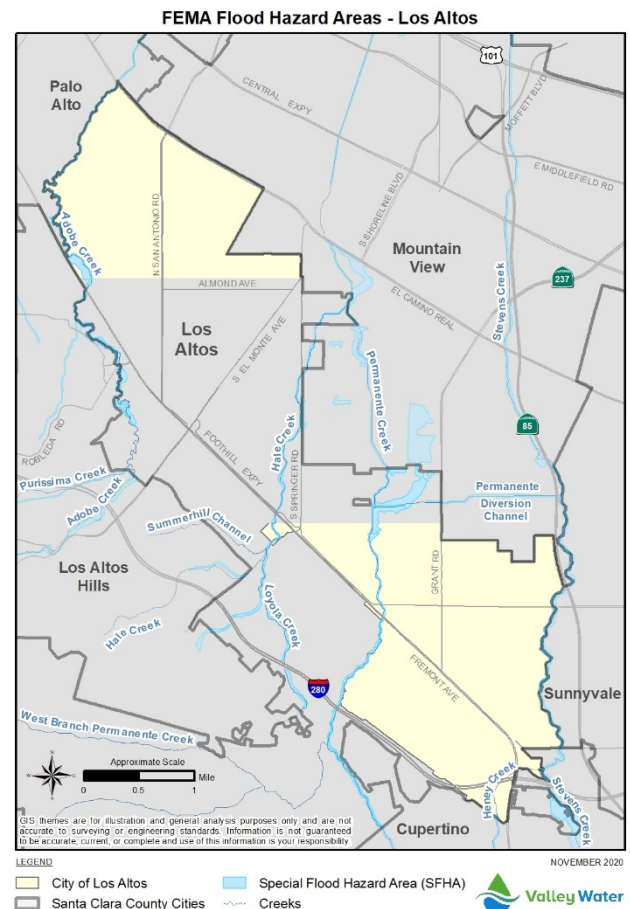
Los Altos' climate is marine-influenced with an average summertime high temperature of 78°F and an average low of 57°F, dropping to an average winter nighttime low temperature of 41°F and an average high of 60°F. Mean annual precipitation ranges from 15 to 22 inches, with most precipitation falling from November through March. Precipitation occurs entirely as rainfall. Snowmelt is not a hydrologic process that significantly affects runoff in the city.

**Flood Hazard** Under the current FIRMs, the City of Los Altos has approximately 550 properties in the Special Flood Hazard Area (SFHA). SFHAs are mainly in FEMA designated Zones A, AH, AE and AO. Of the total structures in the SFHA, 99 percent are single-family, and one (1) percent are commercial or non-residential. The city has four (4) creeks: Adobe Creek, Hale Creek, Permanente Creek, and Stevens Creek. Specific areas that are susceptible to flooding are around Adobe, Permanente, and Hale Creeks.

Precipitation that falls within the City of Los Altos generates stormwater runoff. This runoff is conveyed in several mostly manmade flood protection systems that discharge to the creeks. Most of these systems do not interact with one another, and potential improvements to one system should not impact the performance of other systems. The total land area within the city limits is roughly 6.3 square miles (approximately 4,000 acres). To create a rural aesthetic, many of the streets in Los Altos do not have traditional suburban curb and gutter-lined streets. This layout provides some attenuation before runoff reaches a storm drain inlet.

In addition to storm drains, flood protection is provided to the City of Los Altos by Valley Water and its maintenance of our four creeks (Hale, Stevens, Adobe, and Permanente) that convey storm-generated runoff north to the San Francisco Bay.

**Repetitive Loss Properties** There are no repetitive loss properties in the City of Los Altos.





## City of Los Altos Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 112               | \$84,511 | \$34,838,600       | 13                           | \$32,874.17              | \$2,655.00         |
| 2-4 Family            | 2                 | \$784    | \$700,000          | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 2                 | \$760    | \$780,000          | 0                            | \$0.00                   | \$0.00             |
| Non Residential       | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| Total                 | 116               | \$86,055 | \$36,318,600       | 13                           | \$32,874.17              | \$2,655.00         |

### Insurance by Zone

|                   | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 12                | \$21,659 | \$3,079,600        | 5                            | \$0.00                   | \$570.00           |
| A Zones           | 3                 | \$10,794 | \$440,800          | 4                            | \$27,633.02              | \$800.00           |
| AO Zones          | 16                | \$14,900 | \$4,104,300        | 0                            | \$0.00                   | \$0.00             |
| AH Zones          | 3                 | \$2,730  | \$768,900          | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |          |                    |                              |                          |                    |
| Standard          | 12                | \$8,296  | \$4,000,000        | 2                            | \$0.00                   | \$185.00           |
| Preferred         | 68                | \$27,156 | \$23,425,000       | 2                            | \$5,241.15               | \$1,100.00         |
| Total             | 114               | \$85,535 | \$35,818,600       | 13                           | \$32,874.17              | \$2,655.00         |

## Town of Los Altos Hills

The Town of Los Altos Hills is a residential community in the northwestern region of Santa Clara County. The Town is located adjacent to the City of Los Altos, 35 miles south of San Francisco, five (5) miles south of Stanford University, and 17 miles north of downtown San Jose. The town encompasses approximately nine (9) square miles and contains primarily single-family residences. According to the 2019 Census Bureau, the population is 8,423 with a population density of 918 people per square mile.

There are no commercial or industrial uses within the town limits. As the town has developed over the past 50 years, residents have continued to support the preservation of low-density residential development and the semi-rural character of the community through one-acre zoning, the right to keep horses on private property, and the protection of open space, creek corridors, wildlife habitat, and heritage oak trees.

The town has a mild climate with average summertime highs of 78 degrees, and average wintertime lows of 43 degrees. The town receives approximately 21 inches of rain per year, of which most occurs between November and April. The town does not typically receive any precipitation in the form of snow and does not typically receive any snowmelt runoff.

**Flood Hazard:** The town has six (6) creeks: Adobe Creek, Barron Creek, Deer Creek, Hale Creek, Matadero Creek, and Purissima Creek. Under the current Flood Insurance Rate Maps (FIRMs), the Town has properties in the Special Flood Hazard Area (SFHA) along each of the creeks. SFHAs are shown on the FIRMs as Zone A, V, AE, AO, AH, VE, or AR. The SFHAs included in the town are Zone A and AE. Approximately one (1) percent of structures in the town are located in the one (1) percent annual chance floodplain (SFHAs).

Stormwater runoff, which is generated by precipitation within Los Altos Hills, is conveyed either in the manmade storm drain system or allowed to naturally attenuate as overland flow. The storm drain system discharges to the creeks mentioned above. The system is comprised of small, localized systems that do not interact with one another. To maintain the semi-rural character of the town, many of the streets do not contain traditional curb and gutter lined streets. The lack of curb and gutter allows for some natural attenuation of runoff. In addition to the storm drain system, flood protection is provided to the town by Valley Water maintenance of Adobe Creek, Barron Creek, Deer Creek, Hale Creek, Matadero Creek, and Purissima Creek. These creeks convey storm-generated runoff to the San Francisco Bay.



**Repetitive Loss Properties:** There are no repetitive loss properties in the Town of Los Altos Hills.

# **Town of Los Altos Hills Flood Insurance Data (as of 11/02/20)**

## *Insurance by Occupancy*

|                       | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 47                | \$47,709 | \$14,707,200       | 16                           | \$45,661.56              | \$3,355.00         |
| 2-4 Family            | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| Non Residential       | 1                 | \$1,628  | \$60,000           | 0                            | \$0.00                   | \$0.00             |
| Total                 | 48                | \$49,337 | \$14,767,200       | 16                           | \$45,661.56              | \$3,355.00         |

## *Insurance by Zone*

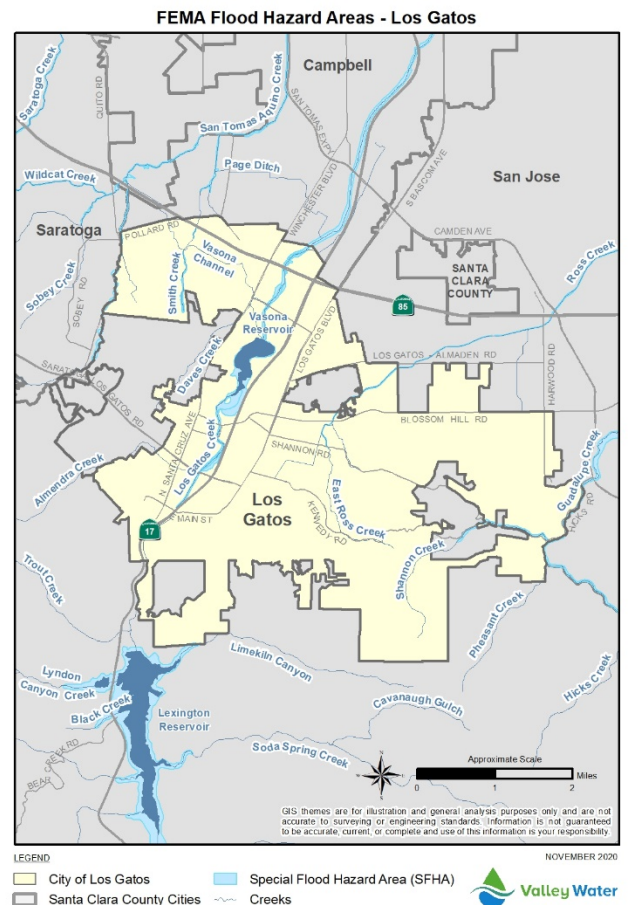
|                   | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 12                | \$23,104 | \$2,807,200        | 6                            | \$3,723.91               | \$875.00           |
| A Zones           | 5                 | \$11,939 | \$1,250,000        | 2                            | \$4,779.05               | \$495.00           |
| AO Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AH Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |          |                    |                              |                          |                    |
| Standard          | 5                 | \$3,768  | \$1,750,000        | 6                            | \$19,102.18              | \$810.00           |
| Preferred         | 26                | \$10,526 | \$8,960,000        | 2                            | \$18,056.42              | \$1,175.00         |
| Total             | 48                | \$49,337 | \$14,767,200       | 16                           | \$45,661.56              | \$3,355.00         |

## Town of Los Gatos

The Town of Los Gatos is located at the southern end of San Francisco Bay. The town is about 50 miles south of San Francisco. The town has a population of around 30,222 residents and encompasses 7,455 acres or approximately 11.7 square miles. Approximately 58 percent of this area are in residential, three (3) percent in commercial and industrial, two (2) percent in office/research and development, five (5) percent in public/quasi-public, one (1) percent in agricultural, 26 percent in parks and open space, and the remaining in vacant/unassigned areas.

**Flood Hazard** Under the current FIRMs, the Town of Los Gatos has 165 properties in the Special Flood Hazard Area (SFHA). The SFHAs are mainly in FEMA designated zones A, AE, AH and AO. Of the total properties in the SFHA, 87 percent are 1-4 family residential, less than one (1) percent are multi-family (5 or more families), and the remaining 12 percent are non-residential areas. The town has Ross Creek, Los Gatos Creek, Smith Creek, and San Tomas Aquino Creek.

**Repetitive Loss Properties** The town does not have repetitive loss properties.



## Town of Los Gatos Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 82                | \$47,653 | \$25,643,100       | 21                           | \$51,957.41              | \$4,240.00         |
| 2-4 Family            | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 3                 | \$1,602  | \$1,112,000        | 0                            | \$0.00                   | \$0.00             |
| Non Residential       | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| Total                 | 85                | \$49,255 | \$26,755,100       | 21                           | \$51,957.41              | \$4,240.00         |

### Insurance by Zone

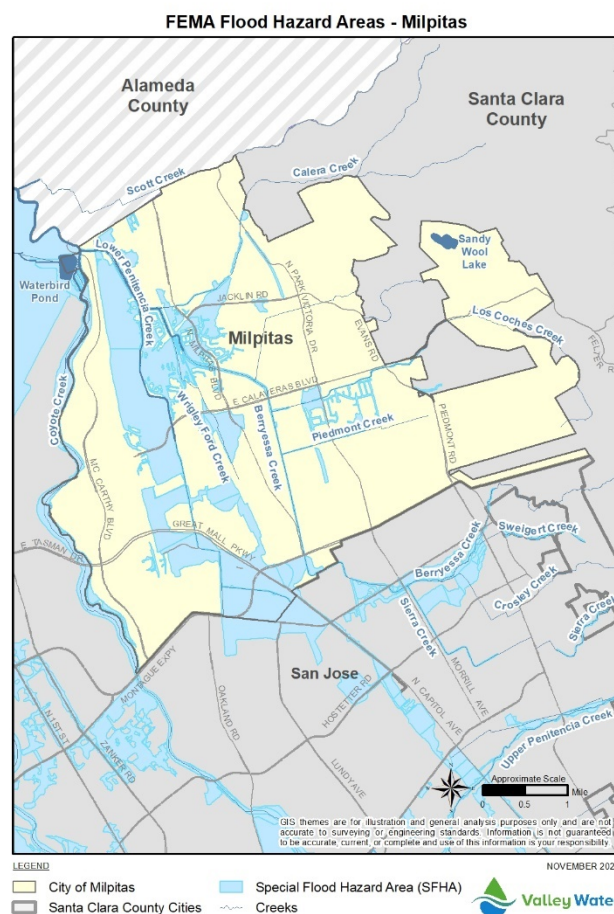
|                   | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 10                | \$14,736 | \$2,525,000        | 0                            | \$0.00                   | \$0.00             |
| A Zones           | 1                 | \$1,981  | \$250,000          | 8                            | \$28,297.59              | \$1,725.00         |
| AO Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AH Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |          |                    |                              |                          |                    |
| Standard          | 7                 | \$6,049  | \$1,533,100        | 9                            | \$19,061.87              | \$1,600.00         |
| Preferred         | 67                | \$26,489 | \$22,447,000       | 3                            | \$4,597.95               | \$845.00           |
| Total             | 85                | \$49,255 | \$26,755,100       | 20                           | \$51,957.41              | \$4,170.00         |

## City of Milpitas

The City of Milpitas, located at the southern tip of the San Francisco Bay, is a progressive community that is an integral part of the high-tech Silicon Valley. With a diverse resident population of 84,196, Milpitas features quality schools, conveniently located neighborhood parks and shopping centers. Milpitas is often called the “Crossroads of Silicon Valley”, with most of its 8,680 Acres or 13.63 square miles of land situated between two major freeways (I-880 and I-680), State Route 237, and a county expressway. A new light rail line opened for service in 2004 and a BART subway extension opened in January of 2020. The city encompasses 8,680 acres of land. Approximately 12 percent of this area is in parks and preserves, less than one (1) percent consists of agricultural uses and other open space uses, 31 percent in low-density residential uses, four (4) percent in medium-density residential uses, eight (8) percent in high-density residential use, 12 percent in commercial/educational uses and 17 percent in industrial uses. There are approximately 1,790 acres, or 2.9 square miles, designated for various industrial uses. About 271 acres are vacant and available in parcels ranging from ½ acre to 75 acres. There are eight existing industrial parks and 550 manufacturing plants in Milpitas.

**Flood Hazard** The City of Milpitas manages a floodplain that includes several local and regional creeks that convey stormwater to other jurisdictions, bay lands and marshes of the San Francisco Bay. Calera, Coyote, Penitencia, Berryessa, Los Coches Piedmont, Wrigley/Ford, and Tularcitos Creeks are among the major creeks that receive this stormwater. The City of Milpitas has 3,000 properties and 3,300 structures in the Special Flood Hazard Area (SFHA). SFHAs are mainly in FEMA designated zones A, AE, AH, and AO and are located near Calera, Penitencia, Berryessa, Los Coches and Tularcitos Creeks.

**Repetitive Loss Properties** The city does not have repetitive loss properties.





## City of Milpitas Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium     | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-------------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 861               | \$930,877   | \$217,612,800      | 64                           | \$72,077.29              | \$11,620.00        |
| 2-4 Family            | 103               | \$43,713    | \$24,465,100       | 4                            | \$3,259.08               | \$525.00           |
| All Other Residential | 193               | \$59,584    | \$42,116,500       | 1                            | \$0.00                   | \$125.00           |
| Non Residential       | 92                | \$191,745   | \$48,877,500       | 4                            | \$0.00                   | \$445.00           |
| Total                 | 1,249             | \$1,225,919 | \$333,071,900      | 73                           | \$75,336.37              | \$12,715.00        |

### Insurance by Zone

|                   | Policies in Force | Premium     | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-------------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 313               | \$612,811   | \$78,773,400       | 7                            | \$0.00                   | \$1,515.00         |
| A Zones           | 2                 | \$2,199     | \$526,300          | 29                           | \$46,730.91              | \$4,730.00         |
| AO Zones          | 146               | \$178,946   | \$43,627,900       | 5                            | \$6,706.92               | \$2,055.00         |
| AH Zones          | 424               | \$258,998   | \$97,639,700       | 14                           | \$8,802.44               | \$2,010.00         |
| AR Zones          | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 3                 | \$3,831     | \$705,000          | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |             |                    |                              |                          |                    |
| Standard          | 57                | \$52,889    | \$17,360,500       | 6                            | \$2,877.70               | \$960.00           |
| Preferred         | 83                | \$49,683    | \$28,988,000       | 0                            | \$0.00                   | \$0.00             |
| Total             | 1,028             | \$1,159,357 | \$267,620,800      | 61                           | \$65,117.97              | \$11,270.00        |

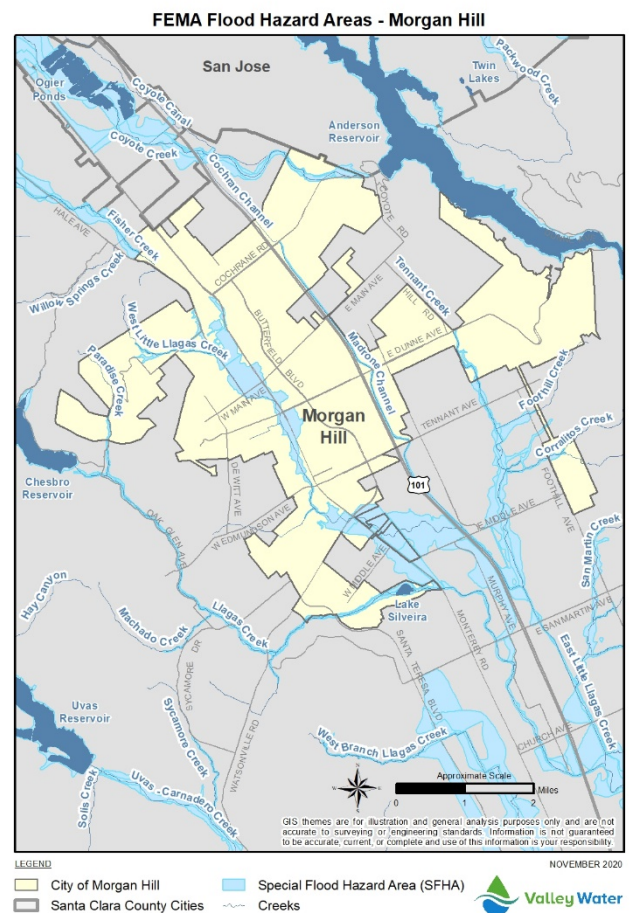
## City of Morgan Hill

The City of Morgan Hill is located within South Santa Clara County between the City of San José and the City of Gilroy; Morgan Hill is about 65 miles south of San Francisco. The city has an approximate population of 45,952 residents with an area of 8,206 acres or approximately 13 square miles, with the following breakdown in land use:

|                                        |                            |
|----------------------------------------|----------------------------|
| a. Commercial                          | 705 acres (10.8 percent)   |
| b. Industrial                          | 718 acres (11.0 percent)   |
| c. Mixed-Use                           | 238 acres (3.6 percent)    |
| d. Open Space                          | 1,328 acres (20.3 percent) |
| e. Public Facilities                   | 301 acres (4.6 percent)    |
| f. High-Density Res. (6 to 12 DU/ac.)  | 242 acres (3.7 percent)    |
| g. Medium-Density Res. (up to 7 DU/ac) | 744 acres (11.4 percent)   |
| h. Low-Density Res. (0 to 4 DU/ac)     | 2,259 acres (34.6 percent) |

**Flood Hazard** Under the current FIRMs, the City of Morgan Hill has approximately 643 structures (as of 2018) in the Special Flood Hazard Area (SFHA). SFHAs are mainly in the FEMA designated Zone A, AE, AH, and AO. Of the total structures in the SFHA, 34 percent (221 structures) are low-density residences, 31 percent (197 structures) are medium-density residences, and 15 percent (96 structures) are high-density residences. There is one (1) main creek, West Little Llagas Creek, which runs through the west side of Morgan Hill and flows south; it is along West Little Llagas Creek where residents and commercial properties are susceptible to flooding. West Little Llagas Creek is tributary to Llagas Creek which conveys water to the south to Gilroy and eventually the Monterey Bay.

**Repetitive Loss Properties** The city has four (4) repetitive loss properties with 19 structures in the repetitive loss areas in FEMA designated Zone A, AE, AH, or AO zones.





## City of Morgan Hill Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 295               | \$252,228 | \$84,389,900       | 59                           | \$341,180.11             | \$24,139.57        |
| 2-4 Family            | 26                | \$31,752  | \$6,742,500        | 3                            | \$36,652.84              | \$1,650.00         |
| All Other Residential | 67                | \$40,040  | \$18,646,000       | 0                            | \$0.00                   | \$0.00             |
| Non Residential       | 38                | \$104,181 | \$15,456,100       | 11                           | \$233,120.31             | \$10,228.45        |
| Total                 | 426               | \$428,201 | \$125,234,500      | 73                           | \$610,953.26             | \$36,018.02        |

### Insurance by Zone

|                   | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 177               | \$272,444 | \$48,771,900       | 31                           | \$396,189.98             | \$23,743.02        |
| A Zones           | 2                 | \$7,110   | \$500,000          | 10                           | \$53,522.39              | \$2,455.00         |
| AO Zones          | 10                | \$12,082  | \$2,785,300        | 9                            | \$50,199.67              | \$2,775.00         |
| AH Zones          | 22                | \$18,492  | \$5,629,200        | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |           |                    |                              |                          |                    |
| Standard          | 81                | \$63,729  | \$22,765,100       | 15                           | \$106,045.67             | \$5,500.00         |
| Preferred         | 123               | \$50,983  | \$41,599,000       | 4                            | \$2,469.44               | \$1,000.00         |
| Total             | 415               | \$424,840 | \$122,050,500      | 69                           | \$608,427.15             | \$35,473.02        |

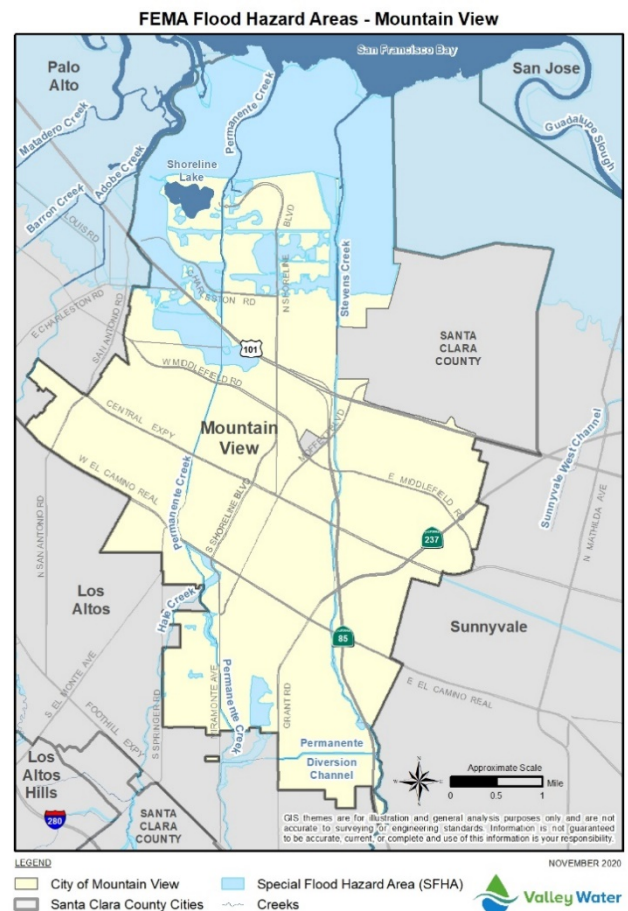
## City of Mountain View

Just over 12 square miles and home to approximately 82,739 residents, while the daytime population exceeds 125,000. The size and population of Mountain View may be modest, yet it has a prominent role on the world stage as the center of innovation for Silicon Valley, being the home to some of the most prominent tech companies in the world as well as hundreds of startups. The vibrant downtown draws people from all over the world to visit its shops and restaurants. The wonderful parks and network of trails delight people of all ages.

Mountain View boasts strong safety and public education records and is considered one of the best places to live in the Bay Area.

**Flood Hazard** Under the current FIRMs, the City of Mountain View has 1,139 parcels in the Special Flood Hazard Area (SFHA). SFHAs are in FEMA designated Zones A, AE, AH, and AO (1 & 2). Stevens Creek, Permanente Creek, Permanente Diversion Channel, and Hale Creek all flow through the City of Mountain View. The city is also subject to tidal flooding from San Francisco Bay.

**Repetitive Loss Properties** There are no repetitive loss properties in the City of Mountain View.



## City of Mountain View Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 222               | \$132,091 | \$62,229,600       | 1                            | \$274.58                 | \$225.00           |
| 2-4 Family            | 61                | \$31,023  | \$14,412,000       | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 69                | \$63,971  | \$17,685,000       | 6                            | \$10,645.22              | \$1,500.00         |
| Non Residential       | 76                | \$170,634 | \$38,347,600       | 2                            | \$0.00                   | \$400.00           |
| Total                 | 428               | \$397,719 | \$132,674,200      | 9                            | \$10,919.80              | \$2,125.00         |

### Insurance by Zone

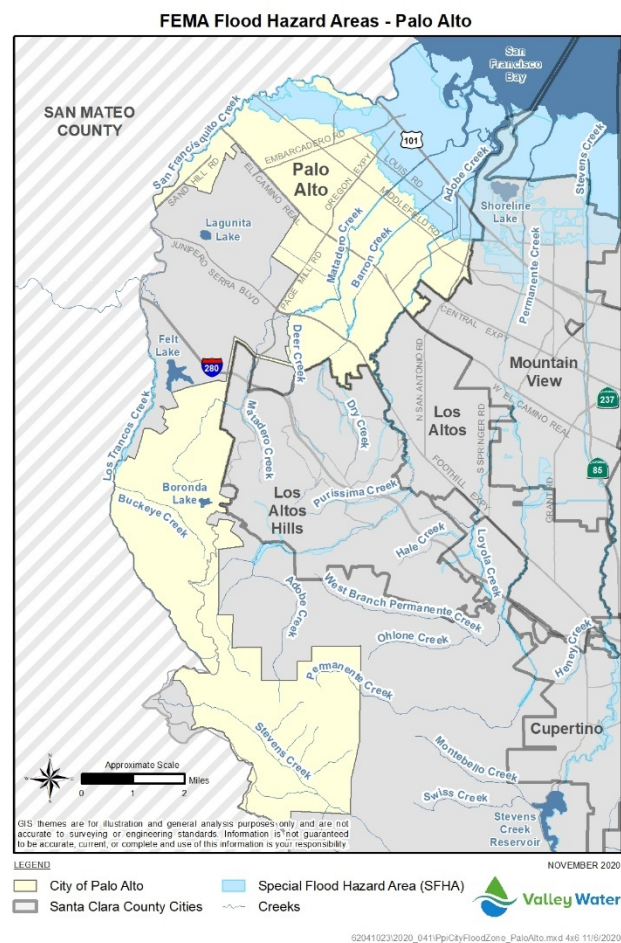
|                   | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 45                | \$106,987 | \$22,290,300       | 1                            | \$0.00                   | \$275.00           |
| A Zones           | 1                 | \$823     | \$76,000           | 0                            | \$0.00                   | \$0.00             |
| AO Zones          | 150               | \$190,528 | \$43,098,400       | 2                            | \$2,450.59               | \$575.00           |
| AH Zones          | 5                 | \$5,475   | \$1,277,100        | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |           |                    |                              |                          |                    |
| Standard          | 33                | \$32,030  | \$9,924,400        | 3                            | \$5,653.35               | \$750.00           |
| Preferred         | 87                | \$36,025  | \$28,823,000       | 0                            | \$0.00                   | \$0.00             |
| Total             | 321               | \$371,868 | \$105,489,200      | 6                            | \$8,103.94               | \$1,600.00         |

## City of Palo Alto

The City of Palo Alto is located on the San Francisco Peninsula, at the southern end of San Francisco Bay. The city is 35 miles south of San Francisco and 14 miles north of San José and at the northern edge of Santa Clara County, between the cities of Mountain View and Menlo Park. The city has a population of around 65,364 residents and encompasses 16,627 acres or approximately 26 square miles. Approximately 40 percent of this area is in parks and preserves and another 15 percent consists of agriculture and other open space uses. The remaining area is nearly completely developed, with single-family uses predominating. Less than one (1) percent of the city's land area consists of vacant, developable land.

**Flood Hazard** Under the current FIRMs, the City of Palo Alto has 4,889 structures in the Special Flood Hazard Area (SFHA). SFHAs are mainly in FEMA designated zone A, AE, and AH. Of the total structures in the SFHA, 87 percent are single-family (1-4 units), 11 percent are multi-family (5 or more units), and two (2) percent are commercial or non-residential. The city has four (4) creeks, San Francisquito Creek, Matadero Creek, Adobe Creek, and Barron Creek, that flow to San Francisco Bay. San Francisquito Creek flows into San Francisco Bay, and Matadero Creek, Barron Creek and Adobe Creek flow into 600 acres Palo Alto Flood Basin. The flow of water from the flood basin to the bay passes through eight (8) box culverts controlled by flap gates in the box culverts. Specific areas that are susceptible to flooding are around San Francisquito Creek and San Francisco Bay, where the levees are not built to FEMA standard for a 100-year storm protection. The city had experienced flooding around San Francisquito Creek in 1955 and 1998 when water overtopped the levee and caused immense damage to properties. A Joint Powers Authority was established in the year 2000 to provide flood protection for the San Francisquito Watershed.

**Repetitive Loss Properties** There are five (5) repetitive loss areas in the city and there are 107 building structures on the five (5) repetitive loss areas.



## City of Palo Alto Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium     | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-------------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 2,288             | \$2,649,633 | \$610,650,100      | 454                          | \$8,574,374.89           | \$372,073.59       |
| 2-4 Family            | 70                | \$37,070    | \$16,830,600       | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 394               | \$179,738   | \$85,876,800       | 12                           | \$238,321.38             | \$8,625.00         |
| Non Residential       | 96                | \$580,340   | \$45,317,000       | 14                           | \$192,278.78             | \$8,162.56         |
| Total                 | 2,848             | \$3,446,781 | \$758,674,500      | 480                          | \$9,004,975.05           | \$388,861.15       |

### Insurance by Zone

|                   | Policies in Force | Premium     | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-------------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 1,282             | \$2,253,965 | \$323,208,900      | 156                          | \$3,469,136.56           | \$137,779.30       |
| A Zones           | 38                | \$78,125    | \$9,262,300        | 27                           | \$646,228.60             | \$24,191.23        |
| AO Zones          | 37                | \$37,081    | \$9,607,900        | 159                          | \$3,463,894.86           | \$141,374.06       |
| AH Zones          | 762               | \$720,210   | \$193,982,900      | 31                           | \$323,129.25             | \$19,769.84        |
| AR Zones          | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |             |                    |                              |                          |                    |
| Standard          | 184               | \$146,911   | \$50,442,400       | 27                           | \$168,810.38             | \$10,787.74        |
| Preferred         | 317               | \$151,274   | \$111,583,000      | 32                           | \$247,978.43             | \$14,123.11        |
| Total             | 2,620             | \$3,387,566 | \$698,087,400      | 432                          | \$8,319,178.08           | \$348,025.28       |



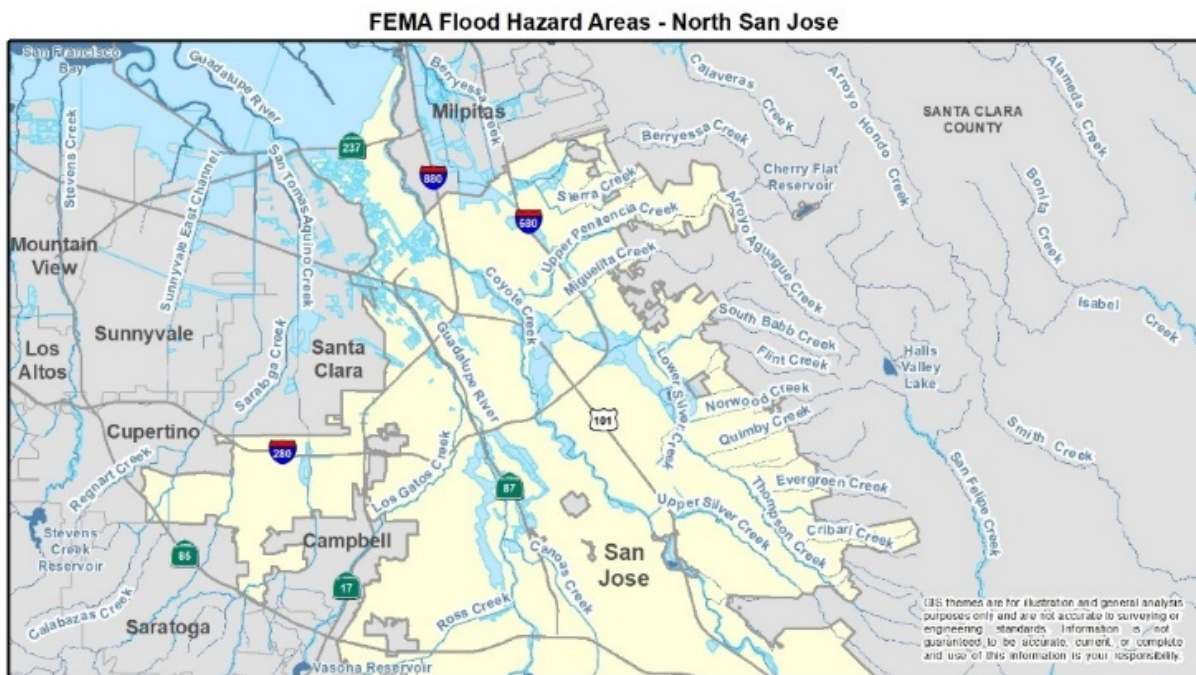
## City of San José

The City of San José is located at the southern tip of the San Francisco Bay. With a population of 1,021,795 residents. San José is the third-largest city in California. The city encompasses 115,200 acres or approximately 180 square miles. Approximately 17 percent of this area is in parks, agriculture, and other open space uses. Residential use is comprised of 34 percent single-family, two (2) percent two-family, four (4) percent multi-family and one (1) percent mobile homes. Other uses include four (4) percent in commercial, three (3) percent educational, and 10 percent in industrial uses.

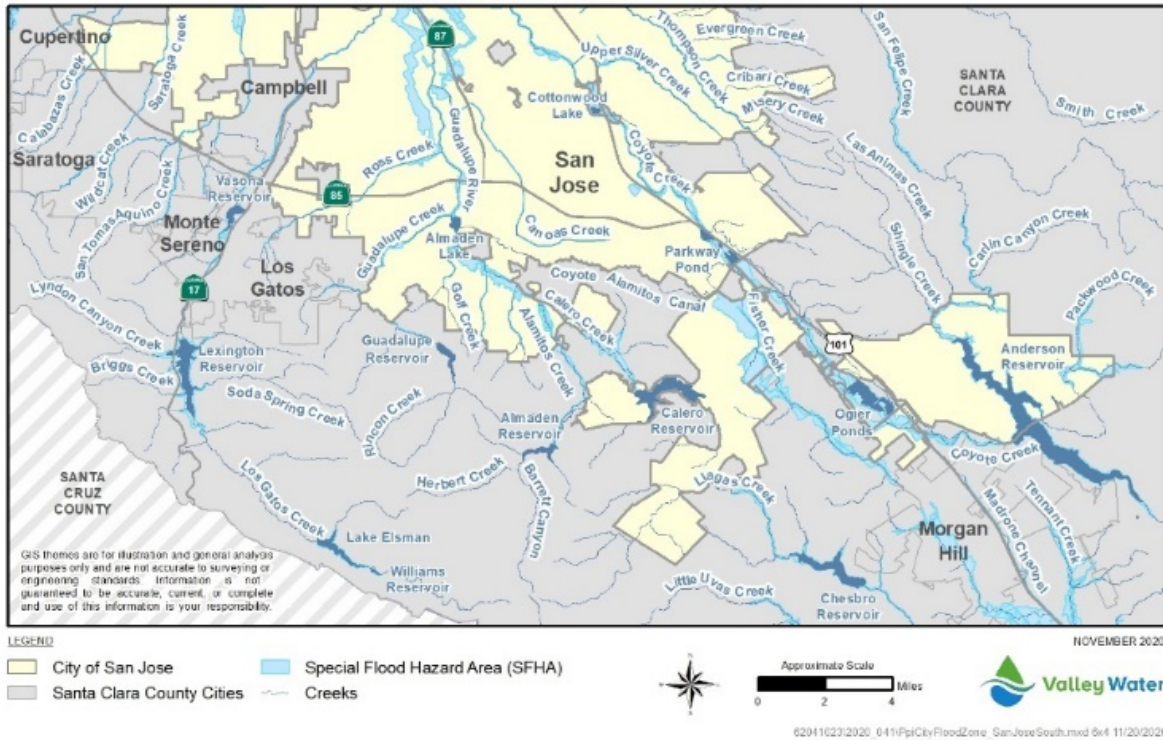
**Flood Hazard** Under the current FIRMs, the City of San José has approximately 20,000 structures in the Special Flood Hazard Area (SFHA); 67 percent of these structures are single-family residences

(1-4 units), 13 percent are multi-family (5 or more units), and 20 percent are other non-residential uses, including commercial and industrial. These structures are located in FEMA flood zone designations A, AE, AH and AO. There are two (2) main creeks/rivers that flow into the San Francisco Bay, the Coyote Creek, and the Guadalupe River. The areas that flood San José are from the many tributaries that drain into the Coyote Creek and the Guadalupe River.

**Repetitive Loss Properties** The City of San José has six (6) repetitive loss properties with a total of 11 structures.



### FEMA Flood Hazard Areas - South San Jose



### City of San José Flood Insurance Data (as of 11/02/20)

#### Insurance by Occupancy

|                       | Policies in Force | Premium     | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-------------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 4,604             | \$3,780,947 | \$1,151,265,400    | 517                          | \$6,404,404.92           | \$277,415.63       |
| 2-4 Family            | 531               | \$398,700   | \$127,607,700      | 76                           | \$2,866,636.23           | \$111,657.24       |
| All Other Residential | 996               | \$430,135   | \$228,028,500      | 22                           | \$546,597.69             | \$17,692.42        |
| Non Residential       | 499               | \$1,243,952 | \$229,130,900      | 32                           | \$710,402.65             | \$29,450.53        |
| Total                 | 6,630             | \$5,853,734 | \$1,736,032,500    | 647                          | \$10,528,041.49          | \$436,215.82       |

#### Insurance by Zone

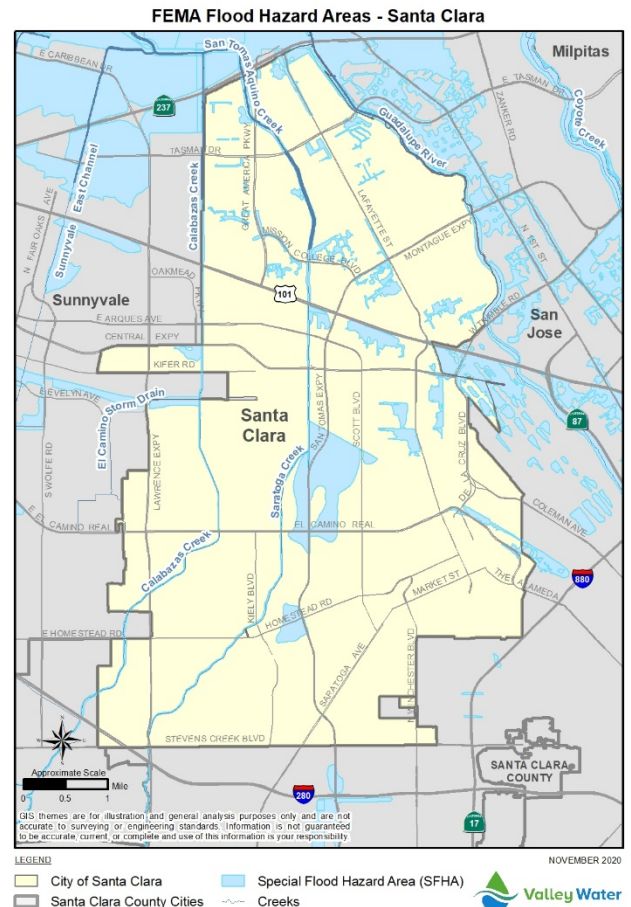
|                   | Policies in Force | Premium     | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-------------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 757               | \$1,349,929 | \$212,096,900      | 123                          | \$4,634,069.72           | \$162,791.30       |
| A Zones           | 20                | \$48,250    | \$5,095,200        | 79                           | \$725,661.42             | \$24,699.40        |
| AO Zones          | 2,532             | \$2,576,621 | \$644,679,500      | 176                          | \$2,674,644.82           | \$135,066.19       |
| AH Zones          | 1,008             | \$831,852   | \$244,809,200      | 47                           | \$239,089.26             | \$15,540.00        |
| AR Zones          | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 1                 | \$703       | \$100,000          | 7                            | \$31,082.76              | \$2,400.00         |
| V01-30 & VE Zones | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0         | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 157               | \$325,262   | \$40,828,100       | 26                           | \$378,470.93             | \$13,209.07        |
| B, C & X Zone     |                   |             |                    |                              |                          |                    |
| Standard          | 122               | \$116,773   | \$42,579,800       | 4                            | \$175,631.38             | \$6,124.17         |
| Preferred         | 185               | \$120,513   | \$68,864,000       | 7                            | \$9,456.96               | \$2,605.00         |
| Total             | 4,782             | \$5,369,903 | \$1,259,052,700    | 469                          | \$8,868,107.25           | \$362,435.13       |

# City of Santa Clara

The City of Santa Clara is located about 45 miles south of San Francisco. The city encompasses roughly 12,352 acres, or 19.3 square miles, and has a population of approximately 130,365. The city is categorized into areas consisting of approximately 43 percent residential, 27 percent commercial and industrial, 11 percent office/research and development, 11 percent public/quasi-public, and six (6) percent parks and open space, with the remaining area being categorized as vacant/unassigned.

**Flood Hazard** Under the current FIRMs, the City of Santa Clara has 1,012 properties in the Special Flood Hazard Area (SFHA). SFHA are mainly in FEMA designated zone A, AE, AH, and AO. Of the total properties in the SFHA, 50 percent are 1-4 family residential, 27 percent are multi-family (5 or more families), and the remaining 23 percent are non-residential areas. The city has four (4) creeks/rivers: Calabazas Creek, Saratoga Creek, San Tomas Aquino Creek, and Guadalupe River. The city has experienced flooding around Calabazas Creek and San Tomas Aquino Creek in 1983, 1986, and 1998 when water overtopped the levees and caused significant damage to properties.

**Repetitive Loss Properties** The city does not have repetitive loss properties.





## City of Santa Clara Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 375               | \$238,589 | \$102,884,800      | 25                           | \$296,887.02             | \$8,865.00         |
| 2-4 Family            | 111               | \$48,378  | \$27,438,000       | 2                            | \$880.40                 | \$150.00           |
| All Other Residential | 202               | \$134,805 | \$55,039,000       | 4                            | \$0.00                   | \$590.00           |
| Non Residential       | 112               | \$237,210 | \$65,019,000       | 1                            | \$11,985.67              | \$750.00           |
| Total                 | 800               | \$658,982 | \$250,380,800      | 32                           | \$309,753.09             | \$10,355.00        |

### Insurance by Zone

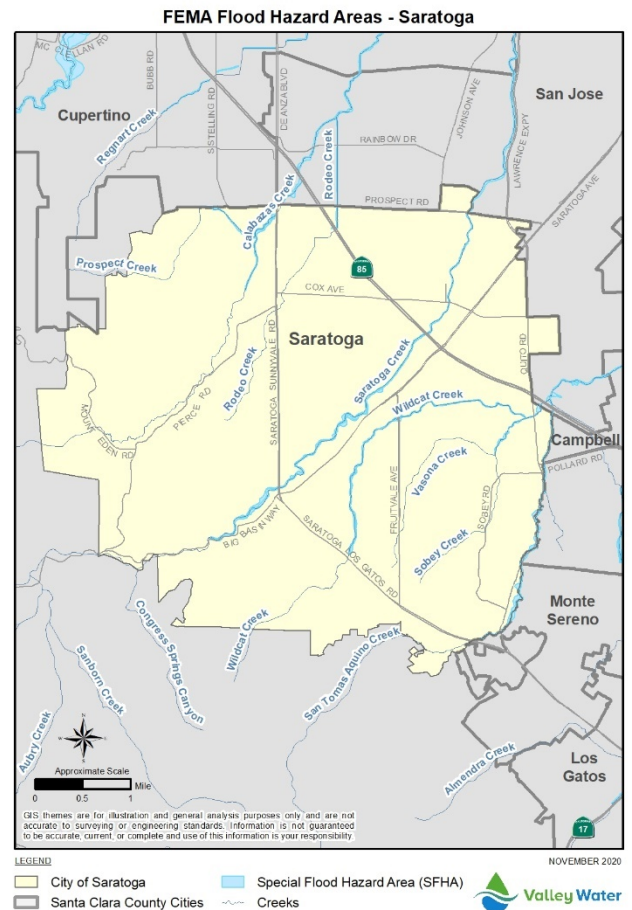
|                   | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 2                 | \$13,274  | \$1,000,000        | 0                            | \$0.00                   | \$0.00             |
| A Zones           | 0                 | \$0       | \$0                | 14                           | \$176,693.06             | \$4,745.00         |
| AO Zones          | 240               | \$252,011 | \$67,834,400       | 6                            | \$880.40                 | \$800.00           |
| AH Zones          | 131               | \$192,854 | \$45,846,400       | 3                            | \$266.54                 | \$160.00           |
| AR Zones          | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 1                 | \$2,367   | \$500,000          | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |           |                    |                              |                          |                    |
| Standard          | 20                | \$22,304  | \$6,168,100        | 3                            | \$988.46                 | \$335.00           |
| Preferred         | 135               | \$109,191 | \$52,631,000       | 4                            | \$253,483.06             | \$6,495.00         |
| Total             | 529               | \$592,001 | \$173,979,900      | 30                           | \$432,311.52             | \$12,535.00        |

## City of Saratoga

The City of Saratoga is located on the west side of the Santa Clara Valley, directly west of San José, in the San Francisco Bay Area. The city is 48 miles south of San Francisco and 14 miles west of San José and at the southwest edge of Santa Clara County, between the cities of Cupertino and Los Gatos. The city has a population of 30,153 residents and encompasses 8,179 acres or approximately 13 square miles. Approximately 40 percent of this area is in parks and preserves, and another 15 percent consists of agriculture and other open space uses. The remaining area is nearly completely developed, with single-family uses predominating. Less than one (1) percent of the city's land area consists of vacant, developable land.

**Flood Hazard** Under the current FIRMs, the City of Saratoga has 128 structures in the Special Flood Hazard Area (SFHA). SFHA are mainly in FEMA designated zone A, AE, and AH. Of the total structures in the SFHA, 98 percent are single-family (1-4 units), and two (2) percent are commercial or non-residential. The city has six (6) creeks: Calabazas, Rodeo, Saratoga, Wildcat, Vasona, and San Tomas. In general, flooding from these creeks has been confined to the relatively narrow flood plain directly adjacent to the creeks.

**Repetitive Loss Properties** There are no repetitive loss properties within the city.



## City of Saratoga Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 75                | \$54,033 | \$23,780,100       | 18                           | \$53,675.76              | \$12,075.00        |
| 2-4 Family            | 1                 | \$421    | \$350,000          | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 2                 | \$2,881  | \$739,700          | 0                            | \$0.00                   | \$0.00             |
| Non Residential       | 3                 | \$7,564  | \$2,150,000        | 0                            | \$0.00                   | \$0.00             |
| Total                 | 81                | \$64,899 | \$27,019,800       | 18                           | \$53,675.76              | \$12,075.00        |

### Insurance by Zone

|                   | Policies in Force | Premium  | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 16                | \$28,614 | \$4,423,100        | 3                            | \$17,303.34              | \$1,025.00         |
| A Zones           | 1                 | \$1,981  | \$250,000          | 4                            | \$4,888.78               | \$735.00           |
| AO Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AH Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0      | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |          |                    |                              |                          |                    |
| Standard          | 9                 | \$8,425  | \$2,944,700        | 8                            | \$4,488.41               | \$1,120.00         |
| Preferred         | 55                | \$25,879 | \$19,402,000       | 3                            | \$26,995.23              | \$9,195.00         |
| Total             | 81                | \$64,899 | \$27,019,800       | 18                           | \$53,675.76              | \$12,075.00        |

## City of Sunnyvale

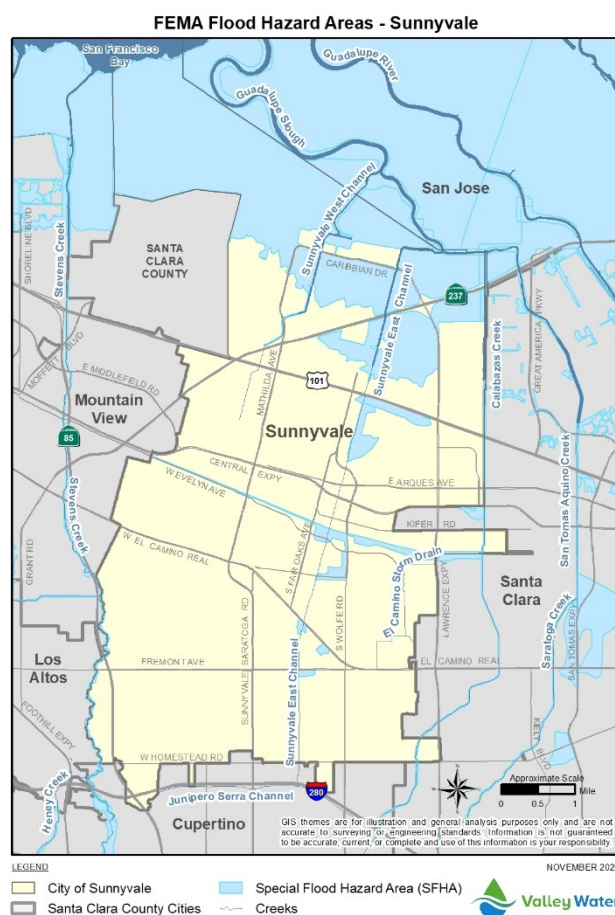
The City of Sunnyvale is one of the major cities that make up the Silicon Valley located in the San Francisco Bay Area. It is the second-highest populated city within Santa Clara County, with a population of 152,703. Sunnyvale is bordered by portions of San José to the north, Moffett Federal Airfield to the northwest, Mountain View to the west, Los Altos to the southwest, Cupertino to the south, and Santa Clara to the east.

The city's land area is approximately 22.87 square miles. Of this, 15.47 square miles are considered developable, as follows: 0.3 percent vacant, 54.7 percent residential, 22.4 percent office/industrial, 6.2 percent retail/service, 7.4 percent parks/open space, and 6.2 percent other uses.

**Flood Hazard** Under the current FIRMS, Sunnyvale has 1,270 parcels that lie within a Special Flood Hazard Area (SFHA). SFHA's in Sunnyvale are: Zones A, and V. Approximately 20 percent, or 254 parcels, are zoned for non-residential use. The remaining parcels within the SFHA are primarily single-family (1-4 units) residential (997 parcels), with only 19 parcels being multi-family residential (5+ units).

Areas subject to flooding in Sunnyvale are, in general, the northern portion of the city, selected areas flanking the East and West Channels, Calabazas Creek, El Camino Real, and US Highway 101. Both the East and West Channels and Calabazas Creek flow directly into the San Francisco Bay, which abuts the northerly boundary of the city.

**Repetitive Loss** There are no repetitive loss properties within the City of Sunnyvale.



## City of Sunnyvale Flood Insurance Data (as of 11/02/20)

### Insurance by Occupancy

|                       | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-----------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| Single Family         | 398               | \$433,459 | \$100,277,400      | 7                            | \$11,268.56              | \$2,640.00         |
| 2-4 Family            | 198               | \$101,139 | \$48,134,000       | 0                            | \$0.00                   | \$0.00             |
| All Other Residential | 130               | \$114,516 | \$39,682,300       | 0                            | \$0.00                   | \$0.00             |
| Non Residential       | 62                | \$261,572 | \$31,407,200       | 3                            | \$57,386.63              | \$2,525.00         |
| Total                 | 788               | \$910,686 | \$219,500,900      | 10                           | \$68,655.19              | \$5,165.00         |

### Insurance by Zone

|                   | Policies in Force | Premium   | Insurance in Force | Number of Closed Paid Losses | \$ of Closed Paid Losses | Adjustment Expense |
|-------------------|-------------------|-----------|--------------------|------------------------------|--------------------------|--------------------|
| A01-30 & AE Zones | 255               | \$543,251 | \$67,781,700       | 6                            | \$62,845.76              | \$4,490.00         |
| A Zones           | 3                 | \$6,163   | \$750,000          | 0                            | \$0.00                   | \$0.00             |
| AO Zones          | 134               | \$164,907 | \$38,067,100       | 1                            | \$0.00                   | \$125.00           |
| AH Zones          | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| AR Zones          | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| A99 Zones         | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V01-30 & VE Zones | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| V Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| D Zones           | 0                 | \$0       | \$0                | 0                            | \$0.00                   | \$0.00             |
| B, C & X Zone     |                   |           |                    |                              |                          |                    |
| Standard          | 133               | \$110,107 | \$36,132,500       | 2                            | \$5,809.43               | \$550.00           |
| Preferred         | 141               | \$61,947  | \$44,123,000       | 1                            | \$0.00                   | \$0.00             |
| Total             | 666               | \$886,375 | \$186,854,300      | 10                           | \$68,655.19              | \$5,165.00         |

## V. TARGET AUDIENCES

The PPI Committee identified several key audiences that can be divided into categories: 1) those who are at risk of flood impacts; and 2) those who are a conduit to those who are at risk of flood impacts or “messengers to other target audiences.”

### **Priority Audiences and Areas:**

#### **1. Community at Large**

The PPI Committee recognized that the entire community that lives and/or works in Santa Clara County is subject to impacts due to flooding. CRS typically focuses on residential flooding; however, in the San Francisco Bay Area, flooding of businesses and roads is also significant.

Within the community-at-large, there are several sub-communities:

*Multi-lingual Communities:* Within the community-at-large, there are non-English language speakers and non-US citizens. More than 112 languages are spoken in the Bay Area; however, the top three non-English languages are Spanish, Vietnamese, and Mandarin Chinese.

*Groups with Special Evacuation Needs:* Within the community-at-large, access and functional need individuals require special evacuation support, such as seniors and fixed or low-income residents. These groups are of great concern during a flooding event and would need additional time, resources, and logistics to support them.

*New Residents, Visitors, and Tourists:* Within the community-at-large, there are residents, visitors, and tourists who are new to the area or visiting for a short duration and may be unfamiliar with the hazards specific to this region. They may be unaware of flood risks, the resources available to them, and where to locate them. Additionally, new residents are less likely to be aware of sandbag locations and how to flood-proof a structure.

#### **2. Special Flood Hazard Area (SFHA) Communities**

The PPI Committee identified several geographic areas that are particularly prone to flooding. This includes areas of Mountain View and Milpitas that are prone to shallow flooding; areas of Mountain View and Palo Alto that are prone to riverine flooding, especially north of Highway 101; areas subject to tidal flooding; Los Altos, near Permanente and Hale creeks; areas of Palo Alto prone to flooding from San Francisquito Creek; flood-prone areas of San José, including Alviso; Morgan Hill, especially the downtown area; the South County corridor between Morgan Hill and the county line.

A map of each community SFHA can be found on each community-specific page under Section IV: Communities' Flood Hazard Areas.

*Residents and Businesses in the Special Flood Hazard Area (SFHA):* The offices of the largest employers of Silicon Valley form a ring around the edge of the San Francisco Bay, located in areas that flood. Consequently, thousands of people

work in the zone subject to tidal flooding, driving into and out of the tidal zone every day on their way to and from work. Street flooding can impact workers' commutes. Major thoroughfares can be blocked by flooding, impeding access to residents, schools, hospitals, and workplaces.

Those at risk of flood impacts include property owners, renters, and workers. For people who work in the tidal zone, family emergency plans are critical. Individuals should have flood-safe routes identified to get safely out of the tidal flooding zone. For residents who live in the FEMA-designated SFHA, the emergency plan ensures individuals and families are prepared for a flood event.

Additionally, it is important for our communities to protect their property by purchasing flood insurance for home and business locations. Most homeowner insurance policies do not cover damage from natural disasters, such as flooding. Therefore, advising residents to purchase flood insurance to cover the contents in their homes is a critical message for this community.

Within the SFHA, there are several sub-communities:

*Low Lying Areas, Along Rivers and Creeks:* Within the SFHA, there are low-lying areas along rivers and creeks at risk for flooding.

*Coastal Communities at Risk for Sea Level Rise/Tsunamis:* Within the SFHA, there are coastal communities at risk for sea-level rise and tsunamis. These areas are identified through the base flood elevation. The bayfront cities in Santa Clara County with areas subject to fluvial and tidal flooding are Palo Alto, Mountain View, Sunnyvale, Santa Clara, San José, and Milpitas.

*Repetitive Loss (RL) Areas:* Within the SFHA, there are a few repetitive loss areas located in the County of Santa Clara and the cities of Morgan Hill, Palo Alto and San José. Additional information on these areas can be found on each community-specific page under Section IV: Communities' Flood Hazard Areas.

### **3. Messengers to Other Target Audiences (Organizations and Businesses Serving the Community)**

Lenders, real estate agencies or boards, developers/contractors, and appraisers all serve as a messenger to people who are at risk of flooding as they provide their respective business service. In addition, organizations or agencies that serve at-risk communities include PG&E, American Red Cross, Emergency Assistance Network (EAN), Community Emergency Response Teams (CERT), neighborhood associations, schools, churches, hospitals, and social services agencies. These messenger organizations and businesses function as another target audience for the PPI.

As government agencies work to reduce flood risk, they need to provide these messengers with the best information available and tailor the message to the County of Santa Clara's needs. In other words, the PPI needs to include training that convey the information that the messengers will need. This will be implemented by presentations to groups, website postings and newsletter

articles. While all the messages need to be conveyed to messengers from time to time, some messages are more pertinent than others. For instance, lenders need a detailed understanding of flood insurance, but neighborhood associations would be more interested in how to protect people and property from a flood.

All these audiences can be reached through a combination of messages from Valley Water, the cities, the county, and the American Red Cross.

## **VI. OTHER PUBLIC INFORMATION EFFORTS**

To develop an effective PPI, the committee inventoried a broad sample of current initiatives, programs, and training that focus on raising the community's awareness of local flood hazards and encouraging them to take action that will reduce risks (see Table 2).

Outside activity by agencies and organizations in Santa Clara County relating to flood protection generally falls into one of four categories: 1) training and courses; 2) community-based engagement events; 3) traditional and social media messaging, and 4) mailers. Many community events feature at least one agency providing information on disaster preparedness and safety. The information in all four categories is usually provided on websites as well, so it is readily available.

Additionally, phone and tablet apps have become particularly popular. The American Red Cross has developed a series of free apps related to disaster awareness such as flood protection, first aid, earthquake, and fire. The content of this messaging usually covers general hazard awareness and safety, with an increasing emphasis on preparedness, planning, and mitigation; however, the information can be applied to flood preparedness and safety.



**Table 2: Other Public Information Efforts**

| Agency/Organization                                   | Project/Effort                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Message                                                                                                                         |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| American Red Cross Silicon Valley Chapter             | <ul style="list-style-type: none"> <li>• <u>Training</u>: Personal preparedness, organizational preparedness. Audience: Adults, Seniors, Youth/Kids.</li> <li>• <u>Community events</u>: Regularly staff booths at community events and company health fairs to provide information about American Red Cross services and preparedness.</li> <li>• <u>Social media messaging</u>: Facebook, Twitter posts with updates on current disaster responses, seasonal tips on safety, preparedness.</li> <li>• <u>Website</u>: Downloadable materials.</li> <li>• <u>Other</u>: Smart device apps.</li> </ul>           | <p>General hazard/disaster awareness, safety, and preparedness.</p> <p>The importance of preparing a family emergency plan.</p> |
| Collaborating Agencies Disaster Relief Effort (CADRE) | <ul style="list-style-type: none"> <li>• <u>Training</u>: Monthly meetings, workshops, annual conference, which include training sessions.</li> <li>• <u>Social media messaging</u>.</li> <li>• <u>Website</u>: <a href="http://www.cadresv.org">http://www.cadresv.org</a>.</li> <li>• <u>Other</u>: Newsletter.</li> </ul>                                                                                                                                                                                                                                                                                     | <p>Target CBOs, FBOs and nonprofit service providers.</p> <p>Organization disaster readiness and resiliency.</p>                |
| Catholic Charities of Santa Clara County              | <ul style="list-style-type: none"> <li>• <u>Training</u>: Disaster preparedness workshops.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>Disaster readiness and preparedness.</p>                                                                                     |
| Community Emergency Response Training (CERT)          | <ul style="list-style-type: none"> <li>• <u>Training</u>: Personal preparedness.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Disaster readiness and preparedness.</p>                                                                                     |
| Department of Water Resources                         | <ul style="list-style-type: none"> <li>• <u>Training</u>: Flood manager trainings, workshops, California Flood Preparedness prep meetings (Aug-Oct).</li> <li>• <u>Community events</u>: California Flood Preparedness Week (CFPW) every October.</li> <li>• <u>Social media messaging</u>: Social media toolkits for CFPW, social media messaging.</li> <li>• <u>Website</u>: Downloadable materials, toolkits, tips on flood safety: <a href="https://water.ca.gov/What-We-Do/Flood-Preparedness">https://water.ca.gov/What-We-Do/Flood-Preparedness</a>.</li> <li>• <u>Other</u>: YouTube channel.</li> </ul> | <p>Flood preparedness and safety messaging.</p>                                                                                 |
| Federal Emergency Management Agency (FEMA)            | <ul style="list-style-type: none"> <li>• <u>Training</u>: Online trainings.</li> <li>• <u>Community events</u>: Community events in partnership with local city/county.</li> <li>• <u>Social media messaging</u>: Facebook, Twitter, social media toolkits, smart device app: FEMA app.</li> <li>• <u>Website</u>: <a href="https://www.Ready.gov/floods">https://www.Ready.gov/floods</a>.</li> <li>• <u>Other</u>: Youth education materials, YouTube channel.</li> </ul>                                                                                                                                      | <p>Disaster readiness and preparedness.</p>                                                                                     |

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                          |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| NOAA                                                    | <ul style="list-style-type: none"> <li>• <u>Training</u>: Online webinars.</li> <li>• <u>Social media messaging</u>: Facebook, Twitter, Smart device app: NOAA Weather Radio.</li> <li>• <u>Website</u>: Downloadable materials: <a href="https://www.weather.gov/safety/flood">https://www.weather.gov/safety/flood</a>.</li> <li>• <u>Other</u>: Youth education materials, YouTube channel.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Flood preparedness and safety messaging. |
| Pacific Gas & Electric (PG&E)                           | <ul style="list-style-type: none"> <li>• <u>Other</u>: Utility bill inserts, radio safety ads.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Safety tips related to winter storms.    |
| Santa Clara County Department of Public Health          | <ul style="list-style-type: none"> <li>• <u>Website</u>: Downloadable materials: <a href="https://www.sccgov.org/sites/phd/hi/phep/Pages/prep-home.aspx">https://www.sccgov.org/sites/phd/hi/phep/Pages/prep-home.aspx</a>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Disaster readiness and preparedness.     |
| Santa Clara County Office of Emergency Management       | <ul style="list-style-type: none"> <li>• <u>Website</u>: Downloadable materials: <a href="https://emergencymanagement.sccgov.org/home">https://emergencymanagement.sccgov.org/home</a>.</li> <li>• <u>Other</u>: Smart device app: ReadySCC.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Disaster readiness and preparedness.     |
| San José Fire Department (Office of Emergency Services) | <ul style="list-style-type: none"> <li>• <u>Training</u>: Personal preparedness.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Disaster readiness and preparedness.     |
| Silicon Valley Independent Living Center (SVILC)        | <ul style="list-style-type: none"> <li>• <u>Training</u>: Personal preparedness.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Disaster readiness and preparedness.     |
| US Army Corps of Engineers                              | <ul style="list-style-type: none"> <li>• <u>Training</u>: Online webinars.</li> <li>• <u>Website</u>: Downloadable materials: <a href="https://www.usace.army.mil/">https://www.usace.army.mil/</a>.</li> <li>• <u>Other</u>: Youth education materials, YouTube channel.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Flood preparedness and safety messaging. |
| Valley Water                                            | <ul style="list-style-type: none"> <li>• <u>Training</u>: Virtual Flood Preparedness workshop, covering FEMA SFHA maps, stream gauges tools, community flooding hot spot awareness, flood insurance options, communication plans, emergency kits, and alerts and tips for avoiding floodwaters.</li> <li>• <u>Community events</u>: Flood awareness materials distributed at community fairs and events.</li> <li>• <u>Social media messaging</u>: Extensive multilingual flood awareness campaign with multilingual flood awareness videos and posts on Facebook, Instagram, Twitter, Nextdoor and YouTube, TV, radio, Pandora, print and digital newspapers, as well as email newsletter.</li> <li>• <u>Website</u>: Flood awareness blogs, videos, links, and preparedness resources available at <a href="http://www.valleywater.org/floodready">http://www.valleywater.org/floodready</a>.</li> <li>• <u>Other</u>: Mailers – Multi-lingual mailer with flood preparedness tips and resources distributed to 52,000 homes and 15 cities every winter.</li> </ul> | Flood preparedness and safety messaging. |

## VII. COMMUNICATION STRATEGY, PROJECTS, AND INITIATIVES

The focus of the Multi-Jurisdictional PPI (5-Year Plan) is to encourage flood preparedness best practices for the following key audiences:

- The community-at-large;
- Special Flood Hazard Area (SFHA) communities; and
- Messengers to other target audiences.

The committee selected nine (9) topics with messages for each topic that need to be disseminated to the various audiences. The first six (6) are the same as the six (6) priority messages for the CRS program and included several public messages to select from. Three (3) additional topics were added by the committee and include one (1) priority message each (see Table 3).

**Table 3: CRS Priority Messages**

| <b>Topic Number</b>                                                              | <b>Topic message</b>                                                 | <b>Public Message</b><br><i>(select one message per topic)</i>                                                                                                                                                                                  |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TOPIC #1                                                                         | Know your flood hazard                                               | <ul style="list-style-type: none"> <li>• Know your flood risk</li> <li>• Contact your floodplain manager to find out if your property is in a floodplain</li> <li>• Check if your home or business is in a Special Flood Hazard Area</li> </ul> |
| TOPIC #2                                                                         | Insure your property for your flood hazard                           | <ul style="list-style-type: none"> <li>• Get flood insurance ahead of time</li> <li>• Insure your property</li> <li>• There is a 30-day waiting period for the policy to take place</li> </ul>                                                  |
| TOPIC #3                                                                         | Protect people from the flood hazard                                 | <ul style="list-style-type: none"> <li>• Put your 3-day emergency kit together</li> <li>• Follow evacuation orders</li> <li>• Learn the best route to high ground</li> </ul>                                                                    |
| TOPIC #4                                                                         | Protect your property from the flood hazard                          | <ul style="list-style-type: none"> <li>• Protect your home from flood threats</li> <li>• Prepare your home</li> <li>• Sandbags can offer protection against a foot or less of floodwater</li> <li>• Get sandbags before a flood</li> </ul>      |
| TOPIC #5                                                                         | Build responsibly                                                    | <ul style="list-style-type: none"> <li>• Build responsibly in floodplains</li> <li>• Comply with development requirements</li> <li>• Check with your city/county floodplain manager before you build</li> </ul>                                 |
| TOPIC #6                                                                         | Protect natural floodplain functions                                 | <ul style="list-style-type: none"> <li>• Keep creeks clean and flowing</li> <li>• Keep debris and trash out of our streams</li> <li>• Don't pollute, dump, or drain anything in creeks</li> </ul>                                               |
| <b>Additional Outreach Topic Messages</b><br><i>(only one message per topic)</i> |                                                                      |                                                                                                                                                                                                                                                 |
| TOPIC #7                                                                         | Develop an emergency plan                                            | <ul style="list-style-type: none"> <li>• Develop an emergency plan</li> </ul>                                                                                                                                                                   |
| TOPIC #8                                                                         | Download disaster apps                                               | <ul style="list-style-type: none"> <li>• Download disaster emergency apps</li> </ul>                                                                                                                                                            |
| TOPIC #9                                                                         | Understand shallow flooding risks—don't drive through standing water | <ul style="list-style-type: none"> <li>• Understand shallow flooding risks - don't drive through standing water</li> </ul>                                                                                                                      |

## **Flood Response Preparation Projects:**

City of Santa Clara's Flood Response Program (FRP) provides a road map for city staff in various departments to quickly distribute prescribed messages through several social media outlets before, during, and after a storm event. These messages serve to remind residents to prepare for an impending storm by cleaning up fallen leaves, picking up sandbags from the city, and preparing emergency kits for their household. During a storm or flood event, these messages inform residents how to stay safe. After a storm or a flood, these messages relay essential safety information and provide resources for reporting issues to the city or appropriate agencies.

1. Before a storm/flood: The City of Santa Clara's Office of Emergency Service notifies all departments whether localized or area-wide flooding is anticipated. The fire Department, Police Department, and the Department of Public Works post their pre-approved messages and informs the City Manager's Office.
2. During a storm/flood: The City of Santa Clara's Manager's Office and the Office of Emergency Services authorize public outreach activities during a flood event when the Emergency Operations Center (EOC) is activated. Specifically, for storms, each department posts its pre-approved message that applies to the current situation. In this situation, the City Manager's Office does not need to give authorization, but they must be informed.
3. After a flood: The City of Santa Clara's Manager's Office and Office of Emergency Services authorize public outreach activities following a flood event.

Additionally, many of our communities are developing their Flood Response Programs (FRP) message plan. One idea was to develop a regionwide FRP messaging plan (*listed as 'Other New Initiatives' Item No. 9*), which would encompass all the participating communities.

**Table 4: Flood Response Preparation Priority Messages:**

| Topic Message                                                                         | Public Message<br>(can select multiple messages per topic)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Messaging Before A Flood</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>TOPIC #1:</b> Know your flood hazard                                               | <ul style="list-style-type: none"> <li>Your floodplain manager can provide you with flood insurance information and may have a FEMA Elevation Certificate for your property on file.</li> </ul>                                                                                                                                                                                                                                                                                                                                                    |
| <b>TOPIC #4:</b> Protect your property from the flood hazard                          | <ul style="list-style-type: none"> <li>Prepare your house for the storm by gathering building materials like plywood, plastic sheeting, and sandbags.</li> <li>Follow the sandbag guide to construct barriers to stop floodwater from entering your home.</li> <li>To further protect your home from localized flooding, make sure to keep the gutter in front of your house clean.</li> </ul>                                                                                                                                                     |
| <b>TOPIC #6:</b> Protect natural floodplain functions                                 | <ul style="list-style-type: none"> <li>If you see a storm drain clogged/flooded or tree branches down, please call (number).</li> <li>Place fallen leaves into your clean green container instead of blowing them onto the street and pick-up litter that can clog up storm drains.</li> </ul>                                                                                                                                                                                                                                                     |
| <b>TOPIC #7:</b> Develop an emergency plan                                            | <ul style="list-style-type: none"> <li>Make a family emergency plan and emergency kit for your home and car.</li> <li>Sign up for AlertSCC.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Messaging During A Flood</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>TOPIC #2:</b> Insure your property for your flood hazard                           | <ul style="list-style-type: none"> <li>Collect your valuable documents, such as property insurance.</li> <li>If you need to evacuate, take your property insurance documents and their contact number with you.</li> </ul>                                                                                                                                                                                                                                                                                                                         |
| <b>TOPIC #3:</b> Protect people from the flood hazard                                 | <ul style="list-style-type: none"> <li>If advised to evacuate, do so immediately.</li> <li>Turn off utilities at the main switches or valves.</li> <li>Disconnect electrical appliances.</li> <li>Do not touch electrical equipment if you are wet or standing in water.</li> <li>Check city/county website for the most up-to-date information on street closure, current situation, available shelter, and press releases.</li> <li>Tune to radio stations KCBS (740 AM), KGO (810 AM), and KLIV (1590 AM) for emergency information.</li> </ul> |
| <b>TOPIC #9:</b> Understand shallow flooding risks—Don't drive through standing water | <ul style="list-style-type: none"> <li>Avoid fast-moving water.</li> <li>"Turn Around Don't Drown."</li> <li>For puddles, let off the gas, keep the steering wheel straight, and don't slam on the brakes.</li> <li>Do not drive into flooded areas.</li> </ul>                                                                                                                                                                                                                                                                                    |

| Messaging After A Flood                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TOPIC #3:</b> Protect people from the flood hazard | <ul style="list-style-type: none"> <li>• Do not walk in floodwater.</li> <li>• Stay away from a downed power line and report them to Silicon Valley Power's 24-hour hotline at 408-615-5640.</li> <li>• Return home only when authorities indicate it is safe.</li> <li>• Don't attempt to re-enter your home before then, or you may be at risk of the building collapsing.</li> <li>• Check the city/county website for the most up-to-date information.</li> <li>• Check the city/county website for the most up-to-date information on street closure, current situation, available shelter, and press releases.</li> <li>• Listen for news reports on whether the community's water supply is safe to drink. Check on the city/county website or contact City Water Utility Department at (number) to confirm.</li> </ul> |
| <b>TOPIC #5:</b> Build responsibly                    | <ul style="list-style-type: none"> <li>• Get a permit for flood damage repairs to avoid future damages. The city/county has a permit process to help you get back into your house.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>TOPIC #6:</b> Protect natural floodplain functions | <ul style="list-style-type: none"> <li>• If you see a storm drain clogged/flooded or tree branches down, please call (number).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Outreach Projects:

Numerous outreach projects have been carried out over the past several years. Since they match the key audiences and are an effective means to disseminate the nine (9) topic messages, they will continue. Each outreach project includes one or more of the key messages. These projects are also reflected in Appendix A: CRS Creditable Outreach and Flood Response Projects by Community and Appendix B: Additional CRS Outreach Projects by Community (Non-Creditable Activities for Activity 330).

### 1. Outreach and Flood Response Projects by CRS Community

- a. **County of Santa Clara:** The County of Santa Clara's website includes a Santa Clara County "Storm and Flood Information and Resources" webpage available for all residents in the county: <https://www.sccgov.org/sites/opa/Pages/storm.aspx>. The storm and flood information page redirects residents to Valley Water's Flood Ready webpage, National Weather Service, American Red Cross, and [www.floodsmart.gov](http://www.floodsmart.gov), as useful resources.

The County has a Consumer Protection Division's website that also includes a "Flood Safety Information" webpage. The site redirects residents to Valley Water's Access Valley Water customer portal for reporting debris in creeks and flood-ready webpage and [www.Ready.gov](http://www.Ready.gov). Additionally, there are multi-language 'Flood Safety Information' documents for resident's use and other resourceful links: <https://cpd.sccgov.org/flood-safety-information>.

Every fall, the County sends annual letters to the properties in the unincorporated section of the county's mapped repetitive loss areas, as required by FEMA and is a prerequisite for a CRS Class 9.

As needed, the County's Office of Emergency Management shares Valley Water's digital social media resource links during the flood season. The "Floods Follow Fires. Are you Ready?" and "Got Sandbags" messages redirect to Valley Water's website and all messages are available in English, Spanish, Chinese, and Vietnamese. Messages are used on social media, short-form newsletter, short-form email, web, and Nextdoor.

The County's Office of Emergency Management's website has a "Be a Prepared Community Member" webpage that includes emergency preparedness information including, signing up for AlertSCC, making an emergency plan, downloading the ReadySCC App, building an emergency supply kit, packing a go-bag, checking on neighbors, "Do One Thing," 12-month preparedness calendar, and get CERT trained. <https://emergencymanagement.sccgov.org/be-prepared-community-member>.

The County's Office of Emergency Management's website has a "People with Access and Functional Needs (AFN)" webpage that provides resources to help enhance independence and readiness through emergency preparedness: <https://emergencymanagement.sccgov.org/people-access-and-functional-needs-afn>.

- b. City of Cupertino:** The City of Cupertino publishes annual flood notice in the local newsletter (The Cupertino Scene, a community-wide newsletter) that highlights nine (9) priority topics and is mailed to all residential and commercial properties within Cupertino's jurisdiction. These notices provide information on flood risks and flood safety and inform property owners on ways to protect themselves and their property. The notice is typically published before or at the beginning of the rainy season (October or November issue).

Although there are no longer any repetitive loss properties within the city, the City of Cupertino continues to send annual letters to these properties, highlighting five (5) of the nine (9) priority topics. The letter is typically mailed mid-year.

In addition, Valley Water conducts several general and informational outreach projects that distribute materials countywide, highlighting the nine (9) priority topics that Cupertino can take credit for. Some of these outreach materials include their latest Flood Ready campaign brochures and flood kits, FEMA flood-related materials, which have also been distributed at various Cupertino events/facilities.

The City of Cupertino recognizes the robust social media campaign led by Valley Water and has linked the city's main flood preparation webpage, 'Citizens Preparedness' to Valley Water's Flood Ready webpage.

The City's Office of Emergency Services also hosts a "Citizen Preparedness" webpage that includes emergency preparedness

information for different types of disaster such as floods. The webpage also includes re-directing to Valley Water's Flood Ready webpage. <https://www.cupertino.org/residents/community-services-programs/emergency-services/citizen-preparedness>.

Cupertino's Public Works Department and Community Development Department's Building Division also work closely together to provide Flood Protection Assistance, Property Protection Advice, site visits, and general flood protection assistance to interested community members. Advice and assistance are provided one-on-one, either over the phone, face-to-face at the public counter or through comments related to development review. Site visits, if requested, are also conducted, and scheduled directly with qualified city staff.

The city participates in yearly clean-up events: the annual National River Clean-up Day (each May) and Coastal Clean-up Day (each September) and coordinates volunteers. Staff coordinate with Valley Water on both these clean-up efforts. The city also participates in Valley Water's Adopt-a-Creek Program.

On a project-specific basis, the city provides homeowners and business owners of active construction sites a Winter Preparedness notification that informs them that during the winter season, they need to winterize their project(s) site. Certain soil disturbance activities are not allowed during the rainy season.

- c. **City of Gilroy:** The City of Gilroy recognizes Valley Water's Flood Awareness Campaign and has linked the city's main flood webpage to Valley Water's Flood Ready webpage. In addition, all the residents in the FEMA designated SFHA receive Valley Water's annual floodplain mailer. This mailer is kept in a static location at City Hall for residents to pick-up and is also distributed at various events throughout the year.

Gilroy participates in two fair/events. The Gilroy Garlic Festival, held typically at the end of July and the city's Public Works Week Community Open House, held typically in May. Both support promoting PPI topic messages – distributes flood preparedness materials.

- d. **City of Los Altos:** Annually, the City of Los Altos sends a letter, along with a "Are You Prepared for a Flood in Your Neighborhood?" brochure, each fall to property owners in the SFHA to inform them their property is within the SFHA, flood risk reduction information, requirements for development standards within the SFHA, availability of flood insurance, and where additional information can be found. The mailer contains information on the following topic messages:

- What to do before, during, and after
- Recognize the natural and beneficial functions of floodplains
- History of flooding in Los Altos
- Determine if your property is located in an area subject to flooding



- Purchase flood insurance
- Maintain drainage channels and pipes free of obstruction and debris
- Protect your property from flood damage
- Know floodplain development standards
- Comply with development requirements
- Plan for emergencies – Prepare a family disaster plan, make an emergency kit, sign-up for AlertSCC.

Also, in the fall, each year, two (2) newspapers ads are published in the 'Los Altos Town Crier,' which contain similar information as the "Are You Prepared for a Flood in Your Neighborhood?" brochure including flood insurance information.

- e. **Town of Los Altos Hills:** The Town of Los Altos Hills hosts a "Flood Information" webpage on the town's website. This webpage includes information on the PPI nine topics, including a supporting message. The webpage redirects to the following key resource websites: [www.valleywater.org/floodready](http://www.valleywater.org/floodready), [www.floodsmart.org](http://www.floodsmart.org), [www.ready.gov](http://www.ready.gov), and [www.weather.gov](http://www.weather.gov).

The town recognizes Valley Water's Flood Awareness Campaign and has linked the town's main flood webpage to Valley Water's Flood Ready webpage. In addition, all residents in the FEMA designated SFHA receiving Valley Water's annual floodplain mailer; the mailer is kept at a static location in the town hall for residents to pick-up.

The town's "Our Town" quarterly newsletter (fall issue) includes information on flood preparedness. The newsletter is mailed out town-wide and is also available online on the town's website.

The town participates in annual clean-up events: National River Clean-up Day (each May) and Coastal Clean-up Day (each September) and coordinates volunteers. They coordinate with Valley Water on both these clean-up efforts. The city also participates in Valley Water's Adopt-a-Creek Program.

Annually, the town hosts two events - Earth Day (held in the spring) and the Town Picnic (held late summer). The town distributes various flood preparedness and safety materials at these events, including Valley Water's annual floodplain mailer and promotional item (e.g., emergency starter kits, Get Flood Ready Emergency Supply Checklist tote bags, etc.). Additionally, Valley Water hosts a table at the Town Picnic event and distributes various flood readiness materials and information (i.e. FEMA flood insurance information, ReadySCC, and American Red Cross Flood apps, AlertSCC, sandbag guidelines, flood protection project-specific notices, FEMA NFIP materials, and preparedness activity/coloring books, etc.) to the public.

- f. **Town of Los Gatos:** The Town of Los Gatos' website encourages residents and businesses to purchase flood insurance and redirects visitors to [www.floodsmart.gov](http://www.floodsmart.gov).

The town recognizes Valley Water's Flood Awareness Campaign and has linked the town's main flood webpage to Valley Water's Flood Ready webpage. In addition, all residents in the FEMA designated SFHA receiving Valley Water's annual floodplain mailer; the mailer is kept at a static location in the town hall for residents to pick-up.

- g. **City of Milpitas:** Annually, the City of Milpitas mails out a brochure, "Flood Public Advisory" during the months of December or January to residents and businesses within SFHA and the community at large. The brochure promotes flood safety and flood preparedness messaging, including purchase flood insurance, SFHA, flood warning information, illegal dumping, ongoing flood mitigation projects, the city's participation in the CRS, elevation certificates, Flood Protection Assistance, permit requirements for floodplain development, floor elevations, substantial improvements, and substantial damage, and provides contact information for a number of flood-related issues. The city's "Flood Public Advisory" brochure, along with Valley Water's "Are You Flood Ready?" floodplain mailers are posted in the public libraries and at City Hall.

The city offers Flood Protection Assistance, Property Protection Advice and provides in-person flood risk consultation at the front counter. Anyone seeking flood zoning and flood mitigation information, can talk to a Registered Civil Engineer and/or a CFM from the Engineering Department. This service is advertised to the whole city by the 'Flood Public Advisory' that is mailed out annually between December-January. An engineer and/or CFM will visit the project site upon request and will provide an analysis report after the visit. A copy of any site visits and analysis report will be kept on file with the city.

On a project-specific basis, the city provides contractors a Winter Preparedness notification that informs them that during the winter season, they need to winterize their project(s) site. Certain soil disturbance activities are not allowed during the rainy season.

The city participates in annual clean-up events: National River Clean-up Day (each May) and Coastal Clean-up Day (each September) and coordinates volunteers. They coordinate with Valley Water on both these clean-up efforts. The city also participates in Valley Water's Adopt-a-Creek Program.

Year-round, the city distributes at various events the FEMA flood-related publications, including "Myths and Facts about the NFIP" and "Q&A NFIP Handbook" and the front counter area in a brochure rack.

The city's website has a "Flood Information" webpage contains information on several of the PPI message topics; the webpage also

redirects to Valley Water, FEMA, NOAA, [www.floodsmart.gov](http://www.floodsmart.gov), [www.Ready.gov](http://www.Ready.gov), and USGS webpages.

- h. **City of Morgan Hill:** Annually, the City of Morgan Hill sends a citywide “Flood Report” close to or during the start of the rainy season. The report is for residents and businesses to understand the flood hazards in the City of Morgan Hill, to learn what they can do to protect themselves before the next rainy season and to find out about recent and planned improvements being made in the city. The Flood Report varies on PPI priority messages including:

- Know Your Flood Risk
  - Flood Insurance Rate Maps (FIRMS)
  - FEMA Flood Map Service Center (redirects to [www.msc.fema.gov](http://www.msc.fema.gov))
  - City contact information for flood map requests, flood protection assistance, and other flood-related inquiries
  - Major Creeks: Llagas, West Little Llagas, Edmundson, Foothill, Paradise, Tennant, Coyote, Maple, and Corralitos Creeks
- Build Responsibly - Morgan Hill Municipal Code Chapter 15.80
- SFHA
- Recent and Planned Improvements
- Keep Debris and Trash Out of Streams – It’s illegal to dump into our creeks; Do Not Dump
- Insure Your Property (redirects to [www.floodsmart.gov](http://www.floodsmart.gov))
- Be Prepared Before a Flood
  - Protect Your Property
- Elevation Certificates
- Be Prepared During a Flood
  - Register for AlertSCC
  - Follow evacuation orders
  - Stayed tuned (radio or TV) for possible warnings
  - Avoid floodwaters – “Turn Around Don’t Drown”
- 6” of moving water can knock you off your feet
- A car can be carried away by just 2’ of water
- Develop a Family Emergency Plan
  - Create a communications plan
  - Assemble an emergency kit
  - Keep a minimum 3-day supply of non-perishable food and bottled water
- Download Disaster and Emergency Apps
  - ReadySCC
  - Red Cross Flood App
- Redirects to [www.ValleyWater.org/FloodReady](http://www.ValleyWater.org/FloodReady)

From year-to-year, the Flood Report can also include additional messaging based on the current outreach efforts and publicity requirements on city’s CRS activities.

The city's website has a "Flood Information" webpage that contains the city's flooding information, which redirects to their Floodplain Management page and includes a link to the city's annual "Flood Report." The webpage redirects to Valley Water's Flood Ready webpage and also contains FEMA flood information.

Each summer, the city sends an annual notice to Repetitive Loss (RL) areas as required by FEMA and is a prerequisite for a CRS Class 9.

- i. **City of Mountain View:** The City of Mountain View sends information on flood risk, flood safety, and the importance of buying flood insurance in the Winter version of the city's newsletter called, "The View." The city publishes this newsletter bi-annually and is sent to all postal addresses in the City of Mountain View (over 17,000 addresses). The Fall edition of the newsletter includes a "Are You Flood Prepared?" section that provides a wealth of informs the public of flood risks including the nine priority flood messages including: know your flood risk, contact your floodplain manager to find out if your property is in a floodplain, how to insure your property, protect people from the flood hazard by creating a 3-day emergency kite, protect your property with city provided sandbags, build responsibly, protect the natural floodplain by keeping debris and trash out of our streams, develop an emergency plan, download the emergency apps and 'Turn around don't drown' messaging. The city's "Flood Protection and Insurance Information" webpage also provides information on many of these same topics and also redirects to Valley Water's webpage and [www.floodsmart.gov](http://www.floodsmart.gov).

Each year, all residents and businesses see these nine priority flood messages again as an insert in their utility bill that arrives between July-September.

The city participates in the Mountain View Art & Wine Festival (each September) and Thursday Night Live (months of June and July) and distributes Valley Water's annual floodplain mailer and the promotional item (e.g., emergency starter kits, Get Flood Ready Emergency Supply Checklist tote bags, etc.). Valley Water also hosts a table at the Mountain View Art & Wine Festival and distributes various flood readiness materials and information (i.e. Valley Water's floodplain mailer [containing all 9 PPI topic messages], FEMA NFIP flood insurance information, ReadySCC, and American Red Cross flood apps, AlertSCC, sandbag guidelines, flood protection project-specific notices, FEMA NFIP materials, and preparedness activity/coloring books, etc.) to the public.

The City of Mountain View does a social media notification about storm preparation for winter storms ahead of time. The notification directs residents to their "Flood Protection and Insurance Information" webpage. The city has also linked the city's webpage to Valley Water's Flood Ready webpage.

- j. **City of Palo Alto:** Annually, the City of Palo Alto's "Are You Ready for Winter Storms?" flyer (aka utility insert) is sent to all residents and

businesses in the city, in their utility bills in the fall. The flyer contains information on the nine (9) PPI topic messages, including: what to do before, during, and after a storm; prepare family emergency plans and emergency kits; sign up for AlertSCC; bookmark [cityofpaloalto.org/storms](http://cityofpaloalto.org/storms) webpage for up-to-date local storm information; stay powered safely; understand shallow flooding – Turn Around, Don't Drown; protect your property – know your flood hazard area, insure your property sufficiently, purchase flood insurance; identify flood zone designation; build responsibly; clean out roof gutters, downspouts, landscape inlets and swales; sandbags available/locations; report hazardous material spills and illegal dumping; Do Not Dump; emergency information: flood warning and creek levels; blocked storm drains, mud slides, and fallen trees; sign up to receive text or email notifications of flood conditions; get Red Cross flood app; become an Emergency Services Volunteers (ESV); and other general information including non-emergency; real-time public safety updates are posted on social media accounts on: Twitter, Nextdoor, Facebook, etc. Information on the link to real-time creek monitor page and San Francisquito Creek JPA early flood warning system is also provided.

The city distributes various flood preparedness and safety documents, including FEMA NFIP materials for public/policyholders (e.g. Valley Water's annual floodplain mailer, FEMA's NFIP Why Do I Need Flood Insurance? Your Homeowners Insurance Does Not Cover Flooding, The Preferred Risk Policy for Homeowners and Renters, etc.). These materials are available at the Public Works Department, the Development Center, and are also made available via the city's website, "Flood Information and Winter Storm Preparedness" webpage that redirects to 'Flood Information Documents' from the City of Palo Alto Library Digital Collection database. These materials are also distributed at the city's annual events noted below.

Annually, the city also sends out a utility announcement, "Anytime it can rain, it can flood. Don't get caught off-guard." The announcement includes a link to the city's flood safety tips webpage at [www.cityofpaloalto.org/storms](http://www.cityofpaloalto.org/storms). The announcement is sent once a year during the month of March/April. Messages included are: Valley Waters Flood Safety Tips, purchase flood insurance, prepare a family emergency plan, know the location of neighborhood streams and drainage channels, learn the best route to high ground; protect natural floodplains; protect your home and understand shallow flooding.

As required by FEMA and is a prerequisite for a CRS Class 9, the city also sends annual letters to the properties in the city's mapped repetitive loss areas, highlighting flood safety tips; the letter is typically mailed in the month of August/September.

Annually, at the beginning of the flood season (September/October), the city sends out letters to real estate agencies informing them of their responsibility to identify flood hazard areas and to take advantage of the

Flood Zone Lookup on the city's website on the Floodplain Management webpage.

The city participates in the annual clean-up events: National River Clean-up Day (each May) and Coastal Clean-up Day (each September). They coordinate with Valley Water on both these clean-up efforts. Additionally, the city participates in Valley Water's Adopt-A-Creek Program.

Trash booms are located in Matadero Creek and Adobe Creek. Annually, booms clean-ups are done on an as-needed basis. The city also assesses its hot spots and cleans up the local drainage system on an ongoing basis as part of the city's operations and maintenance.

Each April, city staff host a flood readiness table at the city's annual Earth Day event and at the City Municipal Corporation Open House held in July. Flood preparedness materials are distributed to the community, including Valley Water's outreach promotional item (varies from year to year) and their annual floodplain mailer, the city's "Are You Ready for Winter Storms?" utility insert, the Creekwise mailer/brochure, and runs a slideshow presentation of flood preparedness and protection. Upon request, the city also participates in other fairs and promotes flood readiness.

- k. **City of San José:** Annually, at the beginning of the flood season, the City of San José sends an annual flyer to properties in repetitive loss areas typically between September and December as required by FEMA and is a prerequisite for a CRS Class 9. The informs property owners that their property is in a flood-prone area. The flyer also details ways property owners can protect themselves and their property, such as be informed and know your flood risk, how to reduce this risk, how to protect your people and your property, including flood insurance (redirecting to [www.floodsmart.gov](http://www.floodsmart.gov)), build responsibly, and to practice flood safety.

The city's Public Works, Development Services, "Flood Hazard Zones" webpage located here: <https://www.sanjoseca.gov/your-government/departments/public-works/development-services/floodplain-management>, includes information on the following:

- **Flood Information**

Public Works staff provides information regarding flood zones, flood insurance, Special Flood Hazard Area regulations, and maintains copies of elevation certificates. The public may also check if their property is in the flood zone by visiting [flood hazards zone map](#).

- **Flood Hazard Zones**

The City of San José is a member of the [National Flood Insurance Program](#). Membership in the program allows residents of the City of San José to obtain federally backed mortgages and disaster assistance in the event of floods. In exchange, the city requires new land developments and remodels of existing buildings to

conform to rules that minimize flood damage. Public Works is responsible for administering this program and providing flood zone information to the citizens of San José.

- **Re-directs to Valley Water's Flood Ready webpage** for more information about watersheds and historical flooding information. The city also has a link on its website to [www.floodsmart.gov](http://www.floodsmart.gov) for residents to learn more about purchasing flood insurance.

The city recognizes Valley Water's Flood Awareness Campaign and has linked the city's main flood webpage to Valley Water's Flood Ready webpage. In addition, all the residents in the FEMA designated SFHA receive Valley Water's annual floodplain mailer. This mailer is kept in a static location at City Hall for residents to pick-up and is also distributed at various events throughout the year.

Annually, at the beginning of the flood season (September–December), the city sends out letters to real estate and insurance agencies and lenders, informing them of their responsibility to identify flood hazard areas and to take advantage of the Flood Zone Lookup on the city's website on the "Flood Hazard Zones webpage and advises to contact the city for map reading services and elevation certificates on file.

The city hosts an annual public safety event, 'Building Permits and Home Safety Open House,' typically held in May. Valley Water staff also participates in the city's annual Pumpkins in the Park' event, held in October. At both events, there are booths/tables with information/materials that support our PPI topic messages; flood prevention materials are distributed.

- I. **City of Santa Clara:** Each fall, the City of Santa Clara mails out a citywide newsletter for residents and businesses, including all addresses in the SFHA, called "Inside Santa Clara." The fall issues have a "Are You Flood Ready" page that includes all nine (9) CRS key priority messages urging residents and business to purchase flood insurance, learn more about flood from floodsmart.gov, find out their flood zone and flood risk with available services from the city, prepare emergency kits and family emergency plans, sign up for ALERT SCC (the Santa Clara County emergency alert system), download emergency apps "ReadySCC" or the Red Cross Emergency App, make permanent improvements to reduce flood damages with free Flood Protection Assistance, Property Protection Advice service from the city, build responsibly and obtain building permits and elevation certificates in SFHA, protect properties from flood threats with sandbags available from the city, stay safe from shallow flood and flood water while driving or walking – Turn Around, Don't Drown, keep storm drain inlet and catch basins clear of debris or leaves. The citywide newsletter also provided "How To" information on staying safe during a flood, proper sandbag usage, reporting storm drain blockage, and reporting illegal dumping in/near creeks to reduce flood and pollution risk. The newsletter is mailed to all residential and business addresses in the city. Additional copies of the newsletter are available for display and pick



up at City Hall, and it can also be accessed online on the city's website: <https://www.santaclaraca.gov/i-want-to/stay-informed/newsroom/city-publications/inside-santa-clara>.

City staff host a flood readiness table at the city's annual Art & Wine Festival held each September to display and distribute emergency preparedness kits, Valley Water's floodplain mailer and flood reporting phone number magnet and provide flood zone look up service. Valley Water also sponsors a table at the festival promoting flood preparedness and distributes various flood readiness materials to the community.

During the storm season, the City of Santa Clara publishes social media posts on Facebook, Twitter, and other platforms, focused on safety and urges residents to stay vigilant while walking or driving during heavy rains/storms; reminds them to keep storm drain inlets clear, and advises them to report blocked storm drain inlets. The city's Office of Emergency Services prepared a pre-flood plan (FRP) for public information projects that will be implemented before, during, and after a storm/flood, as well as identifying who is responsible for posting these messages, what type of events they apply to, what social media platforms to post to and how often. Before a storm/flood, the messages focus on emergency kit, plan, and app-sign-up preparation, and flood damage prevention. During a storm/flood, the messages focus on shallow flood risk, utility safety, and where to find accurate information on evacuation order, shelter, and road closure. After a flood, the messages focus on keeping people safe, reporting issues, where to find accurate information on the current status for drinking water, utility, road closure, evacuation order and shelter, and rebuilding and recovery.

The city's website, "Flood Protection Information" webpage contains valuable information on flood-related topics, such as local flood risk, FEMA flood zones, flood insurance, and flood emergency preparedness, among other things. Many FEMA publications containing a wealth of flood-related information are also available for viewing in hard copy at Santa Clara City Hall or at the City of Santa Clara Central Library: <https://www.santaclaraca.gov/our-city/departments-g-z/public-works/engineering/flood-protection>.

- m. **City of Saratoga:** The City of Saratoga's website encourages residents/businesses to purchase flood insurance and redirects visitors to [www.floodsmart.gov](http://www.floodsmart.gov): <https://www.saratoga.ca.us/218/Winter-Storms>.

The City of Saratoga does a social media notification about storm preparation for winter storms ahead of time. The notification directs residents to their "Staying Safe, Winter Storms" webpage. The City of Saratoga has also linked the city's Winter Storms webpage to Valley Water's Flood Ready webpage.

The City of Saratoga recognizes Valley Water's Flood Awareness Campaign and has linked the city's main flood webpage to Valley Water's Flood Ready webpage. In addition to all residents in the FEMA



designated SFHA receiving Valley Water's annual floodplain mailer, the mailer is kept static at the City Hall for residents to pick-up.

- n. **City of Sunnyvale:** The City of Sunnyvale sends two (2) mailers and one (1) newsletter article each October. The first mailer/postcard is targeted to all residents and businesses within the SFHA informing them of the requirement to purchase flood insurance and about the automatic 15% discount. The second mailer/postcard is targeted to real estate agents informing them of the client's responsibility for identification and purchase of flood insurance and the availability of the automatic 15% discount.

The City of Sunnyvale's annual fall "Horizon" newsletter, which comes out in October, includes a "Know How to Be Flood Safe" article that promotes flood safety and flood preparedness messaging, including purchasing flood insurance and promotes [www.floodsmart.gov](http://www.floodsmart.gov), Flood Zone Lookup information, AlertSCC, Do Not Dump, and highlights the city's website.

Additionally, the City of Sunnyvale has permanent "Road May Flood" street signs in areas of the city prone to flooding and promotes the "Flood Zone Look Up" featured on the city's website.

Furthermore, during the rainy season (October-March), the City of Sunnyvale actively posts flood safety and preparedness messaging through the city's Environmental Services social media platforms (i.e., Facebook and Twitter).

- o. **Valley Water:** Valley Water sends an annual multi-language floodplain mailer countywide to all residents and businesses within the SFHA in Santa Clara County.

The floodplain mailer is an extensive mailer that includes language on all the nine (9) PPI priority messages, such as contact numbers for mapping services for each of the communities and flood response messaging on what to do before, during, and after a flood. The mailer is sent out each year between November/December to remind residents and businesses in the SFHA of the upcoming rainy season and urges them to prepare beforehand and to purchase flood insurance. An electronic version of the mailer is also available on Valley Water's website on the flood preparedness page at [www.valleywater.org](http://www.valleywater.org). It should be noted that this is not necessarily a mailer to every creek side owner. Many properties are adjacent to creeks but not in the SFHA and would not receive this mailer.

Hard copies of the floodplain mailer are provided to all the cities/county for their use to disseminate at various events (i.e. emergency preparedness fairs, festivals, public meetings, etc.), including keeping the mailer static in lobby areas for visitors to pick-up. Electronic copies are also provided to the CRS communities to post on their websites.

Additionally, Valley Water includes flooding messages in an annual multi-language countywide mailer sent to every postal address in the county in

late October/early November. This is a general mailer whose topics cover the full range of services Valley Water carries out; therefore, topics vary from year to year, but a minimum of six (6) topics are included. The importance of buying flood insurance is always mentioned and the 30-day waiting period for an NFIP policy to go into effect.

Every CRS community submits the floodplain and countywide mailers for CRS credit. Annually, Valley Water also distributes and provides each community with a flood promotional item to giveaway to the public at community events.

During the year, Valley Water participates in booth duty support at various events and fairs throughout the county, including Valley Water Capital project meetings, or other events, as requested by various organizations. A number of communities pursue Outreach Project (OP) credit under Activity 300 for this activity. Valley Water distributes flood preparedness and awareness outreach materials (e.g., annual floodplain and countywide mailers, FEMA NFIP materials, USACOE Disaster preparedness coloring book, etc.) to the public at various events/fairs throughout the county encouraging the public to “Get Flood Ready.” Valley Water maintains public outreach materials for use before, during and after a flood and safety messaging. The distributed materials cover all of the nine (9) key CRS messages: sandbag guideline and flood protection project(s) information; downloading flood/emergency apps; information to encourage creating a family emergency plan; encourage homeowners, business owners, and renters to purchase of flood insurance ahead of time; prepare emergency kits; to know your flood risk; protecting people and property from flood threats; keeping creeks clean and flowing; avoid floodwaters, and to build responsibly in floodplains. The materials that are distributed include several FEMA publications and Valley Water flood preparedness promotional items which can vary from year to year.

Annually, Valley Water Office of Government Relations participates in the below community events during the flood season (*from September-May*. Note: The below list of events is subject to be amended.):

**Table 5: Community Events During the Flood Season**

| Month     | Event                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| September | <ul style="list-style-type: none"> <li>- Santos Car Show (<i>Alviso/San José</i>)</li> <li>- Mountain View Chamber of Commerce Art &amp; Wine Festival (<i>Mountain View</i>)</li> <li>- Cupertino Chamber of Commerce Silicon Valley Fall Festival (<i>Cupertino</i>)</li> <li>- Morgan Hill Chamber of Commerce Taste of Morgan Hill (<i>Morgan Hill</i>)</li> </ul>                                                                                                                                                          |
| October   | <ul style="list-style-type: none"> <li>- Day on the Bay Multicultural Festival (<i>hosted by Santa Clara County</i>)</li> <li>- Day in the Park (<i>hosted by the City of San José, District 8</i>)</li> <li>- Pumpkins in the Park (<i>hosted by Guadalupe River Park Conservancy, San José</i>)</li> <li>- Diwali Festival of Lights (<i>hosted by Cupertino Chamber of Commerce</i>)</li> <li>- Hispanic Chamber of Commerce of Silicon Valley Festiv'ALL (<i>sponsored by Valley Water and City of San José</i>)</li> </ul> |

|          |                                                                                                                                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| November | - Annual American Indian Heritage Celebration ( <i>hosted by ConXion to Community, San José</i> )                                                                                                                                                                                                                          |
| December | - Santa Visits Alviso ( <i>San José</i> )                                                                                                                                                                                                                                                                                  |
| January  | - South Valley Science Fair (hosted by South Valley Science and Engineering fair, Morgan Hill)<br>- San José Women's March (hosted by Women's March Bay Area, San José)                                                                                                                                                    |
| February | - Valley Medical Center's Women's Leadership Policy Summit (hosted by Valley Medical Center Foundation, Saratoga)                                                                                                                                                                                                          |
| March    | - Silicon Valley Leadership Group Regional Economic Forum (hosted by Silicon Valley Leadership Group, Campbell)<br>- Tech Challenge (hosted by The Tech Interactive, San José)<br>- Morgan Hill Wildflower Run (hosted by American Association of University Women, Morgan Hill)                                           |
| April    | - City of Palo Alto Great Race for Saving Water (hosted by City of Palo Alto)                                                                                                                                                                                                                                              |
| May      | - Berryessa Annual Art & Wine Festival (hosted by Berryessa Business Association & Bay Area Community Services, San José)<br>- Campbell Chamber of Commerce Boogie on the Avenue (hosted by Campbell Chamber of Commerce, Campbell)<br>- Mushroom Mardi Gras (hosted by Morgan Hill Mushroom Mardi Gras Inc., Morgan Hill) |

Additionally, throughout the year, there are other countywide events that Valley Water participates in by hosting a table and distributing flood preparedness materials.

Valley Water's "Let's Talk Water" Speakers Bureau Program provides general presentations to various groups, including Homeowners Associations. The presentations talk about where your water comes from, reviews the history of Valley Water and how we operate. Presenters also discuss our water supply sources for our county, water quality, flood protection, including flood awareness/preparedness, and our creeks and ecosystems. Information is shared on the topic of flood protection includes, a brief description of the CRS program, how to find your flood risk, make your 3-day emergency kit, the importance of purchasing flood insurance, and Valley Water's ongoing flood protection projects: <https://www.valleywater.org/learning-center/lets-talk-water-speakers-bureau>.

Annually, Valley Water distributes a soft copy of our 'Flood Safety Tips' brochure for all SCC CRS communities' use (print hard copies to distribute at events and/or post of flood preparedness webpages. This brochure covers all nine (9) key priority topics and is also made available on Valley Water's Flood Ready website.

## 2. Valley Water's Annual Flood Awareness Media Campaign

Annually, Valley Water conducts a flood awareness media campaign, reaching the community at large, including our multi-lingual community, groups with special evacuation needs, new residents, visitors, and tourists. The campaign runs the duration of the rainy season, typically from November to April, and features social media videos and postings on various platforms (i.e., Facebook, Twitter, Instagram, Nextdoor, etc.), digital banners, newspaper advertorials, radio ads, billboards, utility bill inserts for communities to use, communities re-direct to Valley Water's flood ready website, and television/mobile ads targeting residents who live in flood-prone areas and multilingual ethnic communities.

As part of Valley Water's annual flood awareness campaign, an annual floodplain mailer is sent to all addresses in the County of Santa Clara's FEMA designated SFHA (see *Section 1. Outreach and Flood Response Projects by CRS Community, Item o. Valley Water*).

Additionally, as needed, Valley Water conducts an outreach campaign targeted to "hot spot" areas (i.e., locations Valley Water has identified as prone to flooding) by engaging in additional outreach with the public, as needed and/or requested. This outreach may include a live or virtual event where residents in hot spot areas receive additional info on how to prepare for a flood event and will include a Board member promoting for residents to purchase flood insurance. An annual 'Winter Preparedness Emergency Resources Guide' (postcard/flyer) is mailed to residents and/or businesses who live or are located within hot spot locations. The guide includes the following CRS messages:

- 'Know Your Risk' by visiting [www.msc.fema.gov](http://www.msc.fema.gov) to see your location on a FEMA SFHA map;
- 'Prepare Your Home' by downloading emergency apps and monitoring stream levels and finding sandbags locations; and
- 'Get Insured' by visiting [www.floodsmart.gov](http://www.floodsmart.gov) to find an agent in your areas.
- What to do Before, During, and After a Flood.

As part of the flood awareness campaign, a 'Get Flood Ready, Social Media and Web Resources Guide' is provided to each of the communities for their use as part of their outreach efforts.

## 3. Do Not Dump Program

- a. Storm Drain Stenciling/Medallion – For more than 20 years, the County of Santa Clara has a program to locate and label all storm drain inlets "Do Not Dump" stencils at storm drains. This program, which helps prevent shallow flooding continues. Several Santa Clara County cities/county and Valley Water participate in the Storm Drain Stenciling Program.
- b. Cities in Santa Clara County require all developments modifying or constructing new catch basins/storm drains/inlets to stencil the "No Dumping! Flows to Bay." In addition, some of these cities require all bid documents for capital projects which are modifying or constructing new

catch basins and require the contractors to install the same stencil. The program is also highlighted on cities' websites.

In South County municipalities (permittees) are subject to the statewide "Phase II" Stormwater Permit: National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The permit became effective July 1, 2013 and remains effective (as amended) until reissued. The last amendment was effective January 1, 2019.

The North County municipalities (permittees) are subject to the San Francisco Bay Municipal Regional Stormwater NPDES Permit. The permit was effective January 1, 2016 and was due to expire December 31, 2020 but has been administratively extended.

- c. The City of Cupertino's annual flood notices in the local newsletter, 'The Cupertino Scene,' contains dumping is illegal messaging and how to report.
- d. The City of Milpitas's annual "Flood Public Advisory" annual brochure contains dumping is illegal messaging and how to report.
- e. The City of Palo Alto's annual "Are You Ready for Winter Storms?" utility bill insert contains the Do Not Dump and report illegal dumping messages.
- f. The City of Sunnyvale's annual fall "Horizon" newsletter includes a "Know How to Be Flood Safe" article that promotes the Do Not Dump message.
- g. Valley Water places "Do Not Dump" signs by waterways/channels.
- h. Valley Water lists the Pollution Hotline number in all their Project Notices.

#### **4. Information for Use Before, During, and After a Flood**

- a. Valley Water maintains public outreach materials for use before, during, and after a flood, including safety messages, how to file insurance claims, the need for permits, etc. These materials include several FEMA publications and Valley Water collateral items. Several of these items are also available on our website. Valley Water distributes these outreach materials to the public at various events/fairs throughout the county, at public meetings, with stakeholders (e.g., Second Harvest Food Bank, HOA's, Fire Departments, etc.) to help disseminate our flood preparedness messaging. These items are also made available upon request to cities/county to distribute within their community.

Valley Water's website includes a 'Flood Safety Advice: Before, During, and After a Flood' webpage <https://www.valleywater.org/floodready/flood-safety-advice-during-after>.

- b. The City of Santa Clara has a plan that outlines flood response activities to carry out before, during, and after a storm/flood. The plan identifies how to disseminate information on social media (i.e., frequency and type of messaging, which media platforms, and who will be responsible for posting the messages).
- c. The City of Milpitas' 'Flood Public Advisory' annual brochures provide information on what to do before and during a flood.

### Other Public Information Initiatives

The PPI Committee reviewed other public information activities, in addition to outreach projects. Additional credit is available under Activities 340, 350, 360, and 540 if the element is described in the PPI document with specific recommendations on how it should be conducted.

**Activity 340** (DFH and REB) – Additional credit is provided if the PPI states that real estate agents should (or have agreed to) advise house hunters about the flood hazard and that real estate agents give house hunters a REB brochure.

- The **City of Morgan Hill** mails out during the rainy season an annual newsletter, "Ask Before You Buy: Know Your Flood Risk!", to local real estate agents that provide homebuyers help to determine the flood risk of the property being purchased.
- The **City of Palo Alto** sends out annual letters to real estate agencies, informing them of their responsibility to identify flood hazard areas and to take advantage of the Flood Zone Lookup on the city's website on the Floodplain Management webpage at the beginning of the flood season (September/October).
- The **City of San Jose** sends out letters to real estate and insurance agencies and lenders, informing them of their responsibility to identify flood hazard areas and to take advantage of the Flood Zone Lookup on the city's website on the "Flood Hazard Zones webpage and advises to contact the city for map reading services and elevation certificates on file (September–December).
- The **City of Sunnyvale** sends a mailer/postcard targeted to real estate agents informing them of the client's responsibility for identification and purchase of flood insurance and the availability of the automatic 15% discount.
- **Other communities** could follow suit and send out the info to real estate agents advising house hunters about flood hazards and advise real estate agents to give house hunters a REB brochure.

**Activity 350** (WEB1) – Additional bonus credit is provided if the communities website covers the additional priority messages (Topics 7-9) that are listed in the PPI, listed in *Table 3: CRS Priority Messages*.

- All communities' website flood protection resources webpage includes language that contains the three additional PPI priority messages noted below:
  - 7. Develop an emergency plan.
  - 8. Download disaster apps.
  - 9. Understand shallowing risks—don't drive through standing water.

**Activity 360** (PPA, PPV, FAA) – Additional bonus credit is provided if the PPI discusses how the community's property protection services should be conducted (PPA), discusses site visits as part of the community's property protection service (PPV), and discusses how the community's financial assistance advisory service should be conducted (FAA).

- The **City of Cupertino** provides property protection advice, site visits, and general flood protection assistance to interested community members. Advice and assistance are provided one-on-one, either over the phone, face-to-face at the public counter or through comments related to development review. Site visits, if requested, are also conducted and scheduled directly with qualified city staff. This service is advertised to the entire community in their annual flood notices in the local newsletter (The Cupertino Scene, a community-wide newsletter). The notice is typically published before or at the beginning of the rainy season (October or November issue).
- The **City of Milpitas** offers Flood Protection Assistance and provides in-person flood risk consultation at the front counter. Anyone seeking flood zoning and flood mitigation information, can talk to a Registered Civil Engineer and/or a Certified Floodplain Manager (CFM) from the Engineering Department. This service is advertised to the whole city by the 'Flood Public Advisory' that is mailed out annually between December-January. An engineer and/or CFM will visit the project site upon request and will provide an analysis report after the visit. A copy of any site visits and analysis report will be kept on file with the city.
- The **City of Santa Clara** provides property protection advice, and general flood protection assistance to interested residents and businesses. Advice and assistance are provided one-on-one by reviewing site plans and site photos, either over the phone, or face-to-face at the permit center counter. Site visits, if requested, are also conducted and scheduled directly with qualified city staff. This service is advertised to the entire community every year in the fall issue of citywide newsletter "Inside Santa Clara", which typically goes out every September.
- **Other communities** could follow suit and send out the info on how the community's property protection services should be conducted, including site visits as part of the community's property protection service and offer the community financial assistance advisory service.

**Activity 540** (Drainage System Maintenance) – Additional credit is provided if the PPI specifies the message and recommends the best way to disseminate it.

- Valley Water's annual floodplain, countywide mailers and all project notices include messaging on Do Not Dump/Illegal Dumping. All communities comply with the Santa Clara County's Storm Drain Stenciling/Medallion Program as developments that are modifying or constructing new catch basins/storm drains/inlets are required, per the below-noted permits, to stencil the "No Dumping Flows to Bay." In addition, some of these cities require all bid documents for capital projects, which are modifying or constructing new catch basins, require the contractors to install the same stencil. The program is also highlighted on cities' websites.

- *South County municipalities are subject to the statewide “Phase II” NPDES Permit*
- *North County municipalities are subject to the SF Bay Municipal Regional Stormwater NPDES Permit*

## Other New Initiatives

The PPI committee identified a number of new initiatives:

1. Continue and expand the standardized flood message prepared for each community to include flood messages in utility bills each year, including PG&E.
2. Expand on partnerships with local chambers of commerce to disseminate and share flood preparedness information.
3. Expand on outreach to the Asian and Latino communities who live in flood prone areas.
4. Expand on outreach to “hot spot” flood prone areas by hosting on-site or virtual events.
5. Expand on reaching local homeowners associations (HOA)s and apartment associations  
(*i.e. Executive Council of Homeowners [ECHO]*)
6. Expand on reaching residents in marginal and low-income communities through partnering with organizations that reach these communities. (*i.e. Second Harvest Food Bank and others*)
7. Communities could pursue FEMA Matching Funds Grants for severe Repetitive Loss Areas.
8. Review and expand other public information activities, such as Flood Protection Assistance (Activity 360) and Flood Insurance Promotion (Activity 370).
9. Develop a regionwide Flood Response Program messaging plan.

## VIII. ANNUAL EVALUATION REPORTS

The Santa Clara County Multi-Jurisdictional PPI Committee will meet at least once per year to evaluate the PPI and incorporate any needed revisions. This meeting will be coordinated through the ongoing CRS User’s Group meetings which are expected to occur at least twice a year. The evaluation will cover:

- Reviewing projects that were completed.
- Evaluation of progress toward outcomes.
- Recommendations on projects that have not been completed.
- Recommendations for new projects not previously identified.
- Target Audience changes; and
- Impact of the program during a real flood event if one has occurred.

A report will be prepared by Valley Water or through a sub-committee of the PPI Committee for submission with each CRS community’s annual CRS recertification package.

During Fiscal Years 2016-19 (Years 1-4), the 2015 PPI Committee met a minimum of twice a year to complete annual evaluation reports for each year. Each community that participated in



the 2015 PPI sent annual evaluation reports to their respective governing body and included the report as part of their annual recertification submittals.

In 2020, the Insurance Services Office (ISO) authorized the exemption of the 2015 PPI Year 5 Annual Evaluation Report, as the Multi-Jurisdictional PPI was scheduled to be updated for its five (5) year revision.

## **IX. FIVE-YEAR REVISIONS**

Every five (5) years, the Santa Clara County Multi-Jurisdictional PPI Committee will meet to review and revise the PPI. At that time, the PPI Committee can decide to draft a new document or an addendum to the existing document that updates the needs assessment and all sections that should be changed based on evaluations of the projects.

The PPI is reviewed for CRS credit according to the *FEMA NFIP CRS Coordinator's Manual (Edition 2017)* currently in effect, not the version used when the community originally requested this credit. The update can qualify as the annual evaluation report for the year it was prepared. The updated PPI must be adopted following the same process as the adoption of the original document.

## **X. ADOPTION OF THE PPI**

The Multi-Jurisdictional PPI will be considered fully adopted after it has been approved by the elected body of each of the participating communities. Each CRS community is encouraged to use Valley Water's Board Agenda Memo so that all the elected officials receive the same information. This saves staff time and resources.

When a community develops a PPI as outlined in the *FEMA NFIP CRS Coordinator's Manual (Edition 2017)*, the PPI must be adopted by the community, through either:

- A formal vote by the community's governing body, or
- A formal vote by another body that has the authority and can provide the funding to implement the PPI, such as a flood control district. If this option is used, the PPI document must still be provided to the community's governing body for informational purposes.

In April of 2015, nine (9) of the twelve (12) CRS communities' governing bodies adopted the original Santa Clara County Multi-Jurisdictional 2015 PPI (5-Year Plan).

## **XI. REFERENCES**

1. Federal Deposit Insurance Corporation (FDIC), Flood Disaster Protection Act of 1973, <https://www.fdic.gov/regulations/laws/rules/6000-2400.html>, December 1973.
2. Federal Emergency Management Agency (FEMA), Developing a Program for Public Information, [https://crsresources.org/files/300/developing\\_a\\_ppi\\_for\\_credit\\_under\\_the\\_crs.pdf](https://crsresources.org/files/300/developing_a_ppi_for_credit_under_the_crs.pdf), March 2013.
3. Federal Emergency Management Agency (FEMA), National Flood Insurance Program Community Rating System Coordinator's Manual, <https://crsresources.org/>, 2017.

4. Federal Emergency Management Agency (FEMA), Flood Zones, <https://www.fema.gov/glossary/flood-zones>, July 2020.
5. Flood Insurance Sheets by Occupancy and by Zone provided by ISO, CRS Technical Reviewer, Dave Arkens on November 15 and 18, 2020.
6. Shawnee County, Kansas, Definitions of FEMA Flood Zone Designations, <https://snmapmod.snco.us/fmm/document/fema-flood-zone-definitions.pdf>.
7. Snohomish County Public Works Surface Water Management, Washington, Snohomish, City of Monroe, City of Sultan: Multi-Jurisdictional Program for Public Information, January 2013.
8. State of California et al, California's Flood Future: Recommendations for Managing the State's Flood Risks, November 2013.
9. US Census Bureau: Population Estimates, <https://www.census.gov/quickfacts/fact/table>, (V2019), July 1, 2019.
10. Town of Surfside Beach, South Carolina PPI, [https://crsresources.org/files/300/surfside\\_beach\\_example\\_ppi.pdf](https://crsresources.org/files/300/surfside_beach_example_ppi.pdf), November 2014.

## APPENDIX B

### Additional Non-Credited CRS Outreach Projects for Activity 330 by Community

*Please Note: Some of the below-identified Outreach Projects may be creditable under other CRS activities/element, such as Activity 350, c). Flood protection website (WEB)*

| CRS Community         | Outreach Projects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| County of Santa Clara | <p>The County's website includes a "Santa Clara County Storm and Flood Information and Resources" webpage available for all residents in the county. The storm and flood information page redirects residents to Valley Water's Flood Ready webpage and <a href="http://www.floodsmart.gov">www.floodsmart.gov</a> as useful resources: <a href="https://www.sccgov.org/sites/opa/Pages/storm.aspx">https://www.sccgov.org/sites/opa/Pages/storm.aspx</a>.</p> <p>Santa Clara County has a Consumer Protection Division's website that also includes a "Flood Safety Information" page. The site redirects residents to Valley Water's Access Valley Water customer portal for reporting debris in creeks: <a href="https://cpd.sccgov.org/flood-safety-information">https://cpd.sccgov.org/flood-safety-information</a>.</p>                                                                                                                                                                                                                                                                        |
| City of Cupertino     | <p>City staff promotes the use of "Property Information" whenever possible. FIRM information is searchable by property address and easily viewed through the city's "Property Information" web mapping application, an interactive map that allows public users to view data for any property in Cupertino. Interested community members can access Property Information from the city's main webpage and immediately find out what flood zone and panel number their property is located in.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| City of Gilroy        | <p>The city's floodplain management regulations comply with Title 44 of the Code of Federal Regulations that regulates development within the city's floodplains and meet state and federal minimum standards.</p> <p>Gilroy has a comprehensive Community Emergency Response Team (CERT) program that educates residents about disaster preparedness for the hazards, including flooding, that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. CERT offers a consistent, nationwide approach to volunteer training and organization that professional responders can rely on during disaster situations, which allows them to focus on more complex tasks. Through CERT, the capabilities to prepare for, respond to and recover from disasters are built and enhanced.</p> <p>CERT volunteers are trained to respond safely, responsibly, and effectively to emergency situations, but they can also support their communities during non-emergency events as well.</p> |
| City of Los Altos     | <p>City Council adopts a Proclamation California Flood Preparedness Week.</p> <p>At the beginning of the flood season, the city's Public Information Officer does social media on various platforms (e.g., City Manager community email, Facebook, Nextdoor, Twitter, etc.).</p> <p>The city's Public Works Department hosts a 'Flood Zone Information' webpage on its website: <a href="https://www.losaltosca.gov/publicworks/page/flood-zone-information">https://www.losaltosca.gov/publicworks/page/flood-zone-information</a>. This page contains information on:</p> <ul style="list-style-type: none"> <li>• Creeks that run through Los Altos: Adobe Creek, Hale Creek, Permanente Creek, and Stevens Creek and the by-pass near Blach School, which carries overflow</li> </ul>                                                                                                                                                                                                                                                                                                            |

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|                     | <p>from Permanente Creek to Stevens Creek. All these creeks may subject property to flooding during periods of heavy storms.</p> <ul style="list-style-type: none"> <li>• Information for Insurance (redirects to FEMA's NFIP, <a href="http://www.floodsmart.gov">www.floodsmart.gov</a>)</li> <li>• Flood zone information</li> <li>• Link to Valley Water's Flood Protection, Flood Ready resource page and news blogs for various flood-related articles.</li> <li>• Link to Valley Water's Sign-up for Emergency Alerts (Alert SCC, ReadySCC and American Red Cross Flood App)</li> <li>• FEMA NFIP</li> <li>• FEMA National Flood Hazard Mapping</li> <li>• FEMA Map Service Center</li> </ul> <p><i>Supporting Documents</i></p> <ul style="list-style-type: none"> <li>- Santa Clara Valley Water District: Contact Your Floodplain Manager</li> <li>- FEMA: Protecting Building Utilities from Flood Damage</li> <li>- FEMA: Protecting Structures Built on Fill</li> <li>- FEMA: Reducing Damage from Localize Flooding</li> <li>- FEMA: Reducing Flood Risk to Residential Building that Cannot be Elevated</li> <li>- FEMA: Substantial Improvement, Substantial Damage Desk Reference</li> <li>- 2019 PPI Annual Evaluation Report (updated annually)</li> <li>- Mailer to Property Owners – Special Flood Hazard Areas (SFHA)</li> </ul> |
| City of Milpitas    | <p>The city distributes a Winter Preparedness flyer that informs contractors that the winter season will arrive, and they need to winterize their project(s) site. Certain soil disturbance activities are not allowed during the rainy season.</p> <p>The city participates in the annual National River Clean-up (each May) and Coastal Clean-up Day (each September). They coordinate with Valley Water on both these clean-up efforts.</p> <p>Year-round, the City of Milpitas distribute at various events the FEMA flood-related publications, including "Myths and Facts about the NFIP" and "Q&amp;A NFIP Handbook" and the front counter area in a brochure rack.</p> <p>The City of Milpitas' "Important Flood Hazard Information" webpage contains information on several of the PPI message topics. The webpage also redirects to Valley Water, FEMA, NOAA, <a href="http://www.floodsmart.gov">www.floodsmart.gov</a>, <a href="http://www.Ready.gov">www.Ready.gov</a>, and USGS webpages: <a href="https://www.ci.milpitas.ca.gov/milpitas/departments/engineering/flood-information/">https://www.ci.milpitas.ca.gov/milpitas/departments/engineering/flood-information/</a>.</p>                                                                                                                                                      |
| City of Morgan Hill | <p>Citywide weekly newsletter/e-mail blast (called Weekly 411) sent out to subscribers during the rainy season include messages about flood safety, emergency preparedness, emergency Apps: AlertSCC, ReadySCC, and the Red Cross Flood App, sandbags, and flood insurance.</p> <p>The city's Floodplain Management webpage includes a link to Valley Water's Flood Ready webpage ALERT System Real-Time Data, as well as a link to FEMA's Flood Map Service Center: <a href="http://www.morgan-hill.ca.gov/748/Floodplain-Management">http://www.morgan-hill.ca.gov/748/Floodplain-Management</a>.</p> <p>The city participates in National River Cleanup Day and Coastal Cleanup Day. Morgan Hill Creek Cleanup is advertised in the City's Recreation Activity Guide on the City's website.</p> <p>Each September, the city declares September as "National Preparedness Month." The city's weekly newsletters/e-mail blasts during the month of September include information on how to be prepared throughout the month.</p>                                                                                                                                                                                                                                                                                                                      |

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|                       | <p>The city's <u>Emergency Preparedness webpage</u> has a link to the Department of Homeland Security's <a href="http://www.Ready.gov">www.Ready.gov</a> website which contains a fillable family emergency communication plan: <a href="http://www.morgan-hill.ca.gov/133/Emergency-Preparedness">http://www.morgan-hill.ca.gov/133/Emergency-Preparedness</a>.</p> <p>During the rainy season, the city mails out an annual newsletter, "Ask Before You Buy: Know Your Flood Risk!" to local real estate agents which are provided to homebuyers to help determine the flood risk of the property being purchased.</p> <p>The city has links to Valley Water's "Permits for Working on Valley Water Land or Easement" on the City's Floodplain Management webpage. Valley Water's webpage includes a link to the Water Resources Protection Ordinance.</p> <p>The city and/or Valley Water hosts an informational table at the annual city festivals: Mushroom Mardi Gras (each May) and the Taste of Morgan Hill (each September). Flood readiness information is disseminated to the public.</p>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| City of Mountain View | <p>The city's Public Works Department hosts a "Flood Protection and Insurance Information" <u>webpage</u> on its website: <a href="https://www.mountainview.gov/depts/pw/flood_protection.asp">https://www.mountainview.gov/depts/pw/flood_protection.asp</a>. Topics include:</p> <ul style="list-style-type: none"> <li>Upcoming Storm Season Information</li> <li>Flood Protection – Sand and sandbags available; how to fill a sandbag</li> <li>See Santa Clara Valley Water District's floodplain mailer</li> <li>Flood Safety Tips (redirects to Valley Water's Flood Ready webpage) <ul style="list-style-type: none"> <li>What to do before, during, and after a flood</li> </ul> </li> <li>Protection Information</li> <li>Flood Safety</li> <li>Flood Insurance</li> <li>Flood Map Information (redirects to <a href="http://www.floodsmart.gov">www.floodsmart.gov</a>)</li> <li>Flood Protection Tips</li> <li>Preparing for Winter Storm Season</li> <li>Remove Fallen Leaves</li> <li>Emergency Contact Numbers</li> <li>Obtain Sandbags When Necessary</li> <li>Report Flooding or Standing Water</li> <li>Report Downed Trees and Limbs</li> <li>Do Not Touch Downed Power Lines</li> <li>Prepare at Home – Emergency kits</li> <li>Contact numbers to report power outages or downed power lines</li> </ul> <p>Trash capture devices are installed in the storm drains of some of the city's high generation rate area and we partner with Valley Water on trash removal on the two creeks in the city.</p> |
| City of Palo Alto     | <p>The City of Palo Alto's website, <u>Public Works "Creek Monitor" webpage</u> includes real-time creek monitoring on San Francisquito Creek, Matadero Creek, and Adobe Creek. This webpage redirects visitors to the San Francisquito Creek Joint Power Authority (JPA), Flood Early Warning System website. The information on this JPA website updates every 15 minutes: <a href="https://www.cityofpaloalto.org/gov/depts/pwd/creek_monitor/default.asp">https://www.cityofpaloalto.org/gov/depts/pwd/creek_monitor/default.asp</a></p> <p>Additionally, the "Creek Monitor" <u>webpage</u> redirects to the National Weather Service, Palo Alto forecast and radar pages; USGS San Francisquito Creek stream gauge; and the California Nevada River Forecast Center websites: <a href="https://www.cityofpaloalto.org/gov/depts/pwd/creek_monitor/default.asp">https://www.cityofpaloalto.org/gov/depts/pwd/creek_monitor/default.asp</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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|                  | <p>The City of Palo Alto's "Floodplain Management" webpage provides relevant FEMA information, including Flood Zone Lookup for all interested residents. This page directs visitors to FEMA Elevation Certificate Information; FEMA NFIP; FEMA Technical Bulletins for Construction in the SFHA; Letter of Map Amendment application materials; and City of Palo Alto Development Center, Permits and Applications:<br/> <a href="https://www.cityofpaloalto.org/gov/depts/pwd/stormwater/floodzones.asp">https://www.cityofpaloalto.org/gov/depts/pwd/stormwater/floodzones.asp</a></p> <p>The City of Palo Alto's Office of Emergency Services, "Flood Information and Winter Storm Preparedness" webpage contains useful information for flood readiness:<br/> <a href="https://www.cityofpaloalto.org/services/public_safety/flood_information_winter_storms/default.asp">https://www.cityofpaloalto.org/services/public_safety/flood_information_winter_storms/default.asp</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| City of San José | <p>The city has a "Flood Emergency Notifications" webpage that includes the following topics: <a href="https://www.sanjoseca.gov/news-stories/news/emergency-notifications/flood-emergency-notifications">https://www.sanjoseca.gov/news-stories/news/emergency-notifications/flood-emergency-notifications</a></p> <ul style="list-style-type: none"> <li>- Emergency public information notifications and updates are provided.</li> <li>- The city's Incident Management Team, a branch of the Emergency Operations Center communicates with <a href="#">Valley Water</a> and the <a href="#">National Weather Service</a> to actively monitor the situation and is ready to respond if conditions change. The city informs residents of significant changes that may cause flooding and ongoing efforts (i.e., Flood Watch or Flood Warnings, creek levels, localized flooding, and downed tree branches).</li> <li>- City field crews respond to routine storm maintenance calls.</li> <li>- Crews from PG&amp;E respond to localized power outages; residents can find the latest information on <a href="#">outages</a> on the PG&amp;E website and their Safety Action Center for <a href="#">preparedness tips</a> and more.</li> <li>- Evacuation Center(s) will open if needed and location(s) will be listed on the city's social media accounts if an evacuation warning or order is issued.</li> <li>- Expected weather conditions are updated. Residents are advised to stay safe by taking the following precautions: <ul style="list-style-type: none"> <li>• Monitor the news and follow the City of San José on social media, <a href="#">Facebook</a>, <a href="#">Twitter</a> and <a href="#">Instagram</a> for regular updates</li> <li>• Be ready and tell neighbors to be ready to evacuate, if needed</li> <li>• Protect property with sandbags to route water away from structures</li> <li>• Raise furniture on the first floor to reduce damage if water threatens to enter home</li> <li>• Seniors or mobility impaired: Alert family or friends, so they are prepared to assist should conditions change</li> <li>• Pack a bag with important documents, medicines, spare clothes</li> <li>• Report blocked drains and other storm-related issues at 408-794-1900</li> <li>• When driving, turn your car around if you encounter water on the road that looks to be 6 inches or deeper—or if you can't tell how deep it is. Be especially cautious at night when it is harder to recognize flood danger.</li> </ul> </li> </ul> |

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|                     | <ul style="list-style-type: none"> <li>- <b>Sandbag Locations</b> within the City of San José are listed. A complete list of sandbag locations can be viewed by visiting: <a href="https://www.valleywater.org/sandbags">https://www.valleywater.org/sandbags</a>.</li> <li>- <b>Sign up for Text and Email Alerts</b> - Residents are advised to opt in to AlertSCC, the Santa Clara County emergency alert system: <a href="http://bit.ly/2BzQxt0">http://bit.ly/2BzQxt0</a>. AlertSCC is a free, easy, and confidential way for anyone who lives or works in Santa Clara County to <a href="#">get emergency warnings</a> sent directly to their cell phone, email, or landline. In addition to AlertSCC, the ReadySCC emergency preparedness mobile app is available.</li> <li>- <b>Warming Center</b> – If needed, the City of San José may open warming centers to service the homeless. Additional information can be found on the "<a href="#">Cold Weather Tips for Older Adults</a>" or <a href="#">find a warming center in Santa Clara County</a>.</li> </ul> <p>The City of San José has established policies that govern development within north San José as related to flood hazard mitigation and impact avoidance. The objective of the city is to provide consistent policies throughout the area to allow increased development density, protect new structures from flooding, minimize potential increases in flood depths, and ensure consistency with FEMA requirements and the city's floodplain management ordinance.</p> <p>The city's Municipal Code, Part 5. 17.08.600 defines the Requirements for Special Flood Hazard Areas: <a href="https://www.sanjoseca.gov/home/showpublisheddocument?id=66695">https://www.sanjoseca.gov/home/showpublisheddocument?id=66695</a>.</p> <p>The city's Public Works, Development Services "Flood and General Inquiry" webpage allows for members of the public to submit inquiries on flood-related issues and questions, including flood zones: <a href="https://www.sanjoseca.gov/your-government/departments-offices/public-works/development-services/flood-general-inquiry">https://www.sanjoseca.gov/your-government/departments-offices/public-works/development-services/flood-general-inquiry</a>.</p> <p>The city also posts on their webpage the following materials:</p> <ul style="list-style-type: none"> <li>• Valley Water's brochure "List of Creeks that are Flood Prone": <a href="https://www.sanjoseca.gov/home/showpublisheddocument?id=9371">https://www.sanjoseca.gov/home/showpublisheddocument?id=9371</a>;</li> <li>• Valley Water's brochure "Prepare for Winter Storms ARE YOU FLOOD-READY": <a href="https://www.sanjoseca.gov/home/showpublisheddocument?id=40707">https://www.sanjoseca.gov/home/showpublisheddocument?id=40707</a>.</li> <li>• The American Red Cross Emergency Preparedness Checklist: <a href="https://www.sanjoseca.gov/home/showpublisheddocument?id=49753">https://www.sanjoseca.gov/home/showpublisheddocument?id=49753</a>.</li> </ul> |
| City of Santa Clara | <p>The city has an Adopt-A-Spot Program that encourages and supports volunteers to organize clean-up events in the city. The Adopt-A-Spot Program is designed to enable community groups, businesses, churches, schools, and other organizations to play an active role in keeping public spaces clean and beautiful while allowing them to set their own schedule. Information on the program and how to Adopt-A-Spot is posted on the city website.</p> <p>The city organizes volunteers for the National River clean-up event each year and event results of trash collected is posted on the city website.</p> <p>The city has a funded program to install hundreds of new storm drain inlet inserts every year.</p> <p>The city promotes ALERTSCC and ReadySCC on social media and during CERT training courses.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



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|                   | <p>The city hosts workshops to promote developing family emergency plans and kits. The city publishes a comprehensive and easy to follow guide on putting together an emergency kit and family emergency plan, and it is available on the city website.</p> <p>The City of Santa Clara City Hall and library have a wealth of flood awareness material available for check out or free to take home. Materials include flood awareness coloring books for children, flood insurance information in English and Spanish for residents and businesses, technical information on protecting a building from flood and more.</p> <p>The city posts social media messages including topics on protecting people and property from flood hazard, such as shallow flood danger and proper usage of sandbags and sandbags availability.</p> <p>The city's Public Works Department has a flood protection webpage on the city's website: <a href="https://www.santaclaraca.gov/our-city/departments-g-z/public-works/engineering/flood-protection">https://www.santaclaraca.gov/our-city/departments-g-z/public-works/engineering/flood-protection</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| City of Sunnyvale | <p>The city hosts a link on its Flood Protection page on how to prevent stormwater pollution: <a href="http://www.mywatershedwatch.org/">http://www.mywatershedwatch.org/</a>.</p> <p>City staff, through Environmental Services, hosted Coastal Clean-up in Sunnyvale.</p> <p>City staff provided preparedness training/information at Farmer's Market and instructed people to download emergency and flood apps to stay informed about the latest emergencies and flood updates. Additionally, city staff provides flood safety information and distributes emergency starter kits at the city's Annual State of the City address.</p> <p>The city's website promotes:</p> <p>Topics on city's '<b>Flood Protection</b>' webpage: <a href="https://sunnyvale.ca.gov/property/floodprotection/default.htm">https://sunnyvale.ca.gov/property/floodprotection/default.htm</a></p> <ul style="list-style-type: none"> <li>Prepare for Storms <ul style="list-style-type: none"> <li>Develop Family Emergency Plan</li> <li>Sign up to receive public safety and weather alerts on your phone</li> <li>Keep gutters free from debris</li> <li>Pick-up free sandbags, available at the city's Corporation Yard</li> </ul> </li> <li>Flood Tips and Resources <ul style="list-style-type: none"> <li>Find out what to do before, during, and after a flood or storm</li> <li>Get emergency preparedness apps from the Red Cross</li> <li>Download the FEMA app for safety, weather, and shelter information</li> <li>If you see a blocked storm drain, call our 24-hour Sewer and Storm Drain Response Hotline</li> </ul> </li> <li>Other Related Topics <ul style="list-style-type: none"> <li>Report broken limbs or fallen tree</li> <li>Report illegal dumping in storm drains</li> <li>Learn how to prevent stormwater pollution</li> <li>Learn about local improvements to prevent flooding</li> </ul> </li> </ul> <p>Topics on city's '<b>Emergency Preparedness</b>' webpage: <a href="https://sunnyvale.ca.gov/government/safety/emergency.htm">https://sunnyvale.ca.gov/government/safety/emergency.htm</a></p> |



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|              | <ul style="list-style-type: none"> <li>- AlertSCC</li> <li>- Follow SunnyvaleDPS Twitter feed for local information during an emergency.</li> <li>- Radio 1680AM on your portable or car radio for local information during a disaster.</li> <li>- ReadySCC</li> <li>- Listos California preparedness class, offered by Sunnyvale Emergency Response Volunteers (SERV).</li> <li>- <a href="http://www.Ready.gov">www.Ready.gov</a></li> </ul> <p>The city's Public Safety Department's Office of Emergency Services provides training, support, and services to ensure the city is prepared to respond to and recover from the effects of major emergencies.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Valley Water | <p>Flood Ready webpage: Flood &amp; Safety, Flood Protection Resources <a href="https://www.valleywater.org/floodready">https://www.valleywater.org/floodready</a> includes:</p> <p>Valley Water in Your Area tool on website homepage: <a href="https://www.valleywater.org/">https://www.valleywater.org/</a></p> <ul style="list-style-type: none"> <li>- Nine Things to Know to Be Flood Ready <a href="https://www.valleywater.org/news-events/news-releases/9-things-you-need-know-be-flood-ready">https://www.valleywater.org/news-events/news-releases/9-things-you-need-know-be-flood-ready</a></li> <li>- Sign Up for Emergency Alerts: AlertSCC and ReadySCC <a href="https://www.valleywater.org/floodready/sign-up-for-emergency-alerts">https://www.valleywater.org/floodready/sign-up-for-emergency-alerts</a></li> <li>- Sandbags Distribution Sites <a href="https://www.valleywater.org/sandbags">https://www.valleywater.org/sandbags</a></li> <li>- ALERT System Real-Time Data - Stream, reservoir, surface water and precipitation gauge data <a href="https://www.valleywater.org/your-water/alert-system-real-time-data">https://www.valleywater.org/your-water/alert-system-real-time-data</a></li> <li>- Flood Safety Advice: Before, During, and After a Flood <a href="https://www.valleywater.org/floodready/flood-safety-advice-during-after">https://www.valleywater.org/floodready/flood-safety-advice-during-after</a></li> <li>- Is Your Home in a Flood Zone? (re-directing to <a href="http://www.floodsmart.gov">www.floodsmart.gov</a> using <a href="https://msc.fema.gov/portal">https://msc.fema.gov/portal</a> <a href="https://www.valleywater.org/floodready/is-your-home-in-a-flood-zone">https://www.valleywater.org/floodready/is-your-home-in-a-flood-zone</a></li> <li>- Report creek blockages, local flooding <a href="https://www.valleywater.org/floodready/report-creek-blockages-local-flooding">https://www.valleywater.org/floodready/report-creek-blockages-local-flooding</a></li> <li>- Flood Insurance (re-directing to <a href="http://www.floodsmart.gov">www.floodsmart.gov</a>) <a href="https://www.valleywater.org/floodready/flood-insurance">https://www.valleywater.org/floodready/flood-insurance</a></li> <li>- Flood Reports - Since 1967, Valley Water staff have prepared reports following instances of severe flooding <a href="https://www.valleywater.org/floodready/flood-reports">https://www.valleywater.org/floodready/flood-reports</a></li> <li>- Stream Maintenance Program <a href="https://www.valleywater.org/flooding-safety/stream-maintenance-program">https://www.valleywater.org/flooding-safety/stream-maintenance-program</a></li> <li>- Dam Safety Program <a href="https://www.valleywater.org/flooding-safety/dam-safety-program">https://www.valleywater.org/flooding-safety/dam-safety-program</a></li> <li>- Climate Change <a href="https://www.valleywater.org/your-water/water-supply-planning/climate-change">https://www.valleywater.org/your-water/water-supply-planning/climate-change</a></li> <li>- Levee Safety <a href="https://www.valleywater.org/flooding-safety/levee-safety">https://www.valleywater.org/flooding-safety/levee-safety</a></li> <li>- HEC-2 and HEC-RAS data library <a href="https://www.valleywater.org/flooding-safety/hec-2-and-hec-ras-data-library">https://www.valleywater.org/flooding-safety/hec-2-and-hec-ras-data-library</a></li> <li>- Vertical Control Network <a href="https://www.valleywater.org/flooding-safety/vertical-control-network">https://www.valleywater.org/flooding-safety/vertical-control-network</a></li> <li>- Flood Emergency Action Plans <a href="https://www.valleywater.org/flooding-safety/flood-emergency-action-plans">https://www.valleywater.org/flooding-safety/flood-emergency-action-plans</a></li> <li>- Adopt a Creek Program <a href="https://www.valleywater.org/learning-center/adopt-a-creek">https://www.valleywater.org/learning-center/adopt-a-creek</a> <ul style="list-style-type: none"> <li>▪ Creekwise Mailer – Various communities distribute this mailer at events they host, including fairs.</li> </ul> </li> </ul> |

[https://www.valleywater.org/sites/default/files/CreekWise%202018%20flyer\\_for\\_Web%20FINAL%20CORRECT.pdf](https://www.valleywater.org/sites/default/files/CreekWise%202018%20flyer_for_Web%20FINAL%20CORRECT.pdf)

- Creekside Property Program <https://www.valleywater.org/learning-center/healthy-creeks-and-ecosystems/creekside-property-program>
- National River Cleanup Day <https://www.valleywater.org/news-events/events/2019-national-river-cleanup-day>
- Coastal River Cleanup Day <https://www.valleywater.org/news-events/news-releases/volunteer-coastal-cleanup-day-sept-15>
- Safe, Clean Water and Natural Flood Protection Grants and Partnerships Program <https://www.valleywater.org/learning-center/safe-clean-water-and-natural-flood-protection-grants-partnerships-program>
- Let's Talk Water: Speakers Bureau Program <https://www.valleywater.org/learning-center/lets-talk-water-speakers-bureau>
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Flood Protection projects:

Safe, Clean Water, and Natural Flood Protection Program, Priority E: Flood Protection to Homes, Business, Schools, and Highways <https://www.valleywater.org/project-updates/safe-clean-water-and-natural-flood-protection-program/priority-e-provide-flood-protection-homes-businesses-schools-and-highways>

5-year Capital Improvement Plan (CIP), Chapter 3 – Flood Protection <https://www.valleywater.org/how-we-operate/five-year-capital-improvement-program>

Neighborhood Work Project Notices <https://www.valleywater.org/project-updates/in-your-neighborhood/neighborhood-work-notice>

Every month, staff check the Flood Ready webpage on Valley Water's website to ensure that it is operational and ensure the content is up to date.

Valley Water Flood Watch map-based tool on the website: <https://gis.valleywater.org/SCVWDFloodWatch/>

Monitor reservoir, stream, rainfall levels with the ALERT Gauge System Real-Time Data on the website: <http://alert.valleywater.org/>

Valley Water in Your Area tool on website homepage: <https://www.valleywater.org/>

Every year before winter, Valley Water Operations & Maintenance crews prepare waterways to help carry floodwaters safely by conducting inspections and maintenance of creeks. Crews remove vegetation and sediment to improve the flow of water. During the rainy season, crews go out during and after storms to clear creeks that we manage of debris and fallen trees that can cause blockage and result in flooding.

Valley Water sends thousands of flyers, **Project Notices** (previously Neighborhood Work Notices) each year to residents and businesses located near a capital or maintenance project site throughout the county. The notices are posted on Valley Water's website, under the Project Updates webpage. Valley Water is dedicated to keeping residents and businesses informed and safe through its flood protection programs and project. These flyers contain a message to discourage illegal dumping in creeks and advertise a pollution reporting hotline.

Valley Water's **Sandbag Guidelines** for Homeowners brochures are distributed at various safety events and fairs throughout the county and are available in multiple language. The

brochures are made available to all cities and the county to distribute. Various sandbag sites are managed by Valley Water and are open from late November through April each season. Certain sites are stocked with filled sandbags, when available, during that period. Additional sites are stocked with sand and empty bags for self-filling. A Sandbag Distribution Sites map is distributed at events/fairs and the map is posted on Valley Water's webpage. The map also includes information on several other sandbag stations managed by various cities within Santa Clara County. "How to Properly Fill a Sandbag" and "How to Protect Your Home with Sandbag" videos are also posted on Valley Water's website.

Valley Water and Santa Clara County cities/county promote the county's **AlertSCC and ReadySCC (Ready Santa Clara County) emergency app and the American Red Cross flood app**. Communities encourage the public to download either/or both apps so that they are prepared and are kept informed before, during and after an event. This information is shared with the public at events/fairs and is included in several of Valley Water's flyers/mailers.

Beginning in approximately June of each year, Valley Water participates in the **California Department of Water Resources'** statewide agency coordination calls, leading up to California Flood Preparedness Week (CFPW) held in October annually. Valley Water encourages Santa Clara County cities/county to participate in the State's CFPW campaign and offer support to the cities/county to promote participation. Each October, Valley Water also executes a resolution declaring the designated week in October as CFPW in Santa Clara County.

Valley Water also maintains a **Flooding & Safety, Flood Protection Resources webpage** on their website: <https://www.valleywater.org/floodready>. As the flood protection authority for Santa Clara County, flood protection is one of Valley Water's priorities. This resourceful flood protection webpage provides a wealth of information to the residents and businesses Valley Water serves. Information is provided to the public on flood preparedness, including how to keep their family, property, and business flood safe.

Valley Water's **Education Outreach Program** reaches close to 19,000 students a year throughout the county. The program offers age-appropriate curriculum on flood preparedness either in a classroom setting or virtual events where students receive information on how to prepare for a flood event.

**APPENDIX C**  
**Past Members of the Santa Clara County 2015 PPI Committee**

| <b>Community</b>      | <b>Local Government Representative and Alternates</b>                                                                                                                              | <b>External Stakeholders</b>                                                                   |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| County of Santa Clara | <b>Chris Freitas</b>                                                                                                                                                               | <b>Trish Mulvey</b> , CLEAN South Bay                                                          |
| Cupertino             | <b>Chad Mosley</b> , Senior Engineer<br><b>Winnie Pagan</b> , Associate Civil Engineer<br>Public Works Department                                                                  | <b>Julia Kinst</b> , Neighborhood Block Leader                                                 |
| Gilroy                | <b>Claudia Moran-Garcia</b> , Civil Engineer I<br>Public Works Department<br><b>Maria Angeles</b> , City Development Engineer, CFM                                                 | <b>Mark Turner</b> , Chamber of Commerce                                                       |
| Los Altos             | <b>Aida Fairman</b> , PE<br>Associate Civil Engineer<br><b>Kathleen Gallagher</b> , CSG Consultants, Inc.<br><b>Frank Navarro</b> , CSG Consultants, Inc.                          | <b>Brandi Garcia</b> , PG&E<br><b>Pam Perdue</b> , PG&E                                        |
| Milpitas              | <b>Ahmed Aly</b> , Principal Civil Engineer, CFM<br>Engineering Land Development Section<br><b>Babak Kaderi</b> , Assistant Civil Engineer<br>Engineering Land Development Section | <b>Donna Chiaramonte</b> , State Farm                                                          |
| Morgan Hill           | <b>Charlie Ha</b> , Associate Engineer<br>Public Works Department                                                                                                                  | <b>Sanjar Chakamian</b> , Morgan Hill Downtown                                                 |
| Mountain View         | <b>Renee Gunn</b> , Associate Civil Engineer, CFM<br><b>Jacqueline Andrews Solomon</b> , Assistant<br>Public Works Director/City Engineer, CFM                                     | <b>Lydia Kou</b> , Real Estate Agent<br>Erin McKeown, Google                                   |
| Palo Alto             | <b>Rajeev Hada</b> , Project Engineer, CFM<br>Public Works Department, Engineering Services Division                                                                               | <b>Dan Melick</b> , CERT Volunteer                                                             |
| San José              | <b>Arlene Lew</b> , Floodplain Manager, CFM<br>Department of Public Works                                                                                                          | <b>Erik Fong</b> , Willow Glen<br>Neighborhood Association<br>Linda Baker, Alain Pinel Realtor |
| Santa Clara           | <b>Van Truong</b><br><b>Falguni Amin</b> , Acting Principal Engineer<br>Public Works - Engineering                                                                                 | <b>Kevin Moore</b> , retired City<br>Council member                                            |
| Sunnyvale             | <b>Jennifer Ng</b> , Senior Civil Engineer<br>Public Works                                                                                                                         | <b>Kerry Haywood</b> , Moffett Park<br>Business Group                                          |
| Valley Water          | <b>Pat Showalter</b> , Sr. Project Manager<br><b>Ricardo Barajas</b> , Public Information Rep. II<br><b>Merna Leal</b> , Project Coordinator                                       | <b>Naomi Pease</b> , American Red Cross                                                        |

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| <div>Appendix A</div> <div>CRS Creditable Outreach and Flood Response Projects by CRS Community</div> <div>Santa Clara County Multi-Jurisdictional PPI 2021</div>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |                                                            |                                        |
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| Audience                                                                                                                                                                            | <sup>1</sup> Message                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Outcome                                                             | Project(s) Proposed to Support the Messages<br>(XX denotes Community acronym, and Outreach Project #)                                                                                                                                                                                                                                                                                                                                                                                                      | Assignment                  | <sup>2</sup> Schedule                                      | <sup>3</sup> Stakeholder               |
| <b>Community At Large (CAL)</b><br><br>- <i>Multi-lingual Communities</i><br><br>- <i>Groups with Special Evacuation Needs</i><br><br>- <i>New Residents, Visitors and Tourists</i> | <u>Topic 1:</u> Know your flood hazard<br>Message 1A - Know your flood risk<br>Message 1B - Contact your floodplain manager to find out if your property is in a floodplain<br>Message 1C - Check if your home or business is in a Special Flood Hazard Area<br><br><u>Topic 2:</u> Insure your property for your flood hazard<br>Message 2A - Get flood insurance ahead of time<br>Message 2B – Insure your property<br>Message 2C – There is a 30-day waiting period for the policy to take place<br><br><u>Topic 3:</u> Protect people from the flood hazard<br>Message 3A - Put your 3-day emergency kit together<br>Message 3B - Follow evacuation orders<br>Message 3C – Learn the best route to high ground<br><br><u>Topic 4:</u> Protect your property from the flood hazard<br>Message 4A - Protect your property from the flood hazard<br>Message 4B - Prepare your home<br>Message 4C - Sandbags can offer protection against a foot or less of floodwater<br>Message 4E - Get sandbags before a flood<br><br><u>Topic 5:</u> Build responsibility<br>Message 5A - Build responsibly in floodplains<br>Message 5B - Comply with development requirements<br>Message 5C - Check with your local floodplain manager before you build<br><br><u>Topic 6:</u> Protect natural floodplain functions<br>Message 6A -Keep creeks clean and flowing<br>Message 6B - Keep debris and trash out of our streams<br>Message 6C - Don’t pollute, dump, or drain anything in creeks<br><br><u>Topic 7:</u> Develop a Family Emergency Plan<br>Message 7A: Develop an emergency plan<br><br><u>Topic 8:</u> Download disaster Apps<br>Message 8A - Download disaster emergency apps<br><br><u>Topic 9:</u> Understand shallow flooding risks – don’t drive through standing water<br>Message 9A - Understand shallow flooding risks - don’t drive through standing water<br>FEMA’s message: “Turn Around Don't Drown®.” | Educate our community on flood protection and preparedness measures | (VW OP #01) Multi-language Countywide Mailer (CWM) to every postal address in Santa Clara County (Topics 1-5 and 7, 8)                                                                                                                                                                                                                                                                                                                                                                                     | Valley Water Communications | Each late October or November                              | All Santa Clara County CRS Communities |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (VW OP #02) Distributes a soft copy of our Flood Safety Tips brochure for all SCC CRS communities’ use (print hard copies to distribute at events and/or post of flood preparedness webpages) (Topics 1-9)                                                                                                                                                                                                                                                                                                 | Valley Water Communications | Annually, November/December                                | All Santa Clara County CRS Communities |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (CUP OP #03) Flood notice in the local newsletter, “The Cupertino Scene” (Topics 1-9)                                                                                                                                                                                                                                                                                                                                                                                                                      | City of Cupertino           | Each October or November issue                             | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (LA OP #04) Two (2) newspapers ads, in the Los Altos Town Crier (Topics 1-5)                                                                                                                                                                                                                                                                                                                                                                                                                               | City of Los Altos           | Each fall                                                  | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (LAH OP #05) The town’s “Our Town” quarterly newsletter includes information on flood preparedness. The newsletter is mailed out town-wide and is also available online on the town’s website ( <i>Topics TBD during cycle visit</i> )                                                                                                                                                                                                                                                                     | Town of Los Altos Hills     | Each fall                                                  | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (LAH OP #06) The town distributes various flood preparedness and safety materials at events, including Valley Water’s annual floodplain mailer and promotional item (e.g., emergency starter kits, Get Flood Ready Emergency Supply Checklist tote bags, etc.), FEMA flood insurance information, ReadySCC, and American Red Cross Flood apps, AlertSCC, sandbag guidelines, flood protection project-specific notices, FEMA NFIP materials, and preparedness activity/coloring books, etc.) to the public | Town of Los Altos Hills     | Annually, spring and late summer                           | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (MIL OP #07) “Flood Public Advisory” brochure to community at large (Topics 1-6)                                                                                                                                                                                                                                                                                                                                                                                                                           | City of Milpitas            | Each December or January                                   | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (MH OP #08) Sends a citywide “Flood Report” brochure (Topics 1-9)                                                                                                                                                                                                                                                                                                                                                                                                                                          | City of Morgan Hill         | Annually, close to or during the start of the rainy season | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (MV OP #09) Sends “The View” citywide newsletter, Winter version, includes information on flood risk, flood safety, and the importance of buying flood insurance (Topics 1-9)                                                                                                                                                                                                                                                                                                                              | City of Mountain View       | Fall newsletter edition                                    | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (MV OP #10) Mails a utility bill insert to all resident and businesses that contains information on flood risk, flood safety, and the importance of buying flood insurance (Topics 9)                                                                                                                                                                                                                                                                                                                      | City of Mountain View       | Between July - September                                   | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (PA OP #11) Sends the “Are You Ready for Winter Storms?’ flyer (aka utilities insert) to all residents and businesses in the City, along with their utility bills (Topics 1-9)                                                                                                                                                                                                                                                                                                                             | City of Palo Alto           | Each Fall                                                  | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (PA OP #12) Sends out utility announcement, “Anytime it can rain, it can flood. Don’t get caught off-guard” (Topics 1, 2,3, 4, 5, 6, 7, & 9 – <i>will pursue adding other topic</i> )                                                                                                                                                                                                                                                                                                                      | City of Palo Alto           | Each March/April                                           | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (PA OP #13) The city distributes various flood preparedness and safety documents, including FEMA NFIP materials for public/policyholders                                                                                                                                                                                                                                                                                                                                                                   | City of Palo Alto           | Year Round                                                 | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     | (SC OP #14) Mails out a citywide newsletter for residents and businesses called “Inside Santa Clara” (Topics 1-9)                                                                                                                                                                                                                                                                                                                                                                                          | City of Santa Clara         | Each fall                                                  | N/A                                    |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Educate our community on flood protection and preparedness measures | (VW OP #15) Flood Ready webpage: Flood & Safety, Flood Protection Resources, includes floodplain and countywide mailers <a href="https://www.valleywater.org/floodready">https://www.valleywater.org/floodready</a>                                                                                                                                                                                                                                                                                        | Valley Water                | Year Round                                                 | All Santa Clara County CRS Communities |

<sup>1</sup>

**Message Topics:** **Outreach Projects (OP):** Topic 1 – Know your flood hazard; Topic 2 – Insure your property for your flood hazard; Topic 3 – Protect people from the flood hazard; Topic 4 – Protect your property from the hazard; Topic 5 – Build responsibly; Topic 6 – Protect natural floodplain functions; Topic 7 – Develop a Family Emergency Plan; Topic 8 – Download disaster Apps; Topic 9 – Understand shallow flooding risks – “Don’t drive through standing water.”

**Flood Response Preparations (FRP):** What to Do Before, During and After a Flood/Storm

<sup>2</sup>

Each September, all deliverables need to be reported to Valley Water for tracking purposes.

<sup>3</sup>

A **stakeholder** can be any agency, organization, or person (other than the community itself) that supports the message. Stakeholders can be: an insurance company that publishes a brochures on flood insurance, even if it is set out at City Hall; a local newspaper that publishes a flood or hurricane season supplement each year; FEMA, if, for example, a FEMA brochure is used as an informational material; schools that implement outreach activities; a local newspaper; a neighborhood or civic association that sponsors and hosts a presentation by a community employee; a utility company that includes pertinent articles in its monthly bills; or presentations made by state or FEMA staff at a Risk Map meeting.

Appendix A  
CRS Creditable Outreach and Flood Response Projects by CRS Community  
Santa Clara County Multi-Jurisdictional PPI 2021

| Audience | <sup>1</sup> Message | Outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Project(s) Proposed to Support the Messages<br>(XX denotes Community acronym, and Outreach Project #)                                                                                                                                                                                                                                                                                                                                                                                                  | Assignment                                        | <sup>2</sup> Schedule | <sup>3</sup> Stakeholder |
|----------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------|--------------------------|
|          |                      | <p>Increase in ‘hits’ on Valley Water and communities Flood Protection Resources webpage</p> <hr/> <p><i>These website projects are credited under Activity 350 – Flood Protection Information, element c). Flood protection website (WEB), not credited under Activity 330</i></p> <p><b>Note:</b> To receive any WEB credit, the community's website must meet the following criteria:</p> <p><i>The community must check the website's links at least monthly, and fix those that are no longer accurate. At least annually, the community must review the content to ensure that it is still current and pertinent</i></p> | (ALL OP #16) All communities’ website flood protection resources webpage includes language that contains the three additional PPI priority messages noted below:<br>7. Develop an emergency plan<br>8. Download disaster apps<br>9. Understand shallow flooding risks—don’t drive through standing water                                                                                                                                                                                               | All Santa Clara County Communities                | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (SCC OP #17) Hosts a “Storm and Flood Information and Resources” webpage available for all residents in the county, includes re-directing to <a href="http://www.floodsmart.gov">www.floodsmart.gov</a><br><a href="https://www.sccgov.org/sites/opa/Pages/storm.aspx">https://www.sccgov.org/sites/opa/Pages/storm.aspx</a>                                                                                                                                                                           | Santa Clara County Office of Public Affairs       | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (SCC OP #18) Hosts a “Flood Safety Information” webpage, includes re-directing to <a href="http://www.valleywater.org/floodready">www.valleywater.org/floodready</a> <a href="https://cpd.sccgov.org/flood-safety-information">https://cpd.sccgov.org/flood-safety-information</a>                                                                                                                                                                                                                     | Santa Clara County Consumer Protection Division   | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (SCC OP #19) Hosts a “Be a Prepared Community Member” webpage that includes emergency preparedness information <a href="https://emergencymanagement.sccgov.org/be-prepared-community-member">https://emergencymanagement.sccgov.org/be-prepared-community-member</a>                                                                                                                                                                                                                                   | Santa Clara County Office of Emergency Management | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (SCC OP #20) Hosts a “People with Access and Functional Needs (AFN)” webpage <a href="https://emergencymanagement.sccgov.org/people-access-and-functional-needs-afn">https://emergencymanagement.sccgov.org/people-access-and-functional-needs-afn</a>                                                                                                                                                                                                                                                 | Santa Clara County Office of Emergency Management | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (CUP OP#21) Hosts a “Citizen Preparedness” webpage that includes emergency preparedness information, includes re-directing to Valley Water’s <a href="http://www.valleywater.org/floodready">www.valleywater.org/floodready</a> webpage<br><br><a href="https://www.cupertino.org/residents/community-services-programs/emergency-services/citizen-preparedness">https://www.cupertino.org/residents/community-services-programs/emergency-services/citizen-preparedness</a>                           | City of Cupertino Office of Emergency Services    | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (GIL OP #22) The city hosts an “Emergency Preparedness” webpage <a href="#">Emergency Preparedness   Gilroy, CA - Official Website (cityofgilroy.org)</a> (listed in Appendix B)                                                                                                                                                                                                                                                                                                                       | City o Gilroy Fire Department                     | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (LA OP #23) The city’s Public Works Department hosts a ‘Flood Zone Information’ webpage on its website (listed in Appendix B) <a href="https://www.losaltosca.gov/publicworks/page/flood-zone-information">https://www.losaltosca.gov/publicworks/page/flood-zone-information</a>                                                                                                                                                                                                                      | City of Los Altos Public Works Department         | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (LAH OP #24) The town hosts a “Flood Information” webpage on the town’s website. This webpage includes information on the PPI nine topics, including a supporting message. The webpage redirects to the following key resource websites: <a href="http://www.valleywater.org/floodready">www.valleywater.org/floodready</a> , <a href="http://www.floodsmart.org">www.floodsmart.org</a> , <a href="http://www.ready.gov">www.ready.gov</a> , and <a href="http://www.weather.gov">www.weather.gov</a> | Town of Los Altos Hills                           | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (LG OP #25) The town’s website encourages residents and businesses to purchase flood insurance and redirects visitors to <a href="http://www.floodsmart.gov">www.floodsmart.gov</a>                                                                                                                                                                                                                                                                                                                    | Town of Los Gatos                                 | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (MIL OP #26) The city’s’ website has a “Flood Information” webpage that contains information on several of the PPI message topics; the webpage also redirects to Valley Water, FEMA, NOAA, <a href="http://www.floodsmart.gov">www.floodsmart.gov</a> , <a href="http://www.Ready.gov">www.Ready.gov</a> , and USGS webpages                                                                                                                                                                           | City of Milpitas Engineering Department           | Year Round            | N/A                      |
|          |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The city’s website also has a “Important Flood Hazard Information” webpage that contains information on several of the PPI message topics; the webpage also redirects to Valley Water, FEMA, NOAA, <a href="http://www.floodsmart.gov">www.floodsmart.gov</a> (listed in Appendix B)<br><a href="https://www.ci.milpitas.ca.gov/milpitas/departments/engineering/flood-information/">https://www.ci.milpitas.ca.gov/milpitas/departments/engineering/flood-information/</a>                            |                                                   |                       |                          |







| <div>Appendix A</div> <div>CRS Creditable Outreach and Flood Response Projects by CRS Community</div> <div>Santa Clara County Multi-Jurisdictional PPI 2021</div> |                                                                             |                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |                                                    |                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------|----------------------------------------|
| Audience                                                                                                                                                          | <sup>1</sup> Message                                                        | Outcome                                                                                                                                                                                                                                                                                              | <div>Project(s) Proposed to Support the Messages</div> <div>(XX denotes Community acronym, and Outreach Project #)</div>                                                                                                                                                                                                                                                                                                                                                         | Assignment                                        | <sup>2</sup> Schedule                              | <sup>3</sup> Stakeholder               |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (SCC OP #41) Shares Valley Water’s digital social media resource links during the flood season. The “Floods Follow Fires. Are you Ready?” and “Got Sandbags” messages redirect to Valley Water’s website. Messages are used on social media, short form newsletter, short form email, web, and Nextdoor                                                                                                                                                                          | Santa Clara County Office of Emergency Management | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (CUP OP #42) Recognizes the robust social media campaign led by Valley Water and has linked the city’s main flood preparation webpage to Valley Water’s Flood Ready webpage                                                                                                                                                                                                                                                                                                      | City of Cupertino                                 | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (GIL OP #43) The city recognizes Valley Water’s Flood Awareness Campaign and has linked the city’s main flood webpage to Valley Water’s Flood Ready webpage                                                                                                                                                                                                                                                                                                                      | City of Gilroy                                    | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (LAH OP #44) The town recognizes Valley Water’s Flood Awareness Campaign and has linked the town’s main flood webpage to Valley Water’s Flood Ready webpage                                                                                                                                                                                                                                                                                                                      | Town of Los Altos Hills                           | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (LG OP #45) Recognizes Valley Water’s Flood Awareness Campaign and has linked the Town’s main flood webpage to Valley Water’s Flood Ready webpage                                                                                                                                                                                                                                                                                                                                | Town of Los Gatos                                 | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (MV OP #46) The city does a social media notification about storm preparation for winter storms ahead of time. The notification directs residents to their “Flood Protection and Insurance Information” webpage. The city has also linked the city’s webpage to Valley Water’s Flood Ready webpage                                                                                                                                                                               | City of Mountain View                             | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (SC FRP #47) City publishes social media posts, on Facebook, Twitter, and other platforms, focused on safety<br><br>The city has prepared a pre-flood plan (FRP) for public information projects that will be implemented before, during, and after a storm/flood, as well as identifying who is responsible for posting these messages, what type of events they apply to, what social media platforms to post to and how often                                                 | City of Santa Clara Office of Emergency Services  | During the storm season                            | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (SJ OP #48) Recognizes Valley Water’s Flood Awareness Campaign and has linked the city’s main flood webpage to Valley Water’s Flood Ready webpage. Keeps Valley Water’s floodplain mailer static location at City Hall for residents to pick-up and is also distributed at various events throughout the year                                                                                                                                                                    | City of San Jose                                  | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (SAR OP #49) Recognizes Valley Water’s Flood Awareness Campaign and has linked the city’s main flood webpage to Valley Water’s Flood Ready webpage                                                                                                                                                                                                                                                                                                                               | City of Saratoga                                  | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (SAR OP #50) The city does a social media notification about storm preparation for winter storms ahead of time                                                                                                                                                                                                                                                                                                                                                                   | City of Saratoga                                  | Year Round                                         | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (SUN OP #51) The city actively posts flood safety and preparedness messaging through social media platforms (i.e. Facebook and Twitter)                                                                                                                                                                                                                                                                                                                                          | City of Sunnyvale Environmental Services          | During the rainy season (October – March)          | N/A                                    |
|                                                                                                                                                                   | Topics 1-9 and supporting messages                                          | Educate our community on flood protection and preparedness measures<br><br>Increase in ‘hits’ on Valley Water and cities Flood Protection Resources pages and improve Valley Water’s Flood Campaign results<br><br>Residents less stress during emergencies and better prepared before a flood event | (VW OP #52) Copies of Valley Water’s multi-language floodplain mailer are made available to all Santa Clara County CRS Communities to disseminate at various events, including keeping the mailer static in lobby areas for visitors to pick-up. Valley Water attends various communities’ events/fairs throughout the county and disseminates flood readiness materials, including various FEMA flood-related publications and Valley Water flood ready materials (Topics 1– 9) | Valley Water                                      | Annually, September - May                          | All Santa Clara County CRS Communities |
|                                                                                                                                                                   | Community Events – Distribute flood preparedness materials to the community |                                                                                                                                                                                                                                                                                                      | (CUP OP #53) Distributes flood readiness outreach materials at various events/ facilities                                                                                                                                                                                                                                                                                                                                                                                        | City of Cupertino                                 | Year Round, as needed                              | N/A                                    |
|                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                      | (GIL OP #54) Participates in two fair/events: Gilroy Garlic Festival (GF) and city’s Public Works Week Community Open House (PWWCOH)                                                                                                                                                                                                                                                                                                                                             | City of Gilroy                                    | End of July (GF)<br><br>Typically, in May (PWWCOH) | N/A                                    |

| <div>Appendix A</div> <div>CRS Creditable Outreach and Flood Response Projects by CRS Community</div> <div>Santa Clara County Multi-Jurisdictional PPI 2021</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                      |                                                                         |                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------|
| Audience                                                                                                                                                          | <sup>1</sup> Message                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Outcome                                                                                                                                                                                                                                                                                           | Project(s) Proposed to Support the Messages<br><small>(XX denotes Community acronym, and Outreach Project #)</small>                                                                                                                                                                                                                                                                                                                                      | Assignment                                                           | <sup>2</sup> Schedule                                                   | <sup>3</sup> Stakeholder                                     |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (LAH OP #55) Hosts two events - Earth Day (ED) and the Town Picnic (TP)                                                                                                                                                                                                                                                                                                                                                                                   | Town of Los Altos Hills                                              | Annually, Spring (ED) and late Summer (TP)                              | N/A                                                          |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (MIL OP #56) Distributes FEMA flood-related publications at various events                                                                                                                                                                                                                                                                                                                                                                                | City of Milpitas                                                     | Year Round                                                              | N/A                                                          |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (MV OP #57) The city participates Mountain View Art & Wine Festival (MVA&WF) and Thursday Night Live (TNL) and distributes flood preparedness information                                                                                                                                                                                                                                                                                                 | City of Mountain View                                                | Each September (MVA&WF)<br><br>Months of June/July (TNL)                | Valley Water                                                 |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (PA OP #58) Staff hosts a flood readiness table at city’s annual Earth Day (ED) event and at the city Municipal Corporation Open House (MCOH). Upon request, the city also participates in other fairs and promotes flood readiness, including Creekwise mailer/brochure                                                                                                                                                                                  | City of Palo Alto                                                    | Each April (ED) and July (MCOH)                                         | Can vary depending on requests made to City to support fairs |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (SJ OP #59) Staff hosts and participates in the ‘Building Permits and Home Safety Open House.’ The city’s also hosts ‘Pumpkins in the Park’ event which Valley Water staff participates in and promotes flood preparedness                                                                                                                                                                                                                                | City of San Jose                                                     | Each May and October                                                    | Valley Water                                                 |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (SC OP #60) City hosts a flood readiness table at the Art & Wine Festival. Valley Water also sponsors a table at the festival promoting flood preparedness and distributes various flood readiness materials to the community                                                                                                                                                                                                                             | City of Santa Clara                                                  | Each September                                                          | N/A                                                          |
|                                                                                                                                                                   | <u>Topic 3:</u> Protect people from the flood hazard<br>Message 3A - Put your 3-day emergency kit together<br>Message 3B - Follow evacuation orders<br>Message 3C – Learn the best route to high ground<br><br><u>Topic 9:</u> Understand shallow flooding risks – don’t drive through standing water<br>Message 9A - Understand shallow flooding risks - don’t drive through standing water<br>FEMA’s message: “Turn Around Don’t Drown®.”                                                                          | Less damage due to the floods; improve sandbag distribution<br><br>Fewer accidents and rescues                                                                                                                                                                                                    | (SUN OP #61) City has permanent “Road May Flood” street signs in areas of the City prone to flooding and promotes the “Flood Zone Look Up” featured on the city’s website                                                                                                                                                                                                                                                                                 | City of Sunnyvale                                                    | Year Round                                                              | N/A                                                          |
|                                                                                                                                                                   | <u>Topic 4:</u> Protect your property from the flood hazard<br>Message 4A - Protect your property from the flood hazard<br>Message 4B - Prepare your home<br>Message 4C - Sandbags can offer protection against a foot or less of floodwater<br>Message 4E - Get sandbags before a flood<br><br><u>Topic 5:</u> Build responsibility<br>Message 5A - Build responsibly in floodplains<br>Message 5B - Comply with development requirements<br>Message 5C - Check with your local floodplain manager before you build | Increase in inquires on retrofitting measures. Decrease the number of repairs and elevations without permits. Increase number of repairs with permits<br><br>Ensure people who are interested in protecting their property from flooding are getting the help they need<br><br>Keep families safe | (CUP OP #62) The city offers Flood Protection Assistance, Property Protection Advice. Staff provides in-person flood risk consultation at the front counter and/or site visits when requested<br><br>(MIL OP # 63) The city offers Flood Protection Assistance, Property Protection Advice and provides in-person flood risk consultation at the front counter<br><br>(SC OP #64) The city offers Flood Protection Assistance, Property Protection Advice | City of Cupertino<br><br>City of Milpitas<br><br>City of Santa Clara | Year Round<br><br>Year Round<br><br>Year Round                          | N/A<br><br>N/A<br><br>N/A                                    |
|                                                                                                                                                                   | <u>Topic 6:</u> Protect natural floodplain functions<br>Message 6A - Keep creeks clean and flowing<br>Message 6B - Keep debris and trash out of our streams<br>Message 6C - Don’t pollute, dump, or drain anything in creeks                                                                                                                                                                                                                                                                                         | Cleaner streams and fewer dumping violations<br><br>Fewer debris blockages during high-flow events<br><br>Drainage inspectors report fewer calls and a decrease in the amount of trash removed                                                                                                    | (VW OP #65) “Do Not Dump”/illegal dumping message is sent each year to all Santa Clara County residents in Valley Water’s CWM and FPM                                                                                                                                                                                                                                                                                                                     | Valley Water Communications                                          | Each late October or November (CWM)<br><br>Each November/December (FPM) | All Santa Clara County CRS Communities                       |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (VW OP #66) “Do Not Dump” signs placed by waterways/channels                                                                                                                                                                                                                                                                                                                                                                                              | Valley Water O&M                                                     | Year Round                                                              | N/A                                                          |
|                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                   | (VW OP #67) Lists Pollution Hotline number in all Project Notices                                                                                                                                                                                                                                                                                                                                                                                         | Valley Water Communications                                          | Year Round                                                              | N/A                                                          |

| <div>Appendix A</div> <div>CRS Creditable Outreach and Flood Response Projects by CRS Community</div> <div>Santa Clara County Multi-Jurisdictional PPI 2021</div> |                      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                            |                                            |
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| Audience                                                                                                                                                          | <sup>1</sup> Message | Outcome | Project(s) Proposed to Support the Messages<br><small>(XX denotes Community acronym, and Outreach Project #)</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Assignment              | <sup>2</sup> Schedule                                      | <sup>3</sup> Stakeholder                   |
|                                                                                                                                                                   |                      |         | (SCC OP #68) Storm Drain Stenciling/Medallion Program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Santa Clara County      | Year Round                                                 | All Santa Clara County CRS Communities     |
|                                                                                                                                                                   |                      |         | (SUN OP #69) The city’s “Horizon” newsletter, includes Do Not Dump messaging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | City of Sunnyvale       | Annually, fall                                             | N/A                                        |
|                                                                                                                                                                   |                      |         | (ALL OP #70) Developments that are modifying or constructing new catch basins/storm drains/inlets are required, per the below-noted permits, to stencil the “No Dumping! Flows to Bay.” In addition, some of these cities, require all bid documents for capital projects which are modifying or constructing new catch basins, require the contractors to install the same stencil. The program is also highlighted on cities’ websites. <ul style="list-style-type: none"> <li>▪ <i>South County municipalities are subject to the statewide “Phase II” NPDES Permit</i></li> <li>▪ <i>North County municipalities are subject to the SF Bay Municipal Regional Stormwater NPDES Permit</i></li> </ul> | All                     | Year Round                                                 | N/A                                        |
|                                                                                                                                                                   |                      |         | (CUP OP #71) The city’s annual flood notice in the local newsletter, ‘The Cupertino Scene,’ contains dumping is illegal messaging and how to report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | City of Cupertino       | Annually, October - November                               | N/A                                        |
|                                                                                                                                                                   |                      |         | (CUP OP #72) Participates in clean-up events: the annual National River Clean-up Day (NRCD) and Coastal Clean-Up Day (CCD). They coordinate with Valley Water on both these clean-up efforts. The city also participates in Valley Water’s Adopt-a-Creek Program                                                                                                                                                                                                                                                                                                                                                                                                                                         | City of Cupertino       | Each May (NRCD) and September (CCD)                        | Volunteers Valley Water Stream Stewardship |
|                                                                                                                                                                   |                      |         | (LAH OP #73) The town participates in annual clean-up events: National River Clean-up Day (each May) and Coastal Clean-up Day (each September) and coordinates volunteers. They coordinate with Valley Water on both these clean-up efforts. The town also participates in Valley Water’s Adopt-a-Creek Program                                                                                                                                                                                                                                                                                                                                                                                          | Town of Los Altos Hills | Each May (NRCD) and September (CCD)                        | Volunteers Valley Water Stream Stewardship |
|                                                                                                                                                                   |                      |         | (MIL OP #74) “Flood Public Advisory” brochure contains dumping is illegal messaging and how to report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | City of Milpitas        | Each December or January                                   | N/A                                        |
|                                                                                                                                                                   |                      |         | (MIL OP #75) Participates in annual clean-up events: National River Clean-up Day (NRCD) and Coastal Clean-Up Day (CCD). They coordinate with Valley Water on both these clean-up efforts. The city also participates in Valley Water’s Adopt-a-Creek Program                                                                                                                                                                                                                                                                                                                                                                                                                                             | City of Milpitas        | Each May (NRCD) and September (CCD)                        | Volunteers Valley Water Stream Stewardship |
|                                                                                                                                                                   |                      |         | (MH OP #76) “Flood Report” contains message on keeping debris and trash out of streams – Do Not Dump messaging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | City of Morgan Hill     | Annually, close to or during the start of the rainy season | N/A                                        |
|                                                                                                                                                                   |                      |         | (PA OP #77) “Are You Ready for Winter Storms?” utilities insert contains the Do Not Dump and report illegal dumping messages                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | City of Palo Alto       | Each fall                                                  | N/A                                        |
|                                                                                                                                                                   |                      |         | (PA OP #78) Utility bill insert includes a ‘Utility Announcement on Flood Safety Tips,’ including Protect natural floodplains - keep rain gutters and drainage channels free of debris                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | City of Palo Alto       | Annually, March-April                                      | N/A                                        |
|                                                                                                                                                                   |                      |         | (PA OP #79) Participates in annual clean-up events: National River Clean-up Day (NRCD) and Coastal Clean-Up Day (CCD). They coordinate with Valley Water on both these clean-up efforts. Additionally, the city participates in Valley Water’s Adopt-a-Creek Program                                                                                                                                                                                                                                                                                                                                                                                                                                     | City of Palo Alto       | Each May (NRCD) and September (CCD)                        | Volunteers Valley Water Stream Stewardship |
|                                                                                                                                                                   |                      |         | (PA OP #80) Clean-ups of trash booms located in Matadero Creek and Adobe Creek are done annually on an as-needed basis. The city also assesses its hot spots and cleans up the local drainage system on an ongoing basis and part of its operations and maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                      | City of Pal Alto        | Annually, as-needed                                        | N/A                                        |
|                                                                                                                                                                   |                      |         | (SUN OP #81) “Horizon” newsletter includes a “Know How to Be Flood Safe” article that promotes the Do Not Dump message                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | City of Sunnyvale       | Each October, Fall Edition                                 | N/A                                        |

| <div>Appendix A</div> <div>CRS Creditable Outreach and Flood Response Projects by CRS Community</div> <div>Santa Clara County Multi-Jurisdictional PPI 2021</div>                                                                                   |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
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| Audience                                                                                                                                                                                                                                            | <sup>1</sup> Message                                                                                                                                                                                                                                                                     | Outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Project(s) Proposed to Support the Messages<br>(XX denotes Community acronym, and Outreach Project #)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Assignment                                                                                                                                                                                                                                                                                                                                | <sup>2</sup> Schedule                                                                                                                                                                                                                                                                                                                                                                    | <sup>3</sup> Stakeholder                                                                                                                                      |
| <b>Residents and Businesses in the Special Flood Hazard Area (SFHA)</b><br><br>- <i>Low Lying Areas, Along Rivers and Creeks</i><br><br>- <i>Coastal Communities at Risk for Sea Level Rise/Tsunamis</i><br><br>- <i>Repetitive Loss (RL) Areas</i> | <b>Topic 1:</b> Know your flood hazard<br>Message 1A - Know your flood risk<br>Message 1B - Contact your floodplain manager to find out if your property is in a floodplain<br>Message 1C - Check if your home or business is in a Special Flood Hazard Area                             | Residents/businesses in the SFHA are aware they’re in the SFHA and prepare before floods<br><br>Increase in number of flood insurance policies in the SFHAs and RLAs in the county in general<br><br>Prospective buyers understand flood risks<br><br>Increase number of elevation certificates on file, and structures repaired with permits; decrease the number of repetitive loss increase homes<br><br>Increase in the number of flood insurance policies with contents coverage | (VW OP #82) Multi-language floodplain mailer (FPM) to all residents and businesses within the SFHA in Santa Clara County (Topics 1– 9)<br><br>(CUP OP #83) Flood notice in the local newsletter, The Cupertino Scene, which reaches residents and businesses in the SFHA (Topics 1-9)<br><br>(LA OP #84) Letter, along with a “Are You Prepared for a Flood in Your Neighborhood?” brochure to property owners in the SFHA (Topics 1-8)<br><br>(LAH OP #85) The town’s “Our Town” quarterly newsletter includes information on flood preparedness. The newsletter is mailed out town-wide and is also available online on the town’s website ( <i>Topics TBD during cycle visit</i> )<br><br>(MIL OP #86) “Flood Public Advisory” brochure to residents and businesses within SFHA (Topics 1-6)<br><br>(MH OP #87) Sends a citywide “Flood Report” brochure, including to those in the SHFA (Topics 1-9)<br><br>(MV OP #88) Sends “The View” citywide newsletter, Winter version, includes information on flood risk, flood safety, and the importance of buying flood insurance (Topics 1-9)<br><br>(MV OP #89) Mails a utility bill insert to all resident and businesses that contains information on flood risk, flood safety, and the importance of buying flood insurance (Topics 9)<br><br>(PA OP #90) Sends the “Are You Ready for Winter Storms?’ flyer ( <i>aka utilities mailer</i> ) to all residents and businesses in the city, including to those in the SFHA, along with their utility bills (Topics 1-9)<br><br>(PA OP #91) Sends out utility announcement, “Anytime it can rain, it can flood. Don’t get caught off-guard” (Topics 1, 2,3, 4, 5, 6, 7, & 9 – <i>will pursue adding other topic</i> )<br><br>(SC OP #92) Mails out a citywide, including all addresses in the SFHA, newsletter for residents and businesses called “Inside Santa Clara” (Topics 1-9)<br><br>(SUN OP #93) Sends two (2) mailers and one (1) “Horizon” newsletter article “Know How to Be Flood Safe” that promotes flood safety and flood preparedness messaging targeted to all residents and businesses within the SFHA (Topics 2 and 4)<br><br>(SUN OP #94) Sends mailer to all those in the SFHA (Topics 1-4, and 7) | Valley Water<br><br>City of Cupertino<br><br>City of Los Altos<br><br>Town of Los Altos Hills<br><br>City of Milpitas<br><br>City of Morgan Hill<br><br>City of Mountain View<br><br>City of Mountain View<br><br>City of Palo Alto<br><br>City of Palo Alto<br><br>City of Santa Clara<br><br>City of Sunnyvale<br><br>City of Sunnyvale | Each November/ December<br><br>Each October or November issue<br><br>Annually, each fall<br><br>Each fall<br><br>Each December or January<br><br>Annually, close to or during the start of the rainy season<br><br>Fall newsletter edition<br><br>Between July - September<br><br>Each fall<br><br>Each March/April<br><br>Each fall<br><br>Each fall around October<br><br>Each October | All<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A<br><br>N/A |
|                                                                                                                                                                                                                                                     | <b>Topic 2:</b> Insure your property for your flood hazard<br>Message 2A - Get flood insurance ahead of time<br>Message 2B – Insure your property<br>Message 2C – There is a 30-day waiting period for the policy to take place                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 3:</b> Protect people from the flood hazard<br>Message 3A - Put your 3-day emergency kit together<br>Message 3B - Follow evacuation orders<br>Message 3C – Learn the best route to high ground                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 4:</b> Protect your property from the flood hazard<br>Message 4A - Protect your property from the flood hazard<br>Message 4B - Prepare your home<br>Message 4C - Sandbags can offer protection against a foot or less of floodwater<br>Message 4E - Get sandbags before a flood |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 5:</b> Build responsibility<br>Message 5A - Build responsibly in floodplains<br>Message 5B - Comply with development requirements<br>Message 5C - Check with your local floodplain manager before you build                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 6:</b> Protect natural floodplain functions<br>Message 6A - Keep creeks clean and flowing<br>Message 6B - Keep debris and trash out of our streams<br>Message 6C - Don’t pollute, dump, or drain anything in creeks                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 7:</b> Develop a Family Emergency Plan<br>Message 7A: Develop an emergency plan                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 8:</b> Download disaster Apps<br>Message 8A - Download disaster emergency apps                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 9:</b> Understand shallow flooding risks – don’t drive through standing water<br>Message 9A - Understand shallow flooding risks - don’t drive through standing water<br>FEMA’s message: “Turn Around Don't Drown®.”                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                               |
|                                                                                                                                                                                                                                                     | <b>Topic 2:</b> Insure your property for your flood hazard<br>Message 2A - Get flood insurance ahead of time<br>Message 2B – Insure your property<br>Message 2C – There is a 30-day waiting period for the policy to take place                                                          | Increase in number of flood insurance policies in the SFHAs, RLAs, and in the county in general<br><br>Prospective buyers understand flood risks<br><br>Increase in the number of flood insurance policies with contents coverage                                                                                                                                                                                                                                                     | (SCC OP #95) Sends letters to the properties in the unincorporated section in the areas of the county’s mapped repetitive loss areas<br><br>(CUP OP #96) Continues to send a letter to former repetitive loss properties<br><br>(MH OP #97) Sends a notice to repetitive loss (RL) areas as required by FEMA<br><br>(PA OP #98) Sends letters to the properties in the city’s mapped repetitive loss areas, highlighting flood safety tips                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Santa Clara County<br><br>City of Cupertino<br><br>City of Morgan Hill<br><br>City of Palo Alto                                                                                                                                                                                                                                           | Annually, each fall<br><br>Annually, mid-year<br><br>Annually, each summer<br><br>Annually, typically August - September                                                                                                                                                                                                                                                                 | N/A<br><br>N/A<br><br>N/A<br><br>N/A                                                                                                                          |

| Appendix A<br>CRS Creditable Outreach and Flood Response Projects by CRS Community<br>Santa Clara County Multi-Jurisdictional PPI 2021 |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |                                                                 |                                                                                                                                                |
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| Audience                                                                                                                               | <sup>1</sup> Message                                                                                                                                                                                                                                                                     | Outcome                                                                                                                                                                                                                                                                                            | Project(s) Proposed to Support the Messages<br>(XX denotes Community acronym, and Outreach Project #)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Assignment                                  | <sup>2</sup> Schedule                                           | <sup>3</sup> Stakeholder                                                                                                                       |
|                                                                                                                                        |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                    | (SJ OP #99) Sends letters to the properties in the city’s mapped repetitive loss areas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | City of San Jose                            | Annually, each typically between September - December           | N/A                                                                                                                                            |
| Messengers to Other Target Audiences (Organizations & Businesses Serving the Community)                                                | <u>Topic 1:</u> Know your flood hazard<br>Message 1A - Know your flood risk<br>Message 1B - Contact your floodplain manager to find out if your property is in a floodplain<br>Message 1C - Check if your home or business is in a Special Flood Hazard Area                             | Educate our community on flood protection and preparedness measures by working and coordinating with groups who serve as messengers, to people who are at risk of flooding, as they provide their respective business service                                                                      | (VW OP #100) Administers a “Let’s Talk Water” Speakers Bureau Program that customizes presentations to update groups on specific issues provide updates on Valley Water projects, including flood protection projects and to educate residents on existing flood risks as well as provide resources and tips to be flood ready                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Valley Water Communications Unit            | On a project-specific basis or as requested                     | Could vary from year-to-year<br>Kiwanis<br>Rotary Clubs<br>Homeowners and Neighborhood Associations<br>Forum Groups<br>Association of Realtors |
|                                                                                                                                        | <u>Topic 2:</u> Insure your property for your flood hazard<br>Message 2A - Get flood insurance ahead of time<br>Message 2B – Insure your property<br>Message 2C – There is a 30-day waiting period for the policy to take place                                                          |                                                                                                                                                                                                                                                                                                    | (VW OP #101) Participates in booth duty support at various events and fairs throughout the county, including Valley Water Capital project meetings or other events, as requested by various organizations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Valley Water Office of Government Relations | Annually. During the flood season (starting in September – May) | All Santa Clara County CRS Communities                                                                                                         |
|                                                                                                                                        | <u>Topic 3:</u> Protect people from the flood hazard<br>Message 3A - Put your 3-day emergency kit together<br>Message 3B - Follow evacuation orders<br>Message 3C – Learn the best route to high ground                                                                                  |                                                                                                                                                                                                                                                                                                    | (VW OP #102) Partner with local Second Harvest Food Bank with distributing FEMA and Valley Water flood preparedness materials, including promotional item(s) as available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Valley Water CRS Program                    | In October (during CFPW)                                        | Second Harvest Food Bank of Silicon Valley                                                                                                     |
|                                                                                                                                        | <u>Topic 4:</u> Protect your property from the flood hazard<br>Message 4A - Protect your property from the flood hazard<br>Message 4B - Prepare your home<br>Message 4C - Sandbags can offer protection against a foot or less of floodwater<br>Message 4E - Get sandbags before a flood |                                                                                                                                                                                                                                                                                                    | (ALL OP #103) Other New Initiatives (as noted in the PPI document)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All                                         | TBD                                                             | TBD                                                                                                                                            |
|                                                                                                                                        | <u>Topic 5:</u> Build responsibility<br>Message 5A - Build responsibly in floodplains<br>Message 5B - Comply with development requirements<br>Message 5C - Check with your local floodplain manager before you build                                                                     |                                                                                                                                                                                                                                                                                                    | 1. Continue and expand the standardized flood message prepared for each community to include flood messages in utility bills each year, including PG&E.<br>2. Expand on partnerships with local chambers of commerce to disseminate and share flood preparedness information.<br>3. Expand on outreach to the Asian and Latino communities who live in flood prone areas.<br>4. Expand on outreach to “hot spot” flood prone areas by hosting on-site or virtual events.<br>5. Expand on reaching local homeowners associations (HOA)s and apartment associations (i.e. Executive Council of Homeowners [ECHO])<br>6. Expand on reaching residents in marginal and low-income communities through partnering with organizations that reach these communities. (i.e. Second Harvest Food Bank and others) |                                             |                                                                 |                                                                                                                                                |
|                                                                                                                                        | <u>Topic 6:</u> Protect natural floodplain functions<br>Message 6A -Keep creeks clean and flowing<br>Message 6B - Keep debris and trash out of our streams<br>Message 6C - Don’t pollute, dump, or drain anything in creeks                                                              |                                                                                                                                                                                                                                                                                                    | (CUP OP #104) The city provides a Winter Preparedness notification informing contractors that during the winter season, they need to winterize their project(s) site as certain soil disturbance activities are not allowed during the rainy season                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | City of Cupertino                           | On a project-specific basis                                     | Various contractors                                                                                                                            |
|                                                                                                                                        | <u>Topic 7:</u> Develop a Family Emergency Plan<br>Message 7A: Develop an emergency plan                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                    | (MIL OP#105) On a project-specific basis, the city provides contractors a Winter Preparedness notification that informs them that during the winter season, they need to winterize their project(s) site. Certain soil disturbance activities are not allowed during the rainy season                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | City of Milpitas                            | On a project-specific basis                                     | Various contractors                                                                                                                            |
|                                                                                                                                        | <u>Topic 8:</u> Download disaster Apps<br>Message 8A - Download disaster emergency apps                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                    | (MH OP #106) The city mails out a newsletter, “Ask Before You Buy: Know Your Flood Risk!” to local real estate agents which are provided to homebuyers to help determine the flood risk of the property being purchased (listed in Appendix B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | City of Morgan Hill                         | During the rainy season                                         | Real Estate Agencies/Agent                                                                                                                     |
|                                                                                                                                        | <u>Topic 9:</u> Understand shallow flooding risks – don’t drive through standing water<br>Message 9A - Understand shallow flooding risks - don’t drive through standing water<br>FEMA’s message: “Turn Around Don't Drown®.”                                                             |                                                                                                                                                                                                                                                                                                    | (PA OP #107) Sends out letters to real estate agencies informing them of their responsibility to identify flood hazard areas and to take advantage of the Flood Zone Lookup on the city’s website                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | City of Palo Alto                           | Annually, beginning of flood season (September/October)         | Real Estate Agencies/Agent                                                                                                                     |
|                                                                                                                                        | <u>Topic 2:</u> Insure your property for your flood hazard<br>Message 2A - Get flood insurance ahead of time<br>Message 2B – Insure your property<br>Message 2C – There is a 30-day waiting period for the policy to take place                                                          | Increase in number of flood insurance policies in the SFHAs and in the county in general<br><br>Prospective buyers understand flood risks<br><br>These projects are credited under Activity 340 (DFH and REB) – Additional credit is provided if the PPI states that real estate agents should (or |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |                                                                 |                                                                                                                                                |



| <div>Appendix A</div> <div>CRS Creditable Outreach and Flood Response Projects by CRS Community</div> <div>Santa Clara County Multi-Jurisdictional PPI 2021</div> |                      |                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                             |                   |                                                             |                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------|-----------------------------|
| Audience                                                                                                                                                          | <sup>1</sup> Message | Outcome                                                                                                                          | Project(s) Proposed to Support the Messages<br><small>(XX denotes Community acronym, and Outreach Project #)</small>                                                                                                                                                                                                                                        | Assignment        | <sup>2</sup> Schedule                                       | <sup>3</sup> Stakeholder    |
|                                                                                                                                                                   |                      | <i>have agreed to) advise house hunters about the flood hazard and that real estate agents give house hunters a REB brochure</i> | (SJ OP #108) Sends out letters to real estate and insurance agencies and lenders, informing them of their responsibility to identify flood hazard areas and to take advantage of the Flood Zone Lookup on the city’s website on the “Flood Hazard Zones webpage and advises to contact the city for map reading services and elevation certificates on file | City of San Jose  | At the beginning of the flood season (September – December) | Real Estate Agencies/Agent  |
|                                                                                                                                                                   |                      |                                                                                                                                  | (SUN OP #109) Sends mailer/postcard targeted to real estate agents informing them of the client’s responsibility for identification and purchase of flood insurance and the availability of the automatic 15% discount                                                                                                                                      | City of Sunnyvale | Each October                                                | Real Estate Agencies/Agents |

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### Definitions of FEMA Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

#### Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

| ZONE                      | DESCRIPTION                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B and X (shaded)</b>   | Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile. |
| <b>C and X (unshaded)</b> | Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.                     |

#### High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

| ZONE         | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                       |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A</b>     | Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.                                                                                                                          |
| <b>AE</b>    | The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.                                                                                                                                                                                                                                  |
| <b>A1-30</b> | These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).                                                                                                                                                                                                                                       |
| <b>AH</b>    | Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.                                         |
| <b>AO</b>    | River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.      |
| <b>AR</b>    | Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations. |
| <b>A99</b>   | Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.                                                                                                                                  |



## High Risk - Coastal Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones.

| ZONE               | DESCRIPTION                                                                                                                                                                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>V</b>           | Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.                                                   |
| <b>VE, V1 - 30</b> | Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones. |

## Undetermined Risk Areas

| ZONE     | DESCRIPTION                                                                                                                                                                     |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>D</b> | Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk. |

From FEMA Map Service Center:

<http://msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations>



# CITY OF MILPITAS AGENDA REPORT (AR)

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>            | <b>Adopt a Resolution upholding the Appeal of the Planning Commission's Denial and approving a Site Development Permit and Conditional Use Permit Amendment to Demolish an Existing Manual Coin-operated Car Wash and Develop a New, Fully Automatic 3,189-square foot Car Wash with an Additional 2,301-square foot Canopy Area and associated site improvements with an increased front setback of 37 feet-7 inches on a .46 Acre Site Located at 554 S. Main Street Pursuant to CEQA Guidelines 15303 and 15183 (Staff Contact: Rozalynne Thompson, Senior Planner, 408-586-3278)</b> |
| <b>Category:</b>              | Consent Calendar-Community Development                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Meeting Date:</b>          | 5/18/2021                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Staff Contact:</b>         | <b>Rozalynne Thompson, Senior Planner, 408-586-3278</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b><u>Recommendation:</u></b> | Adopt a Resolution upholding the Appeal of the Planning Commission's Denial and approving Site Development Permit SD18-0010 and Conditional Use Permit Amendment UA18-0020 to demolish an existing manual coin-operated car wash and develop a new, fully automatic 3,189-square foot car wash with an additional 2,301-square foot canopy area and associated site improvements with an increased front setback of 37 feet-7 inches.                                                                                                                                                    |

## **Background:**

On May 4, 2021, the City Council held a public hearing to consider an appeal of the Planning Commission's decision to deny a Site Development Permit and Conditional Use Permit Amendment to demolish an existing manual car wash and develop a new, fully automatic 3,189-square foot car wash with an additional 2,301-square foot canopy and associated site improvements with an increased front yard setback of 37 feet, 7 inches at 554 South Main Street ("the Project"). After conducting a public hearing, receiving presentations from staff and the appellant, and receiving public comment, the Council voted 3-2 to reverse the Planning Commission's decision and approve the Project. The Council directed staff to prepare required findings and conditions of approval for confirmation by the City Council at its next regular meeting on May 18, 2021.

## **Recommendation:**

Staff recommends that the City Council adopt a Resolution upholding the Appeal of the Planning Commission's Denial and approving Site Development Permit SD18-0010 and Conditional Use Permit Amendment UA18-0020 to demolish an existing manual coin-operated car wash and develop a new, fully automatic 3,189-square foot car wash with an additional 2,301-square foot canopy area and associated site improvements with an increased front setback of 37 feet-7 inches.

## **Attachments:**

A: Resolution

**RESOLUTION NO. \_\_\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS UPHOLDING THE APPEAL OF THE PLANNING COMMISSION’S DENIAL AND APPROVING SITE DEVELOPMENT PERMIT NO. SD18-0010 AND CONDITIONAL USE PERMIT AMENDMENT NO. UA18-0020 TO DEMOLISH AN EXISTING MANUAL COIN-OPERATED CAR WASH AND CONSTRUCT A NEW, FULLY AUTOMATIC 3,189-SQUARE FOOT CAR WASH WITH AN ADDITIONAL 2,301-SQUARE FOOT CANOPY AREA AND ASSOCIATED SITE IMPROVEMENTS WITH AN INCREASED FRONT SETBACK OF 37 FEET-7 INCHES IN THE MIXED-USE ZONING DISTRICT (MXD) AT 554 SOUTH MAIN STREET (APN 086-25-012), AND FINDING THAT THE PROJECT IS EXEMPT FROM ENVIRONMENTAL REVIEW UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) PURSUANT TO CEQA GUIDELINES SECTIONS 15303 AND 15183**

**WHEREAS**, on November 25, 1964, the Planning Commission approved Use Permit No. 78 and Site Plan Approval to construct a 2,181 square-foot manual carwash on a vacant parcel; and

**WHEREAS**, on March 6, 1980, the Planning Commission approved an “S” Zone application to allow architectural remodeling of the west façade of the existing car wash and a new three-foot high fence along the southern and eastern property line; and

**WHEREAS**, on September 17, 2018, Joel Chapin of Norr Associates, Inc., on behalf of Ramesh and Promilia Sood (the “Appellant”), submitted an application to the City of Milpitas for the approvals necessary to demolish the existing manual car wash and to construct and operate a new 3,189-square foot fully-automatic car wash at 554 South Main Street (the “Project”) at the subject site. The Project thus consists of and requires:

1. Site Development Permit SD18-0010: To allow demolition of the existing manually-operated car wash and the development of a fully-automatic 3,189-square foot car wash with an additional 2,301-square foot canopy and associated site improvements; and
2. Conditional Use Permit Amendment UA18-0020: To allow replacement and significant intensification of a use with an existing Conditional Use Permit (Use Permit No.78) and an increased front setback of 37 feet-7 inches, which requires an amendment of the existing use permit; and

**WHEREAS**, the property is located within the Mixed-Use (MXD) Zoning District and the Midtown Specific Plan Area (APN: 086-25-012); and

**WHEREAS**, pursuant to the California Environmental Quality Act (Public Resources Code, § 21000 et seq.), the State CEQA Guidelines (California Code of Regulations, title 14, § 15000 et seq.) (collectively, “CEQA”), the City of Milpitas is the lead agency for the proposed Project; and

**WHEREAS**, on March 10, 2021, the Planning Commission held a duly-noticed public hearing on the subject application, at which all those in attendance were given the opportunity to speak on the Project; and

**WHEREAS**, the Planning Commission considered all written and oral testimony presented at the public hearing in making its decision; and

**WHEREAS**, the Planning Commission voted 4-2 (1 abstention) to deny Site Development Permit No. SD18-0010, Conditional Use Permit Amendment No. UA18-0020; and

**WHEREAS**, on March 19, 2021, within the time allowed by the Milpitas Municipal Code, Ramesh Sood, the Appellant, appealed the Planning Commission’s denial of Site Development Permit No. SD18-0010 and Conditional Use Permit Amendment No. UA18-0020; and

**WHEREAS**, a duly-noticed public hearing on the appeal was scheduled on April 20, 2021, and at the Appellant's request, the appeal hearing was continued to May 4, 2021; and

**WHEREAS**, the City provided all interested parties and individuals with the opportunity to submit comments on the Project prior to the public hearing; and

**WHEREAS**, on May 4, 2021, the City Council held a duly-noticed public hearing on the subject appeal, at which time all those who wanted to speak on the Project were given the opportunity to make oral comments during the public hearing; and

**WHEREAS**, the City Council closed the public hearing and considered all written and oral testimony presented at the public hearing on the appeal, including evidence presented by City staff, the Appellant, and the public in making its decision; and

**WHEREAS**, on May 4, 2021, in conducting their deliberations, the Council voted 3-2 to direct staff to return with new findings and a Resolution for approval of Site Development Permit No. SD 18-0010 and Conditional Use Permit Amendment No. UA 18-0020; and

**WHEREAS**, the Project is exempt from environmental review under CEQA, pursuant to CEQA Guidelines Section 15303(c) (New Construction or Conversion of Small Structures), and, as a separate and independent basis, determined that the proposed Project is exempt from CEQA review pursuant to CEQA Guidelines Section 15183 (Projects Consistent with a Community Plan, General Plan or Zoning); and

NOW THEREFORE, the City Council of the City of Milpitas hereby finds, determines and resolves as follows:

#### **SECTION 1. Recitals**

The City Council has duly considered the full record before it, which may include but is not limited to such things as the City staff report, testimony by staff and the public, and other materials and evidence submitted or provided to it.. Furthermore, the recitals set forth above are found to be true and correct and are incorporated herein by reference.

#### **SECTION 2. CEQA Findings**

The Project is exempt from environmental review under CEQA pursuant to CEQA Guidelines Section 15303(c) (New Construction or Conversion of Small Structures). Section 15303(c) of the CEQA Guidelines consists of construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. This exemption applies to up to four stores, motels, offices, restaurants, or similar structures located in an urbanized area as defined by CEQA Guidelines Section 15387 and not exceeding 10,000 square feet in floor area on sites zoned for such use if not involving the use of hazardous substances where all public services and facilities are available and the surrounding area is not environmentally sensitive.

With a population of 80,430 and a population density of 5,922 persons per square mile, the city of Milpitas is an "urbanized area" under CEQA Guidelines Section 15387, which is a "central city or a group of contiguous cities with a population of 50,000 or more, together with adjacent densely populated areas having a population density of at least 1,000 persons per square mile. Moreover, the proposed car wash is 3,189 square feet and located in the Mixed-Use Zoning District, which allows a car wash use with approval of a Conditional Use Permit. According to the Project application, only soaps, detergents, and water-based cleansers will be used at the site;

no hazardous substances will be used for car wash operations. All public services are available, and the area surrounding the site is not environmentally sensitive. None of the exceptions under CEQA Guidelines Section 15300.2 apply to the Project. Therefore, the exemption under CEQA Guidelines Section 15303(c) applies.

**SECTION 3: Conditional Use Permit (MMC Section XI-10-57.04(F)(1))**

- 1. The proposed use, at the proposed location will not be detrimental or injurious to property or improvements in the vicinity nor to the public health, safety, and general welfare.

The proposed car wash meets all applicable development standards of the Zoning Ordinance and Milpitas Midtown Specific Plan (“MSP”) with the granting of a conditional use permit. Although the project is surrounded by properties zoned mixed-use, existing uses on these properties are commercial in nature and not multi-family and single-family residential uses. All operations of the fully automatic car wash will occur within the new building and will not generate significant new noise impacts over existing conditions. The Project includes a six-foot CMU wall along the perimeter of the property, which would further attenuate any noise generated by the car wash. Outdoor service areas are situated away from the lot boundaries and covered by a shade canopy to help contain noise. Daytime hours of operation will limit nighttime noise issues.

Further, the requested deviation from the maximum front setback meets the design intent of providing a safe pedestrian environment along Main Street. The proposed setback of 37 feet-7 inches would accommodate safe vehicle circulation on the site and allow a landscape buffer between the public sidewalk and onsite driveways and parking areas. The project includes an approximately 127-foot queuing lane for vehicles waiting to enter the car wash, which will avoid or eliminate potential traffic conflicts on Main Street. The expanded setback is also consistent with the neighboring building to the north and will not detract the overall architectural or site planning integrity of the site.

The car wash design meets the standards in the Zoning Code and the Midtown Specific Plan related to massing, varied rooflines, use of multiple material elements. Further, the design incorporates a clear design concept carried throughout the building and site and is compatible with the existing architecture of the surrounding commercial development. Therefore, the proposed car wash would not be detrimental to the health, safety, or general welfare of residents or businesses in the area.

- 2. The proposed use is consistent with the Milpitas General Plan.

The General Plan land use designation for the Project site is Milpitas Midtown Specific Plan. This designation defers decisions about current and future development in this area to the goals and policies of the Specific Plan and establishes the types, locations, and intensities of land uses to be accommodated in the Specific Plan area. A variety of uses are allowed in this designation, including entertainment, retail, office, commercial, mixed-use residential, and civic and cultural uses.

The proposed Project is consistent with General Plan policies in contributing to the revitalization of Main Street and fostering economic development by supporting the retention and expansion of an existing commercial service in the community. Table 1 outlines project conformance with relevant General Plan policies.

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**Table 1: General Plan Consistency**

| General Plan Policy                                                                                                                                                                                      | Consistency Finding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>CD2-1:</b><br/> <i>Use the project review process to encourage creative, high-quality, innovative, and distinctive architectural and site designs that help create unique, vibrant places.</i></p> | <p><b>Consistent:</b> City staff and the project architect worked together to make the project design more compatible with a pedestrian-oriented environment. The architect added decorative screening and landscaping at the front of the building to enhance the appearance from the street. The site design includes windows and a door on the front façade and pedestrian access to the rear office. The project will also use solar panels and modern car wash equipment to conserve both water and energy. Permeable pavement at the car wash exit will help retain water on the site. The project will include historical displays to celebrate Main Street and the car wash use.</p> |
| <p><b>CD 4-1:</b><br/> <i>Provide special attention to development within or adjacent to Specific Plan areas or special districts.</i></p>                                                               | <p><b>Consistent:</b> The proposed project is compatible with existing uses in the surrounding area and the site design places the car wash entrance at the rear of the site to reduce noise and allow adequate on-site queueing of vehicles. Special attention was given to the design of the building to screen the outdoor equipment and service areas from the street and to provide landscaping to enhance overall appearance.</p>                                                                                                                                                                                                                                                      |
| <p><b>ED 4-2:</b><br/> <i>Encourage change and revitalization of Main Street and other commercial corridors in need of maintenance and/or modernization.</i></p>                                         | <p><b>Consistent.</b> The project encourages change and revitalization of Main Street by replacing an existing, outmoded manual car wash with a new, fully automated car wash with modern equipment that conserves both water and energy. The project will enhance commercial activity in the neighborhood and attract new customers to Main Street. The project will retain and expand an established small business establishment on Main street and support the stability and vibrancy of the area.</p>                                                                                                                                                                                   |

3. The proposed use is consistent with the Milpitas Zoning Ordinance

The proposed Project conforms to the development standards in the Mixed-Use (MXD) Zoning District and the Midtown Specific Plan for setbacks, height requirements, and parking. The proposed Project requires approval of an amendment to the existing Conditional Use Permit to allow an extended front setback of 37 ft.-7 inches where the standard maximum front setback is 15 feet. Table 2 outlines Project conformance with the development standards in the MXD Zoning District.

**Table 2: Summary of Development Standards in the MXD Zoning District**

| Standards               | MXD Requirements                                                                                                                        | Proposed                                                                                                                                                        | Complies          |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Front Setback (min)     | 8 ft. min./15 ft. max.                                                                                                                  | 37 ft.-7 in.                                                                                                                                                    | Yes<br>(with CUP) |
| Side Yard Setback (min) | 10 ft.                                                                                                                                  | 10 ft.                                                                                                                                                          | Yes               |
| Rear (min)              | 10 ft.                                                                                                                                  | 68 ft.                                                                                                                                                          | Yes               |
| Building Height (max)   | Principal building: 3 stories/45 ft.                                                                                                    | 1 story / 22 ft.                                                                                                                                                | Yes               |
| Parking                 | 1 per 200 sq. ft of building area and reservoir space outside building area equal to two (2) times the maximum capacity of the facility | 1,342 sq. ft building area/200 sq. ft = 7 spaces required (10 (10 spaces provided)<br><br>Maximum capacity of building = 2 cars/ (13 reservoir spaces provided) | Yes               |

*Site and Architectural Design* - The proposed architecture uses straight lines to establish building symmetry via flat roofing, the placement of windows and awnings, and the transition of materials and paint color on the elevations. Roof height varies from 12 feet at the canopy to 22 feet at the top of the parapet to provide variation in roofline and building massing. The building design includes a combination of stucco cladding with score lines, decorative CMU wainscoting carried around the entire building along the base and columns, and a trellis with plantings on the north side of the building. Awnings along the north and south building facades complement the roof color and add visual interest. The earth-tone colors of the stucco exterior are compatible with adjacent and nearby buildings.

4. The proposed use is consistent with the Midtown Specific Plan.

The Project is located within the Midtown Specific Plan area and conforms with the following policies:

**Table 3: Midtown Specific Plan Consistency**

| Specific Plan Development Policies                                                                                                                                                                        | Consistency Finding                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>Policy 3.10:</i></b><br><i>Designate parcels along the Main Street and Abel Street mixed-use and allow a mixture of retail, office, housing, service, and public/quasi-public uses in this area</i> | <b>Consistent.</b> The proposed project will retain, expand, and modernize an existing car wash use on Main St. The updated car wash structure and related site improvements will significantly enhance the appearance of the property and promote business activity in the area. The new car wash will continue to contribute to the diversity of existing uses on Main St. |

| Specific Plan Development Policies                                                                                                                                                                                                               | Consistency Finding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Policy 3.14:</b><br/> <i>Limit the establishment of new quasi-public uses within the mixed-use designation in order to create a more active street environment.</i></p>                                                                    | <p><b>Consistent.</b> The proposed project will expand and modernize an existing local business and contribute to the overall mix of uses on Main St. Development of an overall public commercial use on the project site will limit the establishment of a new quasi-public use at this location. The project includes site improvements, such as new sidewalks and landscaping, to promote an active street environment. Outdoor vending and self-service vacuums will also contribute to a more active and street environment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p><b>Policy 3.15</b><br/> <i>Allow existing legally established service businesses to remain within the area as conforming uses.</i></p>                                                                                                        | <p><b>Consistent.</b> The proposed project will expand and upgrade an existing legally established service business and allow it to remain within the area as a conforming use. Redevelopment of the car wash site will provide immediate economic benefits to the overall Main Street corridor.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Policy 5.3:</b><br/> <i>Promote high-quality private development that contributes to the visual identity and environmental quality of the Midtown Area through the application of the Development Standards and Design Guidelines.</i></p> | <p><b>Consistent.</b> The proposed architecture, site design, and landscaping are suitable for the building and site and compatible with existing buildings and development surrounding the site. The building incorporates a flat roof design, utilizes enhanced building materials such as CMU wainscoting concentrated at the base of the building and trellises at the north side of the building, and breaks up the façade with varied parapet heights and a consistent wainscot extending the perimeter of the building. With the exception of the front yard setback, the site complies with development standards pertaining to setbacks, building height, parking, landscaping, and lighting of the Zoning Code. The increased front yard setback of 37 feet, 7 inches would accommodate safe vehicle circulation on the site and allow a landscape buffer between the public sidewalk and onsite driveways and parking areas. Therefore, the Project will enhance the visual identity and environmental quality of the Midtown Area.</p> |

The MSP establishes a standard maximum setback of 15 feet along Main Street to enhance pedestrian safety and support retail foot traffic along the street frontage. The project proposes an expanded setback of 37 feet-7 inches to accommodate onsite vehicle circulation and landscaping along the front sidewalk. An exception



to the standard maximum setback may be granted with approval of a Conditional Use Permit, in accordance with the following Zoning Ordinance requirements:

- a. *The deviation from the Midtown Specific Plan Standard meets the design intent identified within the Specific Plan and does not detract from the overall architectural, landscaping, and site planning integrity of the proposed development.*

The requested deviation from the maximum front setback meets the design intent of providing a safe pedestrian environment along Main Street. The proposed setback of 37 feet-7 inches would accommodate safe vehicle circulation on the site and allow a landscape buffer between the public sidewalk and onsite driveways and parking areas. The project includes an approximately 127-foot queuing lane for vehicles waiting to enter the car wash, which will avoid or eliminate potential traffic conflicts on Main Street. The expanded setback is also consistent with the neighboring building to the north and will not detract the overall architectural or site planning integrity of the site.

- b. *The deviation from the Midtown Specific Plan Standard allows for a public benefit not otherwise obtainable through the strict application of the Design Standard.*

The Midtown Specific Plan establishes a maximum setback of 15 feet to enhance pedestrian safety and encourage retail activity. The intent of the expanded setback is to enhance pedestrian and vehicle safety by accommodating safe and efficient vehicle circulation on the site and allowing a landscape buffer between the front public sidewalk and onsite driveways and parking areas. This public benefit is not otherwise obtainable because the maximum 15-foot setback would not support safe or efficient exiting of vehicles from the car wash. This unsafe design would create conflicts between pedestrians and vehicles at the front of the site. As proposed, the project also includes an approximately 127-foot queuing lane for vehicles waiting to enter the car wash, which will avoid or eliminate potential traffic conflicts on Main Street thereby providing a public benefit. Further, the granting of the deviation in order to revitalize the site will bring an improvement into the area that could spur additional development along Main Street thereby creating an additional public benefit.

#### **SECTION 4: Site Development Permit (MMC Section XI-10-57.03(F)(1))**

1. The layout of the site and design of the proposed buildings, structures and landscaping are compatible and aesthetically harmonious with adjacent and surrounding development.

The proposed architecture, site design, and landscaping are suitable for the building and site and compatible with existing buildings and development surrounding the site. The site plan includes a 127-foot vehicle queuing lane to accommodate on-site queuing for vehicles entering the car wash. The building incorporates a flat roof design, utilizes enhanced building materials such as CMU wainscoting concentrated at the base of the building and trellises at the north side of the building, and breaks up the façade with varied parapet heights and a consistent wainscot extending the perimeter of the building. The site complies with development standards pertaining to setbacks, building height, parking, landscaping, and lighting of the Zoning Code. Therefore, the Project will enhance the character of the neighborhood and community.

2. The Project is consistent with the Milpitas Zoning Ordinance.

As discussed above, the project is compatible and consistent with surrounding uses and conforms to the intent of the Mixed-Use Development (MXD) Zoning District. The extended front setback of 37 ft.-7 in. may be allowed with approval of a Conditional Use Permit.

3. The Project is consistent with the Milpitas General Plan.

As discussed above, the project is compatible and consistent with surrounding uses conforms with the goals and policies of the General Plan land use designation.

4. The Project is consistent with the Midtown Specific Plan.

As discussed above, the Project is consistent with the specific requirements of the MSP, including the Development Standards and Design Guidelines. In addition, the findings for an exception to the maximum front setback standard of 15 feet can be made to allow an expanded front setback of 37 feet- inches.

**SECTION 5: City Council Approval**

The City Council of the City of Milpitas hereby upholds the appeal of the Planning Commission's denial and approves Site Development Permit No. SD18-0010 and Conditional Use Permit Amendment No. UA18-0020 subject to the Conditions of Approval attached hereto as **Exhibit 1** and incorporated herein.

This decision is based on the Findings contained in this Resolution, the full record before this Council, and the Council's interpretation of the Milpitas Municipal Code.

PASSED AND ADOPTED this \_\_\_\_\_ day of \_\_\_\_\_, 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

## EXHIBIT 1

### CONDITIONS OF APPROVAL NEW CAR WASH LOCATED AT 554 SOUTH MAIN STREET SITE DEVELOPMENT PERMIT NO. SD18-0010 AND CONDITIONAL USE PERMIT AMENDMENT NO. UA18-0020

#### General Conditions

1. General Compliance. The applicant, including all successors in interest (collectively “Permittee”) shall comply with each and every condition set forth in this Permit. This Site Development Permit No. SD18-0010 and Conditional Use Permit Amendment No. UA18-0020 (“Permit”) shall have no force or effect and no building permit shall be issued unless and until all things required by the below-enumerated precedent conditions have been performed or caused to be performed and this Resolution has been recorded by the Permittee with the Santa Clara County’s Recorder Office and a copy shall be provided to the Planning Department.
2. Effective Date. Unless there is a timely appeal filed in accordance with the Milpitas Zoning Code, the date of approval of this Permit is the date on which the decision-making body approved this Permit.
3. Permit Expiration. Pursuant to Section XI-10-64.06 of the Milpitas Municipal Code, this Permit shall become null and void if the activity permitted by this Permit is not commenced within two (2) years from the date of approval, or for a project submitted with a tentative map, within the time limits of the approved tentative map. Pursuant to Section XI-10-64.06(B) of the Milpitas Municipal Code, an activity permitted by this Permit shall be deemed to have commenced when the project:
  - a. Completes a foundation associated with the project; or
  - b. Dedicates any land or easement as required from the zoning action; or
  - c. Complies with all legal requirements necessary to commence the use, or obtains an occupancy permit, whichever is sooner.
4. Time Extension. Pursuant to Section XI-10-64.07 of the Milpitas Municipal Code, unless otherwise provided by State law, Permittee shall have the right to request a one-time extension of the Permit if the request is made in writing to the Planning Department prior to the expiration date of the approval. **(P)**
5. Notice. Pursuant to California Government Code Section 66020, any protest filed in court relating to the imposition of fees, dedication, reservations, or other exactions to be imposed on the development project shall be filed within ninety (90) days after the date of the adoption of this Resolution. This provision serves as notice from the local agency to the Permittee that the ninety (90) day period in which the applicant may file a protest has begun under California Government Code Section 66020(d)(1).
6. Cost and Approval. Permittee shall fully complete and satisfy each and every condition set forth in this Resolution and any other condition applicable to the project to the sole satisfaction of the City. Additionally, Permittee shall be solely responsible and liable for the cost to satisfy each and every condition.
7. Conditions. Each and every condition set forth in this Exhibit shall apply to the project and continue to apply to the project so long as the Permittee is operating the project under the permits and approvals in this Resolution.

8. Compliance with Laws. The construction, use, and all related activity authorized under this Permit shall comply with applicable local, state, and federal laws, rules, regulations, guidelines, requirements, and policies.
9. Previous Approvals. Permittee shall abide by and continue to comply with all previous City approvals, permits, or requirements relating to the subject property, unless explicitly superseded or revised by this Permit.
10. Indemnification. To the fullest extent permitted by law, Permittee shall indemnify, defend with counsel of the City's choosing, and hold harmless City, its City Council, its boards and commissions, officials, officers, employees, and agents from and against any and all claims, demands, obligations, damages, actions, causes of action, suits, losses, judgments, fines, penalties, liabilities, costs and expenses (including without limitation, attorney's fees, disbursements and court costs) of every kind and nature whatsoever which may arise from or in any manner relate (directly or indirectly) to (i) City's approval of the project, including but not limited to, the approval of the discretionary permits, maps under the Subdivision Map Act, and/or the City's related determinations or actions under the California Environmental Quality Act, and (ii) Permittee's construction, operation, use, or related activity under this Permit. This indemnification shall include, but not be limited to, damages awarded against the City, if any, costs of suit, attorneys' fees, and other expenses incurred in connection with such claim, action, causes of action, suit or proceeding whether incurred by applicant, City, and/or the parties initiating or bringing such proceeding. Permittee shall indemnify the City for all of City's costs, attorneys' fees, and damages which City incurs in enforcing the indemnification provisions set forth in this condition. Permittee shall pay to the City upon demand or, as applicable, to counsel of City's choosing, any amount owed pursuant to the indemnification requirements prescribed in this condition.
11. Revocation, Suspension, Modification. This Permit may be suspended, revoked, or modified in accordance with Section XI-10-63.06 of the Milpitas Municipal Code.
12. Severability. If any term, provision, or condition of this Permit is held to be illegal or unenforceable by the Court, such term, provision, or condition shall be severed and shall be inoperative, and the remainder of this Permit shall remain operative, binding, and fully enforceable.
13. Modifications to Approved Plans. Permittee shall develop the Project in conformance with the development plans approved by the City Council on May 18, 2021, in accordance with these Conditions of Approval. Any deviation from the approved site plan, elevations, materials, colors, landscape plan, or other approved submittal shall require that, prior to the issuance of building permits, the Permittee shall submit modified plans and any other applicable materials as required by the City for review and obtain the approval of the Planning Director or designee. If the Planning Director or designee determines that the proposed modifications are significant, the Planning Director or designee shall refer the revised plans for consideration by the Planning Commission or City Council, as applicable, in accordance with the Milpitas Zoning Code. **(P)**
14. Vending Areas. Permittee shall clearly identify the size and location of all outdoor vending areas on the development plans submitted to the City for review and approval of a Building Permit. The Permittee shall also submit elevations and/or renderings of all vending areas. The Planning Director or designee shall review and approve the final size, location, and design of all outdoor vending areas. **(P)**
15. Public Art. Permittee shall comply with the City's Public Art Ordinance (MMC Section XI-10-14) by devoting an amount not less than one-half of one percent of Building Development costs for acquisition and installation of Publicly Accessible Art on the development site. All Public Art to be installed on the project site shall first be reviewed and approved by the Art Commission for its artistic value and appropriateness relative to the size of the development project. The Permittee shall install all Public Art prior to issuance of a Certificate of Occupancy by the City. **(P)**

16. Historical Displays. In accordance with comments made by the Permittee at the public hearing on May 4, 2021, Permittee shall install and maintain a historical display about people, activities, or events related to the project site and Main Street. The historical display to be installed on the project site shall first be reviewed and approved by the Parks, Recreation, and Cultural Resources Commission (PRCRC) for its size, design, and content relative to the development project. The Permittee shall install the historical display prior to issuance of a Certificate of Occupancy by the City. **(P)**
17. Permeable Pavement. Permittee shall clearly identify the size, location, and other specifications of all permeable pavement areas on the development plans submitted to the City for review and approval of a Building Permit. The Engineering Director and Planning Director or their designees shall review and approve the final size, location, and specifications of all permeable pavement areas in accordance with the requirements of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP). **(P/E)**
18. Screening of Outdoor Service Areas. The architectural plans shall include a full decorative screen at the front of the car wash building to fully screen the outdoor service area (car vacuums) from the public sidewalk. The decorative screen shall incorporate colors, materials, and design elements that complement the overall design of the car wash building. Landscaping may be used, but the screen shall also include other decorative elements. The screen shall not be a solid wall but should cover at least 80 percent of the area at the west side of the outdoor service area facing the public sidewalk on Main Street. **(P)**
19. Compliance with Fire Department and California Fire Code. The project shall comply with the requirements of the Milpitas Fire Department and the California Fire Code, as adopted by the City. Changes to the site plan and/or buildings requires review and approval by the Fire Department. **(F)**
20. Written Response to Conditions. The Permittee shall provide a written response to the Conditions of Approval indicating how each condition has been addressed with the building permit application submittal. **(ALL)**
21. Encroachment Permit. Applicant shall obtain an encroachment permit from the City before performing work in any public easement. **(E)**

### **ENGINEERING CONDITIONS**

22. Grading Plan: At this location, the sidewalk extends the full 10 feet to the face of curb. The driveways shall follow Standard Drawing No. 436 – Option 4. **(E)**
23. Utility Plans: The Permittee shall abandon the existing SD line crossing the frontage of the property and connect to the existing SDMH on South Main Street. This set-up will provide a cleaner connection of your project to the SD System. If the SD line were to stay where it currently is, future maintenance or replacement work by the City would significantly impact your business. **(E)**
24. Bio-retention: The Permittee shall relocate the bio-retention basin (IMP-2) at the front of the property away from the PSUE. **(E)**

### **FIRE DEPARTMENT CONDITIONS**

25. Technical Assistance: To determine the acceptability of technologies, processes, products, facilities, materials, and uses attending the design, operation or use of a building or premises subject to inspection by the Fire Code Official, the Fire Code Official is authorized to require the owner or agent to provide, without

charge to the jurisdiction, a technical opinion(s), plan review(s) and/or report(s). CFC Section 104.7.2

26. Electronic documents: The Fire Code Official may require electronic base documents for all construction documents and operational permits. The Fire Code Official shall designate the software base format for the electronic documents. CFC Section 105.4.2.2, added by MMC Section V-300-2.11, and CFC Section 102.9
27. Fire Department access. Fire Department apparatus and staff access shall be provided to all buildings and site. Detailed review will be done during construction permit process. (CFC Section 503)
- a. Fire Apparatus Access: Fire apparatus access shall extend to within 150 feet of all portions of exterior walls of the building/structure per the California Fire Code Section 503.1.1. When there is a dead-end condition, means for fire apparatus turn-around shall be provided.
  - b. Fire Access Road Materials and Load Bearing Requirements: Fire access roads shall be paved (concrete and/or asphalt cement, or other concrete type pavement approved by the Fire Dept.). Fire apparatus access roads/lanes and emergency vehicle roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather capabilities. Design criteria shall be based on the City of Milpitas fire apparatus Sutphen S95 Aerial Platform unit. Please contact the Fire Prevention Division for specifications. (CFC Section 503.2.3)
  - c. Obstruction of Fire Access: Ground structures (including landscape) and building projections shall not encroach or impede the fire apparatus access requirements. (CFC Section 503.4)
  - d. No parking in fire access roads. The required access road shall be designated and clearly marked as a fire lane. The designated fire lane shall be identified as set forth in Section 22500.1 of the Vehicle Code. The designation shall be indicated (1) by a sign posted immediately adjacent to, and visible from, the designated place clearly stating in letters not less than one inch in height that the place is a fire lane, (2) by outlining or painting the place in red and, in contrasting color, marking the place with the words "FIRE LANE", which are clearly visible from a vehicle, or (3) by a red curb or red paint on the edge of the roadway upon which is clearly marked the words "NO PARKING FIRE LANE – CVC 22500.1". (CFC Section 503.3)

Minimum marking shall be pole signage and red curb with "FIRE LANE" stencil. Signage and red curbs shall be done throughout and as needed to clearly identify the no parking zones.

28. Fire Protection Water Supply (Hydrants, On-site and/or Public): An approved water supply (hydrants on-site and/or public) capable of supplying the required fire flow for fire protection shall be provided upon which facilities, buildings, or portions of buildings are hereafter constructed or moved into or within the jurisdiction. Water supply shall meet the Fire Code and the City of Milpitas Engineering Division water supply guidelines and the CFC Section 507.
- a. Fire Hydrant Location: The location and quantity of hydrants will be evaluation during the construction permit process. This applies to the on-site private streets as well as to the public streets. (CFC Section 507.5)
  - b. Hydrant for Automatic Fire Sprinkler/Standpipe Systems: Buildings equipped with an automatic fire sprinkler system and/or a standpipe system installed in accordance with Sections 903 and or 905 shall have a fire hydrant within 50 feet of the fire department connections. (CFC Section 507.1.1, amended by MMC Section V-300-2.53)

- c. Private Hydrant Requirements: Private hydrants shall have the bottom 6 inches of the hydrant painted, with a weather resistive paint, white in color. (CFC Section 507.5.7, added by MMC V-300-2.54)
- d. No parking is permitted in front of fire hydrants. Hydrants located on streets (Public or Private Street) shall have an unobstructed clearance of not less than 30 feet per CA Vehicle Code 22514. Provide stripping per CA Vehicle Code 22500.1. (CFC Section 507.5.4)

29. Automatic Fire Sprinkler System for Structures:

- a. Automatic Fire Sprinkler. The buildings shall be provided with an automatic fire sprinkler system in conformance with the NFPA 13 Standards. (California Fire Code Section 903.3)
- b. Sprinkler Valves: All valves controlling the water supply for the automatic sprinkler system shall be electrically supervised by a listed fire alarm control unit. (CFC 903.4)
- c. Fire Riser Location. The fire sprinkler system riser shall not be located within electrical rooms or storage closets and shall be provided with clear access and working clearance. California Fire Code Section 903.3.5.3, added by MMC Section V-300-2.65
- d. Sprinkler Design. Hydraulic design for the automatic fire sprinkler system shall provide a minimum of 20% safety margin. CFC Section 903.3.5.6, MMC V-300-2.68
- e. Requirements for Fire Service Water Laterals for Building Sprinkler Systems: Each building shall have a fire service water laterals for the automatic fire sprinkler system and shall meet the California Fire Code requirements Chapter 9 and the NFPA applicable Standards. Note, the utilities drawings provided are not reviewed nor approved for construction. (CFC Section 912.1)
- f. FDC/PIV (fire department connection/post indicating valve) Location(s). The location of the fire department FDC's/PIV's shall be at a readily visible and accessible location off the fire access road and approved by the Fire Code Official. FDC's/PIV's shall not be located behind parking stalls nor behind any other obstruction. Final review for location for the FDC's/PIV's will be conducted during the construction permit process. (CFC Section 912.2)
- g. FDC/PIV Signage. A metal sign with raised letters at least 1 inch in size shall be mounted on all fire department connections. Signage shall be reflective, weather resistive and approved by the Fire Code Official. (CFC Section 912.5)
- h. Backflow Protection. Potable water supply to the automatic sprinkler and/or the standpipe systems shall be protected against backflow as required by the Health and Safety Code section 13114.7 and the City of Milpitas Utilities Engineering Division. (CFC Section 912.6)
- i. Water Drainage. All new installations of sprinkler systems shall preclude sprinkler test and system drain water from discharging into the storm drain; provisions to direct water to the sanitary sewer or landscape or other approved means shall be provided. Sprinkler system design shall include the proposed method for drainage of sprinkler system discharge. (Storm Water Pollution Regulations)

30. Fire Alarm / Sprinkler Monitoring System:

- a. Fire Alarm Panel: Fire alarm panel (or fire alarm annunciator panel) shall be located in a readily accessible location and shall be provided with the necessary access and working clearance as required by the CA Electrical Code. (CFC Section 907.6.4.1.1)

- b. Fire Alarm Monitoring: Fire alarm monitoring (approved supervising station - UL, or FM approved). Fire alarm systems required by the Fire Code or by the California Building Code shall be monitored by an approved supervising station in accordance with the NFPA 72. (CFC Section 907.6.6)

31. Building/Structure Other Requirements:

- a. Access Control Devices: When access control devices including bars, grates, gates, electric or magnetic locks or similar devices, which would inhibit rapid fire department emergency access to the building, are installed, such devices shall be approved by the Fire Code Official. All access control devices shall be provided with an approved means for deactivation or unlocking by the fire department. Access control devices shall comply with Chapter 10 Egress. (CFC Section 504.6, added by MMC Section V-300-2.51)
- b. Premises Identification: New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet letters and shall be consistent with Milpitas standardized addressing guidelines. CFC Section 505. The Fire Dept. may require the installation of address numbers at multiple building locations. (CFC Section 102.9)
- c. Address Illumination: All required addresses shall be illuminated. (CFC Section 505.3, added by MMC V-300-2.52)
- d. Fire Department Emergency Key Box (aka: Knox Box, Knox Locks, Knox Electric Switches, etc.): The Fire Code Official is authorized to require a key box(es) to be installed in an approved location(s) if necessary for life-saving or fire-fighting purposes. Quantity and location shall be as directed by the Fire Code Official. CFC Section 506. Locked mechanical closets, fire alarm closets, sprinkler riser closets, etc. will need a Fire Dept. approved lock or “Knox” key box.
- e. Fire Equipment ID signs. Fire protection equipment shall be identified in an approved manner. Rooms containing controls for air-conditioning, systems, sprinkler risers and valves, or other fire detection, suppression or control elements shall be identified for the use of the fire department. (CA Fire Code Section 509)
- f. Portable Fire Extinguishers. Portable fire extinguishers shall be selected, installed and maintained in accordance with CFC Section 906.

32. Landscape sheets. The proposed landscaping may be impacted by the comments above and the requirements for fire access, fire systems and devices (such as apparatus access, hydrants, fire service lines, fire department connections valves, etc.). The Fire Dept. reserves the right to relocate, delete or change the proposed landscaping when in conflict with fire systems and devices. (CFC 507.5.4)

33. Fire Permits. Complete plans and specifications for all aspects of fire protection systems shall be submitted to the Fire Department for review and permits prior to system installation. (CFC Section 901.2)

**BUILDING DEPARTMENT CONDITIONS**



## Architectural Comments

34. Applicable codes shall be 2016 California Building Code (CBC), California Mechanical Code (CMC), California Electrical Code (CEC), California Plumbing Code (CPC), Green Building Standards Code (CalGreen), California Energy Code (CEnC) and 2017 Milpitas Municipal Code (MMC).
35. It is mandated to obtain Business license and Certificate of occupancy prior to start of business operation.
36. Applicant shall apply for new building addresses prior to submitting for building permit.
37. Plans shall be prepared and designed by Architect/Engineer licensed in the state of California.
38. Obtain permits from Health Department and Water Pollution Control prior to applying for a Building permit.
39. Structural calculations and details shall be provided for the framing, support and bracing of awning, parapet, roof screening, and attachment of façade.
40. Required separation in buildings with mixed occupancies shall be per CBC sec.508.
41. Clean air vehicles parking shall be provided as per California Green Building Standards Code sec. 5.106.5.2. As per City policy BDP-BLG17 if EV charging stations are provided at least one such parking space shall be accessible and accessible EV charging parking space shall not be counted as one of the required accessible parking spaces as required by CBC, because the space is allowed to be used by non-disabled people.
42. Provide allowable area analysis based on building type of construction and allowable areas as per CBC sec.506.
43. Two required exit doors shall be placed a distance apart equal one half of the diagonal dimension of the area served or one-third of the diagonal dimension in fire sprinkled buildings as per CBC sec. 1007.1.1.
44. Separate toilet facilities shall be provided for each sex when total number of customers served and employees exceeds 10 or exceed 50 in business and mercantile occupancies as per CPC sec. 422.2.
45. Structural members exposed to weather shall be naturally durable or preservative- treated wood per CBC section 2304.12.
46. The minimum number of plumbing fixtures shall be determined as per CPC sec.422.1 and Table 422.1.
47. Patios and similar outdoors areas shall comply with CBC, section 1004.5.
48. Roofing material shall be per CBC, Table 1505.1.
49. If projected water consumption for the car wash exceeds 1000 gal/day, indicate and provide separate submeter for that use per Cal Green sec. 5.303.1.2.
50. Indicate on plan the STC sound rating. A min. STC rating of 50 shall be provided for wall and floor-ceiling assemblies per Cal Green sec. 5.507.4.1.
51. The building shall comply with the mandatory requirements for solar ready buildings per CEnC sec. 110.10

## **Accessibility**

52. People with disabilities accessible parking shall be provided as per CBC, sec. 11B-208.1.
53. Accessible parking spaces shall be dispersed and located closest to the accessible entrances as per CBC sec.11B-208.3.1.
54. One in every six accessible parking spaces, but not less than one parking space shall be van accessible as per CBC sec.11B-208.2.4.
55. Curb ramps shall have detectable warnings extending 36 inches in the direction of travel as per CBC sec.11B-406.5.12 and sec.11B-705.1.2.2.
56. Provide accessible path of travel from sidewalk to the accessible entrance as per CBC sec.11B-206.2.1.
57. All primary entrances and required exit doors shall be accessible to people with disabilities as per CBC, sec. 11B-206.4.1.
58. Tactile exit signs shall be provided where exit signs as per CBC sec.1011.1 are provided as per CBC sec.1011.3.
59. Sanitary facilities shall be fully accessible to people with disabilities as per CBC sec. 11B-213.1.
60. Provide maneuvering clearances at doors as per CBC, Sec. 11B-404.2.4.
61. At least one accessible counter for each counter type shall be provided for the public and in general employee area. Counter must be 36 in. long minimum and not more 34 inches high per CBC sec. 11B-904.4.
62. Operable parts of equipment in public-serving areas shall meet the reach range requirements per CBC sec. 11B-308.2 and operable parts requirements per CBC sec. 11B-309.
63. Provide min. aisle width per CBC section 11B-403.5.1 exception 4. Every aisle shall be 36" wide if serving one side and 44" min. wide if serving both sides.
64. Double swinging doors shall be provided with a minimum of 10" smooth surface at the bottom of the door as per CBC sec.11B-404.2.10.
65. At least one hand washing sink in each space, when provided, shall be accessible as per CBC sec. 11B-212.3.
66. Provide accessible card-reading devices at fuel dispensing aisles as per CBC sections 11B-228 and 11B-309.

## **Electrical**

67. All new electrical services shall be underground per Milpitas Municipal Code (MMC) sec. II-6-2.02.
68. Grounding system shall comply with MMC sec.II-6-2.04.

## **Structural**

69. Provide complete set of structural design calculations (vertical and lateral) and five sets of construction plans and details when applying for a building permit. Plans and calculations shall be wet signed and stamped by Civil/Structural Engineer. All roof- and floor-mounted equipment weighing over 400 pounds and suspended equipment weighing over 20 pounds shall be seismically anchored and braced per CBC section 1613.1 and ASCE 7-10 sec.13.1.4.

## **Engineering**

70. A soil report shall be provided when applying for grading, site improvement and building permit.

71. Paving of parking lot shall comply with Milpitas Municipal Code section II-13-18.

72. All non-structural concrete flat work shall be as per Milpitas Municipal Code, section II-13-17.05.

73. Erosion control plan shall be submitted when applying for grading permit as per Milpitas Municipal Code sec. II-13-10.

74. Prior to issuance of building permit, all the easements including private storm drain easement through adjacent parcels shall be recorded. The developer shall include interim erosion control provisions and schedules in the construction plans for areas, which will not have permanent erosion control features installed (such as landscaping) prior to any occupancy so that erosion and sediment control can be sustained through the rainy season as per Milpitas Municipal Code section II-13-11.

## **POLICE DEPARTMENT CONDITIONS**

75. Install lighting of sufficient wattage to provide adequate illumination and to make clearly visible the presence of any person in or about the outside premises during hours of darkness.

76. Allow for circulation of police patrols (foot, bicycles, and vehicles) on site.

77. All entrances to the facility must be posted with appropriate signage such as “No Trespassing/Loitering” and applicable towing advisement such as in Section 22568(a) of the California Vehicular Code to assist in the removal of unauthorized persons and vehicles on the private premises.

78. All exits to the facility must be posted with appropriate signage to restrict left turns, such as “Right turn only.” This signage would stop vehicles from attempting to make a left turn to travel south, alleviating traffic congestion and limiting the likelihood of a vehicle collision.

(P) = Planning

(B) = Building

(E) = Engineering

(F) = Fire Prevention



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Accept Four Donations Totaling \$8,000 and approve a related FY 2021-22 Budget Amendment</b>                                                                                                                                                                                                      |
| <b>Category:</b>       | Consent Calendar-Community Services and Sustainable Infrastructure                                                                                                                                                                                                                                   |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                                                                                                                                                                                            |
| <b>Staff Contact:</b>  | <b>Renee Lorentzen, Director of Recreation and Community Services, 408-586-3409</b>                                                                                                                                                                                                                  |
| <b>Recommendation:</b> | Accept four donations totaling \$8,000 from Gomez Consulting, Morley Bros., Overton Moore Properties, and the Pulte Group for funding temporary housing for unhoused persons and approve an appropriation of \$8,000 to the FY 2021-22 Recreation and Community Services Department Operating Budget |

**Background:** Four donations totaling \$8,000 have been offered to Milpitas Recreation and Community Services' Social Services programs, to be used for social service programs for unhoused persons including providing emergency hotel stays for unhoused persons.

**Analysis:** With the addition of a fulltime Social Services Coordinator, Recreation and Community Services' Social Services program is serving an increasing number of residents and unhoused individuals and families.

When emergency situations arise, such as extreme heat/cold or unsafe air quality as occurred during last year's fires, or when an individual's own medical conditions make it unsafe, the individual is temporarily housed in a hotel. The Social Services Coordinator works first with Santa Clara County to provide temporary hotel stays. However, if the County is unable to fulfill the request, the City's Social Services Coordinator has worked with the Milpitas Police Department to underwrite hotel stays using money from a one-time grant.

Donations, such as these offered by Gomez Consulting (\$1,000), Morley Bros. (\$2,000), Overton Moore Properties (\$2,500), and Pulte Homes (\$2,500) allow the City to provide funding for safe temporary housing for Milpitas residents in extreme need.

In order to streamline acceptance of donations for this purpose as well as for other programs, as part of the FY 2021-22 Proposed Budget, staff included an amendment to the city's budget guidelines authorizing the City Manager to adjust appropriations for receipt of donations under certain conditions. If this budget guideline amendment is approved by the City Council as part of the adoption of the Fiscal Year 2021-22 budget, future acceptance of donations for this program would be handled administratively.

**Fiscal Impact:** The donation monies will be deposited into Recreation and Community Services' holding account and appropriated to the Recreation and Community Services FY 2021-22 Budget once adopted.

**Recommendation:** Accept four donations totaling \$8,000 from Gomez Consulting, Morley Bros., Overton Moore Properties, and the Pulte Group for funding for temporary housing for unhoused persons and approve an appropriation of \$8,000 to the FY 2021-22 Recreation and Community Services Department Operating Budget.

**Attachments:**  
Budget Change Form

**City of Milpitas, California**

**BUDGET CHANGE FORM**

| Type of Change                                                                                                                                         | From*           |                | To*                |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|--------------------|----------------|
|                                                                                                                                                        | Account         | Amount         | Account            | Amount         |
| <b>Check one:</b><br><br><input checked="checked" type="checkbox"/> <b>Budget Appropriation</b><br><br><input type="checkbox"/> <b>Budget Transfer</b> | <b>100-3750</b> | <b>\$8,000</b> | <b>100-1754201</b> | <b>\$8,000</b> |

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☐ **Check if City Council Approval required.**

**Meeting Date:** May 18, 2021

|                      |                                         |                           |
|----------------------|-----------------------------------------|---------------------------|
| <b>Requested by:</b> | <b>Department Head:</b> Renee Lorentzen | <b>Date:</b> May 18, 2021 |
|----------------------|-----------------------------------------|---------------------------|

|                                                    |                                     |                           |
|----------------------------------------------------|-------------------------------------|---------------------------|
| <b>Reviewed by:</b>                                | <b>Finance Director:</b> Lauren Lai | <b>Date:</b> May 18, 2021 |
| <b>Date approved by City Council, if required:</b> |                                     | <b>Confirmed by:</b>      |

FI/24786/V

LarForm 30-222 (Rev. 1/92)



## CITY OF MILPITAS AGENDA REPORT (AR)

|                               |                                                                                            |
|-------------------------------|--------------------------------------------------------------------------------------------|
| <b>Item Title:</b>            | <b>Approve the Proposed Legislative Advocacy Policy and Legislative Guiding Principles</b> |
| <b>Category:</b>              | Consent Calendar-Leadership and Support Services                                           |
| <b>Meeting Date:</b>          | 5/18/2021                                                                                  |
| <b>Staff Contacts:</b>        | <b>Ashwini Kantak, Assistant City Manager, 408-586-3053</b>                                |
| <b><u>Recommendation:</u></b> | Approve the Proposed Legislative Advocacy Policy and Legislative Guiding Principles        |

### **Background:**

In 2019, the City Council, based on community input, identified seven priority areas for the City: Community Wellness and Open Space, Economic Development and Job Growth, Environment, Governance and Administration, Neighborhoods and Housing, Public Safety, and Transportation.

Initiatives and policies in these priority areas can be directly impacted by federal and state legislation and regulations so it is essential for the City to be able to closely track legislation and regulatory proceedings and advocate for the City's best interests in a timely manner.

Historically, the City has not had dedicated internal or external resources nor has there been a framework to guide work on legislative affairs. This has resulted in the City not being able to provide timely input on legislation or regulatory proceedings that could adversely impact the City's interests. This topic was initially brought forward for Council discussion in December 2018; however, discussion was deferred to a future date.

The City Council has expressed a renewed interest for a more pro-active approach on legislative advocacy and in light of the high volume of bills introduced during the current legislative cycle and the quick turnaround generally needed for any advocacy actions, staff brought forward a Legislative Advocacy Framework on April 20. The framework was comprised of a draft legislative advocacy policy and draft legislative guiding principles so as to enable the City to quickly respond to priority legislation.

The staff report ([link to staff report](#)) described the state and federal legislative processes and recommended several ways to improve the City's tracking and response to bills or regulatory proceedings at the federal and state level and to also have timely access to funding opportunities. The recommendations were based on guidance from the League of California Cities and best practices from other peer cities. The proposed Legislative Advocacy Framework was intended to streamline the City's process to track and respond to bills as they evolve through the legislative processes at the State and federal level.

Council directed staff to return with the proposed policy and guiding principles for Council consideration.

### **Analysis:**

#### **Legislative Advocacy Framework**

The proposed Legislative Advocacy Policy and Legislative Guiding Principles would allow the Mayor or City Manager to issue support or oppose letters on individual bills based on the approved priority areas. Council will be kept apprised in a timely manner on any letters or actions related to proposed legislation. Staff will also provide a quarterly legislative update to the Council.

The proposed Legislative Advocacy Policy (attached) outlines the process for tracking and responding to legislation. The policy envisions annual adoption of Legislative Guiding Principles (LGP).

Staff is recommending the following LGP for Council input and consideration:

1. *Protect Local Control*  
The City values its ability and authority to exercise local control, enable excellent public services and protect and enhance the quality of life for Milpitas residents and businesses. The City supports efforts to streamline regulations that benefit the administration of the City and opposes efforts that erode the City's authority to control its own affairs.
2. *Support Efforts to Keep Milpitas Safe*  
The City supports legislation and policies that enable local officials to access resources and provide quality police, fire, emergency management, emergency medical services, youth violence prevention initiatives, and to engage the community in its own safety.
3. *Support Efforts to Create Affordable Housing and Address Homelessness*  
The City supports legislation and policies that enable local officials to access resources and support the creation of affordable housing, address homelessness, and to strive for a balance of jobs and housing in each city across the region.
4. *Support City's Vision for Strategic, Sustainable, and Smart Growth*  
The City strives to foster economic development, including planning and implementation of regional transportation and traffic congestion relief projects. The City supports legislation and policies that support local initiatives to develop or redevelop the community to strengthen the local and regional economy, to accommodate local workers' housing needs in places close to transit and jobs, and to continually improve services provided to the community.
5. *Protect and Increase Local Funding, No Unfunded Mandates*  
The City opposes legislation, policies, or budgets that have negative impacts on City services, revenues or costs. The City supports efforts that protect and enhance local governments' revenues, maximize access to State and Federal funding sources, and increase local funding flexibility including legislation that allows the City to recover costs related to state and federal mandates.
6. *Pursue or Retain Federal and State Funding for Key Efforts*  
In order to support the City's efforts and key policies to provide quality services, affordable housing, transportation, and public infrastructure for its residents and businesses and to fund the needed strategic support services, it is necessary that the federal and state governments act as partners with local government and provide appropriate levels of funding for these City and regional efforts.
7. *Support and Promote Inclusive Communities*  
The City values diversity and recognizes all residents, including immigrants, as valuable contributors to our community's success. The City supports legislation that helps our residents be safe, healthy, and able to thrive, while providing opportunities to actively engage in civic, cultural, and economic life.
8. *Promote Livability and Environmental Stewardship*  
The City values a sustainable quality of life in an urban environment. The City supports legislation and policies that emphasize sustainable development; improve environmental standards and the regulatory process; provide incentives and financial support for preservation of natural resources and climate action; promote greenhouse gas reduction, sustainable energy and water, and waste reduction policies; ensure equitable and effective regulations for Community Choice Aggregation (CCA) programs; and support efforts to mitigate odor issues.



#### 9. Promote Investment in Infrastructure

The City supports legislation and policies that promote investing in the maintenance and rehabilitation of aging infrastructure and build system capacity expansion in a smart and sustainable manner.

### **Resources for Legislative Affairs**

Given the impacts of the COVID-10 pandemic on the City's budget, staff is not recommending procuring additional external resources at this time and is instead proposing the following model to track and respond to legislative actions:

1. The City Manager's Office will work with staff across departments and with the City Attorney. The City Attorney will continue to provide analysis and information on state and federal legislation on a periodic basis and as requested by City staff.
2. Continue to have the Mayor and Council represent the City's interests on regional boards and committees such as Valley Transportation Authority (VTA), Valley Water, Cities Association of Santa Clara County (CASCC), Silicon Valley Regional Interoperability Authority (SVRIA), Silicon Valley Clean Energy (SVCE), Bay Area Water Supply and Conservation Agency (BAWSCA).
3. Leverage advocacy groups such as the League of California Cities, CASCC, California Association of Sanitation Agencies for wastewater (CASA), BAWSCA for potable water, SVCE and Cal CCA for clean energy, the Committee to House the Bay Area (CASA), California Chapter of the American Planning Association (APA), SPUR, Association of Environmental Professionals (AEP), California Building Industry Association (CBIA), and California Building Officials (CALBO).

Several peer cities have retained the services of legislative advocacy consultants or lobbyists at the federal and/or state levels to assist in proactively tracking legislation and advocating for the cities' interests. Other cities rely on other outside organizations or are evaluating retaining consultants.

Given the more direct impact of state legislation on the City, and the volume of bills proposed, in the future, the City could procure the services of a legislative advocacy firm, with a focus on specific state legislation related to City priorities and focus areas. The selected firm would need to have an established and active presence in Sacramento. Services provided by the firm could include monitoring and providing reports to the City, advocating on the City's behalf on specific legislation, and identifying potential State grants which align with the City's mission and values and assist in the writing of grant proposals and the acquiring of letters of support for grant proposals.

### **POLICY ALTERNATIVES:**

*Alternative 1: Do not adopt a legislative advocacy policy and legislative guiding principles.*

Pros: Will maintain status quo.

Cons: Will not enable the City to actively track and quickly respond to proposed legislation that is relevant to the City's interests.

Reason for not Recommending: Will not position the City well to proactively track proposed legislation and to respond quickly with support or oppose positions, and to make these positions clear to the legislators and the Milpitas community.

### **Fiscal Impact:**

No fiscal impact. Existing staff and the City Attorney's Office will leverage external industry and advocacy groups to track legislation at the state level. The City Attorney's Office will provide assistance to analyze and track legislation when requested by City staff, however, these services will be accommodated within the existing contract and should not require additional funding depending on the volume of request for legislative analysis and assistance.

### **California Environmental Quality Act:**

Not applicable

**Recommendation:**

Approve the Proposed Legislative Policy and Legislative Guiding Principles.

**Attachment:**

Legislative Advocacy Policy  
Legislative Guiding Principles



## CITY OF MILPITAS

| Revision | Date |
|----------|------|
| 1        | TBD  |
|          |      |

### CITY COUNCIL POLICY

|                                                                             |                                                         |                                                        |
|-----------------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|
| <b>Policy No:</b> x<br>TBD                                                  | <b>Legislative Advocacy Policy</b>                      | <b>Effective Date:</b><br>TBD                          |
| <b>Revision No:</b><br>Click or tap here to enter text.                     | <b>Policy Administrator:</b><br>City Manager            | <b>Next Review Due:</b><br>TBD                         |
| <b>Related Policies and Procedures:</b><br>Click or tap here to enter text. | <b>Approved by:</b><br>Click or tap here to enter text. | <b>Date Approved:</b><br>Click or tap to enter a date. |

#### 1. PURPOSE

- 1.1. To establish clear guidelines for advancing City goals and positions through legislative review and advocacy at the regional, state, and federal levels of government and to provide guidance for City officials who serve on regional, state, and national boards, committees, and commissions when they are asked to review public policy matters and issues.

#### 2. POLICY

- 2.1. This policy outlines the guiding principles and process to enable a comprehensive review of legislation affecting the City of Milpitas, seek Council's position on proposed legislation, and to make the City's position known.
- 2.2. All legislative reviews shall be made on the basis of the effect on the City and the community as a whole, and taking into account existing City positions, policies, or goals.
- 2.3. The City shall support the legislative positions of the Cities Association of Santa Clara County, League of California Cities, and the National League of Cities, on priority bills that benefit the City of Milpitas.
- 2.4. The City shall adopt Legislative Guiding Principles (LGP) based on approved Council Priority Areas, the adopted General Plan, the Economic Development Strategy, and other Council approved master plans and strategic plans.
- 2.5. On an annual basis, the LGP shall be updated as needed, and shall be approved by the City Council at the beginning of the calendar year.

#### 3. DEFINITIONS

- 3.1. The following definitions are provided solely as a guide to assist in the application of this policy and may be subject to change.
  - 1.1.1. Department - Includes all City departments and offices

- 1.1.2. Economic Development Strategy – A five year strategy document adopted by the City Council in May 2020
- 1.1.3. General Plan – A comprehensive planning document adopted by the Council in March 2021
- 1.1.4. Legislative Advocacy – A position of support or opposition to proposed legislation
- 1.1.5. Legislative Guiding Principles - Principles adopted on an annual basis by the City Council to guide the City's position on proposed legislation
- 1.1.6. Milpitas Municipal Code – Codification of the General Ordinances of Milpitas

#### **4. PROCEDURE**

- 4.1. Legislation and issues of interest are brought to the City's attention through several means: League of California Cities, National League of Cities, Cities Association of Santa Clara County, Councilmembers, legislators, City staff, community members, and professional or governmental organizations. All legislation or issues of interest shall be referred to the City Manager's Office.
- 4.2. City Manager's Office (CMO) shall review the proposed legislation and, if warranted, request assistance from the City Attorney and/or from one or more departments.
- 4.3. The process for evaluation and action related to proposed legislation of particular interest to the City shall be as follows:
  - 1.1.1. CMO/Department shall evaluate the proposed bill for its impact on Milpitas, recommend a position and potential action, and draft a position statement or support/opposition letter.
  - 1.1.2. If Council has previously adopted a policy directly relevant to the proposed legislation or if the proposed legislation is generally consistent with the City's Legislative Guiding Principles, the Mayor or City Manager may sign a letter supporting or opposing legislation on behalf of the City as further detailed below.
  - 1.1.3. If there is no Council policy relative to the legislation, the issue is politically controversial, or there is significant community interest in the issue, the proposed legislation, including a recommendation to support, remain neutral, or oppose the legislation, will be brought to Council for consideration.
  - 1.1.4. Letters and other communications expressing the City's position on legislation will bear the signature of the Mayor in accordance with the Milpitas Municipal Code. If the legislation will mainly impact the City's operations, the communication may be signed by the City Manager or designee.
  - 1.1.5. In order to keep the City Council informed of all City communications on legislation, copies of the letter or summary of actions will be distributed to the City Council as information items.
- 4.4. Quarterly legislative updates on items of interest will be provided to the City Council.

**1. Protect Local Control**

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**4. Support City's Vision for Strategic, Sustainable, and Smart Growth**

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In order to support the City's efforts and key policies to provide quality services, affordable housing, transportation, and public infrastructure for its residents and businesses, and to fund the needed strategic support services, it is necessary that the federal and state governments act as partners with local government and provide appropriate levels of funding for these City and regional efforts.

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The City supports legislation and policies that promote investing in the maintenance and rehabilitation of aging infrastructure and build system capacity expansion in a smart and sustainable manner.



## CITY OF MILPITAS AGENDA REPORT (AR)

|                               |                                                                                                                                                                                                                                                                    |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>            | <b>Approve and Authorize the City Manager, or his Designee, to Execute a Memorandum of Understanding (MOU) by and Between the City of Milpitas and the Milpitas Unified School District Regarding the MUSD Alliance Partners for Future-Ready Learners Program</b> |
| <b>Category:</b>              | Consent Calendar-Community Development                                                                                                                                                                                                                             |
| <b>Meeting Date:</b>          | 5/18/2021                                                                                                                                                                                                                                                          |
| <b>Staff Contact:</b>         | <b>Alex Andrade, Director of Economic Development, 408-586-3046</b><br><b>Renee Lorentzen, Director of Recreation and Community Services, 408-586-3409</b>                                                                                                         |
| <b><u>Recommendation:</u></b> | Approve and authorize the City Manager, or his designee, to execute a Memorandum of Understanding (MOU) by and between the City of Milpitas and the Milpitas Unified School District regarding the MUSD Alliance Partners for Future-Ready Learners Program.       |

### **Background:**

The Milpitas Unified School District (MUSD) is interested in increasing opportunities for residents to work in Milpitas, supporting the business community, and providing the MUSD community with critical skills to compete within the Silicon Valley workforce. A program named MUSD Alliance Partners for Future Ready Learners or “MAP” is a ten-year initiative that aims to accomplish these goals. MUSD believes that their MAP program is an opportunity to establish a mutually beneficial understanding and collaborative working relationship between the entities that drive the Milpitas economy such as the City of Milpitas, MUSD ecosystem and public and private sector organizations.

MUSD is providing seventy-five Founding Member Organizations (FMOs) an opportunity to “invest in their organization’s stability, present and future local workforce, and local economic prosperity.” Each MAP partner is expected to commit to a five-year agreement and contribute \$25,000 annually. MUSD is inviting the City of Milpitas to become an FMO in the MAP program. MUSD has communicated that due to the economic impact of COVID-19, the City of Milpitas will receive an inaugural rate of \$25,000 per year captured as in-kind services to MUSD and a two-year commitment instead of the expected five-year agreement. The Analysis section of this Agenda Report outlines the City’s commitment to MUSD through a Memorandum of Understanding (MOU).

On April 23, 2020, the City-School Collaborative Subcommittee met and discussed agenda topic, “MUSD Innovation Campus/MAP for Future Ready Learners.” The City-School Collaborative Subcommittee directed staff from the City of Milpitas and MUSD to move forward with consideration of a City/MUSD MOU by the Milpitas City Council and the MUSD Board of Education as the respective decision-making bodies.

### **Analysis:**

The City recognizes that participation in this important MUSD initiative benefits the Milpitas community through a strategic focus on workforce development and education. The partnership encourages the City, MUSD, and public and private sector organizations to build alliances benefiting students and residents to jointly solve community concerns. In lieu of contributing \$25,000 each year, staff is recommending leveraging in-kind

services and existing programs that support the same objectives and goals of the MUSD MAP program such as implementation of the City's Economic Development Strategy, the Milpitas Youth Program, and partnerships and programs like NOVAWorks, NextFlex and FlexFactor.

On May 5, 2020, the Milpitas City Council adopted the [Economic Development Strategy](#) (EDS) to serve as a road map to grow and diversify the City's economy, support businesses and workers, and improve quality of life in the community. The EDS is a policy document that is currently guiding the City's economic development activities over a five-year period. The EDS consists of seven topic areas based on challenges and opportunities identified through outreach activities and data analysis. The Workforce Development and Education Resources strategy is one of the most important, especially during the current pandemic. Unemployment rates increased significantly in April 2020 due to layoffs resulting from COVID-19, and job seekers require workforce development and education opportunities more than ever to enhance their skills and compete for high quality job opportunities.

In addition, the Recreation and Community Services Department leads the [Milpitas Youth Force](#) (MYF) program focused on high school students working with other City Departments and Milpitas businesses to gain valuable workplace experience and networking in a career path of interest. Students from Milpitas High and Cal Hill Schools earn school service credits for their participation, which is typically 5-10 hours per week over a period of eight weeks. During that time, students are encouraged to work in groups to help solve a real-world business problem and ideate paths to solutions. Participating employers contribute to future employees and benefit from an infusion of youthful energy and fresh ideas. In addition, the Recreation and Community Services Department partners with the City's Youth Advisory Commission and MUSD on the MYF program.

#### External Partnerships

NOVAworks' vision is to be an effective partner in providing innovative, high quality, customer-focused workforce development services to build a better community. The Office of Economic Development recently commenced its COVID-19 Workforce Recovery Program. A two-phase program, Phase I (April – August 2021) explores practical solutions for workforce training opportunities while Phase II (August 2021 – March 2022) focuses on the actual implementation of those recommendations. Project deliverables include customized workforce training workshops, assessments, career navigation and career counseling for Milpitas unemployed and underemployed workers, young adult learners, as well as identifying the types of upskilling needed for Milpitas-based businesses impacted by COVID-19. Each phase will cost the City \$20,000 for a total contract price of \$40,000.

NextFlex is a Manufacturing USA Institute under an agreement with the U.S. Department of Defense with the goal of developing a domestic ecosystem for advanced manufacturing. FlexFactor is an education and outreach program developed to inform, inspire, attract, and recruit high school students into careers in the tech economy. Through a project-based learning approach, FlexFactor engages students with real-world problems, advanced technologies, and entrepreneurship while exposing them to career pathways. The Office of Economic Development has partnered with NextFlex, Evergreen Valley College and MUSD on several successful FlexFactor programs. Milpitas High School students from the E-Tech Program will continue to be challenged to identify a real-world problem, conceptualize an advanced hardware product to address the issue, build a business model, and pitch their idea to a panel. Students will continue to be given the opportunity to dual enroll at Evergreen Valley College to receive 0.5 college credits for completing FlexFactor. The Office of Economic Development has expended \$5,000 for the academic year of 2019-2020 plus staff time over several years. During the 2021-2022 academic year, another \$5,000 for the program and staff time will be expended. Staff time is expected to cost approximately \$3,000-5,000 per academic year.

#### **Proposed Memorandum of Understanding – Key Terms**

The following information outlines the proposed MUSD MOU and the City's commitment to MUSD's request for the City to become an FMO of the MUSD MAP program.

#### MUSD Roles and Responsibilities

MUSD MAP Membership is an opportunity to establish a collaborative working relationship with the City of Milpitas, MUSD and its strategic partners. Potential FMO benefits include, but are not limited to the following:

- Steering committee participation;
- Strategic partnership grant collaboration;
- Event sponsorship;
- Internships;
- City staff training opportunities;
- Professional development projects; and
- Innovative local workforce development.

Membership benefits to the City will also include the following:

- Inclusion in all MUSD Innovation Campus literature as an FMO;
- 5-year naming rights opportunity for campus, facility, classroom or program (additional commitments may be required);
- Sponsorship opportunities to MUSD events aligned with member industry, mission and vision;
- MUSD and inter-district enrollment opportunities for employees of MAP affiliates if available;
- Participation in MAP for Future Ready Learners Career Fair for MUSD Parents and Adult Education Students;
- Priority placement for posting and distribution of internship, apprenticeship and other opportunities;
- Corporate Social Responsibility opportunities for MUSD Alliance Partners employees; and
- Participation in regionally hosted District learning seminars on cultural sustainability, education and workforce development events.

In addition, MUSD commits to use the City's in-kind services by supporting the development and sustainability of MUSD Innovation Learning Campus programs, equipment, personnel and professional development. In addition, they commit to providing input on training curricula that align with the needs of MUSD's students, adult learners and others to MAP affiliate partners. MUSD will host workshops, seminars and events that attract regional, national and international funding sources and partnerships for MAP members.

#### City of Milpitas Roles and Responsibilities

The City will commit to in-kind services provided by its Office of Economic Development, the Recreation and Community Services Department and its partners (i.e., NOVAworks, NextFlex/FlexFactor and Evergreen Valley College) in-lieu of the \$25,000 monetary contribution. These in-kind services translate to significantly more than \$25,000 in City staff time, and City funding provided to the partners and programs directly supporting MAP's mission. In addition, the City's commitment includes a two-year engagement, with a review thereafter to determine if the City can renew the MOU.

- Develop a Working Group to focus on educational programs that prepare youth and adults for employment in growing and emerging industries in Milpitas (Included in EDS).
- Collaborate with the MUSD Board of Trustees and staff leadership to develop a shared work program that clarifies Milpitas City staff roles in connecting school district programs and students with training and exposure opportunities at Milpitas businesses (included in EDS)).
- Seek to develop a shared work program and agreement with the MUSD, San José State University, Evergreen Valley College, and other organizations (included in EDS).
- Collaborate on economic development strategies, planning, and events such as Milpitas Manufacturing Day and summer internships for high school students.
- Engage in partnerships for job skills training and workforce development with MUSD, NovaWorks, NextFlex, and Evergreen Valley College.
- Facilitate future member connections with MUSD.
- Participate in annual MUSD Workforce Career Fair.
- Explore workforce development grant funding opportunities (Federal/State/County).



- Lead MYF program focused on high school students; currently planned to be virtual due to COVID-19 but may return to person based on public health orders.
- Host a Solutions Presentation Event where students and business representatives convene to showcase final solutions for each business.

Implementation of the overall Workforce Development and Education Resources Strategy is expected to require approximately a .20 Full Time Equivalent position at the Economic Development Coordinator level estimated to cost the City \$26,000. The total cost of the recent virtual Milpitas Youth Force program was \$19,708. The total in-kind City services proposed for the term of the two year MOU are valued at approximately \$95,700.

### **Policy Alternatives:**

**Alternative 1: Do not proceed with an MOU by and between the City of Milpitas and the Milpitas Unified School District regarding the MUSD Alliance Partners for Future-Ready Learners Program.**

**Pros:** The City of Milpitas may benefit from waiting to execute an MOU with MUSD to determine if the Alliance Partners for Future-Ready Learners program is successful and whether the City will benefit from the collaboration.

**Cons:** The Office of Economic Development would not be able to implement the EDS' Workforce Development and Education Strategy in a partnership with MUSD. The Workforce Development and Education Strategy calls for "deepening existing partnerships between the City, the school districts and community colleges, workforce-focused organizations, and private employers to increase coordination and communication, grow existing programs, and establish potential new resources such as apprenticeship programs." The Recreation and Community Services Department's Milpitas Youth Force Program would continue to be available to the public, however, the potential for growth and expansion of the program as a result of participating in the MUSD Alliance Partners programs would remain unknown.

**Reason not recommended:** The current successful relationship enjoyed between the City of Milpitas and MUSD will be able to continue and the investment in workforce and education will also endure to benefit the entire community. The City and MUSD partnership offer students opportunities to gain vital work skills, build interest in public service careers, provide tools to become civically engaged and the joint effort helps leverage funds, staff resources and expertise from both entities.

### **Fiscal Impact:**

The MUSD MOU calls for the City of Milpitas to receive an inaugural rate of \$25,000 per year captured as in-kind services. However, if the City Council approves executing an MOU between the City of Milpitas and MUSD, approximately \$95,700 of in-kind services will be utilized for the MAP partnership in-lieu of a monetary contribution. No new funds are required as the approximate \$95,700 of City in-kind services is included in the proposed fiscal year 2021-22 General Fund budget.

### **California Environmental Quality Act:**

By the definition provided in the California Environmental Quality Act (CEQA) Guidelines Section 15378, this action does not qualify as a "project" for the purpose of CEQA as this action has no potential to result in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.

### **Recommendation:**

Approve and authorize the City Manager, or his designee, to execute a Memorandum of Understanding (MOU) by and between the City of Milpitas and the Milpitas Unified School District regarding the MUSD Alliance Partners for Future-Ready Learners Program.

**Attachments:**

Attachment A – Draft Memorandum of Understanding between the City of Milpitas and Milpitas Unified School District Regarding the Milpitas Unified School District Alliance Partners for Future-Ready Learners Program.

**MEMORANDUM OF UNDERSTANDING BETWEEN  
THE CITY OF MILPITAS  
AND THE MILPITAS UNIFIED SCHOOL DISTRICT  
REGARDING THE MILPITAS UNIFIED SCHOOL DISTRICT ALLIANCE PARTNERS FOR  
FUTURE-READY LEARNERS PROGRAM**

This Memorandum of Understanding (“MOU”) is made and entered into as of \_\_\_\_\_, 2021 (“Effective Date”) by and between the City of Milpitas, a municipal corporation organized and existing under the laws of the State of California (“City”), and the Milpitas Unified School District, a public school district organized and existing under the laws of the State of California (“District” or “MUSD”). City and District are sometimes individually referred to as “party” and collectively as “parties” in this MOU.

**RECITALS**

The parties enter into this MOU with reference to the following facts, objectives, and understandings:

- A. To accelerate the economic recovery of the City of Milpitas due to the COVID-19 pandemic and to prepare MUSD parents, adult learners and high school learners eligible for the workforce in support of the Milpitas community, the District has created the MUSD Alliance Partners (“MAP”) for Future-Ready Learners program.
- B. The MAP program is a ten-year initiative to increase the Milpitas employment rate for high wage jobs beyond 25 percent, support the Milpitas business community, and provide MUSD learners, parents and residents with global skills in driving the future of work.
- C. The MAP program is an opportunity to establish a mutually beneficial understanding and collaborative working relationship between the entities that drive the Milpitas economy, the District and its strategic partners.
- D. The MAP program seeks to provide Founding Member Organizations (“FMOs”) unique opportunities to invest in their organization’s stability, present and future local workforce, and local economic prosperity.
- E. FMO benefits include: steering committee participation, strategic partnership grant collaboration, event sponsorship, internships, staff training opportunities, professional development projects, and innovative local workforce development.
- F. City wishes to become a Founding Member Organization of the MAP program.
- G. As part of City’s commitment to serve as a FMO of the MAP program, District agrees to provide City an inaugural rate of \$25,000 per year captured as in-kind services to the District.
- H. City, by and through its Office of Economic Development, Recreation and Community Services Department, and City partners (NOVAworks, NextFlex, and FlexFactor), agrees to provide in-kind services to the District, as specified in Exhibit “A,” in-lieu of the annual contribution of \$25,000 during the term of this MOU. The value of in-kind services from City is approximately \$95,700.

- I. The purpose of this MOU is to define the expectations, rights, and responsibilities of the parties with regard to the MAP program.
- J. The parties hereby determine that the proposed in-kind services set forth in this MOU will result in public benefits to the City and its residents, including but not limited to: skills training and workforce development; and creation of additional employment opportunities for City residents, including MUSD parents, adult learners and high school learners.

NOW, THEREFORE, the parties agree as follows:

1. Roles and Responsibilities.

- a. The roles and responsibilities of City are defined in Exhibit “A” attached hereto and incorporated herein by reference.
- b. The roles and responsibilities of District are defined in Exhibit “B” attached hereto and incorporated herein by reference.

2. Term.

This MOU is effective for two (2) years from the Effective Date, and may be modified at any time by the written consent of the parties. The MOU may be terminated at any time upon mutual consent of the parties, or unilaterally upon written notice from the terminating party to the other party at least thirty (30) days prior to the date of termination.

3. Compliance with Laws.

The parties shall comply with all applicable federal, state and local laws, rules and regulations in performing the services contemplated in this MOU.

4. Hold Harmless and Liability.

In lieu of and notwithstanding the pro rata risk allocation that might otherwise be imposed between the parties pursuant to Government Code Section 895.6, the parties agree that all losses or liabilities incurred by a party shall not be shared pro rata but, instead, City and District agree that pursuant to Government Code Section 895.4, each party shall fully indemnify and hold the other party, its officers, governing body members, employees, and agents, harmless from any claim, expense or cost, damage or liability imposed for injury (as defined in Government Code Section 810.8) occurring by reason of the negligent acts or omissions or willful misconduct of the indemnifying party, its officers, governing body members, employees, or agents, under or in connection with or arising out of any work, authority, or jurisdiction delegated to such party under this MOU. No party, nor any governing body member, officer, employee, or agent, thereof shall be responsible for any damage or liability occurring by reason of the negligent acts or omissions or willful misconduct of the other party hereto, its officers, governing body members, employees, or agents, under or in connection with or arising out of any work, authority or jurisdiction delegated to such other party under this MOU. The obligations set forth in this Section 4 will survive termination and expiration of this MOU.

5. Insurance.

Each party shall maintain the following programs of insurance coverage:

- a. General Liability insurance with limits of not less than the following, and naming the other part as an additional insured:

|                    |             |
|--------------------|-------------|
| General Aggregate: | \$2 million |
| Personal Injury:   | \$1 million |
| Each Occurrence:   | \$1 million |

- b. Workers' Compensation and Employers Liability insurance providing workers' compensation benefits, as required by the State of California.
- c. The insurance coverage requirements in this Section 5 shall be subject to review and adjustment to reflect coverage recommended by the parties' insurance advisors over the term of this MOU. Any such adjustment shall be set forth in a written amendment to the MOU signed by both parties.

6. Availability of Personnel and Resources.

This MOU does not involve the exchange of funds, nor does it represent any obligation of funds by any party. All costs that may arise from activities covered by, mentioned in, or pursuant to this MOU will be assumed by the party who incurs them, unless otherwise stipulated and decided pursuant to a future written arrangement. All activities undertaken pursuant to this MOU are subject to the availability of funds, personnel and other resources of each party.

7. Independent Contractor.

City officers, employees, and agents shall be independent contractors in the performance of this MOU, and not officers, employees, contractors, or agents of District.

8. In-Kind Services.

Documentation for in-kind services provided under this MOU shall be submitted annually, with such detail as mutually agreed by City and District.

9. Laws and Venue.

This MOU shall be interpreted in accordance with the laws of the State of California. If any action is brought to interpret or enforce any term of this MOU, the action shall be brought in a state or federal court situated in the County of Santa Clara, State of California.

10. Notice.

Any notice or instrument required to be given or delivered by this MOU may be given or delivered by depositing the same in any United States Post Office, certified mail, return receipt requested, postage prepaid, addressed to:

City of Milpitas  
455 E. Calaveras Boulevard  
Milpitas, California 95035  
Attn: Steven G. McHarris, City Manager

Milpitas Unified School District  
1331 E. Calaveras Boulevard  
Milpitas, CA 95035  
Attn: Cheryl Jordan, Superintendent

and shall be effective upon receipt thereof.

11. Third Party Rights.

Nothing in this MOU, whether express or implied, is intended to confer any rights or remedies on any persons or entities other than the parties to this MOU.

12. Entire Agreement.

This MOU represents the entire agreement between City and District and all preliminary negotiations and agreements are deemed a part of this MOU. No verbal agreement or implied covenant shall be held to vary the provisions of this MOU. This MOU shall bind and inure to the benefit of the parties to this MOU and any subsequent successors and assigns.

13. No Assignment.

Neither party may assign any rights or obligations under this MOU without the prior written consent of the other party.

14. Severability.

The unenforceability, invalidity or illegality of any provision(s) of this MOU shall not render the provisions unenforceable, invalid or illegal.

15. Force Majeure.

Neither party shall be liable hereunder by reason of any failure or delay in the performance of its obligations hereunder on account of strikes, electrical or other shortages, riots, insurrection, fires, flood, storm, explosions, acts of God, epidemics, war, governmental action, labor conditions, earthquakes, material shortages, or any other cause beyond the reasonable control of such party.

16. Non-Waiver.

None of the provisions of this MOU shall be considered waived by either party, unless such waiver is specifically specified in writing.

17. Counterparts.

This MOU may be signed in multiple counterparts, which, when taken together, shall constitute a single signed original, as though all parties had signed the same MOU.

18. Headings.

All headings in this MOU are for convenience of reference only and shall not affect the interpretation of this MOU.

19. Exhibits Incorporated.

All exhibits referenced in or attached to this MOU are incorporated into this MOU.

20. Incorporation of Recitals.

The Recitals preceding this MOU are true and correct and are incorporated into and made a part of this MOU.

21. Time of Essence.

Time is of the essence of each provision of this MOU, unless otherwise specified in this MOU.

22. Further Assurances.

City and District agree to cooperate fully and execute any and all supplementary documents and take all additional actions which may be necessary or appropriate to give full force and effect to the basic terms and intent of this MOU.

**[SIGNATURES ON FOLLOWING PAGE]**

**SIGNATURE PAGE FOR MEMORANDUM OF UNDERSTANDING BETWEEN  
THE CITY OF MILPITAS  
AND THE MILPITAS UNIFIED SCHOOL DISTRICT  
REGARDING THE MILPITAS UNIFIED SCHOOL DISTRICT ALLIANCE PARTNERS FOR  
FUTURE-READY LEARNERS PROGRAM**

IN WITNESS WHEREOF, the parties have executed this MOU as of the date first written above.

**CITY OF MILPITAS**

*Approved By:*

\_\_\_\_\_  
Steven G. McHarris, City Manager

\_\_\_\_\_  
Date

*Approved As To Form:*

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

*Approved:*

\_\_\_\_\_  
Lauren Lai, CPA, MPA, Finance Director/Risk  
Manager

*Approved As To Content:*

\_\_\_\_\_  
Alex Andrade, Economic Development Director

*Approved As To Content:*

\_\_\_\_\_  
Renee Lorentzen, Recreation and Community  
Services Director

**MILPITAS UNIFIED SCHOOL DISTRICT**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

\_\_\_\_\_  
DIR Registration Number (If Applicable)



## **EXHIBIT “A”**

### **CITY’S ROLES AND RESPONSIBILITIES**

In addition to all other obligations set forth in this MOU, City agrees to contribute the following in-kind services as described below:

#### **Office of Economic Development**

The Office of Economic Development shall take part in the following:

- Collaboration on economic development strategies, planning, and events such as Milpitas Manufacturing Day and summer internships for high school students.
- Partnership in opportunities for job skills training and workforce development including the City, MUSD, NextFlex, and Evergreen Valley College.
- Facilitating future member connections with MUSD.
- Participation in annual MUSD Workforce Career Fair.
- Workforce Development Grant Funding Opportunities (Federal/State/County) will be explored.

Implementation of the overall Workforce Development and Education Resources strategy is expected to require approximately a .20 Full Time Equivalent position at the Economic Development Coordinator level estimated to cost the City \$26,000.

#### **Recreation and Community Services Department**

The Recreation and Community Services (RCS) Department leads the Milpitas Youth Force (MYF) program focused on high school students working with Milpitas employers to gain valuable workplace experience. The program model was updated for 2021 due to COVID-19 where students were encouraged to work in groups to help solve a business problem over the course of eight weeks. The RCS Department matches students to businesses, conducts weekly check-ins, establishes milestones and deadlines, and hosts a “Solutions Presentation Event” where students and business representatives convene to showcase final solutions for each business at the conclusion of the program. In future years MYF may return to an in-person model, as allowed by State and County orders. The total cost of the virtual Milpitas Youth Force program was \$19,708.

#### **NOVAworks**

NOVAworks’ vision is to be an effective partner in providing innovative, high quality, customer-focused workforce development services to build a better community. The Office of Economic Development has just commenced its COVID-19 Workforce Recovery Program. A two-phase program, Phase I (April - August 2021) explores practical solutions for workforce training opportunities while Phase II (August 2021 - March 2022) focuses on the actual implementation of those recommendations. Project deliverables include customized workforce training workshops, assessments, career navigation and career counseling for Milpitas unemployed and underemployed workers, young adult learners, as well as identifying the types of upskilling needed for Milpitas-based businesses impacted by COVID-19. Each phase will cost the City \$20,000 for a total contract price of \$40,000.

### **NextFlex and FlexFactor**

NextFlex is a Manufacturing USA Institute under an agreement with the U.S. Department of Defense with the goal of developing a domestic ecosystem for advanced manufacturing in the United States. FlexFactor is an education and outreach program developed to inform, inspire, attract, and recruit high school students into careers in the tech economy. Through a project-based learning approach, FlexFactor engages students with real-world problems, advanced technologies, and entrepreneurship while exposing them to career pathways. The Office of Economic Development has partnered with NextFlex, Evergreen Valley College, and MUSD on several successful FlexFactor programs. Milpitas High School students from the E-Tech Program will continue to be challenged to identify a real-world problem, conceptualize an advanced hardware product to address the issue, build a business model, and pitch their idea to a panel. Students will continue to be given the opportunity to dual enroll at Evergreen Valley College to receive 0.5 college credits for completing FlexFactor. The Office of Economic Development has expended \$5,000 for the academic year of 2019-2020 plus staff time over several years. During the 2021-2022 academic year, another \$5,000 and staff time will be expended. Staff time is expected to cost approximately \$3,000 - \$5,000 per academic year.

Additionally, City agrees to:

- Provide work-study, service learning, apprenticeship and internship opportunities for MUSD learners and parents to shadow, intern, and/or experience an aspect of the organization's product and/or services development, implementation, and application.
- Participate in workforce development discussions and events.
- Provide insights and thought partnering in developing future programs for MUSD future-ready learners.
- Promote networking and communication about MAP and MUSD initiatives pertaining to developing future ready learners in a thriving and diverse Milpitas economy.

## **EXHIBIT “B”**

### **DISTRICT’S ROLES AND RESPONSIBILITIES**

In addition to all other obligations set forth in this MOU, District shall have the following obligations:

#### **MUSD Commitments for Use of In-Kind Services**

District agrees to:

- Support the development and sustainability of MUSD Innovation Learning Campus programs, equipment, personnel and professional development.
- Provide reasonable input into training curriculums that aligns with the needs of MUSD secondary students, adult learners and others to MAP affiliate partners.
- Host broadscope workshops, seminars and events that attract regional, national and international funding sources and partnerships for MAP members.

#### **Membership Benefits**

District agrees to provide the following membership benefits:

- Inclusion in all MUSD Innovation Campus literature as a Founding Member Organization.
- Five (5)-year naming rights opportunity for campus, facility, classroom or program (additional commitments may be required).
- Sponsorship opportunities to MUSD events aligned with member industry, mission, and vision.
- MUSD school district inter-district enrollment opportunities for employees of MAP affiliates, if available.
- Participation in MAP for Future Ready Learners Career Fair for MUSD Parents and Adult Education Students.
- Priority placement for posting and distribution of Internship, Apprenticeship and other opportunities.
- Corporate Social Responsibility opportunities for MUSD Alliance Partners employees.
- Participation in regionally hosted District learning seminars on cultural sustainability, education and workforce development events.



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Consider the Mayor's Recommendation of Vice Mayor Carmen Montano to Serve on the Bay Area Water Supply and Conservation Agency and its Regional Financing Authority Board of Directors a four-year term from July 1, 2021 through June 30, 2025.</b> |
| <b>Category:</b>       | Consent Calendar-Community Services and Sustainable Infrastructure                                                                                                                                                                                      |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                                                                                                                                               |
| <b>Staff Contact:</b>  | <b>Tony Ndah, Public Works Director, 408-586-2602</b>                                                                                                                                                                                                   |
| <b>Recommendation:</b> | Consider Mayor's recommendation of Vice-Mayor Carmen Montano to serve on the Board of Bay Area Water Supply and Conservation Agency and its Regional Financing Authority for a four-year term from July 1, 2021 through June 30, 2025.                  |

### **Background:**

The Bay Area Water Supply and Conservation Agency (BAWSCA) is governed by a 26-member Board of Directors comprised of respected community leaders representing the 24 cities and water districts that are member agencies of BAWSCA, and two private utilities that also have appointees to the board, Stanford University and California Water Service Company. Board of Directors serve a four-year term following appointment by the action of the full Council at a public meeting. Per applicable statute, the person appointed to serve on the Board and represent the City must be a resident of the City and a registered voter and may but does not have to be a member of the City Council.

On February 5, 2019, the City Council approved the appointment of then Councilmember Montano to the Board of Bay Area Water Conservation & Supply Agency and its Regional Financing Authority, to fill the unexpired 4-year term ending on June 30, 2021. As part of the January 5, 2021 action regarding appointment of City Councilmembers serving as Liaisons to City Commissions, City Subcommittees, and Outside Agency Boards and Committees, the City Council appointed Vice-Mayor Montano to serve as the City's BAWSCA representative for 2021 and 2022.

### **Analysis:**

Since the term of Vice Mayor Carmen Montano on the Board of Directors of the Bay Area Water Supply and Conservation Agency and its Regional Financing Authority ends on June 30, 2021, BAWSCA requires that the Council appoint a Board Member representing our City for the four-year term from July 1, 2021 through June 30, 2025 by separate motion.

Mayor Tran recommends that the City Council appoint Vice-Mayor Carmen Montano to serve on the Board of Bay Area Water Conservation & Supply Agency and its Regional Financing Authority for a four-year term from July 1, 2021 through June 30, 2025.

### **Fiscal Impact:**

None

### **California Environmental Quality Act:**

This action is not a "project" subject to the California Environmental Quality Act (CEQA) as it can be seen with certainty that the action will not cause either a direct or indirect physical change in the environment and is instead more akin to an organizational governmental activity exempt from the definition of project under CEQA pursuant to CEQA Guideline 15378(b).

**Recommendation:**

Consider Mayor's recommendation of Vice-Mayor Carmen Montano to serve on the Board of Bay Area Water Supply and Conservation Agency and its Regional Financing Authority for a four-year term from July 1, 2021 through June 30, 2025.



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Approve and Authorize the City Manager to Enter into a Side Letter to Amend the Memorandum of Understanding between the City and the Milpitas Police Officers Association (MPOA) and between the City and LIUNA/UPEC Local 792, representing the Mid-Management-Confidential Unit (Mid-Con) and the Professional and Technical Unit (ProTech) amending the Vacation Cash Out MOU provisions.</b>                           |
| <b>Category:</b>       | Consent Calendar-Leadership and Support Services                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Staff Contact:</b>  | <b>Jeannine Seher, Director of Human Resources, 408-586-3086</b>                                                                                                                                                                                                                                                                                                                                                              |
| <b>Recommendation:</b> | Approve and Authorize the City Manager to Enter into a Side Letter to Amend the Memorandum of Understanding between the City and the Milpitas Police Officers Association (MPOA) and between the City and LIUNA/UPEC Local 792, the Mid-Management-Confidential Unit (Mid-Con) and the Professional and Technical Unit (Pro-Tech) relating to the vacation cash-out provisions amending the Vacation Cash Out MOU provisions. |

### **Background:**

All employers conducting business in California are subject to the federal and state employment tax laws. Employers are responsible for reporting wages paid to their employees and paying Unemployment Insurance (UI) tax and Employment Training Tax (ETT) on those wages, as well as withholding and remitting federal and state income tax, Medicare tax, and SDI due on those wages. When an employee receives a benefit that is not otherwise nontaxable (e.g., health insurance), and has control of how that benefit is received, the employer is obligated to treat the benefit as taxable wages and withhold applicable taxes on the value of that benefit, regardless of whether or not the employee actually received the monetary value of the benefit, that is known as the constructive receipt doctrine codified in Section 451 of the Internal Revenue Code.

Employees in the Mid-Con and Pro-Tech units have the ability to cash out vacation leave accruals each fiscal year based upon their accrual rates as specified in the Memorandum of Understanding (MOU). The constructive receipt doctrine requires the employer to tax employees who have a “choice” of taking cash for accrued vacation or using vacation accruals during a given year, are to be treated as if the employee has actually received the cash that year – regardless of whether or not the employee has actually taken the cash.

In order to continue to provide this benefit but to avoid the constructive receipt doctrine codified in Section 451 of the Internal Revenue Code, the parties have reached agreement on alternative language, as specified in the side letter.

### **Analysis:**

The IRS states that the constructive receipt doctrine can be mitigated if the vacation cash out is limited by:

- 1) Restricting the cash out option of vacation to unforeseeable emergencies. The unforeseeable emergencies must be well defined and in compliance with guiding regulations. Further, the amount

the cash out is limited to an amount reasonably necessary to satisfy the emergency need (such as the amount needed to cover unforeseen hospital expenses).

- 2) Structuring the cash out provision in a manner that substantially restricts the employee's choice to receiving the cash out. For example, the City could establish a program that requires cash out of all hours accrued over a specific amount – such as cashing out all accruals over 80 hours and eliminate all other cash out provisions.
- 3) The City could continue giving the employee the choice as to the number of hours one could elect to cash out; however, this election would be against “future accruals” and must be made prior to when the leave accrues and once made, the election is irrevocable.

The parties met and conferred in good faith to resolve this matter and selected options 1 and 3 above. Option 2 was not selected as it was not a desirable resolution of the employees.

### **Policy Alternative:**

**Alternative:** Maintain the existing MOU language.

Pros: Will provide a previously committed benefit to City employees in the Mid-Con and ProTech bargaining units.

Cons: The City will have to modify its payroll system and practices and begin taxing employees in these bargaining units on their vacation accruals, regardless of whether or not they utilize the vacation cash-out provision of the MOU.

Reason for Not Recommending: In order to tax employees on their vacation accruals, the City will need to augment its current payroll system and processing, which will create significant technologic and administrative challenges.

### **Fiscal Impact:**

There are insignificant impacts associated with implementing this change, to include staff time to change administrative forms and update work processes.

### **California Environmental Quality Act:**

Approval of the recommendation is not an activity defined as a “project” under the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines 15061(b) (3) and 15378(b)(4) either because it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment and/or because the action is financial and/or administrative and does not directly impact the environment.

### **Recommendation:**

Approve and Authorize the City Manager to Enter into a Side Letter to Amend the Memorandum of Understanding between the City and the Milpitas Police Officers Association (MPOA) and between the City and LIUNA/UPEC Local 792, representing the Mid-Management-Confidential Unit (Mid-Con) and the Professional and Technical Unit (ProTech) amending the Vacation Cash-Out provisions.

### **Attachment:**

Side Letter to MOU with Mid-Con Unit, LIUNA/UPEC (792)

Side Letter to MOU with Pro-Tech Unit, LIUNA/UPEC (792)

Side Letter to MOU with MPOA

**SIDE LETTER AGREEMENT**  
Between the City of Milpitas  
and  
Mid-Management and Confidential Unit (LIUNA)  
Regarding Vacation Leave Cash Outs

The constructive receipt doctrine (codified in Section 451 of the Internal Revenue Code) has potentially significant ramifications to employees in your bargaining unit. Under Treasury Regulation Section 1.451-2, employees who have a "choice" of taking cash for accrued vacation or using vacation accruals during a given year, are to be treated as if the employee has actually received the cash that year – regardless of whether or not the employee has actually taken the cash. The City of Milpitas and the Union want to address this, and as such, they are entering into this agreement.

This confirms the understanding reached between the City of Milpitas, hereinafter referred to as the City, and the LIUNA, UPEC 792, hereinafter referred to as the Union, representing the Mid-Management and Confidential Unit (MidCon), collectively referred to as (the Parties).

The Parties agree to the following change to the Vacation cash out election language in the MOU, Section 8.08 as follows:

**SECTION 8.00 – ANNUAL VACATION LEAVE**

8.08 An employee may elect to cash out vacation leave accruals as either (1) a Future Vacation Leave Accrual Cash-out or (2) an Emergency Vacation Leave Cash-out, in accordance with the provisions below:

- a. An employee whose annual vacation leave accrual is 120 hours or less, may elect to cash out a maximum of forty (40) hours of accrued vacation per calendar year.
- b. An employee whose annual vacation leave accrual is more than 120 hours, may elect to cash out a maximum of eighty (80) hours per calendar year.
- c. An employee who cashes out the maximum vacation accruals under the Future Vacation Leave Accrual provisions shall not be eligible for Emergency Vacation Leave cash-out in the same calendar year.

**8.08.1 Future Vacation Leave Accrual Cash Out Eligibility**

- a. The employee uses at least one full workday of paid vacation leave in the calendar year the election request is submitted.
- b. Between November 1st of each year through the end of the first full pay period in December, an employee wishing to cash out future vacation accruals in accordance with the provision above, may make a request by completing and submitting an Irrevocable Vacation Cash Out request form to the Director of



- Human Resources. Forms that are received after the first full pay period of December shall be ineligible for receiving the cash out the following calendar year.
- c. Once the election is made, it is irrevocable, meaning the employees must cash out the elected number of accrued vacation hours during that calendar year. If the employee does not select a date to receive the cash out, the employee will be paid with the paycheck coinciding with the last pay period of the calendar year.
  - d. The employee will select either pay period 7, pay period 13, pay period 19 or pay period 24 to receive the cash-out; however, in no circumstances can an employee receive payment for future vacation accrual cash-out until the employee has actually accrued that number of vacation hours. For example, an employee earning 5 hours of vacation per pay period, who wishes to cash out 40 hours of vacation accruals, may receive their cash-out accrual any time after eight pay periods have passed.
  - e. As a condition of applying for cash-out, an employee must consent to future payroll deductions (in accordance with Section 8.08.3 below) for necessary withholdings of required taxes.
  - f. All cash-outs of future vacation accruals will be included in an employee's regular paycheck.

8.08.2. Emergency Vacation Accrual Cash-out

- (a) An employee may request to cash-out vacation due to an unanticipated emergency that is caused by an event beyond the control of the employee and when the employee can demonstrate that it would result in severe financial hardship to the employee if early withdrawal were not permitted. Severe financial hardship to the employee includes:
  - i. Losses resulting from a sudden and unexpected illness or accident of the employee or of a qualified family member.
  - ii. Losses of the employee's property due to casualty, or other similar extraordinary and unforeseeable circumstances arising as a result of events beyond the control of the participant.
  - iii. Losses that can be resolved through reimbursement or compensation by insurance or otherwise, liquidation of the participant's assets, to the extent the liquidation of such assets would not itself cause severe financial hardship, or by cessation of voluntary deferrals to a 457 plan shall disqualify an employee from being eligible to receive Emergency Vacation Accrual Cash-out.
  - iv. Or any other reason as allowable per the IRS.
- (b) Emergency Vacation Accrual Cash-out shall be limited to the amount of leave necessary to address the nature of the emergency and shall not exceed the maximums identified if section 8.08 (a) through (c).

8.08.2 Vacation leave may not be carried-over to cash-out in subsequent years, except upon separation from City service.

8.08.3 The Union understands and agrees that employees have a responsibility to pay their taxes in accordance with IRS regulations. Therefore, any adjustments for prior taxes shall be deducted from an employee's paycheck. The City shall provide the employee a fourteen (14) calendar day notice before taking any payroll deductions for this purpose. For

amounts greater than \$100, the employee may request the deductions be taken over a period of sequential pay periods, not to exceed eight (8) pay periods.

For the City of Milpitas:

For Mid-Con/LIUNA:

\_\_\_\_\_  
Jeannine M. Seher  
Human Resources Director

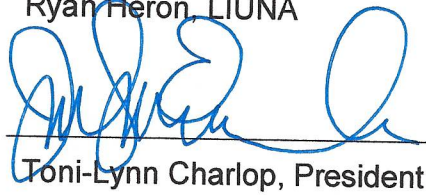
\_\_\_\_\_  
Date

\_\_\_\_\_  
Ryan Heron, LIUNA

\_\_\_\_\_  
Date

\_\_\_\_\_  
Steven McHarris  
City Manager

\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Toni-Lynn Charlop, President

5/10/21  
\_\_\_\_\_  
Date

**SIDE LETTER AGREEMENT**  
Between the City of Milpitas  
and  
Professional and Technical Unit (LIUNA)  
Regarding Vacation Leave Cash Outs

The constructive receipt doctrine (codified in Section 451 of the Internal Revenue Code) has potentially significant ramifications to employees in your bargaining unit. Under Treasury Regulation Section 1.451-2, employees who have a “choice” of taking cash for accrued vacation or using vacation accruals during a given year, are to be treated as if the employee has actually received the cash that year – regardless of whether or not the employee has actually taken the cash. The City of Milpitas and the Union want to address this, and as such, they are entering into this agreement.

This confirms the understanding reached between the City of Milpitas, hereinafter referred to as the City, and the LIUNA, UPEC 792, hereinafter referred to as the Union, representing the Professional and Technical Unit (Pro-Tech), collectively referred to as (the Parties).

The Parties agree to the following change to the Vacation cash out election language in the MOU, Section 9.09 as follows:

**SECTION 9.00 – ANNUAL VACATION LEAVE**

9.09 An employee may elect to cash out vacation leave accruals as either (1) a Future Vacation Leave Accrual Cash-out or (2) an Emergency Vacation Leave Cash-out, in accordance with the provisions below:

- a) An employee whose annual vacation leave accrual is 120 hours or less, may elect to cash out a maximum of a maximum of forty (40) hours of accrued vacation per calendar year.
- b) An employee whose annual vacation balance exceeds one hundred and twenty (120) hours, may elect to cash out a maximum of eighty (80) hours per calendar year
- c) An employee who cashes out the maximum vacation accruals under the Future Vacation Leave Accrual provisions shall not be eligible for Emergency Vacation Leave cash-out in the same calendar year.

**9.09.1 Future Vacation Leave Accrual Cash Out Eligibility**

- a) The employee uses at least one full workday of paid vacation leave in the calendar year the election request is submitted
- b) Between November 1st of each year through the end of the first full pay period in December, an employee wishing to cash out future vacation accruals in accordance with the provision above, may make a request by completing and submitting an Irrevocable Vacation Cash Out request form to the Director of Human Resources. Forms that are received after the first full pay period of

December shall be ineligible for receiving the cash out the following calendar year.

- c) Once the election is made, it is irrevocable, meaning the employees must cash out the elected number of accrued vacation hours during that calendar year. If the employee does not select a date to receive the cash out, the employee will be paid with the paycheck coinciding with the last pay period of the calendar year.
- d) The employee will select either pay period 7, pay period 13, pay period 19 or pay period 24 to receive the cash-out; however, in no circumstances can an employee receive payment for future vacation accrual cash-out until the employee has actually accrued that number of vacation hours. For example, an employee earning 5 hours of vacation per pay period, who wishes to cash out 40 hours of vacation accruals, may receive their cash-out accrual any time after eight pay periods have passed.
- e) As a condition of applying for cash-out, an employee must consent to future payroll deductions (in accordance with Section 9.09.4 below) for necessary withholdings of required taxes.
- f) All cash-outs of future vacation accruals will be included in an employee's regular paycheck.

#### 9.09.2 Emergency Vacation Accrual Cash-out

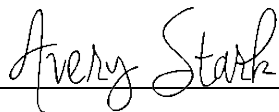
- (a) An employee may request to cash-out vacation due to an unanticipated emergency that is caused by an event beyond the control of the employee and when the employee can demonstrate that it would result in severe financial hardship to the employee if early withdrawal were not permitted. Severe financial hardship to the employee includes:
  - i. Losses resulting from a sudden and unexpected illness or accident of the employee or of a qualified family member.
  - ii. Losses of the employee's property due to casualty, or other similar extraordinary and unforeseeable circumstances arising as a result of events beyond the control of the participant.
  - iii. Losses that can be resolved through reimbursement or compensation by insurance or otherwise, liquidation of the participant's assets, to the extent the liquidation of such assets would not itself cause severe financial hardship, or by cessation of voluntary deferrals to a 457 plan shall disqualify an employee from being eligible to receive Emergency Vacation Accrual Cash-out.
  - iv. Or any other reason as allowable per the IRS.
- (b) Emergency Vacation Accrual Cash-out shall be limited to the amount of leave necessary to address the nature of the emergency and shall not exceed the maximums identified if section 9.09 (a) through (c).

9.09.3 Vacation leave may not be carried-over to cash-out in subsequent years, except upon separation from City service.

9.09.4 The Union understands and agrees that employees have a responsibility to pay their taxes in accordance with IRS regulations. Therefore, any adjustments for prior taxes shall be deducted from an employee's paycheck. The City shall provide the employee a fourteen (14) calendar day notice before taking any payroll deductions for this purpose. For amounts greater than \$100, the employee may request the deductions be taken over a period of sequential pay periods, not to exceed eight (8) pay periods.

For the City of Milpitas:

For Pro-Tech/LIUNA:

|                                                        |               |                                                                                                              |                           |
|--------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------|---------------------------|
| _____<br>Jeannine M. Seher<br>Human Resources Director | _____<br>Date | _____<br>Ryan Heron, LIUNA                                                                                   | _____<br>Date             |
| _____<br>Steven McHarris<br>City Manager               | _____<br>Date | <br>Avery Stark, President | <u>05-10-2021</u><br>Date |

**SIDE LETTER AGREEMENT**  
Between the City of Milpitas  
and  
Milpitas Police Officers Association  
Regarding Vacation Leave Cash Outs

The City of Milpitas ("City") and the Milpitas Police Officers Association ("Association") (collectively, "the parties") make the following agreement to amend Section 9.07 of the 2017-2021 Memorandum of Understanding (MOU) (in effect until December 31, 2023):

Under Treasury Regulation Section 1.451-2, "Constructive Receipt of Income", City employees who can elect during a given calendar year either to use vacation accruals or to receive cash in lieu of accrued vacation are treated for income tax purposes as if they had actually received cash even if they did not. The intent of the parties to this agreement is to mitigate the impact of this regulation on represented employees.

Therefore, the Parties agree to amend Section 9.07 as follows:

**SECTION 9.00 - ANNUAL VACATION LEAVE**

[. . .]

9.07 Vacation Cash-Out. An employee may elect to cash out annual vacation leave accruals as either (1) a Future Vacation Leave Accrual Cash-Out or (2) an Emergency Vacation Leave Cash-Out, in accordance with the provisions below:

- (a) An employee whose annual vacation leave accrual is 120 hours or less may elect to cash out a maximum of 40 hours of accrued annual vacation leave per calendar year.
- (b) An employee whose annual vacation leave accrual exceeds 120 hours may elect to cash out a maximum of 80 hours per calendar year.
- (c) An employee who cashes out the maximum vacation accruals as a Future Vacation Leave Accrual is not eligible for Emergency Vacation Leave Cash-Out in the same calendar year.
- (d) Future Vacation Leave Accrual Cash-out

- 1. The employee must use at least one full workday of paid vacation leave in the calendar year the employee submits the election request.
- 2. Between November 1<sup>st</sup> of each calendar year through the end of the first full pay period in December of the same year, an employee may request to cash out future vacation accruals by completing and submitting an Irrevocable Vacation Cash Out request form to the Director of Human Resources. Employees who submit the request form after the first full pay period of December shall be ineligible to receive the cash-out the following calendar year.

Once the election is made, it is irrevocable. If the employee does not select a date on which to receive the cash-out, the City will make payment in the last full pay period of the calendar year.

- 3. The employee will select either pay period 7, pay period 13, pay period 19 or pay period 24 to receive the cash-out; however, in no circumstances may an

employee receive payment for future vacation accrual cash-out until the employee has actually accrued the minimum number of vacation hours. For example, an employee earning 5 hours of vacation per pay period who wishes to cash out 40 hours of vacation accrual, may request their cash-out accrual any time after eight pay periods.

4. As a condition of applying for cash-out, an employee must consent to future payroll deductions (in accordance with Section 7 below) for necessary withholding of required taxes.
5. All cash-outs of future vacation accruals will be included in an employee's regular paycheck.

(e) Emergency Vacation Accrual Cash-Out

An employee may request to cash-out vacation due to an unanticipated emergency that is caused by an event beyond the control of the employee and when the employee can demonstrate that it would result in severe financial hardship to the employee if early withdrawal were not permitted.

Severe financial hardship to the employee includes:

1. Losses resulting from a sudden and unexpected illness or accident of the employee or of a qualified family member of an employee.
2. Losses of the employee's property due to casualty or other similar extraordinary and unforeseeable circumstances arising as a result of events beyond the control of the employee. However, losses that can be resolved through reimbursement or compensation by insurance or otherwise, or by liquidation of the employee's assets to the extent the liquidation of the assets would not itself cause severe financial hardship, or by cessation of voluntary deferrals to a 457 plan, shall disqualify an employee from eligibility to receive Emergency Vacation Accrual Cash-Out.
3. Any other reason allowable under IRS regulations.

(f) Vacation leave may not be carried over to cash-out in subsequent years (except upon separation from City service).

(g) Any adjustments for prior taxes in amounts greater than \$100.00 shall be deducted from an employee's paycheck consistent with the procedures described in MOU Section 36.05.

**For the City of Milpitas:**

**For the MPOA:**

\_\_\_\_\_  
Jeannine M. Seher

\_\_\_\_\_  
Date

*Alex Prince* 4/30/21  
\_\_\_\_\_  
Alexander Prince, President Date

\_\_\_\_\_  
Steven G. McHarris  
City Manager

\_\_\_\_\_  
Date



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Accept Commissioner Resignation</b>                                                                                             |
| <b>Category:</b>       | Consent Calendar-Leadership and Support Services                                                                                   |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                                                          |
| <b>Staff Contact:</b>  | <b>Wendy Wood, City Clerk, 408-586-3001</b>                                                                                        |
| <b>Recommendation:</b> | Accept commissioner Andrea Liu resignation from the Youth Advisory Commission and confirm the noticing of the unscheduled vacancy. |

### **Background:**

In accordance with the City of Milpitas Commission By-Laws, any member or alternate member of a Commission who is no longer available to serve, must submit a resignation in writing by sending a written communication to the Mayor and the City Clerk, per adopted City Council Resolution No. 7702. The written resignation must then be accepted and confirmed by City Council via action on the consent calendar at a regularly scheduled City Council meeting. Andrea Liu submitted a letter of resignation from Youth Advisory Commission on May 11, 2021.

### **Analysis:**

By state law, a Notice of an Unscheduled Vacancy must be posted by the City Clerk to advertise the vacant Commission seat. Final appointment to the board, commission, or committee for the Unscheduled Vacancy shall not be made by the legislative body for at least ten working days after the posting of the notice in the Clerk's office. The notice of the Unscheduled Vacancy for the Community Advisory Commission was posted on May 12, 2021, in accordance with California Government Code 54974 (a).

### **Fiscal Impact:**

There is no fiscal impact associated with this item.

### **Recommendation:**

Accept the resignation of Andrea Liu from the Youth Advisory Commission; and confirm noticing of the unscheduled vacancy.

### **Attachments:**

1. Email from Commissioner Andrea Liu



## Wendy Wood

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**Subject:** FW: [BULK] Resignation from YAC

**From:** Andrea Liu

**Sent:** Monday, May 10, 2021 11:07 PM

**To:** Mary Lavelle <[mlavelle@ci.milpitas.ca.gov](mailto:mlavelle@ci.milpitas.ca.gov)>

**Cc:** Anthony Teschera <[ateschera@ci.milpitas.ca.gov](mailto:ateschera@ci.milpitas.ca.gov)>

**Subject:** [BULK] Resignation from YAC

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links.

Hello,

I wanted to let you know that I (Andrea Liu) am resigning from the Youth Advisory Commission. My family has moved and we no longer live in Milpitas.

It's been a pleasure serving in the YAC!

Andrea Liu



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Vehicle Miles Traveled Policy to Implement Senate Bill 743</b>                                                                                                                                                                                                                                                                |
| <b>Category:</b>       | Community Development                                                                                                                                                                                                                                                                                                            |
| <b>Meeting Date:</b>   | 5/4/2021                                                                                                                                                                                                                                                                                                                         |
| <b>Staff Contact:</b>  | Ned Thomas, Director of Planning, 408-586-3273                                                                                                                                                                                                                                                                                   |
| <b>Recommendation:</b> | Conduct a public hearing and move to close the hearing following comments; and adopt a resolution for a new citywide policy to establish Vehicle Miles Traveled (VMT) as the standard of measurement for analysis of potential environmental impacts from vehicle traffic under the California Environmental Quality Act (CEQA). |

### **Background:**

In September 2013, the State of California signed into law Senate Bill 743 (SB 743), modifying how potential environmental impacts from vehicle traffic should be analyzed under the California Environmental Quality Act (CEQA). In February 2018, the State Office of Planning and Research (OPR) updated the CEQA statute, produced a Technical Guideline, and gave California cities until July 1, 2020 to implement the new law. The law establishes Vehicle Miles Traveled (VMT) as the appropriate methodology for measuring the environmental impacts of transportation. Attachment C (SB 743 Legislation) outlines the regulations.

Historically, the City of Milpitas and other jurisdictions have used LOS as the threshold for analyzing the significance of impacts to transportation infrastructure under CEQA. As a measure of congestion, LOS analysis assigns a letter grade (A through F) to intersections or roadway segments based on the ability to carry a certain level of traffic. California jurisdictions have been using LOS to analyze a project's CEQA transportation impacts since the inception of CEQA in 1970.

California has now shifted away from using LOS because traffic congestion is an indicator of roadway efficiency rather than environmental impacts and measuring congestion at intersections and along roadway segments can have the unintended consequence of encouraging urban sprawl. Under LOS, road widening and other infrastructure improvements, may induce new development to locate in more remote areas to avoid traffic impacts, which often results in increased vehicle use and traffic congestion overall because people must travel longer distances to reach destinations. This is particularly true when employment and residential neighborhoods are located far apart.

VMT measures the per capita number of vehicle trips generated by a project and estimates the distances that those vehicles will travel to and from a project rather than congestion levels at intersections. The legislative mandate under SB 743 seeks to balance the needs of congestion management with statewide goals to promote infill development, improve public health through active transportation, and ultimately, reduce greenhouse gas emissions. The City, as an environmental steward, has been working toward adoption of a new transportation policy that supports the mandate. Scores of cities and counties across the State have adopted similar policies.

City staff in consultation with local transportation planning experts, developed a citywide VMT policy to comply with State law and provide established and consistent criteria to analyze transportation impacts of development projects and long-range plans. Although no longer used to measure CEQA transportation impacts, LOS analysis will continue to be used by Milpitas to comply with the State-mandated Congestion Management

Program (CMP), which is a local transportation improvement program to reduce traffic congestion. The Valley Transportation Authority (VTA) administers the CMP for Santa Clara County and is responsible for overseeing the regional roadway network by maintaining a LOS standard.

On April 14, 2021, the Milpitas Planning Commission held a public hearing, reviewed the proposed VMT thresholds, and voted unanimously to adopt a resolution (Attachment B) recommending that the City Council adopt the VMT policy.

### **Analysis:**

Development of a new citywide VMT policy for transportation analysis under CEQA has been comprised of four major tasks or milestones:

1. **Outreach and Engagement:** Stakeholder engagement efforts have included a project website with background information and FAQs, feedback from the Development Review Committee and Community Development Roundtable, and presentations to the Planning Commission and City Council. An internal working group analyzed the effects of implementing VMT and alignment with the City's General Plan, Climate Action Plan, City Council priorities, and other adopted policies. Staff also coordinated with various departments to ensure successful implementation of the policy during development review, with an emphasis on incentivizing affordable housing projects.
2. **Technical Evaluation:** Staff evaluated the state recommendations included in the Technical Guidelines and VMT policies recently adopted by other cities including San Jose, Sunnyvale, Fremont, and Mountain View. Staff also participated in the Valley Transportation Authority (VTA) LOS-to-VMT working group to better understand State law, ongoing implementation efforts by other cities, and the tools and methodologies available to measure VMT. Some of the items for consideration included facilitating affordable housing, encouraging transit-oriented development, and optimizing the policy for land use planning in special areas of the City.
3. **Policy Formulation:** Based on the results of the outreach and technical evaluation, staff developed a VMT policy that supports the City's General Plan land use and transportation goals. Key considerations for a VMT policy included:
  - Baseline VMT: Establishing the existing VMT conditions by which projects will be analyzed and compared to;
  - CEQA Thresholds of Significance for VMT impacts: Establishing the level at which impacts will be considered significant and less than significant; and
  - CEQA Exemptions to VMT Analysis: Determining which projects can be presumed to have a less than significant VMT impact and would therefore not be required to conduct a VMT analysis.

The state guidelines allow California cities to set their own policy requirements, provided the adopted policy promotes: 1) a reduction of greenhouse gas emissions; 2) the development of multimodal transportation networks; and 3) the diversity of land uses proximate to each other. Ultimately, staff formulated a methodology for VMT analysis that can be applied throughout the City, is context sensitive, and promotes the goals of the City's new General Plan.

The staff working group also developed a methodology to measure and maintain intersection operations, no longer as a CEQA measure, but as an operational tool. The VMT CEQA metric, which is so important in addressing climate change, does not focus on intersection or roadway operations. For those reasons, the proposed policy includes LOS requirements for monitoring and maintaining Milpitas' transportation roadway network for all the residents, employees, and visitors that rely on it every day.

4. **Policy Adoption:** Council adoption of the new citywide VMT Policy is the final step toward bringing the City into compliance with the requirements of SB 743. Attachment D is the draft VMT Policy developed by staff and the consultants for the City of Milpitas.

### The Countywide Transition from LOS to VMT

VTA, in support of this transition from LOS to VMT, and in an ongoing partnership with all the cities in Santa Clara County, has provided publicly accessible resources on their website. These resources include “heat maps” which provide information on existing VMT levels and the Transit Priority Areas and the Santa Clara County VMT Evaluation Tool which is used to measure VMT for many land use projects. The County has also developed an updated Travel Demand Model based on current land use and transportation information to help cities manage the transition to VMT.

### **Key Policy Definitions and Metrics**

The transition from LOS to VMT will change how the City analyzes potential transportation impacts under CEQA. As noted above, VMT measures the per capita number of vehicle trips generated by a project and estimates the distances that those vehicles will travel to and from a project while LOS measures congestion levels at intersections (graded on a scale of A–F).

The proposed VMT policy establishes the following metrics:

1. **Baseline VMT**: VTA established a baseline VMT for both residential and employment projects throughout Santa Clara County, which is used by staff to measure the existing VMT conditions in the City.
2. **CEQA Thresholds of Significance**: Project impacts will be considered significant for both residential and employment projects if they fall below 15% of the countywide baseline levels.
3. **CEQA Exemptions**: The State recommends that certain developments should be exempt from VMT analysis with a presumption of less-than-significant impact if a project is likely to reduce VMT. Exemptions are based on project size, location and type (i.e., affordable housing or locally serving development).
4. **Methodology for Transportation Projects**: The State recommends that transportation projects that increase roadway capacity require a VMT analysis to evaluate induced VMT, while multimodal transportation projects are exempt from VMT analysis.
5. **LOS Analysis Requirements**: Since LOS is still required by City policy and the CMP, projects will continue to analyze and address LOS.

### Baseline VMT

Baseline VMT is defined as the current average amount of vehicle miles residents and employees are traveling in daily life. Existing VMT averages at the City, County, and Regional (i.e. 9 Bay Area Counties) levels were developed by VTA with information from their Travel Demand Model, Census data, the California Household Survey, and existing land use information provided by city staff. Additionally, VMT averages are further separated into two distinct land uses; 1) household (i.e., residential) and 2) employment. Table A provides the average VMT for both types of land uses at each level:

**Table A: Existing Average VMT by Land Use**

| <b>Land Use</b>             | <b>Milpitas</b> | <b>Countywide</b> | <b>Regional</b> |
|-----------------------------|-----------------|-------------------|-----------------|
| Household VMT per Capita    | 12.12           | 13.33             | 13.95           |
| Employment VMT per Employee | 17.54           | 16.64             | 15.33           |

City staff evaluated these options and selected the Countywide average as the City’s baseline VMT for both residential and employment due to the many countywide resources available today to help reduce VMT. VTA, the transit agency for Santa Clara County, is the administrator of various multimodal transportation funds and grants (e.g., 2016 Measure B). Consequently, VTA has developed comprehensive programs which bring Santa Clara County cities together to discuss countywide transportation projects, land use planning, and transportation issues, as traffic is a regional issue. Staff created heat maps to show the City’s baseline or existing VMT for each parcel (Attachment E).

### CEQA Thresholds of Significance

In addition to establishing the baseline VMT, CEQA also requires the City's VMT policy to establish a threshold of significance. This threshold is the minimum level of significant impacts at which CEQA would require the City to disclose these impacts and either identify mitigation measures or adopt findings to override impacts. The proposed policy is following the State's recommendation to use a significance threshold of 15% below baseline VMT levels for residential and employment projects, which contribute most to VMT.

This recommendation is based on several factors:

- This threshold can be achievable for a variety of projects throughout California;
- A 15% reduction is consistent with California Climate Action Plan goals; and
- Using a 15% threshold creates consistency throughout California jurisdictions.

City staff recommends using the 15% threshold for residential and employment projects to align with the State recommendation. This will allow the City to meet the State's requirements and apply a conservative approach when determining VMT methodology to development in the City. These policy considerations can always be revisited in the future after the City becomes accustomed to measuring VMT and as more VMT resources are available.

Lead agencies may develop their own specific thresholds for other land uses such as regional land uses. This can include regional hospitals, stadiums, sports complexes, private schools, and regional shopping centers. Consistent with the State's recommendation, the policy establishes a net increase in total VMT as a significant transportation impact for regional land uses.

#### CEQA Exemptions

The State guidelines recommend that certain development projects should be exempt from VMT analysis with a presumption of less than significant impact if a project is likely to reduce VMT. The recommended exemptions include:

- Small Infill Projects: Projects that generate 110 or less daily vehicle trips.
- Local Serving Retail: Although the State guidelines establish a maximum floor area of 50,000 square feet, cities have the flexibility to establish their own criteria based on their local context. The policy proposes a maximum floor area of 100,000 square feet since many of the City's existing retail shopping centers are over 50,000 square feet in size.
- Affordable Residential Projects: Although the State guidelines recommend an exemption for 100% affordable residential projects, cities have the flexibility to establish their own criteria based on their local context. The policy proposes an exemption for mixed-income residential projects to incentivize developers to provide affordable units on site beyond the requirements of the City's Affordable Housing Ordinance.
- Transit-Supportive Projects: Certain projects<sup>1</sup> within a Transit Priority Area (TPA) are exempt because they support and encourage walking, biking, and transit as viable transportation options. A TPA is an area within ½ mile of an existing transit stop/station or high quality transit corridor, which includes all rail transit and major bus routes with a frequency of 15 minutes or less during morning and evening peak hours.

The State further recommends that transit-supportive projects have the following characteristics:

- A Floor Area Ratio (FAR) of 0.75 or greater;
- Does not propose more parking for use by residents, customers or employees of the project than required by the jurisdiction;
- Is consistent with the applicable Sustainable Communities Strategies (as determined by the lead

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<sup>1</sup> The State defines these as residential, retail, and office projects as well as projects that are a mix of these uses.

agency); and

- Does not replace affordable residential units with a smaller number of moderate- or high-income residential units.

City staff incorporated the State's proposed criteria for transit supportive development within ½ mile of existing transit stop/station or high-quality transit corridor to align with the City's General Plan and planned growth areas. Furthermore, the policy proposes more specific criteria for residential developments within the Transit Priority Area (TPA). Since residential density is often measured in dwelling units per acre (du/ac) rather than FAR, the policy establishes minimum residential densities of 35 du/ac overall, 40 du/ac for the Sierra Center area, and 50 du/ac for the Metro Plan area. See the City's VMT "heatmaps" (Attachment E) for the boundaries of the Sierra Center area and Metro Plan area.

The VMT policy also exempts local serving community facilities such as fire stations, neighborhood parks, branch libraries, and community centers from VMT analysis under CEQA since they typically reduce trip lengths by providing closer amenities and services for residential neighborhoods.

#### Methodology for Transportation Projects

The policy also includes guidelines for analyzing the VMT impacts of local transportation improvement projects such as roadway projects that add vehicle capacity and/or include significant pedestrian and bicycle improvements. The State recommends that these types of projects should be analyzed for near-term and long-term induced VMT. The analysis should: 1) determine if the transportation project is consistent with the State's GHG reduction goals, 2) evaluate if the project has any potential impacts to the multimodal transportation network (hinders or prevents access to walking, biking or transit), and 3) evaluate any potential impacts to the diversity of land use in the city (i.e., results in an undesirable place to live or work due to location or physical conditions). Most new transportation projects within Santa Clara County include significant pedestrian and bicycle improvements which have the potential to offset any increase in VMT generated by roadway capacity improvements.

#### LOS Analysis Requirement

While LOS analysis will no longer be required for CEQA purposes, the proposed VMT policy will continue to require the use of LOS as an analysis tool and operational assessment for projects that are likely to have impacts on intersection operations and traffic flow. A typical transportation operational analysis may include the following: 1) intersection LOS analysis; 2) intersection left-turn storage analysis; 3) project driveway access and circulation; 4) traffic signal warrant studies; 5) pedestrian, bicycle, and transit assessment and improvements; 6) traffic control and crosswalk evaluation; 7) neighborhood intrusion or cut-through 8) parking; and 9) Congestion Management Program requirements. The City's Traffic Engineer may also require other engineering studies.

There are many benefits to studying, monitoring and investing in traffic signal operations and infrastructure. All the Santa Clara County cities included requirements for new development to study LOS and improve intersection operations when warranted. Investing in efficient traffic signal operations ensures safe access and circulation, optimum signal timing, well-designed intersections that accommodate left-turn, right-turn demand, implementation of pedestrian, bicycle and transit improvements, and technology upgrades.

#### **Alignment with Other Policy Efforts**

The City recently updated the General Plan to address new planning issues including air quality, energy, community health and wellness, and climate change. The General Plan acknowledges that land development and transportation goals affect the environment and embraces strategies to reduce VMT. The General Plan also recognizes the need for a balanced transportation system and focuses new development in mixed-use neighborhoods near transit, bringing together office, residential, commercial, and service land uses that reduce VMT and encourage the use of non-automobile transportation modes.

The following General Plan goals and policies most directly support this new policy:

- **Goal CIR-1:** Provide a transportation system that efficiently, equitably and effectively supports the City's land use vision, minimizes vehicle miles traveled (VMT), enhances connectivity of the existing network, and supports the use of all modes of transportation.
- **Policy LU 3-1:** Support regional efforts that promote higher densities near major transit and travel facilities and reduce regional vehicle miles traveled by supporting active modes of transportation including walking, biking, and public transit. Support local and regional land use decisions that promote safe access to and the use of alternatives to auto transit.
- **Policy LU 4-2:** Emphasize efforts to reduce regional vehicle miles traveled by supporting land use patterns and site designs that promote active modes of transportation, including walking, biking, and public transit.

Other General Plan goals, policies, and actions that support VMT reduction include Policy CIR 1-8, Action CIR-1c, Goal CIR-2, Goal CIR-5, Goal CIR-6, Policy CIR 6-2, Policy CIR 6-3, Policy LU 1-1, Policy CHW 1-3, Policy CHW 4-1, Action CHW-4a, Policy CON 7-1, Policy CON 7-10, and many others. The proposed VMT policy supports these policies by encouraging mixed-use, infill, and transit-oriented development and prioritizing active transportation and transit improvements to mitigate project impacts.

Staff also developed the VMT policy in conjunction with the Climate Action Plan and the Milpitas Metro Specific Plan to ensure that the policy furthers the goals and policies of the City's ongoing long-range planning efforts. The policy facilitates the buildout of the General Plan and adopted specific plans by supporting new development near the Milpitas Transit Center, Midtown, and other priority development areas well-served by transit and other amenities.

#### **Policy Alternative:**

Alternative: Do not adopt a new VMT policy.

Pros: None.

Cons: Without a VMT CEQA threshold, the City would not have an established and consistent criteria for analyzing transportation impacts under CEQA. Therefore, the City would have to analyze transportation impacts for development projects on an ad-hoc basis, which would increase staff time spent on project management and coordinating with CEQA consultants. Furthermore, analyzing transportation projects on an ad-hoc basis would make it difficult for the City to comply with State law (CEQA Guidelines Section 15064.3), which provides requirements for evaluating a project's transportation impacts.

Reasons not recommended: The City and development projects could be without a consistent methodology for analyzing transportation impacts. Staff would also have to divert more time and resources to ensuring that the evaluation of each development project is in compliance with the State's requirements for VMT analysis.

#### **Fiscal Impact:**

Adoption of the proposed policy will result in no fiscal impact to the City.

#### **Environmental Review:**

Per CEQA Guidelines Section 15064.7(b), the City can, via a public process, and supported by substantial evidence, develop a VMT threshold of significance it would like to employ for general use in CEQA documents, a threshold which it must then adopt by ordinance, resolution, rule, or regulation.

#### **Recommendation:**

Move to continue the public hearing to the regular City Council meeting of May 18, 2021.

#### **Attachments:**

- A. City Council Resolution
- B. Planning Commission Resolution No. 21-011
- C. SB 743 Legislation
- D. Draft VMT Policy
- E. City VMT Heat Maps

**RESOLUTION NO. 21-\_\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS ADOPTING  
A NEW CITYWIDE POLICY ESTABLISHING VEHICLE MILES TRAVELED (VMT)  
AS THE STANDARD OF MEASUREMENT FOR ANALYSIS OF POTENTIAL  
ENVIRONMENTAL IMPACTS FROM VEHICLE TRAFFIC UNDER THE  
CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)**

**WHEREAS**, the California Environmental Quality Act (CEQA) was enacted by the State of California in 1970 to ensure the long-term protection of the environment and requires public agencies to analyze and disclose the effects of their actions on the environment; and

**WHEREAS**, the California Office of Planning and Research develops the CEQA Guidelines to interpret CEQA statutes and published court decisions, including several appendices to the CEQA Guidelines that contain forms and guidance for lead agencies when performing environmental review; and

**WHEREAS**, in order to carry out their mandate under CEQA, public agencies are encouraged to develop standards and procedures necessary to evaluate their actions including thresholds of significance; and

**WHEREAS**, thresholds of significance are identifiable quantitative, qualitative or performance level measures of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant, and compliance with which means the effect normally will be determined to be less than significant; and

**WHEREAS**, in circumstances where public agencies decide to develop their own thresholds of significance for general use, the CEQA Guidelines provide that thresholds of significance must be formally adopted through a public review process and supported by substantial evidence; and

**WHEREAS**, the City of Milpitas (“City”), as a lead agency on certain projects, implements CEQA pursuant to the Milpitas Municipal Code; and

**WHEREAS**, the Milpitas General Plan provides the following goals and policies:

- **Goal CIR-1:** Provide a transportation system that efficiently, equitably and effectively supports the City’s land use vision, minimizes vehicle miles traveled (VMT), enhances connectivity of the existing network, and supports the use of all modes of transportation.
- **Policy LU 3-1:** Support regional efforts that promote higher densities near major transit and travel facilities and reduce regional vehicle miles traveled by supporting active modes of transportation including walking, biking, and public transit. Support local and regional land use decisions that promote safe access to and the use of alternatives to auto transit.
- **Policy LU 4-2:** Emphasize efforts to reduce regional vehicle miles traveled by supporting land use patterns and site designs that promote active modes of transportation, including walking, biking, and public transit.

**WHEREAS**, public agencies in California have historically relied on a metric known as “Level of Service” (LOS) to evaluate the transportation impacts of development projects under CEQA; and



**WHEREAS**, LOS solely measures how project-generated traffic will increase delay at local and regional intersections, requiring mitigations for those impacts that prioritize the construction of capital improvements to facilitate automobile travel; and

**WHEREAS**, in 2013, the State of California Legislature passed, and Governor Brown signed Senate Bill 743 (Steinberg). Senate Bill 743 directs the California Office of Planning and Research to produce new CEQA guidance for cities that removes automobile LOS from transportation analysis under CEQA and replaces it with Vehicle Miles Traveled (“VMT”), or another measure that “promote(s) the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” The intent of this change is to shift the focus of transportation analysis from driver delay to the reduction of greenhouse gas (GHG) emissions, creation of multimodal networks, and promotion of integrated land uses; and

**WHEREAS**, VMT measures the amount and distance people drive, taking the number of passengers within a vehicle into account. Typically, projects at a greater distance from other uses, located in areas with limited access to non-auto modes of travel, generate more driving than those that are located proximate to other complementary uses and/or where there are transportation options other than the automobile. The information used to calculate VMT is already required to calculate and factor air quality and greenhouse gas emissions; and

**WHEREAS**, on December 28, 2018, the California Natural Resources Agency certified and adopted a CEQA Guidelines update package, including the Guidelines section implementing Senate Bill 743 (§ 15064.3) and directs all public agencies to utilize VMT as a threshold of significance by July 1, 2020; and

**WHEREAS**, the City wishes to adopt the proposed VMT thresholds to bring the City of Milpitas’ transportation analysis methodology in line with State and City goals pursuant to Senate Bill 743 and the Milpitas General Plan; and

**WHEREAS**, Public Resources Code Section 21082 requires all public agencies to adopt by ordinance, resolution, rule, or regulation, objectives, criteria, and procedures for the evaluation of projects and the preparation of environmental impact reports and negative declarations in connection with that evaluation; and

**WHEREAS**, CEQA Guidelines Section 15064.7(a) encourages each public agency “to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects” under CEQA; and

**WHEREAS**, CEQA Guidelines Section 15064.7(b) provides that “[t]hresholds of significance to be adopted for general use as part of the lead agency’s environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence”; and

**WHEREAS**, in accordance with CEQA Guidelines Section 15064.7(b), staff developed proposed threshold of significance through a public review process supported by substantial evidence; and

**WHEREAS**, outreach efforts were conducted with the community including a presentation to the City Council Transportation Subcommittee on August 14<sup>th</sup>, 2020, a presentation to the Planning Commission on August 26<sup>th</sup>, 2020, presentations to the Development Review Committee and the Community Development Roundtable, and a public notice in the *Milpitas Post* on April 2, 2021 and April

28, 2021, on the City’s website, and posted at City hall in accordance with City and state public noticing requirements; and

**WHEREAS**, on April 14, 2021, the Planning Commission held a duly noticed public hearing on the proposed VMT thresholds, at which time all persons wishing to testify in connection with the proposed thresholds were heard, and recommended that the City Council consider the proposed VMT thresholds; and

**WHEREAS**, on May 4, 2021, the City Council held a duly noticed public hearing at which time all persons wishing to testify in connection with the proposed VMT thresholds were heard and the proposed thresholds were comprehensively reviewed; and

**WHEREAS**, the City Council has considered all the written and oral testimony presented at the public hearing in making its decision; and

**WHEREAS**, all other legal prerequisites to the adoption of this Resolution have occurred.

**NOW THEREFORE**, the City Council of the City of Milpitas hereby finds, determines, and resolves as follows:

1. The City Council has duly considered the full record before it, which may include but is not limited to such things as the City staff report, testimony by staff and the public, and other materials and evidence submitted or provided to the City Council. Furthermore, the recitals set forth above are found to be true and correct and are incorporated herein by reference.
2. The City of Milpitas Transportation Analysis Policy, attached hereto and incorporated herein by this reference, is consistent with the policies of the General Plan and the City of Milpitas Municipal Code.
3. The VMT thresholds have been developed through a public review process, are supported by substantial evidence, and are hereby adopted as the City of Milpitas’ VMT Thresholds of Significance for traffic and transportation analysis pursuant to the California Environmental Quality Act.
4. The City of Milpitas hereby adopts the Transportation Analysis Policy, a copy of which is on file at the Planning Department – 455 East Calaveras Blvd., Milpitas, CA 95035.
5. The adoption of a threshold of significance does not qualify as a “project” subject to CEQA. The City Council therefore directs City staff to prepare, execute, and file a Notice of Exemption with the City Clerk within five (5) working days of the passage and adoption of this Resolution.
6. The documents and materials that constitute the record of proceedings on which these findings are based are located at the Planning Department – 455 East Calaveras Blvd., Milpitas, CA 95035.
7. This Resolution shall be effective upon its adoption.

PASSED AND ADOPTED this \_\_\_\_ day of \_\_\_\_ 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

## RESOLUTION NO. 21-011

### A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF MILPITAS RECOMMENDING THAT THE CITY COUNCIL ADOPT A NEW CITYWIDE POLICY ESTABLISHING VEHICLE MILES TRAVELED (VMT) AS THE STANDARD OF MEASUREMENT FOR ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS FROM VEHICLE TRAFFIC UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

**WHEREAS**, the California Environmental Quality Act (CEQA) was enacted by the State of California in 1970 to ensure the long-term protection of the environment and requires public agencies to analyze and disclose the effects of their actions on the environment; and

**WHEREAS**, the California Office of Planning and Research develops the CEQA Guidelines to interpret CEQA statutes and published court decisions, including several appendices to the CEQA Guidelines that contain forms and guidance for lead agencies when performing environmental review; and

**WHEREAS**, in order to carry out their mandate under CEQA, public agencies are encouraged to develop standards and procedures necessary to evaluate their actions including thresholds of significance; and

**WHEREAS**, thresholds of significance are identifiable quantitative, qualitative or performance level measures of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant, and compliance with which means the effect normally will be determined to be less than significant; and

**WHEREAS**, in circumstances where public agencies decide to develop their own thresholds of significance for general use, the CEQA Guidelines provide that thresholds of significance must be formally adopted through a public review process and supported by substantial evidence; and

**WHEREAS**, the City of Milpitas ("City"), as a lead agency on certain projects, implements CEQA pursuant to the Milpitas Municipal Code; and

**WHEREAS**, the Milpitas General Plan provides the following goals and policies:

- **Goal CIR-1:** Provide a transportation system that efficiently, equitably and effectively supports the City's land use vision, minimizes vehicle miles traveled (VMT), enhances connectivity of the existing network, and supports the use of all modes of transportation.
- **Policy LU 3-1:** Support regional efforts that promote higher densities near major transit and travel facilities and reduce regional vehicle miles traveled by supporting active modes of transportation including walking, biking, and public transit. Support local and regional land use decisions that promote safe access to and the use of alternatives to auto transit.

- **Policy LU 4-2:** Emphasize efforts to reduce regional vehicle miles traveled by supporting land use patterns and site designs that promote active modes of transportation, including walking, biking, and public transit.

**WHEREAS**, public agencies in California have historically relied on a metric known as “Level of Service” (LOS) to evaluate the transportation impacts of development projects under the California Environmental Quality Act (CEQA); and

**WHEREAS**, LOS solely measures how project-generated traffic will increase delay at local and regional intersections, requiring mitigations for those impacts that prioritize the construction of capital improvements to facilitate automobile travel; and

**WHEREAS**, in 2013, the State of California Legislature passed, and Governor Brown signed Senate Bill 743 (Steinberg). Senate Bill 743 directs the California Office of Planning and Research to produce new CEQA guidance for cities that removes automobile LOS from transportation analysis under CEQA and replaces it with Vehicle Miles Traveled (“VMT”), or another measure that “promote(s) the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” The intent of this change is to shift the focus of transportation analysis from driver delay to the reduction of greenhouse gas (GHG) emissions, creation of multimodal networks, and promotion of integrated land uses; and

**WHEREAS**, VMT measures the amount and distance people drive, taking the number of passengers within a vehicle into account. Typically, projects at a greater distance from other uses, located in areas with limited access to non-auto modes of travel, generate more driving than those that are located proximate to other complementary uses and/or where there are transportation options other than the automobile. The information used to calculate VMT is already required to calculate and factor air quality and greenhouse gas emissions; and

**WHEREAS**, on December 28, 2018, the California Natural Resources Agency certified and adopted a CEQA Guidelines update package, including the Guidelines section implementing Senate Bill 743 (§ 15064.3) and directs all public agencies to utilize VMT as a threshold of significance by July 1, 2020; and

**WHEREAS**, the City wishes to adopt the proposed VMT policy to bring the City of Milpitas’ transportation analysis methodology in line with State and City goals pursuant to Senate Bill 743 and the Milpitas General Plan; and

**WHEREAS**, CEQA Guidelines Section 15064.7(b) directs the City to adopt thresholds of significance based on substantial evidence by ordinance, resolution, rule or regulation through a public process; and

**WHEREAS**, outreach efforts were conducted with the community including a presentation to the City Council Transportation Subcommittee on August 14<sup>th</sup>, 2020, a presentation to the Planning Commission on August 26<sup>th</sup>, 2020, presentations to the Development Review Committee and the Community Development Roundtable, and a public notice in the *Milpitas Post* on April 2, 2021, on the City’s website, and posted at City hall in

accordance with City and state public noticing requirements; and

**WHEREAS**, on April 14, 2021, the Planning Commission held a duly noticed public hearing on the subject application, at which all those in attendance were given the opportunity to speak on the VMT policy; and

**WHEREAS**, the Planning Commission has considered all the written and oral testimony presented at the public hearing in making its decision.

**NOW THEREFORE**, the Planning Commission of the City of Milpitas hereby finds, determines and resolves as follows:

**SECTION 1. Recitals.**

The Planning Commission has duly considered the full record before it, which may include but is not limited to such things as the City staff report, testimony by staff and the public, and other materials and evidence submitted or provided to the Planning Commission. Furthermore, the recitals set forth above are found to be true and correct and are incorporated herein by reference.

**SECTION 2:** The Planning Commission of the City of Milpitas hereby adopts Resolution No. 21-011 recommending that the City Council adopt a new citywide policy establishing Vehicle Miles Traveled (VMT) as the standard of measurement for analysis of potential environmental impacts from vehicle traffic under the California Environmental Quality Act (CEQA), which is attached hereto as Exhibit A.

**PASSED AND ADOPTED** at a regular meeting of the Planning Commission of the City of Milpitas on April 14, 2021.

DocuSigned by:



Apr-21-2021

E442E89E520C4C8

Steve Tao, Chair

**Resolution No. 21-011****Page 4****TO WIT:**

**I HEREBY CERTIFY** that the following resolution was duly adopted at a regular meeting of the Planning Commission of the City of Milpitas on April 14, 2021 and carried by the following roll call vote:

| <b>COMMISSIONER</b> | <b>AYES</b> | <b>NOES</b> | <b>ABSENT</b> | <b>ABSTAIN</b> |
|---------------------|-------------|-------------|---------------|----------------|
| Steve Tao           | ✓           |             |               |                |
| Bill Chuan          | ✓           |             |               |                |
| Tim Alcorn          | ✓           |             |               |                |
| Steve Belong        | ✓           |             |               |                |
| Mercedes Albana     | ✓           |             |               |                |
| Larry Ciardella     | ✓           |             |               |                |
| Alexander Galang    | ✓           |             |               |                |

## Certificate of Completion

Envelope Id: 0781E47DA4FF4A88A178D524B9EBFA18

Status: Completed

Subject: Please DocuSign: Attachment A\_Resolution 21-011\_for Chair to sign.pdf

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Signatures: 1

Envelope Originator:

Certificate Pages: 5

Initials: 0

Elizabeth Medina

AutoNav: Enabled

455 E Calaveras Blvd

Envelopeld Stamping: Enabled

Milpitas, CA 95035

Time Zone: (UTC-08:00) Pacific Time (US & Canada)

emedina@ci.milpitas.ca.gov

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## Signer Events

Chair Steve Tao

stao@bccre.com

independent contractor

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## Signature

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Accepted: May 15, 2020 | 09:28

ID: 1d0a65ad-ac94-42a6-9f67-3eff56c7a0be

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Jay Lee

jlee2@ci.milpitas.ca.gov

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Elizabeth Medina

emedina@ci.milpitas.ca.gov

Administrative Assistant

City of Milpitas

Security Level: Email, Account Authentication  
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Sent: April 21, 2021 | 08:24

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## Signature

## Timestamp



| Notary Events                              | Signature        | Timestamp              |
|--------------------------------------------|------------------|------------------------|
| Envelope Summary Events                    | Status           | Timestamps             |
| Envelope Sent                              | Hashed/Encrypted | April 20, 2021   18:10 |
| Certified Delivered                        | Security Checked | April 21, 2021   08:23 |
| Signing Complete                           | Security Checked | April 21, 2021   08:23 |
| Completed                                  | Security Checked | April 21, 2021   08:24 |
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Unless you tell us otherwise in accordance with the procedures described herein, we will provide electronically to you through the DocuSign system all required notices, disclosures, authorizations, acknowledgements, and other documents that are required to be provided or made available to you during the course of our relationship with you. To reduce the chance of you inadvertently not receiving any notice or disclosure, we prefer to provide all of the required notices and disclosures to you by the same method and to the same address that you have given us. Thus, you can receive all the disclosures and notices electronically or in paper format through the paper mail delivery system. If you do not agree with this process, please let us know as described below. Please also see the paragraph immediately above that describes the consequences of your electing not to receive delivery of the notices and disclosures electronically from us.

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You may contact us to let us know of your changes as to how we may contact you electronically, to request paper copies of certain information from us, and to withdraw your prior consent to receive notices and disclosures electronically as follows:

To contact us by email send messages to: [mluu@ci.milpitas.ca.gov](mailto:mluu@ci.milpitas.ca.gov)

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To let us know of a change in your email address where we should send notices and disclosures electronically to you, you must send an email message to us at [mluu@ci.milpitas.ca.gov](mailto:mluu@ci.milpitas.ca.gov) and in the body of such request you must state: your previous email address, your new email address. We do not require any other information from you to change your email address.

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- i. decline to sign a document from within your signing session, and on the subsequent page, select the check-box indicating you wish to withdraw your consent, or you may;
- ii. send us an email to [mluu@ci.milpitas.ca.gov](mailto:mluu@ci.milpitas.ca.gov) and in the body of such request you must state your email, full name, mailing address, and telephone number. We do not need any other information from you to withdraw consent.. The consequences of your withdrawing consent for online documents will be that transactions may take a longer time to process..

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### **Acknowledging your access and consent to receive and sign documents electronically**

To confirm to us that you can access this information electronically, which will be similar to other electronic notices and disclosures that we will provide to you, please confirm that you have read this ERSD, and (i) that you are able to print on paper or electronically save this ERSD for your future reference and access; or (ii) that you are able to email this ERSD to an email address where you will be able to print on paper or save it for your future reference and access. Further, if you consent to receiving notices and disclosures exclusively in electronic format as described herein, then select the check-box next to ‘I agree to use electronic records and signatures’ before clicking ‘CONTINUE’ within the DocuSign system.

By selecting the check-box next to ‘I agree to use electronic records and signatures’, you confirm that:

- You can access and read this Electronic Record and Signature Disclosure; and
- You can print on paper this Electronic Record and Signature Disclosure, or save or send this Electronic Record and Disclosure to a location where you can print it, for future reference and access; and
- Until or unless you notify Carahsoft OBO City of Milpitas as described above, you consent to receive exclusively through electronic means all notices, disclosures, authorizations, acknowledgements, and other documents that are required to be provided or made available to you by Carahsoft OBO City of Milpitas during the course of your relationship with Carahsoft OBO City of Milpitas.



**SB-743 Environmental quality: transit oriented infill projects, judicial review streamlining for environmental leadership development projects, and entertainment and sports center in the City of Sacramento. (2013-2014)**

SHARE THIS:



### Senate Bill No. 743

#### CHAPTER 386

An act to amend Sections 65088.1 and 65088.4 of the Government Code, and to amend Sections 21181, 21183, 21186, 21187, 21189.1, and 21189.3 of, to add Section 21155.4 to, to add Chapter 2.7 (commencing with Section 21099) to Division 13 of, to add and repeal Section 21168.6.6 of, and to repeal and add Section 21185 of, the Public Resources Code, relating to environmental quality.

[ Approved by Governor September 27, 2013. Filed with Secretary of State September 27, 2013. ]

#### LEGISLATIVE COUNSEL'S DIGEST

SB 743, Steinberg. Environmental quality: transit oriented infill projects, judicial review streamlining for environmental leadership development projects, and entertainment and sports center in the City of Sacramento.

(1) The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 requires a party bringing an action or proceeding alleging that a lead agency's approval of a project certified by the Governor as an environmental leadership development project is in violation of the California Environmental Quality Act to file the action or proceeding with the Court of Appeal with geographic jurisdiction over the project and requires the Court of Appeal to issue its decision within 175 days of the filing of the petition. The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 requires the lead agency to concurrently prepare the record of proceeding for the leadership project with the review and consideration of the project. The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 provides that the above provision does not apply to a project for which a lead agency fails to certify an environmental impact report on or before June 1, 2014. The Jobs and Economic Improvement Through Environmental Leadership Act of 2011 is repealed by its own terms on January 1, 2015.

This bill would instead require the Judicial Council, on or before July 1, 2014, to adopt a rule of court to establish procedures applicable to actions or proceedings seeking judicial review of a public agency's action in certifying the environmental impact report and in granting project approval that requires the actions or proceedings, including any appeals therefrom, be resolved, within 270 days of the certification of the record of proceedings. The bill would extend the operation of the judicial review procedures unless the lead agency fails to certify an environmental impact report for an environmental leadership project on or before January 1, 2016. The bill would provide that the above provisions do not apply to a project if the Governor does not certify the project as an environmental leadership development project prior to January 1, 2016. Because this bill would extend the time period for which a lead agency would be required to concurrently prepare the record of proceeding with the review and consideration of the environmental leadership development projects, this bill would impose a state-mandated local program. The bill would require the lead agency, within 10 days of the Governor's certification, to issue, at the applicant's expense, a specified public notice, thereby imposing a state-mandated local program.

The bill would repeal the Jobs and Economic Improvement Through Environmental Leadership Act of 2011 on January 1, 2017.

(2) The California Environmental Quality Act, commonly known as CEQA, requires a lead agency, as defined, to prepare, or cause to be prepared, and certify the completion of, an environmental impact report on a project that it proposes to carry out or approve that may have a significant effect on the environment or to adopt a negative declaration if it finds that the project will not have that effect. CEQA also requires a lead agency to prepare a mitigated negative declaration for a project that may have a significant effect on the environment if revisions in the project would avoid or mitigate that effect and there is no substantial evidence that the project, as revised, would have a significant effect on the environment. CEQA establishes a procedure by which a person may seek judicial review of the decision of the lead agency made pursuant to CEQA.

This bill would provide that aesthetic and parking impacts of a residential, mixed-use residential, or employment center project, as defined, on an infill site, as defined, within a transit priority area, as defined, shall not be considered significant impacts on the environment. The bill would require the Office of Planning and Research to prepare and submit to the Secretary of the Natural Resources Agency, and the secretary to certify and adopt, revisions to the guidelines for the implementation of CEQA establishing criteria for determining the significance of transportation impacts of projects within transit priority areas.

This bill would, except for specified circumstances, exempt from CEQA residential, employment center, and mixed-use development projects meeting specified criteria. Because a lead agency would be required to determine the applicability of this exemption, this bill would impose a state-mandated local program.

This bill would require the public agency, in certifying the environmental impact report and in granting approvals for a specified entertainment and sports center project located in the City of Sacramento, including the concurrent preparation of the record of proceedings and the certification of the record of proceeding within 5 days of the filing of a specified notice, to comply with specified procedures. Because a public agency would be required to comply with those new procedures, this bill would impose a state-mandated local program. The bill would require the Judicial Council, on or before July 1, 2014, to adopt a rule of court to establish procedures applicable to actions or proceedings seeking judicial review of a public agency's action in certifying the environmental impact report and in granting project approval that requires the actions or proceedings, including any appeals therefrom, be resolved, to the extent feasible, within 270 days of the certification of the record of proceedings. The bill would provide that the above provisions are inoperative and repealed on January 1 of the following year if the applicant fails to notify the lead agency before the release of the draft environmental impact report for public comment that the applicant is electing to proceed pursuant to the above provisions.

(3) Existing law requires the development, adoption, and updating of a congestion management program for each county that includes an urbanized area, as defined. The plan is required to contain specified elements and to be submitted to regional agencies, as defined, for determination of whether the program is consistent with regional transportation plans. The regional agency is then directed to monitor the implementation of all elements of each congestion management program. The required elements include traffic level of service standards for a system of designated highways and roadways. Existing law defines "infill opportunity zone" for purposes of the above-described provisions and exempts streets and highways in an infill opportunity zone from the level of service standards specified in the above-described provisions and instead requires alternate level of service standards to be applied. Existing law prohibits a city or county from designating an infill opportunity zone after December 31, 2009.

This bill would revise the definition of "infill opportunity zone," as specified. The bill would authorize the designation of an infill opportunity zone that is a transit priority area within a sustainable communities strategy or alternative planning strategy adopted by an applicable metropolitan planning organization.

(4) Existing law terminates the designation of an infill opportunity zone if no development project is completed within that zone within 4 years from the date of the designation.

This bill would repeal this provision.

This bill would make findings and declarations as to the necessity of a special statute for the City of Sacramento.

(5) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

Vote: majority Appropriation: no Fiscal Committee: yes Local Program: yes

## THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

### **SECTION 1.** (a) The Legislature finds and declares the following:

(1) With the adoption of Chapter 728 of the Statutes of 2008, popularly known as the Sustainable Communities and Climate Protection Act of 2008, the Legislature signaled its commitment to encouraging land use and transportation planning decisions and investments that reduce vehicle miles traveled and contribute to the reductions in greenhouse gas emissions required in the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code). Similarly, the California Complete Streets Act of 2008 (Chapter 657 of the Statutes of 2008) requires local governments to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways for safe and convenient travel.

(2) Transportation analyses under the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) typically study changes in automobile delay. New methodologies under the California Environmental Quality Act are needed for evaluating transportation impacts that are better able to promote the state's goals of reducing greenhouse gas emissions and traffic-related air pollution, promoting the development of a multimodal transportation system, and providing clean, efficient access to destinations.

(b) It is the intent of the Legislature to do both of the following:

(1) Ensure that the environmental impacts of traffic, such as noise, air pollution, and safety concerns, continue to be properly addressed and mitigated through the California Environmental Quality Act.

(2) More appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.

### **SEC. 2.** The Legislature further finds and declares all of the following:

(a) The Federal Reserve has stated that "[m]ost policymakers estimate the longer-run normal rate of unemployment is between 5.2 and 6 percent." At 7.6 percent, the current United States unemployment rate remains markedly higher than the normal rate and both the unemployment rates in Sacramento County and California are higher than the current national unemployment rate.

(b) The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) requires that the environmental impacts of development projects be identified and mitigated. The act also guarantees the public an opportunity to review and comment on the environmental impacts of a project and to participate meaningfully in the development of mitigation measures for potentially significant environmental impacts.

(c) The existing home of the City of Sacramento's National Basketball Association (NBA) team, the Sleep Train Arena, is an old and outmoded facility located outside of the City of Sacramento's downtown area and is not serviced by the region's existing heavy and light rail transportation networks. It was constructed 25 years ago and a new, more efficient entertainment and sports center located in downtown Sacramento is needed to meet the city's and region's needs.

(d) The City of Sacramento and the region would greatly benefit from the addition of a multipurpose event center capable of hosting a wide range of events including exhibitions, conventions, sporting events, as well as musical, artistic, and cultural events in downtown Sacramento.

(e) The proposed entertainment and sports center project is a public-private partnership between the City of Sacramento and the applicant that will result in the construction of a new state-of-the-art multipurpose event center, and surrounding infill development in downtown Sacramento as described in the notice of preparation released by the City of Sacramento on April 12, 2013.

(f) The project will generate over 4,000 full-time jobs including employees hired both during construction and operation of the entertainment and sports center project. This employment estimate does not include the substantial job generation that will occur with the surrounding development uses, which will generate additional hospitality, office, restaurant, and retail jobs in Sacramento's downtown area.

(g) The project also presents an unprecedented opportunity to implement innovative measures that will significantly reduce traffic and air quality impacts and mitigate the greenhouse gas emissions resulting from the project. The project site is located in downtown Sacramento near heavy and light rail transit facilities, situated to maximize opportunities to encourage nonautomobile modes of travel to the entertainment and sports center project, and is consistent with the policies and regional vision included in the Sustainable Communities Strategy adopted pursuant to Chapter 728 of the Statutes of 2008 by the Sacramento Area Council of Governments in April of 2012. The project is also located within close proximity to three major infill development areas including projects (The Bridge District, Railyards, and Township Nine) that received infill infrastructure grants from the state pursuant to Proposition 1C.

(h) It is in the interest of the state to expedite judicial review of the entertainment and sports center project, as appropriate, while protecting the environment and the right of the public to review, comment on, and, if necessary, seek judicial review of, the adequacy of the environmental impact report for the project.

**SEC. 3.** Section 65088.1 of the Government Code is amended to read:

**65088.1.** As used in this chapter the following terms have the following meanings:

(a) Unless the context requires otherwise, "agency" means the agency responsible for the preparation and adoption of the congestion management program.

(b) "Bus rapid transit corridor" means a bus service that includes at least four of the following attributes:

- (1) Coordination with land use planning.
- (2) Exclusive right-of-way.
- (3) Improved passenger boarding facilities.
- (4) Limited stops.
- (5) Passenger boarding at the same height as the bus.
- (6) Prepaid fares.
- (7) Real-time passenger information.
- (8) Traffic priority at intersections.
- (9) Signal priority.
- (10) Unique vehicles.

(c) "Commission" means the California Transportation Commission.

(d) "Department" means the Department of Transportation.

(e) "Infill opportunity zone" means a specific area designated by a city or county, pursuant to subdivision (c) of Section 65088.4, that is within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan. A major transit stop is as defined in Section 21064.3 of the Public Resources Code, except that, for purposes of this section, it also includes major transit stops that are included in the applicable regional transportation plan. For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

(f) "Interregional travel" means any trips that originate outside the boundary of the agency. A "trip" means a one-direction vehicle movement. The origin of any trip is the starting point of that trip. A roundtrip consists of two individual trips.

(g) "Level of service standard" is a threshold that defines a deficiency on the congestion management program highway and roadway system which requires the preparation of a deficiency plan. It is the intent of the Legislature that the agency shall use all elements of the program to implement strategies and actions that avoid the creation of deficiencies and to improve multimodal mobility.

(h) "Local jurisdiction" means a city, a county, or a city and county.



(i) "Multimodal" means the utilization of all available modes of travel that enhance the movement of people and goods, including, but not limited to, highway, transit, nonmotorized, and demand management strategies including, but not limited to, telecommuting. The availability and practicality of specific multimodal systems, projects, and strategies may vary by county and region in accordance with the size and complexity of different urbanized areas.

(j) (1) "Parking cash-out program" means an employer-funded program under which an employer offers to provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space. "Parking subsidy" means the difference between the out-of-pocket amount paid by an employer on a regular basis in order to secure the availability of an employee parking space not owned by the employer and the price, if any, charged to an employee for use of that space.

(2) A parking cash-out program may include a requirement that employee participants certify that they will comply with guidelines established by the employer designed to avoid neighborhood parking problems, with a provision that employees not complying with the guidelines will no longer be eligible for the parking cash-out program.

(k) "Performance measure" is an analytical planning tool that is used to quantitatively evaluate transportation improvements and to assist in determining effective implementation actions, considering all modes and strategies. Use of a performance measure as part of the program does not trigger the requirement for the preparation of deficiency plans.

(l) "Urbanized area" has the same meaning as is defined in the 1990 federal census for urbanized areas of more than 50,000 population.

(m) Unless the context requires otherwise, "regional agency" means the agency responsible for preparation of the regional transportation improvement program.

**SEC. 4.** Section 65088.4 of the Government Code is amended to read:

**65088.4.** (a) It is the intent of the Legislature to balance the need for level of service standards for traffic with the need to build infill housing and mixed use commercial developments within walking distance of mass transit facilities, downtowns, and town centers and to provide greater flexibility to local governments to balance these sometimes competing needs.

(b) Notwithstanding any other provision of law, level of service standards described in Section 65089 shall not apply to the streets and highways within an infill opportunity zone.

(c) The city or county may designate an infill opportunity zone by adopting a resolution after determining that the infill opportunity zone is consistent with the general plan and any applicable specific plan, and is a transit priority area within a sustainable communities strategy or alternative planning strategy adopted by the applicable metropolitan planning organization.

**SEC. 5.** Chapter 2.7 (commencing with Section 21099) is added to Division 13 of the Public Resources Code, to read:

**CHAPTER 2.7. Modernization of Transportation Analysis for Transit-Oriented Infill Projects**

**21099.** (a) For purposes of this section, the following terms mean the following:

(1) "Employment center project" means a project located on property zoned for commercial uses with a floor area ratio of no less than 0.75 and that is located within a transit priority area.

(2) "Floor area ratio" means the ratio of gross building area of the development, excluding structured parking areas, proposed for the project divided by the net lot area.

(3) "Gross building area" means the sum of all finished areas of all floors of a building included within the outside faces of its exterior walls.

(4) "Infill site" means a lot located within an urban area that has been previously developed, or on a vacant site where at least 75 percent of the perimeter of the site adjoins, or is separated only by an improved public right-of-way from, parcels that are developed with qualified urban uses.

(5) "Lot" means all parcels utilized by the project.

(6) "Net lot area" means the area of a lot, excluding publicly dedicated land and private streets that meet local standards, and other public use areas as determined by the local land use authority.

(7) "Transit priority area" means an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program adopted pursuant to Section 450.216 or 450.322 of Title 23 of the Code of Federal Regulations.

(b) (1) The Office of Planning and Research shall prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed revisions to the guidelines adopted pursuant to Section 21083 establishing criteria for determining the significance of transportation impacts of projects within transit priority areas. Those criteria shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. In developing the criteria, the office shall recommend potential metrics to measure transportation impacts that may include, but are not limited to, vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated. The office may also establish criteria for models used to analyze transportation impacts to ensure the models are accurate, reliable, and consistent with the intent of this section.

(2) Upon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the guidelines, if any.

(3) This subdivision does not relieve a public agency of the requirement to analyze a project's potentially significant transportation impacts related to air quality, noise, safety, or any other impact associated with transportation. The methodology established by these guidelines shall not create a presumption that a project will not result in significant impacts related to air quality, noise, safety, or any other impact associated with transportation. Notwithstanding the foregoing, the adequacy of parking for a project shall not support a finding of significance pursuant to this section.

(4) This subdivision does not preclude the application of local general plan policies, zoning codes, conditions of approval, thresholds, or any other planning requirements pursuant to the police power or any other authority.

(5) On or before July 1, 2014, the Office of Planning and Research shall circulate a draft revision prepared pursuant to paragraph (1).

(c) (1) The Office of Planning and Research may adopt guidelines pursuant to Section 21083 establishing alternative metrics to the metrics used for traffic levels of service for transportation impacts outside transit priority areas. The alternative metrics may include the retention of traffic levels of service, where appropriate and as determined by the office.

(2) This subdivision shall not affect the standard of review that would apply to the new guidelines adopted pursuant to this section.

(d) (1) Aesthetic and parking impacts of a residential, mixed-use residential, or employment center project on an infill site within a transit priority area shall not be considered significant impacts on the environment.

(2) (A) This subdivision does not affect, change, or modify the authority of a lead agency to consider aesthetic impacts pursuant to local design review ordinances or other discretionary powers provided by other laws or policies.

(B) For the purposes of this subdivision, aesthetic impacts do not include impacts on historical or cultural resources.

(e) This section does not affect the authority of a public agency to establish or adopt thresholds of significance that are more protective of the environment.

**SEC. 6.** Section 21155.4 is added to the Public Resources Code, to read:

**21155.4.** (a) Except as provided in subdivision (b), a residential, employment center, as defined in paragraph (1) of subdivision (a) of Section 21099, or mixed-use development project, including any subdivision, or any zoning, change that meets all of the following criteria is exempt from the requirements of this division:

(1) The project is proposed within a transit priority area, as defined in subdivision (a) of Section 21099.

(2) The project is undertaken to implement and is consistent with a specific plan for which an environmental impact report has been certified.

(3) The project is consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in either a sustainable communities strategy or an alternative planning strategy for which the State Air Resources Board, pursuant to subparagraph (H) of paragraph (2) of subdivision (b) of Section 65080 of the Government Code, has accepted a metropolitan planning organization's determination that the sustainable communities strategy or the alternative planning strategy would, if implemented, achieve the greenhouse gas emissions reduction targets.

(b) Further environmental review shall be conducted only if any of the events specified in Section 21166 have occurred.

**SEC. 7.** Section 21168.6.6 is added to the Public Resources Code, to read:

**21168.6.6.** (a) For the purposes of this section, the following definitions shall have the following meanings:

(1) "Applicant" means a private entity or its affiliates that proposes the project and its successors, heirs, and assignees.

(2) "City" means the City of Sacramento.

(3) "Downtown arena" means the following components of the entertainment and sports center project from demolition and site preparation through operation:

(A) An arena facility that will become the new home to the City of Sacramento's National Basketball Association (NBA) team that does both of the following:

(i) Receives Leadership in Energy and Environmental Design (LEED) gold certification for new construction within one year of completion of the first NBA season.

(ii) Minimizes operational traffic congestion and air quality impacts through either or both project design and the implementation of feasible mitigation measures that will do all of the following:

(I) Achieve and maintain carbon neutrality or better by reducing to at least zero the net emissions of greenhouse gases, as defined in subdivision (g) of Section 38505 of the Health and Safety Code, from private automobile trips to the downtown arena as compared to the baseline as verified by the Sacramento Metropolitan Air Quality Management District.

(II) Achieve a per attendee reduction in greenhouse gas emissions from automobiles and light trucks compared to per attendee greenhouse gas emissions associated with the existing arena during the 2012-13 NBA season that will exceed the carbon reduction targets for 2020 and 2035 achieved in the sustainable communities strategy prepared by the Sacramento Area Council of Governments for the Sacramento region pursuant to Chapter 728 of the Statutes of 2008.

(III) Achieve and maintain vehicle-miles-traveled per attendee for NBA events at the downtown arena that is no more than 85 percent of the baseline.

(B) Associated public spaces.

(C) Facilities and infrastructure for ingress, egress, and use of the arena facility.

(4) "Entertainment and sports center project" or "project" means a project that substantially conforms to the project description for the entertainment and sports center project set forth in the notice of preparation released by the City of Sacramento on April 12, 2013.

(b) (1) The city may prosecute an eminent domain action for 545 and 600 K Street, Sacramento, California, and surrounding publicly accessible areas and rights-of-way within 200 feet of 600 K Street, Sacramento, California, through order of possession pursuant to the Eminent Domain Law (Title 7 (commencing with Section 1230.010) of Part 3 of the Code of Civil Procedure) prior to completing the environmental review under this division.

(2) Paragraph (1) shall not apply to any other eminent domain actions prosecuted by the City of Sacramento or to eminent domain actions based on a finding of blight.

(c) Notwithstanding any other law, the procedures established pursuant to subdivision (d) shall apply to an action or proceeding brought to attack, review, set aside, void, or annul the certification of the environmental impact report for the project or the granting of any project approvals.

(d) On or before July 1, 2014, the Judicial Council shall adopt a rule of court to establish procedures applicable to actions or proceedings brought to attack, review, set aside, void, or annul the certification of the environmental impact report for the project or the granting of any project approvals that require the actions or proceedings, including any potential appeals therefrom, be resolved, to the extent feasible, within 270 days of certification of the record of proceedings pursuant to subdivision (f).

(e) (1) The draft and final environmental impact report shall include a notice in not less than 12-point type stating the following:

THIS EIR IS SUBJECT TO SECTION 21168.6.6 OF THE PUBLIC RESOURCES CODE, WHICH PROVIDES, AMONG OTHER THINGS, THAT THE LEAD AGENCY NEED NOT CONSIDER CERTAIN COMMENTS FILED AFTER THE CLOSE OF THE PUBLIC COMMENT PERIOD FOR THE DRAFT EIR. ANY JUDICIAL ACTION CHALLENGING THE CERTIFICATION OF THE EIR OR THE APPROVAL OF THE PROJECT DESCRIBED IN THE EIR IS SUBJECT TO THE PROCEDURES SET FORTH IN SECTION 21168.6.6 OF THE PUBLIC RESOURCES CODE. A COPY OF SECTION 21168.6.6 OF THE PUBLIC RESOURCES CODE IS INCLUDED IN THE APPENDIX TO THIS EIR.

(2) The draft environmental impact report and final environmental impact report shall contain, as an appendix, the full text of this section.

(3) Within 10 days after the release of the draft environmental impact report, the lead agency shall conduct an informational workshop to inform the public of the key analyses and conclusions of that report.

(4) Within 10 days before the close of the public comment period, the lead agency shall hold a public hearing to receive testimony on the draft environmental impact report. A transcript of the hearing shall be included as an appendix to the final environmental impact report.

(5) (A) Within five days following the close of the public comment period, a commenter on the draft environmental impact report may submit to the lead agency a written request for nonbinding mediation. The lead agency and applicant shall participate in nonbinding mediation with all commenters who submitted timely comments on the draft environmental impact report and who requested the mediation. Mediation conducted pursuant to this paragraph shall end no later than 35 days after the close of the public comment period.

(B) A request for mediation shall identify all areas of dispute raised in the comment submitted by the commenter that are to be mediated.

(C) The lead agency shall select one or more mediators who shall be retired judges or recognized experts with at least five years experience in land use and environmental law or science, or mediation. The applicant shall bear the costs of mediation.

(D) A mediation session shall be conducted on each area of dispute with the parties requesting mediation on that area of dispute.

(E) The lead agency shall adopt, as a condition of approval, any measures agreed upon by the lead agency, the applicant, and any commenter who requested mediation. A commenter who agrees to a measure pursuant to this subparagraph shall not raise the issue addressed by that measure as a basis for an action or proceeding challenging the lead agency's decision to certify the environmental impact report or to grant one or more initial project approvals.

(6) The lead agency need not consider written comments submitted after the close of the public comment period, unless those comments address any of the following:

(A) New issues raised in the response to comments by the lead agency.

(B) New information released by the public agency subsequent to the release of the draft environmental impact report, such as new information set forth or embodied in a staff report, proposed permit, proposed resolution, ordinance, or similar documents.

(C) Changes made to the project after the close of the public comment period.

(D) Proposed conditions for approval, mitigation measures, or proposed findings required by Section 21081 or a proposed reporting and monitoring program required by paragraph (1) of subdivision (a) of Section 21081.6, where the lead agency releases those documents subsequent to the release of the draft environmental impact report.

(E) New information that was not reasonably known and could not have been reasonably known during the public comment period.

(7) The lead agency shall file the notice required by subdivision (a) of Section 21152 within five days after the last initial project approval.

(f) (1) The lead agency shall prepare and certify the record of the proceedings in accordance with this subdivision and in accordance with Rule 3.1365 of the California Rules of Court. The applicant shall pay the lead agency for all costs of preparing and certifying the record of proceedings.

(2) No later than three business days following the date of the release of the draft environmental impact report, the lead agency shall make available to the public in a readily accessible electronic format the draft environmental impact report and all other documents submitted to or relied on by the lead agency in the preparation of the draft environmental impact report. A document prepared by the lead agency or submitted by the applicant after the date of the release of the draft environmental impact report that is a part of the record of the proceedings shall be made available to the public in a readily accessible electronic format within five business days after the document is prepared or received by the lead agency.

(3) Notwithstanding paragraph (2), documents submitted to or relied on by the lead agency that were not prepared specifically for the project and are copyright protected are not required to be made readily accessible in an electronic format. For those copyright protected documents, the lead agency shall make an index of these documents available in an electronic format no later than the date of the release of the draft environmental impact report, or within five business days if the document is received or relied on by the lead agency after the release of the draft environmental impact report. The index must specify the libraries or lead agency offices in which hardcopies of the copyrighted materials are available for public review.

(4) The lead agency shall encourage written comments on the project to be submitted in a readily accessible electronic format, and shall make any such comment available to the public in a readily accessible electronic format within five days of its receipt.

(5) Within seven business days after the receipt of any comment that is not in an electronic format, the lead agency shall convert that comment into a readily accessible electronic format and make it available to the public in that format.

(6) The lead agency shall indicate in the record of the proceedings comments received that were not considered by the lead agency pursuant to paragraph (6) of subdivision (e) and need not include the content of the comments as a part of the record.

(7) Within five days after the filing of the notice required by subdivision (a) of Section 21152, the lead agency shall certify the record of the proceedings for the approval or determination and shall provide an electronic copy of the record to a party that has submitted a written request for a copy. The lead agency may charge and collect a reasonable fee from a party requesting a copy of the record for the electronic copy, which shall not exceed the reasonable cost of reproducing that copy.

(8) Within 10 days after being served with a complaint or a petition for a writ of mandate, the lead agency shall lodge a copy of the certified record of proceedings with the superior court.

(9) Any dispute over the content of the record of the proceedings shall be resolved by the superior court. Unless the superior court directs otherwise, a party disputing the content of the record shall file a motion to augment the record at the time it files its initial brief.

(10) The contents of the record of proceedings shall be as set forth in subdivision (e) of Section 21167.6.

(g) (1) As a condition of approval of the project subject to this section, the lead agency shall require the applicant, with respect to any measures specific to the operation of the downtown arena, to implement those measures that will meet the requirements of this division by the end of the first NBA regular season or June of the first NBA regular season, whichever is later, during which an NBA team has played at the downtown arena.

(2) To maximize public health, environmental, and employment benefits, the lead agency shall place the highest priority on feasible measures that will reduce greenhouse gas emissions on the downtown arena site and in the neighboring communities of the downtown arena. Mitigation measures that shall be considered and implemented, if feasible and necessary, to achieve the standards set forth in subclauses (I) to (III), inclusive, of clause (ii) of subparagraph (A) of paragraph (3) of subdivision (a), including, but not limited to:

(A) Temporarily expanding the capacity of a public transit line, as needed, to serve downtown arena events.

(B) Providing private charter buses or other similar services, as needed, to serve downtown arena events.

(C) Paying its fair share of the cost of measures that expand the capacity of a public fixed or light rail station that is used by spectators attending downtown arena events.

(3) Offset credits shall be employed by the applicant only after feasible local emission reduction measures have been implemented. The applicant shall, to the extent feasible, place the highest priority on the purchase of offset credits that produce emission reductions within the city or the boundaries of the Sacramento Metropolitan Air Quality Management District.

(h) (1) (A) In granting relief in an action or proceeding brought pursuant to this section, the court shall not stay or enjoin the construction or operation of the downtown arena unless the court finds either of the following:

(i) The continued construction or operation of the downtown arena presents an imminent threat to the public health and safety.

(ii) The downtown arena site contains unforeseen important Native American artifacts or unforeseen important historical, archaeological, or ecological values that would be materially, permanently, and adversely affected by the continued construction or operation of the downtown arena unless the court stays or enjoins the construction or operation of the downtown arena.

(B) If the court finds that clause (i) or (ii) is satisfied, the court shall only enjoin those specific activities associated with the downtown arena that present an imminent threat to public health and safety or that materially, permanently, and adversely affect unforeseen important Native American artifacts or unforeseen important historical, archaeological, or ecological values.

(2) An action or proceeding to attack, set aside, void, or annul a determination, finding, or decision of the lead agency granting a subsequent project approval shall be subject to the requirements of Chapter 6 (commencing with Section 21165).

(3) Where an action or proceeding brought pursuant to this section challenges aspects of the project other than the downtown arena and those portions or specific project activities are severable from the downtown arena, the court may enter an order as to aspects of the project other than the downtown arena that includes one or more of the remedies set forth in Section 21168.9.

(i) The provisions of this section are severable. If any provision of this section or its application is held invalid, that invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

(j) (1) This section does not apply to the project and shall become inoperative on the date of the release of the draft environmental impact report and is repealed on January 1 of the following year, if the applicant fails to notify the lead agency prior to the release of the draft environmental impact report for public comment that the applicant is electing to proceed pursuant to this section.

(2) The lead agency shall notify the Secretary of State if the applicant fails to notify the lead agency of its election to proceed pursuant to this section.

**SEC. 8.** Section 21181 of the Public Resources Code is amended to read:

**21181.** This chapter does not apply to a project if the Governor does not certify a project as an environmental leadership development project eligible for streamlining provided pursuant to this chapter prior to January 1, 2016.

**SEC. 9.** Section 21183 of the Public Resources Code is amended to read:

**21183.** The Governor may certify a leadership project for streamlining pursuant to this chapter if all the following conditions are met:

(a) The project will result in a minimum investment of one hundred million dollars (\$100,000,000) in California upon completion of construction.

(b) The project creates high-wage, highly skilled jobs that pay prevailing wages and living wages and provide construction jobs and permanent jobs for Californians, and helps reduce unemployment. For purposes of this subdivision, "jobs that pay prevailing wages" means that all construction workers employed in the execution of the project will receive at least the general prevailing rate of per diem wages for the type of work and geographic area, as determined by the Director of Industrial Relations pursuant to Sections 1773 and 1773.9 of the Labor Code. If the project is certified for streamlining, the project applicant shall include this requirement in all contracts for the performance of the work.

(c) The project does not result in any net additional emission of greenhouse gases, including greenhouse gas emissions from employee transportation, as determined by the State Air Resources Board pursuant to Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

(d) The project applicant has entered into a binding and enforceable agreement that all mitigation measures required pursuant to this division to certify the project under this chapter shall be conditions of approval of the project, and those conditions will be fully enforceable by the lead agency or another agency designated by the lead agency. In the case of environmental mitigation measures, the applicant agrees, as an ongoing obligation, that those measures will be monitored and enforced by the lead agency for the life of the obligation.

(e) The project applicant agrees to pay the costs of the Court of Appeal in hearing and deciding any case, including payment of the costs for the appointment of a special master if deemed appropriate by the court, in a form and manner specified by the Judicial Council, as provided in the Rules of Court adopted by the Judicial Council pursuant to subdivision (f) of Section 21185.

(f) The project applicant agrees to pay the costs of preparing the administrative record for the project concurrent with review and consideration of the project pursuant to this division, in a form and manner specified by the lead agency for the project.

**SEC. 10.** Section 21185 of the Public Resources Code is repealed.

**SEC. 11.** Section 21185 is added to the Public Resources Code, to read:

**21185.** On or before July 1, 2014, the Judicial Council shall adopt a rule of court to establish procedures applicable to actions or proceedings brought to attack, review, set aside, void, or annul the certification of the environmental impact report for an environmental leadership development project certified by the Governor pursuant to this chapter or the granting of any project approvals that require the actions or proceedings, including any potential appeals therefrom, be resolved, within 270 days of certification of the record of proceedings pursuant to Section 21186.

**SEC. 12.** Section 21186 of the Public Resources Code is amended to read:

**21186.** Notwithstanding any other law, the preparation and certification of the administrative record for a leadership project certified by the Governor shall be performed in the following manner:

(a) The lead agency for the project shall prepare the administrative record pursuant to this division concurrently with the administrative process.

(b) All documents and other materials placed in the administrative record shall be posted on, and be downloadable from, an Internet Web site maintained by the lead agency commencing with the date of the release of the draft environmental impact report.

(c) The lead agency shall make available to the public in a readily accessible electronic format the draft environmental impact report and all other documents submitted to, or relied on by, the lead agency in the preparation of the draft environmental impact report.

(d) A document prepared by the lead agency or submitted by the applicant after the date of the release of the draft environmental impact report that is a part of the record of the proceedings shall be made available to the

public in a readily accessible electronic format within five business days after the document is released or received by the lead agency.

(e) The lead agency shall encourage written comments on the project to be submitted in a readily accessible electronic format, and shall make any comment available to the public in a readily accessible electronic format within five days of its receipt.

(f) Within seven business days after the receipt of any comment that is not in an electronic format, the lead agency shall convert that comment into a readily accessible electronic format and make it available to the public in that format.

(g) Notwithstanding paragraphs (b) to (f), inclusive, documents submitted to or relied on by the lead agency that were not prepared specifically for the project and are copyright protected are not required to be made readily accessible in an electronic format. For those copyright-protected documents, the lead agency shall make an index of these documents available in an electronic format no later than the date of the release of the draft environmental impact report, or within five business days if the document is received or relied on by the lead agency after the release of the draft environmental impact report. The index must specify the libraries or lead agency offices in which hardcopies of the copyrighted materials are available for public review.

(h) The lead agency shall certify the final administrative record within five days of its approval of the project.

(i) Any dispute arising from the administrative record shall be resolved by the superior court. Unless the superior court directs otherwise, a party disputing the content of the record shall file a motion to augment the record at the time it files its initial brief.

(j) The contents of the record of proceedings shall be as set forth in subdivision (e) of Section 21167.6.

**SEC. 13.** Section 21187 of the Public Resources Code is amended to read:

**21187.** Within 10 days of the Governor certifying an environmental leadership development project pursuant to this section, the lead agency shall, at the applicant's expense, issue a public notice in no less than 12-point type stating the following:

"THE APPLICANT HAS ELECTED TO PROCEED UNDER CHAPTER 6.5 (COMMENCING WITH SECTION 21178) OF THE PUBLIC RESOURCES CODE, WHICH PROVIDES, AMONG OTHER THINGS, THAT ANY JUDICIAL ACTION CHALLENGING THE CERTIFICATION OF THE EIR OR THE APPROVAL OF THE PROJECT DESCRIBED IN THE EIR IS SUBJECT TO THE PROCEDURES SET FORTH IN SECTIONS 21185 TO 21186, INCLUSIVE, OF THE PUBLIC RESOURCES CODE. A COPY OF CHAPTER 6.5 (COMMENCING WITH SECTION 21178) OF THE PUBLIC RESOURCES CODE IS INCLUDED BELOW."

The public notice shall be distributed by the lead agency as required for public notices issued pursuant to paragraph (3) of subdivision (b) of Section 21092.

**SEC. 14.** Section 21189.1 of the Public Resources Code is amended to read:

**21189.1.** If, prior to January 1, 2016, a lead agency fails to approve a project certified by the Governor pursuant to this chapter, then the certification expires and is no longer valid.

**SEC. 15.** Section 21189.3 of the Public Resources Code is amended to read:

**21189.3.** This chapter shall remain in effect until January 1, 2017, and as of that date is repealed unless a later enacted statute extends or repeals that date.

**SEC. 16.** With respect to certain provisions of this measure, the Legislature finds and declares that a special law is necessary and that a general law cannot be made applicable within the meaning of Section 16 of Article IV of the California Constitution because of the unique need for the development of an entertainment and sports center project in the City of Sacramento in an expeditious manner.

**SEC. 17.** No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or



assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

## Draft

### Transportation Analysis Policy

January 2021

#### Purpose/Intent

The California Environmental Quality Act (CEQA) requires all California Cities to evaluate and disclose potential transportation environmental impacts of any proposed “Project”. This policy establishes Vehicle Miles Traveled (VMT) as the methodology for analyzing transportation environmental impacts and establishes baseline, threshold and exemption criteria for environmental review to comply with State law. This policy also establishes the requirement of a transportation operation analysis to address transportation deficiencies and to conform with the Santa Clara County Congestion Management Program (CMP).

#### Policy Statement

This policy requires all projects to evaluate and disclose transportation environmental impacts by measuring Vehicle Miles Traveled (VMT) per CEQA and establishes intersection Level of Service (LOS) as an operational measure of intersection efficiency, which is not defined as a transportation environmental impact per CEQA.

#### Consistency with Milpitas City Policy

The Milpitas General Plan recognizes how land development and transportation goals affect VMT and embraces the ideals that result in reduced VMT. The General Plan focuses new development in key areas, bringing together office, residential and service land uses to reduce VMT and encourage the use of non-automobile transportation modes. The Circulation Element, Land Use Element, and Conservation and Sustainability Element all provide goals, policies, and actions that support VMT reduction including Policy CIR 1-8, Action CIR-1c, Goal CIR-2, Goal CIR-5, Goal CIR-6, Policy CIR 6-2, Policy CIR 6-3, Policy LU 1-1, Policy CON 7-1, Policy CON 7-10, and many others. However, the following General Plan goals and policies most directly support this new policy:

**Goal CIR-1:** Provide a transportation system that efficiently, equitably and effectively supports the City’s land use vision, minimizes vehicle miles traveled (VMT), enhances connectivity of the existing network, and supports the use of all modes of transportation

**Policy LU 3-1:** Support regional efforts that promote higher densities near major transit and travel facilities and reduce regional vehicle miles traveled by supporting active modes of transportation including walking, biking, and public transit. Support local and regional land use decisions that promote safe access to and the use of alternatives to auto transit.

**Policy LU 4-2:** Emphasize efforts to reduce regional vehicle miles traveled by supporting land use patterns and site designs that promote active modes of transportation, including walking, biking, and public transit.

## Evaluating Vehicle Miles Traveled (VMT)

The policy formally establishes the Countywide Average VMT<sup>1</sup> as the environmental baseline for land development projects. To evaluate whether a project will have a significant impact under CEQA, the City will compare the project's VMT with this baseline. For residential and office and industrial projects, a Project will have a less than significant impact if the Project results in a 15%VMT reduction compared to the baseline. For industrial projects, the 15% threshold applies to the employee commute trip only.

## Evaluating Level of Service (LOS)

The City will continue to measure intersection and roadway operations to comply with the standards set by the City's General Plan and the Congestion Management Program to ensure intersection and roadway efficiency.

## Applicability

All proposed projects are required to undergo environmental review as part of the City's approval process. This includes an analysis of CEQA impacts (VMT) and non CEQA operational analysis (LOS).

In addition to establishing the baseline and significant impact threshold, this policy establishes certain projects that are presumed to have a less than significant impact per the State's guidance and will not require a VMT analysis. The following is the list of projects that do not require VMT analysis.

## Project Screening Criteria

The following screening criteria is recommended in alignment with Office of Planning and Research, Technical Advisory<sup>2</sup>. Projects shall be presumed to have a less-than-significant transportation impact if they meet any of the following screening criteria:

- **Small Projects:** All projects that generate 110 daily trips or less.
- **Retail Projects:** 100,000 square feet or less (local serving<sup>3</sup>)
- **Local Serving City facilities:** fire stations, neighborhood parks, branch libraries, community centers
- **Restricted Affordable Housing Projects** that meet the following:
  - For 100% Affordable developments:
    - Rental developments with all units at or below 80% Area Median Income.
    - Ownership with all units at or below 100% Area Median Income.

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<sup>1</sup> Countywide Average VMT for residential land uses and employment land uses in Santa Clara County obtained from the VTA Countywide Model December 2019.

<sup>2</sup> Office of Planning and Research, Technical Advisory on Evaluating Transportation Impacts in CEQA, (December 2018)

<sup>3</sup> Land uses within a community that have neighborhood context, accessible by walking, bicyclist, transit or vehicle.

- For mixed-income rental developments: A 10% minimum of the total residential units must be affordable to households with income at or below 80% Area Median Income. An additional 10% minimum of the total residential units must be affordable to households with income at or below 50% Area Median Income.
- For mixed-income ownership developments: A 10% minimum of the total residential units must be affordable to households with income at or below 100% Area Median Income. An additional 10% minimum of the total residential units must be affordable to households with income at or below 80% Area Median Income.
- For all residential development:
  - If the requirements for the City's Affordable Housing Ordinance (Title XII, Chapter 1 of the City's Municipal Code) or from State Density Bonus law differ from this policy, the project sponsor shall provide the larger number of affordable units and the lowest level of affordability that is required by any of these policies;
  - To qualify for this exemption, a project and all of its income-restricted units shall be subject to all requirements and provisions in the City's Affordable Housing Ordinance.<sup>4</sup>
- **Transit Screening**: All land-use projects located within one half mile of a major transit stop<sup>5</sup>, or a stop along a high-quality transit corridor<sup>6</sup>, pursuant to State definitions for such facilities; provided the projects include all the following characteristics: minimum Floor Area Ratio (FAR) of 0.75; or minimum residential density of 35 dwelling units/acre except in the Milpitas Metro Specific Plan area which requires a minimum residential density of 50 dwelling units/acre, and the Sierra Center which requires a minimum residential density of 40 dwelling units per acre<sup>7</sup>.
  - Consistent with the applicable Sustainable Communities Strategy (SCS);
  - Does not provide more parking than required by the jurisdiction; or
  - Does not replace affordable housing with a fewer number of moderate or high-income residential units.
- **Transportation Projects** that reduce or do not increase VMT including, but not limited to:
  - Roadway maintenance, rehabilitation, repair and safety improvements designed to improve the conditions of existing transportation facilities that do not add additional motor vehicle capacity;
  - Roadway safety devices or hardware installation such as median barriers or guardrails;
  - Roadway shoulder enhancements to provide "breakdown space", to improve safety but will not be used as automobile vehicle travel lanes;
  - Addition of auxiliary lane less than one mile designed to improve safety;

<sup>4</sup> The City's Affordable Housing Ordinance offers additional incentives to projects that set aside 20% or more of units as affordable housing.

<sup>5</sup> "Major transit stop" means a site containing any of the following: (a) an existing rail or bus rapid transit station; (b) the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods; or (c) a major transit stop that is included in Plan Bay area 2040. Pub. Res Code 21064.3, 21155(b).

<sup>6</sup> "High-Quality Transit Corridor" means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours. Pub. Res. Code 21155(b)

<sup>7</sup> See Attachment A Milpitas Heat Maps for Sierra Center boundary.

- Installation or reconfigured traffic lanes that are not for through traffic, such as left, right, and U-turn pockets, two-way left-turn lanes, or emergency breakdown lanes that are not utilized as through lanes
- Addition of roadway capacity on local or collector streets provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit.
- Conversion of existing lanes to managed or transit lanes;
- Reduction in number of through lanes.
- Multimodal improvements that promote walking, bicycling and transit;
- Technology projects that optimize intersection operations, and traffic metering systems, detection, cameras and other electronics designed to optimize traffic flow;
- Installation of traffic control devices and roundabouts;
- Relocation or removal of parking; and
- Installation of publicly available alternative fuel/charging infrastructure.

Projects that do not meet the above requirements are required to evaluate and disclose potential VMT environmental impacts using the established baseline and threshold criteria. The most commonly available methods for evaluating VMT is the Santa Clara County VMT Evaluation Tool and the Travel Demand Model. Typical VMT mitigation can include multimodal transportation improvements designed to improve pedestrian, bicycle, transit facilities, parking strategies, and Transportation Demand Management (TDM) strategies that provide subsidized transit passes, carpool and shuttle programs, telecommuting, etc.

### **Transportation Projects**

Project types that would likely lead to a measurable increase in vehicle travel such as addition of through lanes on existing or new highways, including general purpose lanes, HOV lanes, peak period lanes, auxiliary lanes or lanes through grade separated interchanges.

Transportation projects that add vehicle capacity to the roadway network will be required to analyze:

- Direct, indirect and cumulative effects of the transportation project
- Near-term and long-term induced vehicle traffic in total VMT
- Consistency with state and local greenhouse gas reduction goals
- Impacts on the development of multimodal transportation networks
- Impacts on the development of diversity of land uses.

### **Regional Land Use Projects**

For projects such as regional retail, hospitals, stadium, sports complexes, or schools not regulated by a public-school district or that require permits from local jurisdiction, a net increase in total VMT may indicate a significant transportation impact.

### **Transportation Operational Analysis Requirement**

In addition to conforming to the VMT CEQA requirements above, land use and transportation projects may be required to conduct a Transportation Operational Analysis (TOA) to evaluate a

project's adverse effects or identify operational deficiencies caused or exacerbated by a project which may include but not limited to the following:

- Intersection Level of Service Analysis
- CMP Conformance
  - Intersection LOS at CMP intersections
  - Freeway Operations
  - Queuing Analysis at freeway ramps
- Multimodal analysis of pedestrian, bicycle and transit facilities
- Traffic signal warrant studies and other intersection traffic control
- Site Access and Circulation
- Neighborhood cut-through, traffic calming, parking issues
- Other transportation related analysis as deemed necessary by the "City Engineer"

### **Existing Approvals**

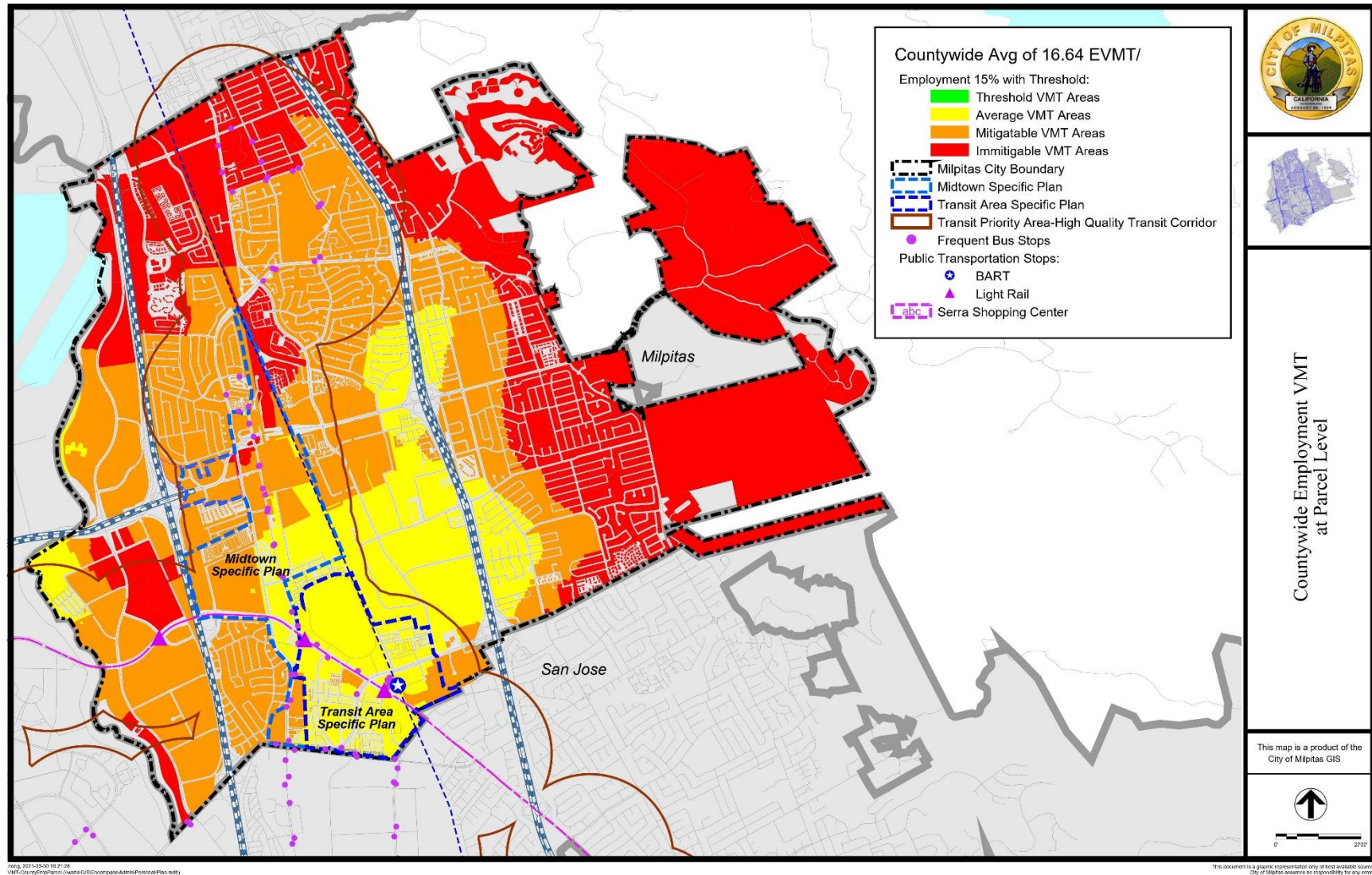
Projects that are currently approved will not require any supplemental VMT environmental review unless the "Project" requires supplemental environmental review not covered by an addendum.

### **Outcomes**

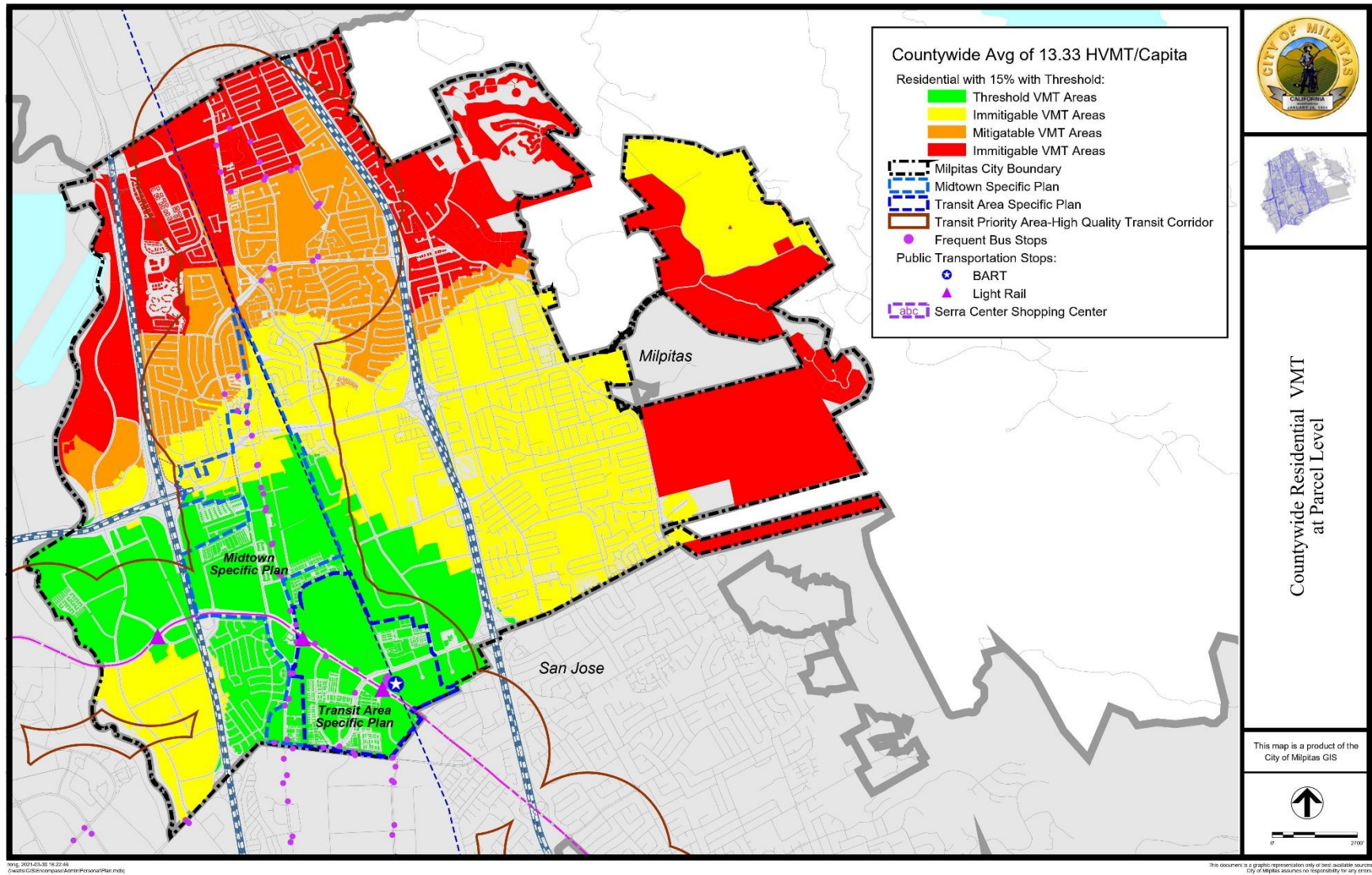
Implementation of this policy will result in reducing VMT growth, promoting the reduction of greenhouse gas emissions, expansion of the multimodal transportation network, increased density and diversity of land uses and ultimately, meeting the State's long-term climate goals. This policy supports and aligns with the General Plan land use and transportation goals, facilitates implementation of the General Plan and supports a more sustainable City as outlined in the Climate Action Plan.



## Attachment C: City of Milpitas Countywide Employment Average VMT



## Attachment C: City of Milpitas Countywide Residential Average VMT







## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                 |
|------------------------|-----------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Receive Monthly Report for Unhoused Services</b>             |
| <b>Category:</b>       | Community Development                                           |
| <b>Meeting Date:</b>   | 5/18/2021                                                       |
| <b>Staff Contact:</b>  | Sharon Goei, Building Safety and Housing Director, 408-586-3260 |
| <b>Recommendation:</b> | Receive March 2021 report for unhoused services.                |

### **Background:**

On November 10, 2020, the City Council approved and authorized staff to enter into an agreement for homeless outreach, assessment, and street-based case management services with Santa Clara County Office of Supportive Housing.

On December 1, 2020, the City Council directed staff to implement a six-month pilot mobile shower and laundry Dignity on Wheels program with WeHOPE.

At the March 2, 2021 City Council meeting, Councilmember Chua presented a sample monthly assessment progress report and requested staff provide a way to monitor progress in a similar manner. At the April 6, 2021 City Council meeting, Councilmember Chua requested to receive statistics on the progress by the end of April or beginning of May. The Council supported Councilmember Chua's request at both meetings.

### **Analysis:**

The County's Homeless Engagement and Access Team (HEAT), via Abode Services, began conducting outreach to engage and provide resources to the City's unhoused residents on March 1, 2021. The HEAT Team received updated encampment locations from the Milpitas Police Department on March 25, 2021. The Team started to conduct outreach to these locations beginning in April. During the month of March, the Team conducted street outreach to unhoused individuals residing in various areas of the City. The HEAT Team enrolled 26 clients and completed assessments for all of them in March. These efforts were across four encampment locations and seven outreach locations where contact was made with clients in a non-encampment setting. See Attachment B for the HEAT Team March 2021 report.

The nonprofit service provider, WeHOPE, began providing mobile shower and laundry services every Sunday starting March 21, 2021 on the site on Winsor Street, immediately south of the Milpitas Library. During the month of March, WeHOPE provided two sessions to the unhoused community, providing a total of 17 showers and 8 loads of laundry, serving 21 individuals. See Attachment C for the WeHOPE Dignity on Wheels March 2021 report.

In addition to working closely with the above service providers, City departments collaborate in providing services to the unhoused residents as well as the community. Building Safety and Housing, Police, and Public Works Departments coordinate on HEAT Team referrals to provide outreach, engagement, and assessment services to unhoused individuals. After these efforts, Departments coordinate 72-hour notice posting and site clean-up activities with the appropriate entities to restore the sites, in response to complaints reported by residents. These collaborative efforts assist the unhoused residents with services as well as address the health and safety of the community.

For a summary of the various activities and services for Milpitas unhoused residents as described above, refer to Attachment A for the March 2021 report for unhoused services. Note that the HEAT Team is in the process of aligning their locations with the Milpitas Police Department information received on March 25. As such, the list may change in subsequent months.

**Fiscal Impact:**

There is no fiscal impact to the City budget other than staff time related to this item.

**California Environmental Quality Act:**

The action being considered has no potential for causing a significant effect on the environment and is exempt from the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Section 15061(b)(3).

**Recommendation:**

Receive March 2021 report for unhoused services.

**Attachments:**

- A. March 2021 report for unhoused services
- B. HEAT Team March 2021 report
- C. WeHOPE Dignity on Wheels March 2021 report

| MARCH 2021 REPORT FOR UNHOUSED SERVICES                                 |                                                   |                                                       |                |                      |               |                  |                                 |                  |                                 |                |             |                                  |
|-------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------|----------------|----------------------|---------------|------------------|---------------------------------|------------------|---------------------------------|----------------|-------------|----------------------------------|
| Outreach Location                                                       | Type                                              | Jurisdiction                                          | Unhoused Count | Date Counted         | Date Referred | Clients Enrolled | Date Enrolled                   | Clients Assessed | Date Assessed                   | Clients Housed | Date Housed | Notes                            |
| 1 Hillview Bridge                                                       | Encampment                                        | Valley Water                                          | 1              | 3/5/2021             | 2/26/2021     | 1                | 3/5/2021                        | 1                | 3/5/2021                        |                |             | 3/8/2021 Site clean-up complete. |
| 2 Topaz Street 1                                                        | Encampment                                        | City                                                  | 1              | 3/17/2021            | N/A           | 1                | 3/17/2021                       | 1                | 3/17/2021                       |                |             |                                  |
| 3 Serra Center                                                          | Encampment                                        | Private Property                                      | 3              | 3/29/2021, 3/30/2021 | 3/26/2021     | 3                | 3/29/2021, 3/30/2021            | 3                | 3/29/2021, 3/30/2021            |                |             | Site clean-up in 4/2021.         |
| 4 Ocean Supermarket                                                     | Encampment                                        | Private Property                                      | 1              | 3/24/2021            | N/A           | 1                | 3/24/2021                       | 1                | 3/24/2021                       |                |             |                                  |
| 5 Dixon Road 1                                                          | Encampment                                        | City                                                  | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 6 Dixon Road 2                                                          | RV Vehicles                                       | City                                                  | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 7 Calaveras Blvd Overpass                                               | Encampment                                        | City                                                  | 5              | 3/23/2021            | 3/19/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 8 Dempsey Road                                                          | Encampment                                        | City                                                  | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 9 Sinclair Frontage Road                                                | Encampment                                        | Union Pacific Railroad                                | 7              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 10 Yosemite Business Park                                               | Encampment                                        | Private Property                                      | 3              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 11 Gibraltar Court                                                      | Trailers                                          | City                                                  | 2              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 12 Topaz Street 2                                                       | Encampment                                        | City                                                  | 8              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 13 Railroad Court                                                       | Camp/Trailers                                     | City                                                  | 10             | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 14 Abel Plaza                                                           | Encampment                                        | Private Property                                      | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 15 S. Main Street                                                       | Encampment                                        | City                                                  | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 16 S. Abbott Avenue                                                     | Encampment                                        | City (if on street) or County (if on County property) | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 17 W Calaveras Blvd                                                     | Encampment                                        | City                                                  | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 18 Ethyl Court                                                          | Camp/Cars                                         | City                                                  | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 19 Hammond Way                                                          | Cars/Trailers                                     | City                                                  | 10             | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 20 Coyote Creek Trail 1                                                 | Encampment                                        | Valley Water                                          | 3              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 21 Coyote Creek Trail 2                                                 | Encampment                                        | Valley Water                                          | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 22 Coyote Creek Trail 3                                                 | Encampment                                        | Valley Water                                          | 1              | 3/23/2021            | 3/25/2021     |                  |                                 |                  |                                 |                |             |                                  |
| 23 Calaveras Plaza Shopping Center                                      | Outreach (contact made in non-encampment setting) | N/A                                                   |                |                      | N/A           | 7                | 3/17/2021, 3/23/2021, 3/28/2021 | 7                | 3/17/2021, 3/23/2021, 3/28/2021 |                |             |                                  |
| 24 Dignity on Wheels Mobile Shower and Laundry                          | Outreach (contact made in non-encampment setting) | N/A                                                   |                |                      | N/A           | 4                | 3/21/2021, 3/28/2021            | 4                | 3/21/2021, 3/28/2021            |                |             |                                  |
| 25 Dixon Landing Shopping Center                                        | Outreach (contact made in non-encampment setting) | N/A                                                   |                |                      | N/A           | 1                | 3/16/2021                       | 1                | 3/16/2021                       |                |             |                                  |
| 26 Great Mall                                                           | Outreach (contact made in non-encampment setting) | N/A                                                   |                |                      | N/A           | 2                | 3/16/2021, 3/24/2021            | 2                | 3/16/2021, 3/24/2021            |                |             |                                  |
| 27 Milpitas Library                                                     | Outreach (contact made in non-encampment setting) | N/A                                                   |                |                      | N/A           | 1                | 3/16/2021                       | 1                | 3/16/2021                       |                |             |                                  |
| 28 Main Street                                                          | Outreach (contact made in non-encampment setting) | N/A                                                   |                |                      | N/A           | 3                | 3/16/2021, 3/17/2021, 3/23/2021 | 3                | 3/16/2021, 3/17/2021, 3/23/2021 |                |             |                                  |
| 29 Other (Street, Panhandle, Vehicle Dweller, or Unidentified Location) | Outreach (contact made in non-encampment setting) | N/A                                                   |                |                      | N/A           | 2                | 3/3/2021, 3/9/2021              | 2                | 3/3/2021, 3/9/2021              |                |             |                                  |
|                                                                         |                                                   | Total                                                 | 64             |                      |               | 26               |                                 | 26               |                                 |                |             |                                  |

|                                                       |                  |                      |                    |                                       |                  |                           |
|-------------------------------------------------------|------------------|----------------------|--------------------|---------------------------------------|------------------|---------------------------|
| WeHOPE Dignity on Wheels<br>Mobile Shower and Laundry | Session Location | Service Dates        | Number of Sessions | Total Unduplicated Individuals Served | Showers Provided | Loads of Laundry Provided |
|                                                       | Milpitas Library | 3/21/2021, 3/28/2021 | 2                  | 21                                    | 17               | 8                         |

Santa Clara County Office of Supportive Housing  
 Abode Services  
 Milpitas HEAT Team  
 March 2021 Report

Through collaboration between the City of Milpitas, Abode Services and community advocates, Abode's HEAT outreach team has begun providing outreach services in the City of Milpitas. Since March 1<sup>st</sup>, Abode's HEAT team has enrolled 26 clients and completed 26 assessments. The team also provided referrals and outreach information to 7 homeless clients that would only accept information at the first engagement (team was unable to gather additional information from client to enroll and assess). The team made a total of 33 outreach contacts for the month of March. The team has also supported the Dignity on Wheels team with providing clients referrals to shelter and other basic needs (food, clothing, and transportation needs).

The team received an updated encampment list from the Milpitas Police Department on March 25<sup>th</sup>. The team will begin to conduct outreach visits to these locations in April, visiting each one to engage residents and provide resources. The team spent the month of March addressing community concerns and conducting street outreach to homeless residing in various areas of the city. The team has tracked encampment and/ or contact locations where they have provided outreach support within the city. The team has engaged and enrolled (client was willing to complete intake paperwork for services- providing identifying information starts the process for HEAT team to connect client to housing opportunities) the following number of clients at each location. Further, the team has conducted VI-SPDAT assessments for the following number of clients.

**Milpitas HEAT Enrolled Clients- March 2021**

| Outreach Location                                         | Clients Enrolled | Assessments |
|-----------------------------------------------------------|------------------|-------------|
| <b>Milpitas Encampment- Hillview Bridge</b>               | <b>1</b>         | <b>1</b>    |
| 3/5/2021                                                  | 1                | 1           |
| <b>Milpitas Encampment- Topaz Street</b>                  | <b>1</b>         | <b>1</b>    |
| 3/17/2021                                                 | 1                | 1           |
| <b>Milpitas Outreach- Calaveras Plaza Shopping Center</b> | <b>7</b>         | <b>7</b>    |
| 3/17/2021                                                 | 5                | 5           |
| 3/23/2021                                                 | 1                | 1           |
| 3/28/2021                                                 | 1                | 1           |
| <b>Milpitas Outreach- Dignity on Wheels Event</b>         | <b>4</b>         | <b>4</b>    |
| 3/21/2021                                                 | 1                | 1           |
| 3/28/2021                                                 | 3                | 3           |
| <b>Milpitas Outreach- Dixon Landing Shopping Center</b>   | <b>1</b>         | <b>1</b>    |
| 3/16/2021                                                 | 1                | 1           |
| <b>Milpitas Outreach- Great Mall</b>                      | <b>2</b>         | <b>2</b>    |
| 3/16/2021                                                 | 1                | 1           |
| 3/24/2021                                                 | 1                | 1           |
| <b>Milpitas Outreach- Library</b>                         | <b>1</b>         | <b>1</b>    |

|                                                                                                |           |           |
|------------------------------------------------------------------------------------------------|-----------|-----------|
| 3/16/2021                                                                                      | 1         | 1         |
| <b>Milpitas Outreach- Main Street</b>                                                          | <b>3</b>  | <b>3</b>  |
| 3/16/2021                                                                                      | 1         | 1         |
| 3/17/2021                                                                                      | 1         | 1         |
| 3/23/2021                                                                                      | 1         | 1         |
| <b>Milpitas Encampment- Ocean Supermarket</b>                                                  | <b>1</b>  | <b>1</b>  |
| 3/24/2021                                                                                      | 1         | 1         |
| <b>Milpitas Outreach- Other (Street, Panhandle, Vehicle Dweller, or Unidentified Location)</b> | <b>2</b>  | <b>2</b>  |
| 3/3/2021                                                                                       | 1         | 1         |
| 3/9/2021                                                                                       | 1         | 1         |
| <b>Milpitas Encampment- Serra Center</b>                                                       | <b>3</b>  | <b>3</b>  |
| 3/29/2021                                                                                      | 2         | 2         |
| 3/30/2021                                                                                      | 1         | 1         |
| <b>Grand Total</b>                                                                             | <b>26</b> | <b>26</b> |

*Milpitas Outreach= Contact made with client in non-encampment setting*

*Milpitas Encampment= Contact made at a location where a tent and/or other structures are used as shelter*









**CITY OF MILPITAS  
AGENDA REPORT  
(AR)**

|                        |                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Receive a Presentation on the Draft Milpitas Water Master Plan</b>                      |
| <b>Category:</b>       | Community Services and Sustainable Infrastructure                                          |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                  |
| <b>Staff Contact:</b>  | <b>Tony Ndah, 408-586-2602</b>                                                             |
| <b>Recommendation:</b> | Receive presentation on the draft Milpitas Water Master Plan and provide feedback to staff |

**Background:**

The City of Milpitas owns and operates its municipal water system, consisting of 206 miles of water pipelines, 4 pumping stations, 5 storage reservoirs, and numerous pressure valves regulating 7 pressure zones, to deliver 11 million gallons per day of potable water to approximately 16,750 customers accounts.

Based on industry standards and practices, a water master plan should be updated to assess the reliability of a water system. A reliable water system is one that has adequate storage, is optimized hydraulically to efficiently transport water to customers, incorporates a proactive and manageable capital improvement program, is flexible through redundant pumping and distribution facilities, and has emergency alternatives for both water and power supply. On September 17, 2019, the City Council awarded West Yost Associates a Professional Services Agreement for the preparation of the water master plan. The Water Master Plan addresses water infrastructure needs based on long-term plans for City development under its adopted 2040 General Plan, including plans for water supply, transmission, and improvements of existing infrastructure deficiencies.

The City's last Water Master Plan, the 2009 Water Master Plan Update (2009 WMPU), was an update of the City's 2002 Water Master Plan (2002 Master Plan). The 2002 Master Plan defined the water system reliability improvements necessary to meet the City's 2002 water demand and future demand associated with future development plans for 2008, 2018, and build-out year of 2021. The 2009 WMPU built on the 2002 Master Plan by incorporating the Milpitas Metro Specific Plan (formerly Transit Area Specific Plan) and assessing the water system reliability as a result of the significant growth associated Milpitas Metro Specific Plan (MMSP). Since the completion of the 2009 Water Master Plan, the City of Milpitas has continued to experience significant growth and has recently adopted the 2040 General Plan and is in the process of updating the Gateway-Main Street Specific Plan (formerly known as the Midtown Specific Plan) and the MMSP.

With the expected growth, water demands within the City's service area are expected to rise within the next 20 years. However, per capita water demand is expected to decrease due to statewide mandated conservation and legislation establishing new statewide water efficiency standards. The updated Water Master Plan identifies and prioritizes capital improvements that maximize the efficiency and capacity of the water system based on the impacts of existing and anticipated developments, as well as achieves regulatory compliance with current and future local, state, and federal requirements. The Water Master Plan also prioritizes improvements based on degree of deficiency, criticality of facility, and timing of the needed improvement for a 20-year period.



## **Analysis:**

The major components and recommendations of the Water Master Plan include the following:

### **1. Existing and Projected Future Water Supplies**

The City's existing water supplies include imported water from San Francisco Public Utilities Commission (SFPUC) and the Santa Clara Valley Water District (Valley Water). The existing water supply also includes groundwater, recycled water, and interties with neighboring agencies. Under normal conditions, imported water comprises the City's entire water supply. The City's share of SFPUC supply is 9.23 MGD and the City is required to take a minimum of 5.34 MGD each fiscal year per the contract. The contract with SFPUC is set to expire in June 30, 2034. Per the City's contract with Valley Water, the City submits a three-year schedule detailing its desired annual supplies from Valley Water. In each of the three years after submitting the request, the City is obligated to purchase at least 95% of the maximum annual amount listed in the schedule. Based on the most recent three-year schedule provided to Valley Water, the average annual amount of water the City would need to purchase from Valley Water per the contract is 3.33 MGD. The City's contract with Valley Water is set to expire on September 4, 2054. The City has limited possibilities to develop new supply sources; however, the City will look to increase future supply reliability by expanding its groundwater capabilities with new wells expected to come online during this City's buildout horizon (i.e. 2040) to improve water supply reliability and the water master plan recommends the City establish an additional point of connection (i.e. turnout) in the Valley Water zone.

### **2. Existing and Projected Future Water Demand**

To evaluate historical, existing, and future water demands, the consultant developed a new hydraulic model to analyze the existing water distribution system. The model was updated to reflect the existing water system performance for capacity and/or fire flow deficiencies and tested for adequacy of storage and supply infrastructure. This analysis is critical for meeting regulatory compliance requirements, identify necessary improvements to support the City's existing water demands while meeting the recommended system performance criteria, and system planning.

Future City water demands were projected based on land use data and hydraulic modeling. Land-use based demand projections geographically allocate water use based on existing consumption and future development. Based on the Association of Bay Area Governments and internal projections, the model assumes over 10,000 new residential water connections and approximately 1,200 new commercial water connections by 2040. Therefore, the City's projected water production required at buildout in 2040 is approximately 13.9 million gallons per day (mgd), or 15,600 acre feet per year (AF/yr). This is an increase of approximately 5.6 mgd, or 67%, over existing (2019) production (8.3 mgd).

### **3. Evaluation of Existing Water System**

The City's existing water system was evaluated based on supply, storage, and pumping capacities, as well as its ability to meet recommended performance and operational criteria under various demand and emergency scenarios. A summary of the analysis is below:

- Supply Capacity —While the VW service area currently has a supply deficit, it can be met by the surplus in the SFPUC service area. While supplies from SFPUC and VW are normally segregated, the City can intermix supply sources if necessary. No additional supply facilities are recommended based on existing demands and normal operating conditions.
- Storage Capacity — There is enough storage in the SFPUC service area and a deficit of 0.45 million gallons (MG) or a 10% deficit in the VW service area. This deficit is not considered critical, as the SFPUC zone storage surplus can cover the shortfall in the VW zones. No additional storage is recommended based on existing demands and normal operating conditions.
- Pumping Capacity — Each pressure zone has a pumping capacity surplus. No additional pumping facilities are recommended based on existing demands and normal operating conditions.

- Distribution System — The existing distribution system meets all minimum pressure criteria under average day, peak hour, and maximum day demand conditions. However, based on fire flow analysis, potential projects are identified to improve overall distribution system flows. These mainly consist of upsizing existing 6-inch and 8-inch diameter pipelines.

#### 4. Evaluation of Future Water System

The City's buildout (2040) water system was evaluated based on supply, storage, and pumping capacities, as well as its ability to meet recommended performance and operational criteria under various demand and emergency scenarios. A summary of the analysis is below:

- Supply Capacity — Buildout supplies fall short of maximum day demands. The supply surplus in the SFPUC service area cannot make up for the deficit in the VW service area. Additional points of connection to the wholesaler's water system are recommended in the VW service area to draw water from both wholesalers as demand requires.
- Storage Capacity — Buildout storage capacity is insufficient. The storage capacity surplus in the SFPUC service area cannot make up for the deficit in the VW service area. A new 2 MG storage reservoir including a new pump station with a capacity of 4,000 gpm in the VW service area is recommended to deliver water from this new storage reservoir.
- Pumping Capacity — Each pressure zone has a pumping capacity surplus. No additional pumping facilities are recommended to meet buildout demands.
- Distribution System — The buildout distribution system meets the minimum pressure criterion under peak demand conditions however, there are locations which do not meet the minimum fire flow pressure requirements. To address locations not meeting recommended fire flows, a new pressure regulating valve is recommended which would allow flows from higher pressure zones to lower pressure zones should pressures drop significantly.

#### 5. Asset Condition Assessment and Risk Management

Risk management affords the City with knowledge of the system to optimize maintenance, plan condition assessment activities, anticipate fiscal expenditures, and prioritize refurbishment and replacement of water system infrastructure. Establishing risk threshold triggers is a valuable tool to anticipate when to modify current practices.

The analysis in the master plan focused on asset and facility risk which is a combination of an asset's likelihood to fail and an asset's consequence if it should fail as shown below:

- Likelihood of Failure (LOF), which estimates the probability that a failure will occur in an asset by meeting the end of its physical, design, service, or economic useful life.
- Consequence of Failure (COF), which estimates the impacts of asset failure expressed either qualitatively or quantitatively, being a loss, injury, or disadvantage from a social, economic, environmental, or regulatory standpoint.
- Risk is estimated using the conventional risk equation:  $\text{Risk} = \text{LOF} \times \text{COF}$ .

Recommended projects were identified based on the asset classification and the risk analysis described above. They include general maintenance modifications, detailed condition assessment, refurbishment, and replacement. A list of capital and non-capital recommendations was developed based on the risk assessment and the risk thresholds. Each water utility asset was evaluated for risk in terms of likelihood and consequence of failure, with recommended projects prioritizing higher risk assets. Recommendations include general maintenance modifications, detailed condition assessment, and renewal and replacement. For the existing system analysis, high priority improvements are recommended for completion within the first 5-years following approval of the master plan, while medium and low priority improvements are recommended for completion prior to 2030.

The desktop analysis indicates the horizontal infrastructure of the water system is well into its useful life curve with most assets rated 3 ("likely" asset failure) or higher for LOF. The consequence of failure analysis indicates

that horizontal assets expose mostly a negligible to minimal impact should they fail, with a small percentage of assets potentially yielding a moderate impact. Overall, the majority (71%) of pipeline assets have a risk rating of Low, with a high LOF and low COF. There is a significant risk exposure to pipeline failure due to this high LOF, which is primarily due to asset age. Hydrants, valves, and meters are also at a Low risk level with generally advanced age contributing to a higher LOF but a relatively low COF.

Facilities were generally rated 2 or higher for LOF. The City has developed most of its newer infrastructure in well and reservoir facilities (Curtis Well, Gibraltar Reservoirs, Minnis Reservoir), which are rated with an LOF of less than 3. Remaining facility LOF was consistently rated between 2.4 and 3. Facility COF ratings ranged from 2 to 3.4, with the highest ratings assigned to pump stations, reservoirs, and wells. PRVs, interties, and turnouts were all rated below 2.9.

Based on the desktop analysis completed as part of this master plan, the overall risk of the water system is low for horizontal infrastructure and medium-high for facilities; however, staff will utilize additional nondestructive evaluation and structural health monitoring techniques over the next years to further assess the soundness of the underground infrastructure and refine the condition assessment.

#### 6. Compliance with America's Water Infrastructure Act of 2018

As part of the development of the water master plan, a Risk and Resilience Assessment (RRA) was conducted in compliance with the requirements of the 2018 America's Water Infrastructure Act (AWIA). This effort includes assessments of both cyber and physical risks and resilience and development of a risk and resilience strategy. Recommendations from the RRA, referred to as risk and resilience management strategies (RRMS), include physical upgrades, planning efforts, and cyber security projects.

#### 7. Recommended Capital Improvement Program

The recommended CIP for the City's existing and future water system includes recommendations from the existing system evaluation, the future system evaluation, the asset renewal and replacement study, and the AWIA risk and resilience assessment. The total CIP cost through 2040 and 2051 is approximately \$51.6 and \$78.7 million (2020 dollars) respectively. To remain consistent with the General Plan, the Draft Water Master Plan development buildout timeframe is assessed to 2040. The CIP assessment is on a 30-year time horizon and therefore assessed to 2051, as is consistent with industry practice. Recommended CIPs would address improvements to the system to maintain existing levels of service, improvement needed for future system requirements, and improvements needed to address findings from the risk and resiliency assessment.

The Draft Water Master Plan report has compiled the findings and recommendations based on analysis which tracks with industry standard procedures and has provided a phased implementation of identified improvements with planning level cost estimates. This document will be the basis of future updates and is intended to either supplement or inform supplemental reports associated but not limited to General Plans, Urban Water Management Plans, Specific Plans, and associated Water Supply Assessments.

#### 8. Next Steps

Following Council's receipt of the presentation on the draft Milpitas Water Master Plan, staff will incorporate any feedback received from Council to finalize the report. In addition, Staff is working on a Financial Utility Master Plan (FUMP), which will provide recommended financial strategies and the most effective expenditure of capital for meeting the present and future utility system needs.

Staff will return to Council in the 2<sup>nd</sup> quarter of FY22 to present the FUMP and seek Council approval of the FUMP and Final Milpitas Water Master Plan. In addition, prior to the approval of the Water Master Plan, staff will evaluate the environmental effects of the Recommended Capital Improvement Program to determine the appropriate level of environmental review required to comply with the California Environmental Quality Act.

#### Policy Alternatives:

Not applicable.

**Fiscal Impact:**

This is an information item for Council review and comment with no fiscal impact.

**California Environmental Quality Act:**

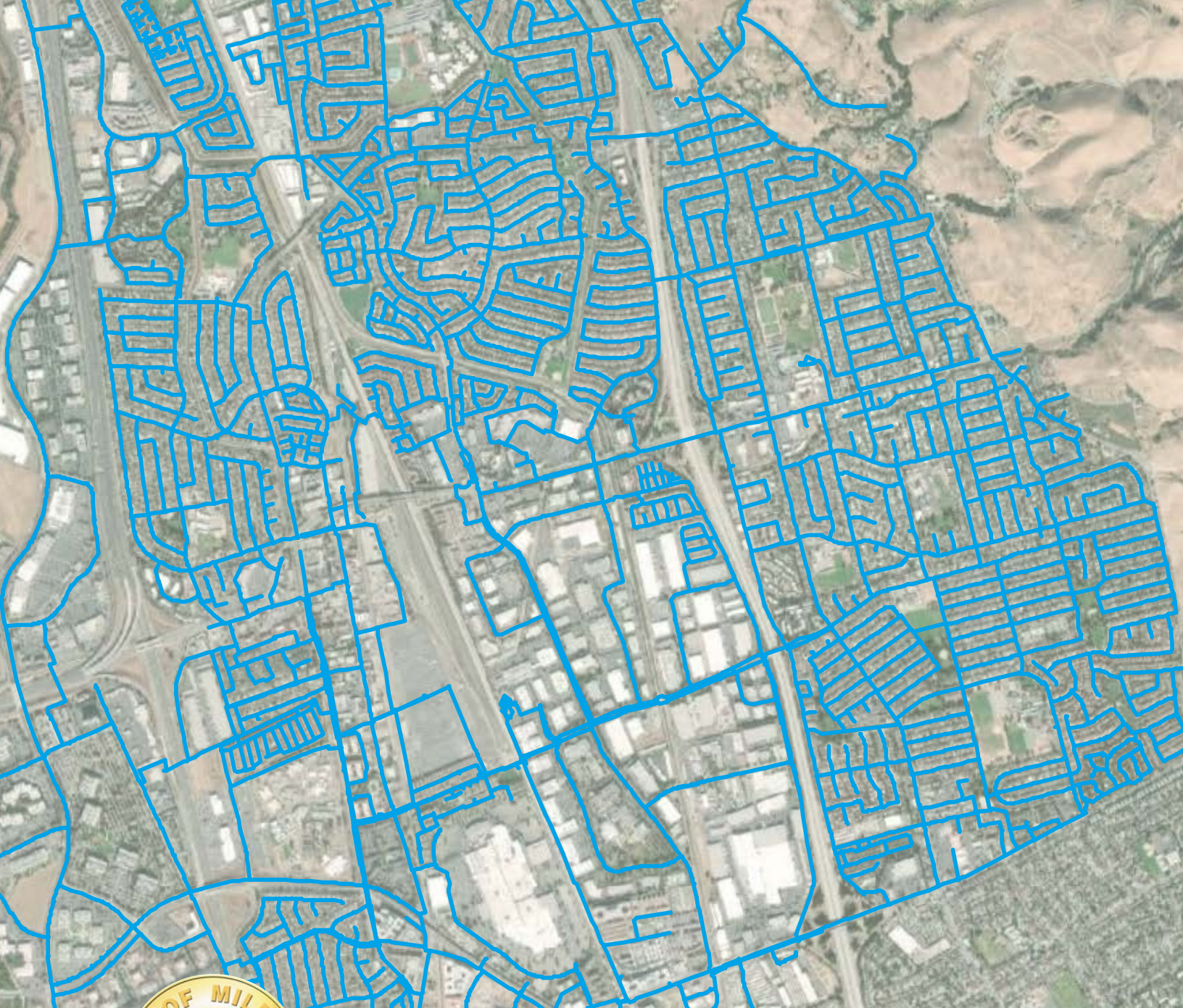
The action being considered does not constitute a “project” within the meaning of the California Environmental Quality Act (“CEQA”) because no decisions will be made at this meeting with approval of the Plan to be considered at a future meeting after environmental review has been conducted.

**Recommendation:**

Receive presentation on the draft Milpitas Water Master Plan and provide feedback to staff

**Attachments:**

Draft Milpitas Water Master Plan



CITY OF MILPITAS

# Water Master Plan

MARCH 2021

FINAL DRAFT REPORT





# Water Master Plan

PREPARED FOR

City of Milpitas



PREPARED BY



# Water Master Plan

---

Prepared for

**City of Milpitas**

**Project No. 270-60-19-16**



Project Manager: Elizabeth Drayer, PE

03-02-21

Date

*Polly L. Boissevain*

QA/QC Review: Polly Boissevain, PE

03-02-21

Date

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## LIST OF ACRONYMS AND ABBREVIATIONS

|                       |                                               |
|-----------------------|-----------------------------------------------|
| 2009 Update/2009 WMPU | 2009 Water Master Plan Update                 |
| 2020 WMP              | 2020 Water Master Plan                        |
| AB 1668               | Assembly Bill 1668                            |
| AC                    | Asbestos Cement                               |
| ACWD                  | Alameda County Water District                 |
| ADD                   | Average Day Demand                            |
| af                    | Acre-Feet                                     |
| af/yr                 | Acre-Feet Per Year                            |
| AMI                   | Advanced Metering Infrastructure              |
| APN                   | Assessor's Parcel Number                      |
| AWIA                  | America's Water Infrastructure Act            |
| AWWA                  | American Water Works Association              |
| BART                  | Bay Area Rapid Transit                        |
| BAWSCA                | Bay Area Water Supply And Conservation Agency |
| CIP                   | Capital Improvement Program                   |
| CIP ID                | Capital Improvement Program ID                |
| City                  | City of Milpitas                              |
| COF                   | Consequence Of Failure                        |
| County                | Santa Clara County                            |
| CVP                   | Central Valley Project                        |
| CY                    | Calendar Year                                 |
| DDW                   | Division of Drinking Water                    |
| Delta                 | Sacramento-San Joaquin Delta                  |
| DIP                   | Ductile Iron Pipe                             |
| DWR                   | Department of Water Resources                 |
| EIR                   | Environmental Impact Report                   |
| EPRV                  | Emergency Pressure Reducing Valve             |
| ERP                   | Emergency Response Plan                       |
| Ft/kft                | Feet Per 1,000 Feet                           |
| Ft/s                  | Feet Per Second                               |
| GIS                   | Geographical Information System               |
| gpcd                  | Gallons Per Capita Per Day                    |
| gpd                   | Gallons Per Day                               |
| HGL                   | Hydraulic Grade Line                          |
| HPR                   | Hydrant Pressure Recorder                     |
| HydroScience          | HydroScience Engineers, Inc.                  |
| I-680                 | Interstate 680                                |
| I-880                 | Interstate 880                                |
| ISG                   | Individual Supply Guarantee                   |
| Legislature           | California State Legislature                  |



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|            |                                               |
|------------|-----------------------------------------------|
| LOF        | Likelihood of Failure                         |
| LUA Report | Land Use Alternatives Report                  |
| LWU        | Large Water Users                             |
| Maddaus    | Maddaus Water Management, Inc.                |
| MDD        | Maximum Day Demand                            |
| MG         | Million Gallons                               |
| mgd        | Million Gallons Per Day                       |
| msl        | Mean Sea Level                                |
| MSP        | Midtown Specific Plan                         |
| MWELo      | Model Water Efficient Landscape Ordinance     |
| NRW        | Non-Revenue Water                             |
| PG&E       | Pacific Gas and Electric                      |
| PHD        | Peak Hour Demand                              |
| PM         | Preventative Maintenance                      |
| PRVs       | Pressure Reducing Valves                      |
| PS         | Pump Station                                  |
| Psi        | Pounds Per Square Inch                        |
| PVC        | Polyvinyl Chloride                            |
| R&R        | Rehabilitation and Replacement                |
| RMC        | Raines, Melton & Carella                      |
| RRA        | Risk and Resilience Assessment                |
| RWS        | Regional Water System                         |
| SB X7-7    | Water Conservation Act of 2009                |
| SBWR       | South Bay Water Recycling                     |
| SCADA      | Supervisory Control and Data Acquisition      |
| SCVWD      | Santa Clara Valley Water District             |
| SFPUC      | San Francisco Public Utilities Commission     |
| SJW        | San Jose Water                                |
| SOI        | Sphere of Influence                           |
| SWRCB      | State Water Resources Control Board           |
| TASP       | Transit Area Specific Plan                    |
| TDH        | Total Dynamic Head                            |
| UPC        | Uniform Plumbing Code                         |
| USEPA      | United States Environmental Protection Agency |
| USGS       | United States Geological Survey               |
| UWMP       | Urban Water Management Plan                   |
| VTA        | Valley Transit Authority                      |
| VW         | Valley Water                                  |
| WTP        | Water Treatment Plant                         |
| WUF        | Water Use Factors                             |

## WATER MASTER PLAN PURPOSE

The purpose of this Water Master Plan for the City of Milpitas (City) is to evaluate the existing system infrastructure and incorporate impacts of short-term and long-term planned growth to develop a comprehensive road map for the City's Water System Capital Improvement Program (CIP). The City's last Water Master Plan was completed in 2002 and was then updated in 2009 to incorporate an analysis of the impacts of the City's Milpitas Metro Specific Plan (then known as the Transit Area Specific Plan). The City is continuing to experience significant growth and is currently in the process of updating its General Plan and two key specific plans, Milpitas Gateway-Main Street Specific Plan (formerly known as the Midtown Specific Plan) and Milpitas Metro Specific Plan.

Since the completion of the 2009 Water Master Plan Update (2009 WMPU), the State endured five years of drought starting in 2012, including the driest four consecutive years in California history (2012-2015). These unprecedented conditions led to statewide mandated water conservation, significant surface water supply reductions and curtailments, and legislation establishing new statewide water efficiency standards and contributing to new water use patterns and trends.

These factors make it critical to both reassess the City's water needs, priorities, and strategies and reevaluate water system infrastructure improvements, with a goal of ensuring a safe and reliable water supply for the City's residents and businesses.

## WATER MASTER PLAN OBJECTIVES

The primary objectives of this Water Master Plan are to:

- Evaluate historical and existing water demands to understand current water use patterns, trends, and unit water use factors and develop future water demand projections based on current updates being made to the General Plan
- Review and refine performance and planning criteria used to evaluate the water system and formulate recommendations for future facilities
- Perform a condition assessment of the City's water assets, including evaluating criticality and likelihood of failure, consequence of failure, and business risk exposure for horizontal assets (e.g., pipes, valves) and vertical assets (e.g., reservoirs, pump stations)
- Prepare a water utility asset renewal and replacement study to provide priorities for asset renewal and replacement
- Develop and calibrate the City's water system hydraulic model using InfoWater modeling software to provide an accurate tool for evaluating various water system scenarios
- Evaluate the need for new backbone water facilities (including pipelines, storage facilities and pumping facilities) to serve buildout of the City's General Plan (estimated by the year 2040)
- Evaluate existing and projected source capacity (per Section 64558, Title 22, of the California Code of Regulations) to ensure that adequate storage is provided throughout the City's water system to meet existing and future needs and requirements
- Develop a capital improvement program for recommended potable water system facilities



## Executive Summary

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### EXISTING AND PROJECTED FUTURE LAND USE

Most of the City's existing land use is single family residential, which is located primarily in the north and the east. Industrial and commercial land uses comprise much of the City's southern and western regions. The City anticipates future growth in the form of smaller development projects identified in several Opportunity Areas located throughout the City and significant new development in two large planning areas (Gateway-Main Street and Metro Plan areas). Opportunity Areas were previously defined by the City's Planning and Economic Development departments and represent locations throughout the City that can accommodate future growth and support economic development while protecting natural resources and open space.

Figure ES-1 shows the locations of each Opportunity Area and briefly describes the land use plan for that area. Growth strategies and goals are outlined in the City's General Plan and detailed for Gateway-Main Street and the Metro Plan Area in their respective specific plans.

Since updates to the General Plan, Milpitas Gateway-Main Street Specific Plan, and Milpitas Metro Specific Plan are currently in progress, West Yost coordinated with the City's Planning Department and HydroScience Engineers, Inc. (HydroScience), who is developing the City's Sewer Master Plan, to develop land use planning assumptions for use in the Water and Sewer Master Plans. These future land use assumptions are preliminary but represent conservative estimates of future development.

Table ES-1 summarizes buildout land use assumptions used in this report to model potential future growth. This Water Master Plan conservatively assumes the high end of the dwelling unit range will be constructed, and that areas shown in Table ES-1 are additional new development (not redevelopment). While this "new development" assumption may double-count some existing demands in growth areas where redevelopment occurs, it was necessary based on limited data. Parcel-specific development data was not available, so West Yost could not identify whether a future development was replacing an existing development (and replacing existing water use) or in addition to existing development (with additional water use).



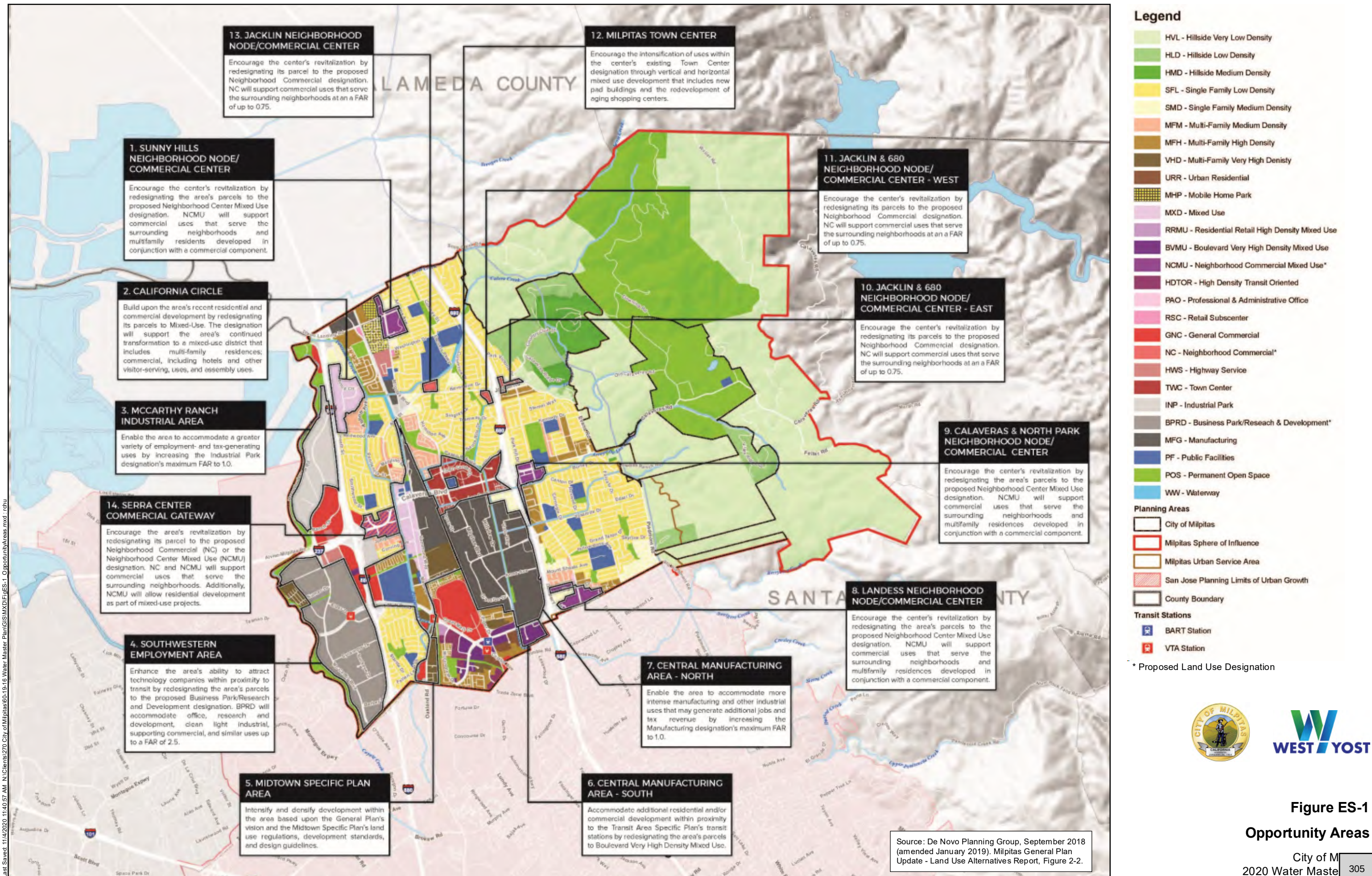


Figure ES-1  
Opportunity Areas  
City of Milpitas  
2020 Water Master Plan



**Table ES-1. Potential New Growth at Buildout<sup>(a)</sup>**

| Development                                                | Land Use Designation <sup>(b)</sup> | Total Acres | Range of Potential New Dwelling Units |        | New Non-Residential Building Square Footage |
|------------------------------------------------------------|-------------------------------------|-------------|---------------------------------------|--------|---------------------------------------------|
|                                                            |                                     |             | Low                                   | High   |                                             |
| Opportunity Areas - Residential                            |                                     |             |                                       |        |                                             |
| Sunny Hills Neighborhood Node/Commercial Center            | NCMU                                | 19.92       | 275                                   | 350    | 569,573                                     |
| California Circle                                          | NCMU                                | 54.10       | 248                                   | 360    | 551,816                                     |
| California Circle                                          | HDR                                 | 18.26       | 252                                   | 365    | 551,816                                     |
| Landess Neighborhood Node/Commercial Center                | NCMU                                | 38.03       | 450                                   | 625    | 521,274                                     |
| Calaveras & North Park Neighborhood Node/Commercial Center | NCMU                                | 28.28       | 325                                   | 425    | 416,836                                     |
| Milpitas Town Center                                       | HDR <sup>(c)</sup>                  | 38.07       | 400                                   | 525    | 434,872                                     |
| Subtotal                                                   |                                     | 196.66      | 1,950                                 | 2,650  | 3,046,187                                   |
| Opportunity Areas - Non-Residential                        |                                     |             |                                       |        |                                             |
| McCarthy Ranch Industrial Area                             | INP                                 | 192.29      | -                                     | -      | 3,049,301                                   |
| Southwestern Employment Area                               | BPRD                                | 488.26      | -                                     | -      | 5,126,097                                   |
| Central Manufacturing Area - North                         | MFG                                 | 492.14      | -                                     | -      | 2,602,882                                   |
| Jacklin & 680 Neighborhood Node/Commercial Center - East   | NC                                  | 7.95        | -                                     | -      | 152,321                                     |
| Jacklin & 680 Neighborhood Node/Commercial Center - West   | NC                                  | 6.42        | -                                     | -      | 75,502                                      |
| Jacklin Neighborhood Node/Commercial Center                | NC                                  | 9.79        | -                                     | -      | 99,629                                      |
| Subtotal                                                   |                                     | 1,196.85    | -                                     | -      | 11,105,732                                  |
| Milpitas Gateway-Main Street Specific Plan                 |                                     |             |                                       |        |                                             |
| HDR Subset of Gateway-Main Street                          | HDR <sup>(c)</sup>                  | 46.70       | 478                                   | 637    | -                                           |
| VHDR Subset of Gateway-Main Street                         | VHDR <sup>(e)</sup>                 | 74.58       | 781                                   | 1,041  | -                                           |
| MDR Subset of Gateway-Main Street                          | MDR <sup>(f)</sup>                  | 62.70       | 242                                   | 322    | 483,391                                     |
| Non-Residential Subset of Gateway-Main Street              | MFG <sup>(g)</sup>                  | 300.30      | -                                     | -      | 954,012                                     |
| Subtotal                                                   |                                     | 484.28      | 1,500                                 | 2,000  | 1,437,403                                   |
| Milpitas Metro Specific Plan                               |                                     |             |                                       |        |                                             |
| VHDR Subset of Metro Plan Area                             | VHDR                                | 99.00       | 2,000                                 | 4,000  | -                                           |
| HDR Subset of Metro Plan Area                              | HDR                                 | 113.52      | 3,000                                 | 3,000  | -                                           |
| NC Subset of Metro Plan Area <sup>(h)</sup>                | NC                                  | 85.35       | -                                     | -      | 2,087,075                                   |
| Subtotal                                                   |                                     | 297.87      | 5,000                                 | 7,000  | 2,087,075                                   |
| Total                                                      |                                     | 2,176       | 8,450                                 | 11,650 | 17,676,397                                  |

(a) Source: City of Milpitas - Buildout Land Use Condition Assumptions, HydroScience Engineers, August 3, 2020.

(b) Land Use Designations based on Preferred Land Use Map (PLUM), Figure 2-3.

(c) Originally Multifamily High Density (MFH), which has been renamed High Density Residential (HDR) in the PLUM.

(d) Originally Boulevard Very High Density Mixed Use (BVMU), which has been renamed Very High Density Mixed Use (VHDMU) in the PLUM.

(e) Originally Multi-Family Very High Density (VHD), which has been renamed Very High Density Residential (VHDR) in the PLUM.

(f) Originally Mixed Use (MXD), which has been retired in the PLUM. This subset has been recategorized as Medium Density Residential (MDR) based on housing density. MDR is the updated name for Multi-Family Medium Density (MFM).

(g) Originally multiple land uses, Manufacturing (MFG) selected because it is the most conservative (i.e., highest water use).

(h) Includes the "Central Manufacturing Area - South" Opportunity Area, which has been combined with MMSP.



## Executive Summary

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### EXISTING WATER SYSTEM FACILITIES

The City's existing potable water system includes the following major facilities: five turnouts, one emergency groundwater well, three emergency interties, five storage reservoirs, five pump stations, 17 pressure reducing valves (PRVs), and approximately 183 miles of pipelines.

There are six main pressure zones within the City's water service area, four served by the San Francisco Public Utilities Commission (SFPUC) (Zones SF1 through SF4), and two served by Valley Water (VW) (Zones VW1 and VW2), which was previously known as the Santa Clara Valley Water District. Under normal conditions, the City operates its potable water system such that the SFPUC and VW supplies remain separate. Isolation valves prevent mixing and create two distinct water service areas.

### EXISTING AND PROJECTED FUTURE WATER SUPPLIES

The City's existing water supplies include imported water, groundwater, recycled water, and interties with neighboring agencies. Under normal conditions, imported water comprises the City's entire water supply. The City currently receives water supplies from the following sources:

- Treated surface water from the SFPUC
- Treated surface water from VW
- Tertiary treated recycled water from South Bay Water Recycling (SBWR)
- During emergencies, groundwater pumped from one well (Pinewood Well) within the City
- Emergency interties with San Jose Water (SJW) and the Alameda County Water District (ACWD)

In 2009, the SFPUC and Bay Area Water Supply and Conservation Agency (BAWSCA) members (including the City) entered into a Water Supply Agreement (WSA), a 25-year contract that allocates 184 million gallons per day (mgd) among BAWSCA members. The City's share of SFPUC supply is 9.23 mgd. Per the City's contract with VW, the City submits a request every three years detailing its desired annual supplies from VW. In each of the three years after submitting the request, the City is obligated to purchase at least 95 percent of the maximum annual amount listed on the schedule.

Based on the City's 2015 Urban Water Management Plan (2015 UWMP), the City expects to meet future water demands with the existing imported surface water supplies described above. As a result, there are no plans to develop new supply sources. However, the City hopes to increase future supply reliability by expanding its groundwater capabilities. Two new wells, the Curtis Well and the McCandless Well, are expected to come online during the City's buildout horizon (i.e., by 2040). To further improve supply reliability, this Water Master Plan also recommends that the City construct an additional VW turnout.



## Executive Summary

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### EXISTING AND PROJECTED FUTURE WATER DEMANDS

In 2019, the City served approximately 78,000 residents and used approximately 8.33 mgd of water. This translates to approximately 107 gallons per capita per day (gpcd), continuing a trend of lower per capita water use following the recent drought and subsequent mandatory water reduction measures. The City is on track to comply with its 2020 per capita water use target of 146 gpcd.

Buildout water demands equal the sum of existing demands and projected future demands as a result of new development. Demand projections are typically calculated based on land use, with expected land area multiplied by a water use factor (WUF). The WUFs are developed from recent historical consumption data and vary by land use type. In other words, the WUFs recognize that a 10-acre industrial processing plant would use more water than a similarly sized office park

West Yost developed preliminary WUFs for each General Plan land use designation based on existing demands (from billing data) and parcel acreages. These preliminary WUFs were refined by examining water use on a per capita basis and for representative developments (e.g., a typical office park or apartment complex), as identified by the City. Water demand projections were developed by applying finalized WUFs to future land use acreages summarized in Table ES-1.

Table ES-2 summarizes the buildout water demand projection. The City's projected water production required at buildout is approximately 13.9 mgd, or 15,600 acre feet per year (af/yr). This is an increase of approximately 5.6 mgd, or 67 percent, over existing (2019) production (8.3 mgd).

The land use-based water demand projection presented above is significantly lower than projections from the 2009 WMPU and the City's 2015 UWMP. At buildout (2040), the land use-based water demand projection is approximately 3.5 mgd and 7.0 mgd lower than projections from the 2009 WMPU and 2015 UWMP, respectively. In contrast, demand projections in this Water Master Plan are generally consistent with demand projections developed by Maddaus Water Management, Inc. (Maddaus) to help BAWSCA member agencies prepare for their 2020 UWMPs.

**Table ES-2. Buildout Potable Water Demand Projection**

| Development                                                | Land Use Designation <sup>(a)</sup> | Total Acres <sup>(a)</sup> | WUF <sup>(b)</sup> , gpd/ac | Demand, mgd |
|------------------------------------------------------------|-------------------------------------|----------------------------|-----------------------------|-------------|
| <b>Opportunity Areas - Residential</b>                     |                                     |                            |                             |             |
| Sunny Hills Neighborhood Node/Commercial Center            | NCMU                                | 19.92                      | 2,100                       | 0.04        |
| California Circle                                          | NCMU                                | 54.10                      | 2,100                       | 0.11        |
| California Circle                                          | HDR                                 | 18.26                      | 4,500                       | 0.08        |
| Landess Neighborhood Node/Commercial Center                | NCMU                                | 38.03                      | 2,100                       | 0.08        |
| Calaveras & North Park Neighborhood Node/Commercial Center | NCMU                                | 28.28                      | 2,100                       | 0.06        |
| Milpitas Town Center                                       | HDR                                 | 38.07                      | 4,500                       | 0.17        |
| Subtotal                                                   |                                     |                            |                             | 0.55        |
| <b>Opportunity Areas - Non-Residential</b>                 |                                     |                            |                             |             |
| McCarthy Ranch Industrial Area                             | INP                                 | 192.29                     | 400                         | 0.08        |
| Southwestern Employment Area                               | BPRD                                | 488.26                     | 400                         | 0.20        |
| Central Manufacturing Area - North                         | MFG                                 | 492.14                     | 2,000                       | 0.98        |
| Jacklin & 680 Neighborhood Node/Commercial Center - East   | NC                                  | 7.95                       | 1,400                       | 0.01        |
| Jacklin & 680 Neighborhood Node/Commercial Center - West   | NC                                  | 6.42                       | 1,400                       | 0.01        |
| Jacklin Neighborhood Node/Commercial Center                | NC                                  | 9.79                       | 1,400                       | 0.01        |
| Subtotal                                                   |                                     |                            |                             | 1.29        |
| <b>Milpitas Gateway-Main Street Specific Plan</b>          |                                     |                            |                             |             |
| HDR Subset of Gateway-Main Street                          | HDR                                 | 46.70                      | 4,500                       | 0.21        |
| VHDR Subset of Gateway-Main Street                         | VHDR                                | 74.58                      | 9,000                       | 0.67        |
| MDR Subset of Gateway-Main Street                          | MDR                                 | 62.70                      | 2,300                       | 0.14        |
| Non-Residential Subset of Gateway-Main Street              | MFG                                 | 300.30                     | 2,000                       | 0.60        |
| Subtotal                                                   |                                     |                            |                             | 1.63        |
| <b>Milpitas Metro Specific Plan (MMSP)</b>                 |                                     |                            |                             |             |
| VHDR Subset of Metro Plan Area                             | VHDR                                | 99.00                      | 9,000                       | 0.89        |
| HDR Subset of Metro Plan Area                              | HDR                                 | 113.52                     | 4,500                       | 0.51        |
| NC Subset of Metro Plan Area                               | NC                                  | 85.35                      | 1,400                       | 0.12        |
| Subtotal                                                   |                                     |                            |                             | 1.52        |
| Total New Demand                                           |                                     |                            |                             | 4.99        |
| NRW (11%)                                                  |                                     |                            |                             | 0.62        |
| New Water Production Required                              |                                     |                            |                             | 5.60        |
| Existing (2019) Water Production                           |                                     |                            |                             | 8.33        |
| <b>Buildout Water Production Required</b>                  |                                     |                            |                             | <b>13.9</b> |
| (a) Refer to Table ES-1.                                   |                                     |                            |                             |             |
| (b) Refer to Table 5-8.                                    |                                     |                            |                             |             |





## Executive Summary

### EVALUATION OF EXISTING WATER SYSTEM

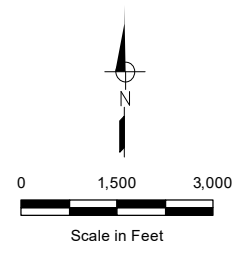
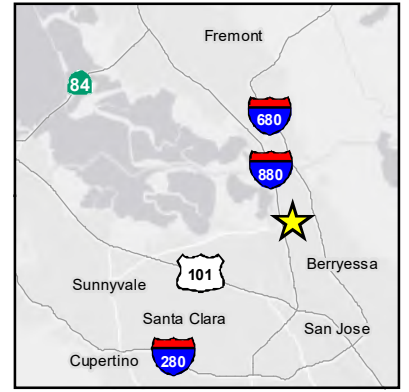
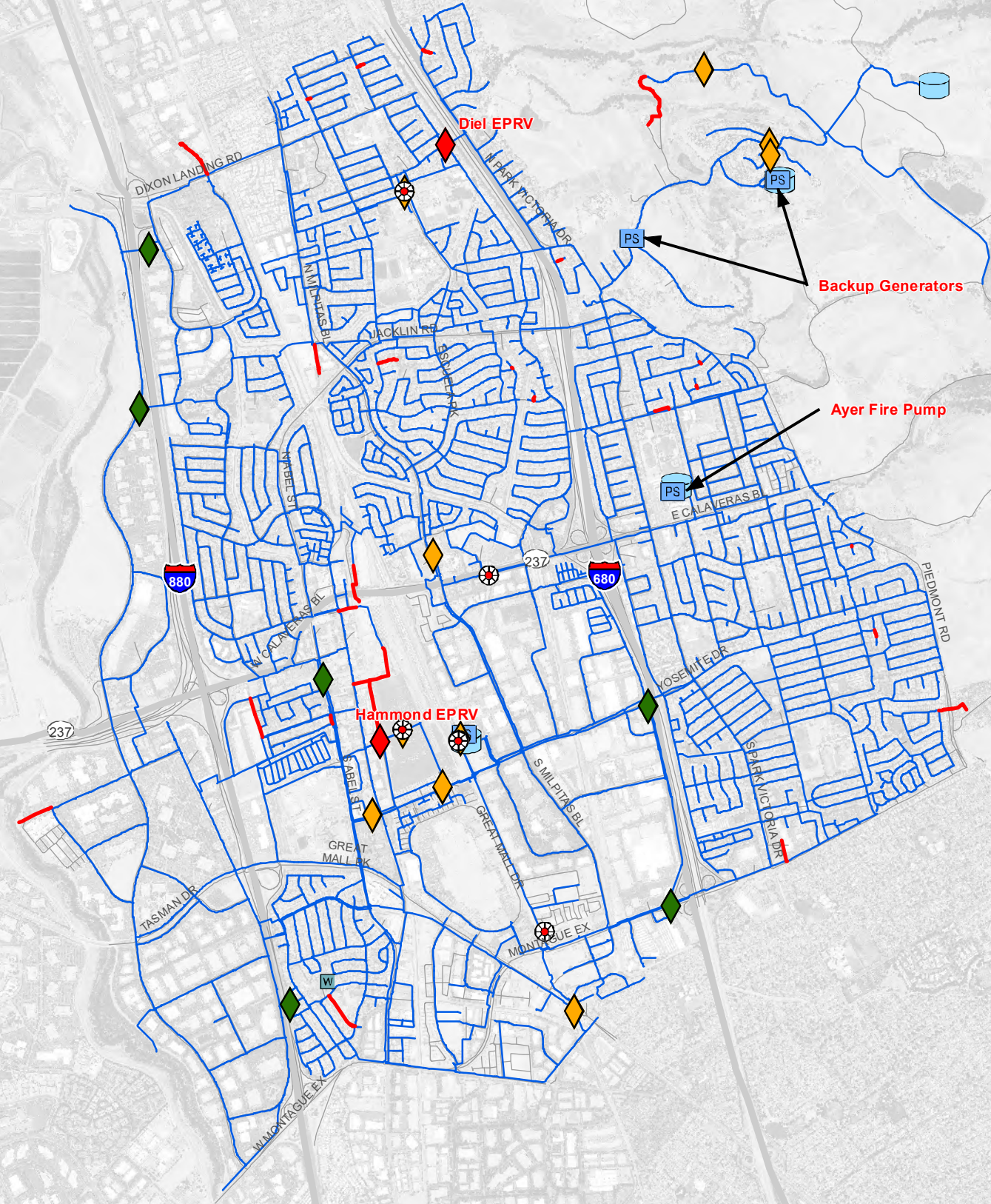
The City's existing water system was evaluated based on supply, storage, and pumping capacities, as well as its ability to meet recommended performance and operational criteria under various demand and emergency scenarios. Below is a summary of findings and recommendations from the existing system evaluation. Figure ES-2 shows the recommended improvements from the existing system analysis.

- **Supply Capacity**
  - Existing firm supplies (i.e., largest turnout offline in each service area) exceed maximum day demand. While the VW service area has a firm supply deficit, it can be met by the surplus in the SFPUC service area. While supplies from SFPUC and VW are normally segregated, the City can intermix supply sources if necessary. No additional supply facilities are recommended based on existing demands and normal operating conditions.
- **Storage Capacity**
  - There is sufficient storage in the SFPUC service area and a deficit of 0.45 million gallons (MG) in the VW service area. This deficit is not considered critical, as the Zone SF1 storage surplus can cover the shortfall in Zones VW1 and VW2. No additional storage is recommended based on existing demands and normal operating conditions.
- **Pumping Capacity**
  - Each pressure zone has a pumping capacity surplus. No additional pumping facilities are recommended based on existing demands and normal operating conditions.
- **Distribution System**
  - The existing distribution system meets all minimum pressure criteria under average day, peak hour, and maximum day demand conditions.
  - Based on fire flow analysis, West Yost identified potential projects to improve overall distribution system flows. These mainly consist of upsizing existing 6-inch and 8-inch diameter pipelines, though some PRV and isolation valve improvements are also recommended.
  - To comply with the City's design guidelines and improve fire flow capacity, the City should consider upsizing any 4-inch diameter pipelines that serve hydrants to 8-inch diameter pipelines.
  - Should SFPUC turnouts go offline, most of Zone SF2 has reduced fire flow capacity. As a result, West Yost recommends installing a pump at the Ayer Pump Station with a capacity of 4,000 gallons per minute (gpm).
  - The existing system is well equipped to handle a power outage or a VW supply outage. No additional significant impacts arise in either emergency scenario.
  - To evaluate system performance during a PRV outage, PRVs normally allowing flow from Zone 2 to Zone 1 were simulated to be disabled one at a time. The Sunnyhills and Parc Metro PRVs are the most critical, as outages at either of these PRVs results in new locations not meeting recommended fire flows. Recommended improvements include a new emergency PRV (EPRV), new pipelines, and pipeline upsizing.



Last Saved: 11/15/2020 8:56:39 AM N:\Clients\270 City of Milpitas\270 City of Milpitas\60-19-16 Water Master Plan\GIS\MXD\FigES-2 Existing Improvements.mxd : rchu

Notes:  
1. Pipeline improvements include new pipes and existing pipes upsized to address existing deficiencies.



- Recommended Improvements**
- Emergency PRV
  - Improved Pipeline
- Existing Facilities**
- Existing Turnout
  - Existing Groundwater Well
  - Existing Pressure Reducing Valve
  - Existing Emergency PRV
  - Existing Pump Station
  - Existing Storage Reservoir
  - Existing Pipeline



**Figure ES-2**  
**Recommended Improvements**  
**for Existing Water System**





## Executive Summary

### EVALUATION OF FUTURE WATER SYSTEM

The City's buildout water system was evaluated based on supply, storage, and pumping capacities, as well as its ability to meet recommended performance and operational criteria under various demand and emergency scenarios. At buildout, it is assumed that Curtis Well and McCandless Well would be available in emergencies. While the City does not currently anticipate any other major water system changes, buildout analyses assume that the infrastructure recommendations from the existing system evaluations have been implemented.

Below is a summary of findings and recommendations from the buildout system evaluation. Appendix G shows the locations of and provides details for each recommended improvement.

- **Supply Capacity**
  - Buildout firm supplies fall short of maximum day demands. The firm supply surplus in the SFPUC service area cannot make up for the deficit in the VW service area. Thus, West Yost recommends constructing a new VW turnout near the intersection of Piper Drive and Garden Street with the same capacity as the existing Gibraltar turnout.
- **Storage Capacity**
  - Buildout storage capacity is insufficient. The storage capacity surplus in the SFPUC service area cannot make up for the deficit in the VW service area. West Yost recommends constructing a new 2 MG storage reservoir in the VW service area.
  - To deliver water from this new storage reservoir, West Yost recommends constructing a new pump station with a firm capacity of 4,000 gpm.
- **Pumping Capacity**
  - Each pressure zone has a pumping capacity surplus. No additional pumping facilities are recommended to meet buildout demands.
- **Distribution System**
  - The buildout distribution system meets the minimum pressure criterion under a peak hour demand condition.
  - To address locations not meeting recommended fire flows, West Yost recommends installing a new EPRV near the intersection of Cedar Way and South Main Street. The Cedar EPRV would allow flows from Zone SF1 to Zone VW1 should pressures in Zone VW1 drop significantly.

### ASSET RENEWAL AND REPLACEMENT

For assets in the City's water distribution system, West Yost performed a condition assessment that focused on risk, a combination of an asset's likelihood of failure and consequence of failure. Assets were then grouped according to three risk levels: A (Watch), B (Investigate), and C (Act). Level A is the initial action level, representing the point at which an asset or facility depicts aging or performance that requires increased attention, health checks, or predictive maintenance efforts. Assets in Level B should undergo detailed condition assessments, while assets in Level C are targets for renewal activities (e.g., inclusion in a mid-range capital improvement plan or more immediate design efforts).



## Executive Summary

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Recommendations were identified based on asset classification and consist of both capital and non-capital projects. Capital projects include pipeline condition assessment, detailed facility condition assessment, and developing a water meter test program. Non-capital projects (i.e., operational improvement measures) include collecting asset performance data, developing a valve and hydrant exercising program, and reviewing the existing maintenance program to identify additional asset monitoring opportunities.

## RECOMMENDED CAPITAL IMPROVEMENT PROGRAM

The recommended CIP for the City's existing and future water system includes recommendations from the existing system evaluation, the future system evaluation, the asset renewal and replacement study, and the AWIA risk and resilience assessment. Table ES-3 summarizes the proposed CIP phasing and cost in 2020 dollars. Improvements are grouped according to their "source" (e.g., Renewal and Replacement Study), and their costs are assigned to a five-year CIP period. The total CIP cost through 2051 is approximately \$78.7 million (2020 dollars).

**Table ES-3. Recommended Capital Improvement Program**

| Improvement                                                           | Capital Cost, \$M <sup>(a,b)</sup> |              |               |              |               |                          |               |
|-----------------------------------------------------------------------|------------------------------------|--------------|---------------|--------------|---------------|--------------------------|---------------|
|                                                                       | 2021-2025                          | 2026-2030    | 2031-2035     | 2036-2040    | 2041-2045     | 2046-2051 <sup>(c)</sup> | Total         |
| <b>Improvements from Renewal and Replacement Study (Chapter 10)</b>   |                                    |              |               |              |               |                          |               |
| Pipeline Condition Assessment                                         | \$0.5                              | -            | -             | -            | -             | -                        | \$0.5         |
| Detailed Facility Condition Assessment                                | \$2.2                              | -            | -             | -            | -             | -                        | \$2.2         |
| Water Meter Test Program                                              | \$0.1                              | -            | -             | -            | -             | -                        | \$0.1         |
| Asset Renewal and Replacement                                         | \$17.1                             | \$1.4        | \$1.6         | \$3.3        | \$17.0        | \$10.1                   | \$50.5        |
| Subtotal                                                              | \$20.0                             | \$1.4        | \$1.6         | \$3.3        | \$17.0        | \$10.1                   | \$53.4        |
| <b>Improvements from Existing System Analysis (Chapter 8)</b>         |                                    |              |               |              |               |                          |               |
| Hammond EPRV and Corning Isolation Valve                              | \$0.5                              | -            | -             | -            | -             | -                        | \$0.5         |
| Pipeline Improvements - Fire Flow                                     | \$2.6                              | -            | -             | -            | -             | -                        | \$2.6         |
| Fire Pump at Ayer Pump Station                                        | -                                  | \$2.1        | -             | -            | -             | -                        | \$2.1         |
| Diel EPRV                                                             | -                                  | \$0.5        | -             | -            | -             | -                        | \$0.5         |
| Pipeline Improvements and New Pipelines - Fire Flow (Outage)          | -                                  | \$0.1        | -             | -            | -             | -                        | \$0.1         |
| Backup Generators at Country Club and Tularcitos Pump Stations        | -                                  | \$0.7        | -             | -            | -             | -                        | \$0.7         |
| Hydrant Service Pipeline Improvements                                 | -                                  | \$0.2        | -             | -            | -             | -                        | \$0.2         |
| Subtotal                                                              | \$3.1                              | \$3.5        | \$0.0         | \$0.0        | \$0.0         | \$0.0                    | \$6.6         |
| <b>Improvements from Future System Analysis (Chapter 9)</b>           |                                    |              |               |              |               |                          |               |
| Piper Turnout                                                         | -                                  | -            | -             | \$0.5        | -             | -                        | \$0.5         |
| VW Storage Reservoir                                                  | -                                  | -            | \$5.5         | -            | -             | -                        | \$5.5         |
| Pump Station for VW Storage Reservoir                                 | -                                  | -            | \$4.1         | -            | -             | -                        | \$4.1         |
| Curtis Well                                                           | -                                  | -            | \$6.0         | -            | -             | -                        | \$6.0         |
| Cedar EPRV                                                            | -                                  | -            | \$0.5         | -            | -             | -                        | \$0.5         |
| Subtotal                                                              | \$0.0                              | \$0.0        | \$16.1        | \$0.5        | \$0.0         | \$0.0                    | \$16.6        |
| <b>Improvements from Risk and Resilience Assessment<sup>(d)</sup></b> |                                    |              |               |              |               |                          |               |
| Perimeter Fencing                                                     | \$0.030                            | -            | -             | -            | -             | -                        | \$0.030       |
| Site Security Protocols                                               | \$0.020                            | -            | -             | -            | -             | -                        | \$0.020       |
| Replace Isolation Valves                                              | \$2.0                              | -            | -             | -            | -             | -                        | \$2.0         |
| ShakeAlert Participation                                              | \$0.085                            | -            | -             | -            | -             | -                        | \$0.085       |
| Subtotal                                                              | \$2.1                              | \$0.0        | \$0.0         | \$0.0        | \$0.0         | \$0.0                    | \$2.1         |
| <b>Total</b>                                                          | <b>\$25.2</b>                      | <b>\$4.9</b> | <b>\$17.7</b> | <b>\$3.8</b> | <b>\$17.0</b> | <b>\$10.1</b>            | <b>\$78.7</b> |

(a) Costs shown are in 2020 dollars.

(b) Costs include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

(c) Includes forecasted renewal and replacement costs for the year 2051.

(d) Costs were only developed for four projects recommended in the Risk and Resilience Assessment.

# CHAPTER 1

## Introduction

### 1.1 WATER MASTER PLAN PURPOSE

The purpose of this Water Master Plan for the City of Milpitas (City) is to evaluate the existing system infrastructure and incorporate impacts of short-term and long-term planned growth to develop a comprehensive road map for the City's Water System Capital Improvement Program. The City's last Water Master Plan was completed in 2002 and was then updated in 2009 to incorporate an analysis of the impacts of the City's Milpitas Metro Specific Plan (then known as the Transit Area Specific Plan). The City is continuing to experience significant growth and is currently in the process of updating its General Plan and two key specific plans, Milpitas Gateway-Main Street Specific Plan (formerly known as the Midtown Specific Plan) and Milpitas Metro Specific Plan.

Since the completion of the 2009 Water Master Plan Update, the State endured five years of drought starting in 2012, including the driest four consecutive years in California history (2012-2015). These unprecedented conditions led to statewide mandated water conservation, significant surface water supply reductions and curtailments, and legislation establishing new statewide water efficiency standards and contributing to new water use patterns and trends.

These factors make it critical to both reassess the City's water needs, priorities, and strategies and reevaluate water system infrastructure improvements, with a goal of ensuring a safe and reliable water supply for the City's residents and businesses.

### 1.2 WATER MASTER PLAN OBJECTIVES

The primary objectives of this Water Master Plan are to:

- Evaluate historical and existing water demands to understand current water use patterns, trends, and unit water use factors and develop future water demand projections based on current updates being made to the General Plan
- Review and refine performance and planning criteria used to evaluate the water system and formulate recommendations for future facilities
- Perform a condition assessment of the City's water assets, including evaluating criticality and likelihood of failure, consequence of failure, and business risk exposure for horizontal assets (e.g., pipes, valves) and vertical assets (e.g., reservoirs, pump stations)
- Prepare a water utility asset renewal and replacement study to provide priorities for asset renewal and replacement
- Develop and calibrate the City's water system hydraulic model using InfoWater modeling software to provide an accurate tool for evaluating various water system scenarios
- Evaluate the need for new backbone water facilities (including pipelines, storage facilities and pumping facilities) to serve buildout of the City's General Plan (estimated by the year 2040)



- Evaluate existing and projected source capacity to ensure that adequate storage is provided throughout the City's water system to meet existing and future needs and requirements<sup>1</sup>
- Develop a capital improvement program for recommended potable water system facilities

## 1.3 PREVIOUS AND ON-GOING STUDIES

### 1.3.1 Previous Water Master Plans

The City's last Water Master Plan, the 2009 Water Master Plan Update (2009 Update, 2009 WMPU), was an update of the City's 2002 Water Master Plan (2002 Master Plan). The 2002 Master Plan defined the water system improvements necessary to meet the City's 2002 water demand and future demand associated with future development plans for 2008, 2018 and build-out year of 2021. The 2009 Update provided a re-evaluation of the City's water system capacity based on updated land use information from several near-term and long-term development projects, including the Transit Area Specific Plan, that were in the planning process at that time. The 2009 Update provided information required for the City's planning and financial efforts and defined the necessary water supply system improvements to accommodate the City's buildout land use.

The 2009 Update used baseline information, flow factors, and other information from the 2002 Master Plan and did not include any re-evaluation of flow factors or model calibration steps. Revised water demands were developed based on updated land use information and flow factors from the 2002 Master Plan. **In the 2009 Update, each water supply area (i.e., San Francisco Public Utilities Commission and Valley Water) was evaluated independently.** The demand conditions analyzed were peak hour demand and maximum day demand plus fire flow.

As noted above, this Water Master Plan provides a comprehensive review and evaluation of the City's existing and future water system needs through an independent evaluation in lieu of building on the 2002 Master Plan or the 2009 Update. The evaluation incorporates updates to unit water demand factors based on recent and projected water use trends and patterns to develop future demand projections, includes an update of the City's water system hydraulic model to evaluate system capacity, and reflects updates to future development plans to provide an updated and comprehensive review and evaluation of future water system needs. **Rather than evaluating each water supply area independently, this Water Master Plan better matches actual water system operations by evaluating them together as a single, citywide water system.**

### 1.3.2 Sewer and Storm Drain Master Plans

In parallel with this Water Master Plan, the City is also preparing a Sewer Master Plan (last updated in 2009) and a Storm Drain Master Plan (last updated in 2013). Unit water use factors, wastewater generation factors, and land use planning assumptions used in the new master plans have been coordinated for consistency as appropriate.

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<sup>1</sup> Analyses from this Water Master Plan are referenced in the City's Source Capacity Planning Study (per Section 64558, Title 22, of the California Code of Regulations), which is being prepared as a separate deliverable.



### **1.3.3 City of Milpitas General Plan and Specific Plans**

The City's current General Plan was adopted in December 1994 and last amended in April 2015. In May 2016, the City initiated a General Plan Update, which is a comprehensive effort to incorporate City growth and changes since 1994, as well as new laws passed, emerging social and environmental issues, and recently developed planning strategies and practices. The General Plan Update and associated Environmental Impact Report are anticipated to be completed in early 2021.

The City has two major development planning areas, the Milpitas Gateway-Main Street Specific Plan area (or Gateway-Main Street Area, formerly known as the Midtown Specific Plan area) and the Milpitas Metro Specific Plan area (or Metro Plan Area, formerly known as the Transit Area Specific Plan area). These areas have been in development over recent years, and development plans continue to be refined. Specific plans for both planning areas were last revised in 2010 (Gateway-Main Street Area, then known as Midtown) and 2011 (Metro Plan Area, then known as Transit Area) and are currently being updated to reflect current development opportunities and constraints.

Proposed future land use associated with the General Plan Update and updated Milpitas Gateway-Main Street and Milpitas Metro Specific Plans has been incorporated into this Water Master Plan and is discussed further in Chapter 2.

### **1.3.4 Emergency Response Plan**

Also, in conjunction with this Water Master Plan, the City's Emergency Response Plan, last updated in 2010, is being updated to reflect current conditions and comply with requirements of America's Water Infrastructure Act of 2018 (AWIA). AWIA requires the City's completion of a water system Risk and Resilience Assessment (RRA) by December 31, 2020 and an updated Emergency Response Plan (ERP) by June 30, 2021. The City's RRA and ERP are prepared as separate deliverables.

## **1.4 REPORT ORGANIZATION**

This Water Master Plan is organized into the following chapters:

|                                             |                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chapter 1: Introduction                     | Describes the purpose and objectives for the Water Master Plan, its relationship to other on-going studies, report organization and acknowledgments                                                                                                                                                   |
| Chapter 2: Water Service Area and Land Use  | Describes the City's existing water service area and land uses as well as projected future land uses based on information provided by the City Planning Department on planned future development                                                                                                      |
| Chapter 3: Existing Water System Facilities | Provides background information on the City's existing water system (including pressure zones, supply turnouts, groundwater wells and emergency interties) and distribution system facilities (including storage reservoirs, pump stations, pipelines, pressure reducing valves and isolation valves) |





|                                                     |                                                                                                                                                                                                                                                  |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chapter 4: Water Supply Sources                     | Provides an overview of the City's available water supplies, including supplies from the San Francisco Public Utilities Commission, Valley Water, City groundwater wells, and recycled water provided by South Bay Water Recycling               |
| Chapter 5: Water Demand                             | Presents historical, current and projected future water demands based on the planned future development described in Chapter 2                                                                                                                   |
| Chapter 6: Hydraulic Model Update and Calibration   | Describes the update and calibration of the City's water distribution system hydraulic model used to analyze the City distribution system performance                                                                                            |
| Chapter 7: System Planning and Performance Criteria | Defines the recommended planning and performance criteria for the City water system, including supply, storage and pumping capacity, fire flow requirements, minimum and maximum system pressures, and maximum pipeline velocity and head loss   |
| Chapter 8: Evaluation of Existing Water System      | Describes the evaluation of the City's existing water system in comparison to the criteria developed in Chapter 7 and provides recommendations for existing system improvements                                                                  |
| Chapter 9: Evaluation of Future Water System        | Describes the evaluation of the City's water system and its ability to meet projected future water demands in comparison to the criteria developed in Chapter 7 and provides recommendations for future system improvements                      |
| Chapter 10: Asset Renewal and Replacement           | Presents a summary of the findings of Water Utility Condition Assessment included in Appendix D and provides a discussion of risk management guidelines and asset profiling and recommends projects and activities to manage infrastructure risk |
| Chapter 11: Recommended Capital Improvement Program | Based on the evaluations described in Chapters 8, 9 and 10, provides a detailed summary of recommended capital improvements for the City's water system to meet existing and projected future demands, along with estimated construction costs   |
| Chapter 12: References                              | Lists reference documents used in the preparation of this Water Master Plan                                                                                                                                                                      |



The following appendices to this Water Master Plan contain additional technical information, assumptions and calculations:

|                                                                            |                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Appendix A: Water System Schematic Profile                                 | Provides a schematic profile of the City's existing water system as referenced in Chapter 3                                                                                                                                                                   |
| Appendix B: System Operations Narratives                                   | Includes system narratives referenced in Chapter 3 describing normal and emergency operations protocols as prepared by Glen Campi, Public Works Maintenance Manager for Utilities                                                                             |
| Appendix C: Hydrant Testing and HPR Placement Plan                         | Outlines the hydrant testing that was performed in March 2020 and the associated collection of water distribution system pressure data using hydrant pressure recorders needed to calibrate the City's water system hydraulic model as described in Chapter 6 |
| Appendix D: Water Utility Condition Assessment                             | Provides the Water Utility Condition Assessment performed for the City's water system and referenced in Chapter 10; includes assessment methodologies, asset valuations, likelihood and consequence of failure factors and risk scores                        |
| Appendix E: Seismic Risk Assessment                                        | Provides the Seismic Risk Assessment performed as part of the City's RRA and referenced in Chapter 10; includes an estimate of the consequences associated with an earthquake event affecting the City water system                                           |
| Appendix F: Cost Estimating Assumptions                                    | Describes cost estimating assumptions used to estimate construction costs for recommended water system improvements as described in Chapter 11                                                                                                                |
| Appendix G: Capital Improvement Program Mapbook and Project Summary Sheets | Provides figures showing the location of recommended water system improvements and, for some larger projects (e.g., EPRVs and new Ayer pump), single-page project summaries as referenced in Chapter 11                                                       |

As noted above, the City's RRA and ERP are prepared as separate deliverables.



## **1.5 ACKNOWLEDGMENTS**

The development of this Water Master Plan would not have been possible without the focused involvement and assistance of City staff. In particular, the following staff provided comprehensive information, significant input and important insights throughout development of this Water Master Plan:

Tony Ndah, Public Works Director

Harris Siddiqui, Principal Engineer (Project Manager for the Water Master Plan)

Glen Campi, Public Works Maintenance Manager for Utilities

Sophia Wendt, Assistant Engineer

Ned Thomas, Planning Director

Jessica Garner, Planning Manager

Kevin Riley, Milpitas Metro Specific Plan Manager

## CHAPTER 2

### Water Service Area and Land Use

This chapter describes the City’s existing water service area and existing and future land uses. Future land use designations are based on discussions with the City Planning Department and City-provided data, reports, and maps.

## 2.1 WATER SERVICE AREA

### 2.1.1 Location and Description

Located in Santa Clara County, the City is bordered by the City of Fremont to the north and the City of San Jose to the south. Major transportation corridors connecting to the City include Highway 237, Interstate 880 (I-880), I-680, and Montague Expressway. The City is currently served by Valley Transit Authority (VTA) light rail and, as of June 2020, Bay Area Rapid Transit (BART).

As shown on Figure 2-1, the City’s water service area is supplied by the San Francisco Public Utilities Commission (SFPUC) and Valley Water (VW, formerly known as the Santa Clara Valley Water District)<sup>2</sup>. The overall water service area is approximately 12 square miles and is generally coincident with City limits, except for some areas in the Calaveras Hills along the City’s eastern edge. The City can be divided into two distinct topographical areas: the relatively flat “valley floor” on the western side and the steeper “hillside” area within the Calaveras Hills. Service elevations within the City range from near sea level in the west to almost 900 feet above mean sea level (msl) in the east.

Within its limits, the City has authority over land use and is responsible for providing public services. Figure 2-1 also shows the City’s Urban Growth Boundary, the result of a voter-approved initiative that restricts development and the extension of public services and infrastructure in the eastern hill areas. In November 2016, the City voted to extend this development moratorium to December 31, 2038.

One exception to the moratorium is the Spring Valley Heights community, which is located outside the Urban Growth Boundary but served by City infrastructure. In 2005, after its groundwater supply became inadequate, the Spring Valley Heights community entered into an agreement with the City to receive potable water from its SFPUC service area. The Spring Valley Heights Association’s private water system (CA Water System No. CA4300856) connects to the City’s municipal supply through a master meter and is operated by the Spring Valley Heights Mutual Water Company.

### 2.1.2 Population Served and Service Connections

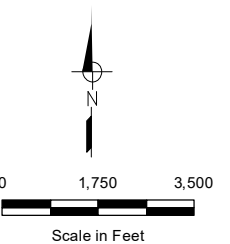
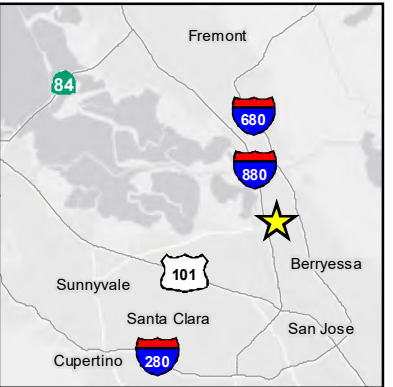
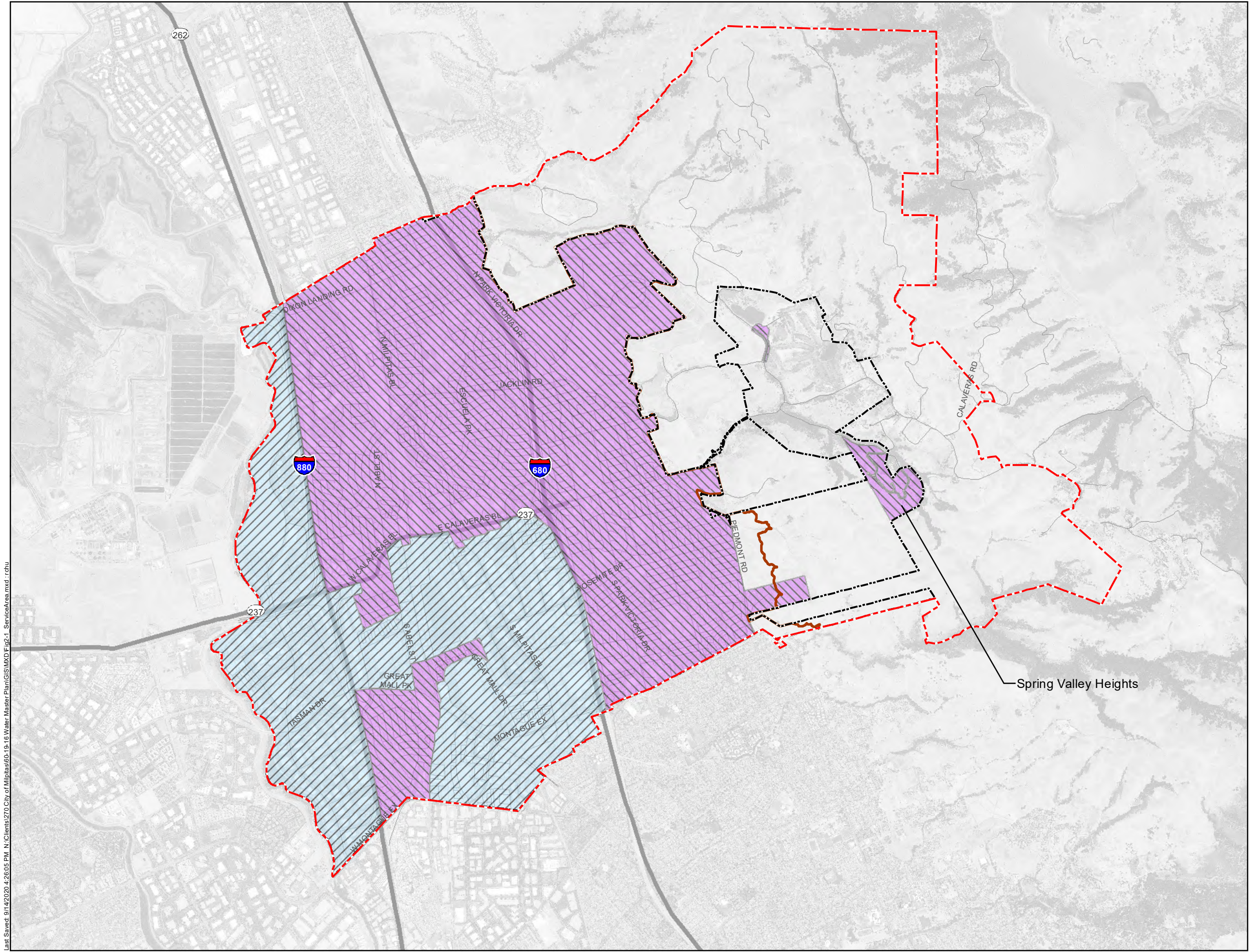
The City was incorporated in 1954, then spanning approximately 3 square miles with a population of 825. Manufacturing, assembly, and high-tech industries have since spurred steady expansion and population growth. The California Department of Finance estimates the City’s January 1, 2020 population at 77,961, which this report will use as the “existing” population for 2019. Historical population is detailed in Chapter 5 of this report.

The City has nine customer billing codes, which West Yost has organized into three categories (residential, commercial, and public) and up to three connection types (water, fire, and irrigation). Table 2-1 presents a summary of historical potable water service connections by customer and connection type. Service connection counts are based on bimonthly billing data from 2013 through 2019 provided by the City in January 2020. In calendar year (CY) 2019, the City had 16,394 metered water service connections. Almost 89 percent of connections were residential, which includes multi-family connections. Note, one multi-family connection can serve as little as two or as many as hundreds of units.

---

<sup>2</sup> In 2019, the Santa Clara Valley Water District (SCVWD) changed its name to Valley Water (VW).





- Water Service Area**
- SFPUC
  - VW
  - City Limits
  - Urban Growth Boundary
  - Sphere of Influence



**Figure 2-1**  
**Existing Water Service Area**

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| Table 2-1. Historical Water Service Connections <sup>(a, b)</sup>                             |              |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |
|-----------------------------------------------------------------------------------------------|--------------|-----------------------|------------------|-----------------------|------------------|-----------------------|------------------|-----------------------|------------------|-----------------------|------------------|-----------------------|------------------|-----------------------|------------------|
| Customer Type                                                                                 | Billing Code | CY 2013               |                  | CY 2014               |                  | CY 2015               |                  | CY 2016               |                  | CY 2017               |                  | CY 2018               |                  | CY 2019               |                  |
|                                                                                               |              | Number of Connections | Percent of Total | Number of Connections | Percent of Total | Number of Connections | Percent of Total | Number of Connections | Percent of Total | Number of Connections | Percent of Total | Number of Connections | Percent of Total | Number of Connections | Percent of Total |
| Residential                                                                                   |              |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |
| Water                                                                                         | WRES         | 14,197                | 86.6%            | 14,244                | 86.8%            | 14,257                | 86.9%            | 14,259                | 87.0%            | 14,264                | 87.1%            | 14,280                | 87.2%            | 14,287                | 87.1%            |
| Fire                                                                                          | FRES         | 108                   | 0.7%             | 109                   | 0.7%             | 109                   | 0.7%             | 110                   | 0.7%             | 110                   | 0.7%             | 110                   | 0.7%             | 110                   | 0.7%             |
| Irrigation                                                                                    | IRP          | 119                   | 0.7%             | 120                   | 0.7%             | 120                   | 0.7%             | 120                   | 0.7%             | 119                   | 0.7%             | 121                   | 0.7%             | 124                   | 0.8%             |
| Subtotal Residential                                                                          |              | 14,424                | 88.0%            | 14,473                | 88.2%            | 14,486                | 88.3%            | 14,489                | 88.4%            | 14,493                | 88.5%            | 14,511                | 88.6%            | 14,521                | 88.6%            |
| Commercial                                                                                    |              |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |
| Water                                                                                         | WCOMM        | 974                   | 5.9%             | 963                   | 5.9%             | 958                   | 5.8%             | 954                   | 5.8%             | 940                   | 5.7%             | 938                   | 5.7%             | 943                   | 5.8%             |
| Fire                                                                                          | FAO          | 462                   | 2.8%             | 455                   | 2.8%             | 446                   | 2.7%             | 444                   | 2.7%             | 438                   | 2.7%             | 436                   | 2.7%             | 449                   | 2.7%             |
| Irrigation                                                                                    | IP           | 351                   | 2.1%             | 346                   | 2.1%             | 341                   | 2.1%             | 331                   | 2.0%             | 326                   | 2.0%             | 320                   | 2.0%             | 312                   | 1.9%             |
| Subtotal Commercial                                                                           |              | 1,787                 | 10.9%            | 1,764                 | 10.7%            | 1,745                 | 10.6%            | 1,729                 | 10.5%            | 1,704                 | 10.4%            | 1,694                 | 10.3%            | 1,704                 | 10.4%            |
| Public                                                                                        |              |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |
| Water - City                                                                                  | WCITY        | 44                    | 0.3%             | 44                    | 0.3%             | 44                    | 0.3%             | 44                    | 0.3%             | 45                    | 0.3%             | 45                    | 0.3%             | 46                    | 0.3%             |
| Water - County                                                                                | WSCC         | 1                     | 0.0%             | 1                     | 0.0%             | 1                     | 0.0%             | 1                     | 0.0%             | 1                     | 0.0%             | 1                     | 0.0%             | 1                     | 0.0%             |
| Irrigation - City                                                                             | ICP          | 130                   | 0.8%             | 128                   | 0.8%             | 129                   | 0.8%             | 129                   | 0.8%             | 129                   | 0.8%             | 123                   | 0.8%             | 122                   | 0.7%             |
| Subtotal Public                                                                               |              | 175                   | 1.1%             | 173                   | 1.1%             | 174                   | 1.1%             | 174                   | 1.1%             | 175                   | 1.1%             | 169                   | 1.0%             | 169                   | 1.0%             |
| Total                                                                                         |              | 16,386                | 100.0%           | 16,410                | 100.0%           | 16,405                | 100.0%           | 16,392                | 100.0%           | 16,372                | 100.0%           | 16,374                | 100.0%           | 16,394                | 100.0%           |
| (a) Source: Billing data provided by City in January 2020.                                    |              |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |
| (b) Includes potable water service connections only. Recycled water connections are excluded. |              |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |                       |                  |



## 2.2 EXISTING LAND USE

Most of the City's existing land use is single family residential, which is located primarily in the north and east. Industrial and commercial land uses comprise much of the City's southern and western regions. Figure 2-2 shows the City's existing land use, while Table 2-2 summarizes key land use statistics.

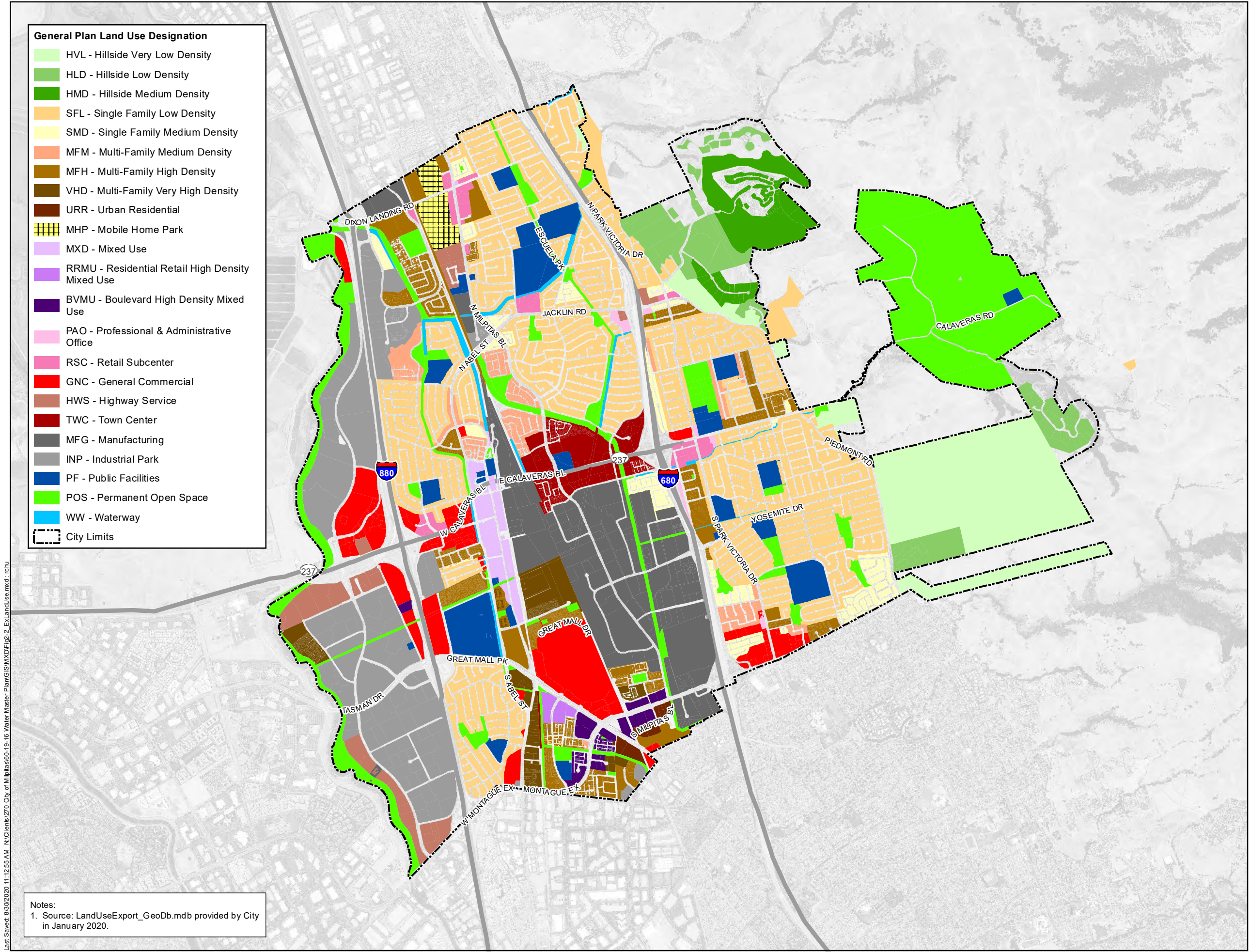
| <b>Table 2-2. Existing Land Use<sup>(a)</sup></b>                                                                                                                                                                                                                                                                                                        |                       |                                       |                           |                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------|---------------------------|--------------------------------------------|
| <b>Population<sup>(b)</sup></b>                                                                                                                                                                                                                                                                                                                          | <b>Dwelling Units</b> | <b>Non-Residential Square Footage</b> | <b>Jobs<sup>(c)</sup></b> | <b>Jobs per Housing Unit<sup>(d)</sup></b> |
| 77,961                                                                                                                                                                                                                                                                                                                                                   | 22,215                | 28,007,888                            | 53,000                    | 2.39                                       |
| (a) Unless otherwise noted, data is from the Draft Environmental Impact Report - Milpitas General Plan, Table 2.0-3, received January 2020.<br>(b) Source: CA Department of Finance, E-1 Population Estimates (May 1, 2020).<br>(c) Source: Estimate provided by the City in February 2021.<br>(d) Calculated based on dwelling units and jobs estimate. |                       |                                       |                           |                                            |

The City classifies customers (excluding hotels and schools) using at least 30,000 gallons per day (gpd) as Large Water Users. To update the list of Large Water Users, West Yost reviewed City-provided billing data<sup>3</sup> from 2013 through 2019. Users were identified according to the "LOCATION\_NO" field provided in billing records. In general, each "LOCATION\_NO" corresponds to a single water meter. In CY 2019, there were 19 Large Water Users; they are ranked in Table 2-3.

| <b>Table 2-3. Large Water Users<sup>(a)</sup></b>                                                                                                                                                                                                                                                             |                                  |                                |                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------|---------------------------------|
| <b>Rank</b>                                                                                                                                                                                                                                                                                                   | <b>Location ID<sup>(b)</sup></b> | <b>Customer</b>                | <b>CY 2019 Consumption, gpd</b> |
| 1                                                                                                                                                                                                                                                                                                             | 3015659                          | Linear Technology              | 179,606                         |
| 2                                                                                                                                                                                                                                                                                                             | 3015510                          | Evoqua Water Technologies LLC  | 177,956                         |
| 3                                                                                                                                                                                                                                                                                                             | 3014575                          | SCC GSA Fiscal Bldg3           | 110,257                         |
| 4                                                                                                                                                                                                                                                                                                             | 3015655                          | Headway Technologies Inc       | 92,605                          |
| 5                                                                                                                                                                                                                                                                                                             | 3016862                          | Essex Management Corporation   | 92,074                          |
| 6                                                                                                                                                                                                                                                                                                             | 3014546                          | Milpitas Mills LP              | 77,853                          |
| 7                                                                                                                                                                                                                                                                                                             | 3015553                          | T Marzetti Company-West        | 73,949                          |
| 8                                                                                                                                                                                                                                                                                                             | 3014577                          | SCC GSA Fiscal Bldg3           | 49,960                          |
| 9                                                                                                                                                                                                                                                                                                             | 3014598                          | Milpitas Housing Assoc         | 47,336                          |
| 10                                                                                                                                                                                                                                                                                                            | 3013322                          | City of Milpitas               | 39,712                          |
| 11                                                                                                                                                                                                                                                                                                            | 3015908                          | Jefferson Smurfit Corp #200585 | 39,378                          |
| 12                                                                                                                                                                                                                                                                                                            | 3015754                          | Fairfield Murphy Road LLC      | 38,397                          |
| 13                                                                                                                                                                                                                                                                                                            | 3016857                          | Cisco Systems                  | 35,091                          |
| 14                                                                                                                                                                                                                                                                                                            | 3001280                          | Evoqua Water Technologies LLC  | 34,175                          |
| 15                                                                                                                                                                                                                                                                                                            | 3015508                          | 555 Apartments LLC             | 33,945                          |
| 16                                                                                                                                                                                                                                                                                                            | 3010133                          | Spinnaker Pointe LLC           | 32,972                          |
| 17                                                                                                                                                                                                                                                                                                            | 3003005                          | Spring Valley Apartments       | 31,851                          |
| 18                                                                                                                                                                                                                                                                                                            | 3017196                          | Corwil Technology              | 31,291                          |
| 19                                                                                                                                                                                                                                                                                                            | 3001229                          | KLA-Tencor                     | 29,969                          |
| <b>Total</b>                                                                                                                                                                                                                                                                                                  |                                  |                                | <b>1,248,376</b>                |
| (a) Customer meters using at least 30,000 gpd based on City-provided billing data in January 2020. Large water users were identified based on the "LOCATION_NO" field in City billing records. Each "LOCATION_NO" generally corresponds to a single water meter.<br>(b) "LOCATION_NO" from City billing data. |                                  |                                |                                 |

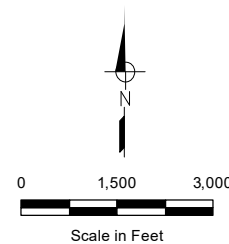
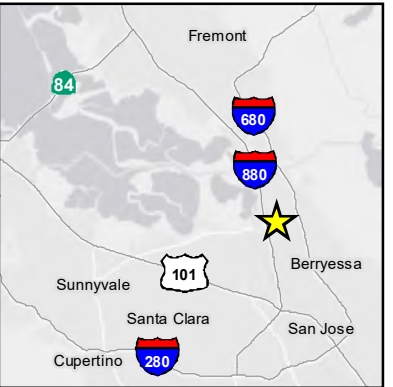
<sup>3</sup> Billing data was bimonthly. Usage was grouped into calendar years based on the ending date of the billing period. As a result, annual consumption may not match other sources.





**General Plan Land Use Designation**

- HVL - Hillside Very Low Density
- HLD - Hillside Low Density
- HMD - Hillside Medium Density
- SFL - Single Family Low Density
- SMD - Single Family Medium Density
- MFM - Multi-Family Medium Density
- MFH - Multi-Family High Density
- VHD - Multi-Family Very High Density
- URR - Urban Residential
- MHP - Mobile Home Park
- MXD - Mixed Use
- RRMU - Residential Retail High Density Mixed Use
- BVMU - Boulevard High Density Mixed Use
- PAO - Professional & Administrative Office
- RSC - Retail Subcenter
- GNC - General Commercial
- HWS - Highway Service
- TWC - Town Center
- MFG - Manufacturing
- INP - Industrial Park
- PF - Public Facilities
- POS - Permanent Open Space
- WW - Waterway
- City Limits



**Figure 2-2**  
**Existing Land Use**

Notes:  
1. Source: LandUseExport\_GeoDb.mdb provided by City in January 2020.

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## **2.3 FUTURE LAND USE**

The City anticipates future growth in the form of smaller development projects located throughout the City and larger, more significant new development in two planning areas (Gateway-Main Street and Metro Plan). Growth strategies and goals are outlined in the City's General Plan and detailed for the Gateway-Main Street and the Metro Plan areas in their respective specific plans. These documents, which are currently being updated, are discussed further in the following sections.

### **2.3.1 City of Milpitas General Plan**

The City's General Plan details the land use plan and policies within the City's incorporated limits and Sphere of Influence (SOI), which includes incorporated and unincorporated territory that is assumed to represent the City's final boundaries and service area. The SOI is bordered by the Santa Clara-Alameda county line to the north, and the City of San Jose to the west and south.

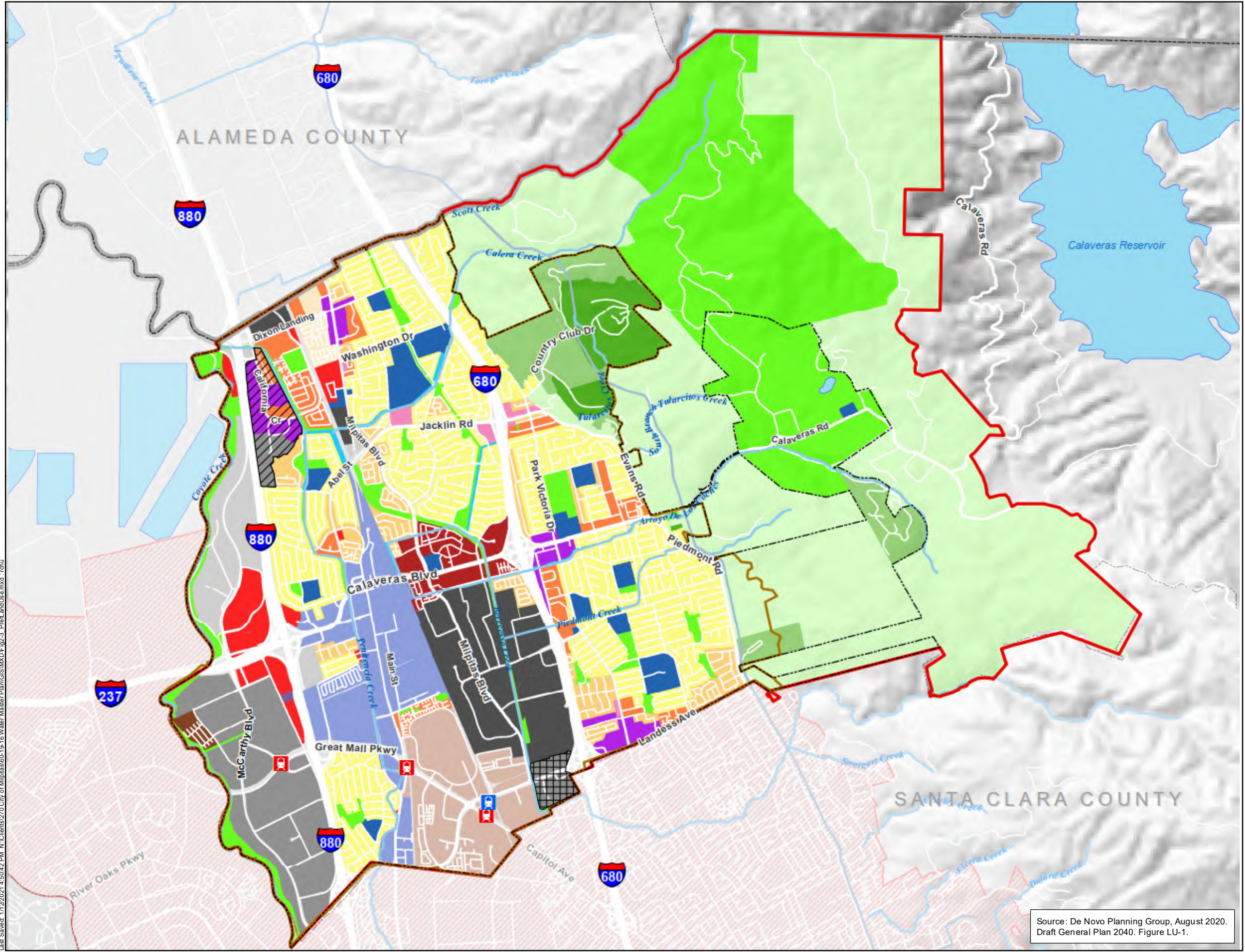
The most recent General Plan was adopted in December 1994 and last amended in April 2015. In May 2016, the City initiated a General Plan Update, a comprehensive effort to incorporate City growth and changes since 1994, as well as new laws passed, emerging social and environmental issues, and recently developed planning strategies and practices. The General Plan Update and associated Environmental Impact Report (EIR) are currently in progress. Figure 2-3 shows the City's preferred land uses based on the Draft General Plan.

As part of the General Plan Update, De Novo Planning Group authored a Land Use Alternatives Report (LUA Report), which evaluates locations throughout the City that can "accommodate future growth, support economic development, maintain fiscal sustainability, and ensure adequate protection of natural resources and open space" (LUA Report). These "Opportunity Areas" are shown on Figure 2-4 of this report, which is adapted from Figure 2-2 of the LUA Report.

West Yost coordinated with the City's Planning Department and HydroScience Engineers, Inc. (HydroScience), who is developing the City's Sewer Master Plan, to develop land use planning assumptions for future residential dwelling units and non-residential square footage for use in the Water and Sewer Master Plans. Table 2-4 summarizes the buildout land use assumptions used in this report. In addition to assigning a preferred land use designation to each Opportunity Area, Table 2-4 breaks down the proposed Milpitas Gateway-Main Street Specific Plan (Gateway Specific Plan) and Milpitas Metro Specific Plan areas into specific land use components. For the purposes of developing and analyzing future system facility and capacity needs, the proposed residential developments have been assigned a range of potential new dwelling units based on coordination with the City's Planning Department.

To remain conservative, this Master Plan assumes the high end of the dwelling unit range will be constructed. In addition, this Master Plan assumes areas listed in Table 2-4 represent new development and not replacing existing developed areas. As detailed in Section 5.3.3 of this report, this means that water demands from growth areas will be in addition to (and not replacing) any existing water demands in those areas. Lastly, land use assumptions in Table 2-4 are preliminary and will be refined as the City updates the General Plan, Gateway Specific Plan, and Milpitas Metro Specific Plan.





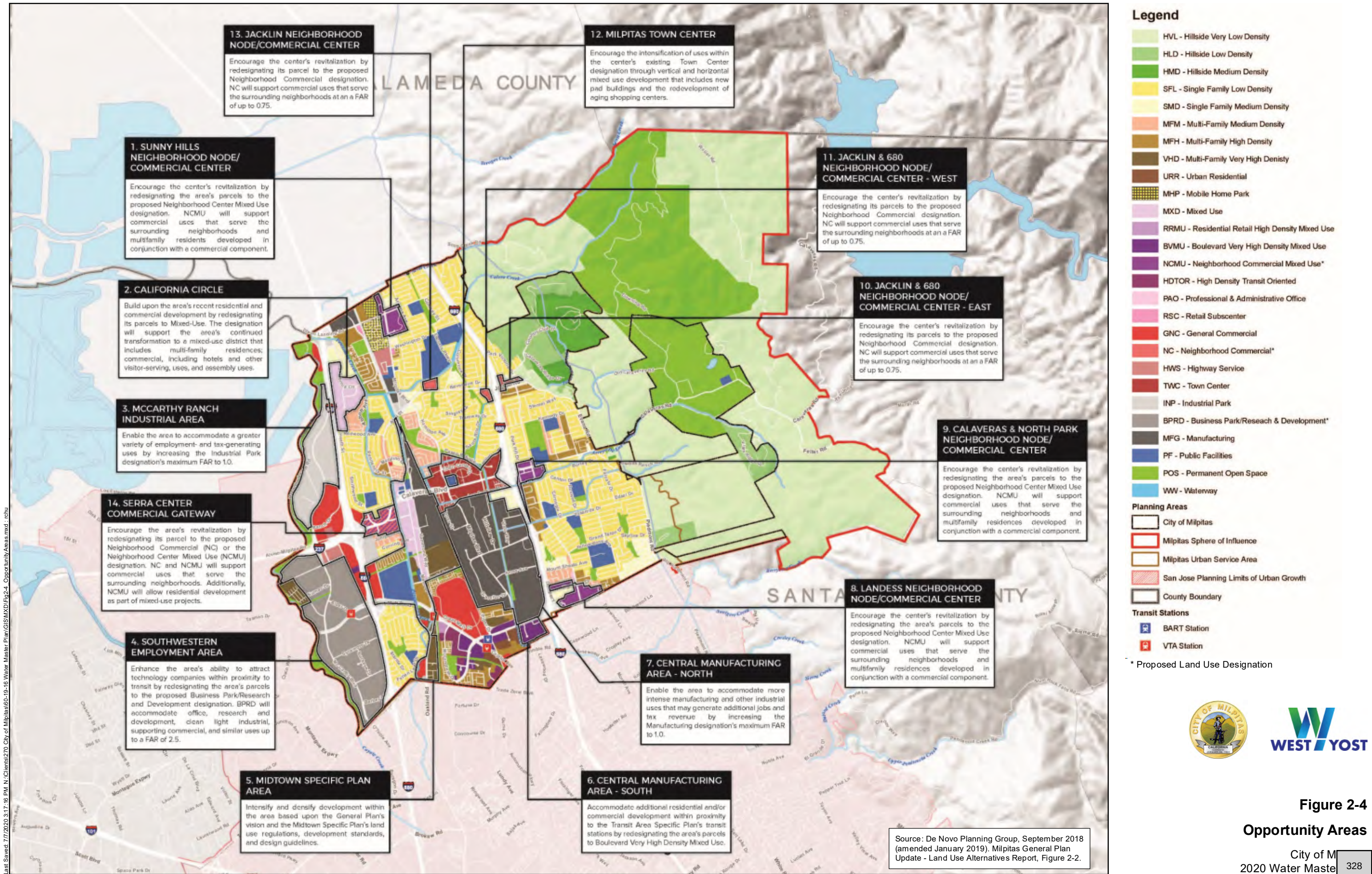
- Legend**
- HVL - Hillside Very Low Density
  - HLD - Hillside Low Density
  - HMD - Hillside Medium Density
  - LDR - Low Density Residential
  - MDR - Medium Density Residential
  - HDR - High Density Residential
  - VHDR - Very High Density Residential
  - MHP - Mobile Home Park
  - VHDMU - Very High Density Mixed Use
  - NCMU - Neighborhood Commercial Mixed Use
  - GNC - General Commercial
  - NC - Neighborhood Commercial
  - TWC - Town Center
  - INP - Industrial Park
  - BPRD - Business Park/Research & Development
  - MFG - Manufacturing
  - PF - Public Facilities
  - POS - Permanent Open Space
  - MMSP - Milpitas Metro Specific Plan
  - MGSP - Milpitas Gateway-Main Street Specific Plan
  - WW - Waterway
  - Future Specific Plan Overlay
  - Innovation District Overlay
- Planning Areas**
- City of Milpitas
  - Milpitas Sphere of Influence
  - Milpitas Urban Service Area
  - San Jose Planning Limits of Urban Growth
  - County Boundary
- Transit Stations**
- BART Station
  - VTA Station



**Figure 2-3**  
**Preferred Land Use**

Source: De Novo Planning Group, August 2020.  
Draft General Plan 2040. Figure LU-1.





**Figure 2-4**  
**Opportunity Areas**  
City of Milpitas  
2020 Water Master Plan



**Table 2-4. Potential New Growth at Buildout<sup>(a)</sup>**

| Development                                                | Land Use Designation <sup>(b)</sup> | Total Acres | Range of Potential New Dwelling Units |        | New Non-Residential Building Square Footage |
|------------------------------------------------------------|-------------------------------------|-------------|---------------------------------------|--------|---------------------------------------------|
|                                                            |                                     |             | Low                                   | High   |                                             |
| Opportunity Areas - Residential                            |                                     |             |                                       |        |                                             |
| Sunny Hills Neighborhood Node/Commercial Center            | NCMU                                | 19.92       | 275                                   | 350    | 569,573                                     |
| California Circle                                          | NCMU                                | 54.10       | 248                                   | 360    | 551,816                                     |
| California Circle                                          | HDR                                 | 18.26       | 252                                   | 365    | 551,816                                     |
| Landess Neighborhood Node/Commercial Center                | NCMU                                | 38.03       | 450                                   | 625    | 521,274                                     |
| Calaveras & North Park Neighborhood Node/Commercial Center | NCMU                                | 28.28       | 325                                   | 425    | 416,836                                     |
| Milpitas Town Center                                       | HDR <sup>(c)</sup>                  | 38.07       | 400                                   | 525    | 434,872                                     |
| Subtotal                                                   |                                     | 196.66      | 1,950                                 | 2,650  | 3,046,187                                   |
| Opportunity Areas - Non-Residential                        |                                     |             |                                       |        |                                             |
| McCarthy Ranch Industrial Area                             | INP                                 | 192.29      | -                                     | -      | 3,049,301                                   |
| Southwestern Employment Area                               | BPRD                                | 488.26      | -                                     | -      | 5,126,097                                   |
| Central Manufacturing Area - North                         | MFG                                 | 492.14      | -                                     | -      | 2,602,882                                   |
| Jacklin & 680 Neighborhood Node/Commercial Center - East   | NC                                  | 7.95        | -                                     | -      | 152,321                                     |
| Jacklin & 680 Neighborhood Node/Commercial Center - West   | NC                                  | 6.42        | -                                     | -      | 75,502                                      |
| Jacklin Neighborhood Node/Commercial Center                | NC                                  | 9.79        | -                                     | -      | 99,629                                      |
| Subtotal                                                   |                                     | 1,196.85    | -                                     | -      | 11,105,732                                  |
| Milpitas Gateway-Main Street Specific Plan                 |                                     |             |                                       |        |                                             |
| HDR Subset of Gateway-Main Street                          | HDR <sup>(c)</sup>                  | 46.70       | 478                                   | 637    | -                                           |
| VHDR Subset of Gateway-Main Street                         | VHDR <sup>(e)</sup>                 | 74.58       | 781                                   | 1,041  | -                                           |
| MDR Subset of Gateway-Main Street                          | MDR <sup>(f)</sup>                  | 62.70       | 242                                   | 322    | 483,391                                     |
| Non-Residential Subset of Gateway-Main Street              | MFG <sup>(g)</sup>                  | 300.30      | -                                     | -      | 954,012                                     |
| Subtotal                                                   |                                     | 484.28      | 1,500                                 | 2,000  | 1,437,403                                   |
| Milpitas Metro Specific Plan                               |                                     |             |                                       |        |                                             |
| VHDR Subset of Metro Plan Area                             | VHDR                                | 99.00       | 2,000                                 | 4,000  | -                                           |
| HDR Subset of Metro Plan Area                              | HDR                                 | 113.52      | 3,000                                 | 3,000  | -                                           |
| NC Subset of Metro Plan Area <sup>(h)</sup>                | NC                                  | 85.35       | -                                     | -      | 2,087,075                                   |
| Subtotal                                                   |                                     | 297.87      | 5,000                                 | 7,000  | 2,087,075                                   |
| Total                                                      |                                     | 2,176       | 8,450                                 | 11,650 | 17,676,397                                  |

(a) Source: City of Milpitas - Buildout Land Use Condition Assumptions, HydroScience Engineers, August 3, 2020.

(b) Land Use Designations based on Preferred Land Use Map (PLUM), Figure 2-3.

(c) Originally Multifamily High Density (MFH), which has been renamed High Density Residential (HDR) in the PLUM.

(d) Originally Boulevard Very High Density Mixed Use (BVMU), which has been renamed Very High Density Mixed Use (VHDMU) in the PLUM.

(e) Originally Multi-Family Very High Density (VHD), which has been renamed Very High Density Residential (VHDR) in the PLUM.

(f) Originally Mixed Use (MXD), which has been retired in the PLUM. This subset has been recategorized as Medium Density Residential (MDR) based on housing density. MDR is the updated name for Multi-Family Medium Density (MFM).

(g) Originally multiple land uses, Manufacturing (MFG) selected because it is the most conservative (i.e., highest water use).

(h) Includes the "Central Manufacturing Area - South" Opportunity Area, which has been combined with MMSP.



## **2.3.2 Specific Plans**

Specific Plan areas, including the Milpitas Metro Specific Plan (formerly the Transit Area Specific Plan or TASP) and the Milpitas Gateway-Main Street Specific Plan (formerly the Midtown Specific Plan or MSP), are designated by the General Plan Land Use Map (see Figure 2-3). These areas have been designated as Special Planning Areas and each has an adopted or soon to be updated Specific Plan to facilitate comprehensive planning of the large strategic areas. The City is planning significant redevelopment in these Specific Plan areas, each of which had previously completed Specific Plans that are currently being updated.

The following subsections detail land use objectives for each area, based on discussions with the City Planning staff.

### ***2.3.2.1 Milpitas Gateway-Main Street Specific Plan (Gateway Specific Plan)***

Originally known as the Midtown Area, the Gateway-Main Street Area has an existing Specific Plan (Midtown Specific Plan, adopted by the City in March 2002) that was last updated in 2010. The Gateway-Main Street Area spans 589 acres and is set between I-880, I-680, Calaveras Boulevard, and the Montague Expressway in the western portion of the City. Per the 2010 plan, the overall strategy for the area is to create a mixed-use community with high-density, transit-oriented housing, a central gathering place, and necessary industrial, service, and commercial uses. Significant development has already occurred within the Gateway-Main Street Area, including new housing units and reinvestment in the Great Mall (which is outside the Gateway-Main Street Area but encompasses its vision) to expand entertainment activities.

While the City is currently updating the Milpitas Gateway-Main Street Specific Plan (henceforth known as the Gateway Specific Plan), the overall strategy is expected to remain generally the same.

As shown in Table 2-4, preliminary projections estimate an additional 1,500 to 2,000 residential dwelling units and approximately 1.4 million square feet of non-residential development at buildout within the Gateway-Main Street Area. These projections are subject to change as the Gateway Specific Plan is updated.

### ***2.3.2.2 Milpitas Metro Specific Plan***

The City adopted the current Milpitas Metro Specific Plan (then known as Transit Area Specific Plan) in June 2008, amending it in December 2011. The Metro Plan Area spans approximately 370 acres in southern Milpitas and includes two light rail stations, the new BART station, and the Great Mall. While the Metro Plan Area is within the area covered by the Gateway Specific Plan (except for a 40-acre area between Piper Drive and Milpitas Boulevard and the Great Mall, which was already outside the Gateway-Main Street Area), the Gateway Specific Plan called for the creation of a separate, detailed plan for the area near the BART station.

The Milpitas Metro Specific Plan fulfills that requirement and is independent of the Gateway Specific Plan. Currently an older industrial area in the City, the Metro Plan Area is re-envisioned in the Milpitas Metro Specific Plan as a high-density, mixed-use neighborhood that encourages walking, biking, and use of public transit. The Milpitas Metro Specific Plan is currently being updated and is expected to maintain this Metro Plan Area vision.

As shown in Table 2-4, preliminary projections estimate an additional 5,000 to 7,000 residential dwelling units, approximately 2.1 million square feet of commercial development within the Milpitas Metro Specific Plan area. These projections are subject to change as the Milpitas Metro Specific Plan is updated.

## CHAPTER 3

### Existing Water System Facilities

This chapter provides a summary of the City's existing key water facilities, which are shown on Figure 3-1. To provide context and understanding of the City's water system, a summary of the current water system configuration and pressure zones is provided before detailing the City's water supply and distribution facilities.

### 3.1 EXISTING WATER SYSTEM CONFIGURATION, OPERATIONS, AND PRESSURE ZONES

As described further in Chapter 4, the City receives water supplies from SFPUC and VW. Under normal conditions, the City operates its potable water system such that the SFPUC and VW supplies remain separate. Isolation valves prevent mixing and create two distinct water service areas. The SFPUC service area includes the City's valley floor and hillside areas, while the VW service area only encompasses the City's valley floor area. Under emergency conditions (e.g., a loss of supply from either SFPUC or VW), the City can open isolation valves that normally separate the SFPUC and VW service areas to move water between the service areas (see further discussion in Section 3.3.4).

The City's valley floor area is generally served directly from SFPUC or VW turnouts, with pressure reducing valves (PRVs) reducing pressures for lower elevation customers. Storage reservoirs and their associated pump stations in the valley floor area help supply peak demands and meet emergency conditions. Additional pump stations deliver water from the valley floor area to the hillside areas and are operated based on hillside storage reservoir levels. A water system schematic profile is provided in Appendix A, along with a detailed operations narrative in Appendix B.

There are six main pressure zones within the City's water service area, four served by the SFPUC (Zones SF1 through SF4), and two served by VW (Zones VW1 and VW2)<sup>4</sup>. Water purchased from SFPUC enters the distribution system through Zone SF2 (directly) or Zone SF1 (via PRV). Zones SF3 and SF4, in the hillside areas, are supplied water from Zone SF2 through a pump station. Significant elevation differences in Zone SF4 require reducing pressures for the lower portions of the zone. As a result, Zone SF4 is split into two subzones: Zone SF4-2 (unregulated) and Zone SF4-1 (regulated via three PRVs).

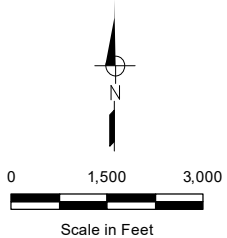
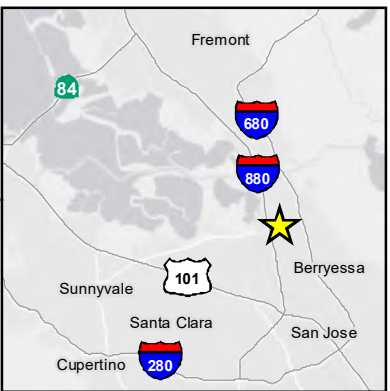
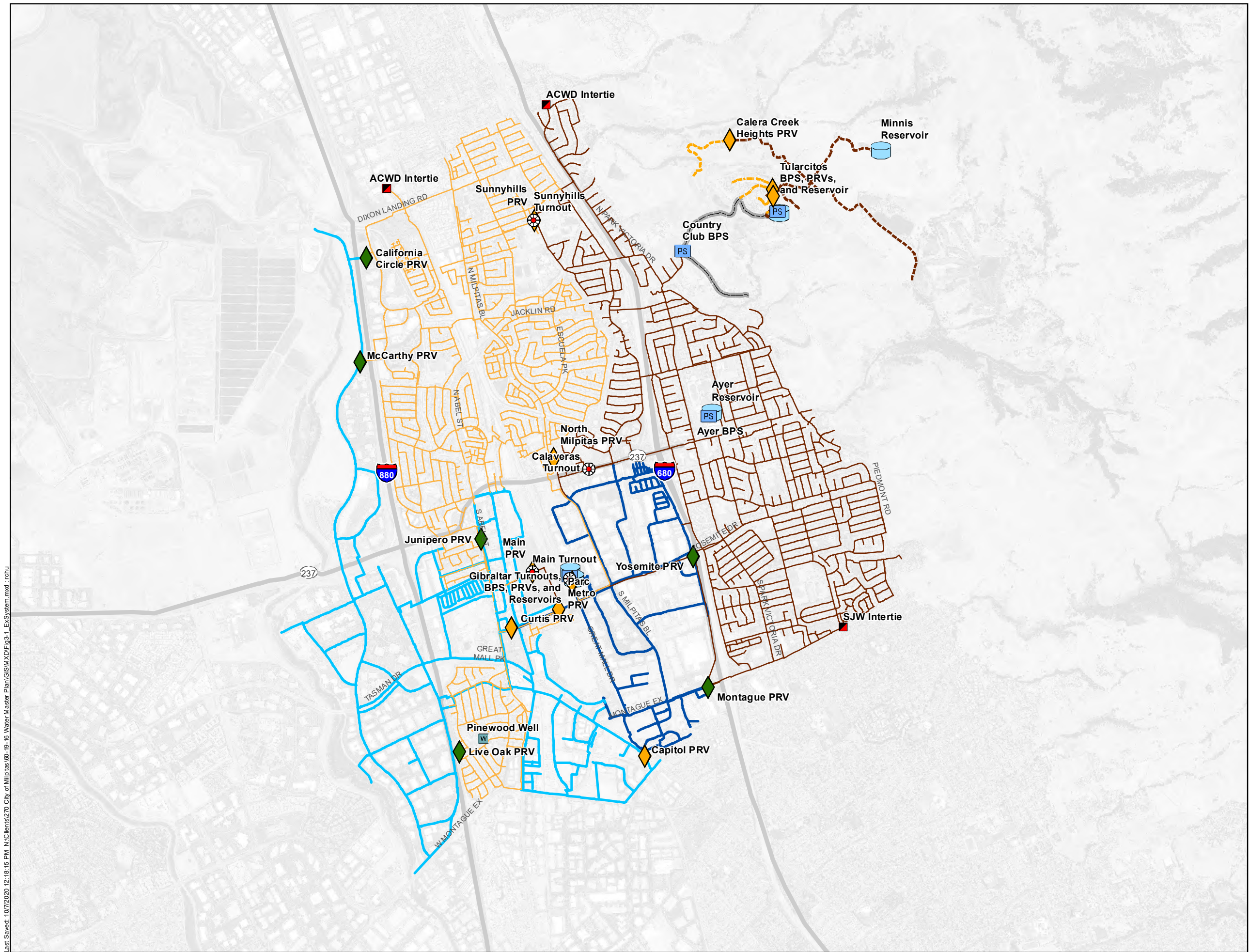
VW water is regulated through a PRV before entering Zone VW2 and through additional PRVs into Zone VW1. The key characteristics of each pressure zone are summarized in Table 3-1.

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<sup>4</sup> Note that the pressure zone designations have been renamed based on the Santa Clara Valley Water District agency name change to Valley Water. Zones VW1 and VW2 were previously known as SC1 and SC2, respectively. The rest of this Water Master Plan will use these updated pressure zone designations.



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- Turnout
- Well
- Emergency Intertie
- Pressure Reducing Valve
- Emergency Pressure Reducing Valve
- Pump Station
- Storage Reservoir
- Pipeline Pressure Zone**
  - VW1
  - VW2
  - SF1
  - SF2
  - SF3
  - SF4-1
  - SF4-2



**Figure 3-1**  
**Existing Water**  
**Distribution System**





**Table 3-1. Existing Pressure Zones**

| Pressure Zone        | Range of Service Elevations <sup>(a)</sup> , feet msl | Nominal HGL <sup>(b)</sup> , feet msl | Static Service Pressure <sup>(c)</sup> , psi | Water Supply Source(s)                                                                                            |
|----------------------|-------------------------------------------------------|---------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| SF1                  | 10 – 112                                              | 200                                   | 38 - 82                                      | Intertie Turnout via the Gibraltar Pump Station (PS) and Zone SF2 via PRVs (Main, North Milpitas, and Sunnyhills) |
| SF2                  | 17 – 212                                              | 340                                   | 55 - 140                                     | SFPUC BDPL No. 3 & 4 Turnouts (Sunnyhills, Calaveras, and Main Street)                                            |
| SF3                  | 233 – 456                                             | 545                                   | 38 - 135                                     | Zone SF2 via Country Club PS and Tularcitos Tank                                                                  |
| SF4-1 <sup>(d)</sup> | 477 – 638                                             | 740                                   | 44 - 114                                     | Tularcitos Tank, PS, and PRVs; Minnis Tank via Zone SF4-2 and Calera Creek Heights PRV                            |
| SF4-2 <sup>(d)</sup> | 493 – 715                                             | 885                                   | 74 - 170                                     | Minnis Tank (filled by Tularcitos PS)                                                                             |
| VW1                  | 11 – 54                                               | 200                                   | 63 - 82                                      | Zone VW2 via Capitol, Curtis (East and West), and Parc Metro PRVs                                                 |
| VW2                  | 22 – 75                                               | 325                                   | 108 - 131                                    | VW Milpitas Pipeline Gibraltar Turnout and Gibraltar PRV                                                          |

(a) Source: Valley Water LiDAR contours covering the City water service area.  
 (b) Source: City of Milpitas Water Distribution System Plan Schematic Profile (HydroScience Engineers) unless otherwise noted.  
 (c) Calculated by subtracting the highest or lowest customer service elevations within the zone from the HGL, and converting from pressure head in feet, to pressure in psi.  
 (d) Elevation differences in Zone SF4 require breaking pressure and splitting the zone into Zones SF4-1 and SF4-2. Zone SF4-2 is unregulated, while Zone SF4-1 is regulated by the Tularcitos North, Tularcitos South, and Calera Creek Heights PRVs.

## 3.2 EXISTING SUPPLY FACILITIES

The City's existing supply facilities include the following:

- Five turnouts
- One emergency groundwater well
- Three emergency interties

Normally, the City obtains all of its potable water from SFPUC and VW turnouts. However, in emergencies, it can also pump groundwater and receive water from San Jose Water (SJW) and the Alameda County Water District (ACWD) through emergency interties shown on Figure 3-1.



### 3.2.1 Turnouts

The City receives wholesale potable water through five turnouts, four from SFPUC Bay Division Pipelines Nos. 3 and 4, and one from VW's Milpitas Pipeline<sup>5</sup>. Under normal operations, water from these turnouts comprises the City's entire potable water supply. Total SFPUC turnout capacity is approximately 37 million gallons per day (mgd), while VW turnout capacity is 14.4 mgd. The SFPUC supply enters the City's system at a hydraulic grade line (HGL) of 340 feet, while VW supply enters the City's system at an HGL of 425 feet. The source, location, pressure zone(s) served, and capacity for each turnout is summarized in Table 3-2.

| <b>Table 3-2. Existing Turnouts</b>                                          |                          |                                              |                          |                                |                                    |
|------------------------------------------------------------------------------|--------------------------|----------------------------------------------|--------------------------|--------------------------------|------------------------------------|
| <b>Name</b>                                                                  | <b>Location</b>          | <b>Meter Type</b>                            | <b>Meter ID(s)</b>       | <b>Pressure Zone(s) Served</b> | <b>Capacity, mgd<sup>(a)</sup></b> |
| <b>SFPUC Service Area</b>                                                    |                          |                                              |                          |                                |                                    |
| Sunnyhills                                                                   | 405 Washington Drive     | 2-8" Neptune High Performance Turbo          | 4572810858<br>4572810888 | SF1, SF2                       | 10.1                               |
| Calaveras                                                                    | 584 East Calaveras Blvd. | 2-8" Neptune High Performance Turbo          | 5000000628<br>5000000975 | SF1, SF2                       | 13.0                               |
| Main                                                                         | 534 Hammond Way          | 1-8" and 1-6" Neptune High Performance Turbo | 9338710434<br>9338710803 | SF1, SF2                       | 7.9                                |
| Intertie                                                                     | 641 Gibraltar Court      | 1-10" Neptune High Performance Turbo         | 3117952820               | SF1 <sup>(b)</sup>             | 5.8                                |
| <b>SFPUC Total</b>                                                           |                          |                                              |                          |                                | <b>36.8</b>                        |
| <b>VW Service Area</b>                                                       |                          |                                              |                          |                                |                                    |
| Gibraltar                                                                    | 641 Gibraltar Court      | 1-20" WaterMaster Electromagnetic            | 3K220000195<br>183       | VW2 <sup>(c)</sup>             | 14.4                               |
| <b>VW Total</b>                                                              |                          |                                              |                          |                                | <b>14.4</b>                        |
| <b>City Total</b>                                                            |                          |                                              |                          |                                | <b>51.2</b>                        |
| (a) Source: 2009 WMPU, Table 4-1.                                            |                          |                                              |                          |                                |                                    |
| (b) Turnout can be reconfigured to deliver SFPUC water directly to Zone VW2. |                          |                                              |                          |                                |                                    |
| (c) Zone VW2 serves Zone VW1 via four PRVs. Refer to Table 3-1.              |                          |                                              |                          |                                |                                    |

### 3.2.2 Emergency Groundwater Wells

The City currently maintains one groundwater well, the Pinewood Well, for use in emergencies. It is connected to Zone SF1 but is not used as an active potable water supply source. The Pinewood Well is permitted as an emergency well, so it cannot be operated more than 15 calendar days per year, and not more than five consecutive days each year. The Pinewood Well can produce approximately 1.7 mgd (per the 2009 WMPU) and is equipped with a chlorination facility and a plug-in adapter and transfer switch to receive power from a portable generator.

<sup>5</sup> Also known as the East Pipeline.



The City anticipates adding two additional wells, Curtis Well and McCandless Well, to its supply portfolio in the future. These future wells are discussed in Chapter 4 of this report.

### 3.2.3 Emergency Interties

The City has three interties with two partner agencies, SJW and ACWD, for a total capacity of approximately 7.1 mgd. These emergency interties are all manually activated with mutual agreement between the City and the partner agency with at least two hours' notice. The 8-inch intertie with SJW is located at Landess Avenue and Corktree Lane and can serve Zones SF2, SF3, and SF4. Per City operations staff, the SJW intertie has no flushing points and needs to be upgraded to allow routine operation and flushing. There are two 8-inch interties with ACWD, with one serving Zone SF1 and the other serving Zone SF2. However, the City and ACWD water systems normally operate under significantly different pressures. Key information for all three emergency interties is summarized in Table 3-3. The SJW intertie has not been used, while the Milmont and Green Valley Road interties were last used in May 2010 and January 2016, respectively.

| <b>Table 3-3. Existing Emergency Interties</b>                                                                                                                                                                                                                                                                                           |                                        |                                |                          |                              |                                               |                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------|--------------------------|------------------------------|-----------------------------------------------|------------------------------------|
| <b>Partner Agency</b>                                                                                                                                                                                                                                                                                                                    | <b>Location</b>                        | <b>Pressure Zone(s) Served</b> | <b>Intertie Type</b>     | <b>Intertie Diameter, in</b> | <b>Pressure Difference<sup>(a)</sup>, psi</b> | <b>Capacity, mgd<sup>(b)</sup></b> |
| SJW <sup>(c)</sup>                                                                                                                                                                                                                                                                                                                       | Landess Avenue and Corktree Lane       | SF2, SF3, SF4                  | Hard piped, closed valve | 8                            | 20                                            | 2.60                               |
| ACWD <sup>(c)</sup>                                                                                                                                                                                                                                                                                                                      | Milmont Drive                          | SF1                            | Hard piped, closed valve | 8                            | 10                                            | 2.25                               |
|                                                                                                                                                                                                                                                                                                                                          | Park Victoria Drive/ Green Valley Road | SF2                            | Hard piped, closed valve | 8                            | 20                                            | 2.25                               |
| <b>City Total</b>                                                                                                                                                                                                                                                                                                                        |                                        |                                |                          |                              |                                               | <b>7.1</b>                         |
| <p>(a) Modeled City pressure minus partner agency pressure. Typical partner agency pressures provided by City in February and March 2021.</p> <p>(b) Source: 2009 WMPU, Table 4-3. It is assumed that each ACWD intertie has equal capacity.</p> <p>(c) Intertie can be opened with mutual agreement and at least two hours' notice.</p> |                                        |                                |                          |                              |                                               |                                    |

## 3.3 EXISTING DISTRIBUTION FACILITIES

The City's distribution facilities include:

- Five storage reservoirs
- Five pump stations
- 17 PRVs (including six emergency PRVs)
- 49 isolation valves
- 964,000 linear feet (LF) (approximately 183 miles) of pipelines

Under normal operations, the City separates its water system by source water zone (SFPUC vs. VW), meaning that Zones SF1 through SF4 are isolated from Zones VW1 and VW2. During emergencies, the City can open isolation valves to allow supply mixing. Emergency PRVs are also set to automatically operate and allow SFPUC water to flow to VW zones if pressures in the VW zones drop significantly. This emergency supply is unidirectional; it can only flow from SFPUC zones to VW zones.



The City's Gibraltar facility has storage, pumping, and pressure regulating facilities for both SFPUC and VW supplies. To distinguish between the pumps and storage reservoirs, references in the following sections will append parenthetical notes specifying the facility's service area/source (e.g., SF or VW). The PRVs at the station are uniquely named, so no disambiguation is necessary.

### 3.3.1 Storage Reservoirs

The City has five storage reservoirs, totaling approximately 16 million gallons (MG) of capacity. Four storage reservoirs serve the SFPUC service area, with Tularcitos and Minnis serving customers in the hillside areas (Zones SF3 and SF4) and Gibraltar (SF) and Ayer serving customers in the valley area (Zones SF1 and SF2). The remaining storage reservoir, Gibraltar (VW), serves Zone VW2 directly and Zone VW1 indirectly (via the Capitol, Curtis, and Parc Metro PRVs). The supply source, location, and key operational information for each storage reservoir is listed in Table 3-4.

Additional disinfection and deliberate reservoir operation help ensure stored water quality remains high. At each storage reservoir, chlorine liquid/tablets and liquid ammonia are added to create a chloramine residual.

| <b>Table 3-4. Existing Storage Reservoirs</b>                                                                      |                               |                         |            |               |                   |                              |                                                  |                             |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------|------------|---------------|-------------------|------------------------------|--------------------------------------------------|-----------------------------|
| Storage Reservoir                                                                                                  | Location                      | Pressure Zone(s) Served | Year Built | Tank Material | Tank Diameter, ft | Tank Floor Elevation, ft msl | Normal Operating Level Range <sup>(a)</sup> , ft | Capacity, MG <sup>(b)</sup> |
| <b>SFPUC Service Area</b>                                                                                          |                               |                         |            |               |                   |                              |                                                  |                             |
| Gibraltar (SF)                                                                                                     | 641 Gibraltar Court           | SF1                     | 1993       | Concrete      | 181               | 22                           | 15 - 24.5                                        | 5.0                         |
| Ayer                                                                                                               | 1429 East Calaveras Boulevard | SF2                     | 1995       | Concrete      | 158               | 47                           | 31.2 - 36                                        | 5.6                         |
| Tularcitos                                                                                                         | 1328 Tularcitos Drive         | SF3                     | 1982       | Steel         | 48                | 544.2                        | 15 - 21.5                                        | 0.30                        |
| Minnis                                                                                                             | 901B Downing Road             | SF4                     | 1982       | Steel         | 51                | 885.5                        | 15 - 21.5                                        | 0.34                        |
| <b>SFPUC Total</b>                                                                                                 |                               |                         |            |               |                   |                              |                                                  | <b>11.2</b>                 |
| <b>VW Service Area</b>                                                                                             |                               |                         |            |               |                   |                              |                                                  |                             |
| Gibraltar (VW)                                                                                                     | 641 Gibraltar Court           | VW2                     | 1993       | Concrete      | 181               | 22                           | 15 - 24.5                                        | 5.0                         |
| <b>VW Total</b>                                                                                                    |                               |                         |            |               |                   |                              |                                                  | <b>5.0</b>                  |
| <b>City Total</b>                                                                                                  |                               |                         |            |               |                   |                              |                                                  | <b>16.2</b>                 |
| (a) Source: City SCADA data (Gibraltar reservoirs) and City-provided circle charts (Ayer, Tularcitos, and Minnis). |                               |                         |            |               |                   |                              |                                                  |                             |
| (b) Source: As-builts provided by City in November 2019.                                                           |                               |                         |            |               |                   |                              |                                                  |                             |



### 3.3.2 Pump Stations

Of the City's five pump stations, four serve the SFPUC service area, with the remaining pump station serving Zone VW2. Besides drawing from the Gibraltar (VW) reservoir to serve Zone VW2, the Gibraltar (VW) PS also has emergency pumps to increase delivery pressures from the Gibraltar turnout if pressures are not sufficient. While these pumps have been used sparingly, they provide valuable redundancy during peak summer periods or emergencies.

In the SFPUC service area, the Gibraltar (SF) PS delivers stored water from the Gibraltar (SF) reservoir to Zone SF1. Similarly, both the Ayer PS and the Tularcitos PS draw water from their respective storage reservoirs (Ayer and Tularcitos). The Ayer PS serves Zone SF2, while the Tularcitos PS serves Zone SF4. The Country Club PS draws from Zone SF2 to serve Zone SF3 and also fills the Tularcitos reservoir. Pump station service area, pump types and capacity, and backup power features are summarized in Table 3-5.

| Table 3-5. Existing Pump Stations |                      |                                                   |                          |                                |                   |
|-----------------------------------|----------------------|---------------------------------------------------|--------------------------|--------------------------------|-------------------|
| Pump Station                      | Pressure Zone Served | Number of Pumps and Capacity <sup>(a)</sup> , gpm | Pump Type <sup>(b)</sup> | Pump Drive Type <sup>(c)</sup> | Backup Generator? |
| Gibraltar (SF)                    | SF1                  | 2 @ 5,500                                         | SCHC                     | 1 Electric, 1 Diesel           | Yes               |
| Ayer                              | SF2                  | 3 @ 1,800                                         | MVT                      | Electric                       | Yes               |
| Country Club                      | SF3                  | 2 @ 250                                           | Submersible MVT          | Electric                       | No                |
| Tularcitos                        | SF4                  | 2 @ 250                                           | Submersible MVT          | Electric                       | No                |
| Gibraltar (VW)                    | VW2                  | 2 @ 5,500 <sup>(d)</sup>                          | SCHC                     | 1 Electric, 1 Diesel           | Yes               |
|                                   | VW2 <sup>(e)</sup>   | 1 @ 5,000                                         | MVT                      | Diesel                         | Yes (all)         |
|                                   |                      | 1 @ 4,000                                         | MVT                      | Electric                       |                   |
|                                   |                      | 1 @ 2,000                                         | MVT                      | Electric                       |                   |
|                                   |                      | 1 @ 2,000                                         | SCHC                     | Electric                       |                   |

(a) Source: City-provided asset spreadsheet (Master List 4.0) and pump curves.

(b) SCHC = split case horizontal centrifugal; MVT = multistage vertical turbine.

(c) All pumps are variable speed except for those at the Country Club and Tularcitos pump stations.

(d) One pump can be valved for either Zone SF1 or VW2.

(e) Emergency backup pumps located at VW turnout, activated when delivery pressures fall below 120 psi.

### 3.3.3 Pressure Reducing Valves

Eleven PRVs ensure that the City's water system pressures remain within acceptable operating range. Since SFPUC and VW supplies have an HGL of 340 feet and 425 feet, respectively, the City must reduce pressures when serving customers at lower elevations. Any inter-zone pipeline connections (e.g., between Zones VW2 and VW1) must also include PRVs or closed valves. Four PRVs serve Zone SF1, and three PRVs serve Zone SF4-1, a small sub-zone within Zone SF4. There are four PRVs in the VW service area, one serving Zone VW2 and three serving Zone VW1. The location, set points, HGL, and associated pressure zones for each PRV are shown in Table 3-6.

The City also has six emergency PRVs set to automatically operate if pressures in the VW service area fall below an HGL of 125 feet in Zone VW1 or 175 feet in Zone VW2. As a result, SFPUC supply can supplement VW supply when needed. Four emergency PRVs serve Zone VW1, and two serve Zone VW2. Emergency PRV locations and key operational information are summarized in Table 3-7.



**Table 3-6. Existing Pressure Reducing Valves**

| PRV                    | Location                                                     | Set Point <sup>(a)</sup> , psi | Hydraulic Grade Line <sup>(b)</sup> , ft | From Zone            | To Zone |
|------------------------|--------------------------------------------------------------|--------------------------------|------------------------------------------|----------------------|---------|
| Calera Creek Heights   | Near 163 Calera Creek Heights Drive                          | 70                             | 787                                      | SF4-2                | SF4-1   |
| Capitol                | North Capitol Avenue b/w Montague Expressway and City Limits | 68                             | 201                                      | VW2                  | VW1     |
| Curtis East & West     | West Curtis Avenue b/w Main Street and Abel Street           | 80                             | 202                                      | VW2                  | VW1     |
| Gibraltar 21 & 21A     | 641 Gibraltar Court                                          | 136                            | 325                                      | VW <sup>(c)</sup>    | VW2     |
| Gibraltar 24           | 641 Gibraltar Court                                          | 76                             | 194 <sup>(d)</sup>                       | SFPUC <sup>(c)</sup> | SF1     |
| Main                   | Hammond Way                                                  | 80                             | 207                                      | SF2                  | SF1     |
| North Milpitas         | North Milpitas/Calaveras                                     | 79                             | 207                                      | SF2                  | SF1     |
| Parc Metro             | East Curtis Avenue/East Lane                                 | 82                             | 218 <sup>(d)</sup>                       | VW2                  | VW1     |
| Sunnyhills             | Washington/Escuela                                           | 67                             | 199                                      | SF2                  | SF1     |
| Tularcitos North Vault | Near 1475 Pinehurst Court                                    | 67                             | 707                                      | SF4-2                | SF4-1   |
| Tularcitos South Vault | Near 1486 Tularcitos Drive                                   | 68                             | 762                                      | SF4-2                | SF4-1   |

(a) Source: City-provided data in June 2020.  
(b) Source: City of Milpitas Water Distribution System Plan Schematic Profile (HydroScience Engineers).  
(c) PRV located immediately downstream of turnout.  
(d) Estimated from set point (converted to pressure head in feet) and approximate elevation from as-builts.

**Table 3-7. Existing Emergency Pressure Reducing Valves**

| Emergency PRV     | Location                                  | Upstream Setting <sup>(a)</sup> , psi | Downstream Setting <sup>(a)</sup> , psi | Hydraulic Grade Line <sup>(b)</sup> , ft | From Zone | To Zone |
|-------------------|-------------------------------------------|---------------------------------------|-----------------------------------------|------------------------------------------|-----------|---------|
| Junipero          | Junipero & South Abel Street              | -- <sup>(c)</sup>                     | -- <sup>(c)</sup>                       | 169                                      | SF1       | VW1     |
| Live Oak          | Live Oak Court and I-880                  | 75                                    | 70                                      | 125                                      | SF1       | VW1     |
| McCarthy          | South of Cadillac Court                   | 82                                    | 72                                      | 73                                       | SF1       | VW1     |
| California Circle | California Circle and I-880               | 82                                    | 72                                      | 71                                       | SF1       | VW1     |
| Montague          | Montague Expressway and I-680             | 118                                   | 110                                     | 216                                      | SF2       | VW2     |
| Yosemite          | Sinclair Frontage Road and Yosemite Drive | 118                                   | 110                                     | 211                                      | SF2       | VW2     |

(a) Source: City-provided data in February 2021.  
(b) Source: City of Milpitas Water Distribution System Plan Schematic Profile (HydroScience Engineers).  
(c) PRV is offline.



#### 3.3.4 Isolation Valves

To prevent blending of the two water sources (SFPUC and VW) and better control water quality, the City has installed 49 isolation valves throughout the distribution system. Thirty-one are in Zone 1 (i.e., separating zones SF1 and VW1), and nine are in Zone 2. The remaining nine isolation valves separate pressure zones within the same service area (e.g., Zones SF1 and SF2) but do not have facilities to regulate flow (i.e., PRVs or booster pumps). Therefore, these nine valves should always remain closed.

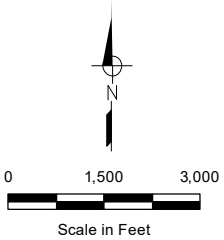
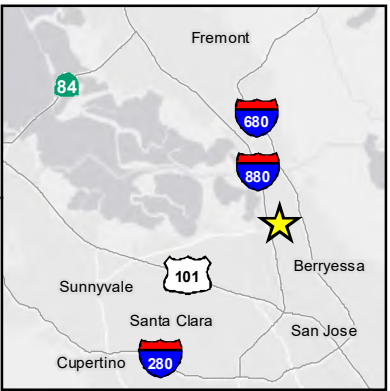
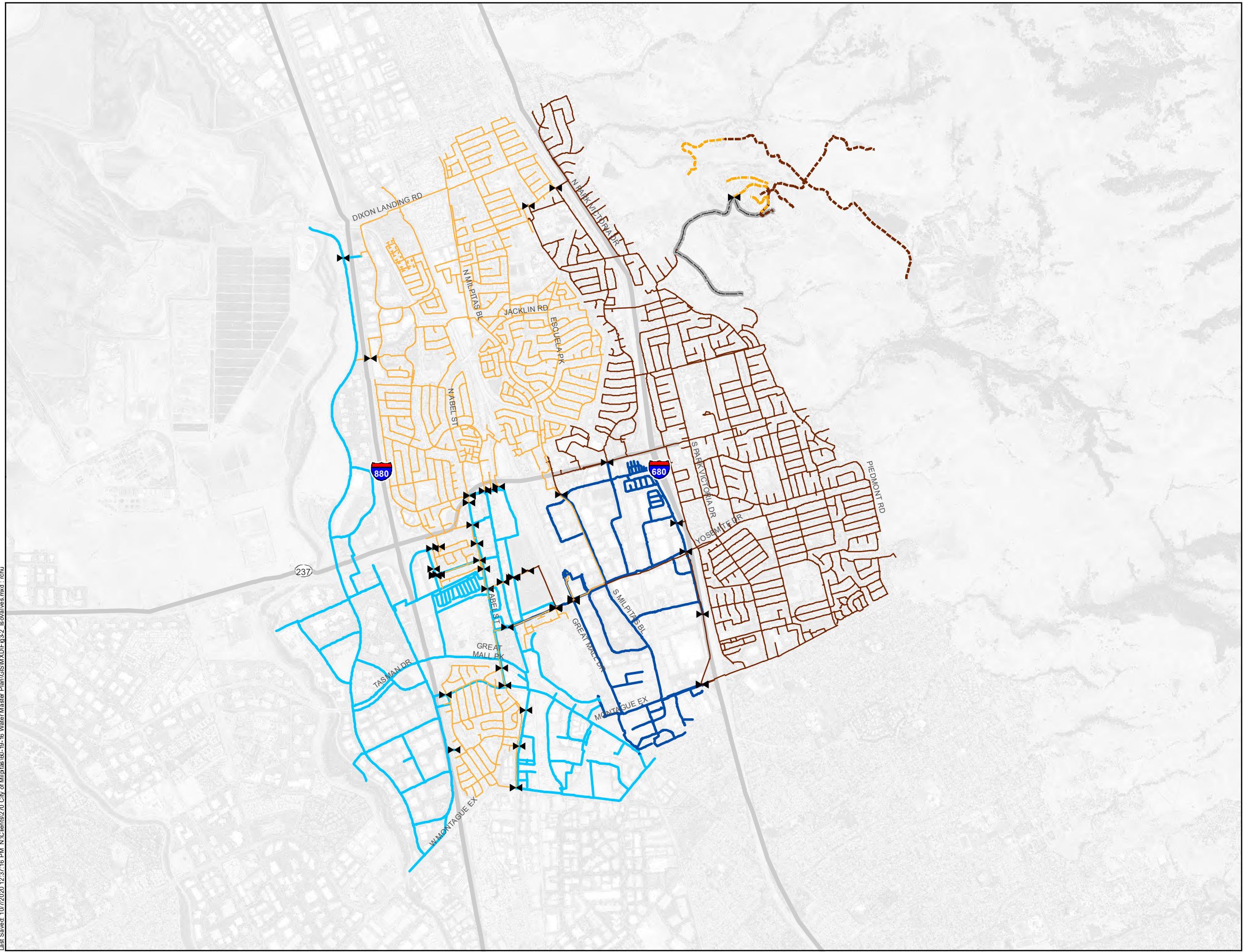
Isolation valves increase supply reliability, as they can be opened during long-term water shortages from either SFPUC or VW. Existing isolation valves are shown on Figure 3-2 and listed in Table 3-8. Previous modeling performed for the 2009 WMPU demonstrated that the City does not have to open every valve to supply the entire system using one supply source. Per the 2009 WMPU, opening only four “key” valves allowed a single supply source to serve the City service area (refer to Chapters 8 and 9 of this Water Master Plan for updated recommendations). Current City emergency operations procedures are detailed in Appendix B.

#### 3.3.5 Pipelines

The existing water distribution system consists of approximately 183 miles of pipeline with diameters ranging from 2 inches to 30 inches. By length, approximately 85 percent of the City’s water pipelines are between 6 inches and 12 inches in diameter, and just over 73 percent are asbestos cement (AC). The diameter and material distributions of the City’s water system pipelines are summarized in Table 3-9 and Table 3-10, respectively.



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- ✂ Isolation Valve
- Pipeline Pressure Zone**
- VW1
  - VW2
  - SF1
  - SF2
  - SF3
  - SF4-1
  - SF4-2



**Figure 3-2**  
**Existing Water System**  
**Isolation Valves**



| Table 3-8. Existing Isolation Valves                                                                                                                                                                                                                                      |                |                                                             |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------|-------------------------------|
| Valve Number                                                                                                                                                                                                                                                              | Valve Size, in | Location                                                    | Classification <sup>(a)</sup> |
| Pressure Zone 1 (between SF1 and VW1)                                                                                                                                                                                                                                     |                |                                                             |                               |
| 1                                                                                                                                                                                                                                                                         | 14             | End of Live Oak Court                                       | None                          |
| 2                                                                                                                                                                                                                                                                         | 12             | Starlite Dr/Capitol Avenue                                  | None                          |
| 2A                                                                                                                                                                                                                                                                        | 10             | 150 feet east of Evening Star Court                         | None                          |
| 3                                                                                                                                                                                                                                                                         | 8              | S. Main Street/S. Abel Street                               | None                          |
| 4                                                                                                                                                                                                                                                                         | 12             | S. Abel Street/Capitol Avenue                               | None                          |
| 5                                                                                                                                                                                                                                                                         | 12             | S. Abel Street/Capitol Avenue                               | None                          |
| 5A                                                                                                                                                                                                                                                                        | 6              | S. Main Street/Cedar Way                                    | None                          |
| 6                                                                                                                                                                                                                                                                         | 8              | S. Main Street/Montague Expwy.                              | None                          |
| 7                                                                                                                                                                                                                                                                         | 10             | S. Main Street/Montague Expwy.                              | None                          |
| 12X                                                                                                                                                                                                                                                                       | 14             | South end of Rio Verde Place                                | None                          |
| 13                                                                                                                                                                                                                                                                        | 12             | S. Abbott Avenue near Economy Inn                           | None                          |
| 13A                                                                                                                                                                                                                                                                       | 8              | North end of Rio Verde Place                                | None                          |
| 14                                                                                                                                                                                                                                                                        | 8              | S. Abel Street/Corning Avenue                               | None                          |
| 14A                                                                                                                                                                                                                                                                       | 6              | Corning Ave/Palmer Avenue                                   | None                          |
| 15                                                                                                                                                                                                                                                                        | 8              | S. Abel Street/Junipero Drive                               | None                          |
| 18                                                                                                                                                                                                                                                                        | 12             | S. Abel Street/Serra Way                                    | None                          |
| 18A                                                                                                                                                                                                                                                                       | 12             | S. Abel Street south of Calaveras Boulevard                 | None                          |
| 20                                                                                                                                                                                                                                                                        | 8              | S. Main Street/Carlo Street                                 | None                          |
| 20A                                                                                                                                                                                                                                                                       | 6              | Carlo Street/Calaveras Boulevard                            | None                          |
| 20B                                                                                                                                                                                                                                                                       | 12             | Carlo Street/Calaveras Boulevard                            | None                          |
| 24                                                                                                                                                                                                                                                                        | 6              | End of E. Carlo Street                                      | None                          |
| 25                                                                                                                                                                                                                                                                        | 8              | South end of Railroad Avenue                                | None                          |
| 26                                                                                                                                                                                                                                                                        | 6              | S. Abel Street/Sylvia Avenue                                | None                          |
| 27                                                                                                                                                                                                                                                                        | 8              | Hammond Way near SFPUC Pipeline                             | None                          |
| 28                                                                                                                                                                                                                                                                        | 8              | Hammond Way near SFPUC Pipeline                             | None                          |
| 30                                                                                                                                                                                                                                                                        | 12             | S. Main Street near SFPUC Pipeline                          | None                          |
| 31                                                                                                                                                                                                                                                                        | 24             | S. Abel Street near SFPUC Pipeline                          | None                          |
| 35                                                                                                                                                                                                                                                                        | 8              | End of Corning Avenue                                       | None                          |
| 32045                                                                                                                                                                                                                                                                     | 14             | End of Cadillac Court                                       | None                          |
| 32523                                                                                                                                                                                                                                                                     | 14             | N. McCarthy Boulevard                                       | None                          |
| 35100                                                                                                                                                                                                                                                                     | 8              | End of Corning Avenue                                       | None                          |
| Pressure Zone 2 (between SF2 and VW2)                                                                                                                                                                                                                                     |                |                                                             |                               |
| 8                                                                                                                                                                                                                                                                         | 8              | Montague Expwy/Southbound 680 offramp                       | None                          |
| 8A                                                                                                                                                                                                                                                                        | 10             | Montague Expwy/Southbound 680 offramp                       | None                          |
| 9                                                                                                                                                                                                                                                                         | 24             | Sinclair Frontage Road/Yosemite Drive                       | Key                           |
| 10                                                                                                                                                                                                                                                                        | 12             | Sinclair Frontage Road south of Wrigley Way                 | None                          |
| 23C                                                                                                                                                                                                                                                                       | 16             | S. Milpitas Boulevard north of Los Coches Street            | Key                           |
| 32                                                                                                                                                                                                                                                                        | 24             | S. Hillview Drive/Calaveras Boulevard                       | Key                           |
| 137                                                                                                                                                                                                                                                                       | 16             | 650 feet west of Gibraltar Drive/Yosemite Drive             | Key                           |
| 174                                                                                                                                                                                                                                                                       | 12             | 650 feet west of Gibraltar Drive/Yosemite Drive             | None                          |
| 31219                                                                                                                                                                                                                                                                     | 12             | Sinclair Frontage Road/Montague Court                       | None                          |
| Between Pressure Zones in the Same Service Area                                                                                                                                                                                                                           |                |                                                             |                               |
| 79                                                                                                                                                                                                                                                                        | 12             | Near Main PRV (between SF1 and SF2)                         | Always Closed                 |
| 99A                                                                                                                                                                                                                                                                       | 18             | Curtis Avenue near Curtis PRV (between VW1 and VW2)         | Always Closed                 |
| 31660                                                                                                                                                                                                                                                                     | 8              | Country Club Drive/Tularcitos Drive (between SF3 and SF4-1) | Always Closed                 |
| 32818                                                                                                                                                                                                                                                                     | 8              | Coelho Street/Diel Drive (between SF1 and SF2)              | Always Closed                 |
| 33788                                                                                                                                                                                                                                                                     | 8              | Coelho Street/Roger Street (between SF1 and SF2)            | Always Closed                 |
| 34357                                                                                                                                                                                                                                                                     | 8              | E. Curtis Avenue near Parc Metro PRV (between SF1 and SF2)  | Always Closed                 |
| 34358                                                                                                                                                                                                                                                                     | 8              | E. Curtis Avenue near Parc Metro PRV (between SF1 and SF2)  | Always Closed                 |
| 34359                                                                                                                                                                                                                                                                     | 8              | E. Curtis Avenue near Parc Metro PRV (between SF1 and SF2)  | Always Closed                 |
| 35727                                                                                                                                                                                                                                                                     | 12             | S. Main Street near Tom Evatt Park (between SF1 and SF2)    | Always Closed                 |
| (a) Isolation valves are normally closed to separate SFPUC and VW supplies. Per the 2009 WMPU, opening only the four key valves allows a single source (SFPUC or VW) to supply the entire system. Valves located between pressure zones shall remain closed at all times. |                |                                                             |                               |

## Chapter 3

### Existing Water System Facilities



**Table 3-9. Summary of Existing Pipelines by Diameter<sup>(a)</sup>**

| Pipe Diameter,<br>inches | Total Pipeline Length,<br>feet | Total Pipeline Length,<br>miles | Percent of<br>Water System |
|--------------------------|--------------------------------|---------------------------------|----------------------------|
| 2                        | 107                            | 0.0                             | 0.0%                       |
| 4                        | 11,542                         | 2.2                             | 1.2%                       |
| 6                        | 243,314                        | 46.1                            | 25.2%                      |
| 8                        | 246,992                        | 46.8                            | 25.6%                      |
| 10                       | 81,940                         | 15.5                            | 8.5%                       |
| 12                       | 242,814                        | 46.0                            | 25.2%                      |
| 14                       | 59,695                         | 11.3                            | 6.2%                       |
| 16                       | 32,961                         | 6.2                             | 3.4%                       |
| 18                       | 38,419                         | 7.3                             | 4.0%                       |
| 20                       | 320                            | 0.1                             | 0.0%                       |
| 24                       | 5,696                          | 1.1                             | 0.6%                       |
| 30                       | 216                            | 0.0                             | 0.0%                       |
| <b>Total</b>             | <b>964,015</b>                 | <b>183</b>                      | <b>100%</b>                |

(a) Source: City GIS pipeline shapefile and as-builts provided February and March 2020.

**Table 3-10. Summary of Existing Pipelines by Material<sup>(a)</sup>**

| Pipe Material      | Abbreviation | Total Pipeline Length,<br>feet | Total Pipeline Length,<br>miles | Percent of<br>Water System |
|--------------------|--------------|--------------------------------|---------------------------------|----------------------------|
| Asbestos Cement    | AC / ACP     | 704,997                        | 133.5                           | 73.1%                      |
| Concrete Cylinder  | CCP          | 887                            | 0.2                             | 0.1%                       |
| Cast Iron          | CIP          | 5,002                          | 0.9                             | 0.5%                       |
| Ductile Iron       | DIP          | 80,772                         | 15.3                            | 8.4%                       |
| Polyvinyl Chloride | PVC          | 144,474                        | 27.4                            | 15.0%                      |
| Steel              | STL          | 27,883                         | 5.3                             | 2.9%                       |
| <b>Total</b>       |              | <b>964,015</b>                 | <b>183</b>                      | <b>100%</b>                |

(a) Source: City GIS pipeline shapefile and as-builts provided February and March 2020.

## CHAPTER 4

### Water Supply Sources

This chapter summarizes the City's existing and future water supply sources. A reliable water supply is critical for ensuring the City can meet water demands through buildout and during emergency outages. The evaluation of water supply availability and reliability begins with understanding the City's supply sources and agreements, as well as the water quality associated with those supply sources. The City's historical and projected future use of its available water supplies is further described in Chapter 5 of this report.

#### 4.1 EXISTING WATER SUPPLIES

The City's existing water supplies include imported water, groundwater, recycled water, and interties with neighboring agencies.

Under normal conditions, imported water comprises the City's entire water supply. The City purchases treated surface water from two agencies: the SFPUC and VW, which was previously known as the Santa Clara Valley Water District. In 2019, water supplies from SFPUC totaled 6,146 acre-feet (af) and represented about 59 percent of the City's total water supplies, while water supplies from VW totaled 3,182 af and represented about 31 percent of the City's total water supplies.

Recycled water is produced at the San José-Santa Clara Regional Wastewater Facility and delivered to the City by South Bay Water Recycling (SBWR). In 2019, the City used approximately 1,049 af of recycled water, mainly for landscape irrigation. This represented about 10 percent of the City's total 2019 water use.

In emergencies, the City can activate interties with SJW and the ACWD and/or pump groundwater. The City overlies the Santa Clara Valley Groundwater Sub-basin and currently has one groundwater well (Pinewood Well).

Each of the City's existing water supplies is described further below.

##### 4.1.1 San Francisco Public Utilities Commission (SFPUC)

The SFPUC is a department of the City and County of San Francisco, which owns and operates the Hetch Hetchy Regional Water System (RWS). The RWS spans from Hetch Hetchy Valley in Yosemite National Park to the City of San Francisco and consists of over 280 miles of pipeline, eleven reservoirs, five pump stations, and two water treatment plants.

The Hetch Hetchy watershed, an area located in Yosemite National Park, is the major source of water for all of San Francisco's retail and wholesale water needs. Spring snowmelt runs down the Tuolumne River and fills Hetch Hetchy Reservoir, the largest reservoir in the Hetch Hetchy water system. This surface water in the Hetch Hetchy Reservoir is treated, but not filtered because it is of such high quality.

The Alameda and Peninsula watersheds produce the rest of the total water supply. The Alameda watersheds (the San Antonio Creek, Upper Alameda Creek, and Arroyo Hondo watersheds) located in Alameda and Santa Clara Counties, contribute surface water supplies captured and stored in two reservoirs: Calaveras and San Antonio. The Sunol Filter Galleries located near the Town of Sunol, are a groundwater source supplying less than one percent of San Francisco's water. The Peninsula watersheds (the San Mateo Creek and Pilarcitos Creek watersheds) in San Mateo County contribute surface water supplies captured and stored in lower and upper Crystal Springs and San Andreas Reservoirs and in two smaller reservoirs, Pilarcitos and Stone Dam. The six reservoirs in the Alameda and Peninsula watersheds

## Chapter 4

### Water Supply Sources

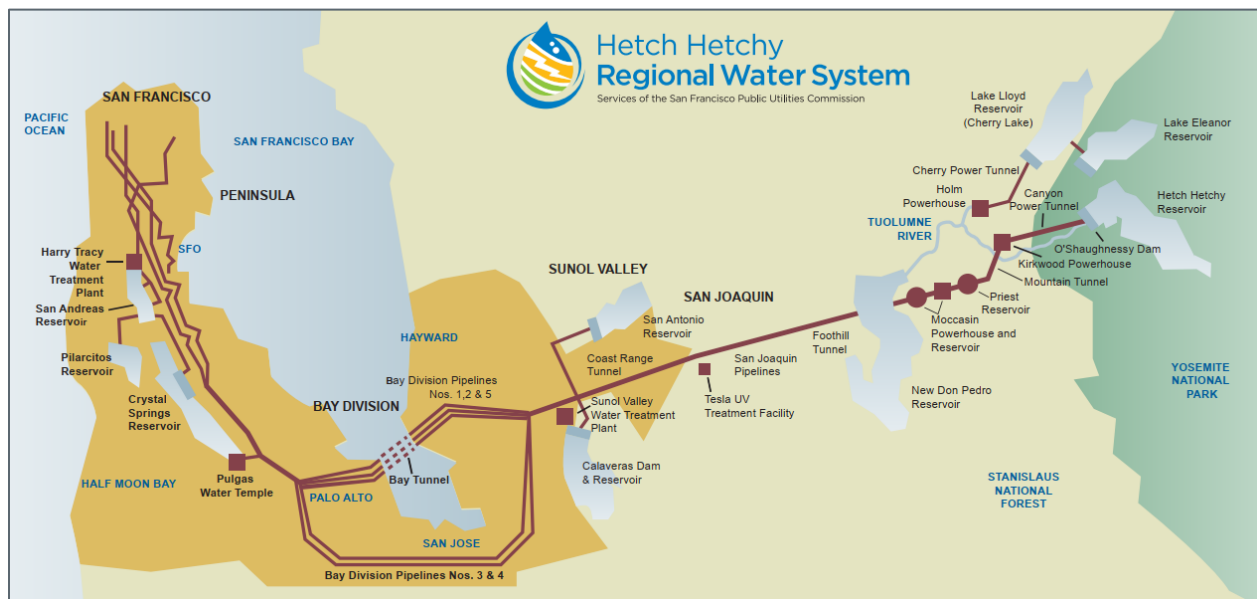


capture rain and local runoff. Some also store Hetch Hetchy water for use by San Francisco. These local water sources and groundwater from the Sunol filter galleries are treated and filtered before delivery.

Although most of the SFPUC water deliveries originate from the Tuolumne River, typically comprising approximately 85 percent of SFPUC water deliveries, the SFPUC prioritizes local surface water supplies. However, in dry years, when local surface water supply is often decreased, Tuolumne River diversions can exceed 90 percent of SFPUC supplies.

The RWS serves the City of San Francisco as well as 25 wholesale customers located throughout Alameda, Santa Clara, and San Mateo Counties, including the City of Milpitas. Overall, the RWS serves approximately 2.7 million residential, commercial, and industrial customers throughout the San Francisco Bay Area.

A schematic of the RWS is provided on Figure 4-1.



Source: [SFPUC website](#)

Figure 4-1. SFPUC Regional Water System

#### 4.1.1.1 City Supplies from SFPUC

The Bay Area Water Supply and Conservation Agency (BAWSCA) represents the interests of the 25 wholesale customers (who together manage 27 water systems), including the City of Milpitas. In 2009, the SFPUC and BAWSCA members entered into a Water Supply Agreement, a 25-year contract outlining the relationship between the two entities. A key component of the Water Supply Agreement is that it continued the “Supply Assurance,” a maximum supply of 184 mgd to be allocated among BAWSCA members, established by the Water Supply Agreement’s predecessor (the 1984 Settlement Agreement and Master Water Sales Contract). Though the Supply Assurance can be reduced due to drought, maintenance, or emergencies, the Water Supply Agreement established the 184 mgd delivery ceiling in perpetuity.



The Supply Assurance is allocated between 22 wholesale customers in the form of Individual Supply Guarantees (ISGs)<sup>6</sup>. ISGs are specified in the Water Supply Agreement and subject to change following the Water Supply Agreement's expiration in 2034. The City's ISG is 9.23 mgd, which is delivered through Bay Division Pipelines Nos. 3 and 4.

#### 4.1.1.2 SFPUC Water Quality

The RWS delivers high quality water that meets all Federal and State requirements. Most of the water originates in the Tuolumne River, which is fed by spring snowmelt in a well-protected watershed in Yosemite National Park. Diverted water is stored in the Hetch Hetchy Reservoir and transported to the Bay Area in pipes and tunnels. According to the SFPUC's 2019 Water Quality Report, Hetch Hetchy water meets Federal and State drinking water quality standards by providing the following treatment: pH adjustment (to control corrosion), disinfection (including ultraviolet light and chlorination), fluoridation (for dental health protection), and chloramination (for maintaining disinfectant residual and minimizing disinfection byproducts). Filtration is not required due to the high water quality.

Local surface water supplies, which typically comprise about 15 percent of SFPUC supplies, require more typical treatment, including coagulation, flocculation, sedimentation, filtration, and disinfection. Most wholesale customers, including the City, receive a blend of Hetch Hetchy and local surface water supplies. The SFPUC does not anticipate any future degradation of water quality.

#### 4.1.2 Valley Water (VW)

Valley Water, previously known as the Santa Clara Valley Water District, is an independent special district that provides wholesale water supply, groundwater management, flood protection and stream stewardship. Its service area includes all of Santa Clara County, which is located at the southern end of San Francisco Bay. Valley Water was formed as the Santa Clara Valley Water Conservation District in 1929 in response to groundwater overdraft and significant land subsidence. In 1954, it annexed the Central Santa Clara Valley Water District. In 1968, it merged with the countywide flood control district to form one agency to manage the water supply and flood programs for most of the county. The Gavilan Water District in southern Santa Clara County was annexed in 1987 and now Valley Water provides services for the entire county. Valley Water is governed by an elected seven-member Board of Directors following the District Act and its own Board Governance Policies.

Valley Water has been a leader in conjunctive use in California for decades, utilizing imported and local surface water to supplement groundwater and to maintain reliability in dry years. Conjunctive use helps protect local subbasins from overdraft, land subsidence, and saltwater intrusion and provides critical groundwater storage reserves for use during droughts or outages. After it was formed to address declining groundwater levels and land subsidence, Valley Water constructed reservoirs to capture more local water. However, local supplies were insufficient to meet the county's growing population. Valley Water began importing water from the State Water Project in 1965 and from the Central Valley Project's San Felipe Division in 1987. These investments, along with water recycling and conservation, have resulted in sustainable groundwater subbasins and reliable water supplies for the county.

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<sup>6</sup> Three wholesale customers do not have ISGs: the cities of San Jose, Santa Clara, and Hayward. The cities of San Jose and Santa Clara are supplied on a temporary and interruptible basis and thus do not have an allocated share of the Supply Assurance. The City of Hayward has an unspecified allocation, equal to the difference between 184 mgd and the sum of the ISGs.

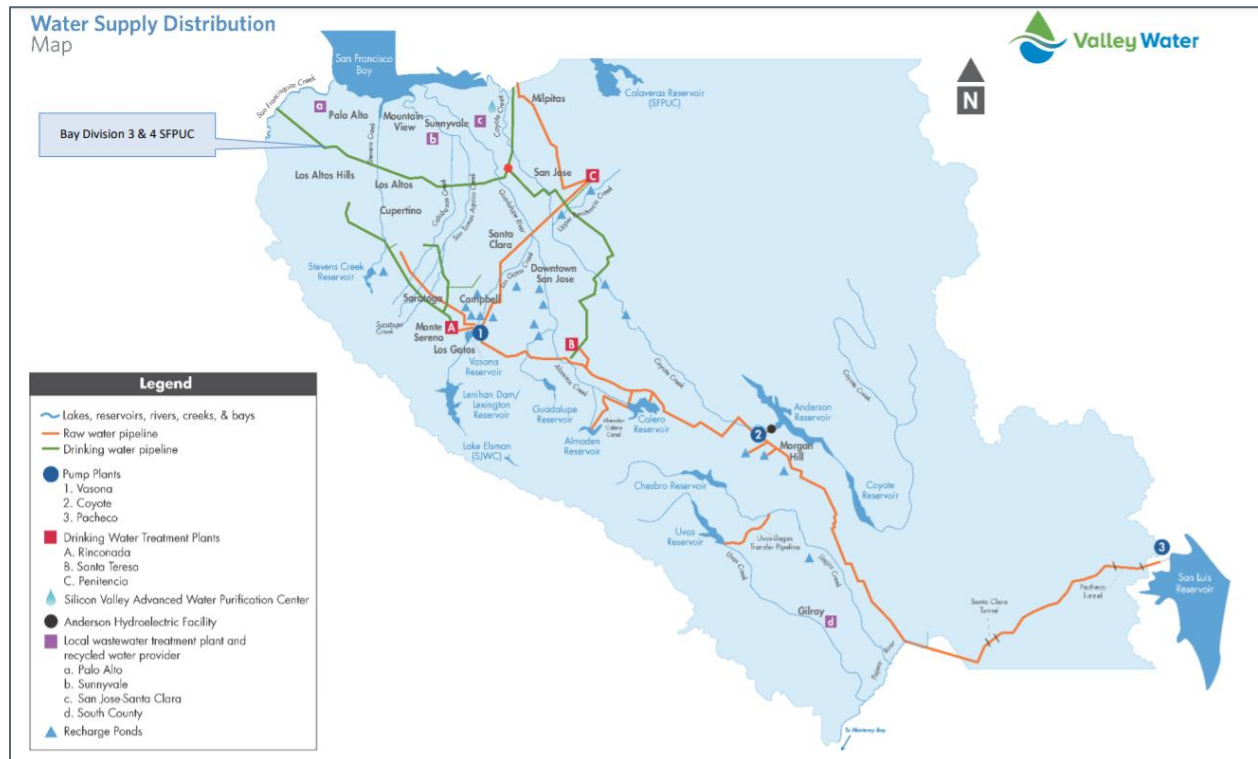
## Chapter 4

### Water Supply Sources



About half of the county's water supply currently comes from local sources and about half comes from imported water sources. Local sources include natural groundwater recharge and surface water supplies, including surface water rights held by Valley Water, San Jose Water, and Stanford University. Imported water includes Valley Water's State Water Project and Central Valley Project contract supplies (100,000 acre-feet per year [af/yr] from the SWP and 152,500 af/yr from the Central Valley Project [CVP]), as well as supplies delivered by the SFPUC to cities in northern Santa Clara County.

A schematic of the VW water supply system is provided on Figure 4-2.



Source: Valley Water, Water Supply Master Plan 2040, November 2019.

**Figure 4-2. Valley Water Water Supply System**

#### 4.1.2.1 City Supplies from VW

VW delivers treated surface water to the City via the Milpitas Pipeline. Per the City's contract with VW, potable water deliveries consist of SWP and CVP water only, with amounts based on an annual request the City submits every three years. In each of the three years after submitting the request, the City is obligated to purchase at least 95 percent of the maximum amount listed on the schedule. Every month, VW guarantees the City can receive at least 15 percent of the annual delivery schedule.





#### 4.1.2.2 VW Water Quality

The SWP and CVP convey water through the Sacramento-San Joaquin Delta (Delta). Delta supplies are threatened by sea level rise and climate change, with elevated nutrient concentrations (causing algal blooms and reducing dissolved oxygen) and disinfection byproducts presenting a more immediate challenge. The Central Valley Regional Water Quality Control Board is also focused on controlling pesticide and herbicide discharges into the Delta.

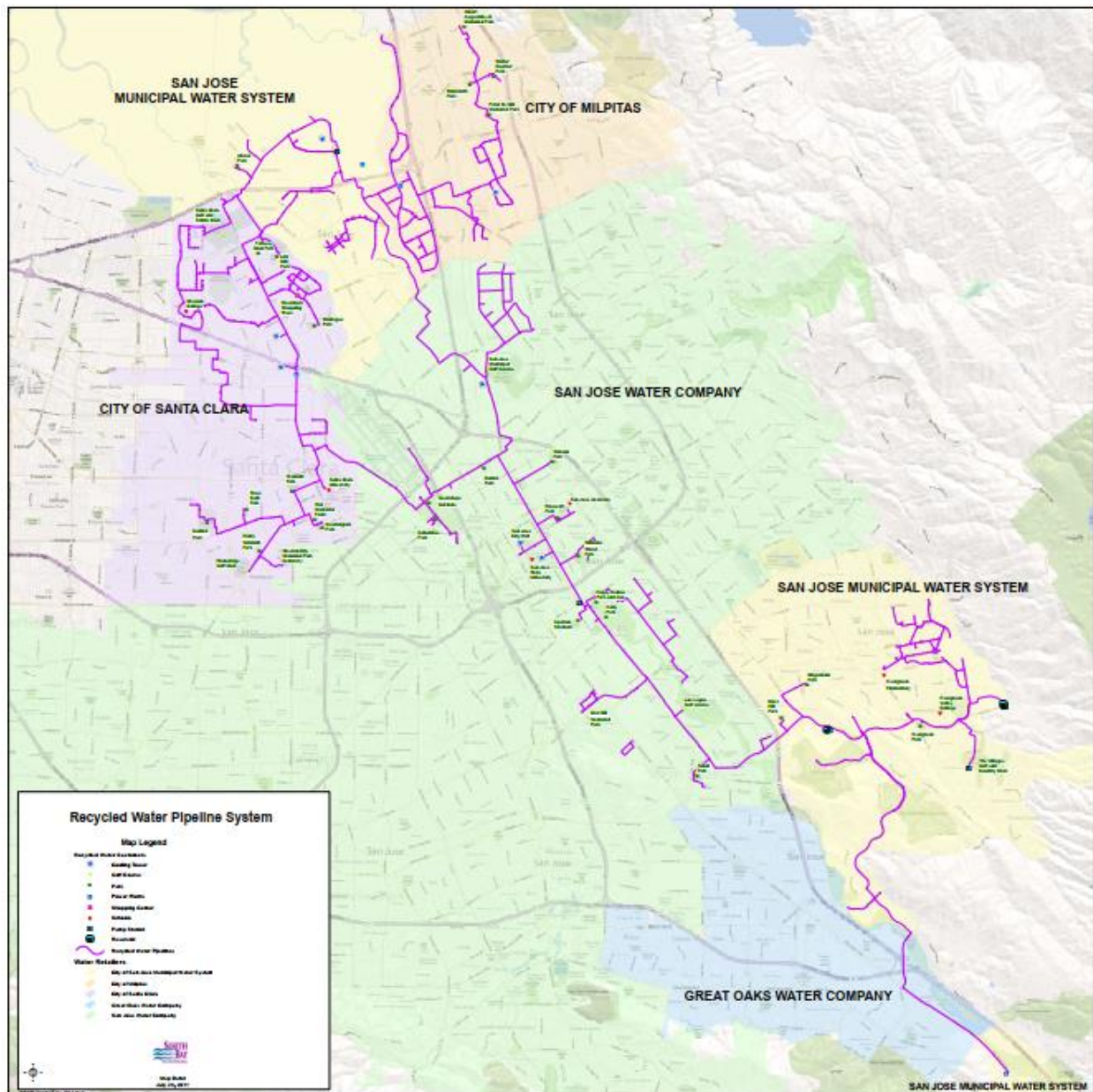
Surface water is treated at either the Penitencia or Santa Teresa Water Treatment Plants (WTPs) before delivery to the City. It should be noted that VW also operates a third WTP, the Rinconada WTP, but it primarily serves the west side of Santa Clara County, which does not include the City. The Penitencia and Santa Teresa WTPs began operations in 1974 and 1989, respectively. In 2006, disinfection facilities at each WTP were upgraded to use ozone instead of chlorine. Not only is ozone a strong disinfectant, but it can also improve taste and odor while also reducing the formation of disinfection byproducts. At both WTPs, raw water is treated via coagulation/flocculation (to remove silt and particles), ozone disinfection, and granular activated carbon filtration (to remove dissolved chemicals). Filtered water is then treated with chloramine to maintain a disinfection residual through the distribution system.

#### 4.1.3 Recycled Water

South Bay Water Recycling (SBWR), a division within the City of San Jose's Environmental Services Department, is the regional permit holder for recycled water in San José, Santa Clara and Milpitas, ensuring compliance with State regulations for recycled water quality and use. SBWR is a recycled water wholesaler to four retailers: San Jose Water, San José Municipal Water, City of Santa Clara, and City of Milpitas. Customers buy recycled water from the retailer in their location.

Tertiary treated recycled water is produced at the San José-Santa Clara Regional Wastewater Facility, one of the largest such treatment facilities in California. SBWR's recycled water system consists of over 150 miles of pipeline, five pump stations, and 10 million gallons of storage in reservoirs. SBWR delivers more than four billion gallons of recycled water per year to more than 900 commercial customers, an average of 11 mgd.

A schematic of the SBWR system is provided on Figure 4-3.



Source: [SBWR website](http://sbwr.org)

**Figure 4-3. South Bay Water Recycling System**

The use of recycled water is a priority for the City, which has adopted an ordinance that prohibits using potable water for irrigation if recycled water is available. While SBWR owns the distribution system, the City is responsible for operation and maintenance of any facilities within City boundaries.

In 2019, the City used approximately 1,049 af of recycled water, mainly for landscape irrigation. This represented about 10 percent of the City's total 2019 water use. According to the City's 2015 Urban Water Management Plan (UWMP), continued growth in landscape irrigation and industrial use, along with expansion to golf course irrigation, should increase recycled water use to approximately 2,690 af by 2040. In addition, the City is seeking to improve recycled water reliability via interties with SJW, also a SBWR retailer.



### **4.1.4 Emergency Groundwater Wells**

The City overlies the Santa Clara Groundwater Subbasin, which is managed by VW. In its 2019 Basin Prioritization project, DWR identified the Santa Clara Groundwater Subbasin as a high priority basin for sustainable management. Overdraft and land subsidence have been challenges in the past, and VW actively manages surface recharge to alleviate subsidence.

Groundwater is not part of the City's normal water supply portfolio. Should SFPUC and/or VW supplies be interrupted, the City can activate the Pinewood Well, which draws water from an aquitard-protected area in the southwestern part of the City. While the Pinewood Well is currently permitted for emergency use only, the City may consider permitting it as an active, fully operational well in the future. The State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) defines emergency or standby water sources as not operating more than 15 calendar days nor more than five consecutive days in a year.

Per the 2009 WMPU, the Pinewood Well has a capacity of 1.7 mgd. Pump production testing would be required to confirm this capacity, but that is outside the scope of this master plan. Therefore, this master plan assumes the Pinewood Well capacity remains at 1.7 mgd. Pumped water meets primary drinking water standards; however, there are taste and odor concerns. In 2016, Water Solutions, Inc. conducted a Groundwater Well Evaluation that examined the Pinewood Well and potential sites for a new well. This Groundwater Well Evaluation recommended using ozone and surface water blending to control taste and odor. As discussed previously in Section 3.2.2, the Pinewood Well is equipped with a plug-in adapter and transfer switch to receive power from a portable generator. The City anticipates completing treatment and operational improvements at the Pinewood Well soon.

The City also has two other planned wells, the Curtis Well and the McCandless Well, which are described in Section 4.2 below.

### **4.1.5 Emergency Interties**

The City has one intertie with SJW and two interties with ACWD. With a 2-hour notice and mutual consent, the City can receive water from either source. The ACWD intertie is a two-way intertie, allowing the City to either receive or provide water supplies, while the City can only receive water from SJW.

## **4.2 FUTURE WATER SUPPLIES**

Based on the City's 2015 UWMP, the City expects to meet future water demands with the existing imported surface water supplies described above. As a result, there are no plans to develop new supply sources.

However, the City hopes to increase future supply reliability by expanding its groundwater capabilities. Two new wells, the Curtis Well and the McCandless Well, are expected to come online during the City's buildout horizon (i.e., by 2040). The Curtis Well was drilled in 2003, but the well was not equipped with above-grade infrastructure required for a functioning well, and the facility was never completed. As a result, bringing the Curtis Well online requires significant effort, including installing a submersible pump, piping, and treatment components, as well as conducting testing and permitting. Design for the Curtis Well improvements began in 2020. Construction of the McCandless Well began in 2020 and is anticipated to be completed by 2022.

## CHAPTER 5

### Water Demand

This chapter reviews the City's existing potable water demands and develops future water demand projections based on refined Water Use Factors (WUFs) described in this chapter and planned future development (described in Chapter 2). Having accurate and thorough water demands allows for:

- Developing and calibrating the potable water system hydraulic model
- Identifying existing and potential future water system deficiencies and recommending improvements

## 5.1 HISTORICAL WATER PRODUCTION AND CONSUMPTION

As described in Chapter 4, the City imports surface water from SFPUC and VW. During normal operation, water production consists exclusively of water imports. Water consumption is defined as metered water use and is based on actual billing data provided by the City. The difference between water production and water consumption is non-revenue water (NRW).

The following subsections detail the City's historical production and consumption to help determine appropriate NRW, per capita water use, and peaking factors. This information, along with future land use plans, will serve as the foundation for future water demand projections.

### 5.1.1 Water Production

Table 5-1 summarizes annual water production from 2009 through 2019 and breaks down deliveries by source (SFPUC and VW). Total production decreased between 2014 and 2017 due to the drought and associated water conservation efforts. Production increased in 2018 and held steady in 2019 but remains below pre-drought levels. In recent years SFPUC imports have comprised approximately 60 to 66 percent of the City's total production, though recent production volume has dropped due to increased use of recycled water. VW imports have comprised about 34 to 40 percent of the City's total production in recent years.

Figure 5-1 shows the City's monthly water production from January 2009 through December 2019. As expected, the City's highest water production has occurred in the summer months (June through September), when temperatures are high and rainfall is minimal. Over this 10-year period, the lowest water production has most frequently occurred in December and March.

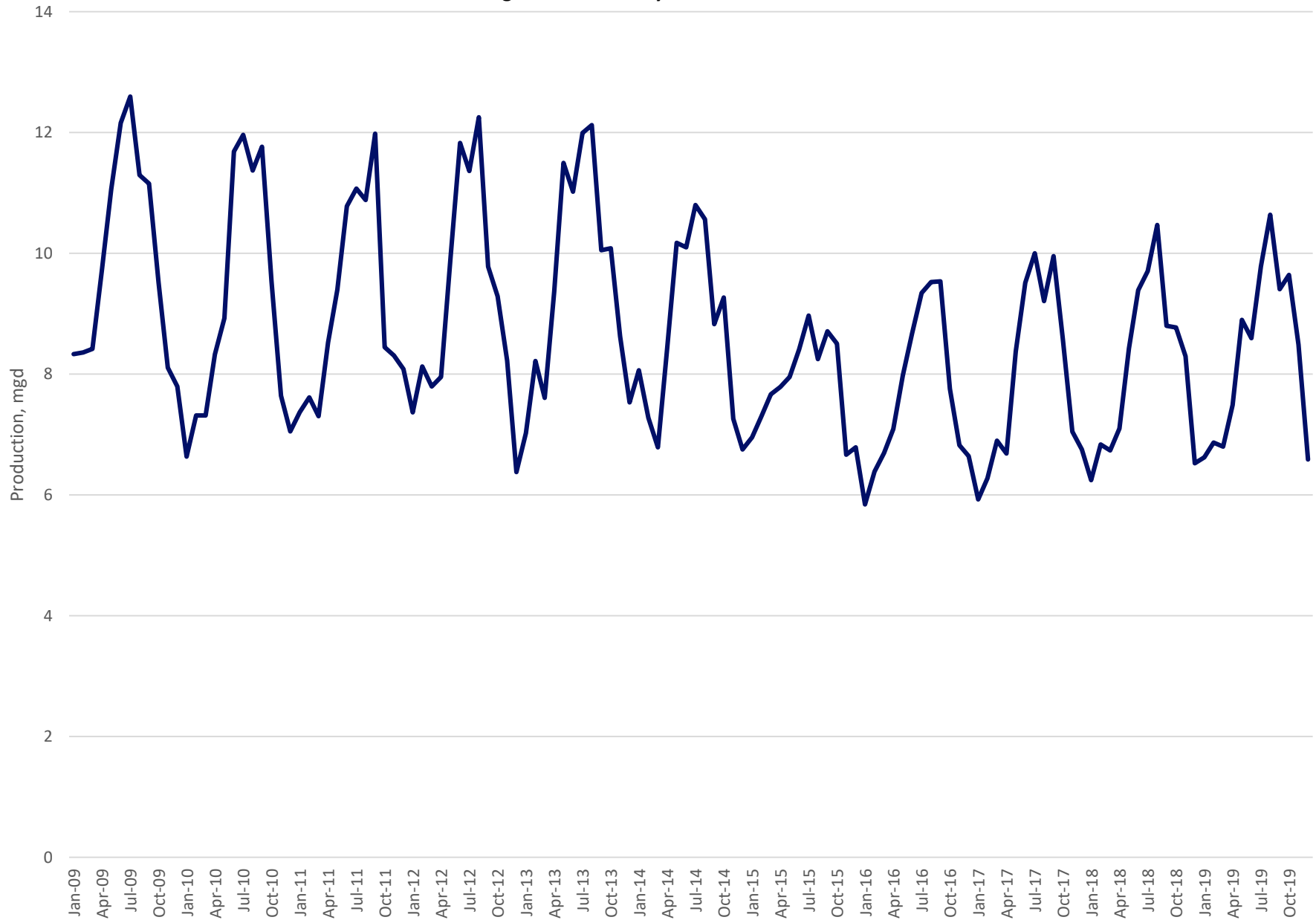


**Table 5-1. Historical Water Production<sup>(a)</sup>**

| Calendar Year  | SFPUC        |                             | VW           |                             | Total Production, af | Average Day Production, mgd |
|----------------|--------------|-----------------------------|--------------|-----------------------------|----------------------|-----------------------------|
|                | Volume, af   | Percent of Total Production | Volume, af   | Percent of Total Production |                      |                             |
| 2009           | 7,563        | 68                          | 3,509        | 32                          | 11,072               | 9.9                         |
| 2010           | 6,748        | 66                          | 3,483        | 34                          | 10,231               | 9.1                         |
| 2011           | 6,855        | 67                          | 3,395        | 33                          | 10,250               | 9.2                         |
| 2012           | 6,984        | 68                          | 3,342        | 32                          | 10,326               | 9.2                         |
| 2013           | 7,506        | 70                          | 3,251        | 30                          | 10,758               | 9.6                         |
| 2014           | 6,418        | 66                          | 3,330        | 34                          | 9,748                | 8.7                         |
| 2015           | 5,288        | 60                          | 3,487        | 40                          | 8,774                | 7.8                         |
| 2016           | 5,270        | 61                          | 3,372        | 39                          | 8,642                | 7.7                         |
| 2017           | 5,707        | 64                          | 3,191        | 36                          | 8,898                | 7.9                         |
| 2018           | 5,776        | 64                          | 3,315        | 36                          | 9,091                | 8.1                         |
| 2019           | 6,146        | 66                          | 3,182        | 34                          | 9,328                | 8.3                         |
| <b>Average</b> | <b>6,387</b> | <b>66</b>                   | <b>3,351</b> | <b>34</b>                   | <b>9,738</b>         | <b>8.7</b>                  |

(a) Historical production data provided by City in January 2020.

Figure 5-1. Monthly Water Production





## 5.1.2 Water Consumption

Table 5-2 summarizes historical water consumption (2013 through 2019) by customer type and was developed from City-provided billing data<sup>7</sup>. Over this 7-year period, residential customers averaged about 55 percent of the total City consumption. Commercial users averaged about 40 percent of total consumption, with Public (City and County) users making up the remainder (just over 4 percent). The overall consumption trend follows the City's production and is consistent across residential and commercial customers.

| <b>Table 5-2. Historical Metered Water Consumption<sup>(a)</sup></b> |                         |                         |                         |                         |                         |                         |                         |
|----------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <b>Customer Type</b>                                                 | <b>CY 2013,<br/>mgd</b> | <b>CY 2014,<br/>mgd</b> | <b>CY 2015,<br/>mgd</b> | <b>CY 2016,<br/>mgd</b> | <b>CY 2017,<br/>mgd</b> | <b>CY 2018,<br/>mgd</b> | <b>CY 2019,<br/>mgd</b> |
| <b>Residential</b>                                                   |                         |                         |                         |                         |                         |                         |                         |
| Water                                                                | 4.39                    | 4.08                    | 3.82                    | 3.74                    | 3.97                    | 4.31                    | 3.92                    |
| Fire                                                                 | 0.00                    | 0.00                    | 0.00                    | 0.00                    | 0.04                    | 0.00                    | 0.00                    |
| Irrigation                                                           | 0.36                    | 0.32                    | 0.21                    | 0.24                    | 0.29                    | 0.31                    | 0.34                    |
| Subtotal Residential                                                 | 4.75                    | 4.40                    | 4.03                    | 3.98                    | 4.31                    | 4.62                    | 4.26                    |
| <b>Commercial</b>                                                    |                         |                         |                         |                         |                         |                         |                         |
| Water                                                                | 2.95                    | 2.68                    | 2.73                    | 2.57                    | 2.65                    | 2.71                    | 2.43                    |
| Fire                                                                 | 0.00                    | 0.01                    | 0.00                    | 0.00                    | 0.00                    | 0.00                    | 0.00                    |
| Irrigation                                                           | 0.64                    | 0.53                    | 0.38                    | 0.37                    | 0.44                    | 0.47                    | 0.51                    |
| Subtotal Commercial                                                  | 3.59                    | 3.21                    | 3.11                    | 2.94                    | 3.10                    | 3.19                    | 2.94                    |
| <b>Public</b>                                                        |                         |                         |                         |                         |                         |                         |                         |
| Water - City                                                         | 0.04                    | 0.03                    | 0.02                    | 0.03                    | 0.03                    | 0.03                    | 0.04                    |
| Water - County                                                       | 0.01                    | 0.01                    | 0.01                    | 0.01                    | 0.01                    | 0.01                    | 0.01                    |
| Irrigation - City                                                    | 0.38                    | 0.23                    | 0.58                    | 0.17                    | 0.28                    | 0.23                    | 0.18                    |
| Subtotal Public                                                      | 0.42                    | 0.26                    | 0.61                    | 0.20                    | 0.32                    | 0.27                    | 0.22                    |
| <b>Total</b>                                                         | <b>8.76</b>             | <b>7.87</b>             | <b>7.75</b>             | <b>7.12</b>             | <b>7.72</b>             | <b>8.09</b>             | <b>7.43</b>             |
| (a) Based on billing data provided by City in January 2020.          |                         |                         |                         |                         |                         |                         |                         |

<sup>7</sup> Billing data was bi-monthly. Usage was grouped into calendar years based on the ending date of the billing period. As a result, annual consumption may not match other sources depending on how year-end water use is accounted for.





### 5.1.2.1 Large Water Users

Refer to Chapter 2 (Table 2-3) for the list of the Large Water Users in CY 2019 (those using more than 30,000 gpd).

## 5.1.3 Non-Revenue Water

NRW is the difference between the volume of water produced and the volume of water consumed or metered. Though there are many reasons why production may exceed consumption, the most common include system losses including, but not limited to, leakage, measurement errors, and unauthorized use. While water utilities try to minimize NRW, it is difficult to eliminate entirely.

Table 5-3 summarizes the City's historical NRW between 2013 and 2019. NRW is calculated from production and consumption data (Table 5-1 and Table 5-2, respectively) except where available from validated American Water Works Association (AWWA) water audits. NRW falls generally between 9 and 11 percent, though it peaked at 15.4 percent in 2016. The average NRW from 2013 to 2019 is approximately 10.9 percent.

West Yost recommends using a NRW of 11 percent to calculate the City's total future water production requirement.

| <b>Table 5-3. Historical Non-Revenue Water<sup>(a)</sup></b>                                                                         |                              |                               |                        |                             |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------|------------------------|-----------------------------|
| <b>Calendar Year</b>                                                                                                                 | <b>Total Production, mgd</b> | <b>Total Consumption, mgd</b> | <b>Water Loss, mgd</b> | <b>Non-Revenue Water, %</b> |
| 2013                                                                                                                                 | 9.60                         | 8.76                          | 0.84                   | 8.8                         |
| 2014                                                                                                                                 | 8.70                         | 7.87                          | 0.84                   | 9.6                         |
| 2015                                                                                                                                 | 7.83                         | 7.75                          | 0.08                   | 10.5 <sup>(b)</sup>         |
| 2016                                                                                                                                 | 7.69                         | 7.12                          | 0.57                   | 15.4 <sup>(b)</sup>         |
| 2017                                                                                                                                 | 7.94                         | 7.72                          | 0.22                   | 9.6 <sup>(b)</sup>          |
| 2018                                                                                                                                 | 8.12                         | 8.09                          | 0.03                   | 11.2 <sup>(b)</sup>         |
| 2019                                                                                                                                 | 8.33                         | 7.43                          | 0.90                   | 10.8                        |
| <b>Average</b>                                                                                                                       | <b>8.32</b>                  | <b>7.82</b>                   | <b>0.50</b>            | <b>10.9</b>                 |
| (a) Refer to Table 5-1 and Table 5-2. Non-revenue water (NRW) equals Water Loss divided by Total Production, unless otherwise noted. |                              |                               |                        |                             |
| (b) NRW equals "Non-revenue water as percent by volume of Water Supplied" from City's water audits, received August 2020.            |                              |                               |                        |                             |

## 5.1.4 Per Capita Water Use

The City's historical per capita water use is presented in Table 5-4. While population continued to grow through the drought, per capita water use fell dramatically in 2015 and remained low in 2016 due to water conservation and mandatory water reduction measures implemented during the drought. Per capita water use rebounded slightly in 2017 and is holding steady but remains well below 2013 levels.



**Table 5-4. Historical Per Capita Water Use<sup>(a)</sup>**

| Calendar Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Population <sup>(b)</sup> | Total Production, mgd | Per Capita Water Use, gpcd |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------|----------------------------|
| 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 68,622                    | 9.60                  | 140                        |
| 2014                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 70,701                    | 8.70                  | 123                        |
| 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 73,632                    | 7.83                  | 106                        |
| 2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 74,766                    | 7.69                  | 103                        |
| 2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 74,922                    | 7.94                  | 106                        |
| 2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 75,083                    | 8.12                  | 108                        |
| 2019                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 77,961                    | 8.33                  | 107                        |
| <b>Average</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           |                       | <b>113</b>                 |
| <b>Average (excluding 2015 and 2016)<sup>(c)</sup></b>                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |                       | <b>117</b>                 |
| <p>(a) Refer to Table 5-1.</p> <p>(b) Population for 2013 through 2018 is from CA Department of Finance, E-4 Population Estimates (May 1, 2020). Population for 2019 is based on January 1, 2020 population from CA Department of Finance, E-1 Population Estimates (May 1, 2020).</p> <p>(c) Data from 2015 and 2016 were excluded due to mandatory water restrictions implemented by the State Water Resources Control Board during these two years.</p> <p>gpcd = gallons per capita per day</p> |                           |                       |                            |

As described in Section 5.2.1 below, the City's per capita water use in 2015 was well below (in compliance with) the City's 2015 per capita water use goal (164 gpcd) as required by the Water Conservation Act of 2009 and is on track to be in compliance with the City's 2020 per capita water use goal (146 gpcd).

### 5.1.5 Peaking Factors

Peak demands are used to evaluate and size water system pipelines and storage facilities and define water supply and capacity requirements. Projecting peak demands typically involves applying a multiplier, or peaking factor, to average day demand (ADD), which is calculated by dividing a year's total water production by the number of days in that year (refer to Table 5-1).

Recent water use data help refine peaking factors for key demand conditions. To account for NRW, production totals are used. This subsection describes the methodologies utilized to update the City's maximum day demand (MDD) and peak hour demand (PHD) peaking factors and presents their revised values.

#### 5.1.5.1 Maximum Day Demand Peaking Factor

The MDD peaking factor is calculated by dividing the calendar year's largest single day demand by the ADD of the same year. Under normal conditions, the City's water demands are served by supplies from either turnouts or pumped storage. As a result, determining daily demands requires data for both turnout flows and storage reservoir levels. Detailed historical reservoir information was unavailable, so West Yost reviewed daily flows from SFPUC and VW turnouts as a proxy for daily demands. Turnout flows are a valid substitute for demands if, as is assumed in this master plan, storage reservoir inflows are similar to pumped outflows over a 24-hour period.



Due to the different customer types in each service area, separate MDD peaking factors have been developed for the SFPUC and VW systems. The 2002 WMP (and the 2009 WMPU, which used the same peaking factors as in 2002) also acknowledged the impact of customer type on water use, going so far as to develop separate peaking factors for residential (1.9) and industrial/commercial (1.5) users. Data limitations preclude calculating land use-based peaking factors for this master plan. However, the portion of the City served by the SFPUC system has more residential customers, while the portion of the City served by the VW system has more industrial/commercial customers.

Based on daily turnout flows from 2016 through 2019, the recommended MDD peaking factor for the SFPUC system is 1.6. Table 5-5 summarizes the historical MDD peaking factors by calendar year, including the date and magnitude of maximum daily production. In 2019, the maximum day production was significantly higher than in previous years. On this date (June 20, 2019), VW turnout flows were less than 2,000 gallons, so it is assumed SFPUC turnouts were supplying the entire City (i.e., both SFPUC and VW service areas). Thus, the 2019 MDD peaking factor is excluded when determining the recommended MDD peaking factor for this master plan.

The City has observed especially high daily water use in Zones SF3 and SF4, so the MDD peaking factor will be doubled for those customers. As a result, the MDD peaking factor will be 1.6 for customers in Zones SF1 and SF2 and 3.2 for customers in Zones SF3 and SF4.

The recommended MDD peaking factor for the VW system is 1.9. This is based on daily turnout flows from 2017 through 2019, as 2016 data had some extreme outliers and thus was deemed less reliable. Maximum daily production was relatively consistent from 2017 to 2018 before jumping up significantly in 2019.

| Table 5-5. SFPUC Historical Maximum Day Demand Peaking Factors                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                             |                                             |                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------|---------------------------------------------|-----------------------------------|
| Calendar Year                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Maximum Day Demand Date <sup>(a)</sup> | Average Day Production <sup>(b)</sup> , mgd | Maximum Day Production <sup>(c)</sup> , mgd | Maximum Day Demand Peaking Factor |
| 2016                                                                                                                                                                                                                                                                                                                                                                                                                                                              | August 12                              | 4.71                                        | 7.10                                        | 1.51                              |
| 2017                                                                                                                                                                                                                                                                                                                                                                                                                                                              | October 15                             | 5.10                                        | 8.25                                        | 1.62                              |
| 2018                                                                                                                                                                                                                                                                                                                                                                                                                                                              | November 15                            | 5.16                                        | 8.09                                        | 1.57                              |
| 2019                                                                                                                                                                                                                                                                                                                                                                                                                                                              | June 20                                | 5.48                                        | 9.59                                        | 1.75                              |
| <b>Average</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        | <b>5.11</b>                                 | <b>8.26</b>                                 | <b>1.61</b>                       |
| <b>Average (excluding 2019)<sup>(d,e)</sup></b>                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        | <b>4.99</b>                                 | <b>7.81</b>                                 | <b>1.56</b>                       |
| <p>(a) SFPUC turnout flows used as a proxy for customer demands in Zones SF1 through SF4.</p> <p>(b) Refer to Table 5-1.</p> <p>(c) SFPUC daily production data provided by City in January 2020.</p> <p>(d) Data from 2019 excluded due to minimal VW flows on date of maximum SFPUC production (June 20, 2019).</p> <p>(e) Due to high peak water use in Zones SF3 and SF4, the maximum day demand peaking factor will be doubled for those pressure zones.</p> |                                        |                                             |                                             |                                   |



**Table 5-6. VW Historical Maximum Day Demand Peaking Factors**

| Calendar Year       | Maximum Day Demand Date <sup>(a)</sup> | Average Day Production <sup>(b)</sup> , mgd | Maximum Day Production <sup>(c)</sup> , mgd | Maximum Day Demand Peaking Factor |
|---------------------|----------------------------------------|---------------------------------------------|---------------------------------------------|-----------------------------------|
| 2016 <sup>(d)</sup> | --                                     | 3.00                                        | --                                          | --                                |
| 2017                | June 30                                | 2.84                                        | 4.90                                        | 1.73                              |
| 2018                | April 25                               | 2.96                                        | 5.26                                        | 1.78                              |
| 2019                | October 10                             | 2.84                                        | 6.64                                        | 2.34                              |
| <b>Average</b>      |                                        | <b>2.91</b>                                 | <b>5.60</b>                                 | <b>1.95</b>                       |

(a) VW turnout flows used as a proxy for customer demands in Zones VW1 and VW2.  
(b) Refer to Table 5-1.  
(c) VW daily production data provided by City in May 2020.  
(d) 2016 data incomplete.

### 5.1.5.2 Peak Hour Demand Peaking Factor

The PHD peaking factor is calculated by dividing the calendar year's largest single hour demand by the ADD of the same year. In the absence of hourly customer water use data for an entire year, the PHD peaking factor is typically estimated by applying diurnal curves during a maximum day demand. A diurnal curve reflects variations in water use over a 24-hour period and often has two demand peaks, one in the morning before residents leave home and another in the evening when they return home.

The City does not have the monitoring and reporting infrastructure in place to provide hourly water use data that would be required to develop a diurnal curve, so the recommended PHD peaking factor is based on West Yost's recent experience and typical PHD peaking factors determined for similar water systems. West Yost recommends a PHD peaking factor of 1.8 times MDD, which is slightly lower than the 2.0 peaking factor utilized in the 2009 WMPU. The recommended PHD peaking factor translates to 2.9 times ADD (1.6 x 1.8) for Zones SF1 and SF2, 5.8 times ADD (3.2 x 1.8) for Zones SF3 and SF4, and 3.4 times ADD (1.9 x 1.8) for the VW service area.

### 5.1.5.3 Summary of Recommended Peaking Factors

Table 5-7 summarizes the recommended peaking factors for each service area. As shown, the peaking factors represent multipliers applied to average day demands.

**Table 5-7. Recommended Peaking Factors**

| Service Area | Pressure Zones          | Maximum Day Demand Peaking Factor <sup>(a)</sup> | Peak Hour Demand Peaking Factor <sup>(a,b)</sup> |
|--------------|-------------------------|--------------------------------------------------|--------------------------------------------------|
| SFPUC        | SF1, SF2                | 1.6                                              | 2.9                                              |
| SFPUC        | SF3, SF4 <sup>(c)</sup> | 3.2                                              | 5.8                                              |
| VW           | VW1, VW2                | 1.9                                              | 3.4                                              |

(a) Peaking factors shown are applied to average day demand.  
(b) The Peak Hour Demand (PHD) peaking factor is calculated by multiplying the Maximum Day Demand (MDD) peaking factor by 1.8 as described in Section 5.1.5.2.  
(c) Due to high peak water use in Zones SF3 and SF4, peaking factors are doubled for those pressure zones.



## **5.2 WATER CONSERVATION**

Water conservation is a key component of water demands. Discussions regarding existing and potential future water conservation in the City are presented below. Additional detail regarding the City's conservation efforts are documented in the City's 2020 Urban Water Management Plan, which is currently being prepared.

### **5.2.1 Water Conservation Act of 2009**

In February 2008, the Governor called for a statewide 20 percent reduction in urban per capita water use by 2020 and asked state and local agencies to develop a more aggressive water conservation plan to achieve that goal. A team of state and federal agencies (the 20x2020 Agency Team) was formed to develop a statewide implementation plan.

Subsequently, the Water Conservation Act of 2009 (Senate Bill [SB] X7-7) was enacted in November 2009 as part of a comprehensive set of new Delta and water policy legislation requiring all water suppliers to increase their efficiency. Overall, the objective of SB X7-7 was to reduce statewide urban water use by 20 percent by the year 2020. SB X7-7 required water retailers to establish and adopt per capita water use targets (an interim target for 2015 and a final target for 2020) using defined methodologies. Adopted per capita water use targets were required to be included in the 2010 UWMPs and could be updated as part of the 2015 UWMPs. The City's adopted per capita water use targets are as follows:

- 2015 Interim Per Capita Water Use Target: 164 gpcd
- 2020 Final Per Capita Water Use Target: 146 gpcd

Compliance with the 2015 per capita water use target was required to be reported in the City's 2015 UWMP. In 2015, the City's actual per capita water use was 106 gpcd (refer to Table 5-4), well below (and in compliance with) the City's interim target for 2015. This was due in large part to the on-going drought conditions and associated mandatory water use restrictions in place in 2015. Based on recent water use trends, the City is expected to be in compliance with its 2020 (final) SB X7-7 per capita water use target.

### **5.2.2 "Making Water Conservation a California Way of Life"**

In May 2016, Governor Brown signed Executive Order B-37-16, instructing state agencies to help Californians adopt permanent changes to use water more wisely. The Executive Order laid out a framework for moving the state from temporary, emergency water conservation measures to a more lasting approach customized to the unique conditions of each local water agency.

In May 2018, the California State Legislature (Legislature) enacted two policy bills (SB 606 and Assembly Bill (AB) 1668) targeting long-term improvements in water conservation and drought planning that could withstand longer and more intense droughts resulting from climate change. These two bills expanded authorities and requirements to enable permanent changes and improve the state's water future. SB 606 and AB 1668 are direct outcomes of Governor Brown's Executive Order B-37-16.



The recommendations in the April 2017 report entitled “Making Water Conservation a California Way of Life, Implementing Executive Order B-37-16” and subsequent extensive legislative outreach efforts informed the development of SB 606 and AB 1668. The new laws focus on establishing water use objectives and long-term water efficiency standards that apply to urban retail water suppliers, including:

- **Indoor Residential Water Use:** Although not all standards have been developed, the indoor residential water use efficiency standard has been set by the Legislature. Until January 1, 2025, the standard is set at 55 gpcd, then it drops to the greater of 52.5 gpcd or a standard developed by the Department of Water Resources (DWR) between January 2, 2025 and January 1, 2030; and then the greater of 50 gpcd or a standard developed by DWR after January 1, 2030.
- **Outdoor Residential Water Use and Commercial, Industrial and Institutional (CII) Irrigation with Dedicated Meters:** Per SB 606 and AB 1668, the State Water Resources Control Board (SWRCB) is required to adopt long-term standards for outdoor irrigation of landscape areas by June 30, 2022. The standards to be set shall incorporate the principles of the Model Water Efficient Landscape Ordinance (MWELO), which considers evapotranspiration adjustment factors, landscape areas, maximum applied water allowance, reference evapotranspiration, and special landscape area.
- **Water Loss (due to leaks in water system pipes):** SB 555, passed in October 2015, requires the SWRCB to develop water loss performance standards for urban retail water suppliers. The SWRCB is required to evaluate the life-cycle cost of achieving these standards. The standards will incorporate local and operational conditions to determine economically achievable water loss reduction for each urban retail water supplier.

The recently passed water efficiency legislation only provides a “provisional standard” for indoor residential water use and does not currently provide specific information on what the water efficiency standards will be for outdoor residential water use and non-residential water uses. These standards will be developed in the coming years and should be further evaluated in subsequent planning studies. Also, there are no guarantees that urban retail water suppliers will meet the water efficiency standards to be set, so West Yost recommends that the City continue to consider more conservative water demand projections based on historical water use for their future water supply and system planning.

### 5.2.3 Current Water Conservation Programs

The City’s 2015 UWMP describes the water conservation measures that have been implemented by the City. A Water Waste Ordinance (Ordinance 240.4) was in effect during the recent drought, along with a Water Conservation Program to facilitate reporting of water waste. The City also implemented the following measures:

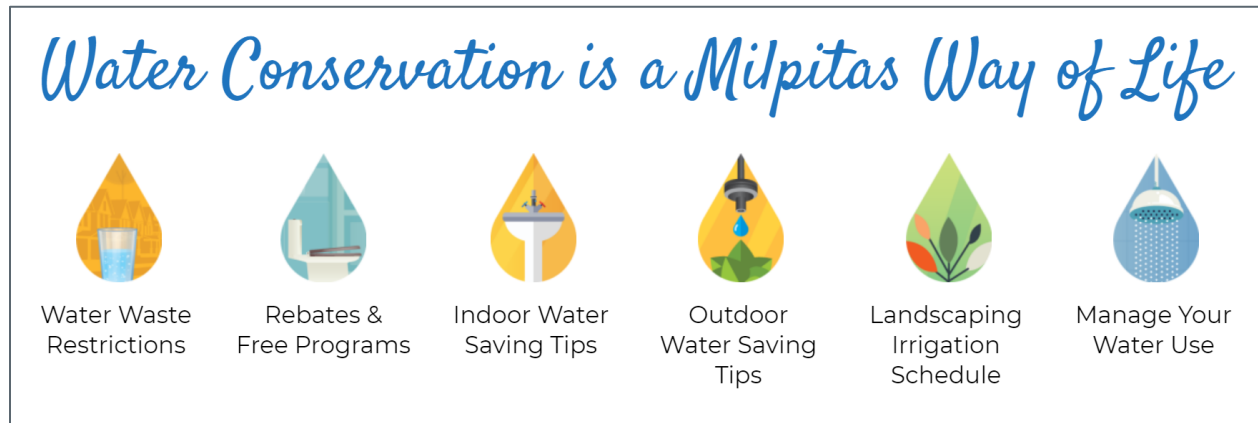
- Conservation pricing
- Public education and outreach in conjunction with Valley Water and the BAWSCA
- Residential water surveys
- Free low-flow plumbing fixtures
- Irrigation submeter rebates
- Landscape water surveys and conversion rebates
- High-efficiency clothes washer rebates





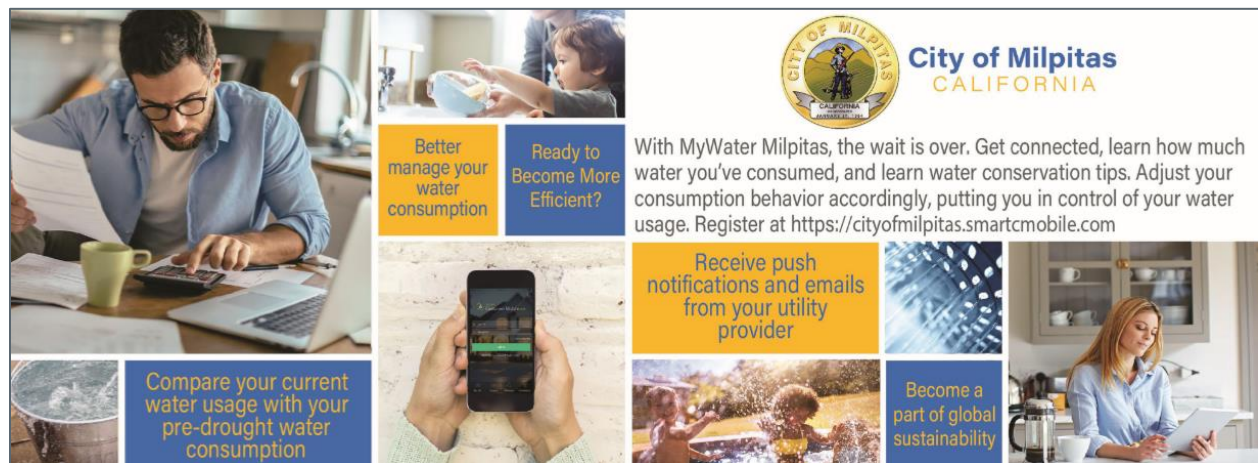
- Rebates for process, technology, and equipment retrofits that save water
- High-efficiency toilet and urinal valve replacement rebates

These water conservation measures continue to be implemented in the City.



*From [savewatermilpitas.org](https://savewatermilpitas.org)*

Current information on the City's water use restrictions and water conservation and rebate programs is posted on the City's water conservation webpage ([savewatermilpitas.org](https://savewatermilpitas.org)). In addition, the City's water customers have access to MyWater Milpitas which is an on-line tool that allows customers to track and manage their water consumption.



*From MyWater Milpitas*





## **5.3 FUTURE WATER DEMAND PROJECTION**

Future City water demands were projected based on land use data, the preferred method for water system master planning and hydraulic modeling. Population-based methods are appropriate for estimating overall water demands, but they fail to account for spatial variations in water use. In contrast, land-use based demand projections geographically allocate water use based on existing consumption and future development.

This section details the demand projection methodology and presents the associated results.

### **5.3.1 Demand Projection Methodology**

Buildout water demands equal the sum of existing demands and projected future demands as a result of new development. Demand projections are typically calculated based on land use, with expected land area multiplied by a WUF. WUFs are developed from recent historical consumption data and vary by land use type. In other words, WUFs recognize that a 10-acre industrial processing plant would use more water than a similarly sized office park.

Establishing appropriate WUFs is a critical step in forming reliable water demand projections. The adopted factors will be used to calculate future demands for growth areas in the City, as defined by the City's General Plan and other on-going planning efforts. Future demands will then be adjusted for NRW to determine the required future water production.

### **5.3.2 Water Use Factors**

A WUF is defined as the estimated water use per unit area of a given land use type. The following data was used to update WUFs:

- 2019 consumption data with service addresses (per billing records)
- Service address-Assessor's Parcel Number (APN) database
- General Plan land use parcel map with APNs (GIS file)

Water consumption was linked with spatially located land use based on customer service address and APN. Using a City-provided spreadsheet of customer service addresses and APNs, the 2019 water meter billing records were first linked to APNs using customer service addresses. Water usage could then be linked to land use via APN. Successfully assigning land use to a water billing record required a match for both service address and APN. Approximately 64 percent of 2019 demand could be linked.

West Yost developed preliminary WUFs for each existing General Plan land use designation by dividing the total linked water use by the total corresponding acreage. Due to the lower demand linkage rate, preliminary WUFs were refined by examining specific developments and estimated per capita water use based on estimated dwelling units per acre and people per dwelling unit. The City provided West Yost with a list of representative developments of various land uses (e.g., office park, apartment complex, commercial) to verify whether a development's actual consumption was in line with its WUF-based demand estimate. In addition, West Yost used General Plan density standards to compare per capita water use across residential and mixed use land use types and to the 2009 WMPU. Any WUFs that resulted in unusually high or low per capita consumption were adjusted accordingly. Most of the preliminary WUFs calculated from actual usage were only adjusted slightly to their recommended values. A handful of



preliminary WUFs (e.g., Urban Residential) were unusually low, likely due to limited linked water use for that land use, and increased to their recommended values.

Recommended WUFs are summarized in Table 5-8, along with a comparison to 2009 WMPU values (where available). WUFs are generally lower than in the 2009 WMPU, which is consistent with conservation efforts and efficiency improvements implemented over the last decade. For some land uses, limited data prevented updating WUFs, so the 2009 WMPU values were used. This is a conservative approach, as actual WUFs have likely decreased.

### 5.3.3 Water Demand Projection

West Yost developed water demand projections by applying the recommended WUFs to the future land use acreages detailed in Chapter 2. Total buildout demand is the sum of existing demands and new demands from future planned growth in Opportunity Areas and the Gateway and Milpitas Metro Specific Plan areas. Based on available data and to be conservative, growth was assumed to be new development, not redevelopment of existing developed areas, so future demands were added to existing demands. The land use-based demand projections are based on preliminary land use estimates that are subject to change as the City refines its planning documents.

Table 5-9 summarizes the buildout water demand projection. After adjusting for NRW, the City's projected water production required at buildout is approximately 13.9 mgd, or 15,600 af/yr. This is an increase of approximately 5.6 mgd, or 67 percent, over existing (2019) production (8.3 mgd).

The buildout water demand projection accounts for existing recycled water use but not additional recycled water use in either existing or future development areas. As discussed in Section 5.3.2, WUFs were based on actual potable water consumption, which reflects any existing recycled water use that would offset potable water use. However, the buildout water demand projection does not include any expanded recycled water use for irrigation or other non-potable uses. Increased recycled water use would mean that actual buildout water demands should be lower than the current projection. Since information on future development remains conceptual, the location and magnitude of future recycled water use are difficult to estimate. As a result, West Yost recommends proceeding with this conservative demand projection.

On a per capita basis, the projected future water use equates to 119 gpcd, slightly higher than the City's 2019 per capita water use (107 gpcd). Using U.S. Census data from 2014 to 2018, the City's household population density averages approximately 3.33 people per dwelling unit (DU). Assuming future housing densities will be similar to existing densities, adding 11,650 new DUs translates to approximately 38,794 new residents, for a total buildout population of approximately 116,755. Dividing the projected buildout demand (13.9 mgd) by the projected future population yields an overall per capita water use of approximately 119 gpcd, similar to the City's recent per capita water use average for the last several years (117 gpcd, see Table 5-4).

In the absence of specific timing for future development, required water production for intermediate planning years was linearly interpolated. Table 5-10 summarizes the land use-based water production projections in five-year increments through buildout (2040).



**Table 5-8. Recommended Water Use Factors**

| Category    | Existing General Plan Land Use <sup>(a)</sup> | Abbreviation <sup>(a)</sup> | Recommended WUF, gpd/ac | 2009 WMPU WUF, gpd/ac | Percent Difference from 2009 WMPU |
|-------------|-----------------------------------------------|-----------------------------|-------------------------|-----------------------|-----------------------------------|
| Residential | Hillside Very Low Density                     | HVL                         | 300                     | 800                   | -63                               |
|             | Hillside Low Density                          | HLD                         | 300                     | 800                   | -63                               |
|             | Hillside Medium Density                       | HMD                         | 600                     | 800                   | -25                               |
|             | Single Family Low Density                     | SFL/LDR                     | 1,300                   | 2,240                 | -42                               |
|             | Single Family Medium Density                  | SMD                         | 2,400                   | NA <sup>(b)</sup>     | --                                |
|             | Multi-Family Medium Density                   | MFM/MDR                     | 2,300                   | NA <sup>(b)</sup>     | --                                |
|             | Multi-Family High Density                     | MFH/HDR                     | 4,500                   | 5,310                 | -15                               |
|             | Multi-Family Very High Density                | VHD/VHDR                    | 9,000                   | 9,720                 | -7                                |
|             | Urban Residential                             | URR                         | 4,500                   | NA <sup>(b)</sup>     | --                                |
|             | Mobile Home Park                              | MHP                         | 825                     | NA <sup>(b)</sup>     | --                                |
| Mixed Use   | Mixed Use                                     | MXD                         | 10,890                  | 10,890                | 0 <sup>(c)</sup>                  |
|             | Residential Retail High Density Mixed Use     | RRMU                        | 10,890                  | NA <sup>(b)</sup>     | --                                |
|             | Boulevard Very High Density Mixed Use         | BVMU/VHDMU                  | 10,890                  | NA <sup>(b)</sup>     | --                                |
|             | Neighborhood Commercial Mixed Use             | NCMU                        | 2,100                   | NA <sup>(b)</sup>     | --                                |
| Commercial  | Professional & Administrative Office          | PAO                         | 3,200                   | 3,200                 | 0 <sup>(c)</sup>                  |
|             | Retail Subcenter                              | RSC                         | 2,800                   | 4,290                 | -35                               |
|             | General Commercial                            | GNC                         | 1,400                   | 2,400                 | -42                               |
|             | Highway Service                               | HWS                         | 2,000                   | NA <sup>(b)</sup>     | --                                |
|             | Town Center                                   | TWC                         | 2,100                   | NA <sup>(b)</sup>     | --                                |
|             | Neighborhood Commercial                       | NC                          | 1,400                   | NA <sup>(b)</sup>     | --                                |
| Industrial  | Manufacturing                                 | MFG                         | 2,000                   | 2,000                 | 0 <sup>(c)</sup>                  |
|             | Industrial Park                               | INP                         | 400                     | 1,250                 | -68                               |
|             | Business Park/Research & Development          | BPRD                        | 400                     | NA <sup>(b)</sup>     | --                                |
| Public      | Public Facilities                             | PF                          | 600                     | 1,000                 | -40                               |
|             | Permanent Open Space                          | POS                         | 1,300                   | 1,300                 | 0 <sup>(c)</sup>                  |
|             | Waterway                                      | WW                          | 1,300                   | NA <sup>(b)</sup>     | --                                |

(a) Categories and abbreviations based on land use information provided by the City in January 2020. Multiple abbreviations reflect existing and future iterations of the same land use category. The future abbreviation is listed second.

(b) NA = not applicable. WUF for this land use was not specified in the 2009 WMPU.

(c) WUF was not updated due to limited data.

**Table 5-9. Buildout Potable Water Demand Projection**

| Development                                                | Land Use Designation <sup>(a)</sup> | Total Acres <sup>(a)</sup> | WUE <sup>(b)</sup> , gpd/ac | Demand, mgd |
|------------------------------------------------------------|-------------------------------------|----------------------------|-----------------------------|-------------|
| <b>Opportunity Areas - Residential</b>                     |                                     |                            |                             |             |
| Sunny Hills Neighborhood Node/Commercial Center            | NCMU                                | 19.92                      | 2,100                       | 0.04        |
| California Circle                                          | NCMU                                | 54.10                      | 2,100                       | 0.11        |
| California Circle                                          | HDR                                 | 18.26                      | 4,500                       | 0.08        |
| Landess Neighborhood Node/Commercial Center                | NCMU                                | 38.03                      | 2,100                       | 0.08        |
| Calaveras & North Park Neighborhood Node/Commercial Center | NCMU                                | 28.28                      | 2,100                       | 0.06        |
| Milpitas Town Center                                       | HDR                                 | 38.07                      | 4,500                       | 0.17        |
| Subtotal                                                   |                                     |                            |                             | 0.55        |
| <b>Opportunity Areas - Non-Residential</b>                 |                                     |                            |                             |             |
| McCarthy Ranch Industrial Area                             | INP                                 | 192.29                     | 400                         | 0.08        |
| Southwestern Employment Area                               | BPRD                                | 488.26                     | 400                         | 0.20        |
| Central Manufacturing Area - North                         | MFG                                 | 492.14                     | 2,000                       | 0.98        |
| Jacklin & 680 Neighborhood Node/Commercial Center - East   | NC                                  | 7.95                       | 1,400                       | 0.01        |
| Jacklin & 680 Neighborhood Node/Commercial Center - West   | NC                                  | 6.42                       | 1,400                       | 0.01        |
| Jacklin Neighborhood Node/Commercial Center                | NC                                  | 9.79                       | 1,400                       | 0.01        |
| Subtotal                                                   |                                     |                            |                             | 1.29        |
| <b>Milpitas Gateway-Main Street Specific Plan</b>          |                                     |                            |                             |             |
| HDR Subset of Gateway-Main Street                          | HDR                                 | 46.70                      | 4,500                       | 0.21        |
| VHDR Subset of Gateway-Main Street                         | VHDR                                | 74.58                      | 9,000                       | 0.67        |
| MDR Subset of Gateway-Main Street                          | MDR                                 | 62.70                      | 2,300                       | 0.14        |
| Non-Residential Subset of Gateway-Main Street              | MFG                                 | 300.30                     | 2,000                       | 0.60        |
| Subtotal                                                   |                                     |                            |                             | 1.63        |
| <b>Milpitas Metro Specific Plan (MMSP)</b>                 |                                     |                            |                             |             |
| VHDR Subset of Metro Plan Area                             | VHDR                                | 99.00                      | 9,000                       | 0.89        |
| HDR Subset of Metro Plan Area                              | HDR                                 | 113.52                     | 4,500                       | 0.51        |
| NC Subset of Metro Plan Area                               | NC                                  | 85.35                      | 1,400                       | 0.12        |
| Subtotal                                                   |                                     |                            |                             | 1.52        |
| Total New Demand                                           |                                     |                            |                             | 4.99        |
| NRW (11%)                                                  |                                     |                            |                             | 0.62        |
| New Water Production Required                              |                                     |                            |                             | 5.60        |
| Existing (2019) Water Production                           |                                     |                            |                             | 8.33        |
| <b>Buildout Water Production Required</b>                  |                                     |                            |                             | <b>13.9</b> |

(a) Refer to Table 2-4.

(b) Refer to Table 5-8.



**Table 5-10. Land Use-Based Water Demand Projection for Intermediate Planning Years**

| Year                | Required Water Production |        |
|---------------------|---------------------------|--------|
|                     | mgd                       | af/yr  |
| 2020                | 8.33                      | 9,334  |
| 2025                | 9.73                      | 10,904 |
| 2030                | 11.1                      | 12,474 |
| 2035                | 12.5                      | 14,044 |
| 2040 <sup>(a)</sup> | 13.9                      | 15,614 |

(a) Refer to Table 5-9.

## 5.3.4 Comparison with Other Demand Projections

### 5.3.4.1 2009 WMPU and 2015 UWMP

Table 5-11 compares current projections with the 2009 WMPU and the 2015 UWMP. At buildout (2040), the land use-based water demand projection presented above is approximately 3.5 mgd lower than projections from the 2009 WMPU. This represents a decrease of approximately 20 percent. The 2009 WMPU did not specify a growth timeline or buildout year, so intermediate planning year demands are blank in the table. Further, it was assumed the 2009 WMPU “future” coincides with the year 2040.

Demand projections in the 2015 UWMP follow the same timeline as this master plan. Throughout the planning horizon, the demand projections from this master plan are significantly lower than demand projections from the 2015 UWMP. At buildout (2040), demand projections are 4.6 mgd (about 25 percent) lower than the 2015 UWMP. Based on the available information, it is not clear why the demand projections in the 2015 UWMP were so high.

**Table 5-11. Land Use-Based Water Demand Projection Comparison with Previous City Reports**

| Source                                | Projected Demand, mgd |                   |                   |                   |      |
|---------------------------------------|-----------------------|-------------------|-------------------|-------------------|------|
|                                       | 2020                  | 2025              | 2030              | 2035              | 2040 |
| 2020 Water Master Plan <sup>(a)</sup> | 8.33                  | 9.73              | 11.1              | 12.5              | 13.9 |
| 2009 WMPU <sup>(b)</sup>              | -- <sup>(c)</sup>     | -- <sup>(c)</sup> | -- <sup>(c)</sup> | -- <sup>(c)</sup> | 17.4 |
| Difference vs. 2009 WMPU              | NA <sup>(d)</sup>     | NA <sup>(d)</sup> | NA <sup>(d)</sup> | NA <sup>(d)</sup> | -3.5 |
| 2015 UWMP <sup>(e)</sup>              | 10.0                  | 12.1              | 14.3              | 16.4              | 18.5 |
| Difference vs. 2015 UWMP              | -1.7                  | -2.4              | -3.2              | -3.9              | -4.6 |

(a) Refer to Table 5-10.

(b) Source: 2009 WMPU, Table 3-6 (Scenario 3). It is assumed future demand in the 2009 WMPU equals demand in year 2040.

(c) 2009 WMPU did not specify a timeline for demands.

(d) NA = not applicable.

(e) Source: 2015 UWMP, Table 4-2.



#### **5.3.4.2 BAWSCA Regional Water Demand and Conservation Projections Demand Forecast for 2020 UWMP**

Maddaus Water Management, Inc. (Maddaus) prepared a Regional Water Demand and Conservation Projections Project for the BAWSCA to support each member agency's preparation of their 2020 UWMPs. In February 2020, Maddaus prepared a technical memorandum (Technical Memorandum #2) to present the following: (1) the demand projection analysis methodology; (2) the demand analysis results including each BAWSCA member agency demand projections through 2045; and (3) the projections verification process to be completed and signed by each member agency to accept the demand projections.

The demand projection update for each BAWSCA member agency uses a combination of two different analytic models – the Econometric Model and the Least Cost Planning Decision Support System (DSS Model). The purpose of using two tools is to leverage the strengths of each tool to obtain a suite of demand recovery scenarios through the year 2045.

- The Econometric Model estimates the impact of various conditions on service area water demand. The model uses historical patterns to project the future rebound in demand associated with post-drought recovery, while taking into account other factors such as economy, rate increases, conservation activity, and weather. Since the Econometric Model is calibrated using historical data, its reliability depends on the historical relationship between water demand and its influencing factors remaining unchanged from the calibration period to the forecasting period.
- The DSS Model can accommodate historical and projected information reflecting how future service area and water use characteristics may differ from the past in each of the BAWSCA member service areas. Further into the future, changes in demographics, living patterns, housing stock, and industrial structure can alter the historical relationship with water demand. To accommodate all of these considerations, a number of scenarios were generated to model the post-drought demand recovery, including one scenario per member agency generated by each agency's respective Econometric Model. The DSS Model also has a conservation component that quantifies savings from plumbing codes and active conservation programs.

The Econometric Model for each BAWSCA member agency was used to generate water demand forecasts to the year 2023. The Econometric Model assumes temporary behavioral changes encouraged during the drought return to pre-drought norms. However, the water savings emanating from historical water rate increases and active conservation programs (e.g., non-behavior-based programs such as rebates) achieved through 2018 are assumed to be permanent and therefore do not rebound. The model assumes that the predicted demand recovery will occur gradually over an additional five years (2019-2023), based on BAWSCA's historical experience of the 1987-1992 drought.

The DSS Model was used to generate long-term demand forecasts for each BAWSCA member agency for 2019 to 2045. The DSS Model also includes a conservation component that quantifies savings from passive conservation (e.g., plumbing codes) and active conservation programs. The DSS Model's conservation component covers the entire forecast period of 2019-2045.

The City provided historical water use data and confirmed population and employment projections to be used by Maddaus for the demand projections. The resulting demand projections for the City, which include both potable and non-potable (i.e., recycled water) uses, are presented in Table 5-12.



**Table 5-12. City of Milpitas Demand Projections as Calculated by Maddaus<sup>(a)</sup>**

| Demand Forecast Scenario <sup>(b)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Demand Projections, mgd |      |      |      |      |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------|------|------|------|------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2023                    | 2025 | 2030 | 2035 | 2040 | 2045 |
| Pre-Recession and Pre-Drought Demand Level Recovery                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 11.4                    | 12.0 | 12.3 | 12.8 | 13.1 | 13.5 |
| Pre-Drought Demand Level Recovery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10.7                    | 11.1 | 11.4 | 11.9 | 12.3 | 12.6 |
| Partial Rebound – Normal Economy, Weather Normalized                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 11.3                    | 11.9 | 12.4 | 13.0 | 13.5 | 14.0 |
| Current Water Demand Profile – Normal Economy, Weather Normalized                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 9.4                     | 9.5  | 9.5  | 10.3 | 10.7 | 11   |
| <p><i>Source: Technical Memorandum #2 BAWSCA Regional Water Demand and Conservation Projection Demand Forecast, prepared for Bay Area Water Supply &amp; Conservation Agency, prepared by Maddaus Water Management, Inc., February 21, 2020</i></p> <p>(a) These demand projections include non-potable (i.e., recycled water) use (approximately 2 mgd by 2045). Savings from active conservation programs are not included in these projections.</p> <p>(b) See text below for description of demand forecast scenarios.</p> |                         |      |      |      |      |      |

The demand forecast scenarios are described as follows:

- **Pre-Recession and Pre-Drought Demand Level Recovery:** Demand projections are based on the City's 2000-2007 water use profile, starting with 2018 demand levels and recovering from the drought in five years.
- **Pre-Drought Demand Level Recovery:** Demand projections are based on the City's 2004-2013 water use profile, starting with 2018 demand levels and recovering from the drought.
- **Partial Rebound–Normal Economy, Weather Normalized:** Demand projections are based on the Econometric Model with the following assumptions: (1) normal weather, (2) normal economy, (3) price escalation projections that vary by agency, (4) historical active conservation efforts, and (5) passive conservation plumbing codes.
- **Current Water Demand Profile:** Demand projections are based on the following assumptions: (1) normal economy, and (2) weather normalized. This is water demand calculated from historical 2018 water production data submitted by each BAWSCA member agency. The 2018 data were weather normalized and assume a normal economy. This scenario does not include any additional post-drought demand recovery.

Savings from plumbing codes (also known as passive conservation) is based on federal and state legislated efficiency standards pertaining to plumbing fixtures and appliances. The impact of codes quantified here include the Energy Policy Act of 1992, CALGreen Building Code, AB 715, and SB 407 (governs the types of fixtures available on the market for toilets, showers, washers, etc.). The plumbing code savings have been added into all four scenarios shown above.

Though the BAWSCA projections include recycled water use and extend to 2045, five years beyond the scope of this Water Master Plan, the buildout demand projections are comparable. As discussed in Section 5.3.3, the Water Master Plan land use-based water demand projection counts any potential new (i.e., above existing) recycled water use as potable water use. Therefore, the projection of 13.9 mgd generally compares well with the Maddaus demand projections, particularly the Partial Rebound – Normal Economy, Weather Normalized scenario demand projection of 14.0 mgd.



## CHAPTER 6

# Hydraulic Model Update and Calibration

This chapter describes the process of updating and calibrating the City’s water system hydraulic model to confirm it accurately represents the City’s existing water system. The hydraulic model was then used to evaluate the adequacy of the City’s water system under existing (Chapter 8) and future (Chapter 9) water demand scenarios.

The following sections detail the hydraulic model update and calibration process:

- Hydraulic Model Background
- Hydraulic Model Element Naming Scheme
- Hydraulic Model Update Methodology
- Hydraulic Model Review and Update
- Steady-State Hydraulic Model Calibration
- Summary of Findings and Conclusions

## 6.1 HYDRAULIC MODEL BACKGROUND

As part of the 2002 WMP, Raines, Melton & Carella (RMC) developed an operational water system hydraulic model for the City using H<sub>2</sub>ONet. In the 2009 WMPU, RMC converted the hydraulic model to H<sub>2</sub>OMAP and re-evaluated the City’s water system using updated land use information. This H<sub>2</sub>OMAP-based hydraulic model has not been regularly updated since the 2009 WMPU.

In 2017, Innovyze retired the H<sub>2</sub>OMAP modeling platform in favor of InfoWater. As a result, West Yost rebuilt the City’s hydraulic model in InfoWater using the latest information for major facilities (e.g., pumps, storage reservoirs, and valves) provided by the City.

## 6.2 HYDRAULIC MODEL ELEMENT NAMING SCHEME

A specific and consistent naming convention allows modelers to easily locate and identify modeling elements like pipes, junctions, pumps, and storage reservoirs. As each facility is created in the model, it is named logically and sequentially based on industry standards and West Yost’s extensive modeling experience. Table 6-1 summarizes the hydraulic element functions, along with prefixes used in naming.

## Chapter 6

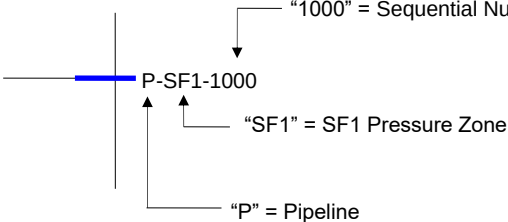
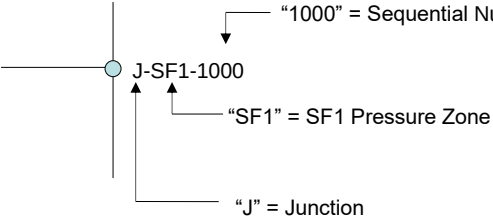
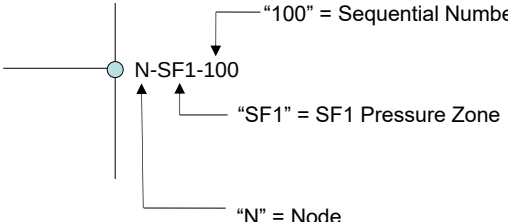
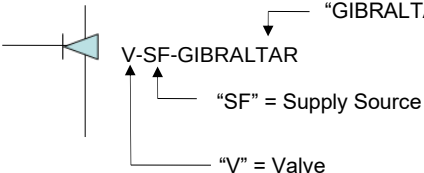
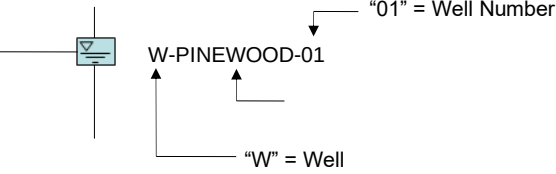
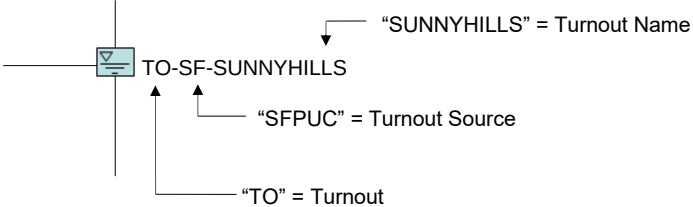
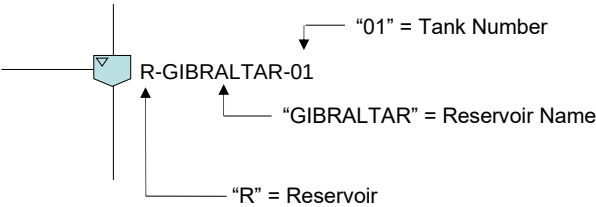
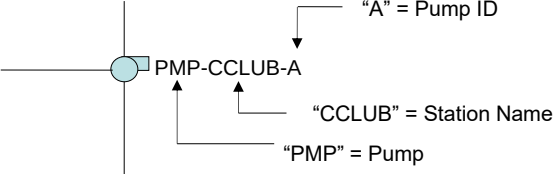
### Hydraulic Model Update and Calibration



**Table 6-1. Hydraulic Network Elements**

| Type               | Description                                                                                                                                                                                                                     | Prefix |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Pipelines          | Conveys water from one node to another. Pipelines are assigned hydraulic characteristics (e.g., diameter, roughness) and general information (e.g., pressure zone, year of installation).                                       | P      |
| Junctions          | Removes (demand) or adds (inflow) water from/to the system. Junctions represent connections to customer service laterals, hydrants, turnouts, etc.                                                                              | J      |
| Nodes              | Represents either a transition in pipeline characteristic (e.g., change in diameter) or a point where pressure and/or water quality are monitored. Nodes are similar to junctions but do not add or remove water to the system. | N      |
| Valves             | Controls flow or pressure in the system based on specified criteria. Valves typically represent pressure reducing valves (PRV) or pump variable frequency drives, using pressure settings provided by the City.                 | V      |
| Wells              | A water source with fixed head, representing the hydraulic grade of the groundwater.                                                                                                                                            | W      |
| Turnouts           | A water source with fixed head, representing the incoming hydraulic grade from the supplier.                                                                                                                                    | TO     |
| Storage Reservoirs | Represents storage capacity. Storage reservoir characteristics (e.g., dimensions, capacity, elevation, operating levels) are based on information from the City.                                                                | R      |
| Pumps              | Raises the hydraulic grade to overcome elevation differences and friction losses. Pump operation is based on pump curves or design points provided by the City.                                                                 | PMP    |

Table 6-2 details the model’s naming scheme, which is primarily based on the hydraulic element prefix.

| Table 6-2. Naming Scheme for Hydraulic Model Network Elements |                                                                                                                                                                                |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model Element                                                 | Naming Scheme                                                                                                                                                                  |
| Pipelines                                                     |  <p>“1000” = Sequential Numbering</p> <p>“SF1” = SF1 Pressure Zone</p> <p>“P” = Pipeline</p> |
| Junctions                                                     |  <p>“1000” = Sequential Numbering</p> <p>“SF1” = SF1 Pressure Zone</p> <p>“J” = Junction</p> |
| Nodes                                                         |  <p>“100” = Sequential Numbering</p> <p>“SF1” = SF1 Pressure Zone</p> <p>“N” = Node</p>     |
| Valves                                                        |  <p>“GIBALTAR” = Station Name</p> <p>“SF” = Supply Source</p> <p>“V” = Valve</p>           |
| Wells                                                         |  <p>“01” = Well Number</p> <p>“W” = Well</p>                                               |
| Turnouts                                                      |  <p>“SUNNYHILLS” = Turnout Name</p> <p>“SFPUC” = Turnout Source</p> <p>“TO” = Turnout</p>  |
| Storage Reservoirs                                            |  <p>“01” = Tank Number</p> <p>“GIBALTAR” = Reservoir Name</p> <p>“R” = Reservoir</p>       |
| Pumps                                                         |  <p>“A” = Pump ID</p> <p>“CCLUB” = Station Name</p> <p>“PMP” = Pump</p>                    |



## **6.3 HYDRAULIC MODEL UPDATE METHODOLOGY**

To rebuild and update the City's water system hydraulic model, West Yost performed the following key tasks:

- Imported existing pipelines from City's geographical information system (GIS) database
- Added new pipelines near the new Milpitas BART station, which were not in the GIS database when it was initially received and imported into the model
- Updated existing and added new water system facilities (e.g., storage reservoirs, booster pump stations, pressure regulating valves, and wells)
- Allocated existing water demands using the City's spatially located meter and billing information
- Performed field hydrant testing within the distribution system on March 11, 2020
- Deployed Hydrant Pressure Recorders (HPRs) throughout the distribution system to record system pressures from March 10 through April 1, 2020
- Calibrated the hydraulic model with the results from data collected during the hydrant testing
- Verified that the hydraulic model system configuration is generally representative of the City's current water system based on system pressures, flows, and tank elevations recorded in the field and from the City's charts and Supervisory Control and Data Acquisition (SCADA) system

As part of these efforts, West Yost coordinated closely with the City to obtain and review:

- Information on existing water supply turnouts, storage reservoirs, booster pump stations, pressure regulating valves, wells, and other water system facilities
- As-built drawings associated with water system improvements implemented since 2002, especially adjacent to the new BART station
- City's GIS database of water system facilities (e.g., pipelines, wells, booster pump stations, etc.), received January 2020
- Metered water consumption information
- Historical SFPUC and VW turnout data
- Historical circular chart and SCADA system data



## 6.4 HYDRAULIC MODEL REVIEW AND UPDATE

The following sections detail specific steps taken to rebuild the hydraulic model in InfoWater and accurately represent the City’s existing water system.

### 6.4.1 Pipeline Import and Update

The City engaged HydroScience to update its GIS-based pipeline records by reviewing recent as-builts, reconciling any discrepancies, and adding any missing alignments. After completing this task, HydroScience transmitted the pipeline shapefiles (one for each pressure zone) to West Yost. The shapefiles, which contained only distribution mains, were then imported to InfoWater via the “Import Manager” tool.

West Yost also checked the pipeline network for connectivity issues using InfoWater’s built-in network review tools. This multi-step process identified and helped resolve parallel pipes (i.e., inadvertent duplicates), pipes that should be connected, and pipes that cross but do not intersect.

### 6.4.2 Pipeline Roughness Factors

Pipeline roughness is represented by a coefficient, known as a C-factor, with higher values corresponding to smoother surfaces. Ideally, C-factors are assigned to pipelines based on material, diameter, and age. In the 2009 WMPU, all pipelines were assigned a roughness coefficient of 120. West Yost assigned preliminary C-factors to pipelines in the hydraulic model based on material and diameter, using an in-house database of C-factors developed from previous hydrant testing performed for numerous water systems. These preliminary C-factors, which were refined as part of the hydraulic model calibration process (Section 6.5), are presented in Table 6-3.

| <b>Table 6-3. Preliminary Pipeline C-factors Assigned in the Hydraulic Model</b> |              |                     |                     |
|----------------------------------------------------------------------------------|--------------|---------------------|---------------------|
| Pipeline Material                                                                | Abbreviation | C-Factor            |                     |
|                                                                                  |              | Diameter ≤ 8 inches | Diameter > 8 inches |
| Asbestos Cement                                                                  | AC / ACP     | 120                 | 130                 |
| Concrete Cylinder                                                                | CCP          | _(a)                | 130                 |
| Cast Iron                                                                        | CIP          | 100                 | 110                 |
| Ductile Iron                                                                     | DIP          | 130                 | 140                 |
| Polyvinyl Chloride                                                               | PVC          | 140                 | 150                 |
| Steel                                                                            | STL          | 120                 | 130                 |
| (a) Material in this diameter range does not exist in City system.               |              |                     |                     |



### 6.4.3 System Elevations

Junction elevations in the hydraulic model are based on 1-foot contours<sup>8</sup> developed by VW using LiDAR. ESRI tools were used to interpolate between contours and create a detailed grid map (i.e., raster) of elevations in the City service area. Finally, InfoWater’s “Elevation Extractor” tool used the raster map to assign elevations to each junction.

For facility sites (e.g., pump stations and storage tanks), junction elevations were further refined per available as-built drawings. Where elevation or depth information was missing from as-built drawings, junction elevations were unchanged from their original, raster-based values.

### 6.4.4 Existing System Facilities

West Yost reviewed City-provided as-built drawings for existing system facilities and added them to the hydraulic model. These include water supply turnouts, storage reservoirs, pump stations, PRVs, and the Pinewood Well. Operational parameters, including pump curves, PRV settings, and storage reservoir levels, were also confirmed with City staff.

In some cases, “equivalent” facilities were used in the model to simplify functionality without compromising simulation accuracy. For example, turnouts are represented by fixed head reservoirs using the hydraulic grade line of the source supply (SFPUC or VW). Additionally, pressure reducing valves are used to represent the discharge pressure setting for variable speed pumps.

### 6.4.5 Spatially Located Meter Accounts

The first step in spatially locating water consumption involved linking billed water consumption to spatially located meters using a unique identifier. The City provided West Yost bimonthly water billing data listing the consumption, service address, unique billing code (i.e., Location\_ID), meter type, and billing period for each customer account from 2013 through 2019. Many (but not all) meters in a City-provided water meter GIS file contained this same Location\_ID. Using this unique identifier, approximately 77 percent of 2019 demand was spatially located. Ideally, at least 95 percent of demand is spatially located, so additional effort was required.

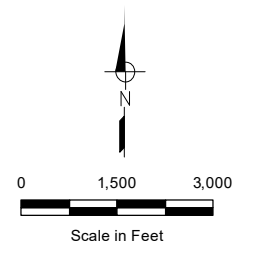
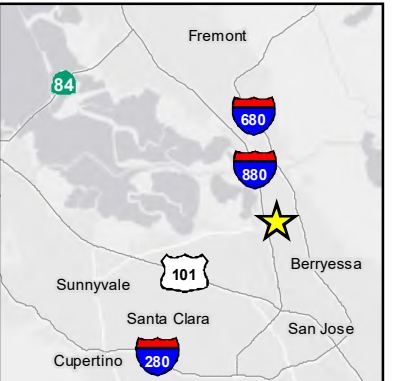
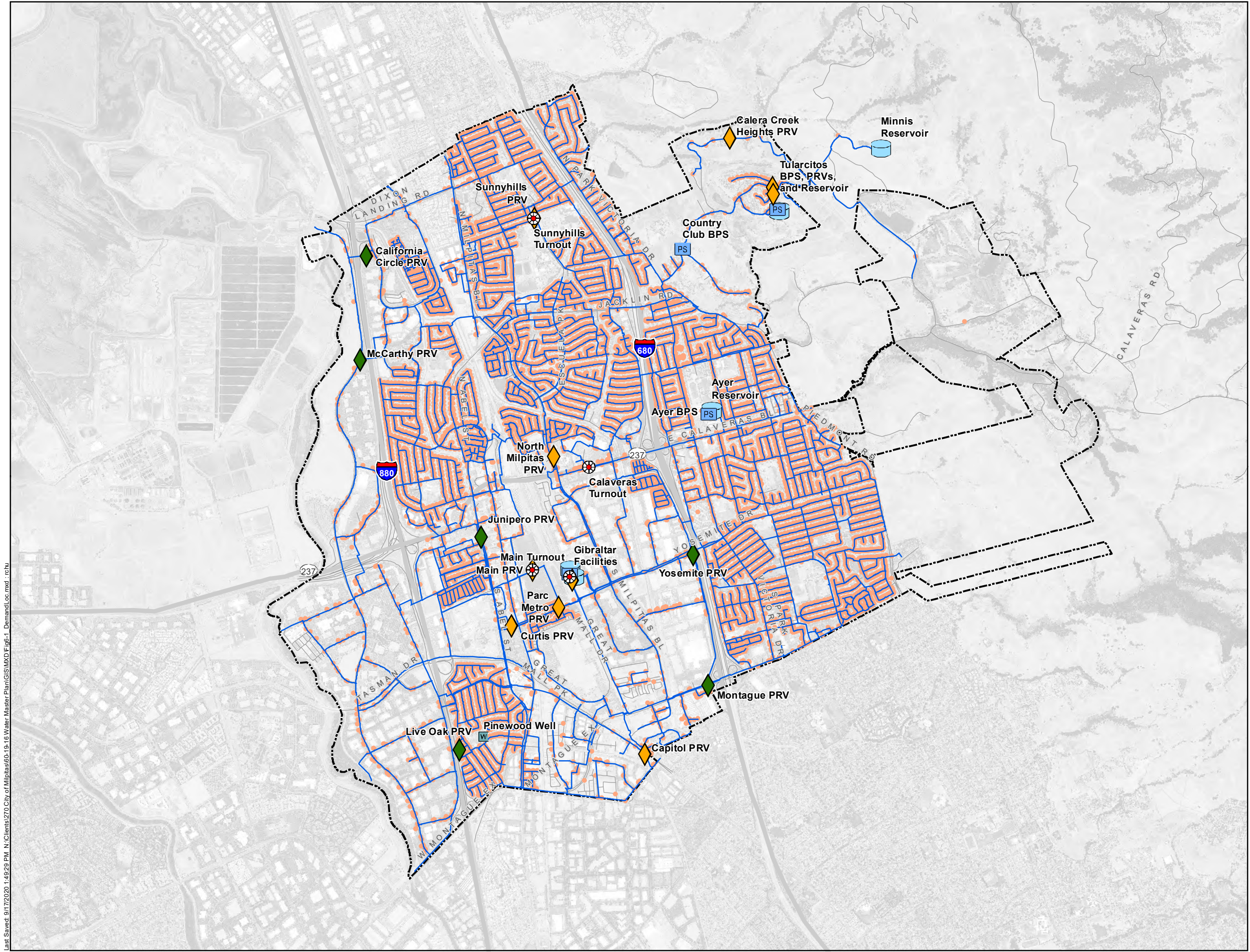
To spatially locate the consumption that could not be linked using Location\_IDs, West Yost utilized ESRI’s “Geocode Addresses” tool. In short, this tool spatially locates addresses based on a user-provided street database containing details like street name, suffix, direction, and address numbers on each side of the street. Another 21 percent of demand was geocoded, resulting in a total of over 98 percent of demand being spatially located. Figure 6-1 shows the spatial distribution of metered consumption in the hydraulic model.

The goal is to spatially locate production, equal to consumption plus NRW. To this end, spatially located demands were globally scaled up to match the total 2019 consumption. Then, 2019 NRW was added to each location as a fixed proportion of consumption. The final demand included in the hydraulic model equals the City’s average daily water production in 2019 (8.3 mgd).

---

<sup>8</sup> Valley Water Contours downloaded on 2/25/2020 from <http://gis.valleywater.org/Download/LIDAR/>





- Spatially Located Demand
- Turnout
- Well
- Pressure Reducing Valve
- Emergency Pressure Reducing Valve
- Pump Station
- Storage Reservoir
- Pipeline
- City Limits



**Figure 6-1**  
**Spatially Located**  
**Water Demands**

Last Saved: 9/17/2020 1:49:29 PM N:\Clients\270 City of Milpitas\60-19-16 Water Master Plan\GIS\MXD\Fig-1 Demand Loc.mxd : rctu





## 6.4.6 Water Demand Allocation

InfoWater’s “Demand Allocator” tool assigns spatially located demands to the closest junction. Some junctions were excluded from the tool, including those on transmission mains (which typically do not have service connections) or facility sites (e.g., at a pump station). West Yost staff then reviewed the junctions with demands to confirm correct allocation with respect to service area and pressure zone.

The following demand sets were created in the model:

- **EX\_ADD:** 2019 average day demand (8.3 mgd)
- **HT\_BASE:** Average day demand for hydrant test day (3/11/2020; 8.4 mgd)

The “EX\_ADD” demand set was used as the basis to create the “HT\_BASE” demand set, which was scaled to equal the average demand on March 11, 2020 and used for steady-state calibration.

## 6.5 STEADY-STATE HYDRAULIC MODEL CALIBRATION

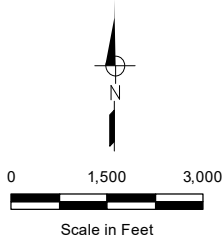
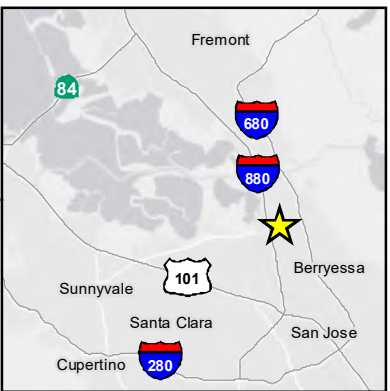
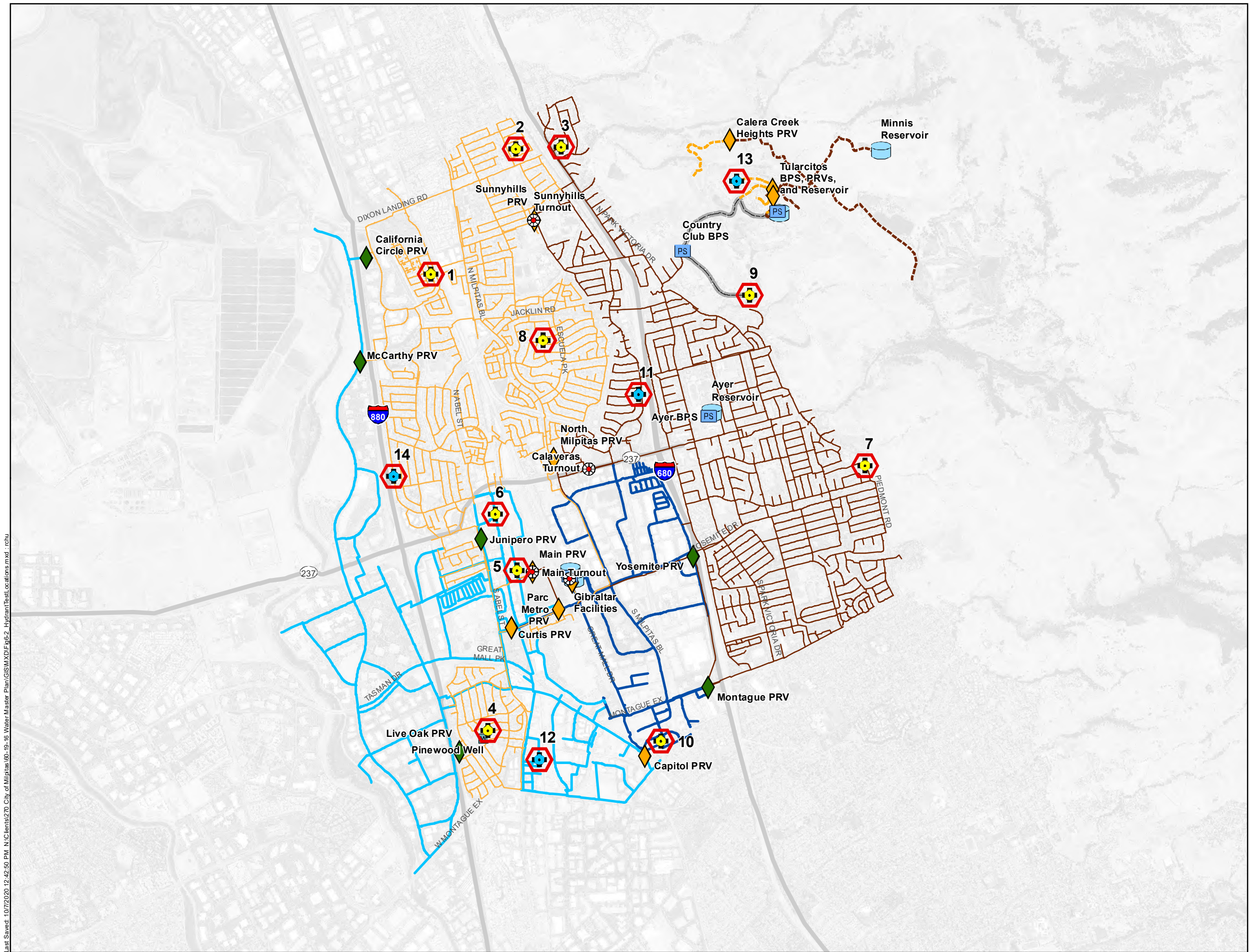
Hydrant test data was used to calibrate the hydraulic model by verifying whether the model can accurately simulate field-observed fire flow conditions. Part of the calibration process entails adjusting pipeline C-factors (within a typical range) to improve model accuracy. For additional detail on the hydrant test process, refer to West Yost’s March 9, 2020 memorandum, which is provided as Appendix C. The following sections summarize the hydrant tests and hydraulic model calibration results.

### 6.5.1 Hydrant Tests

There were 14 hydrant test locations (10 primary and 4 alternate) initially identified based on pipeline diameter, material, and age. Pipeline connectivity was also considered, with priority given to locations requiring fewer valve closures to achieve unidirectional flow. Table 6-4 lists the field status of each test, while Figure 6-2 illustrates the test locations.

| Table 6-4. Hydrant Test Field Status                                     |                        |                           |                                          |                              |
|--------------------------------------------------------------------------|------------------------|---------------------------|------------------------------------------|------------------------------|
| Test No.                                                                 | Pipeline Material Type | Pipeline Diameter, inches | Location                                 | Field Status                 |
| 1                                                                        | PVC                    | 8                         | Along Elkwood Drive                      | Completed                    |
| 2                                                                        | AC                     | 6                         | Along Gosser Street                      | Completed                    |
| 3                                                                        | AC                     | 6                         | Along Stirling Drive and Stratford Drive | Completed                    |
| 4                                                                        | AC                     | 6                         | Along Greentree Way                      | Completed                    |
| 5                                                                        | PVC                    | 8                         | Along Hammond Way                        | Completed                    |
| 6                                                                        | AC                     | 8                         | Along Main Street                        | Completed                    |
| 7                                                                        | AC                     | 8                         | Along Lacey Drive                        | Completed                    |
| 8                                                                        | AC                     | 6                         | Along Clauser Drive                      | Not Performed <sup>(a)</sup> |
| 9                                                                        | AC                     | 8                         | Along Calaveras Ridge Drive              | Completed                    |
| 10                                                                       | DI                     | 8                         | Within Crossing at Montague Apartments   | Completed                    |
| 11                                                                       | AC                     | 6                         | Along Las Lomas Drive and Pacheco Drive  | Not Performed <sup>(b)</sup> |
| 12                                                                       | PVC                    | 8                         | Along Costa Street and Mihalakis Street  | Not Performed <sup>(b)</sup> |
| 13                                                                       | AC                     | 8                         | Along Pebble Beach Court                 | Not Performed <sup>(b)</sup> |
| 14                                                                       | AC                     | 8                         | Along Heath Street                       | Not Performed <sup>(b)</sup> |
| (a) Due to operational concerns, City advised against performing Test 8. |                        |                           |                                          |                              |
| (b) Alternate tests were not performed due to time constraints.          |                        |                           |                                          |                              |





- Test Location
- Alternate Test Location
- Turnout
- Well
- Pressure Reducing Valve
- Emergency PRV
- Pump Station
- Storage Reservoir

**Pipeline Pressure Zone**

- VW1
- VW2
- SF1
- SF2
- SF3
- SF4-1
- SF4-2



**Figure 6-2**  
**Hydrant Test Locations**





Each hydrant test included one flowing hydrant and three to four observation hydrants, which are identified by test number and an alphabetical designation based on proximity to the flowing hydrant. For example, Hydrant 1A is the observation hydrant closest to (flowing) Hydrant 1, while Hydrant 1D is the furthest.

To recreate operational and demand conditions for the hydrant test day (March 11, 2020), City staff provided water system data for turnouts and storage reservoirs. The City turned off booster pump stations during the test period; therefore turnouts were serving all demands in the valley floor. Data was limited for hillside demands during the test period, and since hillside demands are relatively low, demands during the hydrant test period were assumed to be equal to the combined flow from all turnouts. SFPUC turnout flows were provided in hourly increments and averaged from 8:00 am to 6:00 pm, while VW turnout flows were provided in minute increments and averaged from 8:30 am to 5:30 pm. The “test day demand” is the sum of the SFPUC and VW average flows. Spatially allocated average day demands were then scaled up such that the total system demand equals the test day demand.

Each completed hydrant test was simulated using the hydraulic model, and results were compared to field observations. Model performance was evaluated using differential pressure, which is defined as the difference between static and residual pressure for a given location. The model was considered calibrated if differential pressures were within 5 pounds per square inch (psi) of the field data. This psi tolerance is based on standard engineering practice for model calibration in water system planning.

## 6.5.2 Hydraulic Model Calibration Results

The hydraulic model was able to simulate hydrant tests accurately, with only minor adjustments to the preliminary C-factors presented in Table 6-3. Of the nine hydrant tests conducted, eight could be simulated such that differential pressures fell within 5 psi of field observations. The remaining hydrant test (No. 10) was abandoned due to likely incorrect valving during the test. Table 6-5 summarizes the calibration results, while the following sections detail the C-factor adjustments and issues that occurred with Hydrant Test No. 10.

### 6.5.2.1 Pipeline Roughness Factor Adjustments

Field data from hydrant tests indicated that preliminary C-factors for AC and polyvinyl chloride (PVC) pipes were slightly high. Consequently, the C-factors for AC and PVC pipes 8 inches in diameter and smaller were adjusted down to 110 and 130, respectively. Although no hydrant tests were conducted for AC and PVC pipes larger than 8 inches in diameter, West Yost assumed those preliminary C-factors were also high and decreased them accordingly.

Roughness factors for other pipe materials remain equal to their preliminary values. Table 6-6 summarizes the calibrated C-factors used in the City’s hydraulic model.

| Table 6-5. Hydrant Test Calibration Results  |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
|----------------------------------------------|----------------------|-----------------------------|----------------------------|--------------------------------|------------------------------------------------|-----------------------------------------|------------------------|------------------------------------------------|---------------------------------------------------------------------|
| Hydrant                                      | Field Data           |                             |                            |                                |                                                | Modeled Data                            |                        |                                                | Comparison of Differential Pressures between Field and Modeled Data |
|                                              | Static Pressure, psi | High Residual Pressure, psi | Low Residual Pressure, psi | Average Residual Pressure, psi | Differential Pressure, psi (Static - Residual) | Static Pressure, psi                    | Residual Pressure, psi | Differential Pressure, psi (Static - Residual) |                                                                     |
| Hydrant Test No. 1 (8" PVC, 1990s, Zone SF1) |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 1                                    | 86                   |                             |                            |                                |                                                | 84                                      |                        |                                                |                                                                     |
| 1A                                           | 87                   | 44                          | 40                         | 42                             | 45                                             | 83                                      | 41                     | 43                                             | 2                                                                   |
| 1B                                           | 88                   | 52                          | 50                         | 51                             | 37                                             | 83                                      | 50                     | 33                                             | 4                                                                   |
| 1C                                           | 82                   | 76                          | 50                         | 52                             | 30                                             | 84                                      | 57                     | 27                                             | 3                                                                   |
| 1D                                           | 86                   | 64                          | 62                         | 64                             | 22                                             | 84                                      | 66                     | 18                                             | 4                                                                   |
| Hydrant Test No. 2 (6" AC, 1960s, Zone SF1)  |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 2                                    | 54                   |                             |                            |                                |                                                | 52                                      |                        |                                                |                                                                     |
| 2A                                           | 48                   | 18                          | 16                         | 17                             | 31                                             | 46                                      | 15                     | 31                                             | 0                                                                   |
| 2B                                           | 51                   | 31                          | 29                         | 30                             | 21                                             | 48                                      | 30                     | 19                                             | 2                                                                   |
| 2C                                           | 53                   | 48                          | 44                         | 46                             | 7                                              | 54                                      | 49                     | 5                                              | 2                                                                   |
| Hydrant Test No. 3 (6" AC, 1980s, Zone SF2)  |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 3                                    | 98                   |                             |                            |                                |                                                | 94                                      |                        |                                                |                                                                     |
| 3A                                           | 96                   | 28                          | 24                         | 26                             | 70                                             | 91                                      | 24                     | 67                                             | 3                                                                   |
| 3B                                           | 94                   | 36                          | 32                         | 35                             | 59                                             | 87                                      | 32                     | 55                                             | 4                                                                   |
| 3C                                           | 84                   | 42                          | 38                         | 40                             | 44                                             | 81                                      | 41                     | 41                                             | 3                                                                   |
| 3D                                           | 82                   | 84                          | 58                         | 58                             | 24                                             | 79                                      | 54                     | 24                                             | 0                                                                   |
| Hydrant Test No. 4 (6" AC, 1960s, Zone SF1)  |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 4                                    | 78                   |                             |                            |                                |                                                | 76                                      |                        |                                                |                                                                     |
| 4A                                           | 80                   | 41                          | 29                         | 30                             | 50                                             | 76                                      | 25                     | 51                                             | -1                                                                  |
| 4B                                           | 82                   |                             | 45                         | 46                             | 36                                             | 75                                      | 38                     | 37                                             | -1                                                                  |
| 4C                                           | 78                   | 60                          | 53                         | 58                             | 20                                             | 74                                      | 54                     | 20                                             | 0                                                                   |
| Hydrant Test No. 5 (8" PVC, 1980s, Zone VW1) |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 5                                    | 80                   |                             |                            |                                |                                                | 80                                      |                        |                                                |                                                                     |
| 5A                                           | 84                   | 40                          | 40                         | 41                             | 43                                             | 80                                      | 40                     | 41                                             | 3                                                                   |
| 5B                                           | 84                   | 47                          | 45                         | 46                             | 38                                             | 81                                      | 46                     | 34                                             | 4                                                                   |
| 5C                                           | 80                   | 60                          | 50                         | 54                             | 26                                             | 81                                      | 52                     | 28                                             | -2                                                                  |
| Hydrant Test No. 6 (8" AC, UNK, Zone VW1)    |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 6                                    | 84                   |                             |                            |                                |                                                | 82                                      |                        |                                                |                                                                     |
| 6A                                           | 85                   | 50                          | 48                         | 49                             | 36                                             | 82                                      | 44                     | 38                                             | -2                                                                  |
| 6B                                           | 88                   | 54                          | 52                         | 53                             | 35                                             | 82                                      | 47                     | 34                                             | 1                                                                   |
| 6C                                           | 81                   | 56                          | 52                         | 54                             | 27                                             | 81                                      | 53                     | 28                                             | -1                                                                  |
| Hydrant Test No. 7 (8" AC, 1970s, Zone SF2)  |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 7                                    | 60                   |                             |                            |                                |                                                | 59                                      |                        |                                                |                                                                     |
| 7A                                           | 70                   | 52                          | 50                         | 51                             | 19                                             | 67                                      | 52                     | 15                                             | 4                                                                   |
| 7B                                           | 74                   | 64                          | 60                         | 62                             | 12                                             | 74                                      | 64                     | 10                                             | 2                                                                   |
| 7C                                           | 84                   | 81                          | 78                         | 80                             | 4                                              | 84                                      | 81                     | 3                                              | 1                                                                   |
| Hydrant Test No. 9 (8" AC, 1980s, Zone SF3)  |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 9                                    | 143                  |                             |                            |                                |                                                | 139                                     |                        |                                                |                                                                     |
| 9A                                           | 138                  | 54                          | 50                         | 50                             | 88                                             | 134                                     | 45                     | 89                                             | -1                                                                  |
| 9B                                           | 148                  | 70                          | 68                         | 69                             | 79                                             | 146                                     | 69                     | 77                                             | 2                                                                   |
| 9C                                           | 141                  | 84                          | 78                         | 78                             | 63                                             | 140                                     | 76                     | 64                                             | -1                                                                  |
| 9D                                           | 136                  | 136                         | 80                         | 85                             | 51                                             | 132                                     | 83                     | 49                                             | 2                                                                   |
| Hydrant Test No. 10 (8" DI, 2000s, Zone VW2) |                      |                             |                            |                                |                                                |                                         |                        |                                                |                                                                     |
| Flowing 10                                   | 118                  |                             |                            |                                |                                                | Test abandoned due to incorrect valving |                        |                                                |                                                                     |
| 10A                                          | 120                  | 94                          | 90                         | 92                             | 28                                             |                                         |                        |                                                |                                                                     |
| 10B                                          | 122                  | 95                          | 92                         | 94                             | 28                                             |                                         |                        |                                                |                                                                     |
| 10C                                          | 116                  | 92                          | 82                         | 90                             | 26                                             |                                         |                        |                                                |                                                                     |
| 10D                                          | 119                  | 92                          | 89                         | 90                             | 29                                             |                                         |                        |                                                |                                                                     |



**Table 6-6. Calibrated Pipeline C-factors Assigned in the Hydraulic Model**

| Pipeline Material  | Abbreviation | C-Factor            |                     |
|--------------------|--------------|---------------------|---------------------|
|                    |              | Diameter ≤ 8 inches | Diameter > 8 inches |
| Asbestos Cement    | AC / ACP     | 110                 | 120                 |
| Concrete Cylinder  | CCP          | _(a)                | 130                 |
| Cast Iron          | CIP          | 100                 | 110                 |
| Ductile Iron       | DIP          | 130                 | 140                 |
| Polyvinyl Chloride | PVC          | 130                 | 140                 |
| Steel              | STL          | 120                 | 130                 |

(a) Material in this diameter range does not exist in City system.

### 6.5.2.2 Hydrant Test No. 10

Field observations suggest that Hydrant Test No. 10 did not achieve unidirectional flow through the 8-inch ductile iron pipe (DIP) loop within the Crossing at Montague Apartments. While setting up for the test, City staff could not confirm the valve configuration at the intersection between Hydrant 10 and Hydrant 10D. City staff closed a valve at this intersection, but since field-observed differential pressures are relatively consistent across all four observation hydrants, it seems that the isolation valve closed did not direct flow as intended. As a result, the C-factor for 8-inch diameter, DIP could not be confirmed, and Hydrant Test No. 10 should be disregarded.

Abandoning Hydrant Test No. 10 is not a fatal flaw. Only approximately 8 percent of the City's water system consists of DIP, and the preliminary DIP C-factors are based on an extensive list of roughness factors calibrated for other water systems. West Yost remains confident the hydraulic model can accurately simulate the City's water system under various conditions.

## 6.6 SUMMARY OF FINDINGS AND CONCLUSIONS

Hydrant test simulation results indicate that the hydraulic model can accurately replicate a fire flow or other large demand condition using the pipeline C-factors listed in Table 6-6. As a result, West Yost concludes that the hydraulic model is a reliable representation of the City's existing potable water distribution system and can be used as a planning tool. To ensure long-term accuracy and usefulness, it is recommended that the City regularly update and maintain the hydraulic model as facilities are constructed or replaced. In addition, as data availability increases, the City can augment the hydraulic model to run extended period simulations, which simulate the system operation over time, mimicking the operational controls and settings used for system operations.

## CHAPTER 7

# System Planning and Performance Criteria

This chapter presents the criteria used to size and evaluate the performance of the City's potable water system. Key criteria from the City's 2009 WMPU have been incorporated into this chapter; however, some of the previous criteria have been updated to reflect more recent or suitable standards based on West Yost's experience working with similar municipal water systems.

Table 7-1 summarizes the recommended criteria for this 2020 WMP. The following sections describe each criterion in more detail.

## 7.1 GENERAL WATER SYSTEM GUIDELINES

Before discussing specific planning and performance criteria, it is helpful to provide some general guidelines that a water system should meet. This section identifies the requirements for a reliable water system that delivers high-quality water.

### 7.1.1 Water System Reliability

Based on industry standards, a reliable water system is one that has sufficient storage, redundant pumping and distribution facilities, and emergency alternatives for both water and power supply. Thoughtful water distribution system design also enhances reliability through improved hydraulics and flexibility. For example, replacing pipeline dead-ends with looped configurations improves reliability and reduces the risk of stagnant water, which has poor taste and lower disinfectant residuals. Appropriate pipeline sizing and pressure regulation allows the system to serve peak demands at appropriate pressures while minimizing friction losses. Lastly, proper valve placement streamlines maintenance and repairs, while also increasing operational flexibility.

### 7.1.2 Water Quality Standards

The United States Environmental Protection Agency (USEPA) and the SWRCB DDW establish water quality standards to protect public health and help manage aesthetics. Primary drinking water standards are legally enforceable limits on contaminants that present a risk to human health. In contrast, secondary standards target contaminants that are not health threatening, but may cause taste, odor, or color issues. As a water retailer, the City is responsible for ensuring that all applicable water quality standards and regulations are always met. The City is currently updating a report on its water quality monitoring program.

| Table 7-1. Summary of Recommended Potable Water System Planning and Performance Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Component                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Criteria                                                                                                                                                                                                                 | Remarks/Issues                                                                                                                                                                                                                                     |
| Water System Performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| <i>Fire Flow Requirements</i> <sup>(a)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Single Family Residential                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1,500 gpm @ 2 hrs                                                                                                                                                                                                        | Improvements for existing developments will be evaluated on a case-by-case basis because of varying historical standards.                                                                                                                          |
| Multi-family Residential                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2,500 gpm @ 2 hrs                                                                                                                                                                                                        |                                                                                                                                                                                                                                                    |
| Commercial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3,000 gpm @ 3 hrs                                                                                                                                                                                                        |                                                                                                                                                                                                                                                    |
| Mixed <sup>(b)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3,000 gpm @ 3 hrs                                                                                                                                                                                                        |                                                                                                                                                                                                                                                    |
| Industrial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4,000 gpm @ 4 hrs                                                                                                                                                                                                        |                                                                                                                                                                                                                                                    |
| <i>Peak Supply Capacity</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Normal Demand Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Provide firm supply capacity equal to maximum day demand; meet peak hour demand from a combination of supply capacity and storage                                                                                        | Firm supply capacity defined as the total water supply with the largest turnout out of service.                                                                                                                                                    |
| Fire Flow Demand Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Meet maximum day demand plus fire flow from a combination of supply capacity and storage                                                                                                                                 |                                                                                                                                                                                                                                                    |
| <i>System Pressures</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Minimum Pressure - Normal Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Average and Maximum Day Demand: 40 psi at customer service connection<br>Peak Hour Demand: 30 psi at customer service connection                                                                                         | Services with pressure less than 30 psi during an average day demand condition require an individual booster pump.                                                                                                                                 |
| Minimum Pressure - Fire Flow Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20 psi                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                    |
| Maximum Pressure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Zone 1: 80 psi at customer service connection<br>Zone 2 and Hillside Zones: 150 psi at customer service connection                                                                                                       | New services with pressure greater than 80 psi require an individual pressure regulator.                                                                                                                                                           |
| Pipeline Sizing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| <i>Transmission Main</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Diameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 16 inches or larger                                                                                                                                                                                                      |                                                                                                                                                                                                                                                    |
| Maximum Velocity - Normal Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6 ft/s                                                                                                                                                                                                                   | Criteria based on requirements for new development, existing transmission mains will be evaluated on a case-by-case basis. Evaluation will include age, material type, velocity, head loss, and pressure.                                          |
| Maximum Head Loss - Normal Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5 ft/kft                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                    |
| Hazen Williams "C" Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 130                                                                                                                                                                                                                      | For consistency in hydraulic modeling.                                                                                                                                                                                                             |
| <i>Distribution Main</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Minimum Pipeline Diameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8 inches                                                                                                                                                                                                                 | New pipelines only.                                                                                                                                                                                                                                |
| Maximum Velocity - Normal Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8 ft/s                                                                                                                                                                                                                   | Criteria based on requirements for new development, existing distribution mains will be evaluated on a case-by-case basis. Evaluation will include age, material type, velocity, head loss, and pressure.                                          |
| Maximum Velocity - Fire Flow Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12 ft/s                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                    |
| Maximum Head Loss - Normal Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10 ft/kft                                                                                                                                                                                                                |                                                                                                                                                                                                                                                    |
| Hazen Williams "C" Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 130                                                                                                                                                                                                                      | For consistency in hydraulic modeling.                                                                                                                                                                                                             |
| Storage Facility Sizing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Operational Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 25 percent of maximum day demand                                                                                                                                                                                         |                                                                                                                                                                                                                                                    |
| Fire Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Fire flow demand for the most severe fire recommended in the pressure zone multiplied by the recommended duration                                                                                                        | Refer to Table 7-2. Assumes only one fire flow event would occur in any pressure zone at a time.                                                                                                                                                   |
| Emergency Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 50 percent of maximum day demand                                                                                                                                                                                         |                                                                                                                                                                                                                                                    |
| Groundwater Storage Credit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Volume of water pumped over a 24-hour period                                                                                                                                                                             | The maximum credit cannot exceed the recommended emergency storage volume.                                                                                                                                                                         |
| Total Storage Capacity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Operational + Fire + Emergency - Groundwater Credit                                                                                                                                                                      |                                                                                                                                                                                                                                                    |
| Pumping Facility Sizing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Pumping Capacity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Firm pumping capacity equal to maximum day demand (within the designated operational hours)                                                                                                                              | Firm pumping capacity defined as the total capacity of all operational pumps minus the capacity of the largest pumping unit. Pumps located in lower pressure zones must deliver the maximum day demand of all pressure zone(s) located above them. |
| Backup Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All critical pumping facilities <sup>(c)</sup> should be equipped with an on-site, backup power generator                                                                                                                |                                                                                                                                                                                                                                                    |
| Pressure Reducing Station Sizing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Valve Capacity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | In pressure zones with storage, valve capacity must supply the maximum day demand, and in pressure zones without storage, valve capacity must supply maximum day plus fire flow or peak hour demand, whichever is larger |                                                                                                                                                                                                                                                    |
| <p>(a) Based on fire flow requirements adopted in the 2009 WMPU, updated to reflect current fire code.</p> <p>(b) Includes High Density Multi-family Residential land uses in the MMSP area.</p> <p>(c) A pump station is defined as critical if it serves a pressure zone(s) and/or service area(s) without sufficient fire or emergency storage and meets one of the following criteria:</p> <ul style="list-style-type: none"> <li>• The largest facility that provides water to a particular pressure zone and/or service area;</li> <li>• It is the sole source of water to single or multiple pressure zones and/or service areas;</li> <li>• It provides water from a supply turnout; or</li> <li>• It provides water from key groundwater supply wells.</li> </ul> |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |





## 7.2 WATER SYSTEM PERFORMANCE CRITERIA

This section describes the recommended system performance criteria for fire flows, supply capacity, and distribution system pressures.

### 7.2.1 Fire Flow Requirements

Municipal water systems providing supply during a fire flow condition must meet minimum standards for fire flow rate and duration and residual pressure. Based on the City's potable water design guidelines and recommendations from state agencies, the City's water system must concurrently meet maximum day demands and maintain at least 20 pounds per square inch (psi) residual pressure when delivering fire flow.

Minimum fire flow requirements are adopted from the 2009 WMPU (updated in coordination with the City's fire department to reflect current fire code) and summarized by land use type in Table 7-2. These requirements specify minimum distribution system capacities during fires and apply to new developments only (not existing system conditions). Existing buildings are assumed to meet fire flow standards that were in place at the time of construction, which are generally lower than current standards. Therefore, the evaluation of the City's water system under existing demand conditions presents systemwide available fire flow only and does not recommend pipeline improvements to increase existing fire flow capacity. However, the City can use these results as a guide for sizing pipeline improvements and to prioritize replacing existing smaller diameter pipelines to improve overall flows throughout the distribution system.

| <b>Table 7-2. Recommended Fire Flow Requirements for Future Development and Pipeline Replacement Planning<sup>(a)</sup></b> |                       |                        |                                |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|--------------------------------|
| <b>Land Use Designation</b>                                                                                                 | <b>Fire Flow, gpm</b> | <b>Duration, hours</b> | <b>Recommended Storage, MG</b> |
| Single Family Residential                                                                                                   | 1,500                 | 2                      | 0.18                           |
| Multi-family Residential                                                                                                    | 2,500                 | 2                      | 0.30                           |
| Commercial                                                                                                                  | 3,000                 | 3                      | 0.54                           |
| Mixed <sup>(b)</sup>                                                                                                        | 3,000                 | 3                      | 0.54                           |
| Industrial                                                                                                                  | 4,000                 | 4                      | 0.96                           |
| (a) Based on fire flow requirements adopted in the 2009 WMPU, updated to reflect current fire code.                         |                       |                        |                                |
| (b) Includes High Density Multi-family Residential land uses in the Milpitas Metro Specific Plan area.                      |                       |                        |                                |

### 7.2.2 Peak Supply Capacity

Under normal (i.e., non-emergency) demand conditions, the City must meet peak hour demands through a combination of available supplies and storage. In addition, the City must have a firm supply capacity capable of meeting a maximum day demand condition. Firm supply capacity is defined as the total potable water supply capacity with the largest turnout out of service.

Under fire flow demand conditions, the City must meet fire flows and maximum day demand from both available supply capacity and storage.



### **7.2.3 Distribution System Pressures**

Water systems are typically evaluated based on pressure, pipeline velocity, and pipeline head loss. Pressures are the most critical criterion because they are used to evaluate satisfactory system performance under different demand conditions. Consequently, the City's existing water system will be evaluated using pressure as the primary criterion; secondary criteria, such as pipeline velocity, head loss, age, and material type, will be used as indicators to locate where water system improvements may be needed. Recommended improvements from existing and buildout system pressure evaluations are presented in Sections 8.5 and 9.6, respectively.

Minimum distribution system pressure criteria are based on industry standards and vary by demand condition. Under average day and maximum day demands, system pressures should remain above 40 psi. Under peak hour demand conditions, system pressures should remain above 30 psi. During fire flow conditions, residual pressures of 20 psi are allowed. Customer service connections with a pressure below 30 psi during an average day demand condition should have an individual booster pump installed.

Maximum distribution system pressure criteria are based on industry standards and vary by pressure zone. In the valley (Zone 1), pressures should remain below 80 psi. In Zone 2 and Hillside Zones (SF3 and SF4), the maximum pressure shall not exceed 150 psi. These pressure limits are consistent with the 2009 WMPU and the high end of typical operating pressures for municipal water systems. The Uniform Plumbing Code (UPC) requires new customer service connections with a pressure above 80 psi to have an individual pressure regulator installed. Since typical pressures in Zone 2 and the Hillside Zones exceed 80 psi, an alternative would be to install main-line PRVs and create pressure sub-zones within these existing pressure zones; however, this would make it more difficult to move water between these zones and could potentially reduce fire flow availability.

This distribution system pressure criteria will be applied to all areas that fall within the normal customer service elevation ranges for each pressure zone. Customers located above or below the normal service elevation ranges may require an individual booster pump or pressure regulator.

## **7.3 WATER FACILITY SIZING**

This section describes the recommended sizing criteria for pipelines, storage facilities, booster pumping facilities, backup power, and pressure reducing stations within the City's service area

### **7.3.1 Pipeline Sizing**

Pipeline sizing is based on velocity and head loss, which are directly related; higher velocities translate to higher head loss (increases operating costs). Velocity and head loss criteria are defined below for new pipelines and vary with pipeline diameter. Consistent with the 2009 WMPU, transmission mains are defined as pipelines with a diameter of 16 inches or larger, and distribution mains have a diameter less than 16 inches. However, all new pipelines should be required to have a minimum diameter of 8 inches. Compared to 6-inch diameter pipelines, 8-inch diameter pipelines can significantly reduce friction losses at a competitive cost. Phasing out 6-inch diameter (and smaller) pipelines will also help the City streamline its piping and appurtenance inventory.



The following criteria reflect industry standards and West Yost's experience with municipal water systems:

- For transmission mains, the maximum velocity should be limited to 6 feet per second (ft/s), and the maximum head loss should be 5 feet per 1,000 feet (ft/kft) of pipeline.
- For distribution mains, the maximum velocity should be limited to 8 ft/s under normal demand conditions. During fire flow demand conditions, the maximum velocity should be 12 ft/s. Maximum head loss for distribution mains should be 10 ft/kft.

### 7.3.2 Storage Facility Sizing

Storage facilities include reservoirs (i.e., tanks), clearwells, and, in certain cases, groundwater wells. The total recommended treated water storage capacity is the sum of the following three components:

- Operational Storage
- Fire Storage
- Emergency Storage

Each component is detailed below, along with a discussion of groundwater storage credit. West Yost will evaluate storage capacity requirements by pressure zone.

#### 7.3.2.1 Operational Storage

Operational storage is defined as the amount of stored water needed to meet peak demands in excess of normal supply delivery. Since water supplies are generally designed to meet maximum day demands, operational storage is typically used to supply peak demands (e.g., the difference between peak hour and maximum day demand). Supplies replenish operational storage during periods of lower demand.

In accordance with American Water Works Association (AWWA) guidelines<sup>9</sup>, West Yost recommends the operational storage volume be 25 percent of the maximum day demand. This is consistent with the operational storage criterion used in the 2009 WMPU.

#### 7.3.2.2 Fire Storage

Fire storage is the volume of water reserved for fire suppression. For a given pressure zone, fire storage is determined by multiplying the maximum required fire flow rate by the required duration. Refer to Table 7-2 for fire storage recommendations by land use designation. Per industry standards, it is assumed that no more than one fire event would occur in a pressure zone at a time.

#### 7.3.2.3 Emergency Storage

Emergency storage helps meet demands during an unplanned event that reduces the quality and/or quantity of potable water supplies. Determining the appropriate emergency storage volume is challenging, as it depends on the diversity of supplies, the reliability of production and distribution facilities, and the duration of the emergency event. The City's overall risk tolerance is also a factor. The

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<sup>9</sup> The AWWA *Water Distribution Systems Handbook* (AWWA, 2000) (Section 3.2.2.2 Storage) states that the volume of operational storage required is commonly estimated at 25 percent of the total maximum day demand.



AWWA suggests that individual utilities should determine its specific emergency storage requirements based on perceived system vulnerabilities.

West Yost recommends an emergency storage volume equal to 50 percent of the maximum day demand, consistent with the 2009 WMPU. Emergency storage is not required at every reservoir; one reservoir can hold emergency storage for multiple pressure zones if the zones are hydraulically connected and the stored water remains accessible in emergencies.

#### **7.3.2.4 Groundwater Storage Credit**

Based on the City's available emergency groundwater wells, groundwater storage could offset some of the recommended emergency storage. However, the following must be true to use the groundwater supply to offset the need to provide surface storage:

- Groundwater supply is of potable water quality and can be reliably accessed (i.e., wells are equipped with on-site backup power or a plug-in adapter and transfer switch)
- Groundwater supply is not already being relied upon to meet the City's average day demand requirements
- Sufficient water distribution facilities are available to distribute this water to demand areas

The groundwater storage credit equals the volume of water pumped over a 24-hour period. The maximum credit cannot exceed the recommended emergency storage volume (i.e., 50 percent of maximum day demand).

#### **7.3.2.5 Recommended Total Storage Capacity**

In summary, the City's recommended total water storage capacity is the sum of the following components:

- **Operational Storage:** Volume of water to meet diurnal peaks, assumed to be 25 percent of the maximum day demand; plus
- **Fire Flow Storage:** Volume of water to suppress a fire (varies by land use designation); plus
- **Emergency Storage:** Volume of water as emergency supply during unplanned events, assumed to be 50 percent of maximum day demand; minus
- **Groundwater Storage Credit:** Groundwater supply that can be reliably accessed in an emergency.

### **7.3.3 Pumping Facility Sizing and Backup Power**

Based on industry standards, pumping capacity should be sufficient to meet a maximum day demand within the designated operational hours with pumps assumed to operate at firm pumping capacity. Firm pumping capacity is defined as the total pump station capacity with the largest pump out of service. Pumps located in lower pressure zones must deliver the maximum day demand of all pressure zone(s) located above them.



Critical pumping facilities are defined as those facilities that provide service to pressure zone(s) and/or service area(s) which do not have sufficient fire and/or emergency storage available and meet the following criteria:

- The largest pumping facility that provides water to a particular pressure zone and/or service area;
- A facility that provides the sole source of water to single or multiple pressure zones and/or service areas;
- A pumping facility that provides water from a supply turnout; or
- A pumping facility that provides water from key groundwater supply wells (depends on capacity, quality and location).

All critical pumping facilities should be equipped with an on-site, backup power generator.

#### 7.3.4 Pressure Reducing Station Sizing

For pressure zones without available storage capacity and where pressure reducing station(s) are the sole supply source, the total capacity from the active pressure reducing station(s) should be equal to a maximum day demand plus fire flow condition or a peak hour demand condition, whichever is larger. For pressure zones with available storage capacity and where pressure reducing station(s) are the sole supply source, the total capacity from the active pressure reducing station(s) should be equal to a maximum day demand.

## CHAPTER 8

# Evaluation of Existing Water System

This chapter evaluates the City's existing water system and its ability to meet recommended planning and performance criteria described in Chapter 7 and summarized in Table 7-1 of this report. The evaluation encompasses both system capacity and hydraulic performance using existing water demands developed in Section 5.1 of this report. System capacity is evaluated based on potable water supply, storage, and pumping, while the hydraulic performance evaluation examines distribution system pressures under various demand and outage conditions. The following evaluations frequently refer to "normal" conditions, which are defined as non-emergencies (i.e., no fires or unplanned outages).

For reference, Appendix A contains a water system schematic profile that summarizes the supply and distribution facilities described in Sections 3.2 and 3.3 of this report, respectively.

This chapter also includes recommendations for addressing any deficiencies identified from the evaluation. These are incorporated in a recommended capital improvement program (CIP) described in Chapter 11 of this report. To simplify cross-referencing with Chapter 11, each proposed project is assigned a unique capital improvement program ID (CIP ID).

The following sections present the evaluation methodology and results:

- Existing Potable Water Demands
- Existing Potable Water Supply Capacity Evaluation
- Existing Potable Water Storage Capacity Evaluation
- Existing Pumping Capacity Evaluation
- Existing Water Distribution System Evaluation
- Summary of Findings and Recommended Improvements

## 8.1 EXISTING POTABLE WATER DEMANDS

Existing potable water demands are based on 2019 billing meter data, which was spatially allocated in the hydraulic model and scaled up to match the City's 2019 average daily water production (8.3 mgd). Maximum day and peak hour demands were calculated based on the adopted peaking factors of 1.6 and 2.9 times the average day demand, respectively, for Zones SF1 and SF2, and 3.2 and 5.8 times the average day demand, respectively, for Zones SF3 and SF4. In the VW service area, the maximum day and peak hour demand peaking factors are 1.9 and 3.4 times the average day demand, respectively. Table 8-1 summarizes existing potable water demands by pressure zone and service area.





**Table 8-1. Summary of Existing Water Demands by Pressure Zone**

| Pressure Zone | Average Day Demand <sup>(a)</sup> |             | Maximum Day Demand <sup>(b)</sup> |             | Peak Hour Demand <sup>(c)</sup> |             |
|---------------|-----------------------------------|-------------|-----------------------------------|-------------|---------------------------------|-------------|
|               | gpm                               | mgd         | gpm                               | mgd         | gpm                             | mgd         |
| SF1           | 1,748                             | 2.52        | 2,797                             | 4.03        | 5,069                           | 7.30        |
| SF2           | 1,798                             | 2.59        | 2,877                             | 4.14        | 5,214                           | 7.51        |
| SF3           | 14                                | 0.02        | 44                                | 0.06        | 81                              | 0.12        |
| SF4-1         | 19                                | 0.03        | 61                                | 0.09        | 110                             | 0.16        |
| SF4-2         | 17                                | 0.02        | 54                                | 0.08        | 98                              | 0.14        |
| SF Subtotal   | 3,596                             | 5.18        | 5,833                             | 8.40        | 10,571                          | 15.2        |
| VW1           | 1,238                             | 1.78        | 2,351                             | 3.39        | 4,208                           | 6.06        |
| VW2           | 951                               | 1.37        | 1,806                             | 2.60        | 3,232                           | 4.65        |
| VW Subtotal   | 2,188                             | 3.15        | 4,158                             | 5.99        | 7,440                           | 10.7        |
| <b>Total</b>  | <b>5,784</b>                      | <b>8.33</b> | <b>9,990</b>                      | <b>14.4</b> | <b>18,011</b>                   | <b>25.9</b> |

(a) Based on spatially allocated 2019 water meter data, scaled to match 2019 water production.

(b) Maximum day demand is 1.6 times the average day demand for Zones SF1 and SF2, 3.2 times the average day demand for Zones SF3 and SF4, and 1.9 times the average day demand for the VW service area.

(c) Peak hour demand is 2.9 times the average day demand for Zones SF1 and SF2, 5.8 times the average day demand for Zones SF3 and SF4, and 3.4 times the average day demand for the VW service area.

## 8.2 EXISTING POTABLE WATER SUPPLY CAPACITY EVALUATION

As described in Section 4.1 of this report, the City's potable water is supplied via turnouts from SFPUC and VW transmission pipelines. The recommended water system performance criteria specify that under normal demand conditions, the following must be satisfied:

- Provide firm supply capacity equal to maximum day demand
- Meet peak hour demand from a combination of supply capacity and storage

Firm supply capacity is defined as the normal water supply with the largest turnout out of service. In the SFPUC service area, the largest turnout is Calaveras (see Figure 3-1), which has a capacity of 13.0 mgd. The VW service area has only one turnout (Gibraltar), so firm supply is zero, as there is no redundant supply source from the VW system. However, as described in Section 3.3 of this report, if the VW turnout is not available, water can be moved from the City's SFPUC service area to the VW service area.

Table 8-2 summarizes the available and required firm supply capacity for each service area. Pinewood Well is not listed in Table 8-2 because it is not part of the City's existing normal water supply (it is only used for emergencies). The SFPUC service area has approximately 15.4 mgd of firm supply surplus, while the VW service area has a firm supply deficit equal to its maximum day demand (5.99 mgd), due to the lack of a redundant supply source from the VW system. Since SFPUC can supply the VW service area and the SFPUC surplus (15.4 mgd) exceeds the VW deficit (5.99 mgd), West Yost concludes that the City overall has sufficient firm supply capacity.

## Chapter 8

### Evaluation of Existing Water System



For the second supply capacity criterion listed above, the City can meet peak hour demands for each service area from supplies alone (i.e., before counting storage). Given this significant surplus in supplying peak hour demands, the criterion is not discussed further.

**Table 8-2. Comparison of Available and Required Firm Supply Capacity**

| Supply Source                                                                                                                                                                                                                                                                                                                                                         | Turnout     | Design Capacity        |                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|-----------------------|
|                                                                                                                                                                                                                                                                                                                                                                       |             | gpm                    | mgd                   |
| SFPUC                                                                                                                                                                                                                                                                                                                                                                 | Sunnyhills  | 7,014                  | 10.1                  |
|                                                                                                                                                                                                                                                                                                                                                                       | Calaveras   | 9,028                  | 13.0                  |
|                                                                                                                                                                                                                                                                                                                                                                       | Main Street | 5,486                  | 7.90                  |
|                                                                                                                                                                                                                                                                                                                                                                       | Intertie    | 4,000                  | 5.76                  |
| <b>Total Supply Capacity<sup>(a)</sup></b>                                                                                                                                                                                                                                                                                                                            |             | <b>25,528</b>          | <b>36.8</b>           |
| Firm Supply Capacity <sup>(b)</sup>                                                                                                                                                                                                                                                                                                                                   |             | 16,500                 | 23.8                  |
| Required Supply Capacity <sup>(c)</sup>                                                                                                                                                                                                                                                                                                                               |             | 5,833                  | 8.40                  |
| Existing Firm Supply Capacity Surplus (Deficit)                                                                                                                                                                                                                                                                                                                       |             | 10,667                 | 15.4                  |
| VW                                                                                                                                                                                                                                                                                                                                                                    | Gibraltar   | 10,000                 | 14.4                  |
| <b>Total Supply Capacity<sup>(a)</sup></b>                                                                                                                                                                                                                                                                                                                            |             | <b>10,000</b>          | <b>14.4</b>           |
| Firm Supply Capacity <sup>(b)</sup>                                                                                                                                                                                                                                                                                                                                   |             | 0                      | 0                     |
| Required Supply Capacity <sup>(c)</sup>                                                                                                                                                                                                                                                                                                                               |             | 4,158                  | 5.99                  |
| Existing Firm Supply Capacity Surplus (Deficit)                                                                                                                                                                                                                                                                                                                       |             | (4,158) <sup>(d)</sup> | (5.99) <sup>(d)</sup> |
| <p>(a) Total supply capacity assumes all turnouts are available for use.</p> <p>(b) Firm supply capacity assumes largest turnout in each service area (Calaveras (SFPUC) and Gibraltar (VW)) is offline.</p> <p>(c) Required supply capacity is equal to the maximum day demand (see Table 8-1).</p> <p>(d) VW supply deficit can be met by SFPUC supply surplus.</p> |             |                        |                       |



## **8.3 EXISTING POTABLE WATER STORAGE CAPACITY EVALUATION**

Potable water storage is critical for providing operational flexibility and emergency supply during outages or fires. The City's storage reservoir capacity must meet the following requirements (described in Section 7.3.2 of this report):

- Operational storage equal to 25 percent of maximum day demand
- Emergency storage equal to 50 percent of maximum day demand
- Fire storage equal to the largest fire flow demand in a pressure zone multiplied by the recommended duration

The total storage required is the sum of the operational, emergency, and fire storage requirements, less any groundwater credit, which can offset some of the emergency storage requirement. The groundwater credit includes both emergency wells and normally operating wells and equals the volume of water pumped over a 24-hour period. To offset surface storage needs, groundwater must be of potable water quality, and wells must have on-site backup power capabilities. In addition, the City must be able to meet average day demands without relying on groundwater. This is not an issue, since the City does not rely on groundwater as part of its normal (i.e., non-emergency) supply.

The City currently has one operational groundwater well (Pinewood Well), which meets water quality and backup power requirements. As a result, the Pinewood Well provides an emergency groundwater storage credit equal to its daily pumping capacity (1.7 MG).

For each pressure zone, Table 8-3 compares the City's existing potable water storage capacity with storage requirements. Since Zones 1 and 2 in each service area are interconnected through multiple pressure reducing valves (PRVs) that operate under normal conditions, they are combined in each service area (i.e., SF1/SF2 and VW1/VW2). As shown in Table 8-3, there is sufficient storage in the SFPUC service area and a deficit of 0.45 MG in the VW service area. This deficit is not considered critical, due to the flexibility of the Gibraltar facility. Simple valve operations allow the Gibraltar (SF) tank to supply Zone VW2, so the storage surplus for Zones SF1 and SF2 can cover the shortfall in Zones VW1 and VW2.

| Table 8-3. Comparison of Available and Required Water Storage Capacity                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                |                                                     |                         |                               |                          |                          |                        |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------|-----------------------------------------------------|-------------------------|-------------------------------|--------------------------|--------------------------|------------------------|-------------------------------|
| [A]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | [B]     | [C]                            | [D]                                                 | [E] = [C] + [D]         | [F]                           | [G]                      | [H]                      | [I] = [F] + [G] + [H]  | [J] = [E] - [I]               |
| Station                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Status  | Available Storage Capacity, MG |                                                     |                         | Required Storage Capacity, MG |                          |                          | Total Required Storage | Storage Surplus (Deficit), MG |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Reservoir Capacity             | Emergency Groundwater Storage Credit <sup>(a)</sup> | Total Available Storage | Operational <sup>(b)</sup>    | Emergency <sup>(c)</sup> | Fire Flow <sup>(d)</sup> |                        |                               |
| Zones SF1 and SF2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |                                |                                                     |                         |                               |                          |                          |                        |                               |
| Gibraltar (SF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Active  | 5.00                           | --                                                  | 12.30                   | 2.04                          | 4.08                     | 0.96                     | 7.09                   | 5.21                          |
| Ayer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Active  | 5.60                           | --                                                  |                         |                               |                          |                          |                        |                               |
| Pinewood Well                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Standby | --                             | 1.70                                                |                         |                               |                          |                          |                        |                               |
| Zone SF3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |                                |                                                     |                         |                               |                          |                          |                        |                               |
| Tularcitos                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Active  | 0.30                           | --                                                  | 0.30                    | 0.02                          | 0.03                     | 0.18                     | 0.23                   | 0.07                          |
| Zones SF4-1 and SF4-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |                                |                                                     |                         |                               |                          |                          |                        |                               |
| Minnis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Active  | 0.34                           | --                                                  | 0.34                    | 0.04                          | 0.08                     | 0.18                     | 0.30                   | 0.04                          |
| Zones VW1 and VW2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |                                |                                                     |                         |                               |                          |                          |                        |                               |
| Gibraltar (VW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Active  | 5.00                           | --                                                  | 5.00                    | 1.50                          | 2.99                     | 0.96                     | 5.45                   | (0.45)                        |
| (a) Credit based on 24 hours of pumping capacity. The credit cannot exceed the required emergency storage capacity.<br>(b) Based on 25 percent of a maximum day demand (see Table 8-1).<br>(c) Based on 50 percent of a maximum day demand (see Table 8-1).<br>(d) Based on storage required for largest potential fire flow within the pressure zone. Zones SF1/SF2 and VW1/VW2 = Industrial; Zones SF3 and SF4 = Single Family Residential.<br>(e) VW storage deficit can be met by SFPUC storage surplus. |         |                                |                                                     |                         |                               |                          |                          |                        |                               |



## 8.4 EXISTING PUMPING CAPACITY EVALUATION

As described in Section 7.3.3 of this report, industry standard is to have firm pumping capacity equal to maximum day demand. For a given pump station, firm capacity is defined as the total capacity of all operational pumps minus the capacity of the largest pumping unit. In addition, pumping capacity in lower pressure zones should also be able to deliver the maximum day demand of any zones above them. For example, the Zone SF3 pumps should be able to deliver the maximum day demand for Zones SF3 and SF4 (i.e., SF4-1 and SF4-2).

Critical pumping facilities should be equipped with an on-site, backup power generator. A pump station is considered critical if it serves a pressure zone with insufficient storage and meets one of the following criteria:

- It is the largest facility that provides water to a pressure zone and/or service area;
- It is the sole water source to a pressure zone and/or service area;
- It provides water from a supply turnout; or
- It provides water from a key groundwater well.

As discussed in Section 8.3, the pressure zones with insufficient storage are VW1 and VW2. Therefore, the Gibraltar (VW) pump station is deemed critical and should have backup power provisions (which it does). While Zones SF3 and SF4 have sufficient storage, each is served by a single pump station. The City should consider installing backup power generators at the Country Club and Tularcitos pump stations for additional redundancy. These backup power projects are included in Table 11-2 as CIP IDs ECIP-BG-CC and ECIP-BG-TL.

Table 8-4 compares the available and required firm pumping capacities for each pressure zone. Similar to the storage capacity evaluation, Zones 1 and 2 in each service area are combined. In Zones SF1 and SF2, firm pumping capacity consists of one 5,500-gpm pump at Gibraltar (SF) and two 1,800-gpm pumps at Ayer. At 9,100 gpm combined, the firm pumping capacity in Zones SF1 and SF2 exceeds the required firm pumping capacity, which equals the existing MDD of Zones SF1, SF2, and all higher zones (i.e., the entire SFPUC service area). The pumping capacity surplus in Zones SF1 and SF2 is approximately 3,270 gpm.

Similarly, the firm pumping capacities in Zones SF3 and SF4 also exceed requirements. In Zone SF3, the firm pumping capacity consists of one 250-gpm pump at Country Club, while the combined existing MDD of Zones SF3 and higher (i.e., Zones SF3 and SF4) is 159 gpm. The pumping capacity surplus in Zone SF3 is approximately 91 gpm. In Zone SF4, the firm pumping capacity consists of one 250-gpm pump at Tularcitos. The existing MDD of Zone SF4 is only 115 gpm, resulting in a pumping capacity surplus of approximately 135 gpm.

Both sets of pumps at the Gibraltar (VW) PS are included in the pumping capacity evaluation for the VW service area. One set draws from the Gibraltar (VW) storage reservoir, while the other set boosts pressures from the Gibraltar turnout (if necessary). By adjusting valve operations, the “turnout” pumps can also draw from the Gibraltar (VW) storage reservoir. The combined firm capacity for both sets of pumps is 13,500 gpm, which exceeds the VW service area MDD (4,158 gpm) by approximately 9,340 gpm.

**Table 8-4. Comparison of Available and Required Firm Pumping Capacity**

| Pump Station                                                                                                                                   | Critical Facility <sup>(a)</sup> | Existing On-site Backup Power | Status | Firm Capacity <sup>(b)</sup> , gpm | Total Firm Pumping Capacity, gpm | Existing Maximum Day Demand <sup>(c)</sup> , gpm | Pumping Capacity Surplus (Deficit), gpm |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------|--------|------------------------------------|----------------------------------|--------------------------------------------------|-----------------------------------------|
| Zones SF1 and SF2                                                                                                                              |                                  |                               |        |                                    |                                  |                                                  |                                         |
| Gibraltar (SF)                                                                                                                                 |                                  | ✓                             | Active | 5,500                              | 9,100                            | 5,833                                            | 3,267                                   |
| Ayer                                                                                                                                           |                                  | ✓                             | Active | 3,600                              |                                  |                                                  |                                         |
| Zone SF3                                                                                                                                       |                                  |                               |        |                                    |                                  |                                                  |                                         |
| Country Club                                                                                                                                   |                                  |                               | Active | 250                                | 250                              | 159                                              | 91                                      |
| Zones SF4-1 and SF4-2                                                                                                                          |                                  |                               |        |                                    |                                  |                                                  |                                         |
| Tularcitos                                                                                                                                     |                                  |                               | Active | 250                                | 250                              | 115                                              | 135                                     |
| Zones VW1 and VW2                                                                                                                              |                                  |                               |        |                                    |                                  |                                                  |                                         |
| Gibraltar (VW) - from tank                                                                                                                     | ✓                                | ✓                             | Active | 5,500                              | 13,500                           | 4,158                                            | 9,342                                   |
| Gibraltar (VW) - from turnout <sup>(d)</sup>                                                                                                   | ✓                                | ✓                             | Active | 8,000                              |                                  |                                                  |                                         |
| (a) Pump stations are considered critical if they serve a pressure zone with insufficient storage and meet other criteria. Refer to Table 7-1. |                                  |                               |        |                                    |                                  |                                                  |                                         |
| (b) Firm pumping capacity was defined as the total pump station capacity with the largest pump out of service.                                 |                                  |                               |        |                                    |                                  |                                                  |                                         |
| (c) Includes maximum day demands for higher pressure zones, per Table 7-1.                                                                     |                                  |                               |        |                                    |                                  |                                                  |                                         |
| (d) These pumps are intended to boost pressures from the VW turnout but can be valved to draw from the Gibraltar (VW) tank.                    |                                  |                               |        |                                    |                                  |                                                  |                                         |





## **8.5 EXISTING WATER DISTRIBUTION SYSTEM EVALUATION**

West Yost used the updated hydraulic model to conduct steady-state hydraulic analyses of the existing water distribution system. The goal of this evaluation is to identify necessary improvements to support the City's existing water demands while meeting the recommended system performance criteria presented in Sections 7.2.1 and 7.2.3 of this report.

In evaluating the existing system, pressure criteria are prioritized over velocity criteria. This prioritization is typical, because older water systems tend to have many undersized pipes, and strictly adhering to velocity standards would identify those pipes as candidates for replacement, even though pressures meet recommended criteria. West Yost does not recommend replacing existing pipes solely for failing to meet velocity criteria, so while velocity results will be summarized for non-emergency scenarios, the following analyses focus on pressures and fire flow availability.

The following evaluations examine distribution system performance under existing water demand conditions:

- Average Day Demand Scenario: evaluates the potential for high customer service pressures in the system during an average day demand condition
- Peak Hour Demand Scenario: evaluates the potential for low customer service pressures in the system during a peak hour demand condition
- Maximum Day Demand Scenario: evaluates the potential for low customer service pressures in the system during a maximum day demand condition
- Maximum Day plus Fire Flow Scenario: evaluates fire flow availability in the system under a maximum day demand condition
- Emergency Operations (each scenario is evaluated under (a) maximum day demand conditions and (b) maximum day demand plus fire flow):
  - Outage Scenario 1: SFPUC turnouts are offline
  - Outage Scenario 2: VW turnout is offline
  - Outage Scenario 3: SFPUC and VW turnouts are offline
  - Outage Scenario 4: Power outage; all facilities without backup generators are offline
  - Outage Scenario 5: PRVs normally allowing flow between Zones 1 and 2 are offline.

To capture the entire range of normal water system operations, each non-emergency scenario above was evaluated using two operational alternatives. These alternatives are described in the following section.

### **8.5.1 Evaluation Alternatives**

Throughout a normal day, the City varies water distribution system operations to achieve different goals. During morning (approximately 6:00 am to 10:30 am) and evening (approximately 5:00 pm to 11:00 pm) peak demand periods in the SFPUC service area, pumps at Gibraltar (SF) and Ayer draw from their respective tanks and deliver flows to the system. This supplements turnout flows and turns over water stored in reservoirs. During midday (approximately 11:00 am to 4:00 pm) and overnight (approximately 12:00 am to 5:00 am) low demand periods, the pumps are off. Turnouts alone supply the system, including refilling the Gibraltar (SF) and Ayer tanks.

## Chapter 8

### Evaluation of Existing Water System



In the hillside zones (i.e., Zones SF3 and SF4), operations also vary by pump status. Both the Country Club and Tularcitos pump stations operate on a two-pump lead lag system, with operation determined by the water level of the “destination” reservoir (i.e., Tularcitos reservoir for the Country Club pumps and Minnis reservoir for the Tularcitos pumps). The maximum water level in both reservoirs is 23 feet, and setpoints are the same for both pump stations. The lead pump turns on when the destination reservoir level is 15 feet and stops at 21.5 feet, while the lag pump starts at 14 feet and stops at 21 feet. When the Country Club and Tularcitos pumps are off, the Tularcitos and Minnis storage reservoirs serve zones SF3 and SF4, respectively, via gravity. When the Country Club and Tularcitos pumps are operating, they simultaneously serve the hillside zones and refill the elevated storage tanks.

The Gibraltar (VW) pumps also operate on a daily schedule, depending on the season. In the winter and spring, pumps operate during the day (approximately 6:30 am to 5:00 pm), and the Gibraltar (VW) reservoir fills overnight (approximately 7:00 pm to 4:00 am). The schedule reverses in the summer and fall, with the reservoir filling during the day (approximately 7:00 am to 5:00 pm) and pumps running overnight (approximately 9:00 pm to 5:00 am). Seasonal operations change around May 15th and November 15th, based on peak rate schedules set by Pacific Gas and Electric (PG&E).

West Yost identified two operational alternatives to represent the primary modes in which the water system normally functions. These operational alternatives are summarized in Table 8-5. In Base operations, all pumps are off, whereas Alternative 1 allows pump operation as needed. For both alternatives, all turnouts are open, and gravity tank levels are at their minimum. Since the Zone 1 and Zone 2 storage reservoirs (both Gibraltar tanks and the Ayer tank) feed booster pumps, their tank levels do not impact system pressures. Therefore, they are not listed in Table 8-5.

**Table 8-5. Summary of Operational Alternatives**

| Table 8-5. Summary of Operational Alternatives                                           |         |                          |
|------------------------------------------------------------------------------------------|---------|--------------------------|
| Facility                                                                                 | Base    | Alternative 1 – Pumps On |
| SFPUC Service Area                                                                       |         |                          |
| Turnouts <sup>(a)</sup>                                                                  | Open    |                          |
| Gibraltar (SF) Pump Station                                                              | Closed  | Open                     |
| Ayer Pump Station                                                                        | Closed  | Open                     |
| Country Club Pump Station                                                                | Closed  | Open                     |
| Tularcitos Tank Level                                                                    | Minimum |                          |
| Tularcitos Pump Station                                                                  | Closed  | Open                     |
| Minnis Tank Level                                                                        | Minimum |                          |
| VW Service Area                                                                          |         |                          |
| Gibraltar Turnout                                                                        | Open    |                          |
| Gibraltar (VW) Pump Station                                                              | Closed  | Open                     |
| (a) SFPUC turnouts include Sunnyhills, Calaveras, Main Street, and the Intertie turnout. |         |                          |



## 8.5.2 Average Day Demand Analysis

The hydraulic model was used to conduct a steady-state hydraulic analysis of the system during an existing average day demand (ADD) condition for each of the alternatives listed in Table 8-5. As shown in Table 8-1, the ADD for the existing water service area is approximately 5,784 gpm (8.33 mgd). Per recommended water system performance criteria detailed in Section 7.2.3 of this report, under ADD conditions pressures should be at least 40 psi at customer service connections. In addition, customer service pressures should not exceed 80 psi in Zone 1 (SF1 and VW1) or 150 psi in other zones.

Results from the ADD simulations for Base and Alternative 1 operations are shown on Figure 8-1 and Figure 8-2, respectively. In each figure, color-coded circles represent distribution system pressures during an ADD condition. In both Base and Alternative 1 cases, there are no customer service locations with pressures below 40 psi. The lowest customer service pressure in the distribution system is approximately 42 psi (Base alternative), located at the eastern end of Manferd Street near I-680 in Zone SF1. The same location has the lowest pressure with pumps on (Alternative 1), but the pressure is slightly higher (44 psi).

Many customer service locations experience pressures above the recommended limit. Pressures are generally higher when pumps are on, so Alternative 1 (Figure 8-2) is a more conservative representation of high pressures within the system. Per Table 7-1, recommended maximum pressures vary by zone, so Figure 8-1 and Figure 8-2 classify high pressures (i.e., exceeding the maximum) accordingly.

In Zone 1 (SF1 and VW1), high pressures are defined as exceeding 80 psi, and corresponding locations are dark blue. Much of Zone SF1 and the northern portion of Zone VW1 experience high pressures during an ADD condition. In Zone 2 (SF2 and VW2) and above (SF3 and SF4), high pressures are defined as exceeding 150 psi, and corresponding locations are dark purple. As shown on Figure 8-2, the area north of Highway 237 and adjacent to I-680 in Zone SF2 experiences high pressures during an ADD condition.

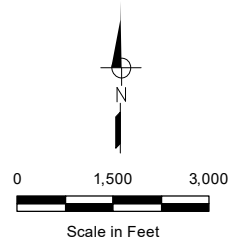
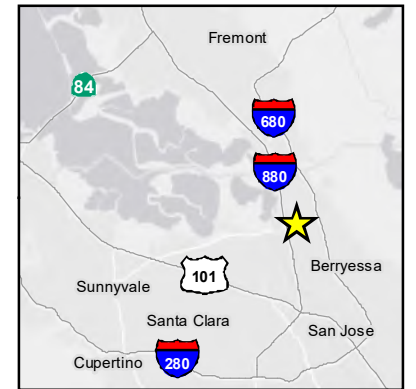
California Plumbing Code requires new services with pressures greater than 80 psi be fitted with a PRV. West Yost recommends that the City verify that individual PRVs are installed on existing customer service laterals in high pressure areas (i.e., dark blue, light purple, and dark purple locations on Figure 8-2). Alternatively, the City could install PRVs on potable water mains and create pressure sub-zones within the existing pressure zones; however, creation of pressure sub-zones would restrict the ability to move water between the existing zones and would reduce the fire flow availability.

Per Table 7-1, under normal conditions the maximum recommended velocities for transmission and distribution mains is 6 and 8 ft/s, respectively. Transmission mains are pipelines 16 inches or larger in diameter, while distribution mains are pipelines smaller than 16 inches in diameter. Under an existing ADD condition, almost all pipelines meet recommended velocity criteria. The only high-velocity pipeline segments are on either side of the Sunnyhills PRV. This 6-inch diameter stretch of pipe experiences velocities of 16.5 ft/s in the Base alternative and 9.0 ft/s in Alternative 1. The remaining pipes meet recommended velocity criteria, with velocities ranging from 0.01 ft/s to approximately 6.1 ft/s.



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Base Operations, all turnouts are operational, and all pumps are turned off.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



**Average Day Pressure**

- Less than 40 psi
- 40 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

**High Pressure (Zone 1)**

- Greater than 80 psi

**High Pressure (Zone 2 and Hillside)**

- 80 psi to 150 psi
- Greater than 150 psi

• Turnout

• Groundwater Well

• Pressure Reducing Valve

• PS Pump Station

• Storage Reservoir

• Pipeline



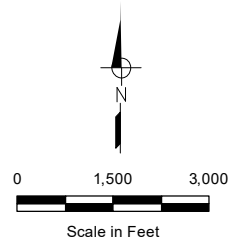
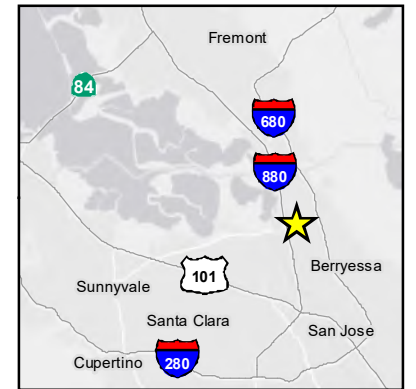
**Figure 8-1**

**Existing System Pressures  
Average Day Demand  
Base Operations**



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Alternative 1 Operations, all turnouts are operational, and pumps operate as needed.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



**Average Day Pressure**

- Less than 40 psi
- 40 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

**High Pressure (Zone 1)**

- Greater than 80 psi

**High Pressure (Zone 2 and Hillside)**

- 80 psi to 150 psi
- Greater than 150 psi

☼ Turnout

W Groundwater Well

◇ Pressure Reducing Valve

PS Pump Station

Storage Reservoir

— Pipeline



**Figure 8-2**

**Existing System Pressures  
Average Day Demand  
Alternative 1 Operations**





### 8.5.3 Peak Hour Demand Analysis

The hydraulic model was used to conduct a steady-state hydraulic analysis of the system during an existing PHD condition for each of the alternatives listed in Table 8-5. As shown in Table 8-1, the PHD for the existing water service area is approximately 18,011 gpm (25.9 mgd). Under PHD conditions, the recommended minimum pressure is 30 psi. Any services experiencing pressures less than 30 psi during a PHD condition would require an individual booster pump.

Results from the PHD simulations for Base and Alternative 1 operations are shown on Figure 8-3 and Figure 8-4, respectively. Figure 8-3 and Figure 8-4 are similar to Figure 8-1 and Figure 8-2, with distribution system locations color coded by pressure. Pressures are slightly higher for Alternative 1 (pumps on), but there are no significant differences in system performance based on operations. In both cases, there are no customer service locations with pressures below 30 psi.

Almost all distribution system pipelines meet velocity criteria under PHD conditions. The 6-inch diameter pipes on either end of the Sunnyhills PRV continue to experience high velocities: 25.5 ft/s in the Base alternative and 19.9 ft/s in Alternative 1. Pipelines at the Gibraltar facility and at the Sunnyhills and Main turnouts also see high velocities (8-12 ft/s). For the rest of the system, velocities range from 0.01 ft/s to approximately 7.8 ft/s.

### 8.5.4 Maximum Day Demand Analysis

The hydraulic model was used to conduct a steady-state hydraulic analysis of the system during an existing MDD condition for each of the alternatives listed in Table 8-5. As shown in Table 8-1, the MDD for the existing water service area is approximately 9,990 gpm (14.4 mgd). Under MDD conditions, the recommended minimum pressure is 40 psi. The same maximum pressure criteria apply as described in the ADD analysis, but since pressures would be higher under ADD conditions, system performance relative to maximum pressures is not discussed here.

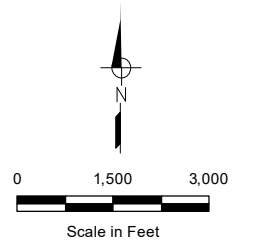
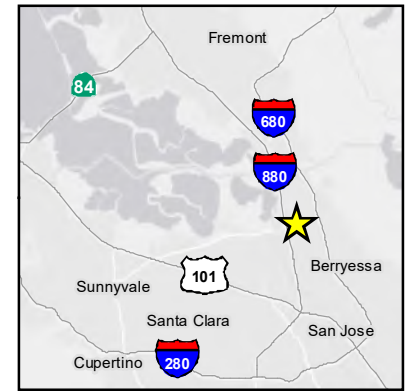
Results from the MDD simulations for Base and Alternative 1 operations are shown on Figure 8-5 and Figure 8-6, respectively. As with figures for ADD and PHD demand conditions, distribution system locations are color coded by pressure. Pressures are slightly higher for Alternative 1 (pumps on), but there are no significant differences in system performance based on operations. In both cases, there are no customer service locations with pressures below 40 psi.

Almost all distribution system pipelines meet velocity criteria under MDD demand conditions. The 6-inch diameter pipes on either end of the Sunnyhills PRV experience high velocities: approximately 19.1 ft/s and 12.1 ft/s under Base and Alternative 1 operations, respectively. Also, on either side of the Gibraltar PRV, the 16-inch diameter pipes see velocities of 6.6 ft/s under Base operations. For the rest of the system, velocities range from 0.01 ft/s to approximately 7.7 ft/s.



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Base Operations, all turnouts are operational, and all pumps are turned off.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



Peak Hour Pressure

- Less than 30 psi
- 30 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

High Pressure (Zone 1)

- Greater than 80 psi

High Pressure (Zone 2 and Hillside)

- 80 psi to 150 psi
- Greater than 150 psi

Turnout



Groundwater Well



Pressure Reducing Valve



Pump Station



Storage Reservoir

Pipeline



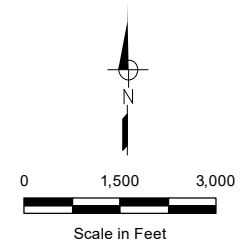
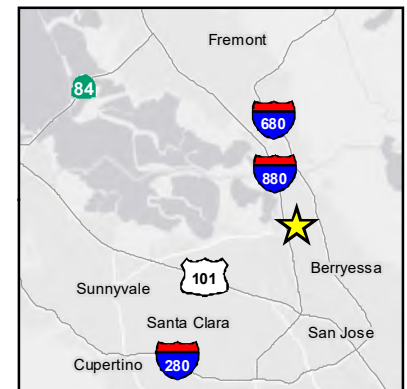
Figure 8-3

Existing System Pressures  
Peak Hour Demand  
Base Operations



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Alternative 1 Operations, all turnouts are operational, and pumps operate as needed.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



Peak Hour Pressure

- Less than 30 psi
- 30 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

High Pressure (Zone 1)

- Greater than 80 psi

High Pressure (Zone 2 and Hillside)

- 80 psi to 150 psi
- Greater than 150 psi

Turnout



Groundwater Well



Pressure Reducing Valve



Pump Station



Storage Reservoir

Pipeline



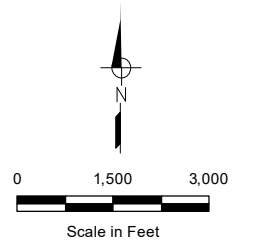
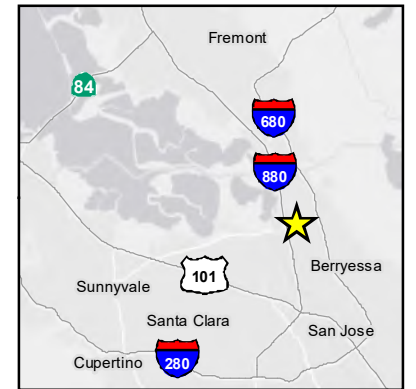
Figure 8-4

Existing System Pressures  
Peak Hour Demand  
Alternative 1 Operations



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Base Operations, all turnouts are operational, and all pumps are turned off.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



**Maximum Day Pressure**

- Less than 40 psi
- 40 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

**High Pressure (Zone 1)**

- Greater than 80 psi

**High Pressure (Zone 2 and Hillside)**

- 80 psi to 150 psi
- Greater than 150 psi

☼ Turnout

W Groundwater Well

◇ Pressure Reducing Valve

PS Pump Station

Storage Reservoir

— Pipeline



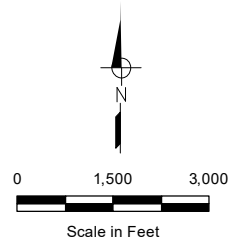
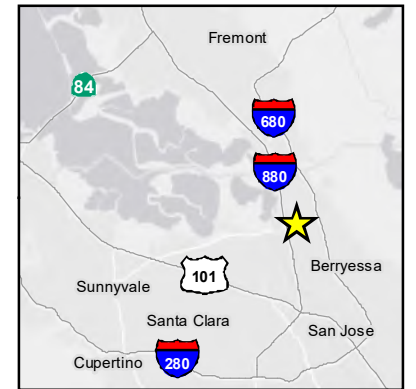
**Figure 8-5**

**Existing System Pressures  
Maximum Day Demand  
Base Operations**



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Alternative 1 Operations, all turnouts are operational, and pumps operate as needed.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



**Maximum Day Pressure**

- Less than 40 psi
- 40 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

**High Pressure (Zone 1)**

- Greater than 80 psi

**High Pressure (Zone 2 and Hillside)**

- 80 psi to 150 psi
- Greater than 150 psi

• Turnout

• Groundwater Well

• Pressure Reducing Valve

• PS Pump Station

• Storage Reservoir

• Pipeline



**Figure 8-6**

**Existing System Pressures  
Maximum Day Demand  
Alternative 1 Operations**





### 8.5.5 Maximum Day Demand Plus Concurrent Fire Flow Analysis

Based on existing land use of adjacent parcels and recommended fire flows in Table 7-1, fire flows were assigned to hydrant locations throughout the distribution system. Where a hydrant may serve multiple land uses (e.g., commercial and industrial), the higher fire flow was assigned. In total, fire flows were assigned to approximately 2,150 locations throughout the distribution system.

Fire flows were then simulated during an MDD condition using the hydraulic model. The hydraulic model conducts fire flow analyses by simulating a fire flow demand at one hydrant location and verifying whether the system can serve all other normal customer demands while maintaining desired residual pressures. This is repeated for all hydrant locations within the distribution system. Hydrant locations meet recommended fire flows if they can deliver the recommended fire flow while maintaining a 20-psi residual system pressure. Note, this fire flow analysis reflects distribution system capacity, as individual hydrants and their associated losses are not modeled.

As discussed in Section 7.2.1, recommended fire flow criteria presented in Table 7-2 apply to future development and not existing system conditions. Much of the City's distribution system is older and was designed to earlier fire flow standards in place at the time the pipelines were installed. Therefore, the existing system fire flow evaluation presents systemwide available fire flow and does not recommend pipeline improvements to increase existing fire flow capacity. However, the City can use these results to prioritize replacing smaller diameter pipelines to improve overall flows throughout the distribution system, which is why potential improvement projects are discussed below.

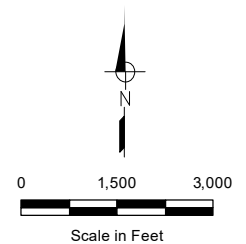
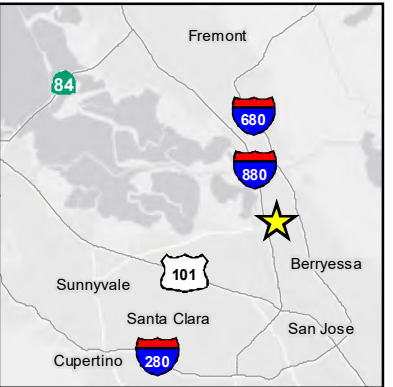
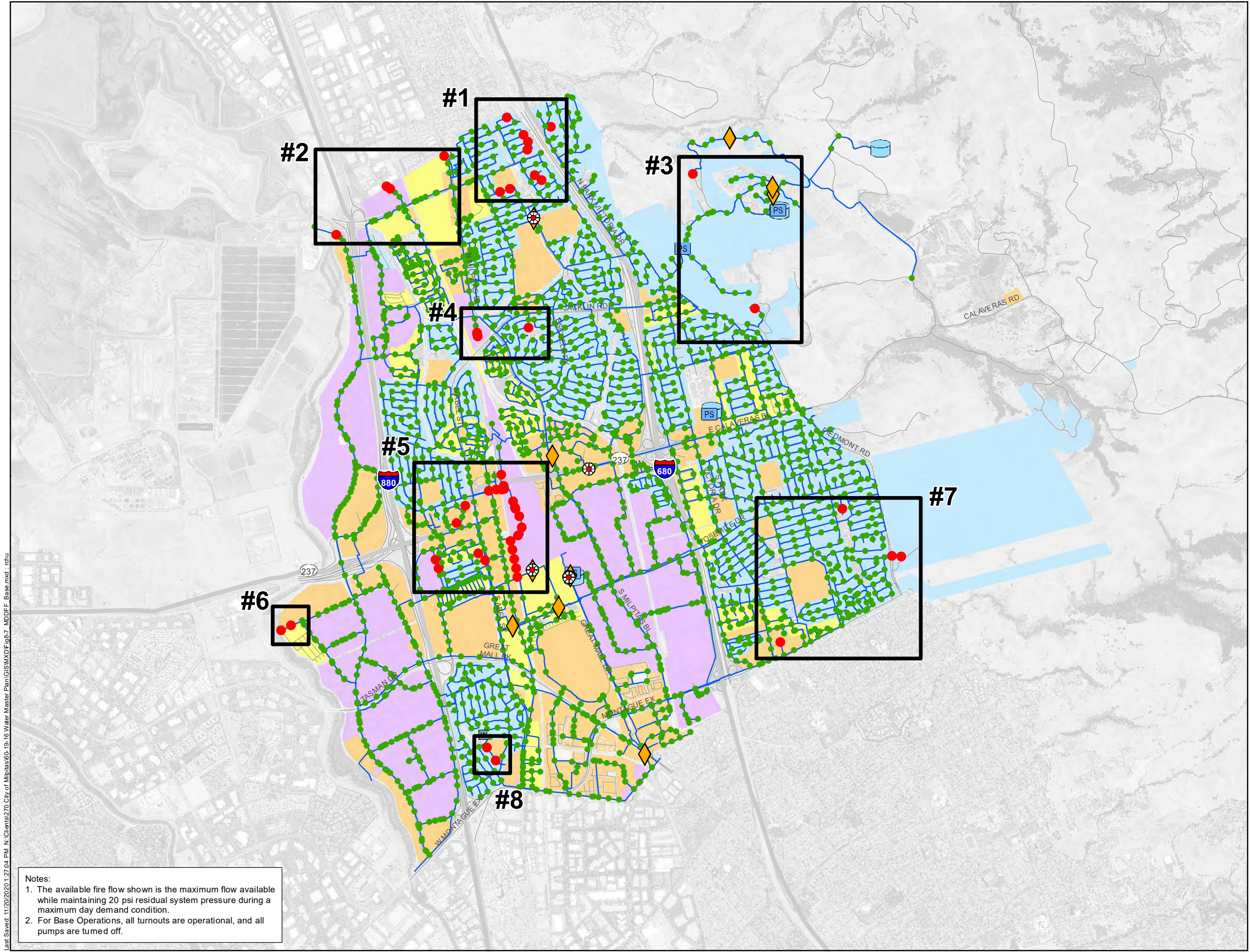
Fire flow analyses were performed independently for each pressure zone, with Zones 1 and 2 combined for each service area. It was assumed that only one fire event would occur at a time, which is standard industry practice. Results from MDD plus concurrent fire flow simulations for Base and Alternative 1 operations are shown on Figure 8-7 and Figure 8-8, respectively. Hydrant locations are represented by circles and color coded by fire flow availability, while parcels are shaded according to recommended fire flow. For example, a green circle adjacent to a purple parcel means that the distribution system can meet a 4,000 gpm fire flow at that location while maintaining 20 psi in the rest of the system.

System performance is similar for the two operational alternatives. With pumps off (Base alternative), 51 locations do not meet recommended fire flows, while 45 locations are below the fire flow criterion under Alternative 1. All "below criterion" locations in Alternative 1 are also flagged in the Base alternative, so pump operation improves fire flow availability for six locations. Since pumps could be off during a fire event, recommended improvements address all 51 below criterion locations identified in the Base alternative.

Before evaluating system improvements, West Yost examined each below criterion location to verify whether the recommended fire flow could be adequately served by multiple hydrants. Distributing the recommended fire flow among multiple hydrants reduces friction losses, because only a portion of the flow reaches the hydrant closest to the simulated fire. The remainder of the fire flow is delivered by an adjacent hydrant served by a shorter (or entirely different) pipeline path. These reduced friction losses can be significant, in some cases allowing otherwise below criterion locations to meet recommended fire flows.

It was assumed that any location with another hydrant within the City's hydrant spacing guidelines (500 feet for single family areas and 300 feet for all other areas) would qualify for delivering fire flows through multiple hydrants. If the qualifying hydrants could combine to deliver the recommended fire flow while maintaining a 20-psi residual system pressure, then the location was no longer considered below criterion. Of the 51 below criterion locations identified in the Base alternative, 13 met recommended fire flows after looking at multiple hydrants.





- Available Fire Flow**
- Below Recommended Fire Flow
  - Meets Recommended Fire Flow
  - ⊗ Turnout
  - Ⓜ Groundwater Well
  - ◇ Pressure Reducing Valve
  - PS Pump Station
  - Ⓢ Storage Reservoir
  - Pipeline
- Recommended Fire Flow**
- 1,500 gpm
  - 2,500 gpm
  - 3,000 gpm
  - 4,000 gpm

Notes:

1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.
2. For Base Operations, all turnouts are operational, and all pumps are turned off.



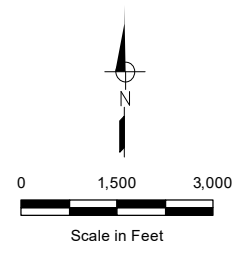
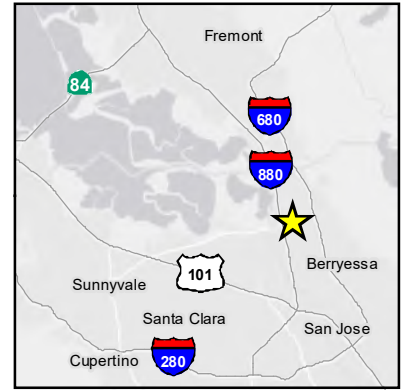
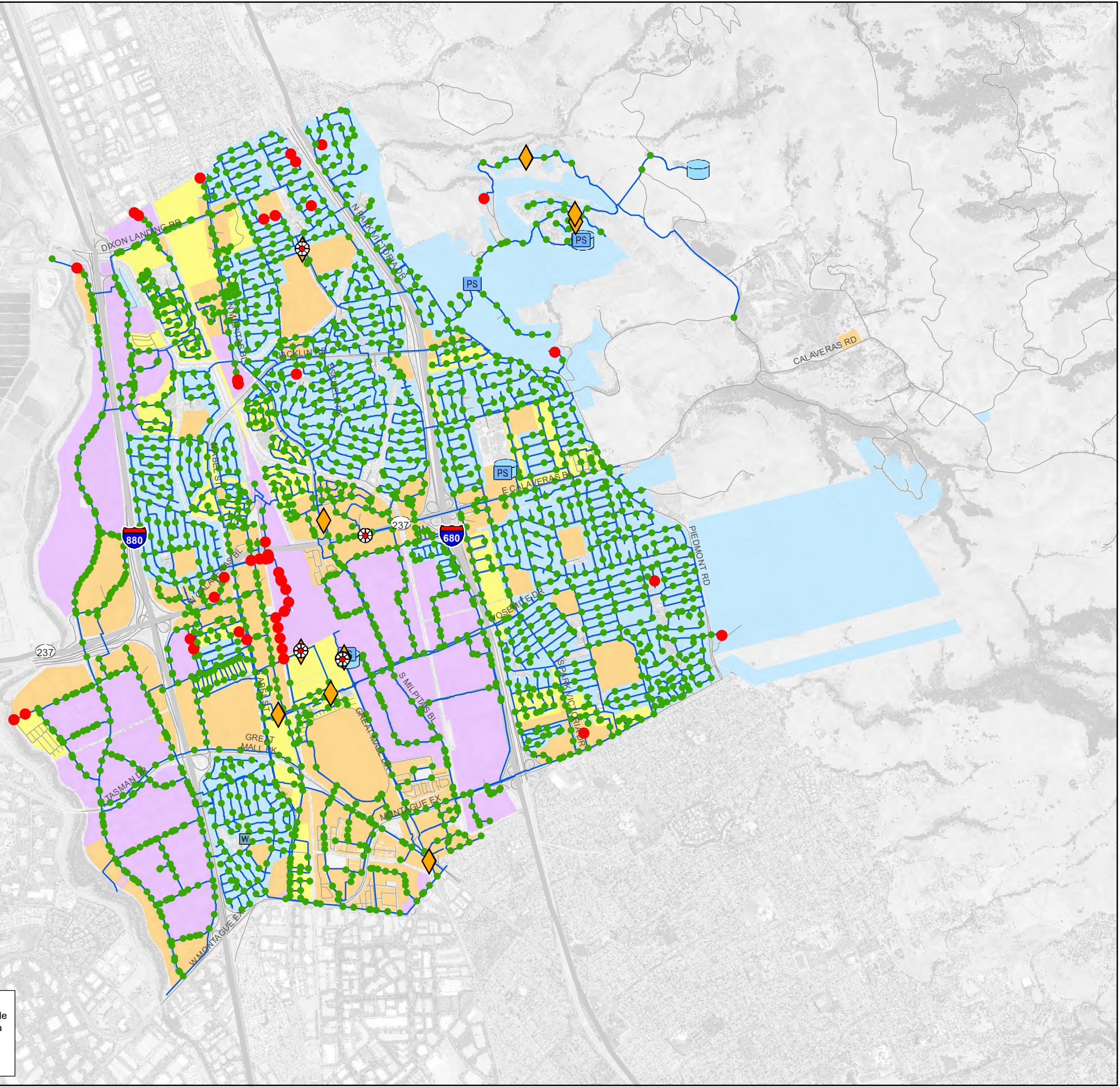
**Figure 8-7**  
**Existing System**  
**Available Fire Flow**  
**Base Operations**

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Notes:  
1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.  
2. For Alternative 1 Operations, all turnouts are operational, and pumps operate as needed.



- Available Fire Flow**
- Below Recommended Fire Flow
  - Meets Recommended Fire Flow
  - Turnout
  - Groundwater Well
  - Pressure Reducing Valve
  - Pump Station
  - Storage Reservoir
  - Pipeline
- Recommended Fire Flow**
- 1,500 gpm
  - 2,500 gpm
  - 3,000 gpm
  - 4,000 gpm



**Figure 8-8**  
**Existing System**  
**Available Fire Flow**  
**Alternative 1 Operations**





To organize discussion of the remaining below criterion locations, Figure 8-7 groups them into eight geographic areas. The recommended improvements for each area are discussed below. As mentioned earlier, each proposed project is assigned a CIP ID to simplify cross-referencing with Chapter 11. In general, to comply with the City's design guidelines, the City should also consider upsizing any pipelines smaller than 6 inches in diameter that serve hydrants. These are also listed below.

- Area No. 1
  - Along Sussex Place, replace approximately 190 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-23)
- Area No. 2
  - Along Milmont Drive between Dixon Landing Road and the ACWD intertie, replace approximately 910 LF of 8-inch and 10-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-06)
- Area No. 3
  - Along Calera Creek Heights Drive between approximately hydrants 4A-001 and 4A-005, replace approximately 1,480 LF of 6-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-26)
- Area No. 4
  - Along Hanson Court, replace approximately 610 LF of 8-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-05)
  - Along Merz Court, replace approximately 430 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-21)
- Area No. 5
  - Along Sinnott Lane, Bothelo Avenue, and East Carlo Street, replace approximately 1,730 LF of 6-inch and 8-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-01)
  - On Hammond Way near Tom Evatt Park, replace the (normally closed) isolation valve separating Zones VW1 and SF1 with an emergency pressure reducing valve (EPRV) to allow flows from Zone SF1 during a fire event along Hammond Way (ECIP-V-01). Alternatively, the City can replace approximately 1,300 LF of 8-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-02).
  - Along Railroad Avenue between approximately hydrant 1A-355 and the southern end of Railroad Avenue, replace approximately 880 LF of 8-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-07)
  - For the below criterion locations near the western end of Corning Avenue, install a new isolation valve at the end of the existing Zone SF1 pipeline, immediately upstream of the tee connecting Zones VW1 and SF1. Should a fire occur at the adjacent industrial site, the City can open existing (normally closed) isolation valves (numbers 35 and 35100) to supplement flows to the area. The hydraulic model shows these locations meet recommended fire flows with this adjustment. The new isolation valve can be closed to maintain separation between Zones VW1 and SF1 (ECIP-V-02). Alternatively, the City can replace approximately 870 LF of 8-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-03).



- Along South Abel Street between Sylvia Avenue and Corning Avenue, replace approximately 240 LF of 6-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-11)
- Area No. 6
  - Along Technology Drive between Murphy Ranch Road and the western end of Technology Drive, replace approximately 740 LF of 4-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-04)
- Area No. 7
  - Along Carlsbad Street between Carlsbad Court and Ben Rodgers Park, replace approximately 160 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-25)
  - Along Pinard Street from Ridgemont Drive up to the Lee's Orchard community, replace approximately 680 LF of 8-inch diameter pipeline with 12-inch diameter pipeline (ECIP-PI-16)
  - Within the shopping center east of the intersection of South Park Victoria Drive and Landess Avenue, replace approximately 450 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-08)
- Area No. 8
  - Along Greenwood Way between Pinewood Way and Fallen Leaf Drive, replace approximately 860 LF of 6-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-10)
- Pipelines less than 6 inches in diameter that serve hydrants
  - Along Santa Rita Drive near the intersection of Santa Rita Drive and Via Baja Drive, replace approximately 20 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-32)
  - Along Calle del Prado, replace approximately 90 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-33)
  - Along Kennedy Drive between Topham Court and Prada Drive, replace approximately 330 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-34)
  - Along Ramos Court, replace approximately 60 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-36)
  - Along Stemel Court, replace approximately 50 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-37)
  - Along Sepulveda Court, replace approximately 20 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-38)
  - Along Berg Court, replace approximately 110 LF of 4-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-39)



#### 8.5.6 Emergency Outage Scenarios

The following emergency outage evaluations identify how well the distribution system functions without one or more key facilities. For reference, the outage scenarios consist of:

- SFPUC turnouts are offline
- VW turnout is offline
- SFPUC and VW turnouts are offline
- Power outage; all facilities without backup generators are offline
- PRVs normally allowing flow between Zones 1 and 2 are offline

Emergency outage scenarios are not intended to evaluate the adequacy of emergency water supplies, which is outside the scope of this master plan. Instead, these evaluations examine system pressures and fire flow availability during an MDD condition. To be conservative, storage reservoir levels are assumed to be at the minimum of normal operating range (see Table 3-4).

Since emergency scenarios assume certain facilities are offline, the corresponding evaluations do not examine system performance under Base and Alternative 1 operations. Besides the assumed outage, there are no additional operational restrictions. All facilities not assumed offline as part of the scenario are assumed to be operational.

Results for each emergency outage scenario are summarized below. Where presented, figures showing system performance during emergency outages are similar to non-emergency figures discussed above. Distribution system locations are color coded by either pressure (for MDD evaluations) or fire flow availability (for fire flow evaluations).

##### 8.5.6.1 Outage Scenario 1 – SFPUC Offline

This outage scenario assumes supply from SFPUC is unavailable, so the Sunnyhills, Calaveras, Main Street, and Intertie turnouts are offline. As a result, the City's normally available potable water supply consists of VW (i.e., the Gibraltar turnout) and storage.

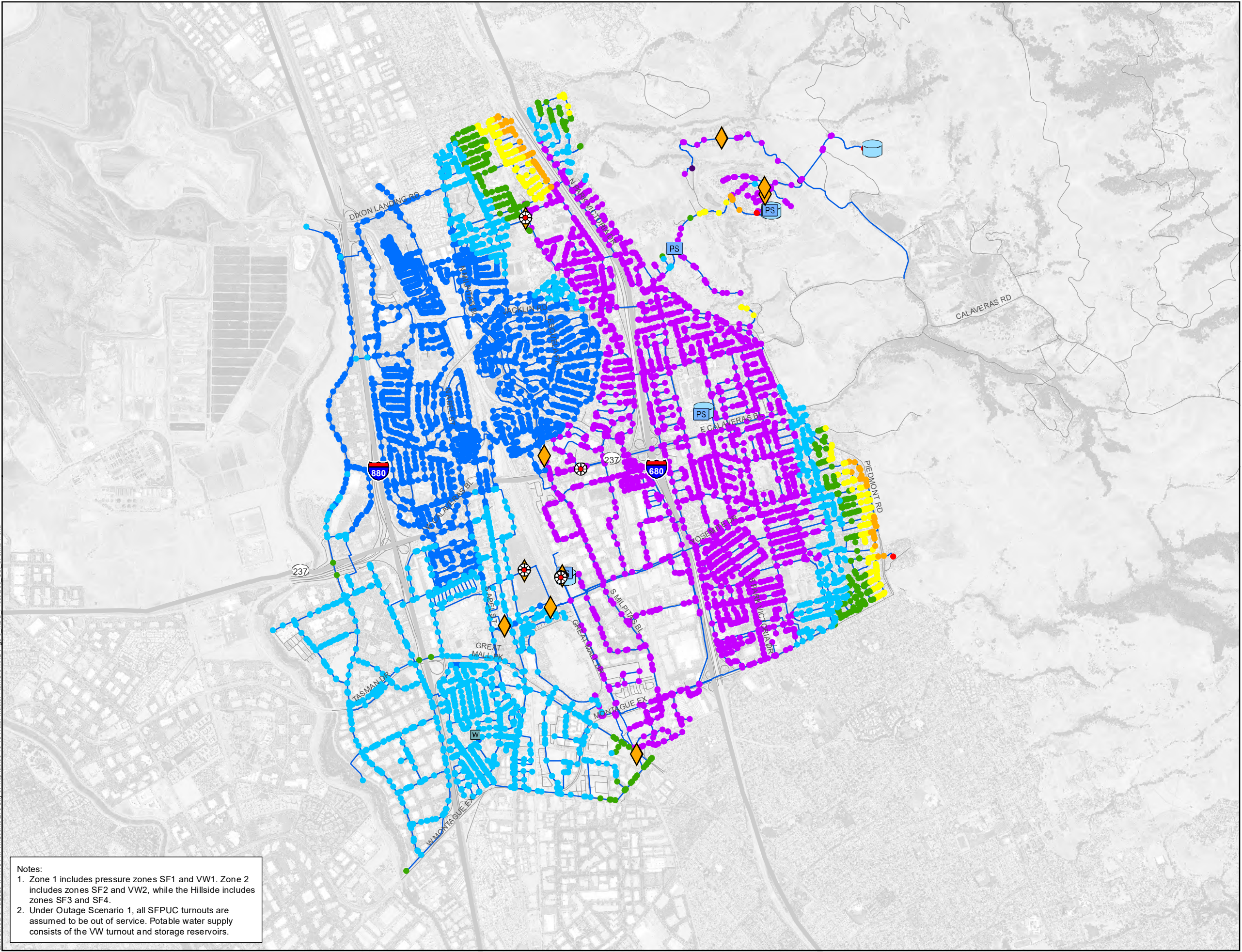
Figure 8-9 shows system pressures under MDD conditions in this outage scenario. Even without SFPUC turnout flows, the system is able to maintain adequate pressures. There are no customer service locations with pressures below 40 psi.

Fire flow availability is significantly hindered with SFPUC turnouts offline. As shown on Figure 8-10, in this outage scenario more than 260 locations do not meet recommended fire flows under this outage scenario. Compared to normal operations, this is over 200 additional below criterion locations, most of which are in Zone SF2. This is due to the relatively small pumps at the Ayer pump station. While the Gibraltar (SF) pumps can serve Zone SF1 fire flows, the pumps at the Ayer pump station cannot deliver Zone SF2 fire flows.

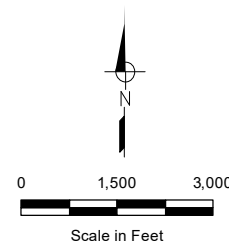
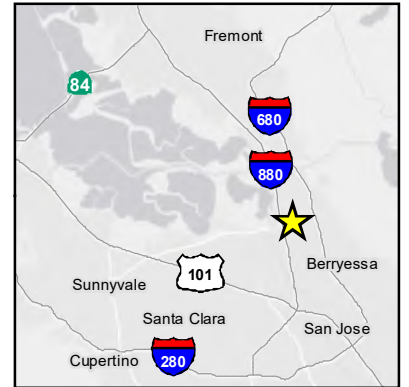
As a result, West Yost recommends installing a pump to meet fire flow at the Ayer pump station (ECIP-PS-AY) with a design capacity of 4,000 gpm at 285 ft of total dynamic head (TDH). Hydraulic model results show that with the pump installed, the distribution system actually slightly outperforms the existing system under normal conditions. While 45 locations were below criterion under Alternative 1 operations, 43 are below criterion with SFPUC turnouts offline and the new Ayer pump active.



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Notes:  
1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.  
2. Under Outage Scenario 1, all SFPUC turnouts are assumed to be out of service. Potable water supply consists of the VW turnout and storage reservoirs.



- Maximum Day Pressure**
- Less than 40 psi
  - 40 psi to 50 psi
  - 50 psi to 60 psi
  - 60 psi to 70 psi
  - 70 psi to 80 psi
- High Pressure (Zone 1)**
- Greater than 80 psi
- High Pressure (Zone 2 and Hillside)**
- 80 psi to 150 psi
  - Greater than 150 psi
- Turnout
- Groundwater Well
- Pressure Reducing Valve
- Pump Station
- Storage Reservoir
- Pipeline

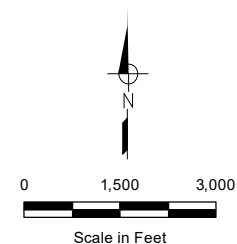
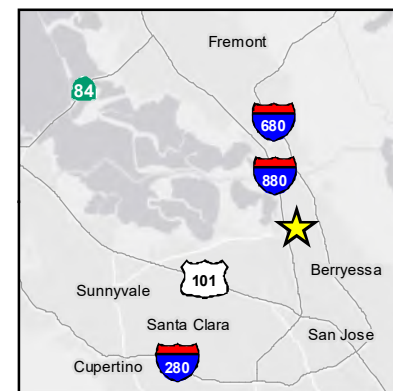
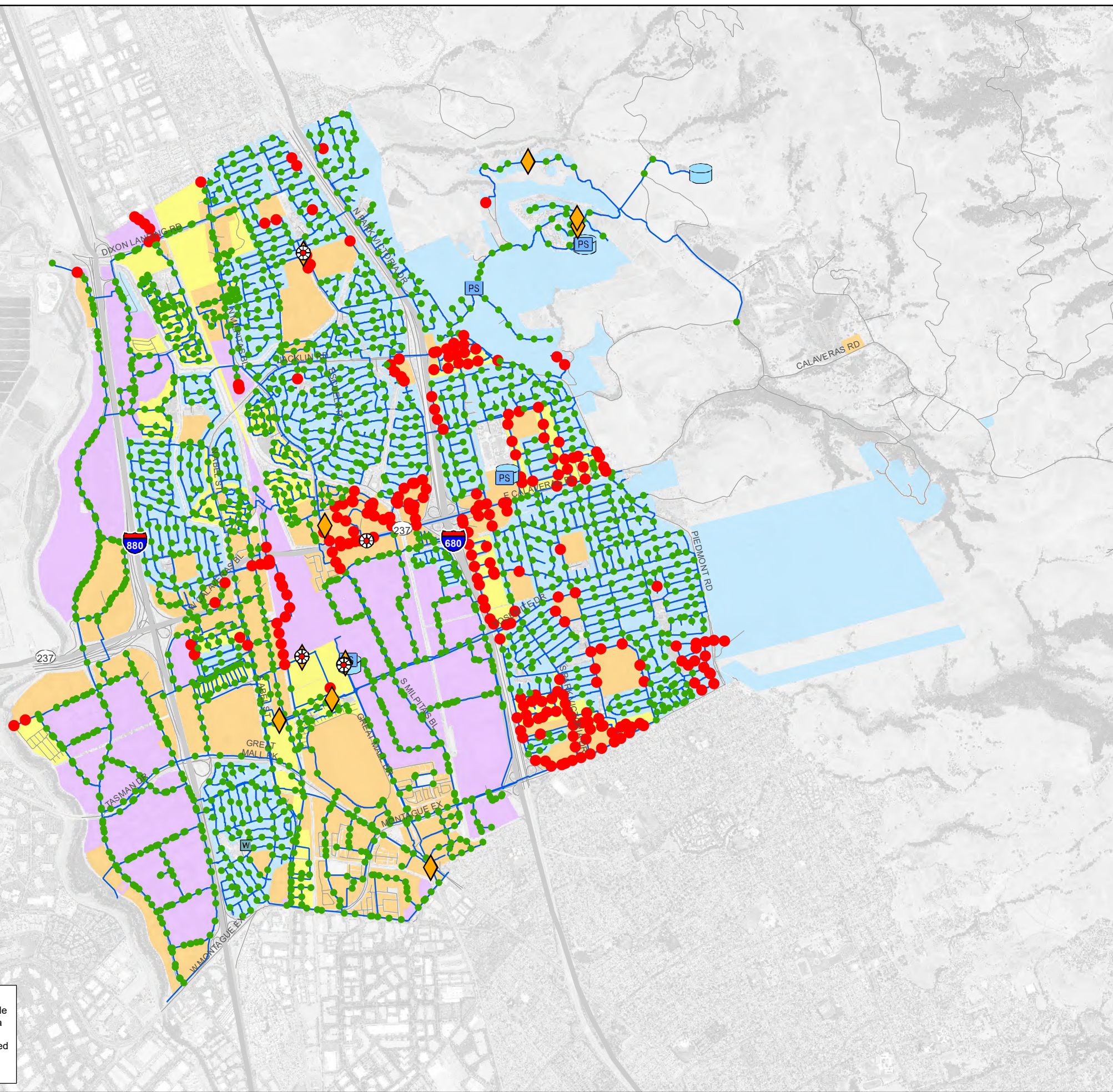


**Figure 8-9**  
**Existing System Pressures**  
**Maximum Day Demand**  
**Outage Scenario 1**



Notes:

1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.
2. Under Outage Scenario 1, all SFPUC turnouts are assumed to be out of service. Potable water supply consists of the VW turnout and storage reservoirs.



Available Fire Flow

- Below Recommended Fire Flow
- Meets Recommended Fire Flow
- ⊗ Turnout
- W Groundwater Well
- ◇ Pressure Reducing Valve
- PS Pump Station
- ⊂ Storage Reservoir
- Pipeline

Recommended Fire Flow

- 1,500 gpm
- 2,500 gpm
- 3,000 gpm
- 4,000 gpm



Figure 8-10

Existing System  
Available Fire Flow  
Outage Scenario 1





#### **8.5.6.2 Outage Scenario 2 – VW Offline**

This outage scenario assumes supply from VW is unavailable, so the Gibraltar turnout is offline. As a result, the City's normally available potable water supply consists of SFPUC turnouts and storage.

Figure 8-11 and Figure 8-12 show system pressures and fire flow availability, respectively, under MDD conditions in this outage scenario. System performance is similar to the Alternative 1 MDD scenarios (Figure 8-6 and Figure 8-8). The Gibraltar (VW) pumps adequately substitute for the Gibraltar turnout, so there remain no customer service locations with pressures below 40 psi. Regarding fire flow availability, there are no additional below criterion locations resulting from the turnout outage. Thus, West Yost does not recommend any improvements based on Outage Scenario 2.

#### **8.5.6.3 Outage Scenario 3 – SFPUC and VW Offline**

This outage scenario assumes supplies from both SFPUC and VW are unavailable, so all turnouts are offline. As a result, the City's normally available potable water supply consists of storage only.

Figure 8-13 and Figure 8-14 show system pressures and fire flow availability, respectively, under MDD conditions in this outage scenario. Since the VW outage does not significantly impact the distribution system, this scenario is similar to Outage Scenario 1 (SFPUC offline). In other words, customer service pressures remain at or above 40 psi, but fire flow availability is significantly reduced.

The additional pumping capacity at the Ayer pump station recommended in Outage Scenario 1 eliminates the fire flow impacts resulting from the turnout outage. No other improvements are needed to address issues created by this outage scenario.

#### **8.5.6.4 Outage Scenario 4 – Power Outage**

This outage scenario assumes electrical power is unavailable, so any facilities without backup generators are offline. While this does not impact the City's normally available potable water supply, distribution system operations are hindered. The Country Club and Tularcitos pump stations have backup power plug-in adapters and transfer switches, but the City does not yet have portable generators. To be conservative, it is assumed the Country Club and Tularcitos pump stations are unavailable in a power outage. However, the Tularcitos and Minnis storage reservoirs can still serve Zones SF3 and SF4, respectively, during a power outage.

Figure 8-15 and Figure 8-16 show system pressures and fire flow availability, respectively, under MDD conditions in this outage scenario. The power outage does not significantly impact customer service pressures or fire flow availability, as the hillside storage reservoirs can adequately serve their respective pressure zones via gravity.

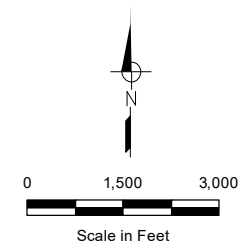
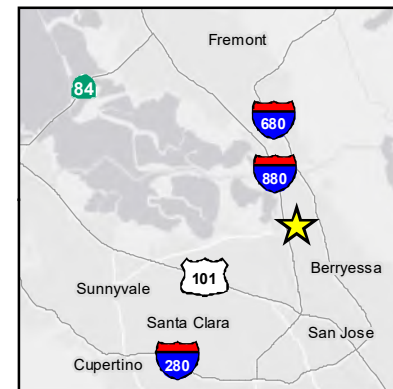
While there are no critical improvements associated with this outage scenario, having backup power capabilities at the Country Club and Tularcitos pump stations would provide redundancy. This could entail a backup generator or, as the City has discussed, purchasing a portable genset capable of powering either pump station.



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Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. Under Outage Scenario 2, the VW turnout is assumed to be out of service. Potable water supply consists of SFPUC turnouts and storage reservoirs.



Maximum Day Pressure

- Less than 40 psi
- 40 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

High Pressure (Zone 1)

- Greater than 80 psi

High Pressure (Zone 2 and Hillside)

- 80 psi to 150 psi
- Greater than 150 psi

Turnout



Groundwater Well



Pressure Reducing Valve



Pump Station



Storage Reservoir

Pipeline

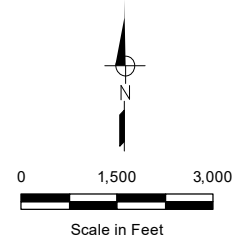
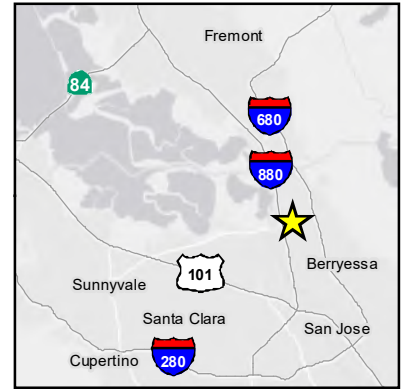


Figure 8-11

Existing System Pressures  
Maximum Day Demand  
Outage Scenario 2



Notes:  
1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.  
2. Under Outage Scenario 2, the VW turnout is assumed to be out of service. Potable water supply consists of SFPUC turnouts and storage reservoirs.



**Available Fire Flow**

- Below Recommended Fire Flow
- Meets Recommended Fire Flow
- Turnout
- Groundwater Well
- Pressure Reducing Valve
- Pump Station
- Storage Reservoir
- Pipeline

**Recommended Fire Flow**

- 1,500 gpm
- 2,500 gpm
- 3,000 gpm
- 4,000 gpm

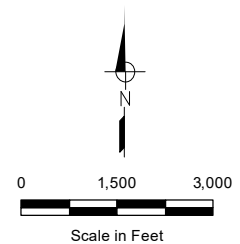
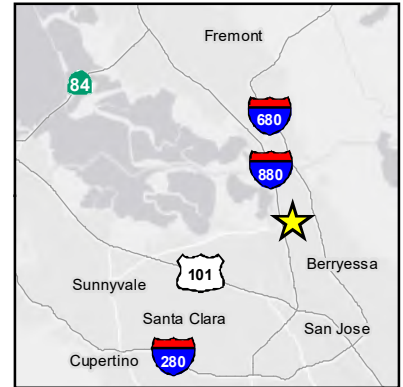


**Figure 8-12**  
**Existing System**  
**Available Fire Flow**  
**Outage Scenario 2**



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Notes:  
1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.  
2. Under Outage Scenario 3, all turnouts (both SFPUC and VW) are assumed to be out of service. Potable water supply consists only of storage reservoirs.



**Maximum Day Pressure**

- Less than 40 psi
- 40 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

**High Pressure (Zone 1)**

- Greater than 80 psi

**High Pressure (Zone 2 and Hillside)**

- 80 psi to 150 psi
- Greater than 150 psi

- Turnout
- Groundwater Well
- Pressure Reducing Valve

- Pump Station
- Storage Reservoir

Pipeline

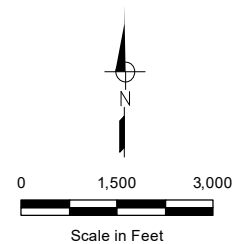
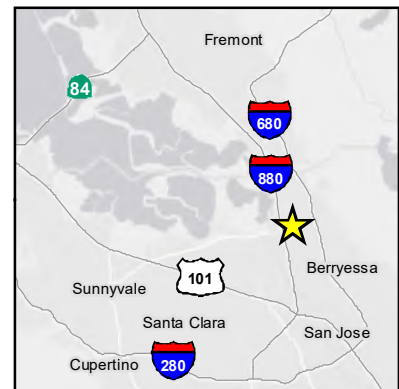


**Figure 8-13**  
**Existing System Pressures**  
**Maximum Day Demand**  
**Outage Scenario 3**



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Notes:  
1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.  
2. Under Outage Scenario 3, all turnouts (both SFPUC and VW) are assumed to be out of service. Potable water supply consists only of storage reservoirs.



**Available Fire Flow**

- Below Recommended Fire Flow
- Meets Recommended Fire Flow
- Turnout
- Groundwater Well
- Pressure Reducing Valve
- Pump Station
- Storage Reservoir
- Pipeline

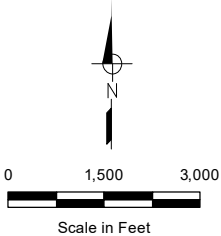
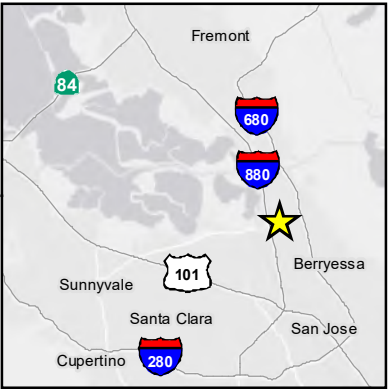
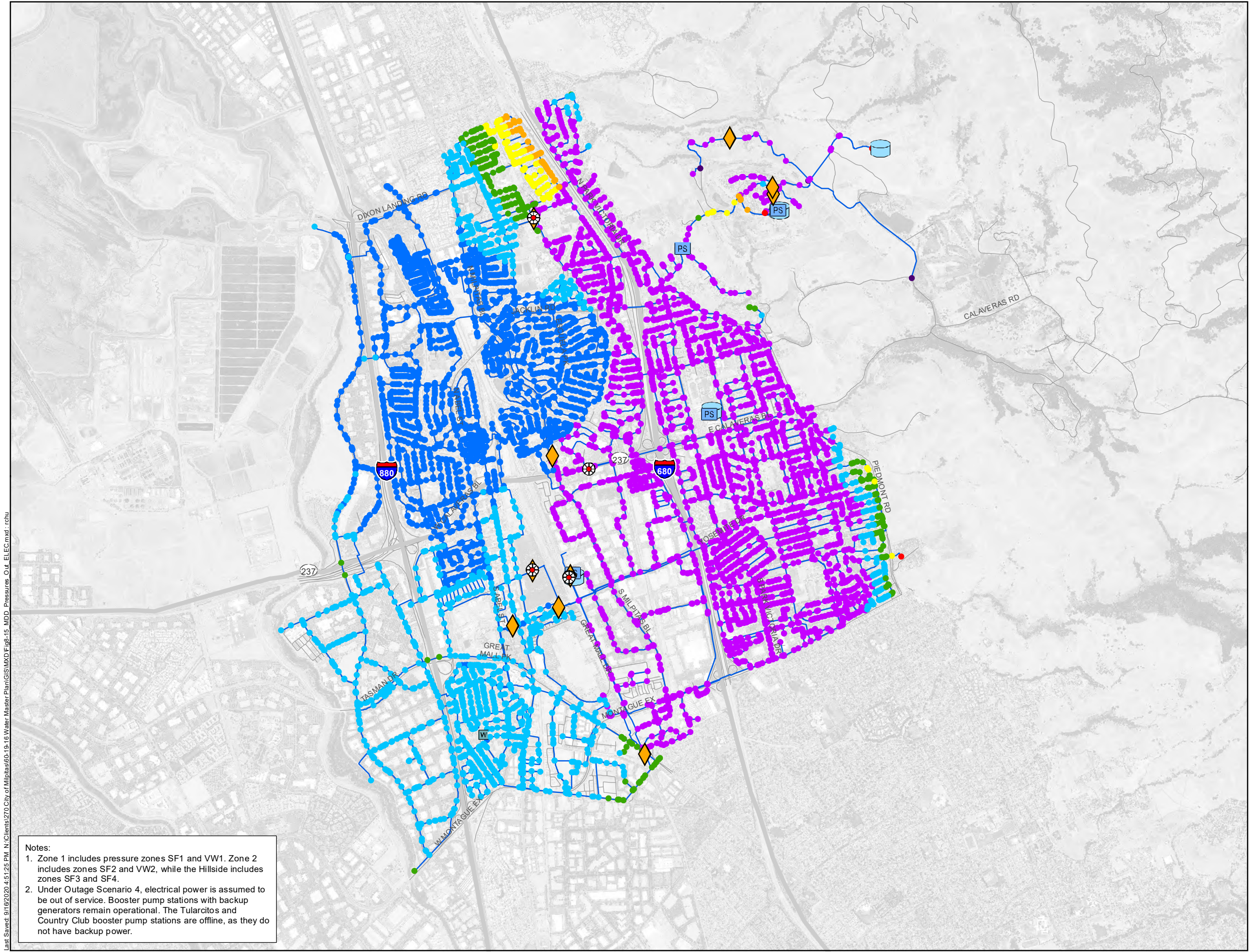
**Recommended Fire Flow**

- 1,500 gpm
- 2,500 gpm
- 3,000 gpm
- 4,000 gpm



**Figure 8-14**  
**Existing System**  
**Available Fire Flow**  
**Outage Scenario 3**





**Maximum Day Pressure**

- Less than 40 psi
- 40 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

**High Pressure (Zone 1)**

- Greater than 80 psi

**High Pressure (Zone 2 and Hillside)**

- 80 psi to 150 psi
- Greater than 150 psi

- ⊗ Turnout
- Ⓜ Groundwater Well
- ◇ Pressure Reducing Valve

- PS Pump Station
- Ⓢ Storage Reservoir
- Pipeline

Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. Under Outage Scenario 4, electrical power is assumed to be out of service. Booster pump stations with backup generators remain operational. The Tularcitos and Country Club booster pump stations are offline, as they do not have backup power.

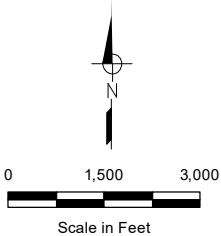
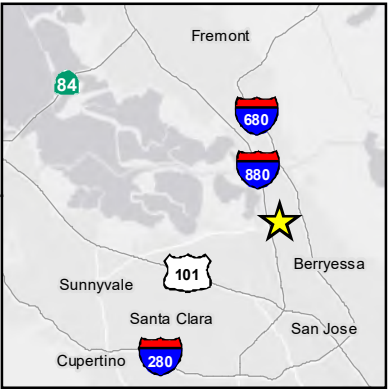


**Figure 8-15**  
**Existing System Pressures**  
**Maximum Day Demand**  
**Outage Scenario 4**



Notes:

1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.
2. Under Outage Scenario 4, electrical power is assumed to be out of service. Booster pump stations with backup generators remain operational. The Tularcitos and Country Club booster pump stations are offline, as they do not have backup power.



- Available Fire Flow**
- Below Recommended Fire Flow
  - Meets Recommended Fire Flow
  - Turnout
  - Groundwater Well
  - Pressure Reducing Valve
  - Pump Station
  - Storage Reservoir
  - Pipeline
- Recommended Fire Flow**
- 1,500 gpm
  - 2,500 gpm
  - 3,000 gpm
  - 4,000 gpm



**Figure 8-16**  
**Existing System**  
**Available Fire Flow**  
**Outage Scenario 4**





#### 8.5.6.5 Outage Scenario 5 – Zone 1/2 PRVs Offline

Outage Scenario 5 assumes a PRV normally allowing flow between Zones 1 and 2 is offline. These “Zone 1/2” PRVs include Main, North Milpitas, and Sunnyhills in the SFPUC service area and Capitol, Curtis East, Curtis West, and Parc Metro in the VW service area. System performance is evaluated with one PRV closed at a time. It is assumed EPRVs are available as needed.

Under MDD conditions, customer service pressures are not significantly impacted by any single Zone 1/2 PRV outage. Should any of these PRVs fail, the remaining PRVs allow the distribution system to operate such that customer service pressures are at least 40 psi.

In contrast, fire flow availability can be significantly reduced depending on the PRV outage. For Main, North Milpitas, and Curtis (East and West), operational status did not significantly impact fire flow availability. However, when Sunnyhills, Capitol, or Parc Metro were offline, fire flow availability decreased. The fire flow impacts of these outages are shown on Figure 8-17 and discussed below, followed by a review of the recommended improvements.

##### 8.5.6.5.1 Sunnyhills PRV Outage

Should the Sunnyhills PRV go offline, eight additional locations do not meet recommended fire flows. These locations are all in Zone SF1. West Yost recommends the following improvements to address these new below criterion locations:

- Near the intersection of Coelho Street and Diel Drive, replace the (normally closed) isolation valve separating Zones SF1 and SF2 with an EPRV to allow flows from SF2 during a fire event in the northern area of Zone SF1 (ECIP-V-03).
- Along Callan Street near the intersection of Callan Street and Arizona Avenue, replace approximately 140 LF of 6-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-28).
- Along Gross Street, near the intersection of Gross Street and Conway Street, replace approximately 170 LF of 6-inch diameter pipeline with 8-inch diameter pipeline (ECIP-PI-31).

##### 8.5.6.5.2 Capitol PRV Outage

Should the Capitol PRV go offline, 11 additional locations do not meet recommended fire flows. However, during a fire at any of these 11 locations (all in Zone VW1), the Live Oak and McCarthy EPRVs will allow sufficient flow from Zone SF1 to meet recommended fire flows. Thus, a Capitol PRV outage can be adequately handled by existing facilities, and no improvements are necessary.

##### 8.5.6.5.3 Parc Metro PRV Outage

Should the Parc Metro PRV go offline, five additional locations do not meet recommended fire flows. At one of these locations, EPRV operation improves fire flows to meet the recommended criterion. West Yost recommends the following improvements to address the remaining below criterion locations:

- Along Curtis Avenue, connect the existing 10-inch diameter pipeline on the northern side of the street to the existing 18-inch diameter pipeline on the southern side of the street. This new connection should be a 12-inch diameter pipeline (approximately 30 LF) and installed downstream of the Curtis PRVs (i.e., in Zone VW1) (ECIP-PN-01).

## Chapter 8

### Evaluation of Existing Water System



- Along Hammond Way, east of Tom Evatt Park, connect the existing 8-inch diameter pipelines in Zone VW1. These pipelines are currently dead ends, created by normally closed isolation valves separating the SFPUC and VW service areas. This new connection should be an 8-inch diameter pipeline and is estimated to be approximately 60 LF (ECIP PN-02).

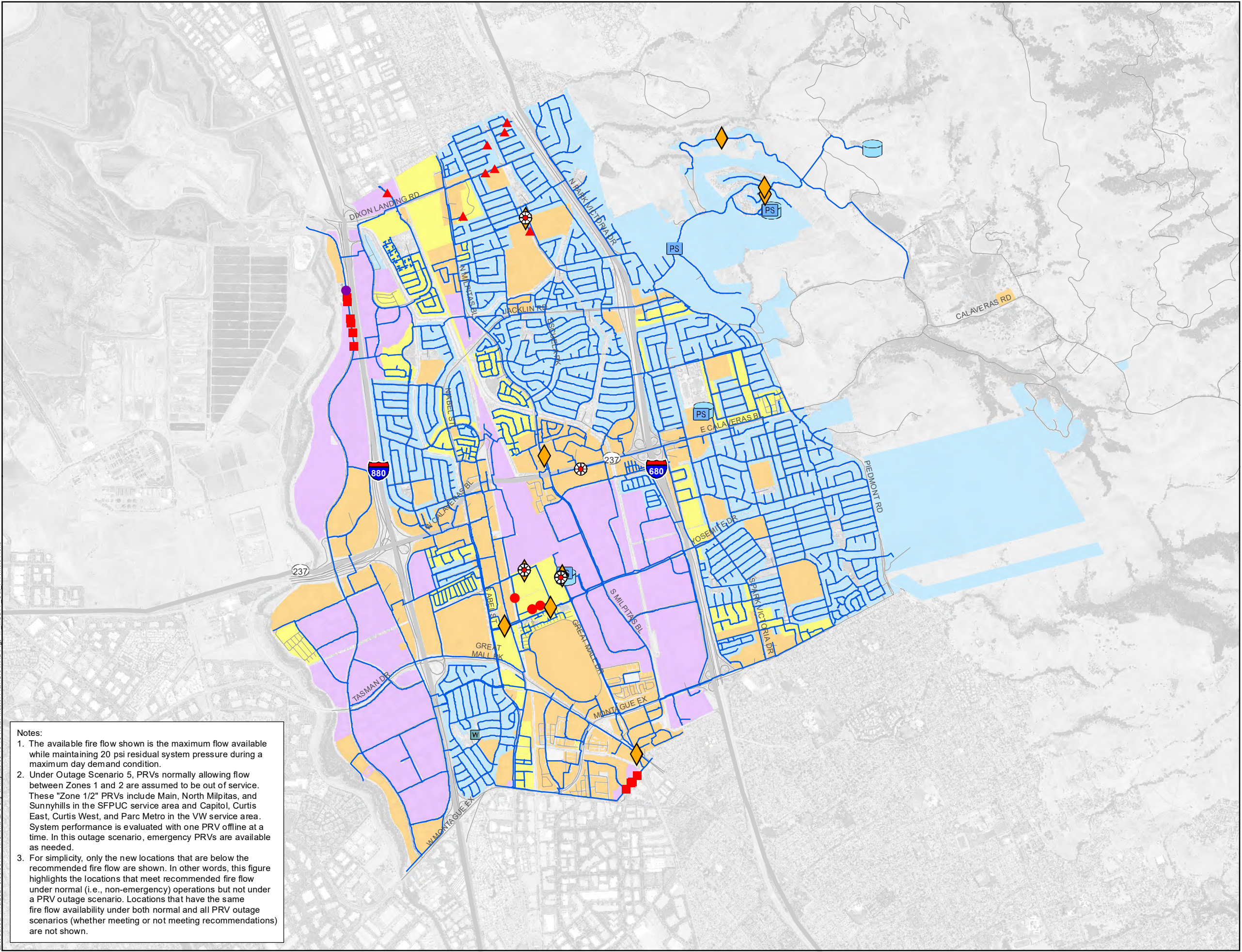
#### 8.5.6.5.4 PRV Outage Priority

Table 8-6 summarizes distribution system performance for each PRV outage. As shown in Table 8-6, each PRV is assigned a priority based on the impact of its outage. Parc Metro and Sunnyhills are the highest priority PRVs, while Main, North Milpitas, and Curtis East/West are the lowest priority PRVs.

| Table 8-6. PRV Outage Priority <sup>(a)</sup>                                                                                                                                                                                                                                                                                                                |                              |                                                                    |                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------|--------------------------------------------------------|
| PRV                                                                                                                                                                                                                                                                                                                                                          | Priority<br>(Low, Med, High) | No. of Additional<br>"Below Criterion"<br>Locations <sup>(b)</sup> | Notes                                                  |
| SFPUC Service Area                                                                                                                                                                                                                                                                                                                                           |                              |                                                                    |                                                        |
| Sunnyhills                                                                                                                                                                                                                                                                                                                                                   | High                         | 8                                                                  | Pipeline improvements recommended                      |
| Main                                                                                                                                                                                                                                                                                                                                                         | Low                          | 0                                                                  | No new below criterion locations from PRV outage       |
| North Milpitas                                                                                                                                                                                                                                                                                                                                               | Low                          | 0                                                                  | No new below criterion locations from PRV outage       |
| VW Service Area                                                                                                                                                                                                                                                                                                                                              |                              |                                                                    |                                                        |
| Parc Metro                                                                                                                                                                                                                                                                                                                                                   | High                         | 5                                                                  | New pipelines recommended                              |
| Capitol                                                                                                                                                                                                                                                                                                                                                      | Med                          | 11                                                                 | New below criterion locations fixed via existing EPRVs |
| Curtis East                                                                                                                                                                                                                                                                                                                                                  | Low                          | 0                                                                  | No new below criterion locations from PRV outage       |
| Curtis West                                                                                                                                                                                                                                                                                                                                                  | Low                          | 0                                                                  | No new below criterion locations from PRV outage       |
| <p>(a) Only PRVs normally allowing flow from Zone 2 to Zone 1 are assigned a priority.</p> <p>(b) Below criterion locations cannot serve recommended fire flows while maintaining a 20-psi residual system pressure during maximum day demands. This represents the number of "below criterion" locations above normal operations (i.e., Base scenario).</p> |                              |                                                                    |                                                        |

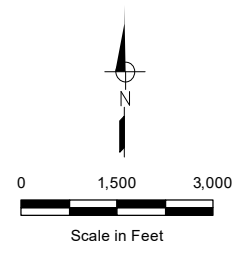
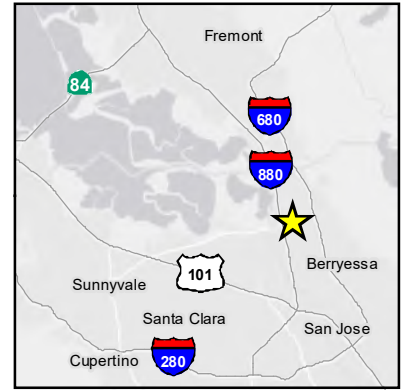


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Notes:

1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.
2. Under Outage Scenario 5, PRVs normally allowing flow between Zones 1 and 2 are assumed to be out of service. These "Zone 1/2" PRVs include Main, North Milpitas, and Sunnyhills in the SFPUC service area and Capitol, Curtis East, Curtis West, and Parc Metro in the VW service area. System performance is evaluated with one PRV offline at a time. In this outage scenario, emergency PRVs are available as needed.
3. For simplicity, only the new locations that are below the recommended fire flow are shown. In other words, this figure highlights the locations that meet recommended fire flow under normal (i.e., non-emergency) operations but not under a PRV outage scenario. Locations that have the same fire flow availability under both normal and all PRV outage scenarios (whether meeting or not meeting recommendations) are not shown.



**Locations Not Meeting Recommended Fire Flow Due to the Following PRV Outage(s)**

- ▲ Sunnyhills
- Parc Metro
- Capitol or Parc Metro
- Capitol
- ⊗ Turnout
- W Groundwater Well
- ◇ Pressure Reducing Valve
- PS Pump Station
- Storage Reservoir
- Pipeline

**Recommended Fire Flow**

- 1,500 gpm
- 2,500 gpm
- 3,000 gpm
- 4,000 gpm



**Figure 8-17**  
**Existing System**  
**Available Fire Flow**  
**Outage Scenario 5**





## **8.6 SUMMARY OF FINDINGS AND RECOMMENDED IMPROVEMENTS**

Below is a summary of findings and recommendations from the evaluations detailed in this chapter. Key recommendations for the existing system were used to develop a CIP, which is the focus of Chapter 11.

- **Supply Capacity**
  - Existing firm supplies exceed maximum day demand. While the VW service area has a firm supply deficit, it can be met by the surplus in the SFPUC service area. No additional supply facilities are recommended based on existing demands and normal operating conditions.
- **Storage Capacity**
  - There is sufficient storage in the SFPUC service area and a deficit of 0.45 MG in the VW service area. This deficit is not considered critical, as the Zone SF1 storage surplus can cover the shortfall in Zones VW1 and VW2. No additional storage is recommended based on existing demands and normal operating conditions.
- **Pumping Capacity**
  - Each pressure zone has a pumping capacity surplus. No additional pumping facilities are recommended based on existing demands and normal operating conditions.
- **Distribution System**
  - The existing distribution system meets all minimum pressure criteria under ADD, PHD, and MDD conditions.
  - West Yost identified potential improvements to address the locations not meeting recommended fire flows in the existing system. These mainly consist of upsizing existing 6-inch and 8-inch diameter pipelines, though some PRV and isolation valve improvements are also recommended. It is assumed these improvements will be implemented for the future water system evaluation in Chapter 9.
  - To comply with the City's design guidelines and improve fire flow capacity, the City should consider upsizing any 4-inch diameter pipelines that serve hydrants to 8-inch diameter pipelines.
  - Should SFPUC turnouts go offline, most of Zone SF2 has reduced fire flow capacity. As a result, West Yost recommends installing a pump at the Ayer pump station with a capacity of 4,000 gpm.
  - The existing system is well equipped to handle a power outage or a VW supply outage. No additional significant impacts arise in either emergency scenario.
  - To evaluate system performance during a PRV outage, PRVs normally allowing flow from Zone 2 to Zone 1 were simulated to be disabled one at a time. The Sunnyhills and Parc Metro PRVs are the most critical, as outages at either of these PRVs results in new locations not meeting recommended fire flows. Recommended improvements include a new EPRV, new pipelines, and pipeline upsizing.



## CHAPTER 9

# Evaluation of Future Water System

This chapter evaluates the City’s future (i.e., buildout) water system and its ability to meet recommended planning and performance criteria described in Chapter 7 and summarized in Table 7-1 of this report. It is assumed complete buildout will occur in the year 2040. The evaluation encompasses both system capacity and hydraulic performance using buildout water demands developed in Section 5.1 of this report. System capacity is evaluated based on potable water supply, storage, and pumping, while the hydraulic performance evaluation examines buildout distribution facilities under various demand and outage conditions. The following evaluations frequently refer to “normal” conditions, which are defined as non-emergencies (i.e., no fires or unplanned outages).

This chapter also includes recommendations for addressing any deficiencies identified from the evaluation. These are incorporated in a recommended CIP described in Chapter 11 of this report. To simplify cross-referencing with Chapter 11, each proposed project is assigned a unique CIP ID.

The following sections present the evaluation methodology and results:

- Buildout Potable Water Demands
- Potable Water Facilities for Buildout Analysis
- Buildout Potable Water Supply Capacity Evaluation
- Buildout Potable Water Storage Capacity Evaluation
- Buildout Pumping Capacity Evaluation
- Buildout Water Distribution System Evaluation
- Summary of Findings and Recommended Improvements

### 9.1 BUILDOUT POTABLE WATER DEMANDS

Buildout potable water demands are summarized in Table 9-1 and represent a combination of existing demands (presented in Table 8-1) and new demands from planned future growth and development in Opportunity Areas and the Gateway Specific Plan/Milpitas Metro Specific Plan areas. While existing demands were adjusted for NRW based on actual production data, future demands were assumed to have an NRW of 11 percent (as discussed in Section 5.1.3). Maximum day and peak hour peaking factors remain as listed in Table 5-7.

New water demand is concentrated in the VW service area, as most of the planned, future growth and development (including Gateway Specific Plan and Milpitas Metro Specific Plan) is anticipated in Zones VW1 and VW2. Existing demands in the SF service area are estimated to increase approximately 18 percent at buildout, while demands in the VW service area are expected to increase by almost 150 percent over the same period. Citywide, the buildout average day demand is estimated at approximately 13.9 mgd, a 67 percent increase from the existing (2019) average day demand of 8.3 mgd.



**Table 9-1. Buildout (2040) Potable Water Demands by Pressure Zone**

| Pressure Zone | Average Day Demand <sup>(a)</sup> |              | Maximum Day Demand <sup>(b)</sup> |              | Peak Hour Demand <sup>(c)</sup> |              |
|---------------|-----------------------------------|--------------|-----------------------------------|--------------|---------------------------------|--------------|
|               | gpm                               | mgd          | gpm                               | mgd          | gpm                             | mgd          |
| SF1           | 2,213                             | 3.19         | 3,541                             | 5.10         | 6,417                           | 9.24         |
| SF2           | 1,973                             | 2.84         | 3,157                             | 4.55         | 5,722                           | 8.24         |
| SF3           | 14                                | 0.02         | 44                                | 0.06         | 81                              | 0.12         |
| SF4-1         | 19                                | 0.03         | 61                                | 0.09         | 110                             | 0.16         |
| SF4-2         | 17                                | 0.02         | 54                                | 0.08         | 98                              | 0.14         |
| SF Subtotal   | 4,236                             | 6.10         | 6,857                             | 9.87         | 12,429                          | 17.90        |
| VW1           | 3,464                             | 4.99         | 6,582                             | 9.48         | 11,779                          | 16.96        |
| VW2           | 1,974                             | 2.84         | 3,752                             | 5.40         | 6,713                           | 9.67         |
| VW Subtotal   | 5,439                             | 7.83         | 10,334                            | 14.88        | 18,492                          | 26.63        |
| <b>Total</b>  | <b>9,675</b>                      | <b>13.93</b> | <b>17,191</b>                     | <b>24.75</b> | <b>30,920</b>                   | <b>44.53</b> |

(a) Based on existing (2019) demands, plus new demands from Opportunity Areas, Gateway Specific Plan, and Milpitas Metro Specific Plan (see Table 5-9 of this report).

(b) Maximum day demand is 1.6 times the average day demand for Zones SF1 and SF2, 3.2 times the average day demand for Zones SF3 and SF4, and 1.9 times the average day demand for the VW service area.

(c) Peak hour demand is 2.9 times the average day demand for Zones SF1 and SF2, 5.8 times the average day demand for Zones SF3 and SF4, and 3.4 times the average day demand for the VW service area.

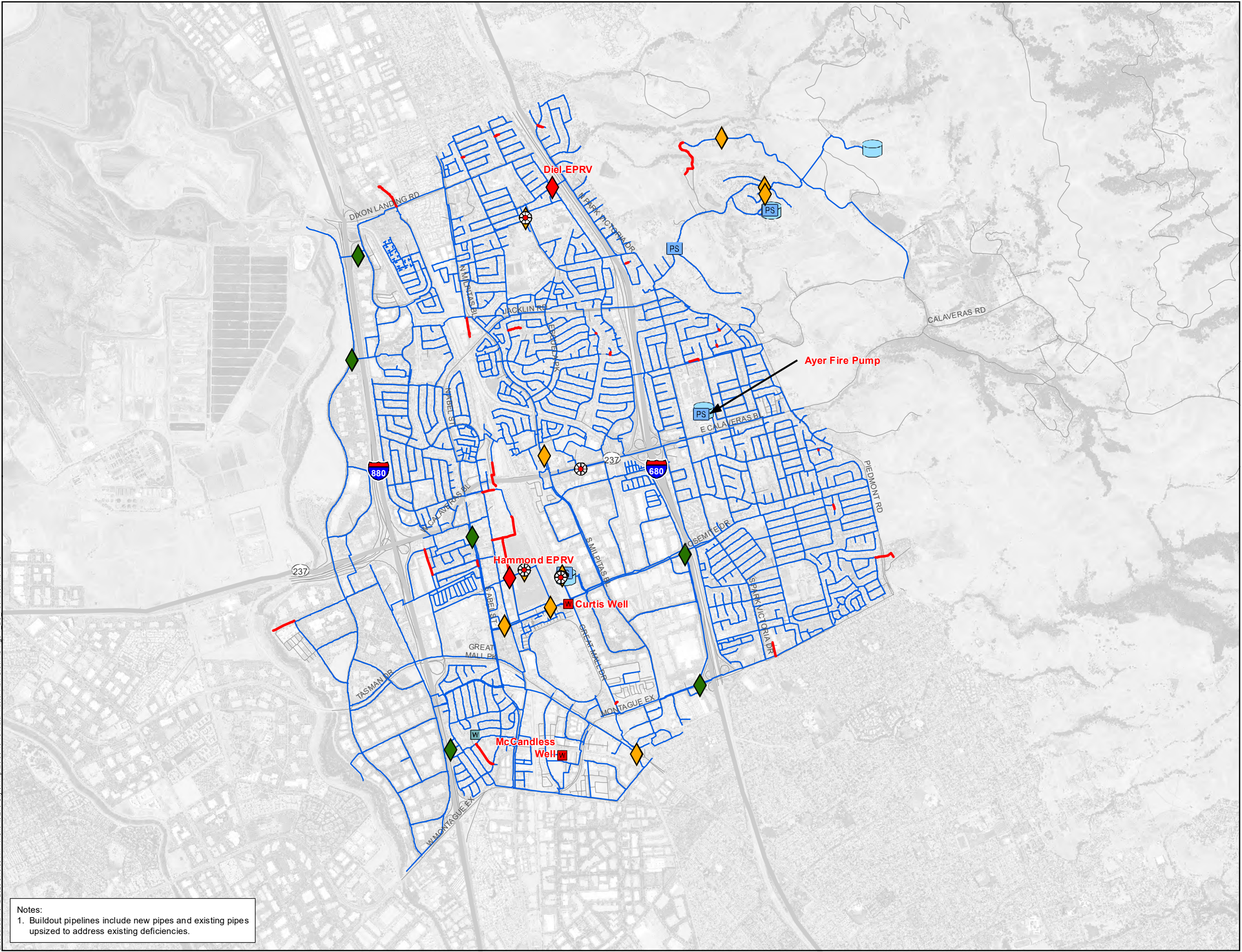
## 9.2 POTABLE WATER FACILITIES FOR BUILDOUT ANALYSIS

At buildout, the City expects three groundwater wells to be available for emergency use only (i.e., at the time of this report, the wells are not planned or intended to operate normally): Pinewood Well, Curtis Well, and McCandless Well. Table 9-2 summarizes the location and capacity for each of these wells. The capacity for Pinewood Well is from the 2009 WMPU (Table 4-3), while the capacity for McCandless Well (currently under construction) is based on discussions with the design team and production testing, which was performed at the end of 2020. It was conservatively assumed that Curtis Well would have the same capacity as McCandless Well, however the Curtis Well capacity is subject to change. While Curtis Well is located within Zone SF1, it is adjacent to transmission mains for Zones SF1, SF2, and VW2. Given the projected large increase in demands in the VW service area (approximately 3,250 gpm in additional average day demand), it is assumed that Curtis Well would serve Zone VW2.

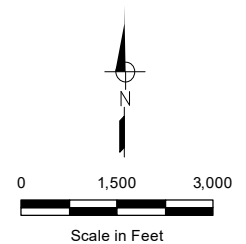
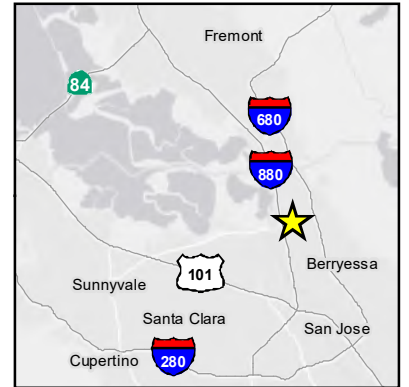
While the City does not currently anticipate any other major water system changes, **the following buildout analyses assume that the existing system infrastructure recommendations detailed in Sections 8.5.5 and 8.5.6 of this report have been implemented.** This includes pipeline improvements, two new EPRVs (Diel and Hammond), and the additional 4,000 gpm pump at Ayer. West Yost recommends that the City complete these existing system CIP projects to optimize system performance and operations as the City approaches buildout. Figure 9-1 shows the existing potable water system with these improvements, Curtis Well, and McCandless Well. On Figure 9-1, the new facilities are highlighted in red.



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Notes:  
1. Buildout pipelines include new pipes and existing pipes upsized to address existing deficiencies.



- Buildout Facilities**
- Buildout Groundwater Well
  - Buildout Emergency PRV
  - Buildout Pipeline
- Existing Facilities**
- Existing Turnout
  - Existing Groundwater Well
  - Existing Pressure Reducing Valve
  - Existing Emergency PRV
  - Existing Pump Station
  - Existing Storage Reservoir
  - Existing Pipeline



**Figure 9-1**  
**Potable Water Facilities for**  
**Buildout Analysis**





**Table 9-2. Emergency Groundwater Wells at Buildout**

| Well Facility                    | Location                   | Pressure Zone Served | Capacity |      |
|----------------------------------|----------------------------|----------------------|----------|------|
|                                  |                            |                      | gpm      | mgd  |
| Pinewood Well <sup>(a,d)</sup>   | 227 Lonetree Court         | SF1                  | 1,181    | 1.70 |
| Curtis Well <sup>(b,d)</sup>     | 330 East Curtis Avenue     | VW2 <sup>(e)</sup>   | 400      | 0.58 |
| McCandless Well <sup>(c,d)</sup> | Near 1680 McCandless Drive | VW1                  | 400      | 0.58 |

(a) Pinewood Well capacity per 2009 WMPU, Table 4-3.  
 (b) Curtis Well capacity is assumed to be equal to McCandless Well but is subject to change pending additional testing.  
 (c) McCandless Well capacity per discussions with design team in September 2020.  
 (d) Pinewood Well has a plug-in adapter and transfer switch to receive power from a portable generator. It is assumed Curtis Well and McCandless Well will also have these backup power features.  
 (e) While Curtis Well is located within Zone SF1, it is adjacent to transmission mains for Zones SF1, SF2, and VW2. Given the projected large increase in demands in the VW service area, it is assumed Curtis Well would serve Zone VW2.

## 9.3 BUILDOUT POTABLE WATER SUPPLY CAPACITY EVALUATION

As described in Section 7.2.2 of this report, the recommended water system performance criteria specify that under normal demand conditions, the following must be satisfied:

- Provide firm supply capacity equal to maximum day demand
- Meet peak hour demand from a combination of supply capacity and storage

Firm supply capacity is defined as the normal water supply with the largest turnout out of service, therefore, groundwater wells (which provide emergency supply) are excluded. In the SFPUC service area, the largest turnout is Calaveras, which has a capacity of 13.0 mgd. The VW service area has only the Gibraltar turnout, therefore, firm supply capacity is zero.

Table 9-3 summarizes the firm supply capacity evaluation for each service area at buildout. The SFPUC service area has a firm supply capacity surplus of approximately 13.9 mgd, while the VW service area has a firm supply capacity deficit of approximately 14.9 mgd. Since water can be moved from the City's SFPUC service area to the VW service area, the surplus in the SFPUC service area can offset most of the deficit in the VW service area. The resulting net deficit is approximately 1.0 mgd.

To address the firm supply capacity deficit and provide supply redundancy in the VW service area at buildout, West Yost recommends constructing a second VW turnout with a capacity of 10,000 gpm (or 14.4 mgd, equal to the Gibraltar turnout) (CIP ID BCIP-TO-01). This would increase the VW service area firm supply capacity to 14.4 mgd and change the City-wide firm supply deficit to a surplus of approximately 13.4 mgd. Without this new turnout, the City would fail to meet the firm supply capacity criterion described in Section 7.2.2 of this report.

Ideally, the second VW turnout would be adjacent to both VW's Milpitas Pipeline and existing City transmission mains. Locating the turnout is outside the scope of this report, though the City has identified one potential site: within a public service utility easement near the intersection of Piper Drive and Garden Street. The distribution system evaluation described in Section 9.6 below assumes this new "Piper" turnout is active, but other locations for a second VW turnout are possible.



By incrementally increasing existing demands, a firm supply capacity “trigger demand” can be identified. This is the demand at which existing supply facilities become insufficient, and any additional demand would require new supplies (i.e., turnouts or groundwater wells). Due to different peaking factors in each service area, the firm supply capacity trigger demand varies slightly depending on the location and timing of growth. Assuming the SFPUC service area would be fully built out prior to the VW service area, the firm supply capacity trigger demand is approximately 13.4 mgd. In the opposite scenario (i.e., VW service area built out before the SFPUC service area), the trigger demand decreases slightly to 13.3 mgd. Based on the linear demand growth projection summarized in Table 5-10 of this report, City demands will approach these levels around the year 2038. This trigger timing is similar for the Maddaus demand projections (Partial Rebound – Normal Economy, Weather Normalized) discussed in Section 5.3.4.2 of this report.

| <b>Table 9-3. Comparison of Available and Required Firm Supply Capacity at Buildout</b>                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                 |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------|---------------|
| Supply Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Facility            | Design Capacity |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     | gpm             | mgd           |
| SFPUC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Sunnyhills Turnout  | 7,014           | 10.1          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Calaveras Turnout   | 9,028           | 13.0          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Main Street Turnout | 5,486           | 7.90          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Intertie Turnout    | 4,000           | 5.76          |
| <b>Total Supply Capacity<sup>(a)</sup></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     | <b>25,528</b>   | <b>36.8</b>   |
| Firm Supply Capacity <sup>(b)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     | 16,500          | 23.8          |
| Required Supply Capacity <sup>(c)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     | 6,857           | 9.9           |
| <b>Buildout Firm Supply Capacity Surplus (Deficit)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     | <b>9,643</b>    | <b>13.9</b>   |
| VW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gibraltar Turnout   | 10,000          | 14.4          |
| <b>Total Supply Capacity<sup>(a)</sup></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     | <b>10,000</b>   | <b>14.4</b>   |
| Firm Supply Capacity <sup>(b)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     | 0               | 0             |
| Required Supply Capacity <sup>(c)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     | 10,334          | 14.9          |
| <b>Buildout Firm Supply Capacity Surplus (Deficit)<sup>(d)</sup></b>                                                                                                                                                                                                                                                                                                                                                                                                                               |                     | <b>(10,334)</b> | <b>(14.9)</b> |
| <p>(a) Total supply capacity assumes all turnouts and wells are available for use.</p> <p>(b) Firm supply capacity assumes largest turnout in each service area (Calaveras and Gibraltar) is offline.</p> <p>(c) Required supply capacity is equal to the maximum day demand (see Table 9-1).</p> <p>(d) Most of the VW service area supply capacity deficit can be met by SFPUC service area supply surplus. A deficit of 1.0 mgd remains if the SFPUC supply capacity surplus is considered.</p> |                     |                 |               |

For the second criterion listed above, Table 9-4 compares total supply plus storage to peak hour demands. Total supply equals the combined capacity from all turnouts, while storage consists of the firm pumping capacity from storage reservoirs. This includes the Ayer, Gibraltar (SF), and Gibraltar (VW) pump stations. To be conservative, firm pumping capacity is assumed (i.e., the largest pump is out of service at each pump station). Also, it is assumed the 4,000 gpm pump recommended in Section 8.5.6.1 of this report has been installed at Ayer.

As shown in Table 9-4, the SFPUC service area has a peak hour supply surplus of approximately 24,000 gpm and can even meet peak hour demands with supplies alone. In the VW service area, peak hour supplies exceed demands by approximately 9,000 gpm. Achieving this surplus in the VW service area requires utilizing the Gibraltar turnout and both sets of pumps at the Gibraltar (VW) pump station. In





other words, the City would need to operate valves within the Gibraltar (VW) pump station so the pumps that normally boost Gibraltar turnout pressures would instead draw from the Gibraltar (VW) reservoir.

**Table 9-4. Comparison of Available and Required Peak Hour Supply at Buildout**

| Supply Source | Total Supply Capacity <sup>(a)</sup> , gpm | Firm Pumping Capacity from Storage <sup>(b)</sup> , gpm | Total Peak Hour Supply Capacity <sup>(c)</sup> , gpm | Peak Hour Demand <sup>(d)</sup> , gpm | Peak Hour Supply Surplus (Deficit), gpm |
|---------------|--------------------------------------------|---------------------------------------------------------|------------------------------------------------------|---------------------------------------|-----------------------------------------|
| SFPUC         | 25,528                                     | 10,900                                                  | 36,428                                               | 12,429                                | 23,999                                  |
| VW            | 10,000                                     | 13,500                                                  | 23,500                                               | 18,492                                | 5,008                                   |

- (a) Equals the total capacity from turnouts. Refer to Table 9-3.  
 (b) Firm pumping capacity assumes the largest pump is offline at each pump station. Pump stations drawing from storage include Ayer, Gibraltar (SF), and Gibraltar (VW). It is assumed the 4,000 gpm pump recommended in Section 8.5.6.1 of this report has been installed at the Ayer pump station.  
 (c) Equals the sum of total supply capacity and firm pumping capacity from storage.  
 (d) Refer to Table 9-1.

## 9.4 BUILDOUT POTABLE WATER STORAGE CAPACITY EVALUATION

As described in Section 7.3.2 of this report, the required storage reservoir capacity in each pressure zone is the sum of the following components:

- Operational storage equal to 25 percent of maximum day demand
- Emergency storage equal to 50 percent of maximum day demand
- Fire storage equal to the largest fire flow demand in a pressure zone multiplied by the recommended duration

The total storage required is the sum of the operational, emergency, and fire storage requirements, less any groundwater credit, which can offset some of the emergency storage requirement.

The groundwater storage credit is calculated for each pressure zone and equals the volume of water pumped over a 24-hour period. The credit cannot exceed the recommended emergency storage volume (i.e., 50 percent of maximum day demand). To offset surface storage needs, groundwater must be of potable water quality, and wells must have backup power capabilities. In addition, the City must be able to meet average day demands without relying on groundwater (which it can).

For each pressure zone, Table 9-5 compares the City's buildout potable water storage capacity with storage requirements. Since Zones 1 and 2 are interconnected through multiple PRVs that operate under normal conditions (see Figure 3-1), they are combined in each service area (i.e., SF1/SF2 and VW1/VW2). As shown in Table 9-5, all three wells qualify for the emergency groundwater storage credit and contribute a storage capacity equivalent to their 24-hour pumping capacities. As a result, there is a 4.11 MG storage surplus in Zones SF1/SF2 and a deficit of 5.97 MG in Zones VW1/VW2. Since stored SFPUC water at Gibraltar can be delivered to VW customers, the surplus in Zones SF1/SF2 can reduce the VW service area shortfall, up to a maximum of 5 MG (the capacity of the Gibraltar (SF) storage reservoir). However, even after accounting for this offset (4.11 MG), there remains a net storage deficit in the VW service area of approximately 1.86 MG.

| Table 9-5. Comparison of Available and Required Water Storage Capacity at Buildout                                                                                                                |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------|-----------------------------------------------------|-------------------------|-------------------------------------|--------------------------|--------------------------|------------------------|-------------------------------|
| [A]                                                                                                                                                                                               | [B]     | [C]                            | [D]                                                 | [E] = [C] + [D]         | [F]                                 | [G]                      | [H]                      | [I] = [F] + [G] + [H]  | [J] = [E] - [I]               |
| Facility                                                                                                                                                                                          | Status  | Available Storage Capacity, MG |                                                     |                         | Required Storage Capacity, MG       |                          |                          |                        | Storage Surplus (Deficit), MG |
|                                                                                                                                                                                                   |         | Available Reservoir Capacity   | Emergency Groundwater Storage Credit <sup>(a)</sup> | Total Available Storage | Required Operational <sup>(b)</sup> | Emergency <sup>(c)</sup> | Fire Flow <sup>(d)</sup> | Total Required Storage |                               |
| Zones SF1 and SF2                                                                                                                                                                                 |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
| Gibraltar (SF)                                                                                                                                                                                    | Active  | 5.00                           | --                                                  | 12.30                   | 2.41                                | 4.82                     | 0.96                     | 8.19                   | 4.11                          |
| Ayer                                                                                                                                                                                              | Active  | 5.60                           | --                                                  |                         |                                     |                          |                          |                        |                               |
| Pinewood Well                                                                                                                                                                                     | Standby | --                             | 1.70                                                |                         |                                     |                          |                          |                        |                               |
| Zone SF3                                                                                                                                                                                          |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
| Tularcitos                                                                                                                                                                                        | Active  | 0.30                           | --                                                  | 0.30                    | 0.02                                | 0.03                     | 0.18                     | 0.23                   | 0.07                          |
| Zones SF4-1 and SF4-2                                                                                                                                                                             |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
| Minnis                                                                                                                                                                                            | Active  | 0.34                           | --                                                  | 0.34                    | 0.04                                | 0.08                     | 0.18                     | 0.30                   | 0.04                          |
| Zones VW1 and VW2                                                                                                                                                                                 |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
| Gibraltar (VW)                                                                                                                                                                                    | Active  | 5.00                           | --                                                  | 6.15                    | 3.72                                | 7.44                     | 0.96                     | 12.12                  | (5.97)                        |
| Curtis Well                                                                                                                                                                                       | Standby | --                             | 0.58                                                |                         |                                     |                          |                          |                        |                               |
| McCandless Well                                                                                                                                                                                   | Standby | --                             | 0.58                                                |                         |                                     |                          |                          |                        |                               |
| (a) Credit based on 24 hours of pumping capacity. The credit cannot exceed the required emergency storage capacity.                                                                               |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
| (b) Based on 25 percent of a maximum day demand (see Table 9-1).                                                                                                                                  |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
| (c) Based on 50 percent of a maximum day demand (see Table 9-1).                                                                                                                                  |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |
| (d) Based on storage required for largest potential fire flow within the pressure zone. Zones SF1 and VW1/VW2 = Industrial; Zone SF2 = Commercial; Zones SF3 and SF4 = Single Family Residential. |         |                                |                                                     |                         |                                     |                          |                          |                        |                               |



As a result, West Yost recommends the City construct a new, 2 MG storage reservoir in the VW service area (CIP ID BCIP-S-01). While additional groundwater wells would also reduce the storage capacity deficit, lower than expected productivity at the McCandless Well suggests new storage reservoir(s) may be a more reliable investment. The City is currently evaluating potential locations for this new storage reservoir.

To deliver water stored in this new reservoir to the distribution system, West Yost recommends constructing a new pump station (CIP ID BCIP-PS-01) with a firm capacity of 4,000 gpm (approximately 5.8 mgd). This ensures that pumps can meet the largest (i.e., industrial) fire flows in the service area. Also, at this capacity pumps can empty the reservoir in approximately eight hours.

By incrementally increasing existing demands, a storage capacity “trigger demand” can be identified. This is the demand at which existing storage facilities (Gibraltar and Ayer Reservoirs plus Pinewood Well) become insufficient, and any additional demand would require new storage (i.e., reservoirs or groundwater wells). Due to different peaking factors in each service area, the storage capacity trigger demand varies slightly depending on the location and timing of growth. Assuming the SFPUC service area would be fully built out prior to the VW service area, the storage capacity trigger demand is approximately 11.8 mgd. In the opposite scenario (i.e., VW service area built out before the SFPUC service area), the trigger demand decreases slightly to 11.7 mgd. Based on the linear demand growth projection summarized in Table 5-10 of this report, City demands will approach these levels around the year 2032.

This trigger timing is significantly sooner based on the Maddaus demand projections (Partial Rebound – Normal Economy, Weather Normalized) discussed in Section 5.3.4.2 of this report. Because Maddaus projects more demand to be added by 2025 (and more gradual growth from 2025 through 2045), City demands will reach storage trigger levels by around 2024, about eight years sooner than the linear growth projection.

Note, storage and timing requirements may change as actual potable water demands adjust to conservation efforts, efficiency standards, and expanded recycled water use. In addition, if Curtis Well production exceeds expectations, the increased groundwater storage credit would also reduce the overall storage capacity deficit. The City should monitor demands and groundwater well feasibility as it continues to grow and approaches buildout.

## 9.5 BUILDOUT PUMPING CAPACITY EVALUATION

As described in Section 7.3.3 of this report, the City should have firm pumping capacity equal to MDD. For a given pump station, firm capacity is defined as the total capacity of all operational pumps minus the capacity of the largest pumping unit. In addition, pumping capacity in lower pressure zones should also be able to deliver the maximum day demand of any zones above them. For example, the Zone SF3 pumps should be able to deliver the maximum day demand for Zones SF3 and SF4 (i.e., SF4-1 and SF4-2).

For each pressure zone, Table 9-6 compares the available and required pumping capacities at buildout. In Zones SF1 and SF2, firm pumping capacity consists of one 5,500 gpm pump at Gibraltar (SF) and three 1,800 gpm pumps at Ayer. It is assumed the 4,000-gpm pump recommended in Section 8.5.6.1 of this report has been installed at Ayer, so firm capacity assumes that pump is offline. As a result, the combined firm pumping capacity in Zones SF1 and SF2 is 10,900 gpm, which exceeds the required firm pumping capacity (i.e., the buildout MDD of the entire SFPUC service area). The pumping capacity surplus in Zones SF1 and SF2 is approximately 4,040 gpm.

**Table 9-6. Comparison of Available and Required Firm Pumping Capacity at Buildout**

| Pump Station                                 | Critical Facility <sup>(a)</sup> | On-site Backup Power | Status | Firm Capacity <sup>(b)</sup> , gpm | Total Firm Pumping Capacity, gpm | Buildout Maximum Day Demand <sup>(c)</sup> , gpm | Pumping Capacity Surplus (Deficit), gpm |
|----------------------------------------------|----------------------------------|----------------------|--------|------------------------------------|----------------------------------|--------------------------------------------------|-----------------------------------------|
| Zones SF1 and SF2                            |                                  |                      |        |                                    |                                  |                                                  |                                         |
| Gibraltar (SF)                               |                                  | ✓                    | Active | 5,500                              | 10,900                           | 6,857                                            | 4,043                                   |
| Ayer <sup>(d)</sup>                          |                                  | ✓                    | Active | 5,400                              |                                  |                                                  |                                         |
| Zone SF3                                     |                                  |                      |        |                                    |                                  |                                                  |                                         |
| Country Club                                 |                                  |                      | Active | 250                                | 250                              | 159                                              | 91                                      |
| Zones SF4-1 and SF4-2                        |                                  |                      |        |                                    |                                  |                                                  |                                         |
| Tularcitos                                   |                                  |                      | Active | 250                                | 250                              | 115                                              | 135                                     |
| Zones VW1 and VW2                            |                                  |                      |        |                                    |                                  |                                                  |                                         |
| Gibraltar (VW) - from tank                   | ✓                                | ✓                    | Active | 5,500                              | 13,500                           | 10,334                                           | 3,166                                   |
| Gibraltar (VW) - from turnout <sup>(e)</sup> | ✓                                | ✓                    | Active | 8,000                              |                                  |                                                  |                                         |

(a) Pump stations are considered critical if they serve a pressure zone with insufficient storage and meet other criteria. Refer to Table 7-1.

(b) Firm pumping capacity was defined as the total pump station capacity with the largest pump out of service.

(c) Includes maximum day demands for higher pressure zones, per Table 7-1.

(d) It is assumed the 4,000 gpm fire pump recommended in Section 8.5.6.1 has been installed at the Ayer pump station.

(e) These pumps are intended to boost pressures from the VW turnout but can be valved to draw from the Gibraltar (VW) tank.



No changes are anticipated at either the Country Club or Tularcitos pump stations, therefore, firm pumping capacities in Zones SF3 and SF4 remain at 250 gpm each. This comfortably exceeds buildout pumping requirements. Firm pumping capacity surpluses in Zones SF3 and SF4 are 91 and 135 gpm, respectively.

Both sets of pumps at the Gibraltar (VW) PS are included in the pumping capacity evaluation for the VW service area. One set draws from the Gibraltar (VW) storage reservoir, while the other set boosts pressures from the Gibraltar turnout (if necessary). By adjusting valve operations, the “turnout” pumps can also draw from the Gibraltar (VW) storage reservoir. The combined firm capacity for both sets of pumps is 13,500 gpm, which exceeds the VW service area buildout MDD (10,334 gpm) by approximately 3,170 gpm.

## 9.6 BUILDOUT WATER DISTRIBUTION SYSTEM EVALUATION

West Yost used the updated hydraulic model to conduct steady-state hydraulic analyses of the buildout water distribution system. The goal of this evaluation was to identify necessary improvements to support the City’s buildout water demands while meeting the recommended system performance criteria presented in Sections 7.2.1 and 7.2.3 of this report.

**This evaluation assumes infrastructure recommendations detailed in Sections 8.5.5 and 8.5.6 of this report have been implemented and that the new VW Piper turnout introduced in Section 9.3 is active.** The new VW Piper turnout is assumed to be a 20-inch diameter connection and include a PRV that will evenly distribute VW flows between the Piper and Gibraltar turnouts.

In evaluating the buildout system, pressure criteria are prioritized over velocity criteria. This prioritization is typical, because older water systems tend to have many undersized pipes, and strictly adhering to velocity standards would identify those pipes as candidates for replacement, even though pressures meet recommended criteria. West Yost does not recommend replacing existing pipes solely for failing to meet velocity criteria. While velocity results will be summarized for non-emergency scenarios, the following analyses focus on pressures and fire flow availability.

The following evaluations are intended to identify distribution facility sizing and capacity requirements at buildout. As a result, they examine system performance under high demand scenarios only (i.e., Peak Hour Demand and Maximum Day Demand plus Fire Flow).

- **Peak Hour Demand Scenario:** evaluates the potential for low customer service pressures in the system during a peak hour demand condition
- **Maximum Day Demand plus Fire Flow Scenario:** evaluates fire flow availability in the system under a maximum day demand condition
- **Emergency Operations** (each scenario is evaluated under maximum day demand plus fire flow):
  - Outage Scenario 1: SFPUC turnouts are offline
  - Outage Scenario 2: VW turnouts are offline
  - Outage Scenario 3: SFPUC and VW turnouts are offline
  - Outage Scenario 4: Power outage; all facilities without backup generators are offline
  - Outage Scenario 5: PRVs normally allowing flow between Zones 1 and 2 are offline





To capture the entire range of normal water system operations, each non-emergency scenario above was evaluated using the two operational alternatives summarized in Table 8-5 of this report. In the Base alternative, all pumps are off, whereas Alternative 1 allows pump operation as needed. For both alternatives, all turnouts are open, and gravity tank levels are at their minimum of normal operating range.

### 9.6.1 Peak Hour Demand Analysis

The hydraulic model was used to conduct a steady-state hydraulic analysis of the system during a buildout PHD condition. As shown in Table 9-1, the PHD for the buildout water service area is approximately 30,776 gpm (44.3 mgd). Under PHD conditions, the recommended minimum pressure is 30 psi. Any services experiencing pressures less than 30 psi during a PHD condition would require an individual booster pump.

Results from the PHD simulations for Base and Alternative 1 operations are shown in Figure 9-2 and Figure 9-3, respectively. In each figure, color-coded circles represent distribution system pressures during a PHD condition. Pressures are slightly higher for Alternative 1 (pumps on), but there are no significant differences in system performance based on operations. In both cases, there are no customer service locations with pressures below 30 psi.

Per Table 7-1 of this report, under normal conditions the maximum recommended velocities for transmission and distribution mains is 6 and 8 ft/s, respectively. Transmission mains are pipelines 16 inches or larger in diameter, while distribution mains are pipelines smaller than 16 inches in diameter. Under PHD conditions, pipeline velocities exceed recommended limits near supply sources (i.e., turnouts and pump stations) and PRVs.

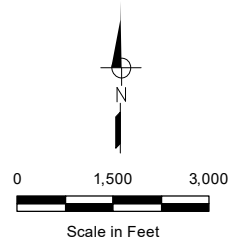
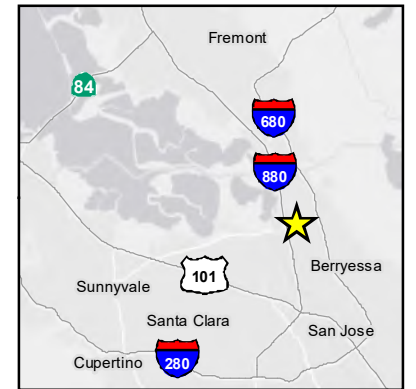
In the SFPUC service area, high velocity pipelines include those adjacent to the Sunnyhills PRV (over 24 ft/s in both Base and Alternative 1 operations) and downstream of the Sunnyhills, Main, and Calaveras turnouts (between approximately 9 and 11 ft/s under Base operations). When pumps are on (Alternative 1), turnout flows are lower. As a result, during Alternative 1 operations, pipeline velocities near the Sunnyhills, Main, and Calaveras turnouts are below the recommended limit.

In the VW service area, high velocity pipelines are located at and adjacent to the Gibraltar facility and PRVs. This includes the transmission main along Curtis Avenue and Yosemite Drive (between South Abel Street and South Milpitas Boulevard). Transmission mains in this area and downstream of the Gibraltar facility have velocities between 7 and 17 ft/s during Base operations (pumps off) and between 7 and 12 ft/s during Alternative 1 operations (pumps on). Pipeline velocities near PRVs are the same for Base and Alternative 1 operations. The pipelines adjacent to the Curtis East and Parc Metro PRVs have velocities of 7.1 and 8.4 ft/s, respectively, during a PHD condition. Velocities in the pipelines near the Capitol PRV are approximately 10.7 ft/s.



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Base Operations, all turnouts are operational, and all pumps are turned off.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



Peak Hour Pressure

- Less than 30 psi
- 30 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

High Pressure (Zone 1)

- Greater than 80 psi

High Pressure (Zone 2 and Hillside)

- 80 psi to 150 psi
- Greater than 150 psi

Turnout



Groundwater Well



Pressure Reducing Valve



Pump Station



Storage Reservoir



Pipeline



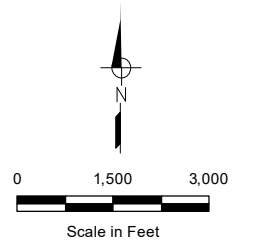
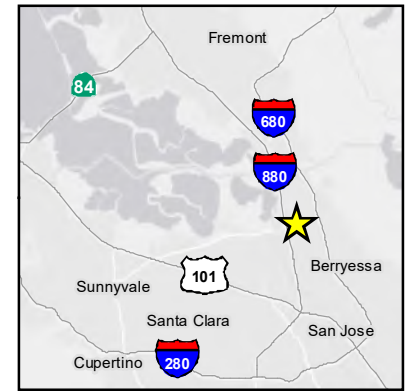
Figure 9-2

**Buildout System Pressures  
Peak Hour Demand  
Base Operations**



Notes:

1. Zone 1 includes pressure zones SF1 and VW1. Zone 2 includes zones SF2 and VW2, while the Hillside includes zones SF3 and SF4.
2. For Alternative 1 Operations, all turnouts are operational, and pumps operate as needed.
3. Per the California Plumbing Code, services which experience pressures exceeding 80 psi are required to be fitted with a pressure reducing valve.
4. The recommended maximum pressure in Zone 1 is 80 psi at the customer service connection. In Zone 2 and the Hillside, the recommended maximum pressure is 150 psi at the customer service connection.



Peak Hour Pressure

- Less than 30 psi
- 30 psi to 50 psi
- 50 psi to 60 psi
- 60 psi to 70 psi
- 70 psi to 80 psi

High Pressure (Zone 1)

- Greater than 80 psi

High Pressure (Zone 2 and Hillside)

- 80 psi to 150 psi
- Greater than 150 psi

Turnout



Groundwater Well



Pressure Reducing Valve



Pump Station



Storage Reservoir

Pipeline



Figure 9-3

**Buildout System Pressures  
Peak Hour Demand  
Alternative 1 Operations**





## **9.6.2 Maximum Day Demand Plus Concurrent Fire Flow Analysis**

Fire flows in the model were updated based on buildout land uses in growth areas and the Gateway Specific Plan and Milpitas Metro Specific Plan areas. Outside of these areas, fire flows remain as originally assigned in Section 8.5.5 of this report. Fire flows were then simulated during a buildout MDD condition using the hydraulic model. The hydraulic model conducts fire flow analyses by simulating a fire flow demand at one hydrant location and verifying whether the system can serve all other normal customer demands while maintaining desired residual pressures. This is repeated for all hydrant locations within the distribution system. Hydrant locations meet recommended fire flows if they can deliver the recommended fire flow while maintaining a 20-psi residual system pressure. Note, this fire flow analysis reflects distribution system capacity, as individual hydrants, and their associated losses are not modeled.

Fire flow analyses were performed independently for each pressure zone, with Zones 1 and 2 combined for each service area (i.e., VW1/VW2 and SF1/SF2). It was assumed that only one fire event would occur at a time, which is standard industry practice. Results from MDD plus concurrent fire flow simulations for Base and Alternative 1 operations are shown on Figure 9-4 and Figure 9-5, respectively. Hydrant locations are represented by circles and color coded by fire flow availability, while parcels are shaded according to the recommended fire flow. For example, a green circle adjacent to a purple parcel means that the distribution system can meet a 4,000 gpm fire flow at that location while maintaining 20 psi in the rest of the system.

System performance is similar for the two operational alternatives. With pumps off (Base alternative), 19 locations do not meet recommended fire flows, while 15 locations are below the fire flow criterion under Alternative 1. All “below criterion” locations in Alternative 1 are also flagged in the Base alternative, therefore, pump operation improves fire flow availability for four locations. Since pumps could be off during a fire event, recommended improvements address all 19 below criterion locations identified in the Base alternative.

As discussed in Section 8.5.5 of this report, some below criterion fire flows can be eliminated by delivering the recommended flow through multiple hydrants. It was assumed that any location with another hydrant within the City’s hydrant spacing guidelines (500 feet for single family areas and 300 feet for all other areas) would qualify for delivering fire flows through multiple hydrants. If the qualifying hydrants could combine to deliver the recommended fire flow while maintaining a 20 psi residual system pressure, then the location was no longer considered below criterion. Of the 19 below criterion locations identified in the Base alternative, 16 met recommended fire flows after looking at multiple hydrants.

The three remaining below criterion locations are all at the southern end of Zone VW1, near South Main Street. To address these locations, West Yost recommends installing a new EPRV between Zones SF1 and VW1 near the intersection of Cedar Way and South Main Street (CIP ID BCIP-V-01). This emergency 8-inch connection would replace a normally closed isolation valve and allow flow from Zone SF1 if pressures in Zone VW1 fall 5 psi below PHD pressures. In addition to improving fire flows under normal operations, this “Cedar” EPRV also provides redundancy for a Capitol PRV outage (detailed below in Section 9.6.3.5).

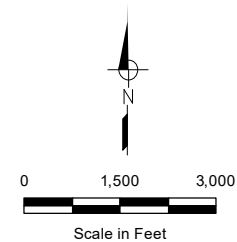
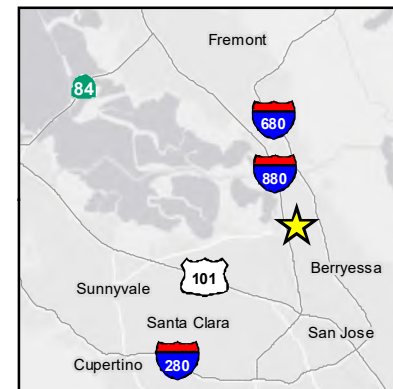
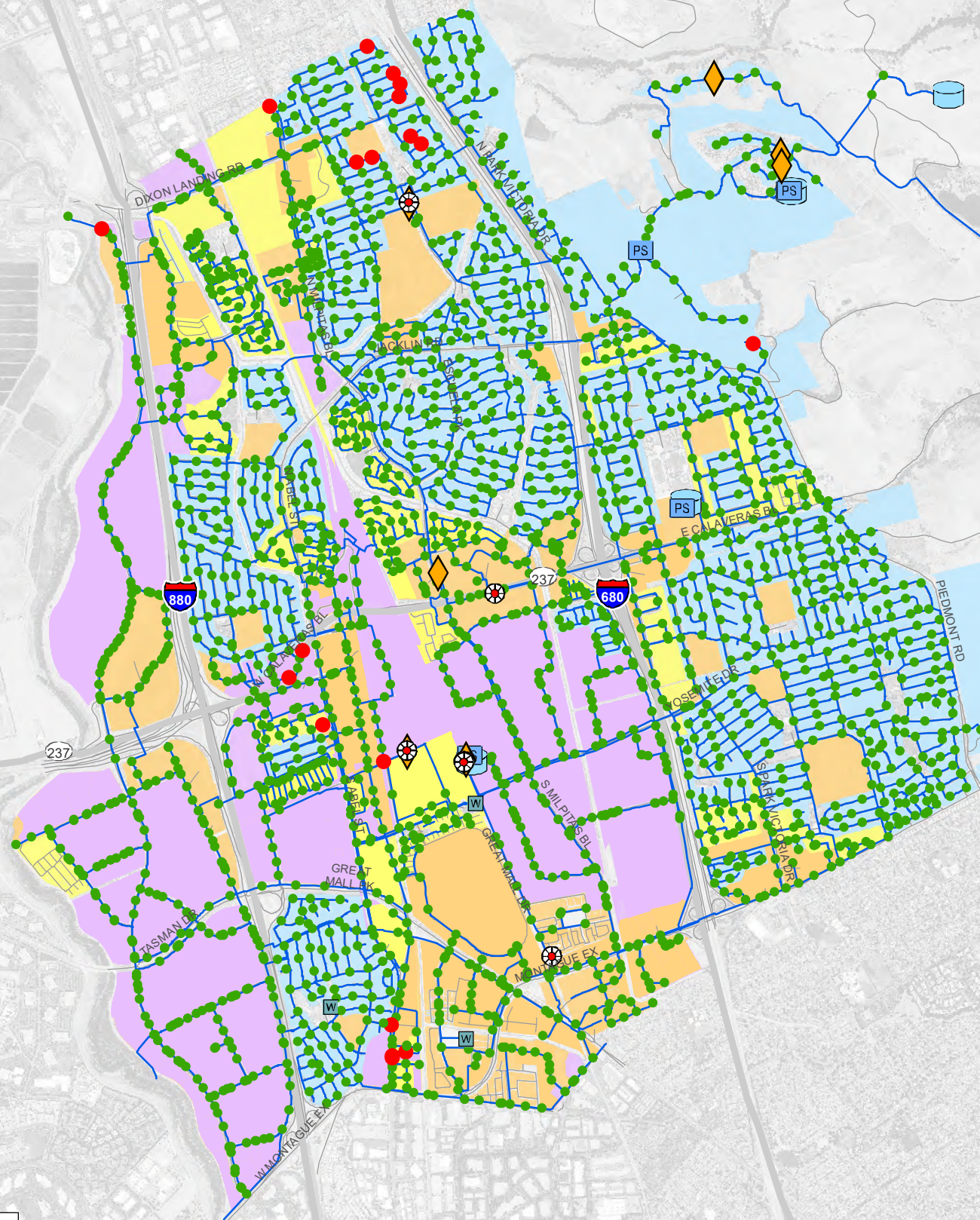
The proposed Cedar EPRV location is based on the MDD plus concurrent fire flow hydraulic analysis described in this section and the existing connection between Zones SF1 and VW1 at the intersection of Cedar Way and South Main Street. Additional study is required to determine whether this location is feasible or if other locations would also solve the below criterion locations in this area.



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Notes:

1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.
2. For Base Operations, all turnouts are operational, and all pumps are turned off.



Available Fire Flow

- Below Recommended Fire Flow
- Meets Recommended Fire Flow
- Turnout
- Groundwater Well
- Pressure Reducing Valve

- Pump Station
- Storage Reservoir
- Pipeline

Recommended Fire Flow

- 1,500 gpm
- 2,500 gpm
- 3,000 gpm
- 4,000 gpm



Figure 9-4

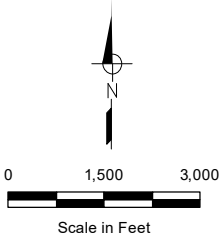
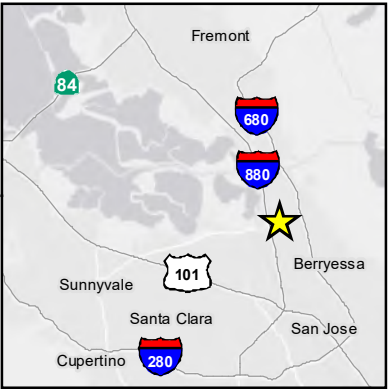
Buildout System  
Available Fire Flow  
Base Operations



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Notes:

1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure during a maximum day demand condition.
2. For Alternative 1 Operations, all turnouts are operational, and pumps operate as needed.



Available Fire Flow

- Below Recommended Fire Flow
- Meets Recommended Fire Flow
- Turnout
- Groundwater Well
- Pressure Reducing Valve
- Pump Station
- Storage Reservoir
- Pipeline

Recommended Fire Flow

- 1,500 gpm
- 2,500 gpm
- 3,000 gpm
- 4,000 gpm



Figure 9-5  
Buildout System  
Available Fire Flow  
Alternative 1 Operations





### **9.6.3 Emergency Outage Scenarios**

The following emergency outage evaluations identify how well the distribution system functions without one or more key facilities. For reference, the outage scenarios consist of:

- SFPUC turnouts are offline
- VW turnouts are offline
- SFPUC and VW turnouts are offline
- Power outage; all facilities without backup generators are offline
- PRVs normally allowing flow between Zones 1 and 2 are offline

Emergency outage scenarios are not intended to evaluate the adequacy of emergency water supplies, which is outside the scope of this master plan. Instead, these evaluations examine system pressures and fire flow availability during an MDD condition. To be conservative, storage reservoir levels are assumed to be at the minimum of normal operating range (see Table 3-4).

Since emergency scenarios assume certain facilities are offline, the corresponding evaluations do not examine system performance under Base and Alternative 1 operations. Besides the assumed outage, there are no additional operational restrictions. All facilities not assumed offline as part of the scenario are assumed to be operational.

Results for each emergency outage scenario are summarized below. Where presented, figures showing system performance during emergency outages are similar to non-emergency figures discussed above. Distribution system locations are color coded by fire flow availability (for fire flow evaluations).

#### **9.6.3.1 Outage Scenario 1 – SFPUC Offline**

This outage scenario assumes supply from SFPUC is unavailable, therefore, the Sunnyhills, Calaveras, Main Street, and Intertie turnouts are offline. As a result, the City's normally available potable water supply consists of VW (i.e., the Gibraltar and Piper turnouts) and storage.

After implementing the distribution system improvements summarized in Section 8.6 of this report, fire flow availability is not significantly impacted with SFPUC turnouts offline. There are no new below criterion locations in this outage scenario. In other words, the pumps at Gibraltar and Ayer alone can adequately serve fire flows in the SFPUC service area during an MDD condition. Thus, West Yost does not recommend any improvements based on Outage Scenario 1.

#### **9.6.3.2 Outage Scenario 2 – VW Offline**

This outage scenario assumes supply from VW is unavailable, therefore, the Gibraltar and Piper turnouts are offline. As a result, the City's normally available potable water supply consists of SFPUC turnouts and storage.

Fire flow availability is not significantly impacted with VW turnouts offline. There are no additional below criterion locations in this outage scenario, though adequately serving fire flows during an MDD condition required adjusting pump operation. In addition to the two pumps that normally draw from the Gibraltar (VW) storage reservoir, one 5,000-gpm pump that normally boosts turnout pressures was also drawing



from the same reservoir. Since this operational flexibility already exists at the Gibraltar facility, West Yost does not recommend any improvements based on Outage Scenario 2.

#### **9.6.3.3 Outage Scenario 3 – SFPUC and VW Offline**

This outage scenario assumes supplies from both SFPUC and VW are unavailable, therefore, all turnouts are offline. As a result, the City's normally available potable water supply consists of storage only (i.e., Gibraltar (SF), Gibraltar (VW), Ayer, Tularcitos, and Minnis reservoirs).

Since neither the SFPUC nor the VW outages significantly impacted fire flow availability, the same is true for the simultaneous outage of both supplies. During an MDD condition, the Gibraltar (SF) and Ayer pumps can adequately serve fire flows in Zones SF1/SF2. In the VW service area, the same three pumps as Outage Scenario 2 are necessary to serve fire flows: two pumps that normally draw from the Gibraltar (VW) storage reservoir and one 5,000-gpm pump that normally boosts turnout pressures. There are no new below criterion locations in Outage Scenario 3. Thus, West Yost does not recommend any improvements based on Outage Scenario 3.

#### **9.6.3.4 Outage Scenario 4 – Power Outage**

This outage scenario assumes electrical power is unavailable, therefore, any facilities without backup generators are offline. While this does not impact the City's normally available potable water supply, distribution system operations are hindered. Because the Country Club and Tularcitos pump stations only have plug-in adaptors and transfer switches to allow for use of portable generators, and do not have on-site emergency generators, they are assumed to be unavailable in a power outage. However, the Tularcitos and Minnis storage reservoirs can still serve Zones SF3 and SF4, respectively, during a power outage.

A power outage does not significantly impact fire flow availability. There are no new below criterion locations associated with this outage scenario, which makes sense, as the impact of a power outage is similar to Base operations (pumps off). As a result, no improvements are necessary from Outage Scenario 4.

#### **9.6.3.5 Outage Scenario 5 – Zone 1/2 PRVs Offline**

Outage Scenario 5 assumes a PRV normally allowing flow between Zones 1 and 2 is offline. These "Zone 1/2" PRVs include Main, North Milpitas, and Sunnyhills in the SFPUC service area and Capitol, Curtis East, Curtis West, and Parc Metro in the VW service area. System performance is evaluated with one PRV closed at a time. It is assumed EPRVs are available as needed.

Impacts to fire flow availability vary depending on which PRV is offline. At buildout, the Capitol PRV is most critical. Should the Capitol PRV go offline, 17 additional locations do not meet recommended fire flows. Activating EPRVs and the McCandless Well allows 14 locations to meet recommended fire flows. The remaining three are solved via the proposed Cedar EPRV. While Sunnyhills, Curtis East, and Parc Metro PRV outages also create new below criterion locations, all can be solved by EPRVs (Diel, McCarthy, and Hammond). Outages of the Main, North Milpitas, and Curtis West PRVs did not result in any new below criterion locations.



## **9.7 SUMMARY OF FINDINGS AND RECOMMENDED IMPROVEMENTS**

Below is a summary of findings and recommendations from the evaluations detailed in this chapter. Key recommendations for the buildout system were used to develop a CIP, which is the focus of Chapter 11 of this report.

- **Supply Capacity**
  - Buildout firm supplies fall short of maximum day demands. The firm supply surplus in the SFPUC service area cannot make up for the deficit in the VW service area. Thus, West Yost recommends constructing a new VW turnout near the intersection of Piper Drive and Garden Street with the same capacity as the Gibraltar turnout.
- **Storage Capacity**
  - Buildout storage capacity is insufficient. The storage capacity surplus in the SFPUC service area cannot make up for the deficit in the VW service area. West Yost recommends constructing a new, 2 MG storage reservoir in the VW service area.
  - To deliver water from this new storage reservoir, West Yost recommends constructing a new pump station with a firm capacity of 4,000 gpm.
- **Pumping Capacity**
  - Each pressure zone has a pumping capacity surplus. No additional pumping facilities are recommended based on buildout demands.
- **Distribution System**
  - The buildout distribution system meets the minimum pressure criterion under a PHD condition.
  - To address locations not meeting recommended fire flows in Base operation and PRV outage scenarios, West Yost recommends installing a new EPRV near the intersection of Cedar Way and South Main Street. The Cedar EPRV would allow flows from Zone SF1 to Zone VW1 should pressures in Zone VW1 drop significantly.

# CHAPTER 10

## Asset Renewal and Replacement

This chapter presents a summary of the Water Utility Condition Assessment Technical Memorandum prepared in conjunction with this Water Master Plan, provides a discussion of risk management guidelines and asset profiling, and recommends projects and activities to manage infrastructure risk. Recommended projects are incorporated in a recommended CIP described in Chapter 11 of this report.

A summary of the Seismic Risk Assessment of the City's water system facilities, conducted in parallel to this Water Master Plan as part of the compliance with the America's Water Infrastructure Act of 2018, is also provided in this chapter.

### 10.1 SUMMARY OF WATER UTILITY CONDITION ASSESSMENT FINDINGS

The Water Utility Condition Assessment Technical Memorandum, included in Appendix D, summarizes the condition assessment that was performed for the City's water utility assets under Task 3 – Water Utility Asset Condition Assessment of this Water Master Plan. That technical memorandum presents assessment methodologies, asset valuations, likelihood and consequence of failure factors, and business risk scores for assets in the City's water distribution system.

The analysis focused on asset and facility risk. Risk is a combination of an asset's likelihood to fail and an asset's consequence if it should fail as shown below.

- Likelihood of Failure (LOF), which estimates the probability that a failure will occur in an asset by meeting the end of its physical, design, service, or economic useful life
- Consequence of Failure (COF), which estimates the impacts of asset failure expressed either qualitatively or quantitatively, being a loss, injury, or disadvantage from a social, economic, environmental, or regulatory standpoint
- Risk is estimated using the conventional risk equation:  $Risk = LOF \times COF$

Risk was defined on a scale from Low to High based on COF ratings of Negligible to Severe and LOF ratings of Unlikely to Very Likely. Table 10-1 presents the adopted risk matrix.

| Table 10-1. Risk Methodology |                 |                                                                                                                                                                                                                                             |               |               |             |                  |
|------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|-------------|------------------|
|                              |                 |                                                                                                                                                                                                                                             | LOF Rating    |               |             |                  |
|                              |                 |                                                                                                                                                                                                                                             | 1<br>Unlikely | 2<br>Possible | 3<br>Likely | 4<br>Very Likely |
| COF Rating and Definition    | 1<br>Negligible | No fiscal/operational impact                                                                                                                                                                                                                | Low           | Low           | Low         | Low              |
|                              | 2<br>Minimal    | Slight pressure loss, minor public response, possible slight injury, minor detours                                                                                                                                                          | Low           | Low           | Medium      | Med-High         |
|                              | 3<br>Moderate   | Water service interrupted over local area, increased media coverage, increased injury potential, public transit impacted, restoration up to one-month impact                                                                                | Medium        | Medium        | Med-High    | High             |
|                              | 4<br>Severe     | Water service interrupted over wide area including fire capacity, potential local media coverage, potential consent order, transit impacts to BART or other outside agencies, long-term economic impact, greater than one-month restoration | Medium        | Med-High      | High        | High             |





Assets were classified by type and evaluated for LOF and COF to determine a risk rating. Water Meter, Line Valve and Fire Hydrant assets were evaluated as individual assets. Other individual asset assessments were aggregated into PRVs, Wells, Turnouts, Interties, Reservoirs, Pipelines and Pump Stations. Table 10-2 presents a summary of risk by these asset groupings. Some asset groups are represented in more than one risk level since individual assets or facilities are currently at different risk levels.

| <b>Table 10-2. Water System Risk Level</b> |                 |                                 |                                                                   |                                                                                    |                            |
|--------------------------------------------|-----------------|---------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------|
|                                            |                 | LOF                             |                                                                   |                                                                                    |                            |
|                                            |                 | 1<br>Unlikely                   | 2<br>Possible                                                     | 3<br>Likely                                                                        | 4<br>Very Likely           |
| COF                                        | 1<br>Negligible | Hydrants<br>Valves<br>Pipelines | Hydrants<br>Valves<br>Meters<br>Pipelines                         | Hydrants<br>Meters<br>Pipelines                                                    | Meters<br>Pipelines        |
|                                            | 2<br>Minimal    | Hydrants<br>Valves<br>Pipelines | Hydrants<br>Valves<br>PRVs<br>Intertie<br>Meters<br>Pipelines     | Hydrants<br>Valves<br>Well<br>Reservoir<br>PRVs<br>Intertie<br>Meters<br>Pipelines | Meters<br>Pipelines        |
|                                            | 3<br>Moderate   | Hydrants<br>Valves<br>Pipelines | Hydrants<br>Valves<br>PRVs<br>Intertie<br>Reservoirs<br>Pipelines | Hydrants<br>Valves<br>PRVs<br>Turnouts<br>Reservoirs<br>Pump Stations<br>Pipelines | Pump Stations<br>Pipelines |
|                                            | 4<br>Severe     | Pipelines                       | Pipelines                                                         | Pipelines                                                                          | Pipelines                  |

## 10.2 RISK MANAGEMENT GUIDELINES AND ASSET PROFILING

Risk management applied to utility planning and management leverages the assessment of LOF and COF into asset life-cycle decision-making. The combination of LOF and COF together provides a risk rating for assets and facilities. Risk Triggers are defined in this section.

### 10.2.1 Risk Threshold Triggers

Leveraging risk management involves more than just applying a decision point based on a current condition or risk rating to prioritize a project. Risk management affords the utility manager knowledge of the system to optimize maintenance, plan condition assessment activities, anticipate fiscal expenditures and prioritize refurbishment and replacement. Establishing risk threshold triggers is a valuable tool to anticipate when to modify current practices.



#### 10.2.1.1 Risk Threshold Triggers

Risk threshold triggers can be set at many levels and for many responses; however, it is best to keep them simple and few to avoid complicating maintenance and asset management practices. To keep the analysis simple as the City begins developing its risk management efforts, triggers have been set as follows:

- Level A - Watch
- Level B - Investigate
- Level C - Act

##### 10.2.1.1.1 Level A - Watch

This initial action level represents the point an asset or facility depicts aging or performance that requires increased attention, health checks or predictive maintenance efforts. Vertical assets such as mechanical and electrical equipment and structures warrant this attention and effort based on visual observations, age and runtime. Due to limited access associated with distribution systems, pipeline assets may pass through this level without action.

A typical action associated with this trigger includes maintenance modifications which may be indicated when the likelihood of failure reaches a level where predictive maintenance may be implemented or additional maintenance efforts may benefit the asset. Predictive maintenance is typically a data collection effort that informs the maintenance manager of potential faults or failures that may be remedied prior to an asset component failure.

##### 10.2.1.1.2 Level B - Investigate

This secondary action level is consistent with condition assessment activities. Once an asset or facility reaches this level, a focused condition assessment may be planned to evaluate where the asset is on its useful life curve and identify potential operational or maintenance activities that may support extending its life. Condition assessment also provides the utility manager with valuable forecasting data for fiscal planning. Water distribution pipelines typically fit this profile based on age, combined with failure history and local conditions, such as aggressive soils and pipe type. Vertical assets fit this profile based on age, performance and predictive maintenance data collection.

A typical action associated with this trigger includes condition assessment activities which may be indicated when the risk rating of an asset or a facility reaches a level that advanced planning should be performed to identify its point on the useful life curve. Identifying this point supports advanced planning for rehabilitation and replacement as well as modifications to asset condition monitoring. Preventative maintenance efforts can support condition assessment.

##### 10.2.1.1.3 Level C - Act

The third action level is the beginning of renewal activities. This may be as long-term as placement on a mid-range capital improvement plan or as immediate as design development and construction.

Rehabilitation and replacement (R&R) are indicated when the asset or facility risk does not support its intended level of service and, as such, requires some form of renewal. Rehabilitation and replacement must be planned sufficiently ahead of time to complete the activity prior to failure.



#### 10.2.1.1.4 Risk Threshold Trigger Setpoints

Triggers were applied to the risk threshold matrix to identify trigger levels that will support long-term risk management of the water utility infrastructure. These triggers were also used to develop and prioritize recommendations to improve the water system. Table 10-3 presents the risk threshold triggers (Level A, Level B and Level C) as defined above.

| <b>Table 10-3. Risk Threshold Triggers</b> |                 |                                                                                                                                                                                                                                             |               |               |             |                  |
|--------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|-------------|------------------|
|                                            |                 |                                                                                                                                                                                                                                             | LOF Rating    |               |             |                  |
|                                            |                 |                                                                                                                                                                                                                                             | 1<br>Unlikely | 2<br>Possible | 3<br>Likely | 4<br>Very Likely |
| COF Rating and Definition                  | 1<br>Negligible | No fiscal/operational impact                                                                                                                                                                                                                | No Action     | No Action     | No Action   | Level C          |
|                                            | 2<br>Minimal    | Slight pressure loss, minor public response, possible slight injury, minor detours                                                                                                                                                          | No Action     | Level A       | Level B     | Level C          |
|                                            | 3<br>Moderate   | Water service interrupted over local area, increased media coverage, increased injury potential, public transit impacted, restoration up to one-month impact                                                                                | No Action     | Level B       | Level C     | Level C          |
|                                            | 4<br>Severe     | Water service interrupted over wide area including fire capacity, potential local media coverage, potential consent order, transit impacts to BART or other outside agencies, long-term economic impact, greater than one-month restoration | Level A       | Level C       | Level C     | Level C          |



## 10.2.2 High Risk Assets Profiling

Risk Threshold Triggers were applied to asset risk ratings developed in the Water Utility Condition Assessment Technical Memorandum (see Appendix D).

### 10.2.2.1 Facilities

A summary of facilities and their risk threshold triggers are presented in Table 10-4 and Table 10-5. As noted earlier, some asset groups are represented in more than one risk level since individual assets or facilities are currently at different risk levels.

| Table 10-4. Risk Threshold Triggers of Facilities by LOF and COF |                 |                                 |                                                                   |                                                                                    |                            |
|------------------------------------------------------------------|-----------------|---------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------|
|                                                                  |                 | LOF Rating                      |                                                                   |                                                                                    |                            |
|                                                                  |                 | 1<br>Unlikely                   | 2<br>Possible                                                     | 3<br>Likely                                                                        | 4<br>Very Likely           |
| COF                                                              | 1<br>Negligible | Hydrants<br>Valves<br>Pipelines | Hydrants<br>Valves<br>Meters<br>Pipelines                         | Hydrants<br>Meters<br>Pipelines                                                    | Meters<br>Pipelines        |
|                                                                  | 2<br>Minimal    | Hydrants<br>Valves<br>Pipelines | Hydrants<br>Valves<br>PRVs<br>Intertie<br>Meters<br>Pipelines     | Hydrants<br>Valves<br>Well<br>Reservoir<br>PRVs<br>Intertie<br>Meters<br>Pipelines | Meters<br>Pipelines        |
|                                                                  | 3<br>Moderate   | Hydrants<br>Valves<br>Pipelines | Hydrants<br>Valves<br>PRVs<br>Intertie<br>Reservoirs<br>Pipelines | Hydrants<br>Valves<br>PRVs<br>Turnouts<br>Reservoirs<br>Pump Stations<br>Pipelines | Pump Stations<br>Pipelines |
|                                                                  | 4<br>Severe     | Pipelines                       | Pipelines                                                         | Pipelines                                                                          | Pipelines                  |

## Chapter 10

### Asset Renewal and Replacement



**Table 10-5. Facilities by Risk Threshold Trigger**

| Facility                   | Risk Threshold Trigger |
|----------------------------|------------------------|
| Calera Creek Heights PRV   | Level A - Watch        |
| Main PRV                   |                        |
| Sunnyhills PRV             |                        |
| SJW Intertie               |                        |
| Curtis Well                | Level B - Investigate  |
| Live Oak PRV               |                        |
| Tularcitos North Vault PRV |                        |
| Tularcitos South Vault PRV |                        |
| North Milpitas PRV         |                        |
| Capitol PRV                |                        |
| Junipero PRV               |                        |
| Gibraltar PRV              |                        |
| McCarthy PRV               |                        |
| Yosemite PRV               |                        |
| Minnis Reservoir           |                        |
| Gibraltar (VW) Reservoir   |                        |
| Gibraltar (SF) Reservoir   |                        |
| ACWD Intertie              |                        |
| SCVWD Intertie             |                        |
| Curtis PRV                 | Level C - Act          |
| Montague PRV               |                        |
| Main Turnout               |                        |
| Calaveras Turnout          |                        |
| Sunnyhills Turnout         |                        |
| Gibraltar Turnout          |                        |
| Tularcitos Reservoir       |                        |
| Ayer Reservoir             |                        |
| Pinewood Well              |                        |
| Country Club Pump Station  |                        |
| Tularcitos Pump Station    |                        |
| Gibraltar Pump Station     |                        |
| Ayer Pump Station          |                        |





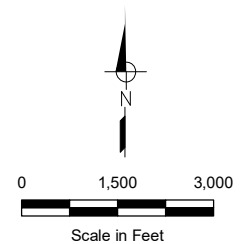
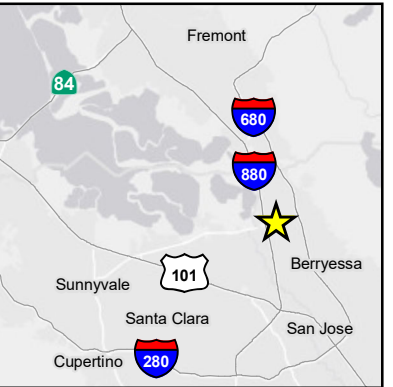
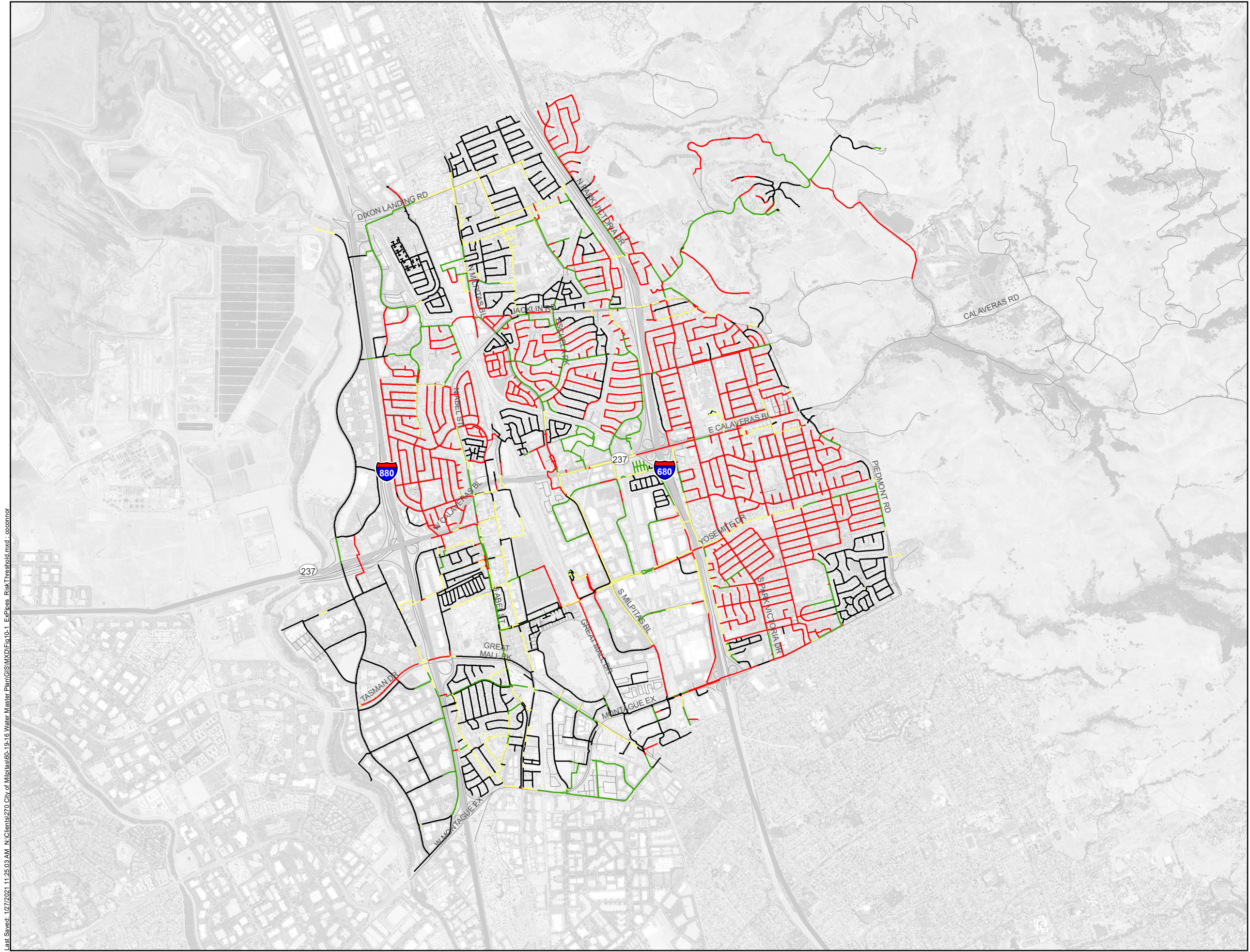
### 10.2.2.2 Horizontal Assets

There are numerous other assets, not associated with facilities, that are associated with pipeline or horizontal assets. These include pipelines, fire hydrants, valves and water meters. Table 10-6 presents a summary of pipeline assets in each classification with their corresponding risk threshold level. Table 10-7 presents a summary count of non-pipeline assets by classification. Pipelines represented in Table 10-6 and Table 10-7 are shown on Figure 10-1. A full listing of each asset is included in the Water Utility Condition Assessment Technical Memorandum (see Appendix D).

| <b>Table 10-6. Asset Count (Miles) of Risk Threshold Trigger by Asset Classification (April 2020 GIS)</b> |                        |             |             |
|-----------------------------------------------------------------------------------------------------------|------------------------|-------------|-------------|
| Pipe Diameter                                                                                             | Risk Threshold Trigger |             |             |
|                                                                                                           | Level A                | Level B     | Level C     |
| Pipeline, Miles                                                                                           |                        |             |             |
| 4-inch                                                                                                    | 0.0                    | 0.0         | 0.2         |
| 6-inch                                                                                                    | 0.5                    | 0.9         | 3.2         |
| 8-inch                                                                                                    | 0.5                    | 3.2         | 7.4         |
| 10-inch                                                                                                   | 0.4                    | 2.9         | 11.8        |
| 12-inch                                                                                                   | 18.5                   | 7.7         | 32.2        |
| 14-inch                                                                                                   | 2.7                    | 1.8         | 7.0         |
| 16-inch                                                                                                   | 0.8                    | 2.7         | 5.2         |
| 18-inch                                                                                                   | 0.7                    | 1.2         | 3.9         |
| 20-inch                                                                                                   | 0.0                    | 0.0         | 0.1         |
| 24-inch                                                                                                   | 0.0                    | 0.2         | 1.1         |
| 30-inch                                                                                                   | 0.0                    | 0.0         | 0.0         |
| <b>Total</b>                                                                                              | <b>24.1</b>            | <b>20.6</b> | <b>72.1</b> |

| <b>Table 10-7. Asset Count of Risk Threshold Trigger by Asset Classification</b> |                        |         |         |
|----------------------------------------------------------------------------------|------------------------|---------|---------|
| Asset Classification                                                             | Risk Threshold Trigger |         |         |
|                                                                                  | Level A                | Level B | Level C |
| Water Meter                                                                      | 2                      | 4       | 1815    |
| Fire Hydrants                                                                    | 231                    | 1265    | 3025    |
| Line Valves                                                                      | 877                    | 1970    | 4848    |





- Pipeline Risk Threshold Trigger**
- No Action
  - Level A
  - Level B
  - Level C



**Figure 10-1**  
**Existing Pipelines**  
**Risk Threshold Level**

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## **10.3 RECOMMENDED PROJECTS**

Recommended projects were identified based on the asset classification and the risk prioritization developed above. They include general maintenance modifications, detailed condition assessment, refurbishment and replacement.

### **10.3.1 Water Meters**

Most of the City's 16,351 Water Meters are beyond their typical useful life of roughly 15 years. Roughly 75 percent have exceeded this age in service. The City currently does not have a water meter replacement program other than replacement upon failure. For a water meter, failure is typically hidden resulting in an undetected meter accuracy reduction. The City is currently implementing an Advanced Metering Infrastructure (AMI) program that will ultimately replace existing water meters to conform to the new AMI system.

With the AMI replacement of the water meter inventory the City should investigate the creation of a water meter test program. The American Water Works Association recommends testing of water meters at a minimum of once every 20 years. This minimum test interval is beyond the nominal useful life of a meter and simply serves to confirm that replacement is, in fact, warranted. A meter test program can be established with a goal to test an appropriate sample of water meters and to profile meter performance specifically in the City's water system to confirm performance and useful life. A test program may begin at 10 years meter age with a goal to test 2 to 5 percent of the meter population per year.

As the AMI program evolves, the system will be selected, and it will be known if existing meters and meter components will be compatible with the new AMI system or if existing assets will require replacement. A new meter test program can then be configured based on the asset replacement rate associated with the AMI program and staffing resources.

### **10.3.2 Facilities**

Each of the 32 facilities evaluated are at a risk trigger level of at least Level A which indicates each should be considered at a minimum for maintenance review.

Facilities at Level A consist of PRVs and Interties and, while they require little maintenance, the preventative maintenance (PM) program should be modified to include visual assessments at least annually to begin to collect condition data to support future decision-making.

Facilities at Level B and Level C include PRVs, wells, interties, reservoirs, pumping stations and turnouts. The PM program should be modified as noted for Level A, as well as a detailed condition assessment program. Since these ratings are based on only a desktop assessment, assets at Level C are not immediately identified for replacement but should be given priority in condition assessment.

### **10.3.3 Pipelines, Fire Hydrants and Line Valves**

Pipeline assets are at risk trigger levels as high as Level C based on the desktop condition and risk assessment performed. Given the level of data available to support the desktop analysis, it is recommended that the maintenance program be reviewed to capture measurable performance data associated with pipeline failures and that a comprehensive condition assessment be conducted of representative portions of the distribution system.



Line valve and fire hydrant assets are at risk trigger levels as high as Level C based on the desktop condition and risk assessment performed. Slightly over half of the City's 9,330 fire hydrants and line valves exceed a typical useful life of 30 years. The City recently acquired equipment to support a valve and hydrant exercise program to provide mainline flushing and valve maintenance. The program is just now beginning. The exercise program should be developed with the objective to locate each valve in the field and confirm in GIS; confirm valves are operable, accessible and free of tuberculation; assure they are able to achieve a tight isolation; and, record depth, number of turns and turn direction. A valve exercise program should target the older system valves and hydrants rapidly in the first few years of the program and then settle into a pace of exercising all valves once every 5 years.

### 10.3.4 Summary of Asset Renewal and Replacement Recommendations

Capital and non-capital recommendations are presented in this section.

#### 10.3.4.1 Capital and Non-Capital Recommendations

A list of capital and non-capital recommendations was developed based on the risk assessment and the risk thresholds presented in this chapter and the Water Utility Condition Assessment Technical Memorandum (included in Appendix D). Table 10-8 presents these recommendations which include projects (capital) and improvement measures (non-capital) that respond to the current state of the City's distribution system.

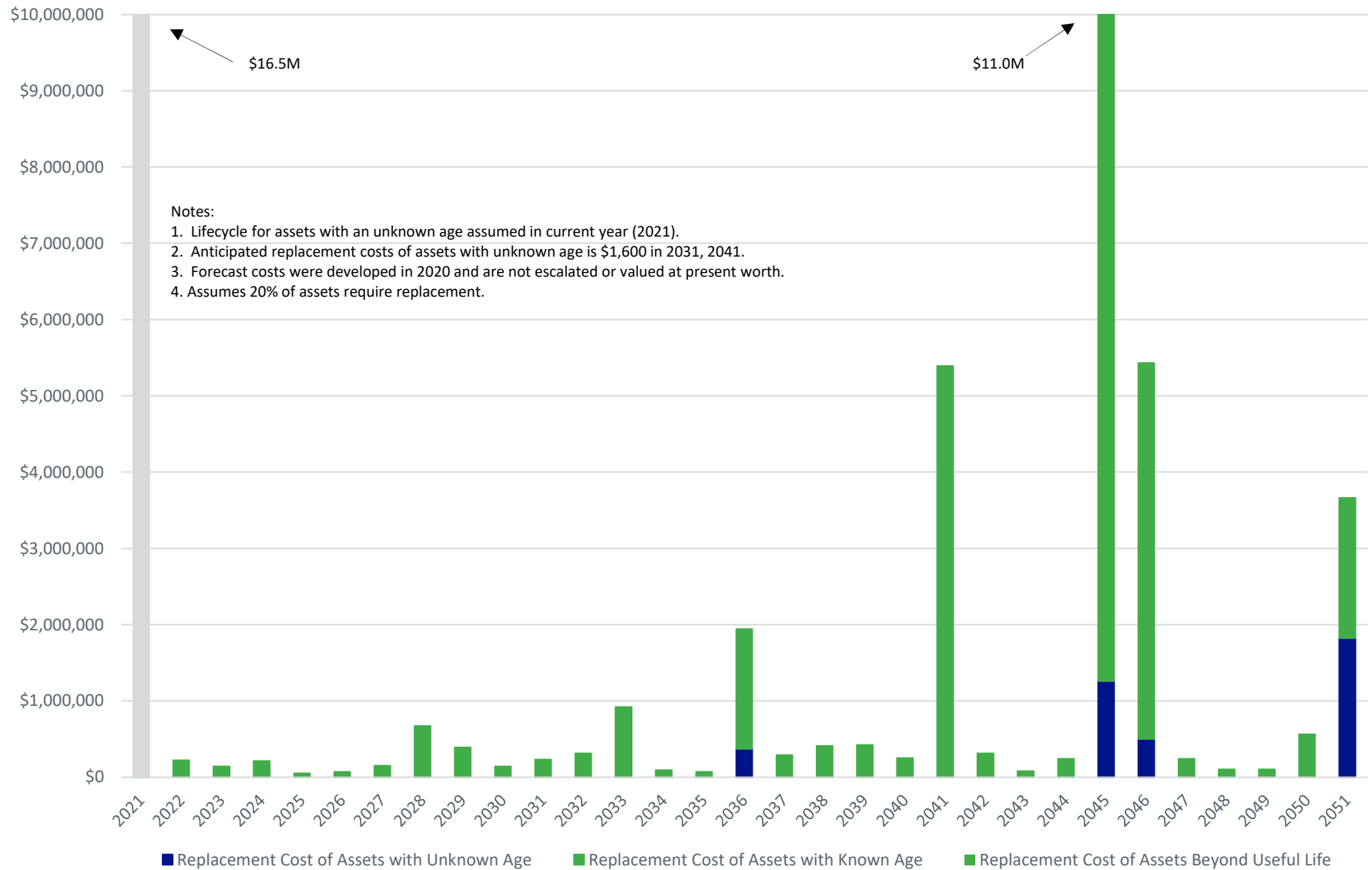
#### 10.3.4.2 R&R Forecast and Methodology

R&R planning is a forecast of planned effort and expenditures for the renewal or improvement of an asset and ultimately the replacement of the asset. While not yet specifically indicated, pending actual condition assessment, a forecast of asset replacement was developed and included to establish a baseline order of magnitude estimate of asset R&R for fiscal planning. This forecast may be used for current fiscal planning but should be verified based on the findings of the recommended condition assessment studies. Assumptions are presented below:

- Forecast year of action based on remaining asset useful life
- Actual asset replacement assumed to be 20 percent of assets reaching project useful life

A forecast of R&R expenditures is presented on Figure 10-2 and in Table 10-9.

**Figure 10-2. 30-Year R&R Forecast**





| Table 10-8. Asset Renewal and Replacement Recommendations |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Title                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Capital Cost Estimate, \$                                                                             |
| Capital Projects                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |
| Pipeline Condition Assessment                             | <p>Conduct a comprehensive assessment of the pipeline distribution system using both destructive and non-destructive assessment techniques. Technologies may include cathodic protection resistivity surveys, coupon sampling and testing, acoustic surveys and electromagnetic surveys and leak detection monitoring. The condition assessment should include appurtenances to pipelines such as air valves, blow off assemblies, fire hydrants and valves.</p> <p>The assessment should focus on metallic and asbestos cement pipeline material segments to document a correlation between pipe material, diameter, age and soil conditions to better estimate remaining useful life.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | \$500,000                                                                                             |
| Detailed Facility Condition Assessment                    | Detailed facility condition assessment studies should be performed at all Level B and C facilities. Level C facilities should be prioritized for immediate assessment. Condition assessment efforts were valued at 2.5% of asset or facility replacement cost.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                       |
|                                                           | Level B Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                       |
|                                                           | <b>PRV/Intertie/Turnout</b> <ul style="list-style-type: none"> <li>Live Oak PRV</li> <li>North Vault PRV</li> <li>South Vault PRV</li> <li>Milpitas PRV</li> <li>Capitol PRV</li> <li>Abel PRV</li> <li>Gibraltar PRV</li> <li>McCarthy PRV</li> <li>Sinclair PRV</li> <li>ACWD Intertie</li> <li>SCVWD Intertie</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5,000<br>15,000<br>15,000<br>5,000<br>15,000<br>5,000<br>15,000<br>15,000<br>5,000<br>15,000<br>5,000 |
|                                                           | Subtotal PRV/Intertie/Turnout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | \$115,000                                                                                             |
|                                                           | <b>Well/Res/PS</b> <ul style="list-style-type: none"> <li>Curtis Well</li> <li>Minnis Reservoir</li> <li>Gibraltar Res (VW)</li> <li>Gibraltar Res (SF)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 75,000<br>80,000<br>325,000<br>325,000                                                                |
|                                                           | Subtotal Well/Res/PS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | \$805,000                                                                                             |
|                                                           | Level B Total Cost                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | \$920,000                                                                                             |
|                                                           | Level C Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                       |
|                                                           | <b>PRV/Intertie/Turnout</b> <ul style="list-style-type: none"> <li>Curtis PRV</li> <li>Montague PRV</li> <li>Main Street Turnout</li> <li>Calaveras Turnout</li> <li>Sunnyhills Turnout</li> <li>Gibraltar Turnout</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 15,000<br>5,000<br>20,000<br>15,000<br>15,000<br>25,000                                               |
|                                                           | Subtotal PRV/Intertie/Turnout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | \$95,000                                                                                              |
|                                                           | <b>Well/Res/PS</b> <ul style="list-style-type: none"> <li>Tularcitos Reservoir</li> <li>Country Club Pump Station</li> <li>Tularcitos Pump Station</li> <li>Ayer Reservoirs</li> <li>Pinewood Well</li> <li>Gibraltar Pump Station</li> <li>Ayer Pump Station</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 75,000<br>60,000<br>70,000<br>355,000<br>105,000<br>435,000<br>125,000                                |
|                                                           | Subtotal Well/Res/PS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | \$1,225,000                                                                                           |
|                                                           | Level C Total Cost                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | \$1,320,000                                                                                           |
| Water Meters                                              | Develop a water meter test program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | \$100,000                                                                                             |
| Non-Capital Projects                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |
| Data Gathering                                            | <p>Develop business processes and modify the CMMS to collect asset performance data.</p> <p><b>Failure Hierarchy</b> – A failure hierarchy should be developed that supports the capture of problems, causes and remedies (PCR) employed for each asset. A sampling of PCR codes is included Appendix D for PUMP assets. Maintenance staff should then note the appropriate code in the work order when responding to asset problems.</p> <p><b>Condition Assessment Data</b> – Visual and predictive data elements should be developed, and the CMMS modified to provide data fields to capture this data during PM activities. At a minimum visual data should be collected to capture corrosion observations, concrete spalling, burning or arcing, and evidence of leakage. A simple domain should be developed to index readings including a photo-based guide for standardization between staff. Predictive data should be consistent with the City’s predictive maintenance program and may include oil analysis, vibration monitoring and thermal imaging.</p> <p><b>CMMS Automation</b> - Business Processes and CMMS workflows should be developed or otherwise modified to require the completion of specific fields such as Failure Codes as part of work order completion. The completion of these fields will be controlled by automated workflow that does not allow the work order to advance from the work performer to the quality assurance reviewer unless all required fields are completed.</p> | NA                                                                                                    |
| Line Valves and Fire Hydrants                             | Develop a valve and hydrant exercise program.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | NA                                                                                                    |
| Review Maintenance Program                                | The existing maintenance program should be reviewed to identify additional monitoring of assets at Level A and B facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | NA                                                                                                    |

## Chapter 10

### Asset Renewal and Replacement



**Table 10-9. 30-Year R&R Forecast**

| Year         | Replacement Cost of Assets Beyond Useful Life, \$ | Replacement Cost of Assets with Known Age, \$ | Replacement Cost of Assets with Unknown Age, \$ | Total Replacement Costs, \$ |
|--------------|---------------------------------------------------|-----------------------------------------------|-------------------------------------------------|-----------------------------|
| 2021         | 16,500,000                                        | 10,000                                        | -                                               | 16,510,000                  |
| 2022         | -                                                 | 220,000                                       | -                                               | 220,000                     |
| 2023         | -                                                 | 140,000                                       | -                                               | 140,000                     |
| 2024         | -                                                 | 210,000                                       | -                                               | 210,000                     |
| 2025         | -                                                 | 50,000                                        | -                                               | 50,000                      |
| 2026         | -                                                 | 70,000                                        | -                                               | 70,000                      |
| 2027         | -                                                 | 150,000                                       | -                                               | 150,000                     |
| 2028         | -                                                 | 670,000                                       | -                                               | 670,000                     |
| 2029         | -                                                 | 390,000                                       | -                                               | 390,000                     |
| 2030         | -                                                 | 140,000                                       | -                                               | 140,000                     |
| 2031         | -                                                 | 230,000                                       | -                                               | 230,000                     |
| 2032         | -                                                 | 310,000                                       | -                                               | 310,000                     |
| 2033         | -                                                 | 920,000                                       | -                                               | 920,000                     |
| 2034         | -                                                 | 90,000                                        | -                                               | 90,000                      |
| 2035         | -                                                 | 70,000                                        | -                                               | 70,000                      |
| 2036         | -                                                 | 1,570,000                                     | 370,000                                         | 1,940,000                   |
| 2037         | -                                                 | 290,000                                       | -                                               | 290,000                     |
| 2038         | -                                                 | 410,000                                       | -                                               | 410,000                     |
| 2039         | -                                                 | 420,000                                       | -                                               | 420,000                     |
| 2040         | -                                                 | 250,000                                       | -                                               | 250,000                     |
| 2041         | -                                                 | 5,390,000                                     | -                                               | 5,390,000                   |
| 2042         | -                                                 | 310,000                                       | -                                               | 310,000                     |
| 2043         | -                                                 | 80,000                                        | -                                               | 80,000                      |
| 2044         | -                                                 | 240,000                                       | -                                               | 240,000                     |
| 2045         | -                                                 | 9,690,000                                     | 1,260,000                                       | 10,950,000                  |
| 2046         | -                                                 | 4,930,000                                     | 500,000                                         | 5,430,000                   |
| 2047         | -                                                 | 240,000                                       | -                                               | 240,000                     |
| 2048         | -                                                 | 100,000                                       | -                                               | 100,000                     |
| 2049         | -                                                 | 100,000                                       | -                                               | 100,000                     |
| 2050         | -                                                 | 560,000                                       | -                                               | 560,000                     |
| 2051         | -                                                 | 1,840,000                                     | 1,820,000                                       | 3,660,000                   |
| <b>Total</b> | -                                                 | <b>\$30,090,000</b>                           | <b>\$3,950,000</b>                              | <b>\$50,540,000</b>         |



## **10.4 OVERVIEW OF SEISMIC RISK ASSESSMENT OF CITY'S WATER SYSTEM FACILITIES**

As part of the parallel preparation of the City's Risk and Resilience Assessment (RRA), in compliance with America's Water Infrastructure Act of 2018 (AWIA), a seismic risk assessment of the City's water system facilities was conducted. A technical memorandum was prepared to document the methodologies used and estimated consequences associated with an earthquake event affecting the City water system. The technical memorandum is included as Appendix E of this Water Master Plan.

The earthquake scenario selected for the City is the Hayward-Rodgers Creek event described in the United States Geological Survey (USGS) Northern California Legacy Catalog (also referred to as ShakeMaps). At magnitude 6.8, this event represents the largest magnitude event described by ShakeMap in relatively close proximity to key City utilities. According to USGS, this event has an estimated annual probability of approximately 0.74 percent (i.e., a 0.74 percent chance of occurring in any given year), and an approximately 31 percent chance of occurrence within the next 50 years.

The Hayward-Rodgers Creek 6.8 magnitude earthquake is estimated to cause significant damage to the City's non-linear and linear assets. The Hazus Method (for non-linear assets) estimates moderate damage to the buildings and moderate/severe damage to the pump stations and reservoirs. The ALA Method (for linear assets) estimates 8 breaks and 32 leaks from the transmission mains and 192 breaks and 58 leaks from the distribution pipelines. Repair and replacement costs are estimated using crew size, labor rate, shift duration, and order of magnitude material costs for the City. Specific recommendations resulting from the seismic risk analysis are included within the City's RRA and include retrofit of reservoirs to meet sloshing wave standards, implementation of seismically resilient design standards for pipelines, and installation of overland piping connections for critical pipelines that may be damaged during an earthquake, among others. Recommended projects are incorporated in the recommended CIP described in Chapter 11 of this report.

# CHAPTER 11

## Recommended Capital Improvement Plan

This chapter presents the recommended CIP for the City's existing and future water system based on the evaluations described in Chapters 8, 9, and 10 of this report, as well as the Risk and Resilience Assessment (RRA) conducted in parallel with this WMP. In addition to summarizing the recommended capital improvement projects, this chapter provides estimates of probable construction costs for each project. The recommended CIP identifies improvements at a Master Plan level and does not necessarily include all required on-site infrastructure or constitute design of improvements. Subsequent detailed design is required to determine the exact sizes and locations of these proposed improvements.

Construction costs are presented in 2020 dollars based on an Engineering News Record (ENR) Construction Cost Index (CCI) of 12920.6 for San Francisco and were developed based on bids from other municipal water facility design projects and standard cost estimating guides. Using cost estimate classifications from the Association for the Advancement of Cost Engineering (AACE), the following costs are Class 5 estimates, which are associated with projects that are only zero to two percent defined. The expected accuracy range for Class 5 cost estimates spans from -50 percent to +100 percent (i.e., the actual cost is typically between half and double the estimate).

Total CIP costs include mark-ups totaling 70 percent of the estimated base construction costs to allow for:

- Design and Construction Contingency: 35 percent
- Engineering: 10 percent
- Construction Management: 15 percent
- Program Implementation: 10 percent

CIP costs do not include costs for land acquisition, right-of-way acquisition, or annual operation and maintenance. Appendix F details the assumptions and development of construction cost estimates for each type of water facility (e.g., storage reservoirs, pump stations, and pipelines).

This chapter organizes the components of the recommended CIP according to the evaluation that identified the improvements. The final section of this chapter summarizes the recommendations and groups them into five-year CIP phases through the year 2051. Sections of this chapter include:

- Improvements from Renewal and Replacement Study
- Improvements from Existing System Analysis
- Improvements from Future System Analysis
- Improvements from Risk and Resilience Assessment
- Summary and Phasing of Recommended Improvements



## 11.1 IMPROVEMENTS FROM RENEWAL AND REPLACEMENT STUDY

Chapter 10 summarized the condition assessment of the City's water utility assets and recommended projects and activities to manage infrastructure risk. Each water utility asset was evaluated for risk in terms of likelihood and consequence of failure, with recommended projects prioritizing higher risk assets. Recommendations include general maintenance modifications, detailed condition assessment, and renewal and replacement.

Table 11-1 presents the costs for the recommended projects from Chapter 10. Facility condition assessment costs were estimated at 2.5 percent of asset or facility replacement cost. Note, the forecast of renewal and replacement costs is preliminary and based on asset age only. Renewal and replacement costs will change as the City performs detailed condition assessments.

| <b>Table 11-1. Probable Costs for Recommendations from Asset Renewal and Replacement Study<sup>(a)</sup></b>                                                                                                                                                                                                             |                                                                                                                                                                              |                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Component</b>                                                                                                                                                                                                                                                                                                         | <b>Description</b>                                                                                                                                                           | <b>CIP Cost, dollars</b> |
| Pipeline Condition Assessment                                                                                                                                                                                                                                                                                            | Conduct a comprehensive assessment of the pipeline distribution system using both destructive and non-destructive assessment techniques.                                     | 500,000                  |
| Detailed Facility Condition Assessment <sup>(b)</sup>                                                                                                                                                                                                                                                                    | Detailed facility condition assessment studies should be performed at all Level B and Level C facilities. Level C facilities should be prioritized for immediate assessment. | 2,240,000                |
| Water Meter Test Program                                                                                                                                                                                                                                                                                                 | Develop a water meter test program.                                                                                                                                          | 100,000                  |
| Asset Renewal and Replacement <sup>(c)</sup>                                                                                                                                                                                                                                                                             | 30-year forecast of asset renewal and replacement.                                                                                                                           | 50,540,000               |
| <b>Total</b>                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                              | <b>\$ 53,380,000</b>     |
| <sup>(a)</sup> Costs shown are in 2020 dollars.<br><sup>(b)</sup> Facility condition assessment efforts were valued at 2.5 percent of asset or facility replacement cost.<br><sup>(c)</sup> Forecast is preliminary and based on asset age only. Renewal and replacement costs will change pending condition assessment. |                                                                                                                                                                              |                          |

## 11.2 IMPROVEMENTS FROM EXISTING SYSTEM ANALYSIS

Chapter 8 summarized the evaluation of the City's existing potable water system and its ability to meet recommended operational and design criteria listed in Table 7-1 of this report. West Yost recommended projects to improve existing system operations. As discussed in Section 7.2.1, the existing system fire flow evaluation presents systemwide available fire flow and does not recommend pipeline improvements to specifically increase existing fire flow capacity. However, because results from the existing system fire flow analysis can help prioritize replacing smaller diameter pipelines to improve overall distribution system flows, recommended improvements from that analysis are included in the CIP.

Table 11-2 presents preliminary capital cost estimates for the recommended existing system improvements, which are organized by priority (high to low) and improvement type. West Yost assigned priorities based on the reason for the improvement, and these will help determine CIP phasing. High priority improvements address meeting recommended fire flows in normal conditions (i.e., no outages), while medium priority improvements address meeting recommended fire flows in emergency outage



## Chapter 11

### Recommended Capital Improvement Program

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scenarios (e.g., SFPUC turnouts offline). Finally, low priority improvements consist of projects that generally improve system performance and/or reliability but do not address any specific issues (e.g., upsizing any 4-inch diameter pipelines that serve hydrants to comply with City design guidelines). Where recommendations consisted of either a pipeline or valve improvement for a particular location (e.g., ECIP-V-01 or ECIP-PI-02), valves were selected for the CIP due to comparable cost and less potential disruption during construction (e.g., traffic impacts). Appendix G contains figures showing the location of these recommended improvements and, for some larger projects (e.g., EPRVs and new Ayer pump), single-page project summaries.

The total CIP cost (including mark-ups) for improvements to the existing system is approximately \$6.6 million. This includes a 50 percent discount for the new pump at the Ayer pump station, since the cost basis assumes an entirely new pump station, while the recommendation is to provide an additional pump at an existing pump station. In other words, a cost was developed for a new pump station with a firm capacity of 5.76 mgd (4,000 gpm), and half that cost was used to estimate installing a new 4,000 gpm pump at Ayer.

**Table 11-2. Probable Construction Costs for Recommended Improvements to Existing System<sup>(a)</sup>**

| Improvement Type              | Improvement Description                                                                                                                                                                                                    | CIP ID     | Reason for Improvement         | Priority | Quantity | Estimated Construction Cost <sup>(b)</sup> , dollars | CIP Cost (includes mark-ups) <sup>(c,d)</sup> , dollars |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------|----------|----------|------------------------------------------------------|---------------------------------------------------------|
| Interconnection               | On Hammond Way near Tom Evatt Park, replace the existing (normally closed) isolation valve separating Zones VW1 and SF1 with a new emergency PRV (Hammond EPRV).                                                           | ECIP-V-01  | Fire Flow                      | High     | 1 LS     | \$ 282,000                                           | \$ 479,000                                              |
| Interconnection               | Near the western end of Corning Avenue, install a new isolation valve at the end of the existing Zone SF1 pipeline, immediately upstream of the tee connecting Zones VW1 and SF1.                                          | ECIP-V-02  | Fire Flow                      | High     | 1 LS     | \$ 8,000                                             | \$ 14,000                                               |
| Pipeline Improvement          | Along Sinnott Lane, Bothelo Avenue, and East Carlo Street, replace existing 6-inch and 8-inch diameter pipeline with 12-inch diameter pipeline.                                                                            | ECIP-PI-01 | Fire Flow                      | High     | 1,731 lf | \$ 320,301                                           | \$ 545,000                                              |
| Pipeline Improvement          | Along Technology Drive between Murphy Ranch Road and the western end of Technology Drive, replace existing 4-inch diameter pipeline with 12-inch diameter pipeline.                                                        | ECIP-PI-04 | Fire Flow                      | High     | 742 lf   | \$ 137,198                                           | \$ 233,000                                              |
| Pipeline Improvement          | Along Hanson Court, replace existing 8-inch diameter pipeline with 12-inch diameter pipeline.                                                                                                                              | ECIP-PI-05 | Fire Flow                      | High     | 611 lf   | \$ 113,070                                           | \$ 192,000                                              |
| Pipeline Improvement          | Along Milmont Drive between Dixon Landing Road and the ACWD intertie, replace existing 8-inch and 10-inch diameter pipeline with 12-inch diameter pipeline.                                                                | ECIP-PI-06 | Fire Flow                      | High     | 907 lf   | \$ 167,841                                           | \$ 285,000                                              |
| Pipeline Improvement          | Along Railroad Avenue between approximately hydrant 1A-355 and the southern end of Railroad Avenue, replace existing 8-inch diameter pipeline with 12-inch diameter pipeline.                                              | ECIP-PI-07 | Fire Flow                      | High     | 880 lf   | \$ 162,788                                           | \$ 277,000                                              |
| Pipeline Improvement          | Within the shopping center east of the intersection of South Park Victoria Drive and Landess Avenue, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                              | ECIP-PI-08 | Fire Flow                      | High     | 450 lf   | \$ 60,727                                            | \$ 103,000                                              |
| Pipeline Improvement          | Along Greenwood Way between Pinewood Way and Fallen Leaf Drive, replace existing 6-inch diameter pipeline with 8-inch diameter pipeline.                                                                                   | ECIP-PI-10 | Fire Flow                      | High     | 861 lf   | \$ 116,222                                           | \$ 198,000                                              |
| Pipeline Improvement          | Along South Abel Street between Sylvia Avenue and Corning Avenue, replace existing 6-inch diameter pipeline with 8-inch diameter pipeline.                                                                                 | ECIP-PI-11 | Fire Flow                      | High     | 240 lf   | \$ 32,397                                            | \$ 55,000                                               |
| Pipeline Improvement          | Along Pinard Street from Ridgemont Drive up to the Lee's Orchard community, replace existing 8-inch diameter pipeline with 12-inch diameter pipeline.                                                                      | ECIP-PI-16 | Fire Flow                      | High     | 680 lf   | \$ 125,767                                           | \$ 214,000                                              |
| Pipeline Improvement          | Along Merz Court, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                                                                 | ECIP-PI-21 | Fire Flow                      | High     | 425 lf   | \$ 57,396                                            | \$ 98,000                                               |
| Pipeline Improvement          | Along Sussex Place, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                                                               | ECIP-PI-23 | Fire Flow                      | High     | 192 lf   | \$ 25,906                                            | \$ 44,000                                               |
| Pipeline Improvement          | Along Carlsbad Street between Carlsbad Court and Ben Rodgers Park, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                | ECIP-PI-25 | Fire Flow                      | High     | 160 lf   | \$ 21,583                                            | \$ 37,000                                               |
| Pipeline Improvement          | Along Calera Creek Heights Drive between approximately hydrants 4A-001 and 4A-005, replace existing 6-inch diameter pipeline with 8-inch diameter pipeline.                                                                | ECIP-PI-26 | Fire Flow                      | High     | 1,476 lf | \$ 199,262                                           | \$ 339,000                                              |
| Pump Station <sup>(e)</sup>   | Install a 4,000 gpm (5.76 mgd) fire pump at Ayer Pump Station.                                                                                                                                                             | ECIP-PS-AY | Fire Flow (Outage)             | Med      | 1 LS     | \$ 1,216,733                                         | \$ 2,068,000                                            |
| Interconnection               | Near the intersection of Coelho Street and Diel Drive, replace the existing (normally closed) isolation valve separating Zones SF1 and SF2 with a new emergency PRV (Diel EPRV).                                           | ECIP-V-03  | Fire Flow (Outage)             | Med      | 1 LS     | \$ 282,000                                           | \$ 479,000                                              |
| Pipeline Improvement          | Along Callan Street near the intersection of Callan Street and Arizona Avenue, replace existing 6-inch diameter pipeline with 8-inch diameter pipeline.                                                                    | ECIP-PI-28 | Fire Flow (Outage)             | Med      | 145 lf   | \$ 19,562                                            | \$ 33,000                                               |
| Pipeline Improvement          | Along Gross Street, near the intersection of Gross Street and Conway Street, replace existing 6-inch diameter pipeline with 8-inch diameter pipeline.                                                                      | ECIP-PI-31 | Fire Flow (Outage)             | Med      | 171 lf   | \$ 23,072                                            | \$ 39,000                                               |
| New Pipeline (Developed Area) | Along Curtis Avenue, connect the existing 10-inch diameter pipeline on the northern side of the street to the existing 18-inch diameter pipeline on the southern side of the street with a new, 12-inch diameter pipeline. | ECIP-PN-01 | Fire Flow (Outage)             | Med      | 30 lf    | \$ 5,550                                             | \$ 9,000                                                |
| New Pipeline (Developed Area) | Along Hammond Way, east of Tom Evatt Park, connect the existing 8-inch diameter pipelines in Zone VW1 with a new, 8-inch diameter pipeline.                                                                                | ECIP-PN-02 | Fire Flow (Outage)             | Med      | 57 lf    | \$ 7,628                                             | \$ 13,000                                               |
| Backup Generator              | Install a backup generator at the Country Club Pump Station.                                                                                                                                                               | ECIP-BG-CC | General Reliability            | Low      | 1 LS     | \$ 200,000                                           | \$ 340,000                                              |
| Backup Generator              | Install a backup generator at the Tularcitos Pump Station.                                                                                                                                                                 | ECIP-BG-TL | General Reliability            | Low      | 1 LS     | \$ 200,000                                           | \$ 340,000                                              |
| Pipeline Improvement          | Along Santa Rita Drive near the intersection of Santa Rita Drive and Via Baja Drive, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                              | ECIP-PI-32 | Hydrant Service <sup>(f)</sup> | Low      | 21 lf    | \$ 2,895                                             | \$ 5,000                                                |
| Pipeline Improvement          | Along Calle del Prado, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                                                            | ECIP-PI-33 | Hydrant Service <sup>(f)</sup> | Low      | 89 lf    | \$ 12,029                                            | \$ 20,000                                               |
| Pipeline Improvement          | Along Kennedy Drive between Topham Court and Prada Drive, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                         | ECIP-PI-34 | Hydrant Service <sup>(f)</sup> | Low      | 331 lf   | \$ 44,646                                            | \$ 76,000                                               |
| Pipeline Improvement          | Along Ramos Court, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                                                                | ECIP-PI-36 | Hydrant Service <sup>(f)</sup> | Low      | 62 lf    | \$ 8,424                                             | \$ 14,000                                               |
| Pipeline Improvement          | Along Stemel Court, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                                                               | ECIP-PI-37 | Hydrant Service <sup>(f)</sup> | Low      | 45 lf    | \$ 6,109                                             | \$ 10,000                                               |
| Pipeline Improvement          | Along Sepulveda Court, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                                                            | ECIP-PI-38 | Hydrant Service <sup>(f)</sup> | Low      | 21 lf    | \$ 2,874                                             | \$ 5,000                                                |
| Pipeline Improvement          | Along Berg Court, replace existing 4-inch diameter pipeline with 8-inch diameter pipeline.                                                                                                                                 | ECIP-PI-39 | Hydrant Service <sup>(f)</sup> | Low      | 107 lf   | \$ 14,483                                            | \$ 25,000                                               |
|                               |                                                                                                                                                                                                                            |            |                                |          |          | <b>Total</b>                                         | <b>\$ 6,589,000</b>                                     |

(a) Costs shown are in 2020 dollars.

(b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

(c) Costs include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

(d) Total rounded to the nearest \$1,000.

(e) Since this an upgrade to an existing pump station (and not a new pump station), the estimated cost is discounted 50 percent.

(f) To comply with the City's design guidelines, West Yost also recommends upsizing pipelines less than 6 inches in diameter that serve hydrants.



## **11.3 IMPROVEMENTS FROM FUTURE SYSTEM ANALYSIS**

Chapter 9 summarized the evaluation of the City’s future (i.e., buildout) potable water system and its ability to meet recommended operational and design criteria listed in Table 7-1 of this report. Evaluation of the buildout system assumed that improvements recommended from the existing system analysis were implemented. Any buildout system deficiencies were then addressed via additional improvements.

Table 11-3 presents preliminary capital cost estimates for the recommended buildout system improvements. With demands in the VW service area increasing over 65 percent from existing levels, supply and storage capacity improvements are recommended. In addition to a new storage reservoir, the Curtis Well helps address the storage capacity deficiency at buildout by providing an emergency groundwater storage credit. The Cedar EPRV will help serve fire flows in Zone VW1 and improve system reliability. Since these projects address capacity deficiencies or improve fire flow, all are considered high priority. Appendix G contains project summary sheets for each of these recommended improvements.

The total CIP cost (including mark-ups) for improvements to the buildout system is approximately \$16.6 million. This total does not include land acquisition costs, which may be necessary for the new storage reservoir. A public service utility easement is available for the Piper turnout, but space is limited. As a result, it is assumed a pump station will not be constructed at the Piper turnout. While the Gibraltar facility has a pump station to boost low pressures from the Gibraltar turnout, to date the City has not used it. Therefore, constructing the Piper turnout without a booster pump station is acceptable.

**Table 11-3. Probable Construction Costs for Recommended Improvements to Future System<sup>(a)</sup>**

| Improvement Type                 | Improvement Description                                                                                                                                                              | CIP ID     | Reason for Improvement | Priority | Quantity | Estimated Construction Cost <sup>(b)</sup> , dollars | CIP Cost (includes mark-ups) <sup>(c,d)</sup> , dollars |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------|----------|----------|------------------------------------------------------|---------------------------------------------------------|
| Turnout                          | New VW turnout near the intersection of Piper Drive and Garden Street with a capacity of 10,000 gpm (14.4 mgd).                                                                      | BCIP-TO-01 | Firm Supply Capacity   | High     | 1 LS     | \$ 313,000                                           | \$ 532,000                                              |
| Storage Reservoir <sup>(e)</sup> | 2.0 MG reservoir in VW service area.                                                                                                                                                 | BCIP-S-01  | Storage Capacity       | High     | 1 LS     | \$ 3,254,000                                         | \$ 5,532,000                                            |
| Pump Station                     | Firm capacity of 4,000 gpm (5.76 mgd) for new storage reservoir.                                                                                                                     | BCIP-PS-01 | Storage Capacity       | High     | 1 LS     | \$ 2,433,466                                         | \$ 4,137,000                                            |
| Groundwater Well <sup>(f)</sup>  | Construct Curtis Well.                                                                                                                                                               | BCIP-W-01  | Storage Capacity       | High     | 1 LS     | \$ 3,500,000                                         | \$ 5,950,000                                            |
| Interconnection                  | Near the intersection of Cedar Way and South Main Street, replace the existing (normally closed) isolation valve separating Zones SF1 and VW1 with a new emergency PRV (Cedar EPRV). | BCIP-V-01  | Fire Flow              | High     | 1 LS     | \$ 282,000                                           | \$ 479,000                                              |
| <b>Total</b>                     |                                                                                                                                                                                      |            |                        |          |          |                                                      | <b>\$ 16,630,000</b>                                    |

(a) Costs shown are in 2020 dollars.

(b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

(c) Costs include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

(d) Total rounded to the nearest \$1,000.

(e) Recommended active volume. Cost assumes the storage reservoir will be an aboveground steel tank. Land acquisition costs are not included.

(f) Estimated construction cost assumes Curtis Well capacity is between 500 and 1,000 gpm. A higher capacity may result in higher costs.



## **11.4 IMPROVEMENTS FROM RISK AND RESILIENCE ASSESSMENT**

West Yost conducted an RRA in compliance with the requirements of the 2018 America's Water Infrastructure Act. This effort includes assessments of both cyber and physical risks and resilience and development of a risk and resilience strategy. Recommendations from the RRA, referred to as risk and resilience management strategies (RRMS), include physical upgrades, planning efforts, and cyber security projects.

Table 11-4 presents the recommended RRMS, organized by project type, along with a project description and priority as assigned in the RRA. High-level cost estimates were developed for four of the 23 RRMS. These four projects and their costs, which total approximately \$2.1 million (2020 dollars), are included in the CIP summary and phasing detailed in Section 11.5.



**Table 11-4. Risk and Resilience Assessment Management Strategies<sup>(a)</sup>**

| Project Type                        | Project No. | Project Name <sup>(b)</sup>                                                                   | Project Description <sup>(b)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Priority | CIP Cost <sup>(c)</sup> , dollars |
|-------------------------------------|-------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------|
| Physical Upgrade                    | 1           | Physical Security Updates - Perimeter Fencing                                                 | Enhance security of site perimeters by establishing and implementing a minimum fencing standard (e.g., 8-feet high, anti-climb fabric, barbed wire).                                                                                                                                                                                                                                                                                                                                                                                   | High     | \$ 30,000                         |
|                                     | 2           | Physical Security Updates - Turnout                                                           | Enhance security of turnout site perimeter by installing minimum 8-ft fencing. Property owned by SFPUC. Work with SFPUC to make improvements.                                                                                                                                                                                                                                                                                                                                                                                          | High     |                                   |
|                                     | 3           | Warning Signage                                                                               | Install signage at all facilities to inform that trespassing, tampering, and vandalism are criminal acts under relevant federal statutes.                                                                                                                                                                                                                                                                                                                                                                                              | High     |                                   |
|                                     | 4           | Site Security Protocols                                                                       | Implement policy of keeping all gates and doors locked at reservoir and pump station sites, and require key or access card to open.                                                                                                                                                                                                                                                                                                                                                                                                    | High     | \$ 20,000                         |
|                                     | 5           | Harden Critical Transmission Mains against Earthquakes - Emergency Connections                | Install overland piping connections for critical pipelines that may be used to provide temporary distribution capacity.                                                                                                                                                                                                                                                                                                                                                                                                                | High     |                                   |
|                                     | 6           | Harden Critical Transmission Mains against Earthquakes - Emergency Connections Exercises      | Conduct periodic exercises for existing overland piping connections across faults.                                                                                                                                                                                                                                                                                                                                                                                                                                                     | High     |                                   |
|                                     | 7           | Harden Critical Transmission Mains against Earthquakes - Replace Isolation Valves             | Following implementation of a program to locate and assess isolation valves on critical transmission mains (see Harden Critical Transmission Mains against Earthquakes - Identify Isolation Valves). Replace isolation valves according to priority.                                                                                                                                                                                                                                                                                   | High     | \$ 2,000,000                      |
|                                     | 8           | Harden Critical Reservoirs against Earthquakes - Isolation Valves                             | Assess and replace (as needed) isolation valves and buried connections at reservoirs.                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Medium   |                                   |
|                                     | 9           | ShakeAlert Participation                                                                      | Enroll in program to receive early warning indications from USGS (or other agencies). Development of protocols for responding to ShakeAlert signals included in other RRMS projects                                                                                                                                                                                                                                                                                                                                                    | Medium   | \$ 85,000                         |
|                                     | 10          | Valve Integration with ShakeAlert                                                             | Install new or modify existing automatic valves to be integrated with or informed by ShakeAlert. Develop remote valve closure protocol to prevent leakage of safe drinking water from reservoirs during and following an earthquake. Coordinate valve closure protocol with Distribution.                                                                                                                                                                                                                                              | High     |                                   |
|                                     | 11          | Equipment Integration with ShakeAlert                                                         | Integrate ShakeAlert with process controls to prevent or reduce earthquake damage. Develop protocols for equipment shutdowns based on risk.                                                                                                                                                                                                                                                                                                                                                                                            | High     |                                   |
|                                     | 12          | Retrofit Steel Reservoirs to Meet Sloshing Wave Standard                                      | Evaluation of the City's reservoir roof and overflow heights and reservoir operating levels revealed that maximum potential sloshing wave height triggered by an earthquake would exceed the reservoir roof heights for all of the City's reservoirs. This could result in structural damage to the reservoirs. Steel reservoirs may be physically retrofitted to increase the roof height to meet the sloshing wave standard. It is recommended that the reservoirs be retrofitted to meet the standard.                              | Low      |                                   |
|                                     | 13          | Implement Seismic Design Standards for Pipeline Upgrades and Replacements                     | Seismic design standards for pipelines were previously identified in the 2006 City of Milpitas Water System Seismic Improvements Strategic Plan (prepared by DWSA). This project would be a continuation of implementation of the recommended upgrades to pipelines within the system.                                                                                                                                                                                                                                                 | Medium   |                                   |
|                                     | 14          | Security Cameras for Critical and Remote Facilities                                           | Where feasible, install PTZ security cameras at the most critical and remote assets. Evaluate feasibility of storing footage from new cameras. This effort is currently in progress.                                                                                                                                                                                                                                                                                                                                                   | High     |                                   |
|                                     | 15          | Fire Pump at Ayer Pump Station                                                                | Install fire pump at the Ayer Pump Station to increase fire flow capacity when the SFPUC turnouts are offline. Note that this project is also included in the recommendations for the 2020 Water Master Plan.                                                                                                                                                                                                                                                                                                                          | High     |                                   |
| Planning and Studies                | 16          | Harden Critical Transmission Mains against Earthquakes - Identify and Assess Isolation Valves | Locate distribution system PRVs and isolation valves, determine if the valves are functional, evaluate the condition of the valves, and record and summarize the data collected during the field investigation. Following evaluation of the distribution valves prioritize valves for maintenance/replacement.                                                                                                                                                                                                                         | Medium   |                                   |
|                                     | 17          | Evaluate Concrete Reservoirs Ability to Withstand Sloshing Wave Forces                        | Evaluation of the City's reservoir roof and overflow heights and reservoir operating levels revealed that maximum potential sloshing wave height triggered by an earthquake would exceed the reservoir roof heights for all of the City's reservoirs. This could result in structural damage to the reservoirs. Concrete roofs may be capable of withstanding forces produced by the sloshing wave if the roof height does not meet the standard, however, further evaluation by a structural engineer is recommended to confirm this. | Complete |                                   |
| Cyber Security                      | 18          | Develop and Implement a SCADA Master Plan                                                     | Prepare a SCADA Master Plan to provide a road map for utility-wide SCADA system policies, procedures and improvements; provide increased security and uniformity across utility. This project would include or provide definition to the projects listed here. This effort is currently in progress.                                                                                                                                                                                                                                   | High     |                                   |
|                                     | 19          | Conduct Day Without SCADA Exercises & Document Capabilities                                   | Following implementation of the City's new SCADA system, conduct emergency preparedness exercises to test operation of distribution system without automation (SCADA). Since the City currently operates the system without the use of SCADA, the purpose of this exercise is to maintain staff knowledge and capabilities.                                                                                                                                                                                                            | High     |                                   |
|                                     | 20          | Engage DHS for Cybersecurity Services                                                         | Engage Cybersecurity Infrastructure Security Agency (CISA) for cybersecurity services including assessments, tools, and recommendations. CISA offers a wide range of assessments. At a minimum, this project will engage DHS for a Phishing Campaign Assessment and a Remote Penetration Test. To be implemented following implementation of SCADA.                                                                                                                                                                                    | Medium   |                                   |
| Shorter Term Activities or Projects | 21          | Business Continuity Plan                                                                      | Develop a Business Continuity Plan to outline the policies and procedures the City must follow to resume business operations following a major disruption (fire, flood, earthquake, cyberattack, etc.).                                                                                                                                                                                                                                                                                                                                | High     |                                   |
|                                     | 22          | Day without Phone Exercises                                                                   | Exercise radio skills on bi-annual basis with monthly radio call ins. Planning for this exercise is currently in progress.                                                                                                                                                                                                                                                                                                                                                                                                             | High     |                                   |
|                                     | 23          | Functional Training on ERP                                                                    | Conduct functional training exercises on the City's ERP to prepare staff for emergency events.                                                                                                                                                                                                                                                                                                                                                                                                                                         | Medium   |                                   |
| <b>Total</b>                        |             |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          | <b>\$ 2,135,000</b>               |

(a) Costs shown are in 2020 dollars.

(b) Project names and descriptions have been generalized to not identify specific system vulnerabilities.

(c) Costs were only developed for four projects recommended in the Risk and Resilience Assessment.



## **11.5 SUMMARY AND PHASING OF RECOMMENDED IMPROVEMENTS**

This section combines the above recommendations and organizes them into five-year CIP periods according to project priority. CIP phasing generally consists of five-year periods spanning from 2021 through 2051. This period is 31 years, so the final CIP period spans six years (2046-2051). It was assumed that improvements from the existing system analysis would be implemented in the next ten years (i.e., by 2030), while improvements from the future system analysis would be implemented when existing facilities can no longer meet operational criteria summarized in Table 7-1 of this report.

It was assumed that condition assessments, water meter test development, and physical upgrades would occur by 2025. Asset renewal and replacement follows the schedule presented in Table 10-9 of this report. Note, the asset renewal and replacement schedule was developed based on asset age and is subject to change pending findings from the recommended detailed condition assessments.

For the existing system analysis, high priority improvements are assigned to the 2021-2025 CIP period, while medium and low priority improvements are assigned to the 2026-2030 CIP period. As noted in Section 9.4 of this report, storage capacity is expected to become insufficient around 2032. Therefore, the new storage reservoir and Curtis Well (which reduces the storage requirement via an emergency groundwater storage credit) are assigned to the 2031-2035 CIP period. In contrast, firm supplies (i.e., largest turnout in each service area offline) can meet demands until around 2038, so the Piper turnout can be pushed to the 2036-2040 CIP period.

Table 11-5 summarizes the proposed CIP phasing and cost in 2020 dollars. Improvements are grouped according to their "source" (e.g., Renewal and Replacement Study), and their costs are assigned to a five-year CIP period. The total CIP cost through 2051 is approximately \$78.7 million (2020 dollars).

**Table 11-5. Capital Improvement Program Phasing**

| Improvement                                                     | Capital Cost, \$M <sup>(a)</sup> |           |           |           |           |                          |         |
|-----------------------------------------------------------------|----------------------------------|-----------|-----------|-----------|-----------|--------------------------|---------|
|                                                                 | 2021-2025                        | 2026-2030 | 2031-2035 | 2036-2040 | 2041-2045 | 2046-2051 <sup>(b)</sup> | Total   |
| Improvements from Renewal and Replacement Study (Chapter 10)    |                                  |           |           |           |           |                          |         |
| Pipeline Condition Assessment                                   | \$0.5                            | -         | -         | -         | -         | -                        | \$0.5   |
| Detailed Facility Condition Assessment                          | \$2.2                            | -         | -         | -         | -         | -                        | \$2.2   |
| Water Meter Test Program                                        | \$0.1                            | -         | -         | -         | -         | -                        | \$0.1   |
| Asset Renewal and Replacement                                   | \$17.1                           | \$1.4     | \$1.6     | \$3.3     | \$17.0    | \$10.1                   | \$50.5  |
| Subtotal                                                        | \$20.0                           | \$1.4     | \$1.6     | \$3.3     | \$17.0    | \$10.1                   | \$53.4  |
| Improvements from Existing System Analysis (Chapter 8)          |                                  |           |           |           |           |                          |         |
| Hammond EPRV and Corning Isolation Valve                        | \$0.5                            | -         | -         | -         | -         | -                        | \$0.5   |
| Pipeline Improvements - Fire Flow                               | \$2.6                            | -         | -         | -         | -         | -                        | \$2.6   |
| Fire Pump at Ayer Pump Station                                  | -                                | \$2.1     | -         | -         | -         | -                        | \$2.1   |
| Diel EPRV                                                       | -                                | \$0.5     | -         | -         | -         | -                        | \$0.5   |
| Pipeline Improvements and New Pipelines - Fire Flow (Outage)    | -                                | \$0.1     | -         | -         | -         | -                        | \$0.1   |
| Backup Generators at Country Club and Tularcitos Pump Stations  | -                                | \$0.7     | -         | -         | -         | -                        | \$0.7   |
| Hydrant Service Pipeline Improvements                           | -                                | \$0.2     | -         | -         | -         | -                        | \$0.2   |
| Subtotal                                                        | \$3.1                            | \$3.5     | \$0.0     | \$0.0     | \$0.0     | \$0.0                    | \$6.6   |
| Improvements from Future System Analysis (Chapter 9)            |                                  |           |           |           |           |                          |         |
| Piper Turnout                                                   | -                                | -         | -         | \$0.5     | -         | -                        | \$0.5   |
| VW Storage Reservoir                                            | -                                | -         | \$5.5     | -         | -         | -                        | \$5.5   |
| Pump Station for VW Storage Reservoir                           | -                                | -         | \$4.1     | -         | -         | -                        | \$4.1   |
| Curtis Well                                                     | -                                | -         | \$6.0     | -         | -         | -                        | \$6.0   |
| Cedar EPRV                                                      | -                                | -         | \$0.5     | -         | -         | -                        | \$0.5   |
| Subtotal                                                        | \$0.0                            | \$0.0     | \$16.1    | \$0.5     | \$0.0     | \$0.0                    | \$16.6  |
| Improvements from Risk and Resilience Assessment <sup>(c)</sup> |                                  |           |           |           |           |                          |         |
| Perimeter Fencing                                               | \$0.030                          | -         | -         | -         | -         | -                        | \$0.030 |
| Site Security Protocols                                         | \$0.020                          | -         | -         | -         | -         | -                        | \$0.020 |
| Replace Isolation Valves                                        | \$2.0                            | -         | -         | -         | -         | -                        | \$2.0   |
| ShakeAlert Participation                                        | \$0.085                          | -         | -         | -         | -         | -                        | \$0.085 |
| Subtotal                                                        | \$2.1                            | \$0.0     | \$0.0     | \$0.0     | \$0.0     | \$0.0                    | \$2.1   |
| Total                                                           | \$25.2                           | \$4.9     | \$17.7    | \$3.8     | \$17.0    | \$10.1                   | \$78.7  |

(a) Costs shown are in 2020 dollars.

(b) Includes forecasted renewal and replacement costs for the year 2051.

(c) Costs were only developed for four projects recommended in the Risk and Resilience Assessment.

## CHAPTER 12

### References

Below is a list of references used for the preparation of this Water Master Plan, sorted alphabetically by author.

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## Appendix A

### Water System Schematic Profile



Elev (FT)

1000  
900  
800  
700  
600  
500  
400  
300  
200  
100  
0

LEGEND

- WHOLESALER SUPPLY LINE
- CITY DISTRIBUTION LINE
- EMERGENCY/NORMALLY CLOSED LINE
- SERVICE ZONE
- VALVE (NORMALLY CLOSED)
- WELL
- PRESSURE REDUCING VALVE (PRV)
- EMERGENCY PRV
- CITY RESERVOIR
- PUMP STATION (PS)
- TURNOUT
- INTERTIE

NOTE:  
Tank Elevations shown are Top of Tank Elevation

SFPUC  
San Francisco Public  
Utilities Commission

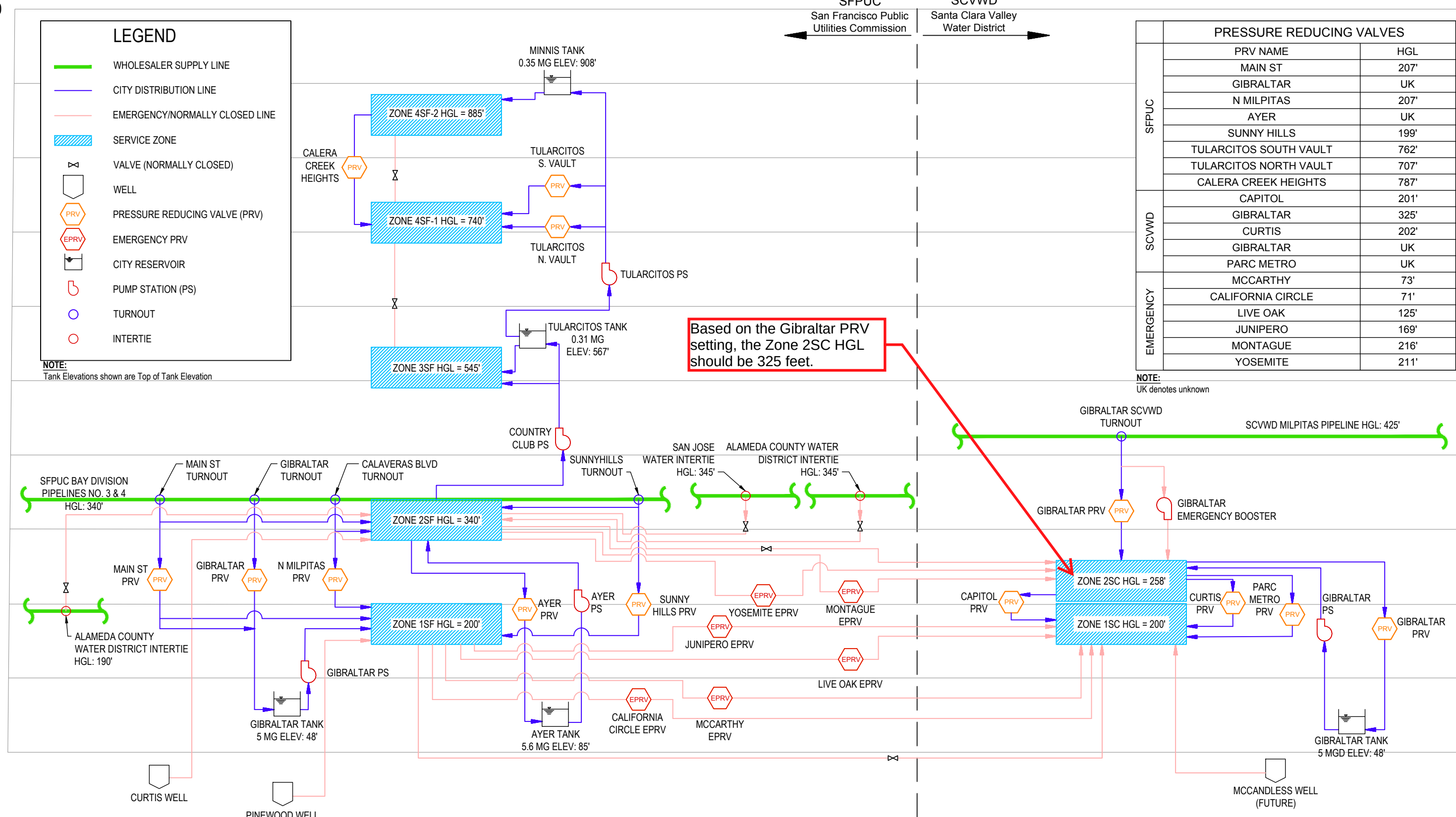
SCVWD  
Santa Clara Valley  
Water District

PRESSURE REDUCING VALVES

|           | PRESSURE REDUCING VALVES |      |
|-----------|--------------------------|------|
|           | PRV NAME                 | HGL  |
| SFPUC     | MAIN ST                  | 207' |
|           | GIBALTAR                 | UK   |
|           | N MILPITAS               | 207' |
|           | AYER                     | UK   |
|           | SUNNY HILLS              | 199' |
|           | TULARCITOS SOUTH VAULT   | 762' |
|           | TULARCITOS NORTH VAULT   | 707' |
|           | CALERA CREEK HEIGHTS     | 787' |
| SCVWD     | CAPITOL                  | 201' |
|           | GIBALTAR                 | 325' |
|           | CURTIS                   | 202' |
|           | GIBALTAR                 | UK   |
|           | PARC METRO               | UK   |
| EMERGENCY | MCCARTHY                 | 73'  |
|           | CALIFORNIA CIRCLE        | 71'  |
|           | LIVE OAK                 | 125' |
|           | JUNIPERO                 | 169' |
|           | MONTAGUE                 | 216' |
|           | YOSEMITE                 | 211' |

NOTE:  
UK denotes unknown

Based on the Gibraltar PRV setting, the Zone 2SC HGL should be 325 feet.



## Appendix B

### System Operations Narratives

# **City of Milpitas Distribution System Operation**

## **General Description**

### **WATER SUPPLY**

The City of Milpitas receives water from two wholesale agencies, San Francisco Public Utilities Commission (SFPUC) and Valley Water (VW). Water from SFPUC is brought through the City by two transmission lines, Bay Division Pipelines 3 & 4, supplies Milpitas through 3 turnouts – Sunnyhills, Calaveras, and Main Street. Valley Water is brought to the City via the East Pipeline, and has one turnout at the City's Gibraltar Pump Station. There is an Intertie connection between Valley Water and SFPUC which runs from the end of the East Pipeline at Gibraltar Pump station and proceeds approximately 1,000 feet north to the SFPUC/VW Intertie Pump Station. Milpitas has a connection to this pipeline which can serve as an additional turnout to SFPUC, which we call the Intertie Turnout. When the SFPUC/VW Intertie is not in operation to transport water from SFPUC to VW or vice versa, the Intertie turnout is used by Milpitas to receive water from SFPUC, thus keeping the Intertie pipeline with fresh water in it.

The City also currently has one operational well, Pinewood Well, can be used to supply water to a portion of the City's zone 1SF distribution system. This well is currently premitted as a Standby Well, and thus can only be used for emergency operations only. An additional well, Curtis Well, has been drilled and developed, but there is no pump station and no connection to distribution system infrastructure. Curtis Well contains manganese and will require treatment. Possible infrastructure connections are to zones 1SC, 2SC and 2SF. In addition, a connection to Gibraltar Pump Station for blending purposes is also in consideration. A third well is in the planning stages now, McCandless Park Well. A test hole had been drilled and the above and below ground portions of the main well are in design with an anticipated completed date of sometime in 2022. This well will also require manganese removal treatment, and will serve zone 1SC.

### **Pressure Zones**

Milpitas does not blend water from the two wholesalers that serve the City. As a result, Milpitas distinct areas that are served water from one or the other wholesaler, and they are designated by the letter codes SF and SC. Each wholesaler served area has two main pressure zones in the area of the City that resides on the valley floor. Zones are identified as low pressure or high pressure. Low pressure zones have a number designation of 1, and are regulated by pressure reducing valves to have a maximum pressure of about 80 psi in the zone. High pressure zones have a number designation of 2. The high pressure zone served

by SF is not regulated and is set by the pressure supplied by SFPUC at the turnouts, which is typically between 130 and 140 psi. For the high pressure zone served by VW, it is set by a pressure reducing valve at Gibraltar Pump Station to between 135 and 140 psi. Valley Water is typically supplied from the East Pipeline at a pressure of 170 – 180 psi.

There are two additional pressure zones that cover the developed area of the hills in Milpitas which includes the Summit Pointe Golf and Country Club. This water system was originally called La Questa and is now commonly referred to as “The Hillside”. Water is transported to these zones, designated 3 and 4a and 4b. These system will be described in more detail later in this document.

## **DISTRIBUTION SYSTEM OPERATION**

### **VW System**

The area of Milpitas which is served by Valley Water (formerly known as Santa Clara Valley Water District, or SCVWD) was carved out in the late 1980s to be served separately from the rest of the City’s distribution system, which was formerly completely serviced by SFPUC. The area selected was primarily commercial/industrial. See the zone map for visual reference. Gibraltar Pump Station was constructed as part of this effort and has two 5 MG storage tanks, one designated for VW water and one for SFPUC water. The station is really 3 stations in one, and was intended to serve multiple purposes. For the distribution of VW water, the turnout connection to the East Pipeline was located on the station grounds. Water from the turnout goes through a revenue meter and vault, maintained by VW, and then goes through a Pressure Reducing Valve (PRV) to enter the City’s zone 2SC distribution system. Water is also sent to the VW reservoir for storage directly from the turnout. Water from the reservoir can be pumped out of the reservoir and into zone 2SC by one of two pumping systems. When pumping from storage, flow from the turnout is generally halted. Once water enters zone 2SC, it is maintained at about 135 psi. There are three PRV stations that then take water from zone 2SC and reduce the pressure to send it to zone 1SC. Pressure in zone 1SC is maintained to have a maximum of about 80 psi as the highest pressure within the zone. The three PRVs that send water to zone 1SC are Curtis, Parc Metro and Capitol. The Curtis PRV is actually two PRVs in parallel, designated East and West.

In addition to the main PRVs that control pressure in zones 1SC and 2SC, there are also Emergency PRV stations. These are standby PRV stations that will only open and supply water if the pressure in zone they are supplying falls below a certain setpoint. For zone 2SC, there are two stations, Yosemite and Montague, that will allow water to pass from zone 2SF to zone 2SC if the pressure in zone 2SC falls below about 120 psi. For zone 1SC, there are 4 emergency PRV stations, Live Oak, McCarthy, California Circle, and Junipero. These stations will supply water from zone 1SF to zone 1SC if the pressure in zone 1SC falls below about 60 psi at the point of highest pressure. It is important to note that the emergency PRVs for both zones

only flow in *one* direction, from the SF zones to the SC zones, and *not* in the opposite direction. The SC zones were intentionally set up to have higher pressures than the corresponding SF zones so that this system could work this way.

### **SFPUC System**

The portion of the City supplied by water from SFPUC is primarily residential, with some commercial. Water is supplied to these zones from the 3 primary turnouts, Sunnyhills (called Washington by SFPUC), Calaveras, and Main Street (called Hammond by SFPUC). Each turnout has connections to the two Bay Division Pipelines, 3 and 4. There are two parallel revenue meters that supply a manifold to which the city connects for our supply. At the Sunnyhills and Main St. turnouts, there are two types of connections. Connections that go directly to zone 2SF are unregulated, fed directly at the pressure supplied by SFPUC. Connections that go to zone 1SF are fed through two parallel PRVs located within the turnout vault structure. At the Calaveras turnout, the connections are all to zone 2SF, and therefore unregulated. There is an associated PRV station a short distance away next to Milpitas City hall, called the Milpitas PRV station, that takes water from the Calaveras turnout and sends it to zone 1SF. This station has two PRVs in parallel, but one larger than the other. All turnout PRV stations with parallel PRVs operate in a lead/lag fashion, with one set to a slightly higher pressure setpoint than the other.

Water from zone 2SF supplies zone 3SF by acting as the supply to the first of two booster pumping stations, Country Club. Country Club booster pump station receives water from zone 2SF as the suction supply that is then pumped into Zone 3SF. There is a 12" supply line that travels from the output of Country Club pump station up to the next station, Tularcitos, where it both supplies water to zone 3SF and fills the 310,000 gallon reservoir there. Both the pumps and the reservoir supply water to zone 3SF. The pumps at Country Club are activated by the level of the Tularcitos Reservoir. Then the level gets down to 15 feet the lead pump is turned on. Usually this is enough to start filling the reservoir, but if demand is high enough for the reservoir level to continue to fall to 14 feet, the lag pump will also turn on. Once the reservoir reaches 21.5 feet the pumps are shut off.

In the same manner, pumps at Tularcitos pull water from the reservoir and pump it into zone 4SFa and up to the Minnis Reservoir. Tularcitos pumps are controlled by the level of the Minnis Reservoir. Zone 4SF is broken into two subzones, a and b. Water from zone 4SFa feeds three PRVs called North Vault, South Vault, and Calera Creek Heights. Due to the elevation differences in zone 4, the PRVs are necessary to break the pressure midway in the zone. Zone 4SFa is unregulated, and the lower part of the zone, zone 4SFb is the portion regulated by the three PRV stations.

Each reservoir, Minnis and Tularcitos, has a nozzle type mixing system which uses a pump to circulate water from the tank through the pump and back in through the side of the tank and



out a nozzle mounted inside which faces up at an angle to circulate the water both vertically and horizontally to avoid thermal and chemical stratification. Each also has a sampling pump and equipment for conducting water quality testing onsite.

Ayer Pump Station is located within zone 2SF and has 3 vertical turbine pumps and a 5.6 MG reservoir. The station has a single inlet/outlet which can be used to either fill the reservoir with water from zone 2SF or pump water into zone 2SF, but it cannot do both at the same time. Operation of this station is set up on a fill and pump basis, twice per day, pumping into the zone during morning and evening peak times, and filling from the zone during afternoon and overnight low demand periods.

Gibraltar Pump Station is located within zone 2SC, but also receives water from zone 1SF as well as the Intertie turnout. Gibraltar has a 5 MG reservoir and is also set up on a daily pump and fill cycle, pumping during morning and evening peak times to zone 1SF and filling during afternoon and overnight low demand periods from the Intertie turnout when not in use by SFPUC/VW, or from zone 1SF when the Intertie turnout is not available.

Pinewood Well is located in the southwest portion of the City in the neighborhood called The Pines and is in Pinewood Park. This well can produce about 1200 gallons per minute at an output pressure of about 70 psi. It is currently permitted as a Standby well and is need of further renovation, but it is eventually planned to be permitted as an active well and used to supplement the zone 1SF supply.

Curtis Well is located in Curtis Park, and has no pump station or connection to infrastructure yet. It was originally designed to provide emergency water supply to zone 2SF, but it's location facilitates a connection to both zones 1 & 2SC, as well as zone 2SF. In addition, a sleeve was put in crossing under the railroad tracks to allow a future line to connect the well to Gibraltar Pump Station for possible mixing or treatment to take place at Gibraltar. This would allow Curtis Well to run and blend water for pumping to zone 2SC or zone 1SF from Gibraltar.

## **INTERTIES**

There are three inter-city interties. Two are with Alameda County Water District. The first one is located on Milmont drive at the border of Fremont and Milpitas. The second is on North Park Victoria, also at the border of Milpitas and Fremont. Both are manual interties, with significant pressure differences in the normal operating pressures of each system. Both interties have been used successfully to supply water from Milpitas to ACWD.

The third intertie is with San Jose, and is located on Landess Avenue. It is also manual. This intertie has no planned flushing points, and needs to be upgraded to allow routine operation and flushing.

## City of Milpitas Water System Emergency Operations Scenarios

This document is a simplified overview of some of the possible emergency conditions that may arise and what changes to system operations are possible to mitigate the impacts of those conditions on the delivery of water to the City's water system customers. This is not a comprehensive how-to manual, as each emergency condition is unique, and the exact circumstances will dictate the actual actions to be taken. This document is intended as a guide to what is possible, and to help guide the responder to considering all possible actions in response to any specific emergency condition. The scenarios below are listed individually, but may occur in any combination, and each will have to be taken into consideration and weighed against the existing system conditions at the time.

### SCENARIOS

1. Loss of Supply
  - a. Loss of SFPUC Supply
  - b. Loss of SCVWD (VW) Supply
  - c. Loss of both SFPUC & VW Supply
  - d. Loss of Well Supplies
2. Pump Station Issues
  - a. Loss of PG&E power
    - i. Ayer
    - ii. Gibraltar
    - iii. Hillside
    - iv. Wells
  - b. Loss of water supply
    - i. Gibraltar
    - ii. Ayer
    - iii. Hillside

### 3. Distribution System Issues

- a. PRV Station loss/malfunction
- b. Zone interconnection
- c. Agency interconnection
- d. Contamination
- e. Fire suppression aid
- f. Main Line break
- g. Fire hydrant hit
- h. Construction shutdowns/tie-ins

## 1. Loss of Supply

### a. Loss of SFPUC supply

The loss of SFPUC supply may can occur in three ways: Loss of a single turnout, a reduction in quantity from SFPUC, or the total loss of supply from SFPUC.

#### i. Loss of a Turnout

SFPUC water is supplied to the City by four turnouts: Sunny Hills, Calaveras, Main Street and the SFPUC/SCVWD Intertie (when available). The loss of a single turnout can be compensated by the other turnouts. Changes in flow patterns within the distribution system will occur which can result in lower pressures in the extremities of the system and dirty water in areas where the flow has reversed or increased. These changes are most significant in zone SF2. The use of Ayer pump station to support peak use times is recommended.

#### ii. Reduction of Supply from SFPUC

In the event SFPUC cannot meet demands there may be a reduction in supply. Here are the possible ways to add supply to zones SF1 and SF2:

1. Pump from storage at Gibraltar and Ayer;
2. Activate Pinewood Well to pump to zone SF1;
3. (FUTURE) Activate Curtis Well to pump to either Gibraltar or zone SF2;
4. Use water from SCVWD at Gibraltar to supply zone SF1 through the use of the Intertie turnout;
5. Use water from SCVWD at Gibraltar to fill SFPUC reservoir and pump to zone SF1;
6. Use water from SCVWD by opening isolation valves in zones SC1 and/or SC2;

7. Contact ACWD and/or SJ Muni to activate intercity interties for zones SF1 & 2 – significant pressure differences exist, and this is a last resort.

iii. Total loss of supply from SFPUC

In the unlikely event we lose all supply from SFPUC or are required to isolate from SFPUC, the options are similar to the partial loss scenario above but may require a combination of options. Pumping from storage is the most immediate remedy while the other options are set up. Storage will not last long and is dependent on the amount of water in storage at that moment and the time of year the outage occurs. If the outage will last more than a few days, use of Pinewood and (future) Curtis Wells may be significant, as SCVWD will likely be tasked to help provide water to SFPUC and their supply may also be limited.

b. Loss of SCVWD Supply

SCVWD water is only supplied to the City through a single turnout located at Gibraltar Pump Station. Loss of supply may occur as a reduction in available water or as a total loss.

i. Supply Reduction and Total Loss Options

1. Pump from storage at Gibraltar and use the VW turnout only to provide water to the SCVWD reservoir;
2. Use SF water from the SFPUC/VW Intertie directly from the Intertie turnout using the Intertie PRV into zone SC2 – pressure will be reduced to about 130 to 135 psi, max;
3. Use water from zone SF1 to provide water to the SCVWD reservoir either directly (pumping to zone



SF1 will not be possible in this configuration) or by floating the two reservoirs, while pumping to zone SC2.

c. Total Loss of both VW and SFPUC Supplies

- i. In the event both wholesale suppliers lose the ability to provide water to the City, the remaining supplies are limited to
  1. Storage at Ayer and Gibraltar;
  2. Pinewood, McCandless and Curtis Wells;
  3. Intercity Interties with ACWD and SJWC.
- ii. Pumping from storage would be the first recourse until the other two options are brought online. Ayer can supply water from the center of zone SF2. Gibraltar can provide water to zones SF1 and SC2.
- iii. Pinewood Well can pump to zone SF1 directly. Future options may allow it to pump to zone SC1.
- iv. McCandless Well, when completed, will be able to pump directly to zone SC1.
- v. Curtis Well, if completed, will be able to pump to any of the following:
  1. Gibraltar Pump Station, either or both reservoirs;
  2. Zone SF2;
  3. Zone SC2; or
  4. Zone SC1
- vi. Intercity Interties with ACWD can provide water to zones SF1 and SF 2 if ACWD has water to provide, along the City's north border.
- vii. An Intercity Intertie with SJWC can provide water to zone SF2 along the southeast border of the City if SJWC has water to provide and the zone pressure in our zone SF2 is low enough to accept water from SJWC.

d. Loss of Well Supplies

- i. Currently, the only well capable of supplying water to the City is Pinewood Well. It is currently permitted as

an Emergency Standby Well. Loss of this well would remove it from the options to provide water in the scenarios listed previously.

- ii. Once all three of the City's wells are completed and brought into service as everyday supplies, the loss of supply from these wells would increase the amount of water the City would pull from its wholesale providers, which could have contract implications. In the event of an emergency, the loss of these wells as backup water supplies would eliminate the ability of the City to have an independent water supply under its control and eliminate this option as a means to provide water under any of the other emergency scenarios listed previously.

## 2. Pump Station Issues

### a. Loss of PG&E Power

#### i. Ayer

- 1. Ayer Pump Station is equipped with a 1,000 KW Caterpillar Genset which is capable of automatically starting and completely powering the station and all three pumps in the event of the loss of outside power.
- 2. The station has a 1,000 gallon (900 gallon useable) above ground fuel storage tank that is capable of running the station for 24 hours before requiring refueling.

#### ii. Gibraltar

- 1. Gibraltar Pump Station is equipped with a 2.5 MW Genset which is capable of automatically starting and completely powering the pump station and all pumps in the event of the loss of outside power.
- 2. The station has a 10,000 gallon (9,000 gallons useable) above ground fuel tank that is capable

of running the genset for 72 hours before refueling would be required.

3. The station also has 3 diesel powered pumps which can run independently with local controllers even if the station has no power. Pump 2 can be used to pump to zone SC2, pump 3 can be used to pump to zone SF1, and Pump 7 can be used as a booster to pump water directly from the SCVWD turnout into zone SC2.

#### iii. Hillside

1. All three Hillside stations are reliant on PG&E power for operation. All three do have a UPS battery emergency supply that will maintain power to the control panel and communications only.
2. Country Club and Tularcitos pump stations have a quick connect transfer switch mounted on the outside of the control building enclosures to be used with a portable trailer genset in the event of a power outage.
3. Country Club and Tularcitos also have pumper connections that can be used with either a trailer mounted portable pump or with a fire truck to act as emergency pumps and bypass the station to pump water to the next station. The City has a portable Paco trailer mounted pump with a capacity of approximately 1,000 gpm that can be used at either station.

#### iv. Wells

1. Pinewood well is not currently set up to easily take power from a portable generator set, nor does it have any installed backup power generator set. Loss of PG&E Utility power will render the well essentially inoperable and unable to serve water into the distribution system.

2. McCandless Well is being designed with a quick connect backup power transfer connection switch similar to the Hillside pump stations and should be operable to at least serve water on an emergency basis.
3. Curtis Well will likely be designed to the same standard as McCandless and able to use a portable generator as backup power to serve water on an emergency basis.

b. Loss of Water Supply

i. Gibraltar

1. Gibraltar Pump Station has three water supply sources:
  - a. 42" pipeline from VW, known as the Milpitas Pipeline or the East Pipeline;
  - b. 24" distribution line from Zone 1SF which can draw water from Main Street Turnout PRVs and Milpitas PRV (the Zone 1SF connection to the Calaveras Turnout);
  - c. 10" connection to the VW/SFPUC Intertie which we call the Intertie Turnout, and normally draws SF water and is closed when VW is using the Intertie to send water to SFPUC.
2. Virtually any of these supplies can be used to support the loss of any other supply through the use of valving at the pump station and/or the use of the two reservoirs onsite. The pump station was designed with versatility in mind, both in the manner and number of pump installations and in the use of valves and bypass pipelines. There are too many combinations possible to list them out individually. Here we will list the general possibilities – the Operator is encouraged to

carefully examine the potential water pathways for each situation to arrive at the best possible solution and to ensure no harm will be done.

3. Loss of the 42" VW supply:

- a. Intertie supply can be used through the Intertie PRV by setting to its highest pressure setpoint and closing the normally open connection to Zone 1SF and then opening the normally closed connection to Zone 2SC - PRV will support about 130 – 135 psi, so zone will run at a slightly lower pressure - the SF reservoir cannot be filled while in this mode;
- b. Booster or Peak Shaving pumps can be used to supply water from storage by using a Flow Through setup to supply the reservoir from Zone 1SF – Pumps can be run in conjunction with the Intertie PRV by setting the pumps to the same pressure as the PRV or the pumps can run in lead at a higher pressure with the Intertie PRV acting as a backup supply. Pumps 3 and 4 cannot be used to pump water from the SF reservoir while supplying water to the SC reservoir from zone 1SF.
- c. The 30" suction lines from the two 5 MG reservoirs can be linked together by opening valve BFV 101 between pumps 2 and 3. The level between the two reservoirs should be as close to the same as possible – the larger the difference between them, the higher the water velocity will be as valve BFV 101 is opened and the levels begin to equalize. This



method allows filling to occur through the SF reservoir from either zone 1SF or the Intertie PRV.

4. Loss of 24" zone 1SF line supply:

- a. Use the Intertie supply to fill reservoir and supply zone 1SF directly. Do not run pump 4 or 3 at the same time as filling the reservoir from zone 1SF, water will only recirculate and not supply the zone.
- b. Use the SC reservoir by opening valve BFV 101 to equalize the SC and SF reservoirs. See 2.b.i.3.c. above for caveats about opening valve BFV 101.
- c. Use the zone 2SC supply by closing valve BFV 020 and then opening valve BFV 021A to fill the SF reservoir from zone 2SC and use pump 4 and/or 3 to supply zone 1SF. This CANNOT be used to directly supply zone 1SF from zone 2SC due to the higher pressure.

5. Loss of 10" VW/SFPUC Intertie supply

- a. This supply is normally only used when the Intertie is not being used to send water from VW to SFPUC or vice versa. Normal configuration sends SFPUC water through this connection to our zone 1SF. Loss of this supply is made up from the 18" connection to zone 1SF which draws water through the distribution system from the low pressure supply PRV at Main St turnout and/or the Milpitas PRV, which is a nearly direct connection to the Calaveras Turnout.
- b. If it is not possible to fill the SF reservoir through the distribution system connection

to zone 1SF, there is a normally closed connection to zone 2SC which can be used to fill the SF reservoir. Since this is a high pressure zone, it cannot be used to directly supply zone 1SF – this must be done through use of pumps 3 and/or 4.

- c. An additional method to use VW water to supply zone 1SF is to open the 30” isolation valve between the two reservoirs so they are both filled from the VW supply and use pumps 3 and/or 4 to send water to zone 1SF.

ii. Ayer

1. Ayer is supplied solely from zone 2SF. The station currently has a single inlet/outlet design, so water can only flow one way into or out of the station at any given time, meaning the station can pump out water or fill the reservoir, but cannot do both at the same time.
2. Calaveras Turnout is the main source of supply to Ayer pump station via large mains that come directly east on Calaveras Blvd from the Calaveras Blvd turnout and valve lot.
3. Loss of supply to Ayer would only occur if there were a loss of the pipeline that supplies the station from Calaveras Blvd, or if that segment of line was not in operation. There is no alternative supply for Ayer in either of those events, and Ayer would not be able to pump water out to the system, regardless of the quantity of water in storage.
4. A CIP project to provide a secondary pipeline connection from zone 2SF to the station has been proposed, but is not currently in design or under construction.

### iii. Hillside

1. The Hillside, or La Questa, water system has only a single supply source – zone 2SF. Water is supplied from system pressure in zone 2SF to Country Club Pump Station. CCPS then pumps water into zone 3SF through a 12 inch transmission and distribution line via 2 250 gpm submersible vertical turbine pumps. This line both supplies the zone and delivers water to a 350,000 gallon reservoir (Tularcitos) at the top of the zone. This reservoir provides gravity pressure to the zone when the pumps are not in use.
2. There is no alternative source of supply if water cannot be delivered from zone 2SF to CCPS. If CCPS experiences failure that results in neither of the 2 pumps being able to pump water, then a backup potable water trailer pump must be brought in to act as the pump station. This pump would hook up to a fire hydrant at the pump station that would provide water from zone 2SF to the suction side of the trailer pump, and then the discharge line from the trailer pump would be connected to a special pumper connection designed for this purpose to provide water to zone 3SF. If the trailer pump is not available for some reason, a fire engine pumper can also be used.
3. Tularcitos reservoir and pump station is the next step in the Hillside water system. Tularcitos Pump station is nearly identical to CCPS in that it has 2 250 gpm submersible vertical turbine pumps that send water from zone 3SF and/or the Tularcitos Reservoir and deliver it into a 12 inch combination distribution/transmission line that

serves zone 4SFa and Minnis Reservoir. Minnis Reservoir provides gravity head and flow for zones 4SFa and 4SFb.

4. Loss of the pumps at Tularcitos would result in the loss of water supply to Minnis and zones 4SFa&b. Use of a trailer pump would be needed to replace the function of those pumps, similar to CCPS. Supply would come from a connection on the Tularcitos Reservoir, and discharge would be connected to a special pumper connection, similar to CCPS, to supply water to zone 4SFa and Minnis Reservoir.
5. Loss of the Tularcitos Reservoir would result in the loss of gravity supplied water to zone 3SF. There are two ways to compensate for this reservoir being out of service.
  - a. At CCPS there is a pressure relief valve located in a vault with a manhole cover between the fenced pump station and Country Club Drive. This pressure relief valve is specifically there to enable the CCPS pumps to be run constantly to supply water to zone 3SF at a constant pressure. The pumps at CCPS are single speed pumps and cannot be ramped up and down to respond to demand changes in the zone to maintain a constant pressure. Instead, the relief valve will open at a set pressure to relieve the excess discharge from the pumps back into zone 2SF. This is not a perfect solution because the water discharged back into zone 2SF simply returns to the suction side of the CCPS pumps, thus running in a circle, and will result in the water being heated

and boiled by the pumps if not relieved. The solution to this is to use hoses to run a constant flow from hose bib connections on the discharge of each pump to the storm drain so that a minimal flow of new water is always coming into the pumps to keep them cool.

- b. The other method to replace the supply from Tularcitos Reservoir is to use a combination pressure relief valve/pressure reducing valve located at Tularcitos Pump Station. There is a double leaf hatch covered vault with this valve located within. This valve has dual pilot valve systems installed on it, and normally uses the pilot valve system that is configured to run the valve as a pressure relief valve. This pilot system must be shut down, and the pilot valve system on the other side opened to configure the valve as a pressure reducing valve. This valve is connected to zone 4SFa and zone 3SF. As a relief valve it opens to relieve excess pressure from zone 4SFa to zone 3SF. As a pressure reducing valve, it opens to maintain use water from zone 4SFa/Minnis Reservoir to maintain a set pressure in zone 3SF, thus doing what Tularcitos reservoir was doing. This is the preferred method to use when Tularcitos Reservoir is not in service to maintain pressure in zone 3SF.
- c. Getting water from zone 3SF to zone 4SFa/Minnis when Tularcitos Reservoir is not in service is different depending on



which method you are using to maintain pressure in zone 3SF. If telemetry is still working between Minnis and Tularcitos, the pumps at Tularcitos will cycle according to the level in Minnis reservoir and can be left to run on their own if using the CC pump method in a. above. The pumps at CC will supply water to the pumps at Tularcitos. Only one pump at Tularcitos should be used in auto to fill Minnis so that the capacity of the CC pumps are not exceeded. If using the pressure reducing valve method in b. above to maintain zone 3SF pressure, the pumps at CC and at Tularcitos will need to be run manually and at the same time. The level at Minnis will need to be monitored, and the pumps both shut down at the same time.

6. Loss of the Minnis Reservoir will result in the loss of gravity pressure and flow for zones 4SFa&b. This is compensated by using the combination relief and pressure reducing valve at Tularcitos in a manner similar to using the relief valve at CC when Tularcitos Reservoir is offline. With the combo valve operating on the pressure relief pilot system the pumps can be used to maintain the pressure in the system. Similar to the CC method, hoses need to be connected to the hose bibs on the discharge side of the pumps in order to keep a minimum flow through the pump and prevent the water from recirculating through the pump and overheating/boiling. See 5.a above.

### 3. Distribution System Issues

#### a. PRV Station Loss/Malfunction

- i. Pressure Reducing Stations take water from a higher zone and feed it into a subsequent zone at a lower pressure. They are both a source of supply and pressure regulator. When a PRV fails, it will usually show signs before having a catastrophic failure. The regulated pressure will begin to increase and become more difficult to control to the desired set point. A gradually rising pressure on the regulated downstream side of the PRV can be a sign that the valve main diaphragm has a pinhole in it and needs to be replaced. It can also be a sign that the pilot valve is failing. If a PRV has failed or needs to be taken out of service the valve can usually be isolated by closing the up and down stream line valves and allowing the lag PRV to take over the load, assuming there is a lag PRV – most stations are configured with lead/lag parallel valves, but not all of them (Capital Ave and Parc Metro, for instance). If a valve does not have a parallel lead/lag to take over, the system balance may need to be adjusted by checking the other PRV stations and making minor pressure setpoint changes. Since possible flow direction changes may occur in the distribution system, this may result in dirty water calls and the need for flushing/NO-DES use to respond to the water flow changes.

#### b. EPRV Station Loss Malfunction

- i. The EPRV stations are single PRVs set to allow water to move from SF zones into corresponding SC zones in the event that pressure falls in the SC zone below the minimum setpoint of the EPRV. When this happens, the EPRV will open and allow water to flow from the SF zone to the SC zone and will try to regulate the SC zone to the EPRV setpoint pressure. Malfunction of an

EPRV will not result in overpressure of any zone, since the served zone is normally higher than the supplying zone, and water cannot flow in reverse through a PRV, even if it has failed. Loss of the function of this station only results in the loss of protection for the served zone in the event that zone incurs a pressure reduction. Zone isolation valves can be opened to directly supply water from the SF zone to the SC zone if needed as an alternative to the EPRV.

c. Zone Interconnection

- i. There are 44 zone isolation valves throughout the City. These are valves that were closed when the City went from being solely supplied by SFPUC to being supplied by both SFPUC and SCVWD (VW). These valves were marked by using large G12 valve boxes and painting them red. They are only to be opened in the event a zone has a supply failure that results in the loss of supply and pressure and all other means of supplying the zone are not available. Opening of these valves will need to be accompanied by flushing of the lines up and downstream and there will likely be dirty/stagnant water.

d. Agency Interconnection

- i. Milpitas has 3 intercity interties, two with ACWD and one with SJWC. Similar to the zone isolation valves, use of these valves is a last resort emergency response measure. Pressures are not the same between the separate agencies, and use must be coordinated between both agencies before opening the valves.
- ii. Connections with ACWD are located with one in zone 1SF on Milmont and one in 2SF on Churchill. The connection with SJWC is located in zone 2SF at the south end of the zone on Landess Ave.

## Hydrant Testing and HPR Placement Plan

## MEMORANDUM

DATE: March 9, 2020 Project No.: 270-60-19-16  
SENT VIA: EMAIL

TO: Harris Siddiqui, PE, City of Milpitas  
Glen Campi, City of Milpitas

FROM: Roger Chu, PE, RCE #87591

REVIEWED BY: Amy Kwong, PE, RCE #73213

SUBJECT: City of Milpitas – 2020 Water Master Plan Update –  
Hydrant Testing and HPR Placement Plan

This memorandum summarizes the proposed hydrant testing and pressure data collection procedures required to calibrate the City of Milpitas's (City) potable water system hydraulic model. West Yost Associates' (West Yost) recommended plan for hydrant testing and hydrant pressure recorder (HPR) placement is provided for your review and comment, as summarized in the following sections:

- Hydrant Testing
- Hydrant Pressure Recorder Placement
- Summary of Hydrant Testing and HPR Placement Plan

It is recommended the City shares this plan with the appropriate parties (e.g., water operations and/or Fire Department staff), so they are aware of the equipment being used or installed at the proposed testing/pressure monitoring locations. Field pressure monitoring is scheduled to occur beginning March 10 through March 18 (monitoring period), and hydrant testing is scheduled for March 11, 2020.

### HYDRANT TESTING

The purpose of hydrant testing is to confirm the assignment of roughness factors (C-factors) to pipelines in the City's hydraulic model. West Yost will use data collected through hydrant testing to ensure the assigned pipeline C-factors are appropriate and representative of actual field conditions. Hydrant tests were selected based on the combination of pipeline material type, diameter, and age that represents the majority of the City's water distribution system.

Details related to hydrant testing are presented in the following sections:

- Personnel and System Data Requirements
- Hydrant Testing Schedule
- Testing Requirements and Procedure
- City's Responsibilities



## Personnel and System Data Requirements

West Yost would like to request the following City personnel and system data to accomplish the recommended hydrant testing under West Yost's direction:

- Three (3) to five (5) City staff members (with vehicles) that will be available during regular working hours to assist with, but not limited to the following:
  - Closing and re-opening valves, as needed, before and after hydrant testing
  - Reading and recording hydrant pressure data
  - Flowing the test hydrant and de-chlorination
  - Directing and controlling traffic and hydrant flows (i.e., to the nearest drainage inlet) to ensure safety
  - Public outreach and interface, as needed
- System information during the monitoring period that includes the following:
  - Available SCADA and telemetry data from all water distribution system facilities:
    - Turnout flows and pressures
    - Reservoir levels [feet]
    - Booster Pump Station information (pump operational status, speed settings, discharge pressures [psi], and flow rate [gpm])
    - Pressure Reducing Valve information (upstream pressure [psi], downstream pressure [psi], and flow rate [gpm], if available)

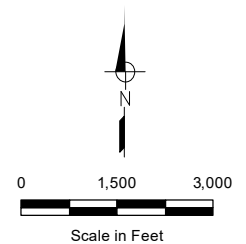
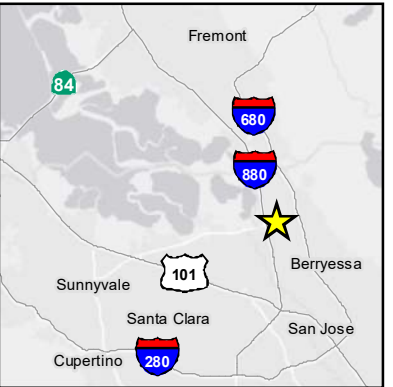
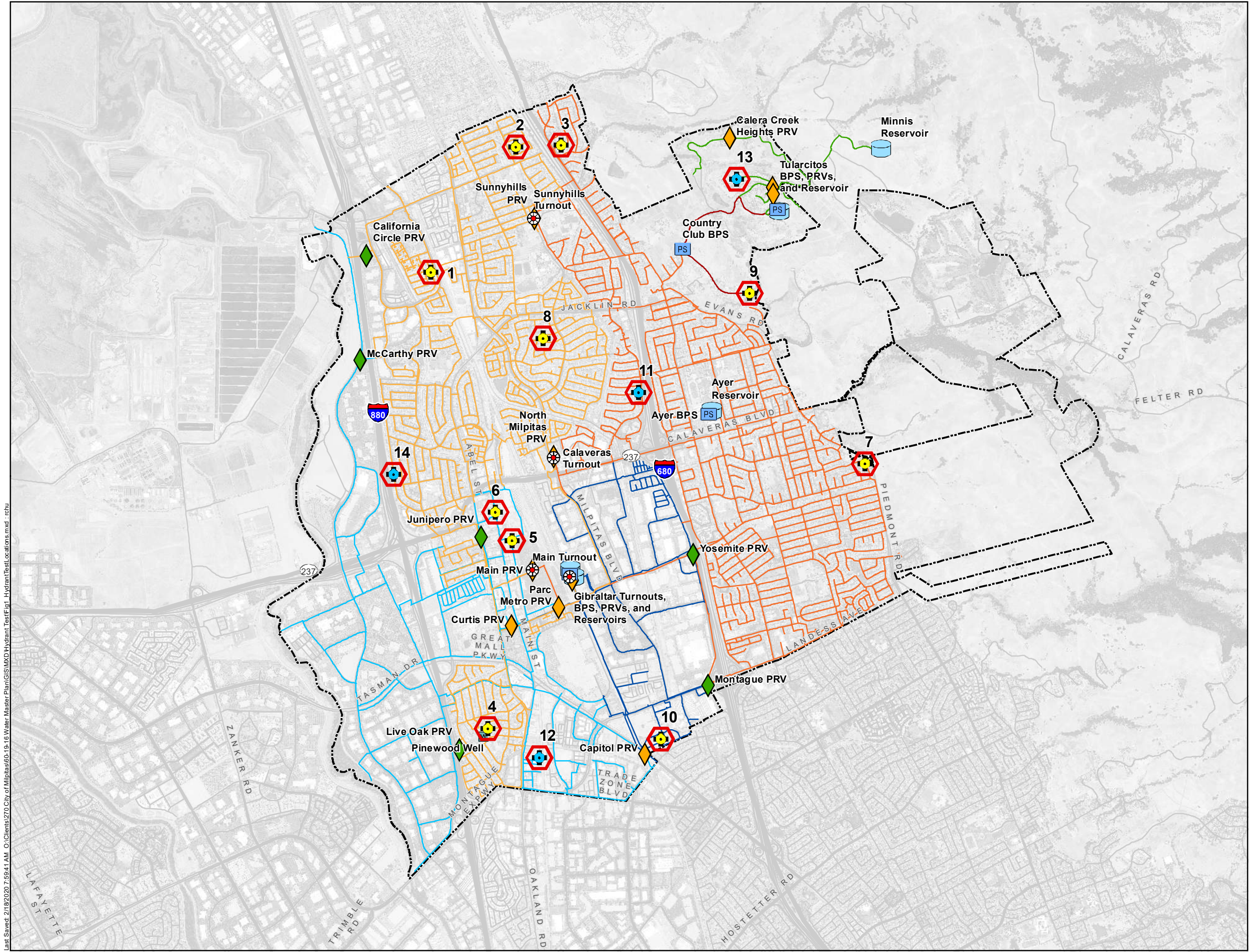
## Hydrant Testing Schedule

West Yost requests that hydrant testing be scheduled from **7:30 AM to 4:30 PM on March 11, 2020**. West Yost will meet with the City staff before hydrant testing at the City's Public Works Department, located at 1265 North Milpitas Boulevard, to conduct a brief field coordination meeting to review hydrant testing procedure and protocol (i.e., where to go and what to do). West Yost will also use this coordination meeting to distribute pressure gauges necessary to complete hydrant testing (hydrant wrenches to be provided by City staff). In addition, West Yost will also discuss with City staff what order they prefer to conduct tests (i.e., avoid school traffic or commuter traffic, etc.) and to review hydrant tests that may present challenges.

## Testing Requirements and Procedure

West Yost plans to conduct up to ten (10) hydrant tests within the City's water system. Figure 1 shows the proposed hydrant test locations. In addition, four (4) alternative hydrant tests have been identified. If any of the primary test locations are unable to be completed, an alternative location may be used. Table A-1 in Attachment A lists the proposed test locations. Details regarding each of the proposed tests (e.g., flowing hydrant, observation hydrants, closed valves, etc.) is also provided in Attachment A (Figures A-1 through A-14).





- Test Location
- Alternate Test Location
- Turnout
- Well
- Pressure Reducing Valve
- Emergency PRV
- Pump Station
- Storage Reservoir
- Pipeline Pressure Zone**
  - SCZ1
  - SCZ2
  - SFZ1
  - SFZ2
  - SFZ3
  - SFZ4
- City Limits



**Figure 1**  
**Hydrant Test Location Map**

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Each hydrant test will involve maintaining flow from a single hydrant while monitoring the residual pressure at two (2) to four (4) observation hydrants located near the flowing hydrant. The field-observed static and residual pressure readings will then be used to confirm pipeline C-factors to calibrate the hydraulic model to observed conditions. Hydrant test locations have been selected to isolate pipelines of a particular material type, diameter, and age. Some tests will require City staff members to close one (1) or more isolation valves prior to the test and then re-open these isolation valves following the test.

The general testing procedure at each of the hydrant test locations is outlined below and illustrated on Figure 2:

- Step 1.** Before attaching the pressure gauge, flush the test (flowing) hydrant and each observation hydrant to remove sediments, which might damage the gauge or cause faulty readings.
- Step 2.** Attach the pressure gauge to the hydrant with the gauge's test cock valve open. Slowly open the hydrant and bleed off the gauge with the gauge's test cock until the hydrant is fully pressurized.
- Step 3.** Close the gauge test cock valve, and then measure the static pressures at the designated test hydrant and each observation hydrant.
- Step 4.** Flow the designated test hydrant and measure the discharge flow and pressure.
- Step 5.** Measure the residual pressures at the designated test hydrant and at each observation hydrant while the test hydrant is flowing.
- Step 6.** Continue monitoring pressure until the "all clear" is given by a West Yost employee. Record the static pressure and then detach the pressure gauge.  
***IMPORTANT: Before closing the hydrant, be sure the gauge's test cock valve is open and bleeding while the hydrant is being closed.***

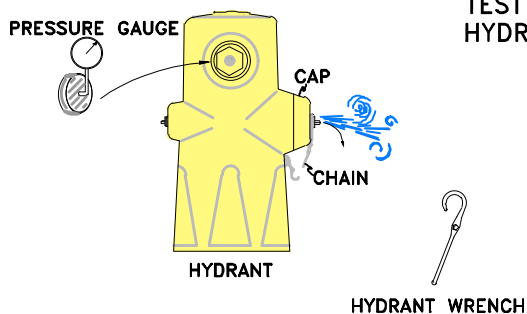
At least one (1) City staff member will be required at the flowing test hydrant and up to two (2) additional City personnel will be required in the field to assist with the opening and closing of valves (refer to Attachment A). West Yost will provide three (3) staff members to direct, oversee, and assist in the field data collection work effort.

It is anticipated that each hydrant test will take no more than 30 minutes and that each hydrant will be flowing for no more than 10 minutes during a test.

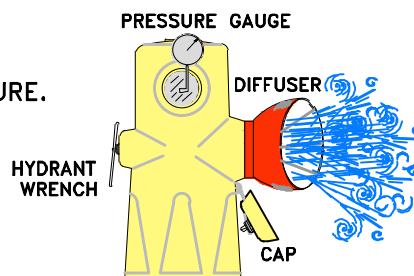
#### Testing Equipment

West Yost will provide a 4.5-inch diameter Swivel Piezo Diffuser and pressure gauges during the hydrant testing program. It is our recommendation that the 4.5-inch diameter Swivel Piezo Diffuser be used for all proposed hydrant tests. For any hydrant test where it is not possible to use this type of diffuser due to drainage or traffic control issues, an alternative method will need to be further evaluated and confirmed before the day of field testing.

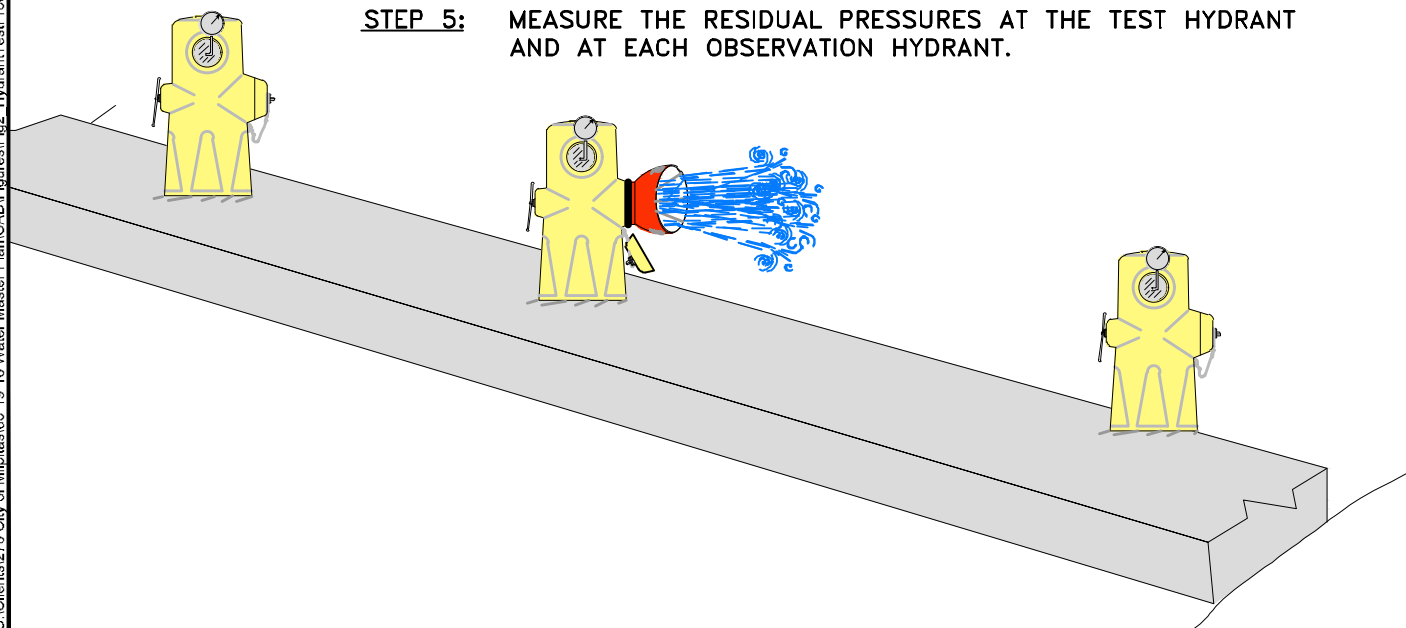
**STEPS 1, 2 & 3:** REMOVE HYDRANT CAP, FLUSH OUT HYDRANT AND MEASURE THE STATIC PRESSURES AT THE TEST HYDRANT AND AT EACH OBSERVATION HYDRANT.



**STEP 4:** FLOW THE DESIGNATED TEST HYDRANT AND MEASURE THE DISCHARGE FLOW AND PRESSURE.



**STEP 5:** MEASURE THE RESIDUAL PRESSURES AT THE TEST HYDRANT AND AT EACH OBSERVATION HYDRANT.



Note:  
1. Figure is not to scale.



**Figure 2**  
**Hydrant Test**  
**Procedure**

City of Milpitas  
2020 Water Master Plan Update

## City's Responsibilities

The City will be responsible for providing the following hydrant testing equipment:

1. Vehicles
2. Hydrant wrenches
3. Equipment for closing valves and controlling traffic
4. De-chlorination equipment<sup>1</sup>
5. Two-way portable communication for each testing personnel

*The City is also responsible for notifying residents, and other City staff and departments (i.e., Fire Department) about the scheduled hydrant testing, obtaining approvals that may be required, and providing proper drainage of the hydrant flow.*

West Yost requests that the City staff review and inspect each of the proposed test locations before the testing date to identify any potential problems or hazards with the selected locations. Of concern is the potential for flooding landscaping or building basements or creating hazardous traffic conditions. West Yost recommends that all drainage inlets/manholes be inspected near the testing site to confirm proper drainage. Additionally, the City should check the location and status of hydrants and valves that will be operated during hydrant testing. Detailed figures, which illustrate the flowing hydrant, observation hydrants, and valves to be closed, are provided in Attachment A.

## HYDRANT PRESSURE RECORDER PLACEMENT

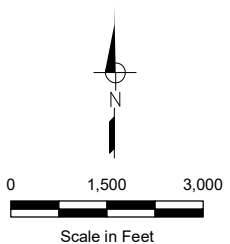
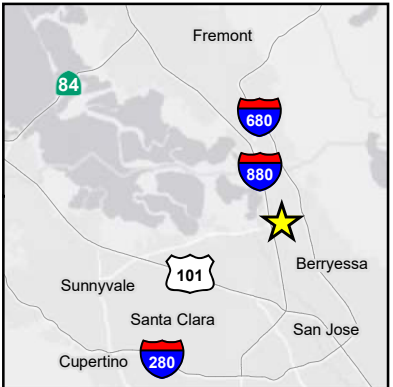
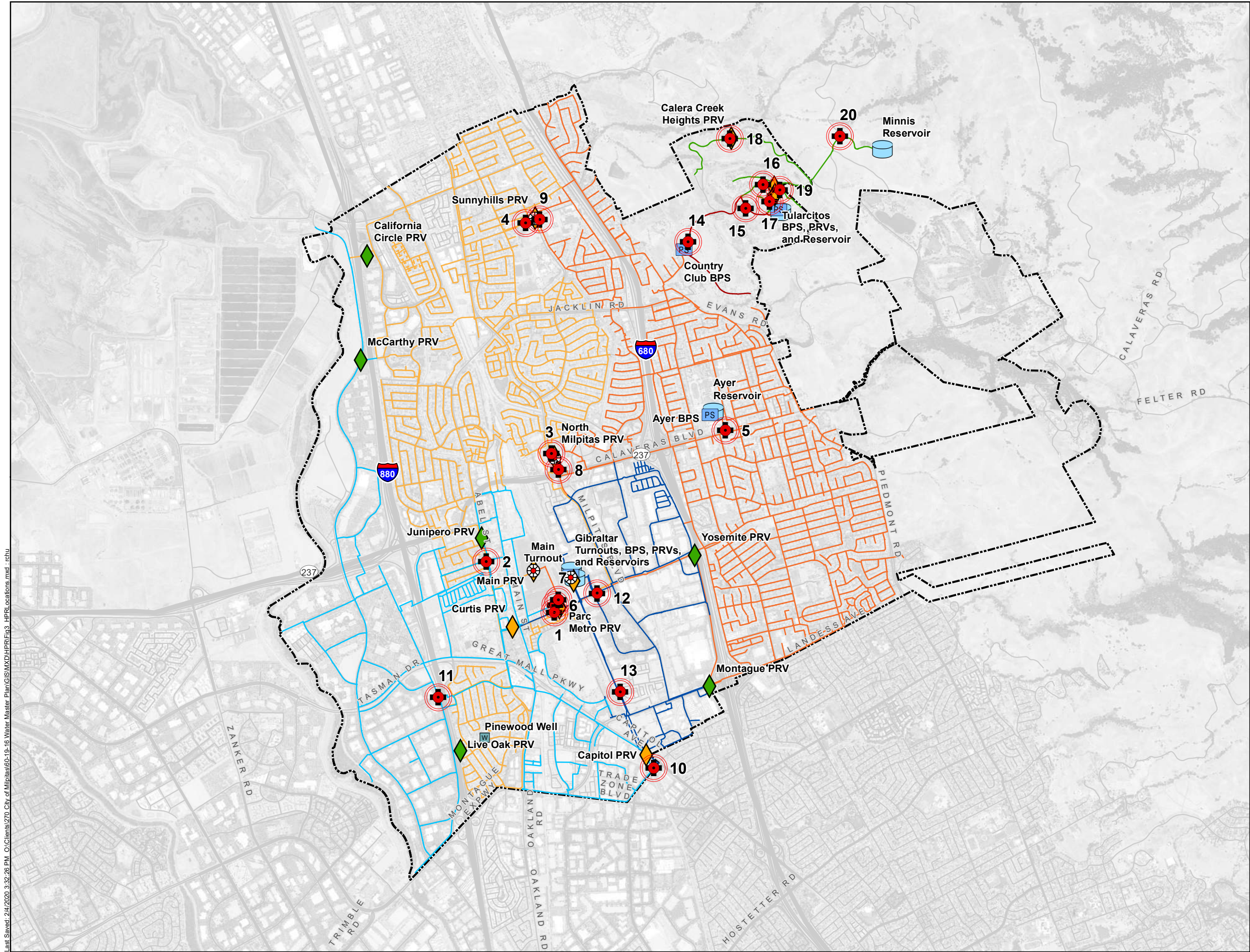
Placement of HPRs at key hydrants within the City's water system allows West Yost to verify pressures simulated in the City's hydraulic model. West Yost has identified twenty (20) hydrants to monitor water system pressures with HPRs. The selected HPR locations are typically downstream of water supply facilities (e.g., turnouts, booster pump stations, and pressure reducing valves).

West Yost is proposing to install the twenty (20) HPRs on March 10, 2020 to collect pressure information for a total of one (1) week. West Yost plans to attach the HPRs to the 2.5-inch port on specified hydrants and lock them in place with a padlock. After the seven-day monitoring period is complete, West Yost will remove the HPRs from their locations (March 18, 2020) and download and review the collected data. Figure 3 shows the general location of each HPR. Table B-1 (in Attachment B), describes the approximate location of each HPR and the water supply facility being monitored. Attachment B also includes detailed figures showing the specific location of each hydrant selected for HPR placement (Figures B-1 through B-20). West Yost requests that City staff review and inspect each of the proposed HPR placement locations before the placement date to identify any potential problems with the selected locations.

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<sup>1</sup> Handling of water released from each hydrant test will need to comply with City Operations procedures and be consistent with the City's NPDES permit for planned releases from hydrant tests.





- Proposed HPR Location
- Turnout
- Well
- Pressure Reducing Valve
- Emergency PRV
- Pump Station
- Storage Reservoir
- Pipeline Pressure Zone**
- SCZ1
- SCZ2
- SFZ1
- SFZ2
- SFZ3
- SFZ4
- City Limits



**Figure 3**  
**Hydrant Pressure Recorder**  
**Location Map**

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It is important for City staff to coordinate with the Fire Department and any other appropriate parties regarding the HPR locations and duration of monitoring. This will help reduce the chance of inadvertently shutting off a hydrant with an HPR installed and may also reduce the risk of an HPR being removed or tampered with. *Each HPR is equipped with a padlock and a set of keys will be provided to the City staff. However, in case of an emergency, the Fire Department can break the lock to remove the HPR.* If an HPR is required to be removed during a non-emergency, or if the associated hydrant needs to be shut off, West Yost requests that the Fire Department inform City staff and that City staff will then coordinate with West Yost.

#### **SUMMARY OF HYDRANT TESTING AND HPR PLACEMENT PLAN**

Hydrant testing will be performed as described above beginning at 7:30 AM on Wednesday, March 11, 2020. West Yost proposes to install HPRs on Tuesday, March 10, 2020 and remove them on Wednesday, March 18, 2020. The locations and associated detailed location maps of the designated hydrants for testing and HPR placement are presented in Attachments A and B, respectively.

West Yost requests a conference call with City staff on Wednesday, March 4, approximately one week before the scheduled testing day, to review and finalize preparations for the hydrant testing and HPR placement. An Outlook meeting request will be sent to City staff to finalize a suitable meeting date and time.

Please feel free to contact Roger Chu at (925) 425-5631 or Amy Kwong at (925) 461-6788 if you have any questions or comments.

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## ATTACHMENT A

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**Table A-1. Hydrant Test Locations<sup>(a)</sup>**

| Test No.                                                               | Pipeline Material | Installation Decade | Pipeline Diameter, Inches | Location                                 | Pressure Zone | No. of Closed Valves | Comments  |
|------------------------------------------------------------------------|-------------------|---------------------|---------------------------|------------------------------------------|---------------|----------------------|-----------|
| 1                                                                      | PVC               | 1990s               | 8                         | Along Elkwood Drive                      | SF1           | 1                    | -         |
| 2                                                                      | AC                | 1960s               | 6                         | Along Gosser Street                      | SF1           | 1                    | -         |
| 3                                                                      | AC                | 1980s               | 6                         | Along Stirling Drive and Stratford Drive | SF2           | 2                    | -         |
| 4                                                                      | AC                | 1960s               | 6                         | Along Greentree Way                      | SF1           | 3                    | -         |
| 5                                                                      | PVC               | 1980s               | 8                         | Along Hammond Way                        | SC1           | 1                    | -         |
| 6                                                                      | AC                | UNK <sup>(b)</sup>  | 8                         | Along Main Street                        | SC1           | 2                    | -         |
| 7                                                                      | AC                | 1970s               | 8                         | Along Lacey Drive                        | SF2           | 1                    | -         |
| 8                                                                      | AC                | 1970s               | 6                         | Along Clauser Drive                      | SF1           | 3                    | -         |
| 9                                                                      | AC                | 1980s               | 8                         | Along Calaveras Ridge Drive              | SF3           | 0                    | -         |
| 10                                                                     | DI                | 2000s               | 8                         | Within Crossing at Montague Apartments   | SC2           | 1                    | -         |
| 11                                                                     | AC                | 1980s               | 6                         | Along Las Lomas Drive and Pacheco Drive  | SF2           | 1                    | Alternate |
| 12                                                                     | PVC               | 2000s               | 8                         | Along Costa Street and Mihalakis Street  | SC1           | 2                    | Alternate |
| 13                                                                     | AC                | 1980s               | 8                         | Along Pebble Beach Court                 | SF4-1         | 0                    | Alternate |
| 14                                                                     | AC                | 1960s               | 8                         | Along Heath Street                       | SF1           | 2                    | Alternate |
| (a) 10 test locations and 4 alternate test locations, if time permits. |                   |                     |                           |                                          |               |                      |           |
| (b) UNK = unknown                                                      |                   |                     |                           |                                          |               |                      |           |



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Flowing Hydrant



Observed Hydrant



Hydrant



Closed Valve (1 total)



Valve

Test Pipeline

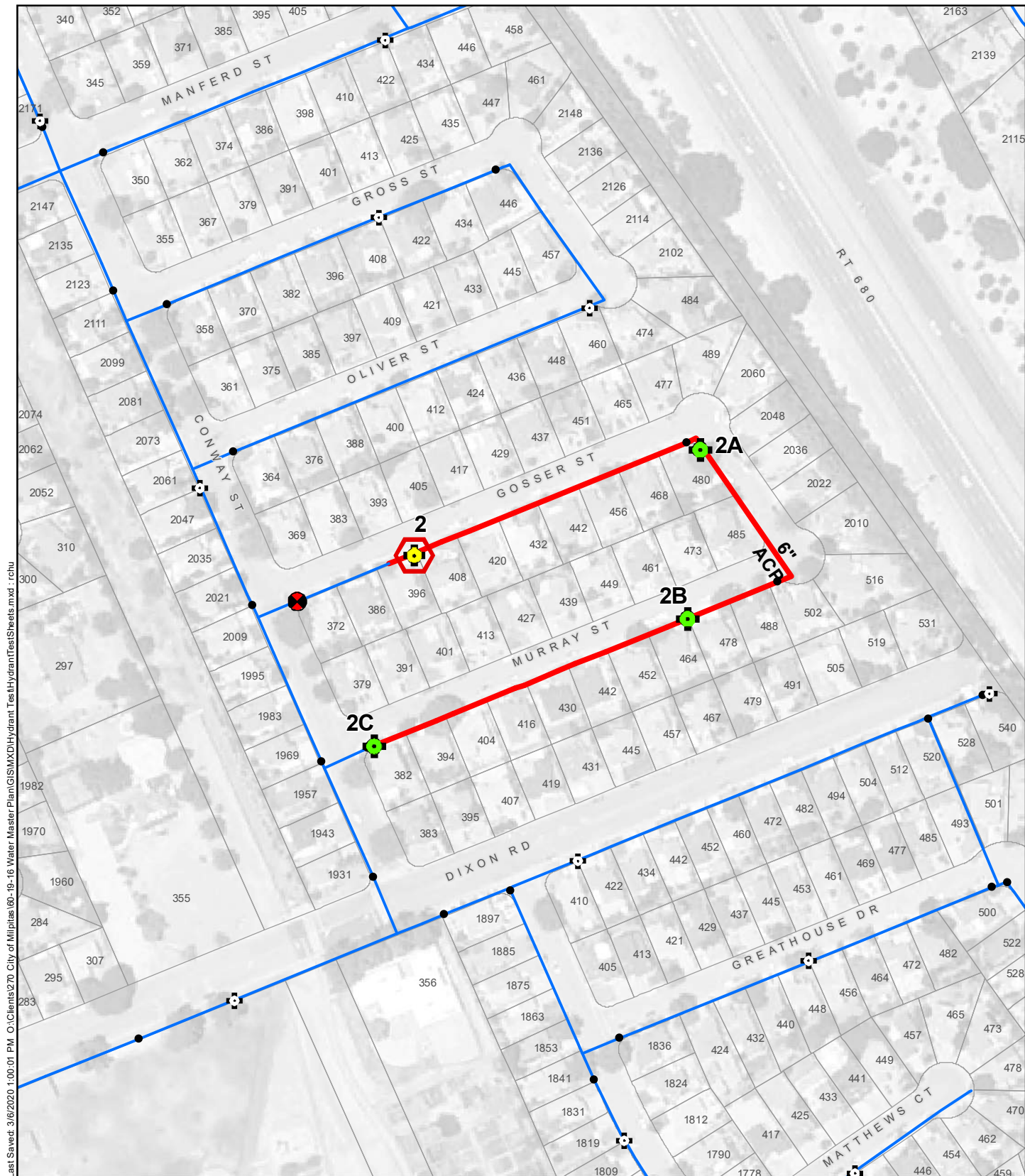
Pipeline



**Figure A-1**

**Test 1 - Zone SF1  
(8-inch PVC - 1990s)**





Flowing Hydrant



Observed Hydrant



Hydrant



Closed Valve (1 total)



Valve

Test Pipeline

Pipeline

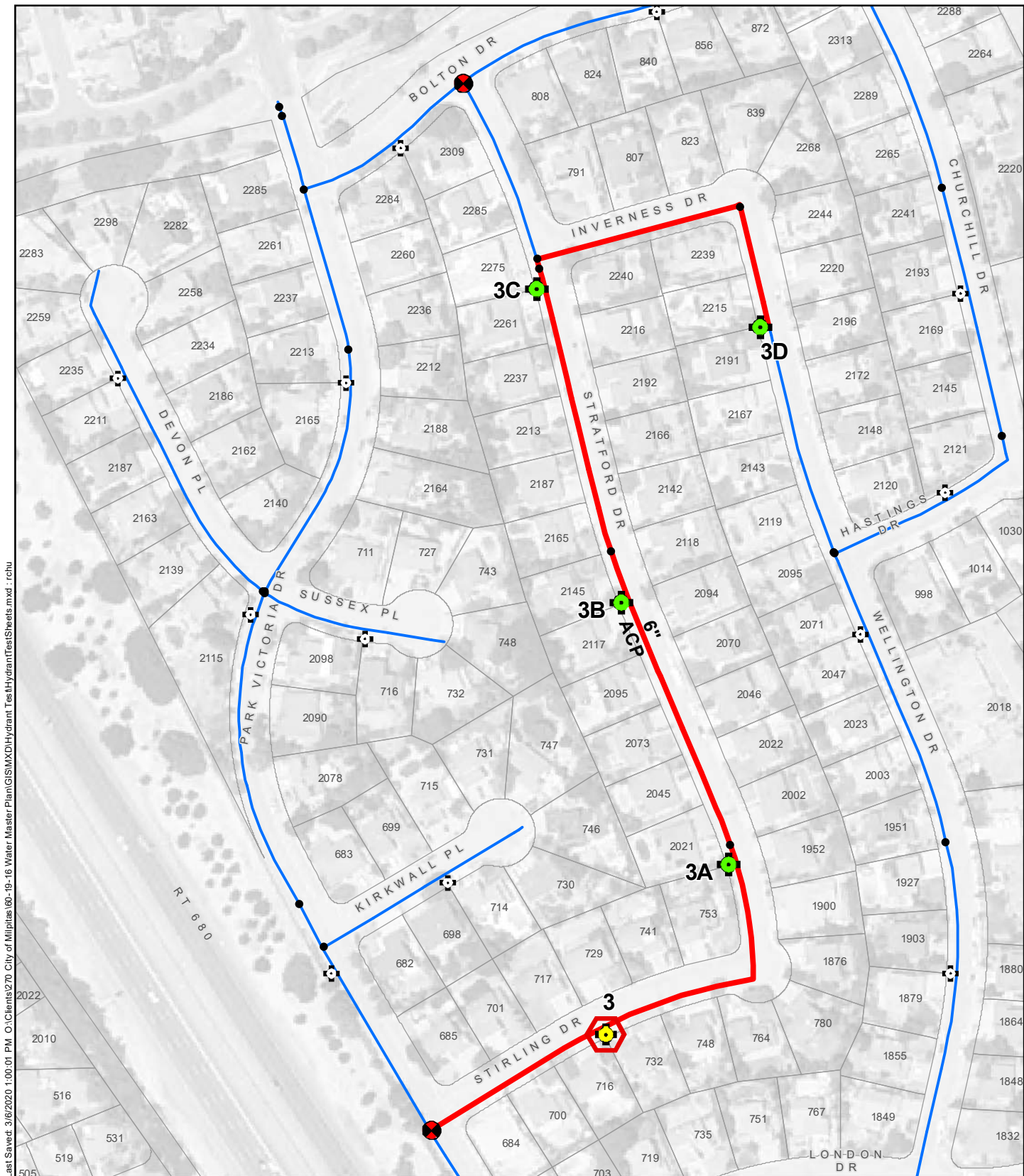


0 100 200  
Scale in Feet



**Figure A-2**

**Test 2 - Zone SF1  
(6-inch AC - 1960s)**



Flowing Hydrant



Observed Hydrant



Hydrant



Closed Valve (2 total)



Valve

Test Pipeline

Pipeline



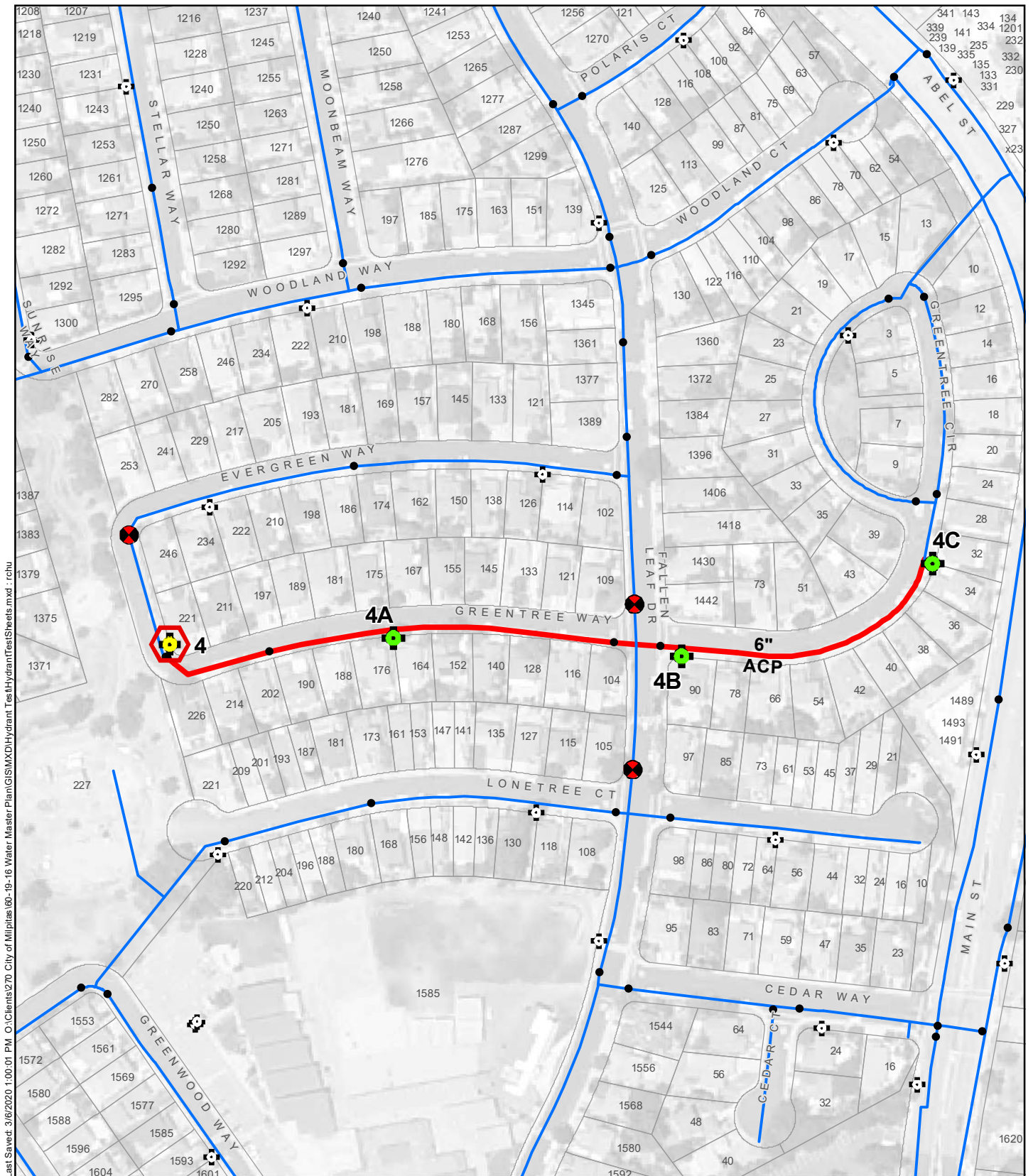
0 100 200  
Scale in Feet



**Figure A-3**

**Test 3 - Zone SF2  
(6-inch AC - 1980s)**





Flowing Hydrant



Observed Hydrant



Hydrant



Closed Valve (3 total)



Valve

Test Pipeline

Pipeline



0 100 200  
Scale in Feet



WEST YOST  
ASSOCIATES

Figure A-4

Test 4 - Zone SF1  
(6-inch AC - 1960s)



Flowing Hydrant



Observed Hydrant



Hydrant



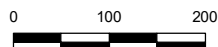
Closed Valve (1 total)



Valve

Test Pipeline

Pipeline



Scale in Feet



**Figure A-5**

**Test 5 - Zone SC1  
(8-inch PVC - 1980s)**





Flowing Hydrant



Observed Hydrant



Hydrant



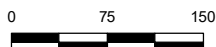
Closed Valve (2 total)



Valve

Test Pipeline

Pipeline



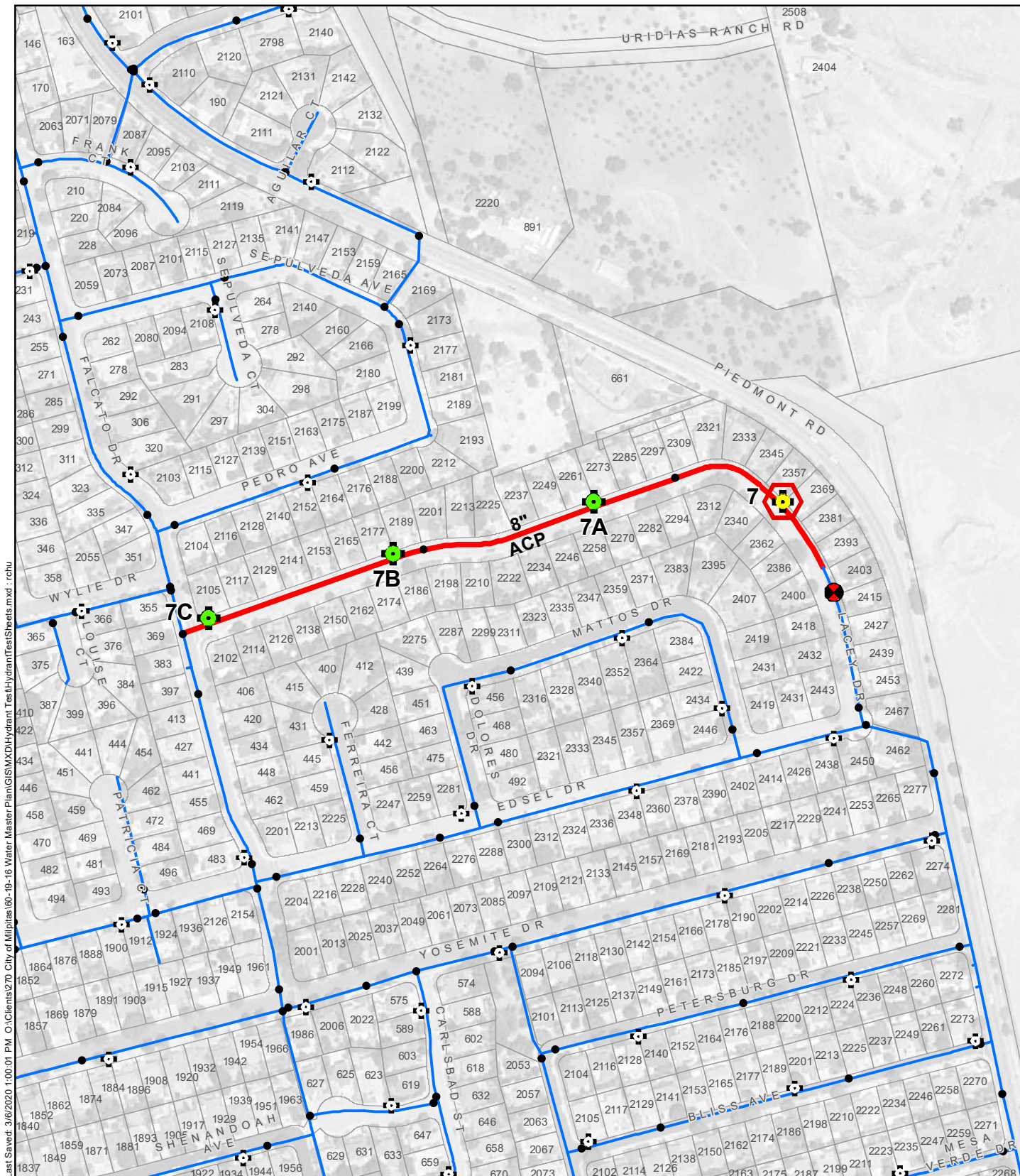
Scale in Feet



**Figure A-6**

**Test 6 - Zone SC1  
(8-inch AC - UNK)**





Flowing Hydrant



Observed Hydrant



Hydrant



Closed Valve (1 total)



Valve

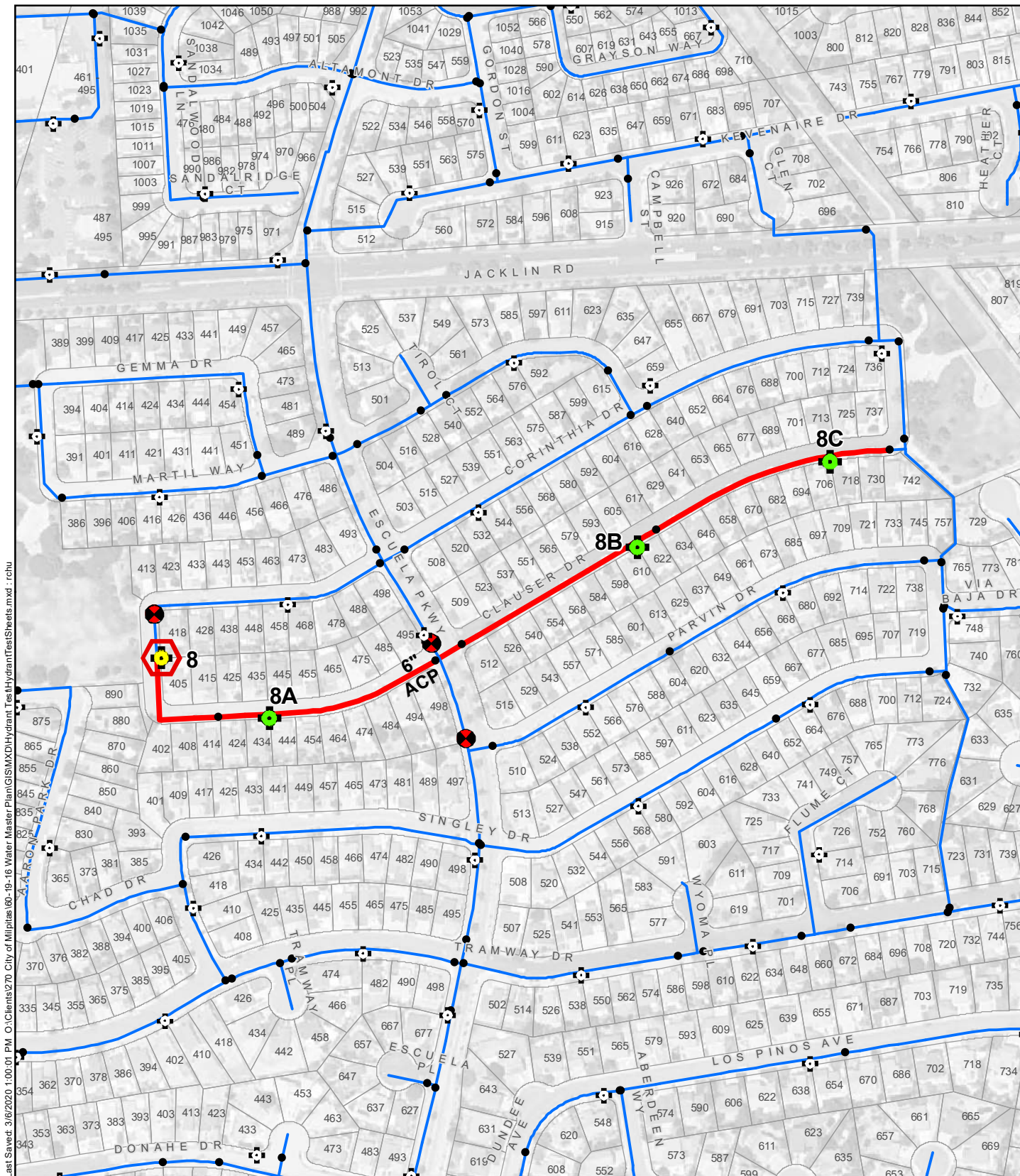
8" Test Pipeline

Pipeline



**Figure A-7**  
**Test 7 - Zone SF2**  
**(8-inch AC - 1970s)**

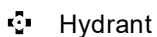




Flowing Hydrant



Observed Hydrant



Hydrant



Closed Valve (3 total)



Valve

Test Pipeline

Pipeline



Figure A-8

Test 8 - Zone SF1  
(6-inch AC - 1970s)



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Flowing Hydrant



Observed Hydrant



Hydrant



Closed Valve (0 total)



Valve

Test Pipeline

Pipeline

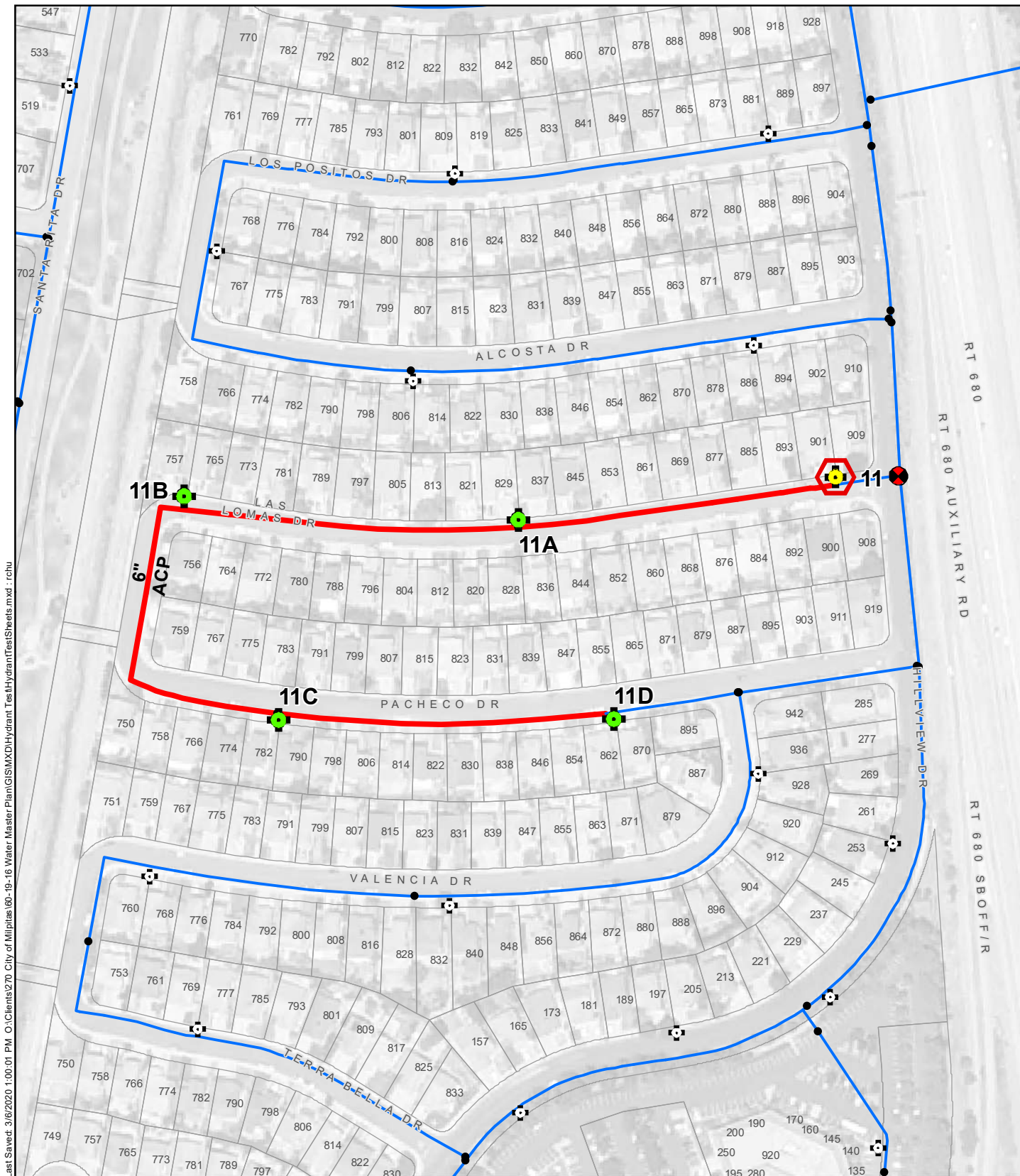


**Figure A-9**

**Test 9 - Zone SF3  
(8-inch AC - 1980s)**







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Flowing Hydrant



Observed Hydrant



Hydrant



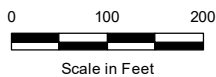
Closed Valve (1 total)



Valve

Test Pipeline

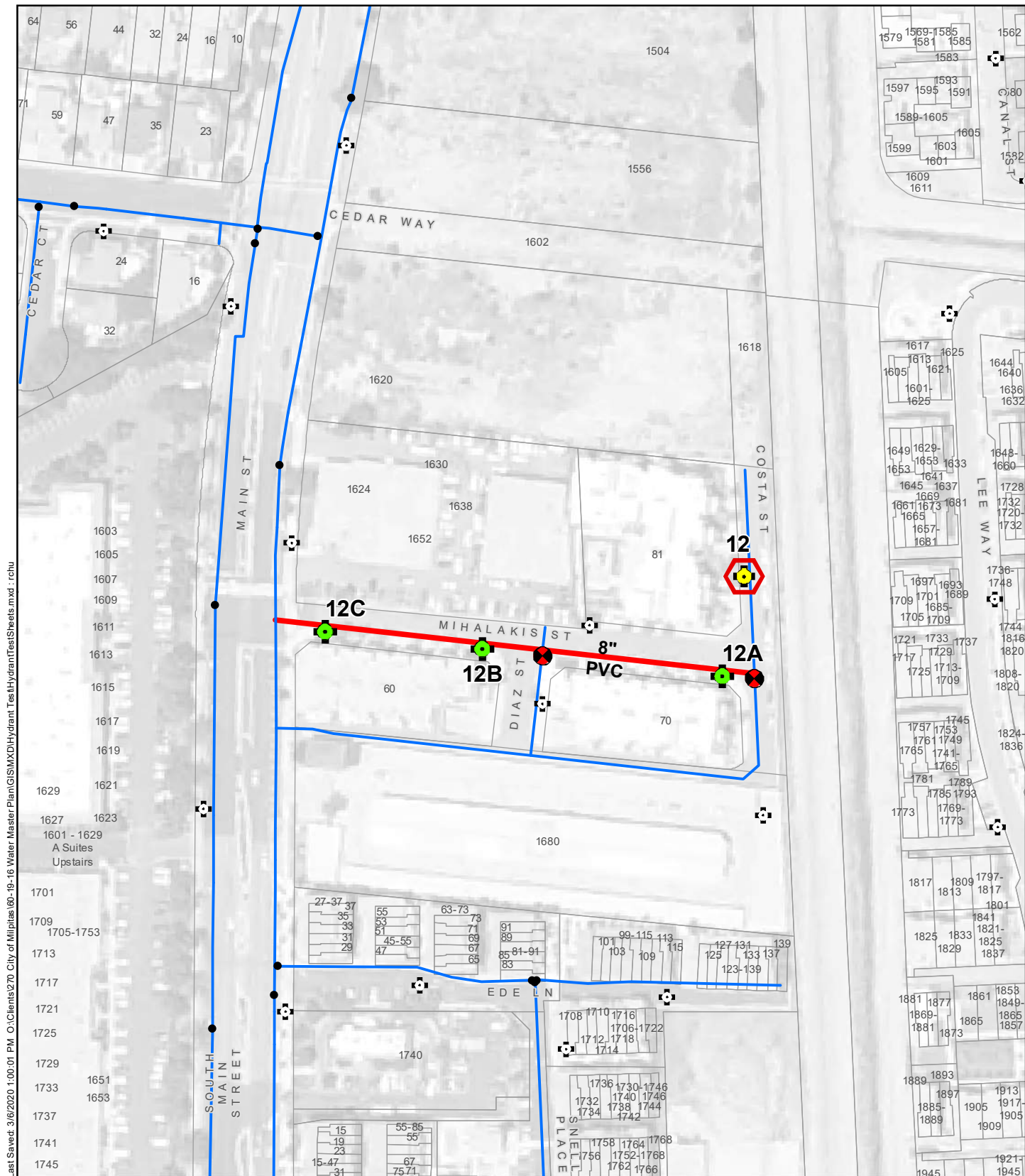
Pipeline



**Figure A-11**

**Alternate Test 11  
Zone SF2  
(6-inch AC - 1980s)**

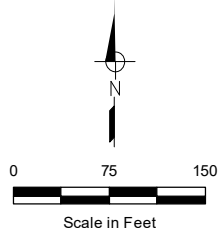




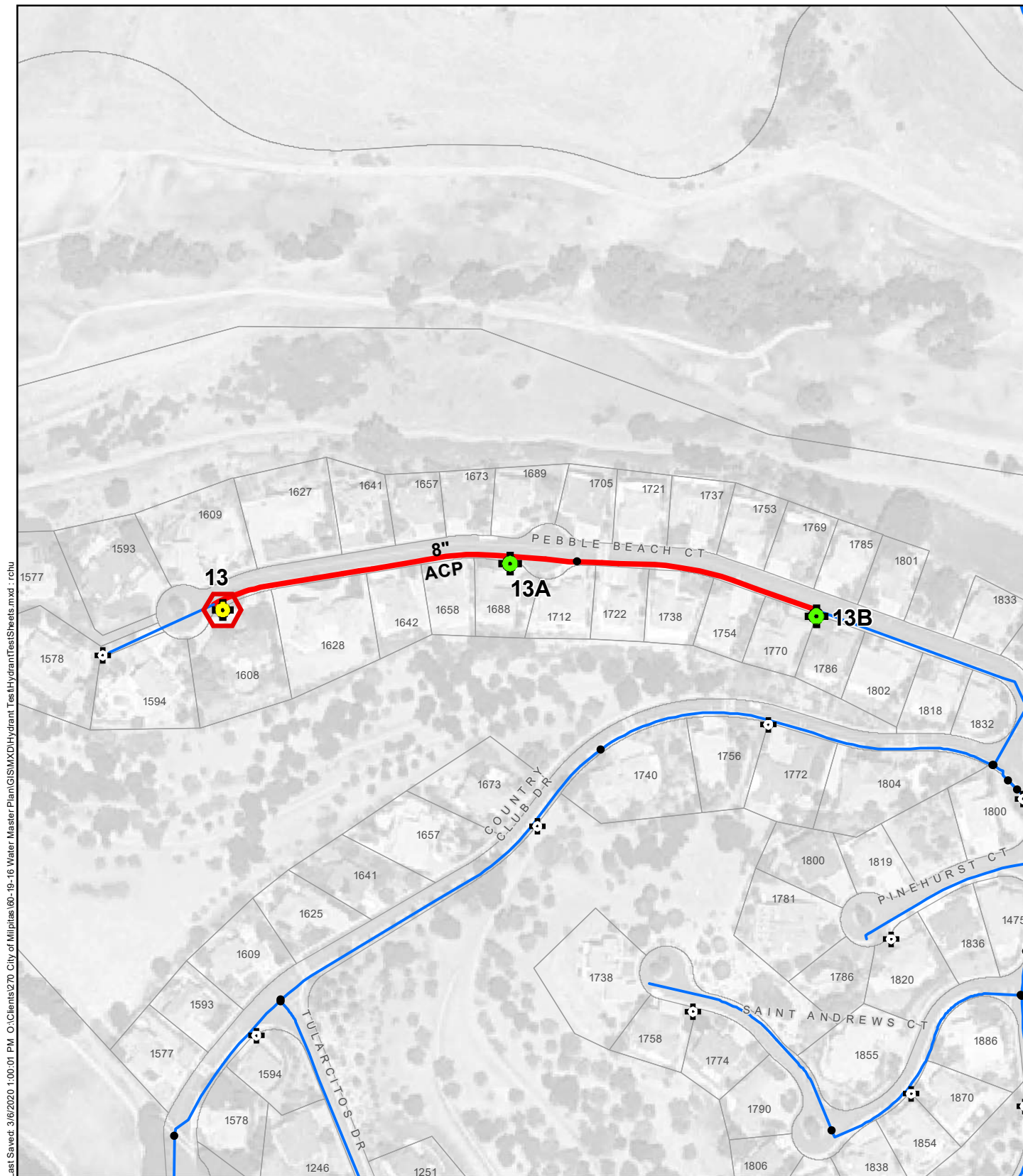
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-  Flowing Hydrant
-  Observed Hydrant
-  Hydrant
-  Closed Valve (2 total)
-  Valve

— Test Pipeline  
— Pipeline



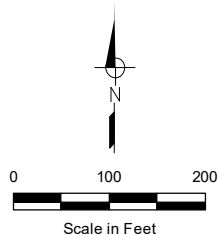
**Figure A-12**  
**Alternate Test 12**  
**Zone SC1**  
**(8-inch PVC - 2000s)**



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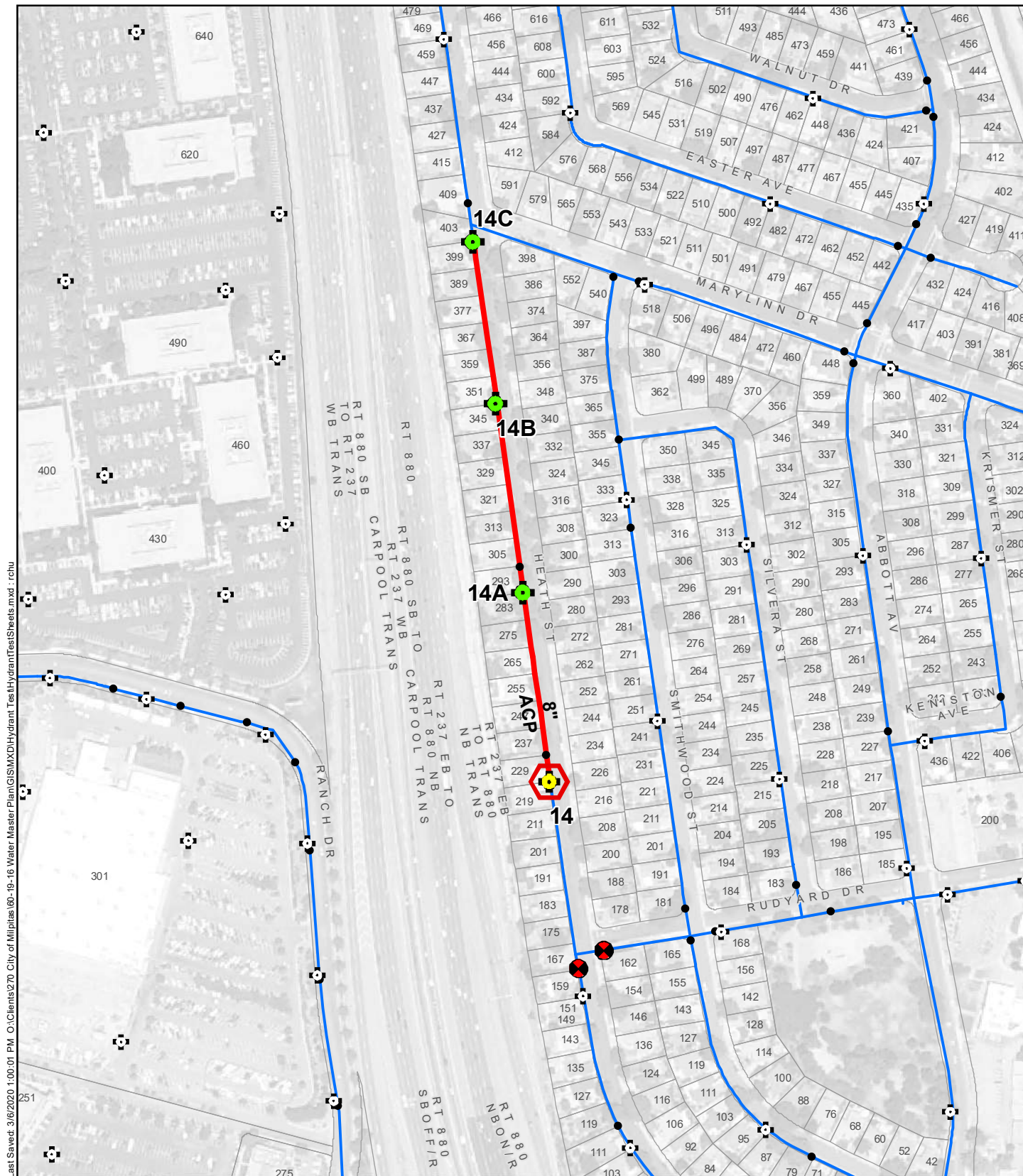
-  Flowing Hydrant
-  Observed Hydrant
-  Hydrant
-  Closed Valve (0 total)
-  Valve

— Test Pipeline  
— Pipeline



**Figure A-13**  
**Alternate Test 13**  
**Zone SF4-1**  
**(8-inch AC - 1980s)**  
 City of Milpitas  
 2020 Water Master Plan Update





Flowing Hydrant



Observed Hydrant



Hydrant



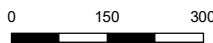
Closed Valve (2 total)



Valve

Test Pipeline

Pipeline



Scale in Feet



**Figure A-14**

**Alternate Test 14  
Zone SF1  
(8-inch AC - 1960s)**

---

## ATTACHMENT B

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**Table B-1. Hydrant Pressure Recorder Locations**

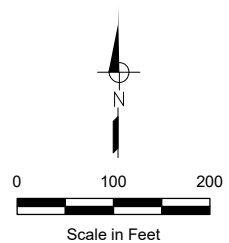
| HPR No. | Pressure Zone | Facility Monitored       | Location                                                                     |
|---------|---------------|--------------------------|------------------------------------------------------------------------------|
| 1       | SF1           | Gibraltar BPS            | Near 819 E Curtis Ave                                                        |
| 2       | SF1           | Main St PRV              | SW corner of Corning Avenue and Abel Street                                  |
| 3       | SF1           | N Milpitas PRV           | Near 70 N Milpitas Boulevard                                                 |
| 4       | SF1           | Sunnyhills PRV           | Near 361 Washington Drive                                                    |
| 5       | SF2           | Ayer BPS                 | Near 1439 E Calaveras Boulevard                                              |
| 6       | SC1           | Parc Metro PRV           | Near 232 Parc Place Drive                                                    |
| 7       | SF2           | Main St Turnout          | Near 271 Parc Place Drive                                                    |
| 8       | SF2           | Calaveras Turnout        | NE corner of N Milpitas Boulevard and E Calaveras Boulevard                  |
| 9       | SF2           | Sunnyhills Turnout       | Near 1589 Washington Drive                                                   |
| 10      | SC1           | Capitol PRV              | Lundy Pl near 880 E Capitol Avenue                                           |
| 11      | SC1           | Curtis PRV               | Near 1189 Barber Lane                                                        |
| 12      | SC2           | Gibraltar PRV            | Intersection of Gibraltar Court and Gibraltar/Yosemite Drive                 |
| 13      | SC2           | Gibraltar BPS            | Piper Dr between Garden Street and Meridian Place                            |
| 14      | SF3           | Country Club BPS         | Country Club Drive, north of BPS                                             |
| 15      | SF3           | Tularcitos Tank          | Near 1251 Tularcitos Drive                                                   |
| 16      | SF4-1         | Tularcitos N PRV         | Near 1772 Country Club Drive                                                 |
| 17      | SF4-1         | Tularcitos S PRV         | Near 1870 Saint Andrews Court                                                |
| 18      | SF4-1         | Calera Creek Heights PRV | Near 1631 Calera Creek Heights Drive                                         |
| 19      | SF4-2         | Tularcitos BPS           | Near 1490 Tularcitos Drive                                                   |
| 20      | SF4-2         | Minnis Tank              | Near intersection of Monument Peak Road and Downing Road (Launch Site Road?) |



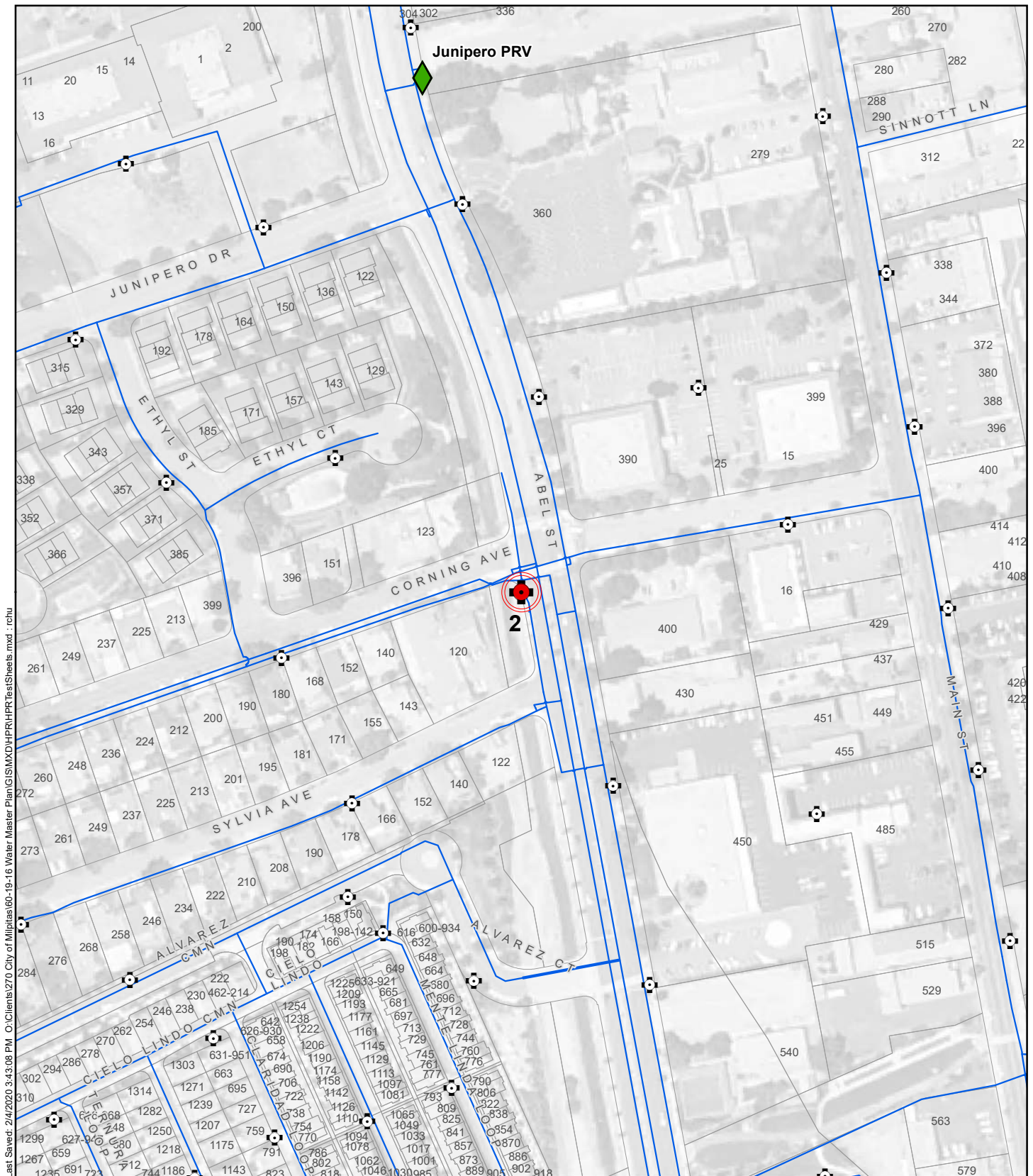


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-  Proposed HPR Location
-  Hydrant
-  Turnout
-  Pump Station
-  Storage Reservoir
-  Well
-  Pressure Reducing Valve
-  Emergency PRV
-  Pipeline

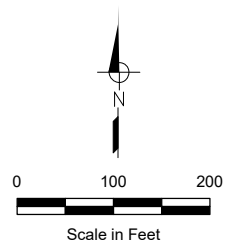


**Figure B-1**  
**Hydrant Pressure Recorder Locations**



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-  Proposed HPR Location
-  Hydrant
-  Turnout
-  Pump Station
-  Storage Reservoir
-  Well
-  Pressure Reducing Valve
-  Emergency PRV
-  Pipeline

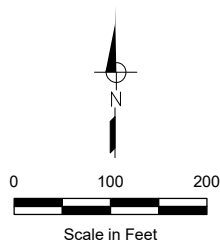


**Figure B-2**  
**Hydrant Pressure Recorder Locations**

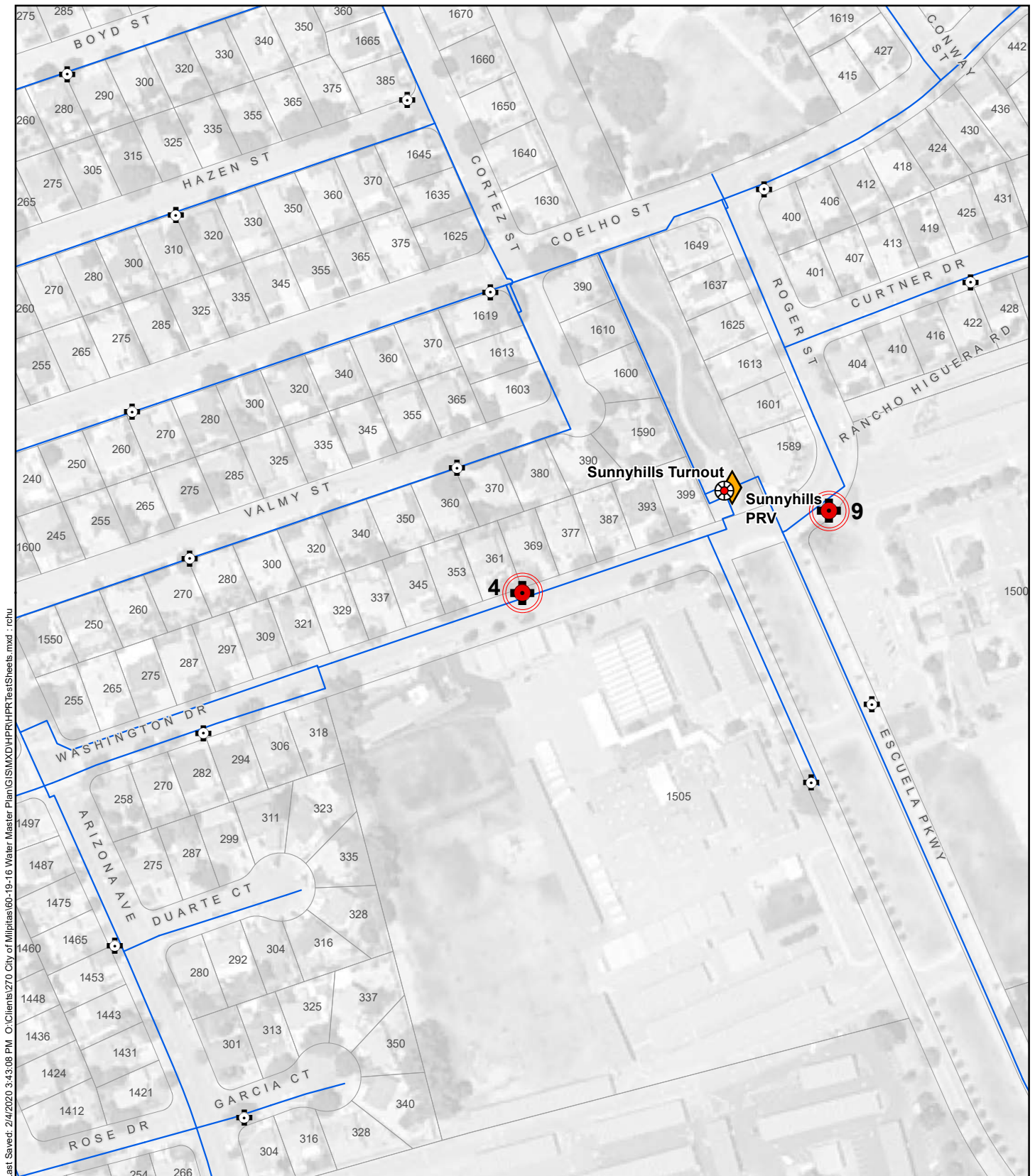




- Proposed HPR Location
- Hydrant
- Turnout
- Pump Station
- Storage Reservoir
- Well
- Pressure Reducing Valve
- Emergency PRV
- Pipeline

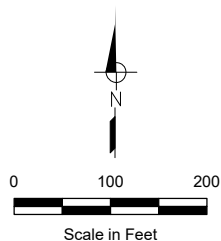


**Figure B-3**  
**Hydrant Pressure Recorder Locations**



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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |



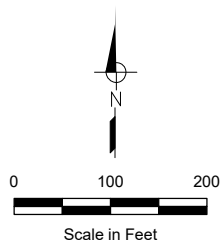
**Figure B-4**  
**Hydrant Pressure Recorder Locations**





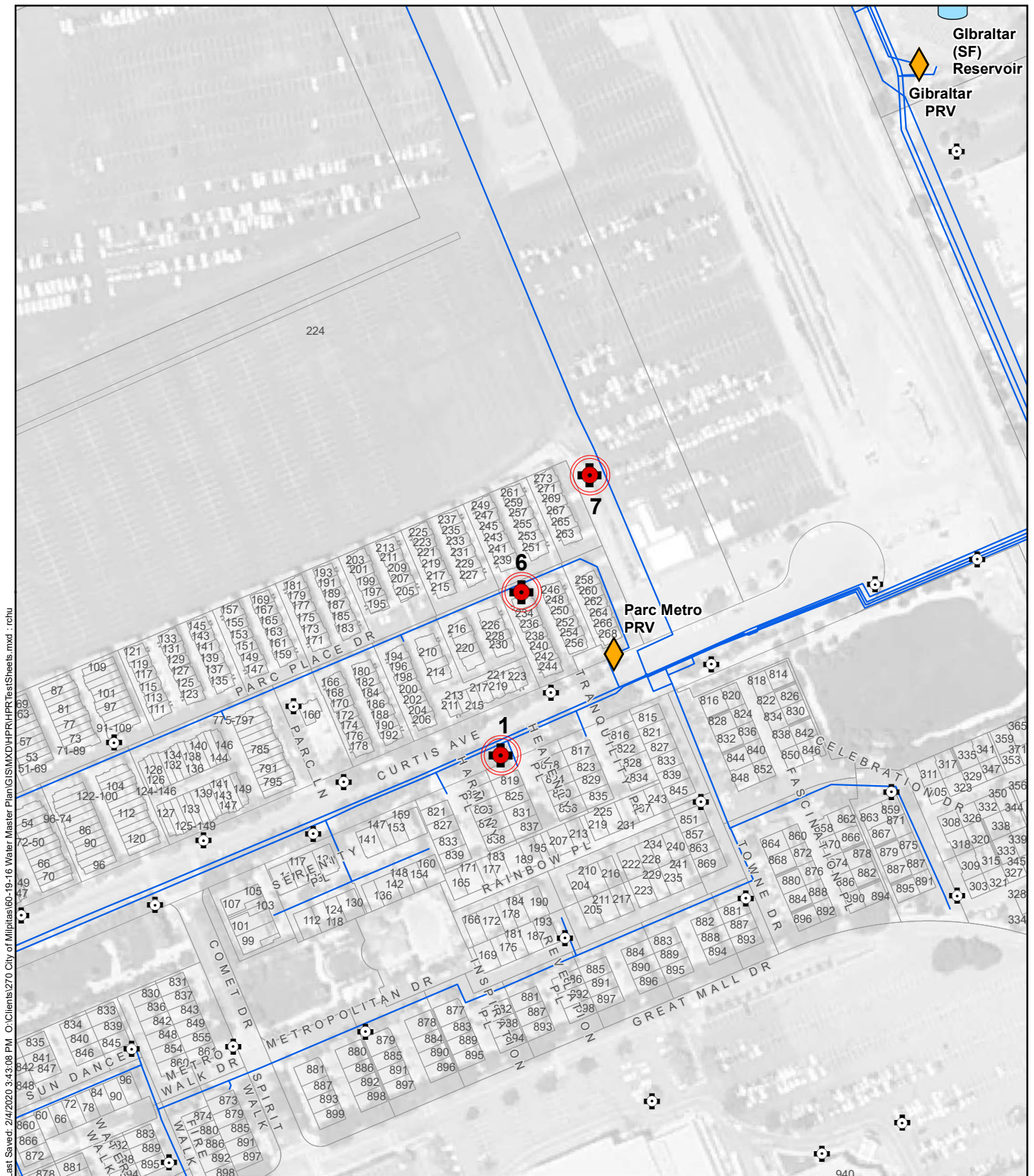
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- |  |                       |  |                         |
|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |



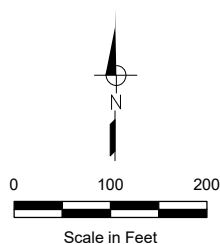
**Figure B-5**  
**Hydrant Pressure Recorder Locations**





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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |

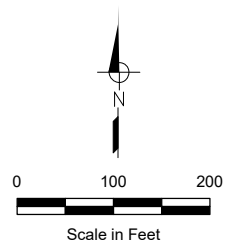


**Figure B-6**  
**Hydrant Pressure Recorder Locations**



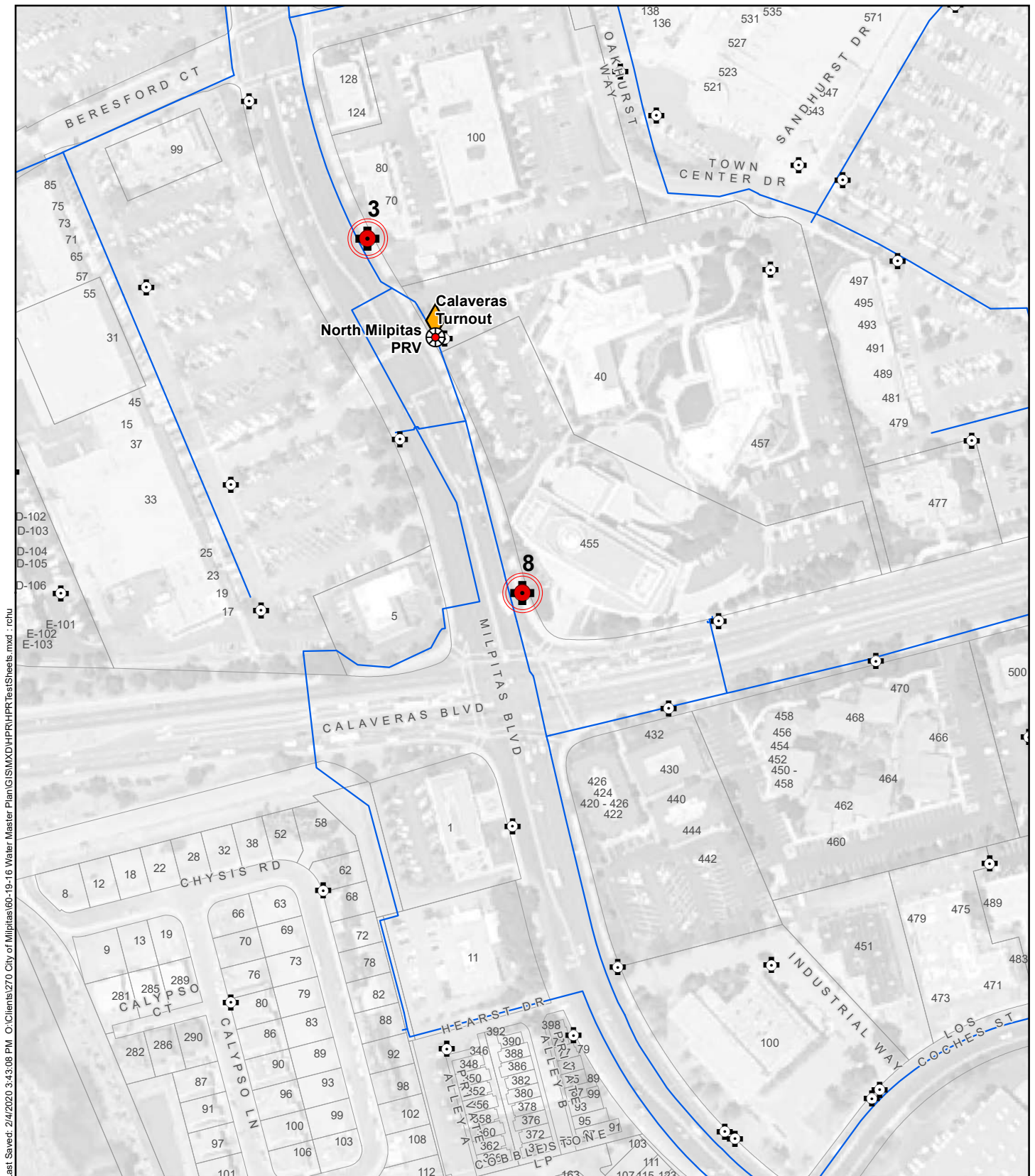
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-  Proposed HPR Location
-  Hydrant
-  Turnout
-  Pump Station
-  Storage Reservoir
-  Well
-  Pressure Reducing Valve
-  Emergency PRV
-  Pipeline

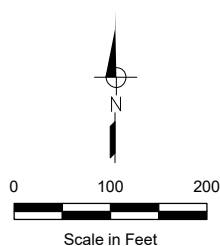


**Figure B-7**  
**Hydrant Pressure Recorder Locations**





-  Proposed HPR Location
-  Hydrant
-  Turnout
-  Pump Station
-  Storage Reservoir
-  Well
-  Pressure Reducing Valve
-  Emergency PRV
-  Pipeline

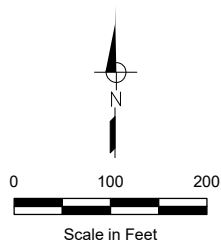


**Figure B-8**  
**Hydrant Pressure Recorder Locations**



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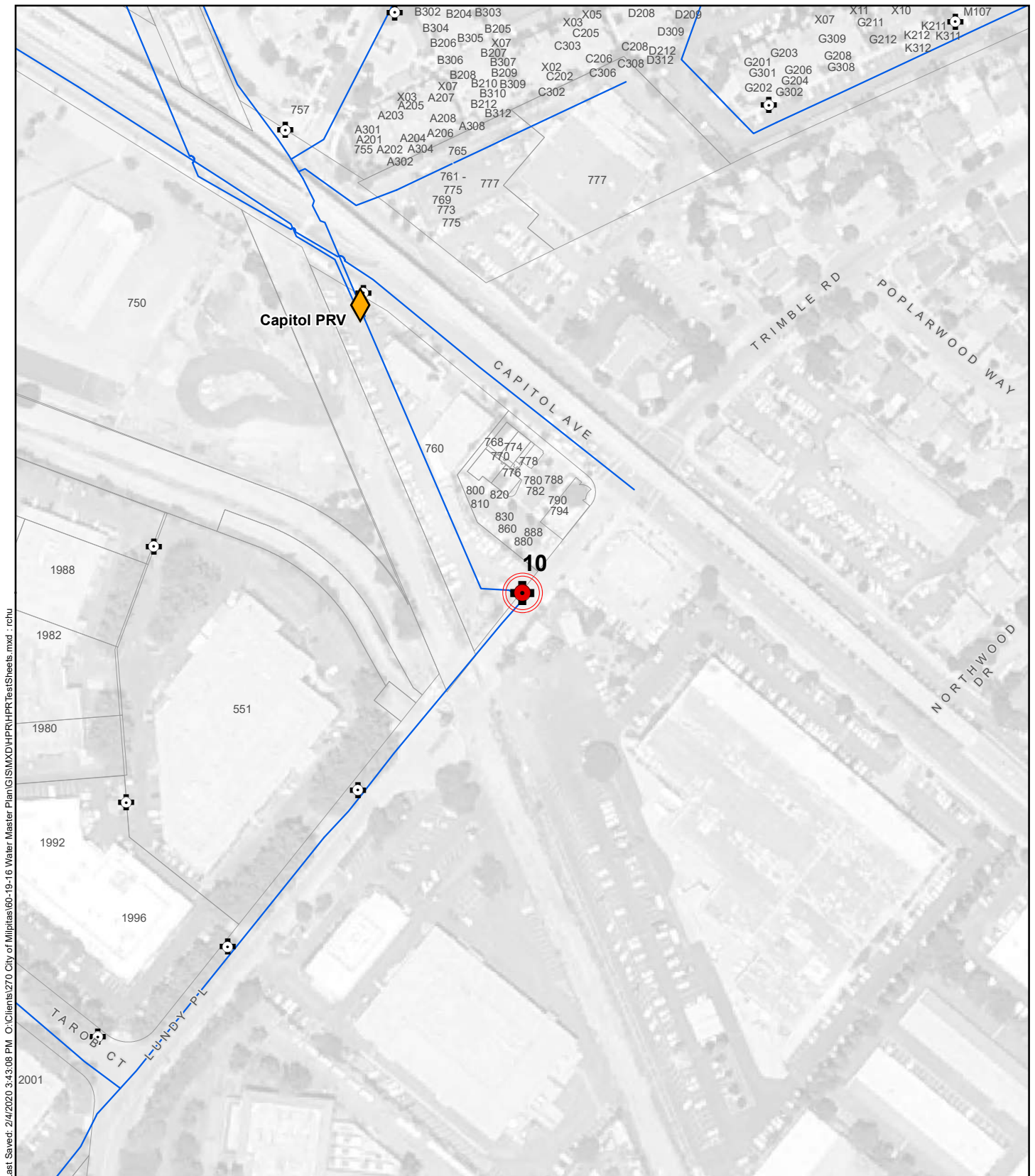
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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |



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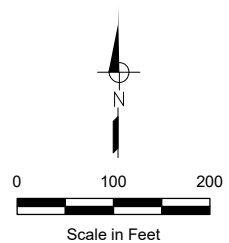
**Figure B-9**  
**Hydrant Pressure Recorder Locations**



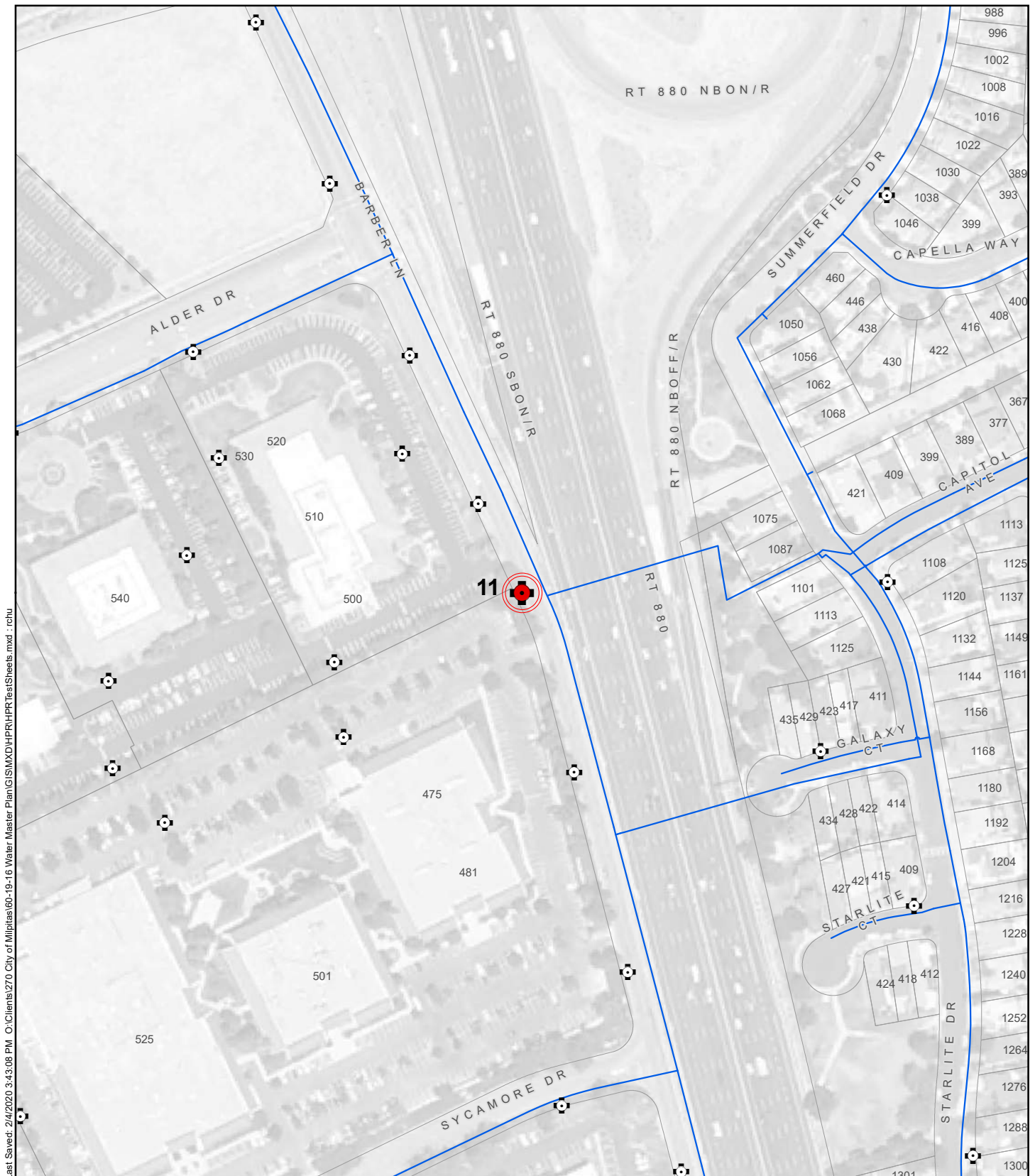


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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |

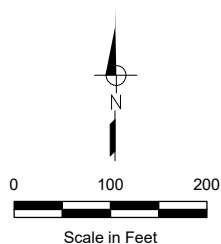


**Figure B-10**  
**Hydrant Pressure Recorder Locations**



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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |



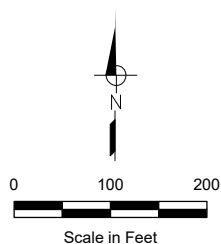
**Figure B-11**  
**Hydrant Pressure Recorder Locations**



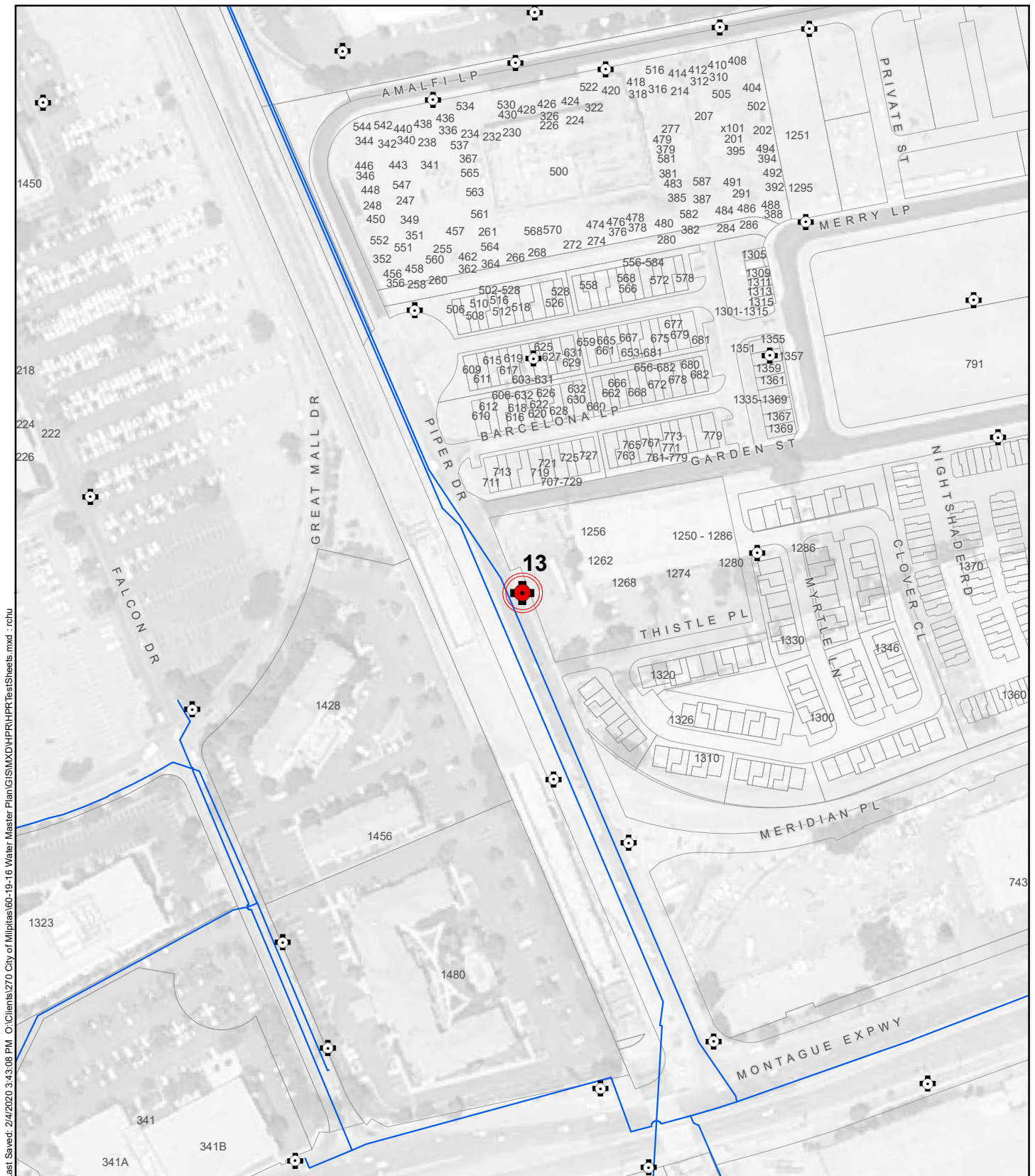


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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |

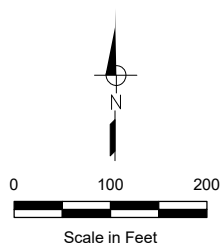


**Figure B-12**  
**Hydrant Pressure Recorder Locations**



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|-------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |                                                                                     |                         |



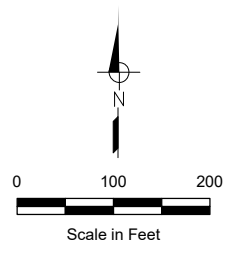
**Figure B-13**  
**Hydrant Pressure Recorder Locations**



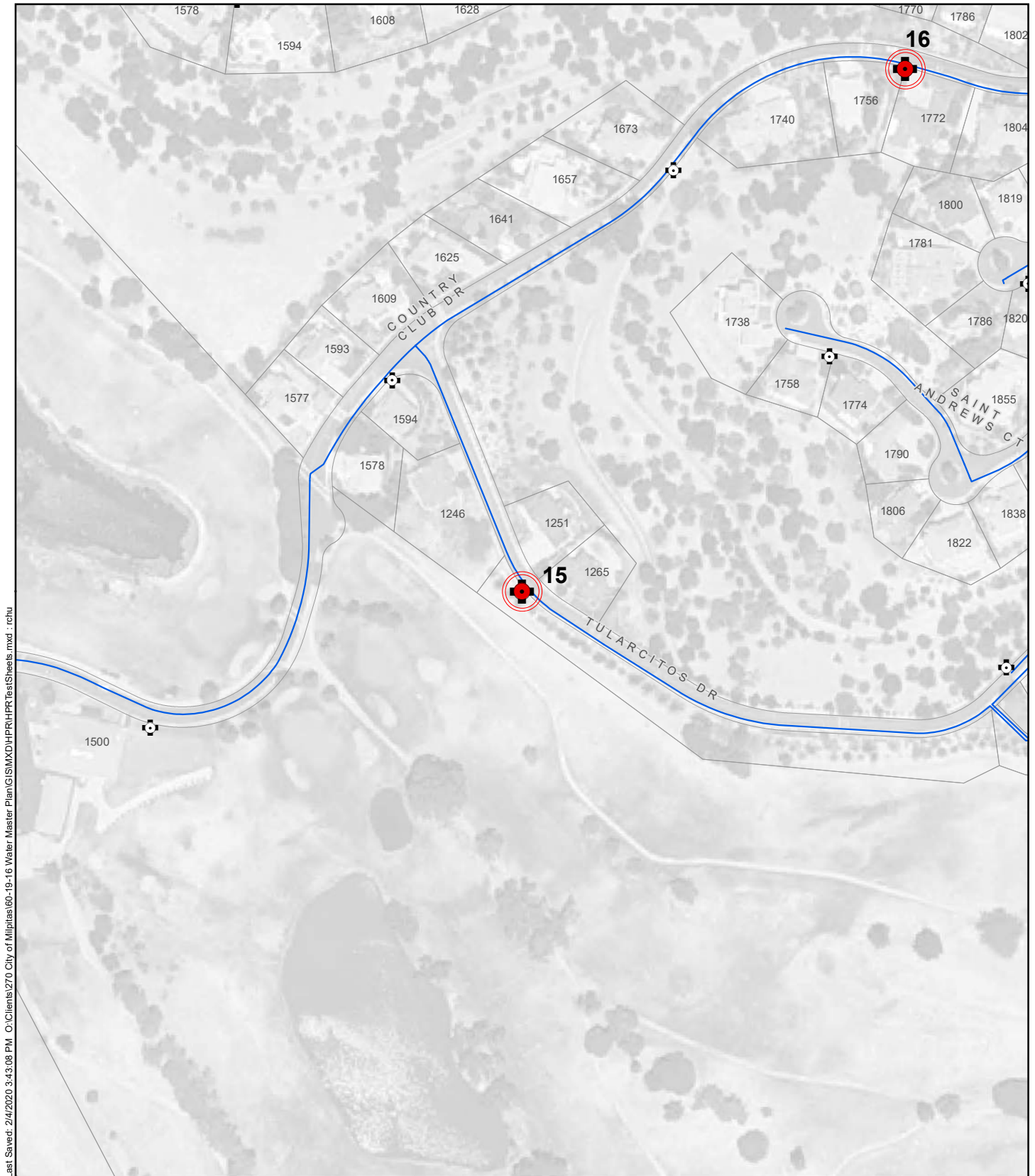


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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |

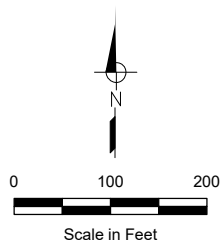


**Figure B-14**  
**Hydrant Pressure Recorder Locations**



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|-------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |                                                                                     |                         |



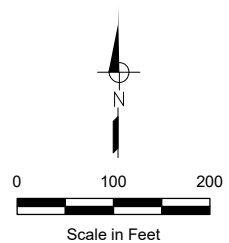
**Figure B-15**  
**Hydrant Pressure Recorder Locations**



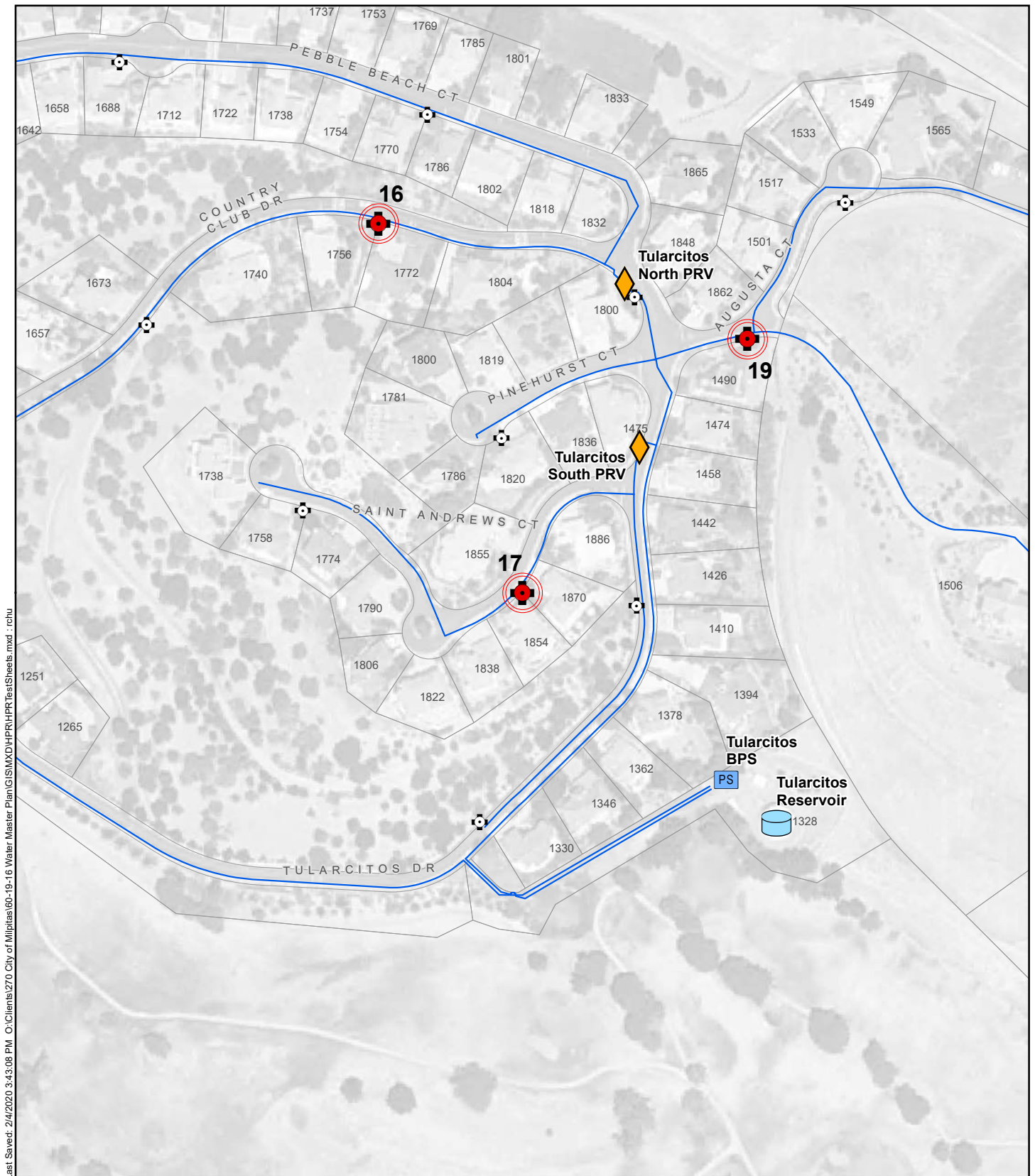


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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |

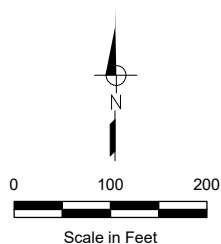


**Figure B-16**  
**Hydrant Pressure Recorder Locations**



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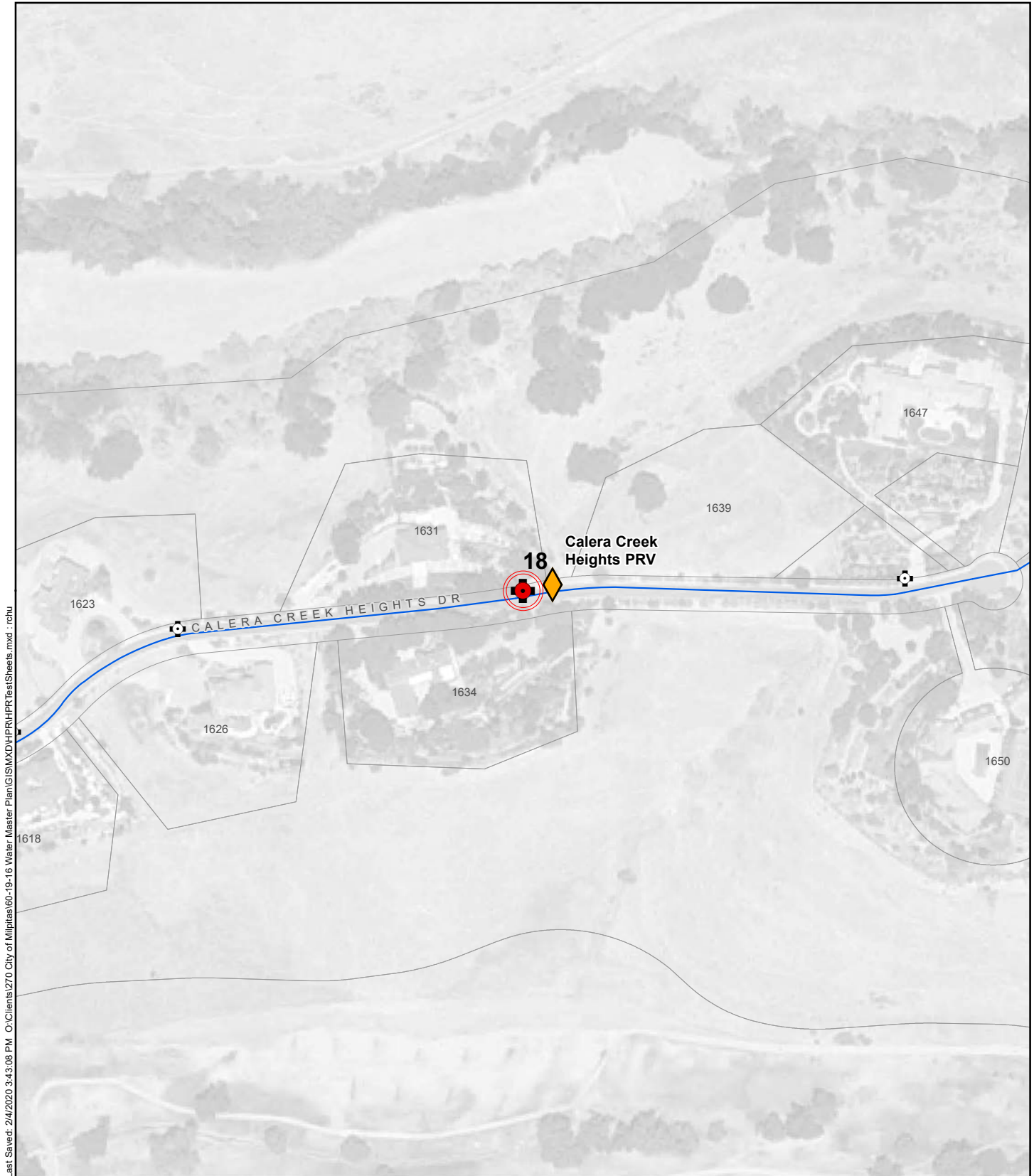
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|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |



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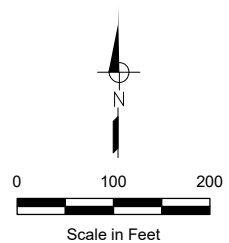
**Figure B-17**  
**Hydrant Pressure Recorder Locations**



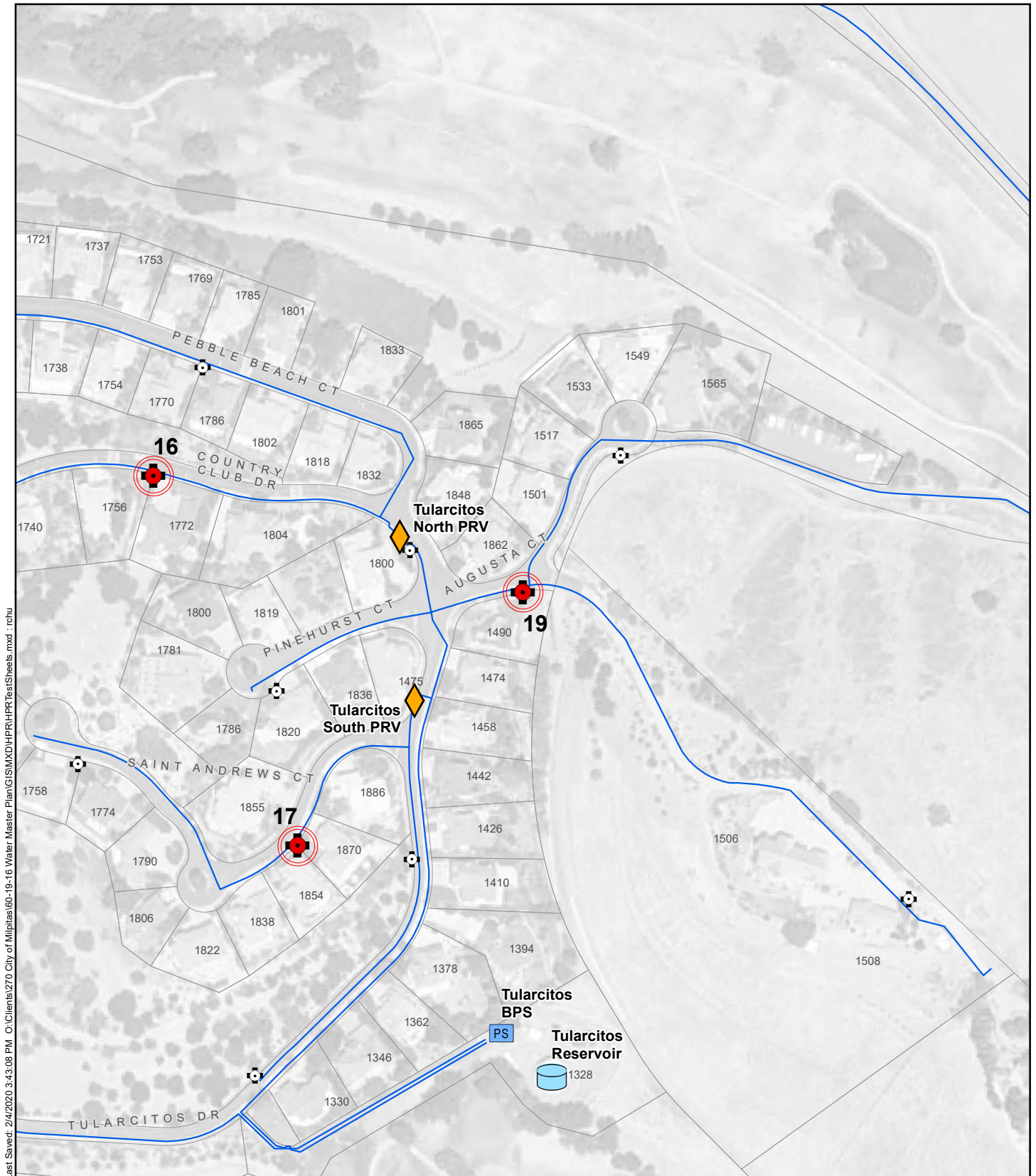


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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |

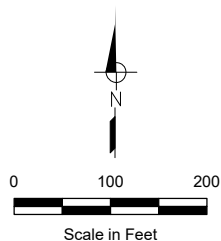


**Figure B-18**  
**Hydrant Pressure Recorder Locations**



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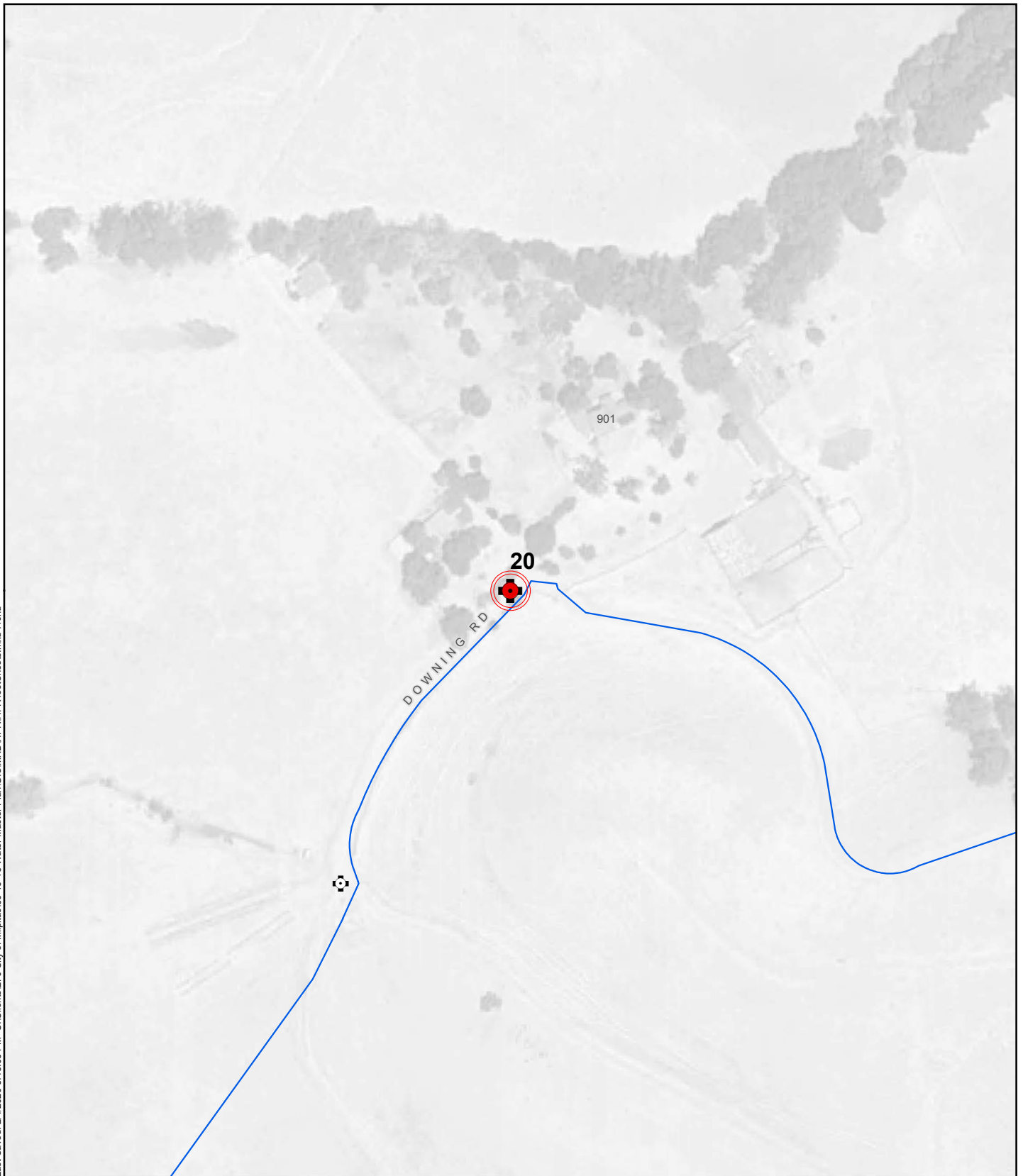
-  Proposed HPR Location
-  Hydrant
-  Turnout
-  Pump Station
-  Storage Reservoir
-  Well
-  Pressure Reducing Valve
-  Emergency PRV
-  Pipeline



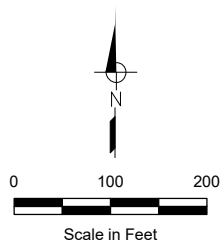
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**Figure B-19**  
**Hydrant Pressure Recorder Locations**

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|--|-----------------------|--|-------------------------|
|  | Proposed HPR Location |  | Well                    |
|  | Hydrant               |  | Pressure Reducing Valve |
|  | Turnout               |  | Emergency PRV           |
|  | Pump Station          |  | Pipeline                |
|  | Storage Reservoir     |  |                         |



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**Figure B-20**  
**Hydrant Pressure Recorder Locations**

## Water Utility Condition Assessment



## 2020 Water Master Plan Water Utility Condition Assessment

PREPARED FOR

City of Milpitas



PREPARED BY



# 2020 Water Master Plan Water Utility Condition Assessment

---

Prepared for

## City of Milpitas

Project No. 270-60-19-16



Michael Zacharia, PE

10-30-20

Date



Anne Girtz, PE

10-30-20

Date

QA/QC Review: Elizabeth Drayer PE

10-30-20

Date

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# 2020 Water Master Plan

## Water Utility Condition Assessment

This Technical Memorandum (TM) summarizes the condition assessment that was performed of the City of Milpitas's (City) water utility assets under Task 3 – Water Utility Asset Condition Assessment of the 2020 Water Master Plan Update (Master Plan). This TM presents assessment methodologies, asset valuations, likelihood and consequence of failure factors, and risk scores as summarized in the following sections:

- 1.0 Scope of Work
- 2.0 Review of Existing Information
- 3.0 Asset Replacement Cost and Current Valuation
- 4.0 Risk Assessment Framework
- 5.0 Likelihood of Failure Methodology
- 6.0 Consequence of Failure Methodology
- 7.0 Risk Assessment
- 8.0 Conclusions

## 1.0 SCOPE OF WORK

The scope of this assessment includes:

- Preparing an estimate of remaining useful life and replacement cost of assets;
- Developing a risk policy consisting of likelihood of failure (LOF) factors, consequence of failure (COF) factors, and interpretation of both LOF and COF to define risk; and
- Performing a desktop risk analysis of utility assets.

Each asset was evaluated according to the risk policy, resulting in risk scores for each water system asset. Risk scores and corresponding risk action thresholds can be used for decision making including selection and prioritization of asset renewal or replacement efforts. The analysis results will be used to inform the Task 7 Rehabilitation and Replacement Study of the Master Plan.

The standardized evaluation process established in the risk policy can be used in future assessments of condition, risk, and valuation of water system assets. The policy framework was developed so that risk factor definitions are commensurate across assets from other City utilities and can be applied to other departments. Should new data become available to support additional or refined risk factors (e.g. pipe break data with failure cause, condition assessment data, etc.), these can be developed within the risk framework proposed herein.



## **2.0 REVIEW OF EXISTING INFORMATION**

This section describes the existing information upon which the assessments were based, and any data processing required prior to undertaking the assessments.

### **2.1 Asset Data and Asset Registry**

The City provided two data sources containing water system asset information: a master inventory spreadsheet and a GIS database.

The master inventory spreadsheet contained information on water facilities including wells, pump stations, reservoirs, PRVs, turnouts, interties, and isolation valves. In addition to facility data, the spreadsheet contained information on select individual assets at each facility (e.g., for a pump station, the pump size(s), manufacturer, model, and other attributes were provided).

The City's existing GIS database was outdated and was updated by HydroScience as part of their work on the City's Sewer Master Plan (being completed concurrently). The updated database contained geospatial and attribute information for horizontal water assets including pipelines, valves, backflow preventers, blow off assemblies, hydrants, and meters.

The master spreadsheet and GIS database were compiled to create an asset registry of all City water system assets. Upon comparison of the two data sources provided by the City, it was observed that several assets were present in both databases. Duplicate entries included: isolation valves (40), PRVs (18), and reservoirs (5). To reconcile the duplicates, a coordinate comparison was performed in GIS to identify duplicate isolation valves; and visual inspection in GIS was performed to identify duplicate PRVs and reservoirs. Duplicates were removed from the respective database prior to compiling the asset registry. The asset registry facilitated the condition and risk assessment discussed herein and provides a database for the City to track and manage their assets moving forward. This database is provided as a separate deliverable which consists of an Excel spreadsheet titled *Asset Registry and Risk Results.xlsx* and may be used to refresh the City's CMMS database.

The final asset registry contained 35,260 entries, consisting of 35,173 horizontal assets and 87 vertical assets. The breakdown of assets by type is presented in Table 1.

## 2020 Water Master Plan

### Water Utility Condition Assessment



**Table 1. Asset Registry – Count of Asset Types**

| Asset Type                     | Count                           |
|--------------------------------|---------------------------------|
| <b>Horizontal Assets</b>       |                                 |
| Pipelines                      | 9,575 pipe segments (183 miles) |
| Hydrants                       | 2,906                           |
| Valves                         | 6,341                           |
| Meters                         | 16,351                          |
| <b>Total Horizontal Assets</b> | <b>35,173</b>                   |
| <b>Vertical Assets</b>         |                                 |
| Fuel Tank                      | 3                               |
| Engine                         | 4                               |
| Generator                      | 3                               |
| Motor                          | 10                              |
| PLC                            | 2                               |
| PRV                            | 23                              |
| Pump                           | 19                              |
| Reservoir                      | 5                               |
| Turnouts and Interties         | 7                               |
| VFD                            | 9                               |
| Well                           | 2                               |
| <b>Total Vertical Assets</b>   | <b>87</b>                       |

## 2.2 2002 Utility Depreciation Study

A Utility Depreciation Study (Schaaf and Wheeler) was performed in 2002. The study included the following:

- An inventory of all City water system assets;
- Replacement costs for those elements; and
- A timetable for replacement of water system elements based on anticipated remaining useful life estimates.

This replacement cost analysis assumed unit costs based on a March 2003 ENR Construction Cost Index. Table 2 presents the resulting replacement costs from the 2002 study for the City's water system assets in 2002 dollars.



## 2020 Water Master Plan

### Water Utility Condition Assessment



**Table 2. Water System Replacement Costs, 2002 Utility Depreciation Study (2002 Dollars)**

| Asset Type           | Replacement Cost<br>Million dollars |
|----------------------|-------------------------------------|
| Pipelines            | 131                                 |
| Valves and Couplings | 8.9                                 |
| ACP Disposal         | 80.6                                |
| Storage Tanks        | 13.4                                |
| Pump Stations        | 10.6                                |
| Wells                | 1.1                                 |
| <b>Total</b>         | <b>\$245.6</b>                      |

### 2.3 2018 Soil Corrosivity Study

In 2018, the City commissioned a soil corrosivity study (JDH Corrosion Consultants, Inc.) to develop a comprehensive database related to corrosion potential of the soils throughout the City. The assessment was focused on water pipelines made of asbestos cement (AC), ductile iron, cast iron, dielectric coated steel, and mortar coated steel materials. Based on in-situ soil resistance measurements and a review of previous soil evaluations, strategies were developed for long-term corrosion control of AC and metallic pipelines.



### 3.0 ASSET REPLACEMENT COST AND CURRENT VALUATION

Asset replacement cost and current valuation estimates are asset management best practices that can afford utility agencies improved decision making. This information provides agencies more accurate and integrated information about their assets, and allows more productive relationships with governing authorities, ratepayers, and other stakeholders because they can provide better information in a more transparent way.

**Asset Replacement Cost** estimates can be used to guide rehabilitation and replacement budgeting. Typically, investment in replacement should cover at a minimum, the depreciation of the assets.

**Asset Current Valuation** estimates are required to support transactions (public-private partnerships, outright sale, etc.), insurance coverage or claims, and rates cases.

#### 3.1 Water System Asset Replacement Cost

A water system asset replacement cost estimate was developed which represents the cost to replace the entire system in-kind, at current construction and design standards. Costs were developed based on a combination of data supplied by manufacturers, published industry standard cost data and curves, construction costs for similar facilities built by other public agencies, and construction costs previously estimated by West Yost for similar facilities with similar construction cost indexes. Details on cost estimating assumptions are provided in a separate appendix of the Water Master Plan.

A summary of the water system replacement costs is presented in Table 3a. Detailed replacement costs are provided in the *Asset Registry and Risk Results* Excel workbook.

| Table 3a. Water System Replacement Costs (2020 Dollars) |                                     |
|---------------------------------------------------------|-------------------------------------|
| Facility Type                                           | Replacement Cost<br>Million dollars |
| Pipelines                                               | 148.4                               |
| Valves                                                  | 4.7                                 |
| Hydrants                                                | 36.2                                |
| Meters                                                  | 6.9                                 |
| Storage Tanks                                           | 46.6                                |
| Pump Stations                                           | 27.6                                |
| Wells                                                   | 7.2                                 |
| PRVs                                                    | 5.9                                 |
| Turnouts and Interties                                  | 4.4                                 |
| <b>Total</b>                                            | <b>\$287.9</b>                      |



## 3.2 Water System Current Valuation

Using the 2020 replacement cost estimate presented in Table 3a, a current water system valuation was prepared using asset useful life estimates (discussed in detail in the Asset Useful Life section) and assuming a straight-line value reduction or depreciation. A straight-line depreciation assumes that the value of an existing asset is reduced gradually over its useful life in a linear relationship. For example, a pipe with 50 percent remaining useful life is valued at 50 percent of its total new replacement cost value. The water system asset valuation estimates the value of individual assets only, not the inherent value of the water system as a whole.

The 2020 water system asset valuation assuming straight-line depreciation is presented in Table 3b. Detailed asset valuation costs are provided in the *Asset Registry and Risk Results* Excel workbook.

| Table 3b. Water System Asset Valuation (2020 Dollars) |                                     |
|-------------------------------------------------------|-------------------------------------|
| Facility Type                                         | Asset Valuation,<br>Million dollars |
| Pipelines                                             | 43.5                                |
| Valves                                                | 1.2                                 |
| Hydrants                                              | 9.1                                 |
| Meters                                                | 0.7                                 |
| Storage Tanks                                         | 16.1                                |
| Pump Stations                                         | 2.8                                 |
| Wells                                                 | 2.0                                 |
| PRVs                                                  | 1.5                                 |
| Turnouts and Interties                                | 1.1                                 |
| <b>Total</b>                                          | <b>\$78.0</b>                       |



## 4.0 RISK ASSESSMENT FRAMEWORK

Understanding the *risk* of each water system asset can help water utilities to prioritize highest-risk assets for renewal or replacement, allowing limited resources to be allocated most effectively. The two components of risk include:

- **Likelihood of Failure (LOF)**, which estimates the probability that a failure will occur in an asset by meeting the end of its physical, design, service, or economic useful life; and
- **Consequence of Failure (COF)**, which estimates the impacts of asset failure expressed either qualitatively or quantitatively, being a loss, injury, or disadvantage from a social, economic, environmental, or regulatory standpoint.

Risk is then estimated using the conventional risk equation:

$$Risk = LOF \times COF$$

The following sections present the LOF and COF methodology that was developed for the City's water system assets, and then calculates asset risk using the risk equation.





## 5.0 LIKELIHOOD OF FAILURE METHODOLOGY

A desktop assessment was performed on existing water utility assets to estimate the LOF of each asset. For this assessment, asset failure is defined by the asset's inability to perform as intended or needed in its application. The primary failure mode utilized for this assessment was physical mortality, which is defined as physical deterioration due to age, usage, or acts of nature. Operational efficiency failure was also evaluated to consider the reduction in pipeline asset performance due to pipe roughness. Supplemental asset data such as failure history and asset condition assessment can also be used to evaluate LOF. This data was not available at the time this analysis was performed.

For each asset type, one or more LOF factors were developed for each failure mode, as presented in Table 4a.

| Table 4a. Asset Failure Modes and LOF Factors |                                                                                                                                                                                                                                       |                                                                                                      |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Failure Mode                                  | Failure Description                                                                                                                                                                                                                   | LOF Factor                                                                                           |
| Physical Mortality                            | The percent of useful life remaining considers that older assets are more likely to fail than newer ones due to the age of materials and wear from repeated use.                                                                      | Remaining Useful Life (for pipelines, considering pipe material, pipe diameter, and soil conditions) |
|                                               | Pipelines that operate at higher working pressures can undergo stress cycles and cause higher failure rates in older pipelines.                                                                                                       | Operating Pressure <sup>(a)</sup>                                                                    |
| Operational Efficiency Failure                | The accumulation of corrosion byproducts and suspended particles on the inside wall of aged pipes can increase pipe roughness and reduce pipe diameter, thereby increasing operational costs to overcome to greater hydraulic losses. | Pipe Roughness <sup>(a)</sup><br>(change in Hazen-Williams C-Factor)                                 |
| (a) LOF Factor only applicable to pipelines   |                                                                                                                                                                                                                                       |                                                                                                      |

LOF ratings were assigned for each factor using standard definitions presented in Table 4b. Ratings and definitions range from 1 – indicating that an asset is in good condition and asset failure is “unlikely”, to 4 – indicating that asset is in poor condition and asset failure is “very likely”. Finally, each asset was evaluated under each applicable LOF factor to develop an overall LOF rating.

| Table 4b. LOF Definition and Ratings |            |          |        |             |
|--------------------------------------|------------|----------|--------|-------------|
|                                      | LOF Rating |          |        |             |
|                                      | 1          | 2        | 3      | 4           |
| LOF Definition                       | Unlikely   | Possible | Likely | Very Likely |

The following sections describe the development of each LOF factor utilized in the assessment.



## 5.1 Asset Useful Life Defined

Asset useful life is generally considered to be the time that an asset provides valued service, after which it does not meet its intended service level. End of life is not necessarily indicative of catastrophic failure, and in most cases an asset can still hold functionality when it has reached the end of its useful life. Absent quantifiable condition or performance data, the assumption is that the older the asset, the greater likelihood it will fail.

Municipal water system assets vary by type, manufacture, design, construction, and quality. They have different characteristics in how they operate and, consequently, will have different profiles of how they perform and ultimately fail. Asset useful life expectancies are documented by the American Water Works Association and Water Environment Research Foundation (WERF) in addition to other notable industry associations. Useful life values presented here are nominal and consistent with the water utility industry and are not specific to any geographic region.

### 5.1.1 Non-Pipeline Useful Life

Table 5a presents a summary of useful life by asset type which were used for the assessment of the City's vertical and non-pipeline horizontal water utility assets. Pipeline assets are discussed separately in the following section.

| Table 5a. Useful Life by Asset Type   |                    |
|---------------------------------------|--------------------|
| Asset Type                            | Useful Life, years |
| <b>Vertical Assets</b>                |                    |
| Fuel Tank                             | 15                 |
| Engine                                | 15                 |
| Generator                             | 15                 |
| Motor                                 | 25                 |
| PLC                                   | 15                 |
| PRV                                   | 25                 |
| Pump                                  | 25                 |
| Reservoir                             | 50                 |
| Turnouts and Interties                | 30                 |
| VFD                                   | 10                 |
| Well                                  | 50                 |
| <b>Non-Pipeline Horizontal Assets</b> |                    |
| Hydrants                              | 50                 |
| Meters                                | 15                 |
| Valves                                | 50                 |



### 5.1.2 Pipeline Useful Life

Pipeline useful life can vary significantly based on pipe size, material, and environmental conditions. The City's 2018 soil corrosivity study indicated that the City's AC pipe was more susceptible to failure in clay soils due to the pipe stresses associated with contraction and expansion of the soil. Smaller diameter AC pipes were especially susceptible to failure due to their relatively low resistance to soil movement. The report recommended a range of AC pipe useful lives based on pipe diameter. The investigation also mapped soil corrosivity and found that soils throughout the City were "severely" to "moderately" corrosive to metallic pipes (cast iron, ductile iron, steel).

Table 5b presents the useful lives for pipelines based on industry standards and the JDH report. It includes a base useful life (not considering soil conditions) and an effective useful life for AC pipe in clayey soils and metallic pipes in corrosive soils. Reinforced concrete pipe was considered vulnerable to corrosive soils due to the potential for exposed reinforcement steel.

| Table 5b. Useful Life – Pipelines |                  |                         |                              |                            |                 |                          |
|-----------------------------------|------------------|-------------------------|------------------------------|----------------------------|-----------------|--------------------------|
| Pipe Material                     | Diameter, Inches | Base Useful Life, years | Effective Useful Life, years |                            |                 |                          |
|                                   |                  |                         | Clay Soils                   | Moderately Corrosive Soils | Corrosive Soils | Severely Corrosive Soils |
| Asbestos Cement                   | 4-10             | 30                      | 24                           | -                          | -               | -                        |
|                                   | 12+              | 90                      | 72                           | -                          | -               | -                        |
| Polyvinyl Chloride                | all              | 70                      | -                            | -                          | -               | -                        |
| Concrete Cylinder                 | all              | 75                      | -                            | 68                         | 64              | 60                       |
| Cast Iron                         | all              | 100                     | -                            | 90                         | 85              | 80                       |
| Ductile Iron                      | all              | 100                     | -                            | 90                         | 85              | 80                       |
| Steel                             | all              | 95                      | -                            | 86                         | 81              | 76                       |

### 5.1.3 Asset Remaining Useful Life Defined

The asset useful life estimates discussed above were used to calculate the remaining useful life (RUL) of each asset with the following formulas:

$$RUL = \text{Asset Useful Life} - \text{Asset Age}$$

$$RUL (\%) = (\text{Asset Useful Life} - \text{Asset Age}) / \text{Asset Useful Life}$$

### 5.1.4 Estimation of LOF based on Remaining Useful Life

Decay curves can be used to illustrate the progression of asset degradation (decay) over an asset's useful life. The curves in Figure 1 were developed by WERF<sup>1</sup> and represent empirical failure patterns at several

<sup>1</sup> WERF SIMPLE (Sustainable Infrastructure Management Program Learning)

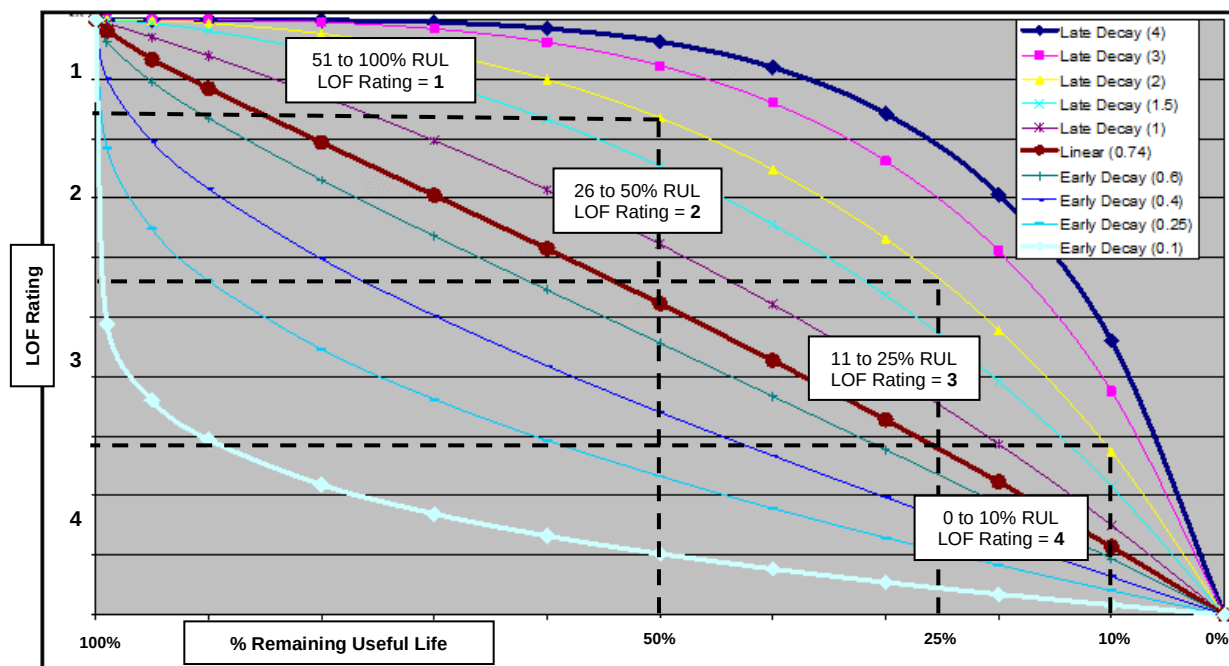
## 2020 Water Master Plan Water Utility Condition Assessment



polynomial rates that may be experienced in the water industry. For this assessment, Late Decay 2 curve was selected as the indicator of likelihood of failure based on the following assumptions:

- Once municipal assets are beyond the point of early mortality, only a gradual decline in asset condition is expected to occur for much of the asset life. Early mortality is characterized by asset failure very soon after the asset is commissioned and in service. The occurrence of early mortality is often associated with manufacturing and installation issues.
- Late Decay Curve 2 provides only a 30 percent reduction in asset condition for the first two-thirds of the asset life. This is considered a nominal reduction in condition for a major milestone in the asset lifecycle and represents a suitable objective for asset performance.
- Late Decay Curve 2 provides a progression that is not significantly steep in terms of asset degradation over the final, remaining, one-third lifecycle.

Figure 1 also shows how Late Decay Curve 2 is used to correlate asset remaining useful life with the LOF rating (e.g. for an asset with a % RUL of 30 percent, the LOF rating is 2).



**Figure 1. Percent Remaining Useful Life and LOF Rating**

Several assets in the City databases were missing age or installation dates. These assets were assigned an LOF rating based on the following assumptions:

- AC pipe was assigned a rating of 4 under the assumption that AC pipe was not installed after the mid-1980s (and therefore the % RUL would be zero). 19 miles (894 pipe segments) of AC pipe had an unknown age/installation date.
- Remaining assets of unknown age were assigned a rating of 3 to account for the generally higher risk associated with unknown asset age and condition.





## 5.2 Pipeline Hydraulic Conditions

Pipeline conditions from the hydraulic model were considered to evaluate LOF factors of pipe roughness (operational efficiency failure mode) and operational pressure (physical mortality failure mode).

### 5.2.1 Pipe Roughness

Hydrant testing was performed over a portion of the distribution system to determine calibrated pipeline roughness, or C-Factors (see Task 4 of the Master Plan, presented in Chapter 6). Calibrated C-Factors from the hydraulic model were used to determine the reduction in C-Factor when compared to the C-Factor of a brand-new pipe of the same material. The result of the C-Factor comparison is presented in Table 6.

| <b>Table 6. Pipe Roughness: C-Factor Comparison</b> |                     |                   |                     |                         |
|-----------------------------------------------------|---------------------|-------------------|---------------------|-------------------------|
| Pipe Material                                       | Pipe Sizes          | New Pipe C-Factor | Calibrated C-Factor | Percent of New C-Factor |
| Asbestos Cement                                     | Diameter ≤ 8 inches | 140               | 110                 | 79%                     |
|                                                     | Diameter > 8 inches |                   | 120                 | 86%                     |
| Polyvinyl Chloride                                  | Diameter ≤ 8 inches | 150               | 130                 | 87%                     |
|                                                     | Diameter > 8 inches |                   | 140                 | 93%                     |
| Concrete Cylinder                                   | Diameter > 8 inches | 140               | 130                 | 93%                     |
| Cast Iron                                           | Diameter ≤ 8 inches | 130               | 100                 | 77%                     |
|                                                     | Diameter > 8 inches |                   | 110                 | 85%                     |
| Ductile Iron                                        | Diameter ≤ 8 inches | 140               | 130                 | 93%                     |
|                                                     | Diameter > 8 inches |                   | 140                 | 100%                    |
| Steel                                               | Diameter ≤ 8 inches | 140               | 120                 | 86%                     |
|                                                     | Diameter > 8 inches |                   | 130                 | 93%                     |

### 5.2.2 Operating Pressure

Operating pressure was obtained from the calibrated hydraulic model under an average day scenario, with system pumps operating. Pipeline assets were evaluated for high operating pressure as an influence to increased LOF. Through discussions with the City, pipeline assets operating continually in excess of 135 psi regardless of design class were considered to be at higher risk of failure or increased LOF.

## 5.3 Supplemental Condition Data

Supplemental condition data typically consists of focused condition assessment studies of assets and facilities to determine condition based on an established set of metrics and criteria. Such assessments should be performed at intervals generally less than the asset's useful life to confirm condition and status on the useful life curve. Maintenance records may also capture details from asset failure and problems. This information can be used to document type and frequency of failures that serve as an indication of asset condition and be used in the future to develop additional LOF factors.



## 5.4 Likelihood of Failure Evaluation

Assets were evaluated under each applicable LOF factor to develop an overall LOF rating. Pipeline assets were assessed based on the criteria outlined above consisting of RUL and operating pressure. Non-pipeline assets considered only RUL alone. Since these criteria are baseline and easy to assess they serve as the *fixed* LOF criteria.

Given the availability of supplemental data, the other criteria were incorporated as *modifiers* to the LOF assessment. LOF scores were subjected to the other criteria as potential modifiers that could increase the LOF rating if additional data were available. These modifiers include pipeline roughness, failure history from maintenance or other failure data, and focused condition assessment activities.

Both fixed and modifier LOF factors were assigned a weight based on the relative importance of each factor. For the fixed LOF factors, RUL is weighted to represent 80 percent of the total rating, while operating pressure represents 20 percent of the total rating. The maximum possible weighted rating for the fixed LOF factors is 4. LOF modifiers are only evaluated if the fixed LOF rating is less than 4. LOF modifiers can increase the overall rating up to 1 additional score, resulting in a total possible LOF rating of 4. Table 7 presents the LOF criteria and rating definitions.

**Table 7. LOF Factor and Ratings – Water System Assets**

| Table 7. LOF Factor and Ratings – Water System Assets |                                    |                                   |                                                   |                                              |        |                                           |
|-------------------------------------------------------|------------------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------|--------|-------------------------------------------|
| Factor                                                | LOF Rating and Definition          |                                   |                                                   |                                              | Weight | Max Possible Rating                       |
|                                                       | 1<br>Unlikely                      | 2<br>Possible                     | 3<br>Likely                                       | 4<br>Very Likely                             |        |                                           |
| Fixed LOF Factors                                     |                                    |                                   |                                                   |                                              |        |                                           |
| Remaining Useful Life (RUL)                           | 51 to 100% RUL                     | 26 to 50% RUL                     | 11 to 25% RUL; Non-AC pipe asset with unknown age | 0 to 10% RUL; AC pipe asset with unknown age | 80%    | 3.2 (Pipelines)<br>4.0 (All other assets) |
| Operating Pressure <sup>(a)</sup>                     | <84 psi                            | 85 psi to 99 psi                  | 100 psi to 134 psi                                | >135 psi                                     | 20%    | 0.8                                       |
| Maximum Rating                                        |                                    |                                   |                                                   |                                              |        | 4.0                                       |
| LOF Modifiers                                         |                                    |                                   |                                                   |                                              |        |                                           |
| Pipe Roughness <sup>(a)</sup>                         | 85% to 100% of new C-Factor Rating | 75% to 84% of new C-Factor Rating | 65% to 74% of new C-Factor Rating                 | <64% of new C-Factor Rating                  | 2.5%   | 0.10                                      |
| Failure History                                       | <2                                 | 3 to 5                            | 6 to 9                                            | >10                                          | 10%    | 0.40                                      |
| Condition Assessment                                  | New                                | Used                              | Worn                                              | Pending Failure                              | 12.5%  | 0.50                                      |
| Maximum Modifier                                      |                                    |                                   |                                                   |                                              |        | 1.0                                       |
| Total Possible LOF Rating                             |                                    |                                   |                                                   |                                              |        | 4.0                                       |
| (a) Factor only applicable to pipelines               |                                    |                                   |                                                   |                                              |        |                                           |



## 5.5 Asset LOF Results

Table 8 presents the LOF rating results as a percent of total assets by type (i.e. for hydrants, 8 percent of all hydrants were evaluated to have a LOF rating of 1 and 17 percent of all hydrants have a LOF rating of 2, etc.). Individual asset LOF results are provided in the *Asset Registry and Risk Results* Excel workbook.

| Table 8. Asset LOF Results, Percent of Total Assets by Type                            |                                           |    |     |     |
|----------------------------------------------------------------------------------------|-------------------------------------------|----|-----|-----|
|                                                                                        | LOF Rating, total assets by type, percent |    |     |     |
|                                                                                        | 1                                         | 2  | 3   | 4   |
| <b>Horizontal Assets</b>                                                               |                                           |    |     |     |
| Pipelines <sup>(a)</sup>                                                               | 25                                        | 18 | 20  | 37  |
| Hydrants                                                                               | 8                                         | 17 | 75  | 0   |
| Meters                                                                                 | 0                                         | 3  | 22  | 75  |
| Valves                                                                                 | 16                                        | 23 | 61  | 0   |
| <b>Vertical Assets</b>                                                                 |                                           |    |     |     |
| Fuel Tank                                                                              | 0                                         | 0  | 33  | 67  |
| Engine                                                                                 | 0                                         | 0  | 0   | 100 |
| Generator                                                                              | 0                                         | 0  | 67  | 33  |
| Motor                                                                                  | 0                                         | 0  | 30  | 70  |
| PLC                                                                                    | 0                                         | 0  | 50  | 50  |
| PRV                                                                                    | 0                                         | 4  | 87  | 9   |
| Pump                                                                                   | 0                                         | 0  | 16  | 84  |
| Reservoir                                                                              | 0                                         | 60 | 40  | 0   |
| Turnouts and Interties                                                                 | 0                                         | 0  | 100 | 0   |
| VFD                                                                                    | 0                                         | 0  | 22  | 78  |
| Well                                                                                   | 50                                        | 0  | 50  | 0   |
| (a) Pipeline results are shown as percent of total pipeline length, not pipe segments. |                                           |    |     |     |

## 5.6 Facility LOF Results

The previous section describes the method for assigning an LOF rating for each asset. For vertical assets, multiple assets can constitute a larger facility; for example, the Ayer Pump Station facility includes a pump, motor, generator, fuel tank, PLC, and VFD. LOF can also be estimated at the facility level by considering the LOF of individual components within that facility. LOF was estimated for Milpitas water system facilities by averaging the associated component LOFs, weighted based on the individual component value. The applied weighting considers the fact that assets of a lower value should have a lesser impact on the overall facility LOF, whereas assets with a higher value should have a greater impact on the overall facility LOF.

$$\text{Facility LOF} = \frac{\sum_{i=1}^n \text{Component LOF} \times \text{Component Value} (\$)}{\text{Total Facility Value} (\$)}$$

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Table 9 presents the LOF rating results for each facility on the same 1 to 4 scale, rounded to the nearest tenth.

| Table 9. Facility LOF Results |            |
|-------------------------------|------------|
| Facility                      | LOF Rating |
| Curtis Well                   | 1.7        |
| Gibraltar Reservoir (SC)      | 2.0        |
| Gibraltar Reservoir (SF)      | 2.0        |
| Minnis Reservoir              | 2.0        |
| ACWD Intertie                 | 2.4        |
| SJWC Intertie                 | 2.4        |
| Calera Creek Heights PRV      | 2.4        |
| Capitol PRV                   | 2.4        |
| Main PRV                      | 2.4        |
| Milpitas PRV                  | 2.4        |
| Sunnyhills PRV                | 2.4        |
| Curtis PRV                    | 2.5        |
| SCVWD Intertie                | 3.0        |
| Gibraltar Turnout             | 3.0        |
| Calaveras Turnout             | 3.0        |
| Sunnyhills Turnout            | 3.0        |
| Main Street Turnout           | 3.0        |
| Abel PRV                      | 3.0        |
| Gibraltar PRV                 | 3.0        |
| Live Oak PRV                  | 3.0        |
| McCarthy PRV                  | 3.0        |
| Montague PRV                  | 3.0        |
| North Vault PRV               | 3.0        |
| Sinclair PRV                  | 3.0        |
| South Vault PRV               | 3.0        |
| Ayer Reservoir                | 3.0        |
| Tularcitos Reservoir          | 3.0        |
| Country Club Pump Station     | 3.2        |
| Tularcitos Pump Station       | 3.2        |
| Pinewood Well                 | 3.4        |
| Ayer Pump Station             | 3.6        |
| Gibraltar Pump Station        | 3.7        |





## 6.0 CONSEQUENCE OF FAILURE METHODOLOGY

Consequence of failure (COF) rates the severity of consequences should an asset fail. Consequences typically include system performance impacts; economic or social impacts to the City, residents, or the community; safety impacts; and local or regional environmental impacts.

COF factors were developed in collaboration with City staff to reflect both City Council Core Goals and Priority Areas.

### 6.1 Consequence of Failure Framework

The Milpitas City Council has adopted a series of goals and priority areas that identify critical elements important to the City in the services it provides. These Goals and Priority Areas are outlined in the City's 2020 fiscal budget as shown below.

| Core Goals                                                                                                                                                                                                        | Priority Areas                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Superior Customer Service</li><li>• Integrity and Accountability</li><li>• Recognition and Celebration</li><li>• Open Communication</li><li>• Trust and Respect</li></ul> | <ul style="list-style-type: none"><li>• Public Safety</li><li>• Transportation and Transit</li><li>• Neighborhoods and Housing</li><li>• Governance and Administration</li><li>• Environment</li><li>• Economic Development and Job Growth</li><li>• Community Wellness and Open Space</li></ul> |

Council objectives such as these can typically align with the critical objectives of a utility's performance and can therefore be related to asset performance and the consequence of an asset failing. A COF framework was developed based on the Council Goals and Priority Areas. Each goal and priority area were evaluated for applicability to asset COF and, for those that could be developed, were categorized, measured, and rating definitions developed. Every objective except for: Recognition and Celebration; Open Communication; Neighborhoods and Housing; and Community Wellness and Open Space were developed into factors within the COF framework. Table 10 presents the COF framework and eight proposed COF factors.

Table 10. COF Framework

| Council Goals and Priority Areas    | Category                                                                 | COF Factor                                                     | Rating and Metric                                       |                                                                              |                                                            |                                                                                                                              |
|-------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|                                     |                                                                          |                                                                | 1<br>Negligible                                         | 2<br>Minimal                                                                 | 3<br>Moderate                                              | 4<br>Severe                                                                                                                  |
| Superior Customer Service           | Reliable, High Quality Customer Service in General                       | (1) Water Service Interruptions                                | Negligible Impact to Water Service                      | Water pressure below 30 psi                                                  | Interruption of Water Service Over Localized Area          | Interruption of Water Service Over Large Area                                                                                |
| Integrity and Accountability        | Public Perception/Response                                               | (2) Magnitude and Method of Public Response                    | No Public Response                                      | May result in telephone calls                                                | May Result in Social Media Coverage                        | May Result in Local or Greater Media Coverage or Public Comment                                                              |
| Trust and Respect                   |                                                                          |                                                                |                                                         |                                                                              |                                                            |                                                                                                                              |
| Public Safety                       | Health and Safety of Public and City Employees                           | (3) Severity of Injury or Illness                              | No Health or Safety Impact                              | Minor Injury, First Aid                                                      | Injury, Medical Attention                                  | Severe Injury or Loss of Life                                                                                                |
| Environment                         | Compliance with Environmental Regulations or other Water Quality Concern | (4) State and Federal Regulatory Violations or Public Response | No Impact                                               | Reportable violation, no enforcement action                                  | May Result in Strong Warning or Fine                       | Non-compliance resulting in administrative or consent order                                                                  |
| Transportation and Transit          | Public Transit Service                                                   | (5) Public Transit Service Interruptions                       | No Impact                                               | Minor Detours                                                                | Bus Service is impacted >15% to sensitive groups/locations | Community Access to BART is Interrupted<br><br>Requires Coordination with Outside Agencies i.e., County, CalTrans, VTA, etc. |
| Economic Development and Job Growth | Economic Impacts                                                         | (6) Local Business Impact                                      | No Impact                                               | Localized Short-term Business Impact, no Adverse Impact on Economic Vitality |                                                            | Long-term or Area-wide Economic Impact, Adverse Impact to Economic Vitality                                                  |
| Governance and Administration       | Utility Operations                                                       | (7) Response Time to Restore an Asset                          | Recovery measured in days                               | Recovery could require up to Two (2) weeks                                   | Recovery Could Require up to One (1) Month                 | Recovery Requires Greater Than One (1) Month                                                                                 |
|                                     |                                                                          | (8) Restoration Costs or Impact on Utility Rates               | Can be absorbed within fiscal budget without adjustment | Could impact multiple budget objects                                         | May Require Council Action                                 | May Impact Reserves                                                                                                          |



## 6.2 Consequence of Failure Rating Defined

The COF framework presented in Table 10 was further developed into a model to assess COF for both horizontal and vertical assets by defining rating interpretations for all factors. Interpretations were developed into metrics such that COF ratings could easily be assigned with asset characteristics or geospatial data, avoiding manual evaluation of individual assets. For horizontal assets, this included assessment based on pipe size, street classification, land use, and hydraulic modeling. For vertical assets this included similar assessment criteria along with asset type.

COF ratings were assigned for each factor using standard definitions presented in Table 11. Ratings range from 1 – indicating the consequence of asset failure would be “negligible”, to 4 – indicating the consequence of asset failure would be “severe”. Tables 11 and 12 present the COF factors, metrics, and ratings for horizontal and vertical assets, respectively.

| Table 11. COF Definition and Ratings |            |         |          |        |
|--------------------------------------|------------|---------|----------|--------|
|                                      | LOF Rating |         |          |        |
|                                      | 1          | 2       | 3        | 4      |
| COF Definition                       | Negligible | Minimal | Moderate | Severe |

| Table 12. COF Factors and Ratings – Horizontal Assets (Pipes, Valves, Hydrants, Meters)                                                                                                                                                                                              |                                                                                     |                                                                                            |                                  |                                                      |                                                                                                      |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Factor                                                                                                                                                                                                                                                                               | Description                                                                         | Data Source                                                                                | Rating and Metric                |                                                      |                                                                                                      |                                                                 |
|                                                                                                                                                                                                                                                                                      |                                                                                     |                                                                                            | 1<br>Negligible                  | 2<br>Minimal                                         | 3<br>Moderate                                                                                        | 4<br>Severe                                                     |
| (1) Water Service Interruption                                                                                                                                                                                                                                                       | Asset failure may cause interruptions to water service                              | GIS Pipe Diameter <sup>(c)</sup> ; GIS Meter Size                                          | Pipes ≤8-inch                    | Pipes 10 to 12-inch; All Other Meters                | Pipes 14 to 18-inch; Meters 6 to 8-inch                                                              | Pipes >18-inch                                                  |
| (2) Magnitude and Method of Public Response                                                                                                                                                                                                                                          | Asset failure may cause a loss in public confidence                                 | GIS Pipe Diameter <sup>(c)</sup> ; Critical Facilities <sup>(a)</sup>                      | -                                | Pipes ≤8-inch; All Other Meters                      | Pipes 10 to 12-inch; Meters 6 to 8-inch                                                              | Pipes >14-inch within 500 feet of a Critical Facility           |
| (3) Severity of Injury or Illness                                                                                                                                                                                                                                                    | Asset failure may cause injury or illness to public or utility operations staff     | GIS Pipe Diameter <sup>(c)</sup>                                                           | Pipes ≤8-inch; All Other Meters  | Pipes 10 to 12-inch; Meters 6 to 8-inch              | Pipes 14 to 18-inch                                                                                  | Pipes >18-inch                                                  |
| (4) State and Federal Regulatory Violations or Public Response                                                                                                                                                                                                                       | Asset failure may result in violation of state or federal environmental regulations | Asset Type                                                                                 | All Valves; All Meters           | All Pipes; All Hydrants                              | -                                                                                                    | -                                                               |
| (5) Public Transit Service Interruptions                                                                                                                                                                                                                                             | Asset failure may cause an impedance to public and private transportation function  | GIS Road Speed; GIS Land Use; BART stations; and Sensitive Groups/Locations <sup>(b)</sup> | Streets with speeds up to 25 mph | Streets with speeds from 30-50 mph in Residential LU | Streets with speeds from 30-50 mph in Non-Residential LU; or Adjacent to a Sensitive Group/ Location | Highways, Highway crossings, or Within 100-feet of BART station |
| (6) Local Business Impact                                                                                                                                                                                                                                                            | Asset failure may have a negative impact to the City economy                        | GIS Land Use (LU)                                                                          | All Other LU Types               | -                                                    | LU types including PF, RRMU, M                                                                       | LU types including TWC, VHDMU, GNC, RSC, INP, MFG, PAO          |
| (7) Response Time to Restore an Asset                                                                                                                                                                                                                                                | The City’s ability to respond depends on the location of the asset                  | GIS Road Speed                                                                             | Streets with speeds up to 25 mph | Streets with speeds from 30-50 mph in Residential LU | Streets with Speeds from 30-50 mph in Non-Residential LU                                             | Highways or Highway Crossings                                   |
| (8) Restoration Costs or Impact to Utility Rates                                                                                                                                                                                                                                     | The asset failure may have an impact to utility fiscal performance                  | GIS Pipe Diameter <sup>(c)</sup>                                                           | Pipes ≤12-inch; All Meters       | Pipes 14 to 16-inch                                  | Pipes 18 to 24-inch                                                                                  | Pipes >24-iinch or Highway Crossings                            |
| (a) Critical Facilities include Schools, Fire Stations, and Hazardous Pipelines.<br>(b) Sensitive Groups/Locations include Fire Stations and Schools.<br>(c) Hydrants were assigned the rating of adjacent/service pipeline; Valves were assigned the rating of connecting pipeline. |                                                                                     |                                                                                            |                                  |                                                      |                                                                                                      |                                                                 |



Table 13. COF Factors and Ratings – Vertical Assets

| Factor                                                         | Description                                                                         | Data Source                                                                                | Rating and Metric                |                                                      |                                                                                                      |                                                                            |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
|                                                                |                                                                                     |                                                                                            | 1<br>Negligible                  | 2<br>Minimal                                         | 3<br>Moderate                                                                                        | 4<br>Severe                                                                |
| (1) Water Service Interruption                                 | Asset failure may cause interruptions to water service                              | Asset Type                                                                                 | -                                | -                                                    | PRVs                                                                                                 | Interties, Turnouts, Reservoirs, Pumping Stations, Wells, Emergency PRVs   |
| (2) Magnitude and Method of Public Response                    | Asset failure may cause a loss in public confidence                                 | Asset Type                                                                                 | -                                | -                                                    | -                                                                                                    | Interties, Turnouts, Reservoirs, Pumping Stations, Wells, PRVs             |
| (3) Severity of Injury or Illness                              | Asset failure may cause injury or illness to public or utility operations staff     | Asset Type                                                                                 | -                                | -                                                    | PRVs                                                                                                 | Interties, Turnouts, Reservoirs, Pumping Stations, Wells, Emergency PRVs   |
| (4) State and Federal Regulatory Violations or Public Response | Asset failure may result in violation of state or federal environmental regulations | Asset Type and location                                                                    | All Others                       | -                                                    | Wells                                                                                                | Wells within 50-feet to a surface water source and Surface Water Interties |
| (5) Public Transit Service Interruptions                       | Asset failure may cause an impedance to public and private transportation function  | GIS Road Speed; GIS Land Use; BART stations; and Sensitive Groups/Locations <sup>(b)</sup> | Streets with speeds up to 25 mph | Streets with speeds from 30-50 mph in Residential LU | Streets with speeds from 30-50 mph in Non-Residential LU; or Adjacent to a Sensitive Group/ Location | Highways, Highway crossings, or Within 100-feet of BART station            |
| (6) Local Business Impact                                      | Asset failure may have a negative impact to the City economy                        | GIS Land Use                                                                               | All Other LU Types               | -                                                    | LU types including PF, RRMU, M                                                                       | LU types including TWC, VHDMU, GNC, RSC, INP, MFG, PAO                     |
| (7) Response Time to Restore an Asset                          | The City’s ability to respond depends on the location of the asset                  | Asset Type                                                                                 | -                                | PRVs, Interties                                      | Turnouts                                                                                             | Reservoirs, Pumping Stations, Wells                                        |
| (8) Restoration Costs or Impact to Utility Rates               | The asset failure may have an impact to utility fiscal performance                  | Asset Type                                                                                 | PRVs, Interties                  | Turnouts                                             | -                                                                                                    | Reservoirs, Pumping Stations, Wells                                        |

(a) Sensitive Groups/Locations include Fire Stations and Schools

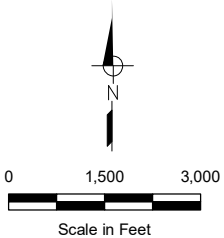
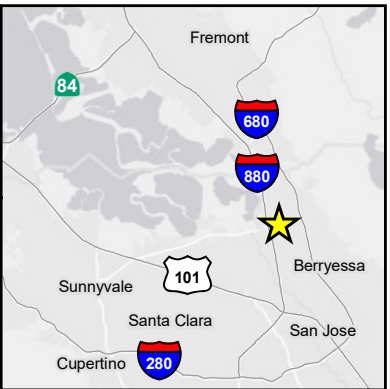
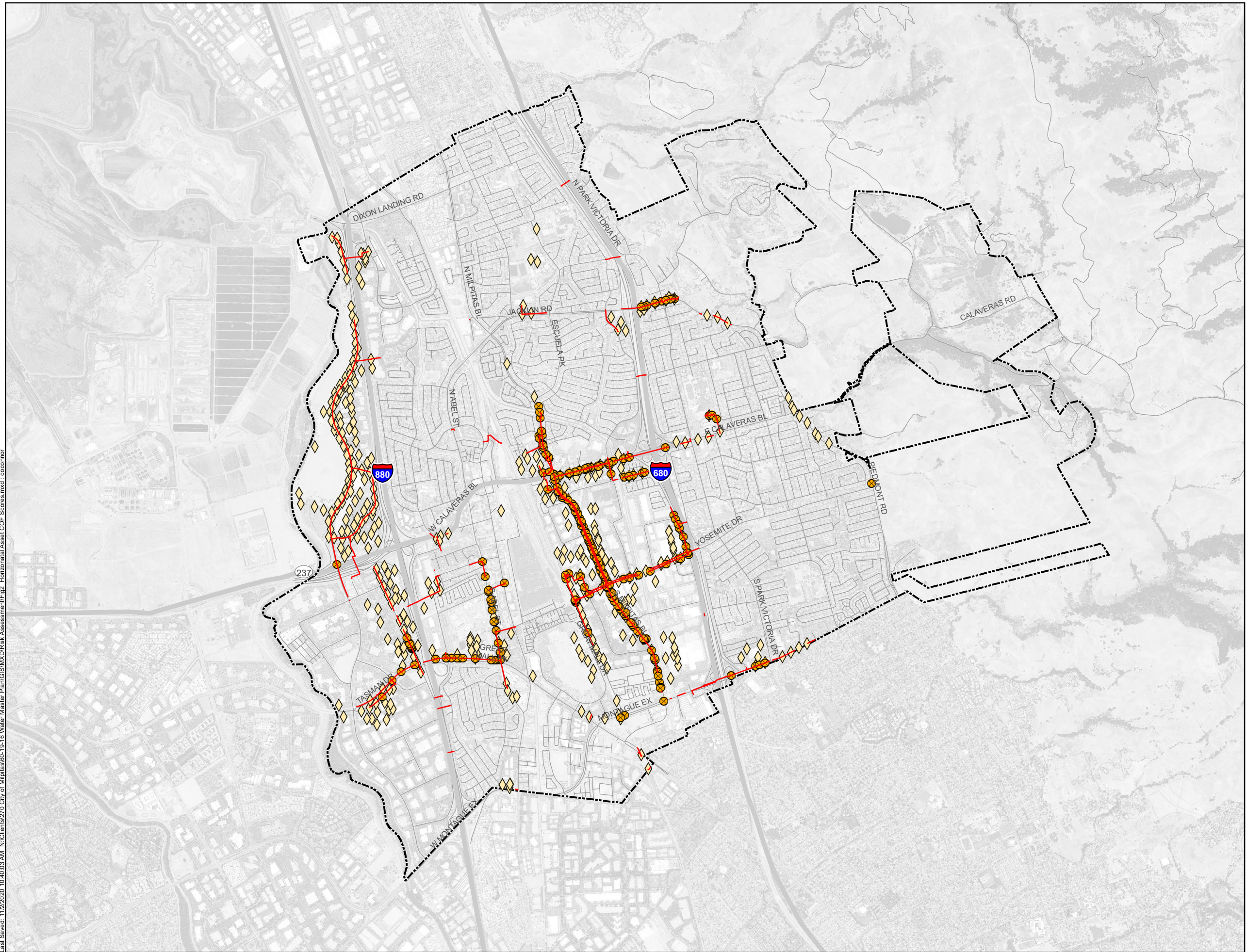


## 6.3 Horizontal Asset COF Results

The eight asset COF ratings were averaged to obtain an overall COF rating on the 1 to 4 scale. Table 14 presents the COF rating results for horizontal assets, summarized by percent of total asset type (i.e. for hydrants, 32 percent of all hydrants were evaluated to have a COF rating of 1). Horizontal assets with a moderate (3) COF rating are shown spatially in Figure 2. Individual asset COF results are provided in the *Asset Registry and Risk Results* Excel workbook.

| <b>Table 14. Horizontal Asset COF Results, Percent of Total Asset by Type</b> |                     |    |    |   |
|-------------------------------------------------------------------------------|---------------------|----|----|---|
| Horizontal Assets                                                             | COF Rating, percent |    |    |   |
|                                                                               | 1                   | 2  | 3  | 4 |
| Pipelines <sup>(a)</sup>                                                      | 45                  | 46 | 9  | 0 |
| Hydrants                                                                      | 32                  | 53 | 15 | 0 |
| Meters                                                                        | 100                 | 0  | 0  | 0 |
| Valves                                                                        | 43                  | 52 | 5  | 0 |
| (a) Pipeline results are shown as percent of total pipeline length.           |                     |    |    |   |





- Valves
- Hydrants
- Pipelines
- City Limits



**Figure 2**  
**Existing Horizontal Assets**  
**with COF Score  $\geq$  3**





## 6.4 Facility COF Results

For vertical assets, COF ratings were assigned at the facility level (i.e. pump station, reservoir, well, etc.), with all facility components inheriting the COF rating of its parent facility. Table 15 presents the overall COF rating results for each facility on the same 1 to 4 scale, rounded to the nearest decimal.

| Table 15. Facility COF Results |            |
|--------------------------------|------------|
| Facility                       | COF Rating |
| Live Oak PRV                   | 2.0        |
| Main PRV                       | 2.0        |
| North Vault PRV                | 2.0        |
| South Vault PRV                | 2.0        |
| Calera Creek Heights PRV       | 2.0        |
| SCVWD Intertie                 | 2.3        |
| SJWC Intertie                  | 2.3        |
| Abel PRV                       | 2.3        |
| Gibraltar PRV                  | 2.4        |
| McCarthy PRV                   | 2.4        |
| Sinclair PRV                   | 2.4        |
| Sunnyhills PRV                 | 2.4        |
| Milpitas PRV                   | 2.5        |
| Main Street Turnout            | 2.5        |
| ACWD Intertie                  | 2.6        |
| Capitol PRV                    | 2.6        |
| Curtis PRV                     | 2.6        |
| Montague PRV                   | 2.6        |
| Calaveras Turnout              | 2.8        |
| Sunnyhills Turnout             | 2.8        |
| Country Club Pump Station      | 2.9        |
| Tularcitos Pump Station        | 2.9        |
| Minnis Reservoir               | 2.9        |
| Tularcitos Reservoir           | 2.9        |
| Gibraltar Turnout              | 2.9        |
| Ayer Reservoir                 | 3.1        |
| Gibraltar Pump Station         | 3.3        |
| Gibraltar Reservoir (SC)       | 3.3        |
| Gibraltar Reservoir (SF)       | 3.3        |
| Curtis Well                    | 3.3        |
| Pinewood Well                  | 3.3        |
| Ayer Pump Station              | 3.4        |



## 7.0 RISK ASSESSMENT

Risk combines both LOF and COF to determine the resulting level of risk exposure that an agency is likely to confront through a potential failure of an asset. Assets with the highest risk have both a high likelihood of failure (i.e., poor condition or increased potential to underperform) and a high consequence of failure (i.e., significant consequences should failure occur).

The conventional risk equation, which was employed in this assessment, is the product of LOF and COF:

$$\text{Risk} = \text{COF} \times \text{LOF}$$

### 7.1 Risk Interpretation

Individual COF and LOF factor definitions were combined to define the overall risk of each asset, interpreted as a Low, Medium, Medium-High, or High risk level. Table 16 presents the risk level matrix and risk definitions.

| Table 16. Risk Level Matrix |                 |                           |               |             |                  |
|-----------------------------|-----------------|---------------------------|---------------|-------------|------------------|
|                             |                 | LOF Rating and Definition |               |             |                  |
|                             |                 | 1<br>Unlikely             | 2<br>Possible | 3<br>Likely | 4<br>Very Likely |
| COF Rating and Definition   | 1<br>Negligible | Low                       | Low           | Low         | Low              |
|                             | 2<br>Minimal    | Low                       | Low           | Medium      | Med-High         |
|                             | 3<br>Moderate   | Medium                    | Medium        | Med-High    | High             |
|                             | 4<br>Severe     | Medium                    | Med-High      | High        | High             |





## 7.2 Risk Results

The risk results are summarized in the tables below, including notation of the median risk rating for each asset type.

### 7.2.1 Pipelines

Table 17 presents the risk results for pipelines by percent of total pipeline length in each risk level. Table 18 presents the detailed LOF and COF ratings by pipeline length. The median risk level for pipelines is Low, with an associated LOF of 3 and COF of 1. Pipeline risk is also presented spatially in Figure 3.

**Table 17. Pipeline Risk, Percent of Total Pipeline Length by Risk Level**

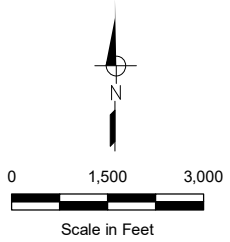
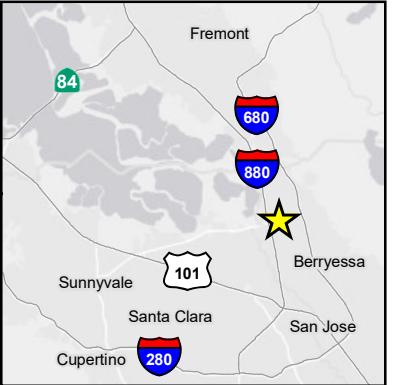
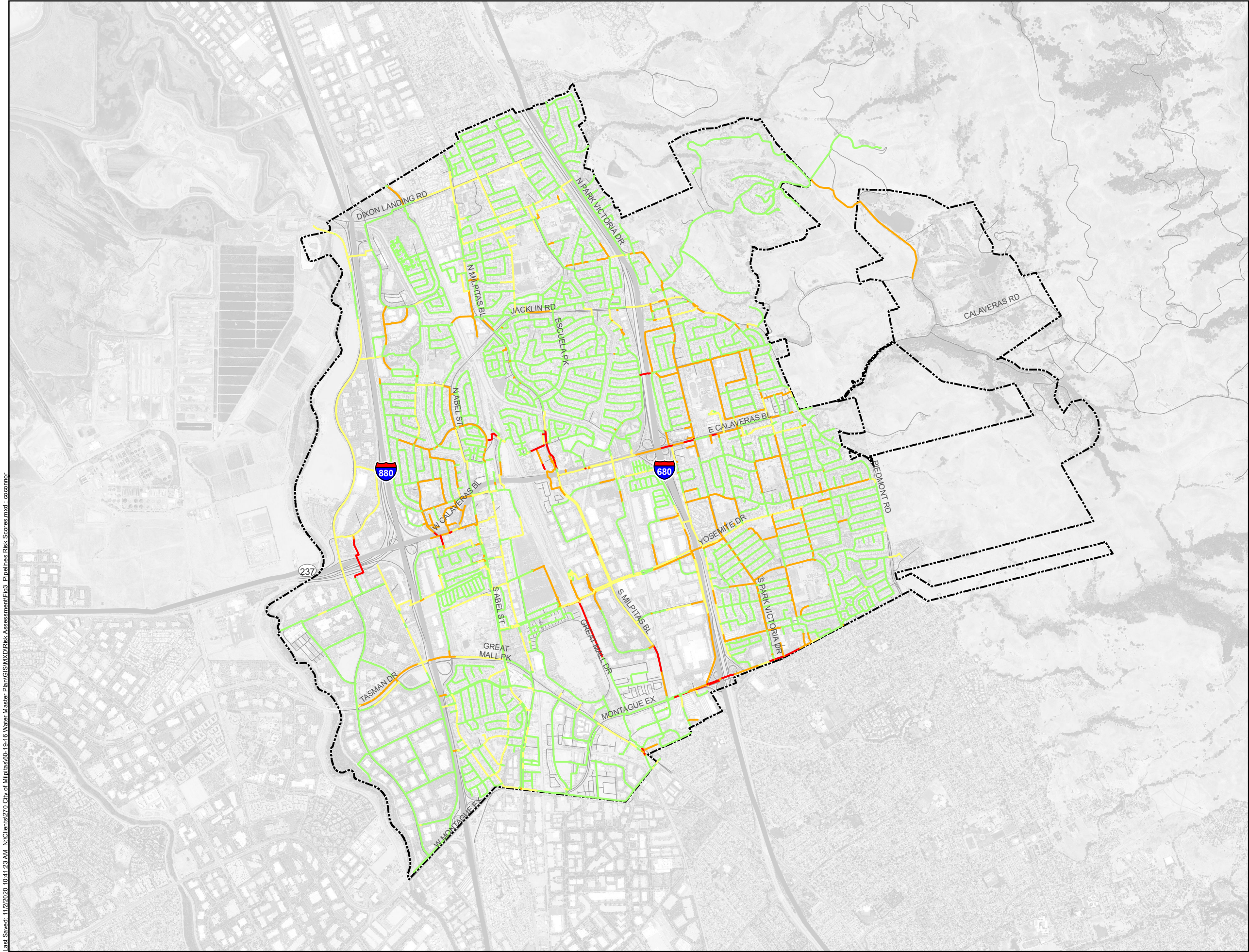
| Risk Level  | Percent |
|-------------|---------|
| Low         | 71      |
| Medium      | 15      |
| Medium-High | 13      |
| High        | 1       |

**Table 18. Pipeline Risk by LOF and COF, Miles of Pipeline**

|       |   | LOF  |      |                     |      | Total Length |
|-------|---|------|------|---------------------|------|--------------|
|       |   | 1    | 2    | 3                   | 4    |              |
| COF   | 1 | 15.1 | 3.0  | 17.2 <sup>(a)</sup> | 46.4 | 81.8         |
|       | 2 | 23.6 | 24.7 | 15.7                | 19.8 | 83.8         |
|       | 3 | 5.7  | 5.6  | 2.9                 | 1.9  | 16.2         |
|       | 4 | 0.3  | 0.2  | 0.4                 | 0.1  | 0.9          |
| Total |   | 44.7 | 33.5 | 36.2                | 68.2 | 183          |

(a) Denotes the median risk score for all pipelines





- City Limits
- Low
- Medium
- Med-High
- High



**Figure 3**  
**Existing Pipelines**  
**Risk Classifications**



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#### 7.2.2 Hydrants

Table 19 presents the risk results for hydrants by percent of total hydrants in each risk level. Table 20 presents the detailed LOF and COF ratings for all hydrants. The median risk level for hydrants is Low, with an associated LOF of 2 and COF of 2.

| Table 19. Hydrant Risk, Percent of Total Hydrants by Risk Level |         |
|-----------------------------------------------------------------|---------|
| Risk Level                                                      | Percent |
| Low                                                             | 78      |
| Medium                                                          | 22      |
| Medium-High                                                     | <0.5    |
| High                                                            | 0       |

| Table 20. Hydrant Risk by LOF and COF, Count of Hydrants |   |     |                      |     |   |                |
|----------------------------------------------------------|---|-----|----------------------|-----|---|----------------|
|                                                          |   | LOF |                      |     |   | Total Hydrants |
|                                                          |   | 1   | 2                    | 3   | 4 |                |
| COF                                                      | 1 | 71  | 523                  | 329 | 0 | 923            |
|                                                          | 2 | 114 | 1,219 <sup>(a)</sup> | 216 | 0 | 1,549          |
|                                                          | 3 | 54  | 376                  | 4   | 0 | 434            |
|                                                          | 4 | 0   | 0                    | 0   | 0 | 0              |
| Total                                                    |   | 239 | 2,118                | 549 | 0 | 2,906          |

(a) Denotes the median risk score for all pipelines

#### 7.2.3 Valves

Table 21 presents the risk results for valves by percent of total valves in each risk level. Table 22 presents the detailed LOF and COF ratings for all valves. The median risk level for valves is Low, with an associated LOF of 2 and COF of 2.

| Table 21. Valve Risk, Percent of Total Valves by Risk Level |         |
|-------------------------------------------------------------|---------|
| Risk Level                                                  | Percent |
| Low                                                         | 87      |
| Medium                                                      | 13      |
| Medium-High                                                 | <0.5    |
| High                                                        | 0       |

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**Table 22. Valve Risk by LOF and COF, Count of Valves**

|       |   | LOF   |                      |       |   | Total Valves |
|-------|---|-------|----------------------|-------|---|--------------|
|       |   | 1     | 2                    | 3     | 4 |              |
| COF   | 1 | 412   | 1,370                | 967   | 0 | 2,749        |
|       | 2 | 509   | 2,248 <sup>(a)</sup> | 549   | 0 | 3,296        |
|       | 3 | 83    | 187                  | 26    | 0 | 296          |
|       | 4 | 0     | 0                    | 0     | 0 | 0            |
| Total |   | 1,004 | 3,794                | 1,542 | 0 | 6,341        |

(a) Denotes the median risk score for all pipelines

#### 7.2.4 Meters

Table 23 presents the risk results for meters by percent of total meters in each risk level. Table 24 presents the detailed LOF and COF ratings for all meters. The median risk level for meters is Low, with an associated LOF of 4 and COF of 1.

**Table 23. Meter Risk, Percent of Total Meters by Risk Level**

| Risk Level  | Percent |
|-------------|---------|
| Low         | >99.9   |
| Medium      | <0.1    |
| Medium-High | <0.1    |
| High        | 0       |

**Table 24. Meter Risk by LOF and COF, Count of Meters**

|       |   | LOF |     |       |                       | Total Meters |
|-------|---|-----|-----|-------|-----------------------|--------------|
|       |   | 1   | 2   | 3     | 4                     |              |
| COF   | 1 | 0   | 476 | 3,555 | 12,312 <sup>(a)</sup> | 16,343       |
|       | 2 | 0   | 2   | 4     | 2                     | 8            |
|       | 3 | 0   | 0   | 0     | 0                     | 0            |
|       | 4 | 0   | 0   | 0     | 0                     | 0            |
| Total |   | 0   | 478 | 3,559 | 12,314                | 16,351       |

(a) Denotes the median risk score for all pipelines



## 2020 Water Master Plan

### Water Utility Condition Assessment



#### 7.2.5 Vertical Assets

Table 25 presents the risk results for all vertical assets by percent of total assets in each risk level. Table 26 presents the detailed LOF and COF ratings for all vertical assets. The median risk level for all vertical assets is Medium-High, with an associated LOF of 3 and COF of 3.

| Table 25. Vertical Asset Risk, Percent of Vertical Assets by Risk Level |         |
|-------------------------------------------------------------------------|---------|
| Risk Level                                                              | Percent |
| Low                                                                     | 1       |
| Medium                                                                  | 25      |
| Medium-High                                                             | 25      |
| High                                                                    | 48      |

| Table 26. Vertical Asset Risk by LOF and COF, Count of Vertical Assets |   |     |   |                   |    |                       |
|------------------------------------------------------------------------|---|-----|---|-------------------|----|-----------------------|
|                                                                        |   | LOF |   |                   |    | Total Vertical Assets |
|                                                                        |   | 1   | 2 | 3                 | 4  |                       |
| COF                                                                    | 1 | 0   | 0 | 0                 | 0  | 0                     |
|                                                                        | 2 | 0   | 0 | 13                | 0  | 13                    |
|                                                                        | 3 | 1   | 4 | 29 <sup>(a)</sup> | 40 | 74                    |
|                                                                        | 4 | 0   | 0 | 0                 | 0  | 0                     |
| Total                                                                  |   | 1   | 4 | 38                | 40 | 87                    |

(a) Denotes the median risk score for all pipelines

#### 7.2.6 Facility Risk Results

The risk for each facility was evaluated based on the resulting facility LOF and COF ratings discussed previously and the risk equation. Table 27 presents the detailed LOF and COF ratings for each facility. Note the four-by-four risk matrix has been expanded to one decimal to provide greater granularity. The overall facility risk scores (LOF x COF) and risk levels are shown in Table 28 from lowest to highest risk.

| Table 27. Risk of Facilities by LOF and COF |     |     |     |     |                                                       |                                                                                              |                                                                                                                                                                       |                                                                |     |
|---------------------------------------------|-----|-----|-----|-----|-------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----|
|                                             |     | LOF |     |     |                                                       |                                                                                              |                                                                                                                                                                       |                                                                |     |
|                                             |     | 0.5 | 1.0 | 1.5 | 2.0                                                   | 2.5                                                                                          | 3.0                                                                                                                                                                   | 3.5                                                            | 4.0 |
| COF                                         | 0.5 | --  | --  | --  | --                                                    | --                                                                                           | --                                                                                                                                                                    | --                                                             | --  |
|                                             | 1.0 | --  | --  | --  | --                                                    | --                                                                                           | --                                                                                                                                                                    | --                                                             | --  |
|                                             | 1.5 | --  | --  | --  | --                                                    | --                                                                                           | --                                                                                                                                                                    | --                                                             | --  |
|                                             | 2.0 | --  | --  | --  | --                                                    | Calera Creek Heights PRV,<br>Main PRV                                                        | Curtis Well, Live Oak PRV,<br>North Vault PRV, South<br>Vault PRV                                                                                                     | --                                                             | --  |
|                                             | 2.5 | --  | --  | --  | --                                                    | SJWC Intertie, Sunnyhills<br>PRV, Milpitas PRV, ACWD<br>Intertie, Capitol PRV,<br>Curtis PRV | Abel PRV,<br>SCVWD Intertie, Gibraltar<br>PRV, McCarthy PRV,<br>Sinclair PRV, Main Street<br>Turnout, Montague PRV                                                    | --                                                             | --  |
|                                             | 3.0 | --  | --  | --  | Minnis Reservoir                                      | --                                                                                           | Calaveras Turnout,<br>Sunnyhills Turnout,<br>Tularcitos Reservoir,<br>Gibraltar Turnout, Country<br>Club Pump Station,<br>Tularcitos Pump Station,<br>Ayer Reservoirs | --                                                             | --  |
|                                             | 3.5 | --  | --  | --  | Gibraltar Reservoir (SC),<br>Gibraltar Reservoir (SF) | --                                                                                           | --                                                                                                                                                                    | Pinewood Well,<br>Gibraltar Pump Station,<br>Ayer Pump Station | --  |
|                                             | 4.0 | --  | --  | --  | --                                                    | --                                                                                           | --                                                                                                                                                                    | --                                                             | --  |

## 2020 Water Master Plan

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**Table 28. Facilities by Risk Score and Risk Level**

| Facility                                           | Risk Score<br>(LOF x COF) | Risk Level  |
|----------------------------------------------------|---------------------------|-------------|
| Calera Heights PRV, Main PRV                       | 4.8                       | Medium      |
| SJWC Intertie                                      | 5.4                       | Medium      |
| Curtis Well                                        | 5.5                       | Medium      |
| Minnis Reservoir                                   | 5.8                       | Medium      |
| Live Oak PRV, North Vault PRV, South Vault PRV,    | 6.0                       | Medium      |
| ACWD Intertie, Capitol PRV                         | 6.3                       | Medium-High |
| Gibraltar Reservoir (SC), Gibraltar Reservoir (SF) | 6.5                       | Medium-High |
| Curtis PRV                                         | 6.6                       | Medium-High |
| Abel PRV, SCVWD Intertie                           | 6.8                       | Medium-High |
| Gibraltar PRV, McCarthy PRV, Sinclair PRV          | 7.1                       | Medium-High |
| Sunnyhills PRV                                     | 5.7                       | Medium-High |
| Milpitas PRV                                       | 6.0                       | Medium-High |
| Main Street Turnout                                | 7.5                       | Medium-High |
| Montague PRV                                       | 7.9                       | Medium-High |
| Calaveras Turnout, Sunnyhills Turnout              | 8.3                       | Medium-High |
| Tularcitos Reservoir, Gibraltar Turnout            | 8.6                       | Medium-High |
| Country Club Pump Station, Tularcitos Pump Station | 9.2                       | Medium-High |
| Ayer Reservoir                                     | 9.4                       | Medium-High |
| Pinewood Well                                      | 11.1                      | High        |
| Gibraltar Pump Station                             | 12.0                      | High        |
| Ayer Pump Station                                  | 12.2                      | High        |



## 8.0 CONCLUSIONS

### 8.1 Horizontal Assets

The desktop analysis indicates the horizontal infrastructure of the water system is well into its useful life curve with most assets rated 3 (“likely” asset failure) or higher for LOF.

The consequence of failure analysis indicates that horizontal assets expose mostly a negligible to minimal impact should they fail, with a small percentage of assets potentially yielding a moderate impact.

Overall, the majority (71%) of pipeline assets have a risk rating of Low, with a high LOF and low COF. There is a significant risk exposure to pipeline failure due to this high LOF, which is primarily due to asset age. Hydrants, valves, and meters are also at a Low risk level with generally advanced age contributing to a higher LOF but a relatively low COF.

### 8.2 Vertical Assets – Facilities

Facilities were generally rated 2 or higher for LOF. The City has developed most of its newer infrastructure in well and reservoir facilities (Curtis Well, Gibraltar Reservoirs, Minnis Reservoir), which are rated with an LOF of less than 3. Remaining facility LOF was consistently rated between 2.4 and 3, except for the Country Club Pump Station, Tularcitos Pump Station, Pinewood Well, Ayer Pump Station and Gibraltar Pump Station which were rated from 3.2 to 3.7. These higher LOF values are indicative of higher asset values with advanced age, suggesting a greater and more immediate investment need in asset renewal.

Facility COF ratings ranged from 2 to 3.4, with the highest ratings assigned to pump stations, reservoirs, and wells. PRVs, interties, and turnouts were all rated below 2.9.

### 8.3 System Level Risk Summary

The overall risk of the water system is low for horizontal infrastructure and medium-high for facilities. Table 29 illustrates the risk at the distribution system level, allocated by each asset type. Note that some facility types are noted in multiple risk levels.

| Table 29. Risk at Water System Level |   |     |                    |                                                 |                       |
|--------------------------------------|---|-----|--------------------|-------------------------------------------------|-----------------------|
|                                      |   | LOF |                    |                                                 |                       |
|                                      |   | 1   | 2                  | 3                                               | 4                     |
| COF                                  | 1 | --  | --                 | Pipelines                                       | Meters                |
|                                      | 2 | --  | Hydrants<br>Valves | Well<br>PRVs                                    | --                    |
|                                      | 3 | --  | Reservoir          | PRVs<br>Turnouts<br>Reservoirs<br>Pump Stations | Well<br>Pump Stations |
|                                      | 4 | --  | Reservoirs         | --                                              | --                    |



## Appendix E

### Seismic Risk Assessment

## TECHNICAL MEMORANDUM

DATE: October 28, 2020 Project No.: 270-60-19-16  
SENT VIA: EMAIL

TO: Harris Siddiqui

FROM: Whitney Sandelin, PE, RCE #86703  
Amara Cairns

REVIEWED BY: Mel Damewood III, PE

SUBJECT: City of Milpitas - Summary of Methodologies and Results from Hazus® Earthquake Model and American Lifelines Alliance® Analysis

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### PURPOSE AND INTRODUCTION

The purpose of this technical memorandum (TM) is to document the methodologies used to estimate consequences and risks associated with an earthquake event affecting the City of Milpitas (City) water system. The results of this analysis conclude in the estimation of the direct consequence of a representative earthquake scenario for the City. The consequence estimates presented herein do not include consideration of community economic losses (e.g. indirect or induced) that may occur due to extended periods without water service.

This TM is organized as follows:

- Introduction to Hazus and American Lifelines Alliance (ALA) Methodologies
- Earthquake Scenario Selection
- Estimated Damage States and Restoration Times
- Estimated Service Denial
- Conclusion and Disclaimer
- References

### INTRODUCTION TO HAZUS AND ALA METHODOLOGIES

The Federal Emergency Management Agency (FEMA) has developed a standardized methodology for estimating losses from certain natural hazards, including earthquakes. The methodology, known as Hazus, addresses flooding, hurricanes, coast surge, tsunamis and earthquakes. Specifically, the Hazus Earthquake Model is designed to “produce loss estimates for use by federal, state, regional and local governments in planning for earthquake risk mitigation, emergency preparedness, response and recovery”.

The American Water Works Association (AWWA) J100 Standard, *Risk and Resilience Management of Water and Wastewater System* (J100 Standard), recommends the Hazus methodology to estimate the damage states and restoration times for individual facilities, such as pump stations and storage tanks. However, West Yost understands that the draft version of the forthcoming update to the J100 Standard recommends the use of the ALA methodology for estimating damages to pipelines and distribution systems under a selected earthquake event. The authors of Hazus acknowledge its limitation for pipelines. As described in the “Message to Users” section of the Hazus Manual, while the Hazus methodology has been tested against the judgment of experts and, to the extent possible, against records from several past earthquakes, limited and incomplete data about actual earthquake damage precludes complete calibration of the methodology.

Although the revised J100 Standard has not yet been released by AWWA, West Yost considers it to reflect best management practices for conducting earthquake consequence analyses for public water systems. Therefore, West Yost is using two methods in this analysis:

- Hazus for non-linear assets (i.e., storage tanks, pump stations, and treatment facilities). The methodologies presented herein are based on the *Hazus Multi-Hazard Technical Manual, Version 2.1* (Hazus Manual).
- *ALA Seismic Fragility Formulations for Water Systems, Part 1, April 2001* (ALA Manual) for linear assets.

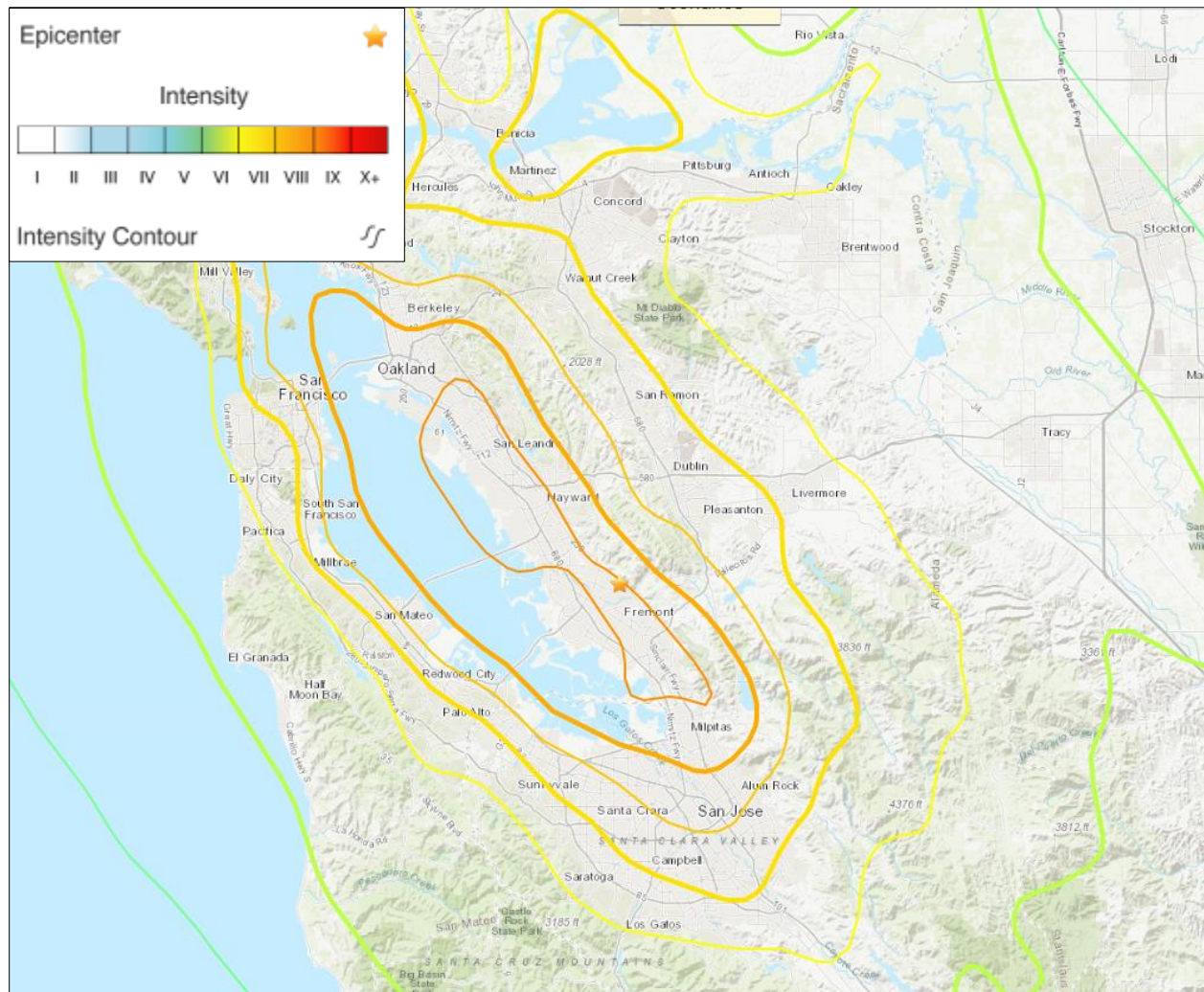
Hazus deals with all aspects of the built environment, including water system infrastructure. Chapter 8 focuses on direct damage to Utility Systems, including a loss estimation methodology for water system supply, storage, transmission, and distribution components. The ALA Manual provides recommended pipe vulnerability functions and fragility curves in Chapter 4.

The following sections document the specific steps taken to estimate consequences associated with an earthquake event, using the Hazus and ALA methodologies to assess select assets within the City’s water system.

## EARTHQUAKE SCENARIO SELECTION

In order to apply the Hazus and ALA methodologies, a user must first identify specific parameters associated with a potential ground shaking event, including peak ground acceleration (PGA), peak ground velocity (PGV), and peak ground deformation (PGD). The United States Geological Survey (USGS) Earthquake Scenario Catalogs (also referred to as ShakeMaps) were examined to identify a relevant earthquake scenario for the utility’s service area.

The earthquake scenario selected for the City of Milpitas is the Hayward-Rodgers Creek event described in the USGS Northern California Legacy Catalog. At magnitude 6.8, this event represents the largest magnitude event described by ShakeMap in relatively close proximity to key City utilities. The scenario map from the USGS site is shown on Figure 1; the scenario selected for the utility is highlighted in blue. According to USGS, this event has an estimated annual probability of approximately 0.74 percent (i.e., a 0.74 percent chance of occurring in any given year), and an approximately 31.02 percent chance of occurrence within the next 50 years. This event is a scenario (i.e., it is not a historical event) and is intended for planning purposes only.



**Figure 1. USGS ShakeMap—6.8 Magnitude Earthquake Event for the City of Milpitas**

Utilizing the interactive geospatial data interface provided by USGS, ground motion contours were examined based on the scenario epicenter and fault location(s). Values for PGA and PGV were visually interpolated for the location of each asset. For the selected scenario, PGD values were not specified on the USGS ShakeMaps. Table A-1 of Attachment A shows the PGA values assigned to each of the City's selected non-linear assets.



## ESTIMATED DAMAGE STATES AND RESTORATION TIMES

The Hazus and ALA methodologies are intended to provide a high-level estimate of damage states for select assets. The purpose of this evaluation is to identify and prioritize more detailed evaluation and mitigation measures in the future.

Based on the PGA and asset type, the Hazus methodology yields an estimate of the damage state for each non-linear asset, along with an associated restoration time as part of the Hazus program. Damage states estimated in this analysis include moderate and extensive for both pump stations and storage tanks. Descriptions of these damage states are included below.

### Pump Stations

- **Extensive damage** for pump stations is defined as extensive damage to facility buildings or damage to pumps beyond repair.
- **Moderate damage** for pump stations is defined by the loss of electric power for approximately one-week, considerable damage to mechanical and electrical equipment, or moderate damage to buildings.

### Storage Tanks

- **Extensive damage** for storage tanks is defined as damage to the tank extensive enough to require removal of the tank from service, including, for example, elephant foot buckling for steel tanks with loss of content or shearing of concrete tank walls.
- **Moderate damage** for storage tanks is defined by the tank being considerably damaged but with only minor loss of content. Examples of moderate damage include elephant foot buckling for steel tanks without loss of content, or moderate cracking of concrete tanks with minor loss of content.

Similarly, the ALA methodology yields estimated numbers of breaks and leaks among linear assets, based on PGV, PGD, and specific asset attributes (e.g., pipeline material, joint type, etc.). The following sections describe these methodologies and the results of their application to the City's assets in greater detail.

## Restoration Times

Restoration time is defined as the time to restore the facility to a functioning level. This analysis considered the time to restore select assets owned and operated by the City. Assets which are required for the delivery of both San Francisco Public Utilities Commission (SFPUC) and Valley Water (VW) source water from the wholesaler to the City were not included in this analysis; it should be noted that, on a regional level, an earthquake event could disrupt supply infrastructure from SFPUC and VW to the City's distribution system, limiting the City's capacity to any wells that are repaired or remain functional.

In this analysis, total restoration time consists of the time to repair the damage (construction and repair activities) plus the preconstruction activities, such as the time involved with the immediate post event, pre-restoration assessment, planning, and mobilization activities. The total restoration time is estimated by using construction/repair duration provided in the Hazus method and adding to this an estimate of the time required for preconstruction activities. Engineering judgement and input from the City were utilized

to fine tune the total restoration times. For linear assets (Pipelines) engineering judgement and input from the City were utilized to estimate restoration times.

Hazus conducted statistical analyses method to provide estimate of the amount of time needed to conduct construction and repair activities for a variety of non-linear assets and a range of damage states. They provide the “mean restoration time” and the standard deviation. This analysis is using the “mean restoration time” provided by Hazus.

## Methodology Summary

The overall methodology to this analysis is to estimate the damage to non-linear and linear utility assets from an earthquake, estimate the restoration time for each damaged asset, and then calculate cost to restore the system based on the restoration time needed for each asset. Repair and replacement costs are calculated using the crew size available to the City, the labor rate, the shift duration and order of magnitude material costs for the City. The next section describes how damage is estimated for non-linear and linear assets.

## Non-Linear Assets: Reservoirs, Pump Stations, and Key City Properties

Non-linear assets include reservoirs, pump stations, and key city properties. Each facility was assigned a Hazus “facility classification.” Classifications are generally based on the type of facility and whether the facility features anchored components/equipment. Hazus defines anchored as “equipment designed with special seismic tiedowns or tiebacks,” while unanchored equipment refers to equipment designed with no special considerations other than the manufacturer’s normal requirements. Based on review of previously prepared seismic facility assessments and observations made during site visits, all of the utility’s assets were assigned to the anchored component facility classification.

The resulting Hazus facility classifications for the City’s assets are presented in Table A-1. Hazus Tables 8.3, 8.6, 8.7 and 8.9 (reproduced in Figures A-1 through A-4 in Attachment A) were used to assign damage states based on PGA or PGV values obtained for the selected earthquake event. In the utility’s case, there are several non-linear facility classifications deemed susceptible to PGD, including reservoirs and pump stations.

Hazus Table 8.1.a (reproduced as Figure A-5 of Attachment A) was used to estimate the damage state and associated mean restoration time for each facility. Hazus-recommended restoration time estimates are based on Hazus restoration function curves and represent an average time for the facility classification. In addition to the restoration time suggested by Hazus, three days were added to account for the immediate post-event, pre-restoration assessment, planning, and mobilization activities. Table A-1 shows the resulting estimated restoration time for each asset.

## Non-Linear Asset Damage State

Using the Hazus Method for non-linear assets, the Hayward-Rogers Creek 6.8 magnitude earthquake scenario is estimated to cause moderate damage to the City’s pump stations, storage tanks, and buildings. This is primarily due to the high Peak Ground Acceleration and Velocity (PGA, PGV) that the earthquake will produce in the City’s service area. Liquefaction susceptibility ranges from very low to moderate for non-linear assets in the City’s service area as well. Probabilities are assigned to each liquefaction susceptibility, as described in Table 3.

The Country Club, Tularcitos, and Ayer pump stations are expected to have extensive damage and require approximately seventeen days for restoration. Extensive damage for pump stations is defined as extensive damage to facility buildings or damage to pumps beyond repair. The Gibraltar pump station (SFPUC and VW) is expected to have moderate damage and take approximately six days for restoration. Moderate damage for pump stations is defined by the loss of electric power for approximately one-week, considerable damage to mechanical and electrical equipment, or moderate damage to buildings. By deploying portable generators in the event of an outage, the City can reduce service losses and associated costs lower than estimated using the Hazus Method.

The Tularcitos, Minnis, and Ayer reservoirs are expected to have extensive damage and require approximately 96 days each for restoration. Extensive damage for storage tanks is defined as damage to the tank extensive enough to require removal of the tank from service, including, for example, elephant foot buckling for steel tanks with loss of content or shearing of concrete tank walls.

Moderate damage was estimated for the Gibraltar Reservoirs (SFPUC and VW) and each are estimated to require six days for restoration. Moderate damage for storage tanks is defined by the tank being considerably damaged but with only minor loss of content. Examples of moderate damage include elephant foot buckling for steel tanks without loss of content, or moderate cracking of concrete tanks with minor loss of content.

The City Hall and Corporation Yard buildings are expected to have moderate damage and take approximately six days for restoration. Moderate damage could include rotation of steel members at connections, cracks through welds, or broken bolts for steel frame buildings; hairline cracks on beams and columns; and larger flexural cracks and concrete spalling. Buildings with red or yellow tags cannot be occupied until an onsite assessment is made by an engineer and will require additional time as needed for restoration.

### ***Reservoir Sloshing Wave Assessment***

To supplement the Hazus assessment, a review of the maximum operating levels of each of the City's water storage reservoirs was performed to determine if operating levels are appropriately set to mitigate against the impact of seismically induced sloshing waves. When operating levels within reservoirs are too high, the sloshing wave within the reservoir that is produced by the seismic forces can cause damage to the significant reservoir structure, including potential roof collapse.

The site-specific seismic design parameters for each reservoir site are summarized in Table 1; these parameters were used to calculate the height of the sloshing wave.

**Table 1. Site-Specific Seismic Design Parameters**

| Reservoir                                                                                                                                                                                                                                                                                                                                                                                                                                            | Seismic Risk Category | Site Soil Class <sup>(a)</sup>    | TL <sup>(b)</sup> | SD1 <sup>(c)</sup> | SDs <sup>(d)</sup> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------|-------------------|--------------------|--------------------|
| Ayer                                                                                                                                                                                                                                                                                                                                                                                                                                                 | IV                    | D – Stiff Soil                    | 12                | 0.82               | 1.341              |
| Gibraltar                                                                                                                                                                                                                                                                                                                                                                                                                                            | IV                    | D – Stiff Soil                    | 12                | 0.682              | 1.147              |
| Minnis                                                                                                                                                                                                                                                                                                                                                                                                                                               | IV                    | C – Very Dense Soil and Soft Rock | 8                 | 0.886              | 1.638              |
| Tularcitos                                                                                                                                                                                                                                                                                                                                                                                                                                           | IV                    | C – Very Dense Soil and Soft Rock | 8                 | 0.828              | 1.535              |
| (a) Site soil class from <i>City of Milpitas Seismic Isolation Study</i> , ABR Engineers, January 2002. Additional study of the site-specific soil conditions could change the soil classification, which would in turn impact the seismic design parameters.<br>(b) Long-period transition period<br>(c) Design spectral response acceleration parameter at a period of 1-s<br>(d) Design spectral response acceleration parameter at short periods |                       |                                   |                   |                    |                    |

Typically, a reservoir is constructed so that the distance between the overflow and the reservoir roof is great enough to accommodate the full height of the produced sloshing wave. In concrete reservoirs, the concrete roof may be designed to withstand some of the force of the sloshing wave, allowing for less distance to be provided between the overflow and reservoir roof (potentially up to half of the sloshing wave height). West Yost reviewed the maximum operating water levels and reservoir roof heights for each of the reservoirs and compared this distance to the sloshing wave height. A sloshing wave height that is greater than the distance between the maximum water level and the roof indicates that the standard is not met, and the sloshing wave could collide with the roof structure, potentially causing structural damage. The results of the sloshing wave analysis are presented in Table 2. The analysis shows that none of the City’s reservoirs currently meet the standard for sloshing waves.

**Table 2. Sloshing Wave Analysis**

| Reservoir                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Inside Diameter, ft | Normal Operating Range (el.) | Overflow Height (el.) | Roof Height (el.) | Sloshing Wave Height, ft | Sloshing Wave Assessment              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------|-----------------------|-------------------|--------------------------|---------------------------------------|
| Ayer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 181                 | 78.2 – 83                    | 85.0                  | 89.96             | 14.2                     | Does not meet standard <sup>(a)</sup> |
| Gibraltar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 158                 | 37 – 46.5                    | 48.0                  | 49.7              | 10.4                     | Does not meet standard <sup>(b)</sup> |
| Minnis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 51                  | 900.5 – 907                  | 908.5                 | 909.5             | 10.0                     | Does not meet standard <sup>(c)</sup> |
| Tularcitos                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 48                  | 559.2 – 565.7                | 567.2                 | 568.2             | 9.2                      | Does not meet standard <sup>(d)</sup> |
| (a) A distance of 4.96 ft is provided between the reservoir roof and the overflow, and a distance of 6.96 ft is provided between the reservoir roof and the high operational level; the calculated sloshing wave height of 14.2 ft exceeds both distances. The concrete tank roof may be capable of withstanding the force of the sloshing wave, but additional structural analysis is needed to confirm this.<br>(b) A distance of 1.7 ft is provided between the reservoir roof and the overflow, and a distance of 3.2 ft is provided between the reservoir roof and the high operational level; the calculated sloshing wave height of 10.4 ft exceeds both distances. The concrete tank roof may be capable of withstanding the force of the sloshing wave, however, as a rule of thumb, the roof is typically assumed to be capable of withstanding a maximum of only half of the sloshing wave height.<br>(c) A distance of 1.5 ft is provided between the reservoir roof and the overflow, and a distance of 2.5 ft is provided between the reservoir roof and the high operational level; the calculated sloshing wave height of 10.0 ft exceeds both distances.<br>(d) A distance of 1.0 ft is provided between the reservoir roof and the overflow, and a distance of 2.5 ft is provided between the reservoir roof and the high operational level; the calculated sloshing wave height of 9.2 ft exceeds both distances. |                     |                              |                       |                   |                          |                                       |



For steel tanks (e.g., the Minnis and Tularcitos Reservoirs), the tank may be retrofitted to meet the sloshing wave standard by adding a steel ring to the top of the tank, thereby increasing the total tank height so that the height of the sloshing wave may be accommodated. Steel tanks typically have a distance between the tank overflow and the tank roof of the sloshing wave height plus one additional foot. When preparing detailed tank retrofit plans, other damage mechanisms should be considered to better reinforce the structure against potential risks, not limited to shearing off inlet/outlet pipes, anchorage system failure causing uplift, and tank shell failure.

## Non-Linear Asset Restoration Time

Hazus Table 8.1.a (reproduced as Figure A-3 of Attachment A) was used to estimate the associated mean restoration time for each facility, using the damage state from Hazus Tables 8.6 and 8.9. Hazus-recommended restoration time estimates are based on Hazus restoration function curves and available crews for restoration and represent an average time for the facility classification. In addition to the restoration time suggested by Hazus, three days were added to account for the immediate post-event, pre-restoration assessment, planning, and mobilization activities. Table A-1 shows the resulting estimated restoration time for each asset.

Two, four- person crews working 12-hour days were assumed to be available to repair and restore facilities following the selected earthquake event. This assumption forms the basis of the overall restoration time for repair and replacement work. This assumption does not include utilizing mutual aid via the Water/Wastewater Agency Response Network (WARN). Utilizing WARN can significantly reduce the time of restoration, which is scalable in the results. The number of days vary based on the size and damage state severity of the facility. Table A-1 shows the resulting estimated restoration time for each asset.

## Non-Linear Consequences Cost Estimates

Utility lost water production and utility economic loss were calculated using the total restoration time and service level for each facility, along with the City of Milpitas' cost of water (\$7,981/million gallons). Replacement costs for reservoirs and pump stations were calculated using the replacement costs documented in the 2020 WY Asset Management TM scaled to reflect the severity of damage (50% for extensive and 25% for moderate damage). This value was selected to represent the repair/replacement cost for all reservoirs and pump stations.

As shown in Table A-1, the analysis found that Ayer Reservoir, Gibraltar Pump Stations (SFPUC and VW) and Gibraltar Reservoirs (SFPUC and VW) had the largest repair and replacement costs and water lost costs of all non-linear assets for the selected earthquake event. Repair and replacement costs are calculated using crew size, labor rate, shift duration and order of magnitude material costs.

The total cost consequence of the non-linear assets is \$5,967,160. This cost includes the total cost of repair and the total cost of water loss.

## Linear Assets: Pipelines

The City owns and maintains 183 miles of pipelines, with pipe sizes ranging in diameter from 6 inches to 24 inches. Based on available pipeline material information contained in the utility's pipeline geographic information system (GIS), the majority of the system is made up of asbestos cement (approximately 133.5 miles by length) and polyvinyl chloride (PVC) (approximately 27.4 miles by length) pipe. The system also contains concrete cylinder, cast iron, ductile iron, and steel pipelines. Using the ALA methodology,

West Yost assessed the distribution system as a whole to estimate the number of anticipated leaks and breaks. The results of this assessment are presented in Table B-2.

The City had previously identified a select subset of pipelines within the City’s service area and designated it as the “backbone”. The “backbone” pipelines are pipelines which transmit water from the sources to all parts of the service area. West Yost broke the “backbone” pipeline network into 28 individual pipeline reaches and assessed the individual reach to estimate the number of anticipate leaks and breaks that would occur on the individual pipeline reaches as a result of a seismic event. Pipeline reaches are identified in Figure B-1. The results of this assessment are presented in Table B-1.

### Linear Asset Damage State

The ALA methodology considers two damage states for buried pipelines: leaks and breaks. The methodology assumes that damage due to seismic waves (represented by PGV) will consist of 80 percent leaks and 20 percent breaks, while damage due to ground failure (represented by PGD) will consist of 20 percent leaks and 80 percent breaks. Two damage algorithms are used to estimate the number of leaks and breaks:

1. **For Ground Shaking:**  $\text{Repair Rate} / 1000 \text{ ft} = K_1 \times 0.00187 \times \text{PGV}$

Where  $K_1$  is a fragility constant related to the expected performance of a given pipe material<sup>1</sup>. Units for PGV are inches per second. Assigned  $K_1$  values can be found on table B-1 and B-2 in Attachment B.

2. **For Peak Ground Deformation:**  $\text{Repair Rate} / 1000 \text{ ft} = K_2 \times 1.06 \times \text{PGD}^{0.319} \times L_s$

Where  $K_2$  is a fragility constant related to the expected performance of a given pipe material<sup>2</sup>, and  $L_s$  is the estimated probability that PGD will occur during ground shaking. Units for PGD are inches. Assigned  $K_2$  values can be found on table B-1 and B-2 in Attachment B.

ShakeMap information was used to obtain an average PGV value for all pipelines. Spatial liquefaction susceptibility data published by USGS were used to identify areas within the distribution system with “very low”, “low”, “moderate”, “high” and “very high” susceptibility to liquefaction (and therefore, PGD). The estimated probabilities of liquefaction occurring in each liquefaction susceptibility category are listed in Table 3 below. For very low, low, moderate, and high liquefaction susceptibility areas, a PGD of six inches was assumed in accordance with J100 Standard recommendations; for very high liquefaction susceptibility areas, a PGD of 12 inches was assumed. The PGV and PGD calculations were considered additive, and resulted in conservative estimates for breaks and leaks, as summarized on Tables B-1 and B-2 in Attachment B.

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<sup>1</sup> See Figure B-1 in Attachment B for a reproduction of  $K_1$  values recommended by the ALA methodology.

<sup>2</sup> See Figure B-2 in Attachment B for a reproduction of  $K_2$  values recommended by the ALA methodology.

| <b>Table 3. Liquefaction Susceptibility and Probability</b>                                |                                    |
|--------------------------------------------------------------------------------------------|------------------------------------|
| <b>Liquefaction Susceptibility</b>                                                         | <b>Probability of Liquefaction</b> |
| Very High                                                                                  | 0.50                               |
| High                                                                                       | 0.25                               |
| Moderate                                                                                   | 0.10                               |
| Low                                                                                        | 0.05 <sup>(a)</sup>                |
| Very Low                                                                                   | 0.02 <sup>(a)</sup>                |
| (a) Hazus recommends using 0.05 for low and 0.02 for very low liquefaction susceptibility. |                                    |

Two, four-person crews working 12-hour days were assumed to be available to repair breaks and leaks following the selected earthquake event. This assumption forms the basis of the overall restoration time for leaks and breaks. An additional 3 days were added to the resulting total to account for the immediate post-disaster assessment, planning, and mobilization time. Total restoration time and total pipeline repair labor and material cost is summarized on Table B-3 in Attachment B.

Using the ALA methodology for linear assets, the Hayward-Rodgers Creek - 6.8 magnitude earthquake scenario is estimated to cause 192 breaks and 58 leaks to the collective transmission pipeline and distribution pipeline. Break and leak estimates and total restoration time for transmission pipelines and distribution pipelines is summarized on Table B-2 in Attachment B. It is estimated to take approximately 113 days to reach total restoration. This includes 3 days for the immediate post-disaster assessment but does not assume the utilization of mutual aid for pipeline restoration, which would shorten the time of restoration significantly if pipe repair crews were to be brought in from other entities in an isolated event. However, the regional impacts of the anticipated earthquake scenario pose a threat to the availability of mutual aid resources, which consequently may need to be sourced from a significant distance away. The City's emergency response preparation should consider the regional impacts of this earthquake scenario.

### Estimated Service Denial

Using the Hazus Method for non-linear assets, the Hayward-Rodgers Creek 6.8 magnitude earthquake scenario is estimated to cause extensive damage to the City's facilities due to an estimated maximum peak ground acceleration of 0.65 g, with g being earth's gravitational acceleration. Hazus predicts significant damage to City facilities would equate to loss of electrical power and backup power and extensive damage to pumping stations and storage tanks. It is also assumed that a loss of water quality would be imminent. Due to the damage anticipated it is expected that there would be a loss of service equivalent to approximately 165 million gallons.

### Linear Consequences Cost Estimates

The analysis found the City's trunk lines could have 8 breaks and 32 leaks, as shown in Table B-1. The overall distribution system was estimated to experience 192 breaks and 58 leaks, as shown in Table B-2. Repair and replacement costs are calculated using crew size, labor rate, shift duration and order of magnitude material costs.

The direct linear consequence costs by type of pipeline are presented in Table B-3. The total cost consequence of the linear assets is \$334,173 for the trunk lines and \$2,515,349 for the overall distribution system. This total includes the cost of the estimated water loss and the cost of repair labor and material.

## Consequence Costs Summary

The Hayward-Rodgers Creek - 6.8 magnitude earthquake is estimated to cause significant damage to the City's non-linear and linear assets, with a total consequence cost of approximately \$10,322, 527. The consequence cost of all linear assets is approximately \$4,355,366, and the consequence cost of all non-linear assets is approximately \$5,967,160. The Hazus Method estimates moderate damage to the buildings and moderate/severe damage to the pump stations and reservoirs. The ALA Method estimates 8 breaks and 32 leaks from the trunk lines and 192 breaks and 58 leaks from the distribution pipelines. Table 4 below shows the consequence costs of each asset from the Hayward-Rodgers Creek earthquake. For the purposes of this TM, the costs indicated below reflect the repair and replacement costs and loss of service. See Table A-1 for a breakdown of these individual cost components.

| Table 4. Earthquake Threat Asset Pair Consequence Costs |                                                   |                           |
|---------------------------------------------------------|---------------------------------------------------|---------------------------|
| Threat                                                  | Asset                                             | Consequence Cost, dollars |
| Earthquake / Landslide                                  | Tularcitos Reservoir                              | 1,550,471                 |
| Earthquake / Landslide                                  | Minnis Reservoir                                  | 1,690,507                 |
| Earthquake / Landslide                                  | Country Club Pump Station                         | 1,235,196                 |
| Earthquake / Landslide                                  | Tularcitos Pump Station                           | 1,390,946                 |
| Earthquake / Liquefaction                               | City Hall                                         | 50,020                    |
| Earthquake / Liquefaction                               | Corporation Yard                                  | 50,020                    |
| Earthquake / Liquefaction                               | Reach 1 / McCarthy PRV                            | 106,632                   |
| Earthquake / Liquefaction                               | Reach 2 / California Circle PRV                   | 26,291                    |
| Earthquake / Liquefaction                               | Reach 3                                           | 12,984                    |
| Earthquake / Liquefaction                               | Reach 4 / Junipero PRV                            | 34,911                    |
| Earthquake / Liquefaction                               | Reach 5 / Live Oak PRV                            | 4,631                     |
| Earthquake / Liquefaction                               | Reach 6                                           | 11,516                    |
| Earthquake / Liquefaction                               | Reach 7 / Main PRV                                | 14,069                    |
| Earthquake / Liquefaction                               | Reach 8 / Parc Metro PRV                          | 8,335                     |
| Earthquake / Liquefaction                               | Reach 9 / Curtis PRV                              | 13,982                    |
| Earthquake / Liquefaction                               | Reach 10                                          | 17,501                    |
| Earthquake / Liquefaction                               | Reach 11                                          | 31,285                    |
| Earthquake / Liquefaction                               | Reach 12 / Gibraltar PRV / Gibraltar Turnout      | 23,650                    |
| Earthquake / Liquefaction                               | Reach 13 / Capitol PRV                            | 20,874                    |
| Earthquake / Liquefaction                               | Reach 14                                          | 8,672                     |
| Earthquake / Liquefaction                               | Reach 15 / Sunnyhills PRV                         | 17,575                    |
| Earthquake / Liquefaction                               | Reach 16                                          | 2,569                     |
| Earthquake / Liquefaction                               | Reach 17                                          | 6,297                     |
| Earthquake / Liquefaction                               | Reach 18                                          | 4,424                     |
| Earthquake / Landslide                                  | Reach 19 / Calera Creek Heights & Tularcitos PRVs | 9,028                     |
| Earthquake / Liquefaction                               | Reach 20 / North Milpitas PRV                     | 21,612                    |
| Earthquake / Liquefaction                               | Reach 21 / Montague PRV                           | 4,882                     |



| Table 4. Earthquake Threat Asset Pair Consequence Costs |                         |                           |
|---------------------------------------------------------|-------------------------|---------------------------|
| Threat                                                  | Asset                   | Consequence Cost, dollars |
| Earthquake / Liquefaction                               | Reach 22                | 11,495                    |
| Earthquake / Liquefaction                               | Reach 23 / Yosemite PRV | 14,714                    |
| Earthquake / Liquefaction                               | Reach 24                | 3,830                     |
| Earthquake / Liquefaction                               | Reach 25                | 12,547                    |
| Earthquake / Liquefaction                               | Reach 26                | 6,210                     |
| Earthquake / Liquefaction                               | Reach 27                | 2,952                     |
| Earthquake / Liquefaction                               | Reach 28                | 7,433                     |
| Earthquake / Liquefaction                               | Distribution System     | 3,894,466                 |
| <b>Total</b>                                            |                         | <b>10,322,527</b>         |

## CONCLUSION AND DISCLAIMER

The methodology and results presented in this TM were based on the Hazus Earthquake Model Methodology and Manual and the ALA Methodology. The Hazus and ALA methodologies have been utilized as best management practice, as recommended in the J100 Standard. Data and assumptions used in the analysis were based on best available information. The methodologies have been interpreted to best suit specific City assets and site conditions. Also note that the ALA pipeline damage results are subject to a range of minus 50 percent to plus 100 percent in accuracy.

## REFERENCES

- ABR Engineers. City of Milpitas Seismic Isolation Study, January 2002.
- American Lifelines Alliance. Seismic Fragility Formulations for Water Systems Part 1 – Guideline. April 2001.
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[https://earthquake.usgs.gov/scenarios/eventpage/nclegacyhaywardrogerscreekhsm6p8\\_se/executive](https://earthquake.usgs.gov/scenarios/eventpage/nclegacyhaywardrogerscreekhsm6p8_se/executive)

## Hazus Methodology Results for Non-Linear Assets

| Table A-1. HAZUS Methodology Results for Non-Linear Assets                                                                                                |            |                       |                       |                          |                                      |                       |                                   |                                         |                                                                   |                                    |                                 |                                            |                                               |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------|-----------------------|--------------------------|--------------------------------------|-----------------------|-----------------------------------|-----------------------------------------|-------------------------------------------------------------------|------------------------------------|---------------------------------|--------------------------------------------|-----------------------------------------------|----------------------------------------|
| Facility/Asset                                                                                                                                            | Year Built | Service Level,<br>MGD | ShakeMap<br>PGA,<br>g | ShakeMap<br>PGV,<br>cm/s | Liquefaction<br>Susceptibility,<br>% | Assumed<br>PGD,<br>In | HAZUS<br>Damage<br>State,<br>PWT1 | HAZUS Mean<br>Restoration<br>Time,<br>d | Days to<br>assess and<br>plan (pre-<br>restoration<br>time),<br>d | Total Time to<br>Restoration,<br>d | Lost Water<br>Production,<br>MG | Utility<br>Economic Loss<br>– Water,<br>\$ | Repair /<br>Replacement<br>Crew Cost,<br>\$/d | Repair /<br>Replacement<br>Cost,<br>\$ |
| Reservoirs                                                                                                                                                |            |                       |                       |                          |                                      |                       |                                   |                                         |                                                                   |                                    |                                 |                                            |                                               |                                        |
| Tularcitos Reservoir                                                                                                                                      | 1980       | 0.06                  | 0.42                  | 41                       | 2%, Very Low                         | -                     | extensive                         | 93                                      | 3                                                                 | 96                                 | 5.76                            | 45,971                                     | 8,200                                         | 1,504,500 <sup>(a)</sup>               |
| Minnis Reservoir                                                                                                                                          | 1980       | 0.17                  | 0.42                  | 41                       | 5% Low                               | -                     | extensive                         | 93                                      | 3                                                                 | 96                                 | 16.32                           | 130,250                                    | 8,200                                         | 1,560,258 <sup>(a)</sup>               |
| Ayer Reservoir                                                                                                                                            | 1993       | 4.14                  | 0.4                   | 40                       | 10%, Moderate                        | 6                     | extensive                         | 93                                      | 3                                                                 | 96                                 | 397.44                          | 3,171,969                                  | 8,200                                         | 7,145,000 <sup>(a)</sup>               |
| Gibraltar Reservoir (SFPUC)                                                                                                                               | 1991       | 4.03                  | 0.35                  | 37                       | 10%, Moderate                        | 6                     | moderate                          | 3.1                                     | 3                                                                 | 6.1                                | 24.58                           | 196,197                                    | 8,200                                         | 3,272,500 <sup>(a)</sup>               |
| Gibraltar Reservoir (VW)                                                                                                                                  | 1991       | 5.99                  | 0.35                  | 37                       | 10%, Moderate                        | 6                     | moderate                          | 3.1                                     | 3                                                                 | 6.1                                | 36.54                           | 291,618                                    | 8,200                                         | 3,272,500 <sup>(a)</sup>               |
| Pump Stations                                                                                                                                             |            |                       |                       |                          |                                      |                       |                                   |                                         |                                                                   |                                    |                                 |                                            |                                               |                                        |
| Country Club Pump Station                                                                                                                                 | 1981       | 0.06                  | 0.42                  | 49                       | 2%, Very Low                         | -                     | extensive                         | 13.5                                    | 3                                                                 | 16.5                               | 0.99                            | 7,901                                      | 8,200                                         | 1,227,295 <sup>(a)</sup>               |
| Tularcitos Pump Station                                                                                                                                   | 1981       | 0.17                  | 0.42                  | 41                       | 2%, Very Low                         | -                     | extensive                         | 13.5                                    | 3                                                                 | 16.5                               | 2.81                            | 22,387                                     | 8,200                                         | 1,368,560 <sup>(a)</sup>               |
| Ayer Pump Station                                                                                                                                         | 1995       | 4.14                  | 0.4                   | 40                       | 10%, Moderate                        | 6                     | extensive                         | 13.5                                    | 3                                                                 | 16.5                               | 68.31                           | 545,182                                    | 8,200                                         | 2,489,563 <sup>(a)</sup>               |
| Gibraltar Pump Station (SFPUC)                                                                                                                            | 1993       | 4.03                  | 0.35                  | 37                       | 10%, Moderate                        | 6                     | moderate                          | 3.1                                     | 3                                                                 | 6.1                                | 24.58                           | 196,197                                    | 8,200                                         | 4,366,522 <sup>(a)</sup>               |
| Gibraltar Pump Station (VW)                                                                                                                               | 1993       | 5.99                  | 0.35                  | 37                       | 10%, Moderate                        | 6                     | moderate                          | 3.1                                     | 3                                                                 | 6.1                                | 36.54                           | 291,618                                    | 8,200                                         | 4,366,522 <sup>(a)</sup>               |
| Other                                                                                                                                                     |            |                       |                       |                          |                                      |                       |                                   |                                         |                                                                   |                                    |                                 |                                            |                                               |                                        |
| City Hall                                                                                                                                                 | 2000       | -                     | 0.365                 | 39                       | 10%, Moderate                        | 6                     | moderate                          | 3.1                                     | 3                                                                 | 6.1                                | -                               | -                                          | 8,200                                         | 50,020 <sup>(b)</sup>                  |
| Corporation Yard                                                                                                                                          | -          | -                     | 0.38                  | 40                       | 10%, Moderate                        | 6                     | moderate                          | 3.1                                     | 3                                                                 | 6.1                                | -                               | -                                          | 8,200                                         | 50,020 <sup>(b)</sup>                  |
| <b>Total</b>                                                                                                                                              | <b>-</b>   | <b>-</b>              | <b>-</b>              | <b>-</b>                 | <b>-</b>                             | <b>-</b>              | <b>-</b>                          | <b>-</b>                                | <b>-</b>                                                          | <b>-</b>                           | <b>613.87</b>                   | <b>\$4,899,288</b>                         |                                               | <b>30,673,259</b>                      |
| (a) Cost based on percentage of replacement cost as documented in the 2020 WY Asset Management TM (50% for extensive damage and 25% for moderate damage). |            |                       |                       |                          |                                      |                       |                                   |                                         |                                                                   |                                    |                                 |                                            |                                               |                                        |
| (b) Costs based on (Total Time to Restoration) X (Repair/Replacement Crew Cost)                                                                           |            |                       |                       |                          |                                      |                       |                                   |                                         |                                                                   |                                    |                                 |                                            |                                               |                                        |

**Table 8.3: Damage Algorithms for Small Water Treatment Plants**

| Peak Ground Acceleration                    |              |            |         |
|---------------------------------------------|--------------|------------|---------|
| Classification                              | Damage State | Median (g) | $\beta$ |
| Plants with anchored subcomponents (PWT1)   | slight/minor | 0.25       | 0.50    |
|                                             | moderate     | 0.38       | 0.50    |
|                                             | extensive    | 0.53       | 0.60    |
|                                             | complete     | 0.83       | 0.60    |
| Plants with unanchored subcomponents (PWT2) | slight/minor | 0.16       | 0.40    |
|                                             | moderate     | 0.27       | 0.40    |
|                                             | extensive    | 0.53       | 0.60    |
|                                             | complete     | 0.83       | 0.60    |

**Figure A-1. Hazus Table 8.3****Table 8.6: Damage Algorithms for Small Pumping Plants**

| Peak Ground Acceleration                    |              |            |         |
|---------------------------------------------|--------------|------------|---------|
| Classification                              | Damage State | Median (g) | $\beta$ |
| Plants with anchored subcomponents (PPP1)   | slight/minor | 0.15       | 0.70    |
|                                             | moderate     | 0.36       | 0.65    |
|                                             | extensive    | 0.66       | 0.65    |
|                                             | complete     | 1.50       | 0.80    |
| Plants with unanchored subcomponents (PPP2) | slight/minor | 0.13       | 0.60    |
|                                             | moderate     | 0.28       | 0.50    |
|                                             | extensive    | 0.66       | 0.65    |
|                                             | complete     | 1.50       | 0.80    |

**Figure A-2. Hazus Table 8.6****Table 8.7: Damage Algorithms for Medium/Large Pumping Plants**

| Peak Ground Acceleration                    |              |            |         |
|---------------------------------------------|--------------|------------|---------|
| Classification                              | Damage State | Median (g) | $\beta$ |
| Plants with anchored subcomponents (PPP3)   | slight/minor | 0.15       | 0.75    |
|                                             | moderate     | 0.36       | 0.65    |
|                                             | extensive    | 0.77       | 0.65    |
|                                             | complete     | 1.50       | 0.80    |
| Plants with unanchored subcomponents (PPP4) | slight/minor | 0.13       | 0.60    |
|                                             | moderate     | 0.28       | 0.50    |
|                                             | extensive    | 0.77       | 0.65    |
|                                             | complete     | 1.50       | 0.80    |

**Figure A-3. Hazus Table 8.7**



**Table 8.9: Damage Algorithms for Water Storage Tanks**

| Peak Ground Acceleration                  |              |             |         |
|-------------------------------------------|--------------|-------------|---------|
| Classification                            | Damage State | Median (g)  | $\beta$ |
| On-Ground Anchored Concrete Tank (PST1)   | slight/minor | 0.25        | 0.55    |
|                                           | moderate     | 0.52        | 0.70    |
|                                           | extensive    | 0.95        | 0.60    |
|                                           | complete     | 1.64        | 0.70    |
| On-Ground Unanchored Concrete Tank (PST2) | slight/minor | 0.18        | 0.60    |
|                                           | moderate     | 0.42        | 0.70    |
|                                           | extensive    | 0.70        | 0.55    |
|                                           | complete     | 1.04        | 0.60    |
| On-Ground Anchored Steel Tank (PST3)      | slight/minor | 0.30        | 0.60    |
|                                           | moderate     | 0.70        | 0.60    |
|                                           | extensive    | 1.25        | 0.65    |
|                                           | complete     | 1.60        | 0.60    |
| On-Ground Unanchored Steel Tank (PST4)    | slight/minor | 0.15        | 0.70    |
|                                           | moderate     | 0.35        | 0.75    |
|                                           | extensive    | 0.68        | 0.75    |
|                                           | complete     | 0.95        | 0.70    |
| Above-Ground Steel Tank (PST5)            | slight/minor | 0.18        | 0.50    |
|                                           | moderate     | 0.55        | 0.50    |
|                                           | extensive    | 1.15        | 0.60    |
|                                           | complete     | 1.50        | 0.60    |
| On-Ground Wood Tank (PST6)                | slight/minor | 0.15        | 0.60    |
|                                           | moderate     | 0.40        | 0.60    |
|                                           | extensive    | 0.70        | 0.70    |
|                                           | complete     | 0.90        | 0.70    |
| Permanent Ground Deformation              |              |             |         |
| Classification                            | Damage State | Median (in) | $\beta$ |
| Buried Concrete Tank (PST7)               | slight/minor | 2           | 0.50    |
|                                           | moderate     | 4           | 0.50    |
|                                           | extensive    | 8           | 0.50    |
|                                           | complete     | 12          | 0.50    |

**Figure A-4. Hazus Table 8.9****Table 8.1.a: Continuous Restoration Functions for Potable Water Systems (After ATC-13, 1985)**

| Restoration Functions (All Normal Distributions) |              |             |                 |
|--------------------------------------------------|--------------|-------------|-----------------|
| Classification                                   | Damage State | Mean (Days) | $\sigma$ (days) |
| Water Treatment Plants                           | slight/minor | 0.9         | 0.3             |
|                                                  | moderate     | 1.9         | 1.2             |
|                                                  | extensive    | 32.0        | 31.0            |
|                                                  | complete     | 95.0        | 65.0            |
| Pumping Plants                                   | slight/minor | 0.9         | 0.3             |
|                                                  | moderate     | 3.1         | 2.7             |
|                                                  | extensive    | 13.5        | 10.0            |
|                                                  | complete     | 35.0        | 18.0            |
| Wells                                            | slight/minor | 0.8         | 0.2             |
|                                                  | moderate     | 1.5         | 1.2             |
|                                                  | extensive    | 10.5        | 7.5             |
|                                                  | complete     | 26.0        | 14.0            |
| Water Storage Tanks                              | slight/minor | 1.2         | 0.4             |
|                                                  | moderate     | 3.1         | 2.7             |
|                                                  | extensive    | 93.0        | 85.0            |
|                                                  | complete     | 155.0       | 120.0           |

**Figure A-5. Hazus Table 8.1.a**

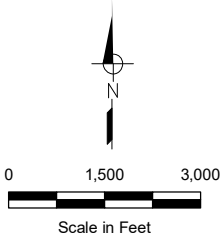
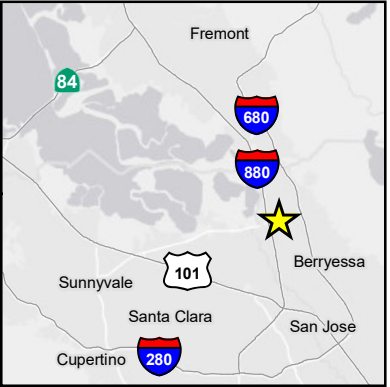
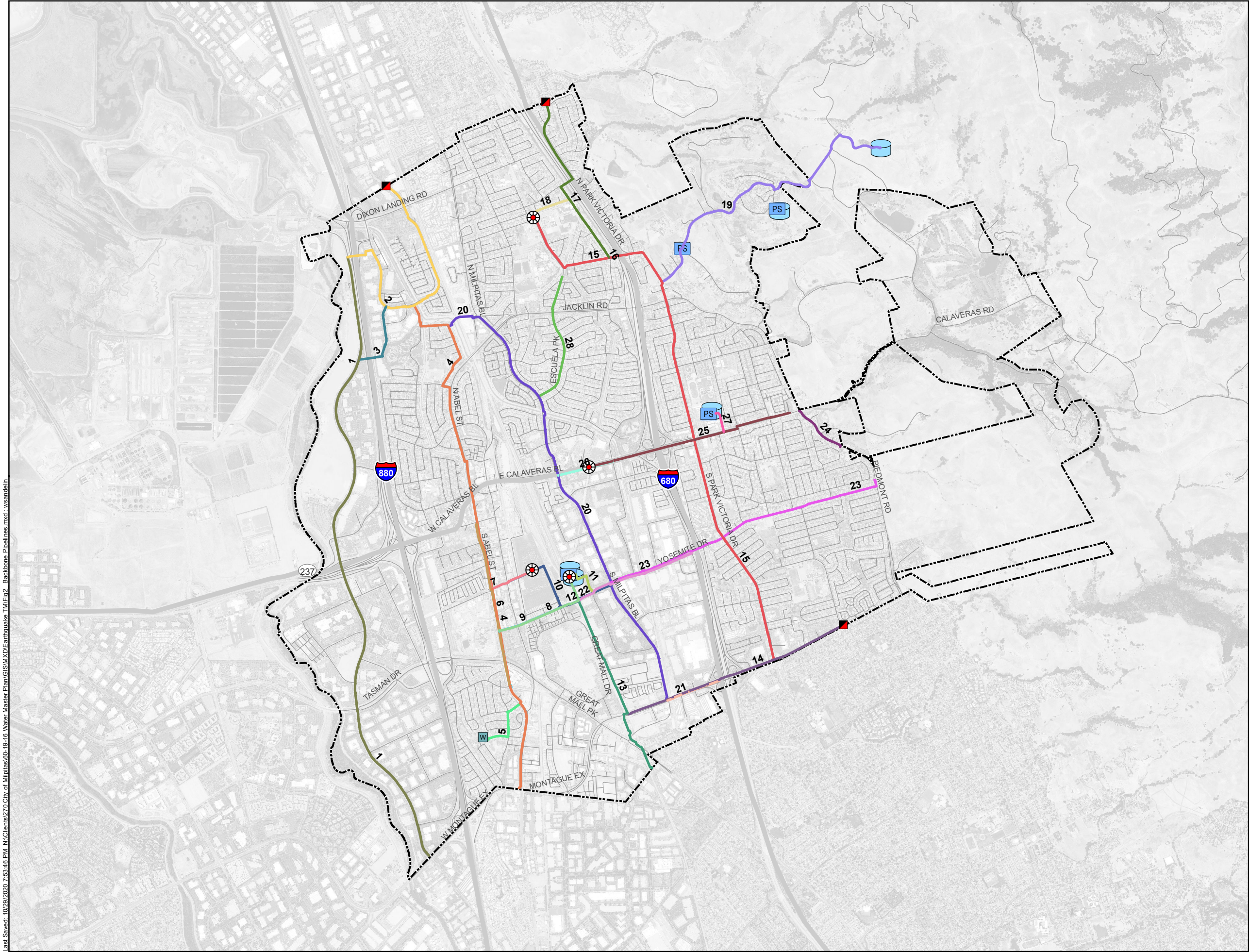
## ALA Methodology Results for Linear Assets

| Table B-1. Trunk Pipeline Lengths and Fragility |                          |                               |                       |     |     |                   |                |                    |       |                |                    |       |
|-------------------------------------------------|--------------------------|-------------------------------|-----------------------|-----|-----|-------------------|----------------|--------------------|-------|----------------|--------------------|-------|
| Pipe Reach                                      | Total Pipe Length, miles | Average Pipe Diameter, inches | Most Common Pipe Type | K1  | K2  | Average PGV, cm/s | No. Leaks      |                    |       | No. Breaks     |                    |       |
|                                                 |                          |                               |                       |     |     |                   | Ground Shaking | Ground Deformation | Total | Ground Shaking | Ground Deformation | Total |
| 1                                               | 3.9                      | 13                            | DIP                   | 0.5 | 0.6 | 35.5              | 0.6            | 11.4               | 11.9  | 0.1            | 2.8                | 3.0   |
| 2                                               | 1.6                      | 12                            | ACP                   | 0.5 | 0.8 | 40.8              | 0.3            | 2.5                | 2.7   | 0.1            | 0.6                | 0.7   |
| 3                                               | 0.5                      | 11                            | ACP                   | 0.5 | 0.7 | 39.8              | 0.1            | 1.3                | 1.4   | 0.0            | 0.3                | 0.3   |
| 4                                               | 3.3                      | 12                            | ACP                   | 0.5 | 0.8 | 36.5              | 0.5            | 2.9                | 3.4   | 0.1            | 0.7                | 0.8   |
| 5                                               | 0.4                      | 11                            | ACP                   | 0.5 | 0.7 | 33.8              | 0.1            | 0.2                | 0.3   | 0.0            | 0.1                | 0.1   |
| 6                                               | 1.0                      | 12                            | DIP                   | 0.5 | 0.6 | 34.3              | 0.1            | 0.5                | 0.6   | 0.0            | 0.1                | 0.2   |
| 7                                               | 0.5                      | 18                            | ACP                   | 0.5 | 0.7 | 36.5              | 0.1            | 0.6                | 0.7   | 0.0            | 0.2                | 0.2   |
| 8                                               | 0.7                      | 19                            | DIP                   | 0.5 | 0.5 | 36.3              | 0.1            | 0.3                | 0.4   | 0.0            | 0.1                | 0.1   |
| 9                                               | 1.1                      | 18                            | DIP                   | 0.5 | 0.5 | 36.3              | 0.1            | 0.6                | 0.7   | 0.0            | 0.1                | 0.2   |
| 10                                              | 0.9                      | 14                            | ACP                   | 0.5 | 0.6 | 36.5              | 0.1            | 0.7                | 0.9   | 0.0            | 0.2                | 0.2   |
| 11                                              | 0.2                      | 24                            | STL                   | 0.3 | 0.3 | 36.3              | 0.0            | 0.1                | 0.1   | 0.0            | 0.0                | 0.0   |
| 12                                              | 0.1                      | 12                            | ACP                   | 0.5 | 0.8 | 36.3              | 0.0            | 0.1                | 0.1   | 0.0            | 0.0                | 0.0   |
| 13                                              | 1.2                      | 17                            | ACP                   | 0.5 | 0.7 | 34.5              | 0.2            | 0.6                | 0.8   | 0.0            | 0.2                | 0.2   |
| 14                                              | 1.4                      | 14                            | ACP                   | 0.5 | 0.6 | 35.8              | 0.2            | 0.2                | 0.4   | 0.1            | 0.1                | 0.1   |
| 15                                              | 3.5                      | 11                            | ACP                   | 0.5 | 0.8 | 38.5              | 0.5            | 0.6                | 1.2   | 0.1            | 0.2                | 0.3   |
| 16                                              | 0.0                      | 10                            | ACP                   | 0.5 | 0.8 | 41.4              | 0.0            | 0.0                | 0.0   | 0.0            | 0.0                | 0.0   |
| 17                                              | 1.1                      | 10                            | ACP                   | 0.5 | 0.8 | 41.4              | 0.2            | 0.1                | 0.3   | 0.0            | 0.0                | 0.1   |
| 18                                              | 0.3                      | 12                            | ACP                   | 0.5 | 0.8 | 41.0              | 0.0            | 0.0                | 0.1   | 0.0            | 0.0                | 0.0   |
| 19                                              | 2.0                      | 11                            | ACP                   | 0.5 | 0.8 | 41.0              | 0.3            | 0.3                | 0.6   | 0.1            | 0.1                | 0.1   |
| 20                                              | 2.9                      | 15                            | ACP                   | 0.5 | 0.7 | 37.3              | 0.4            | 1.2                | 1.7   | 0.1            | 0.3                | 0.4   |
| 21                                              | 0.4                      | 10                            | ACP                   | 0.5 | 0.8 | 35.3              | 0.0            | 0.2                | 0.3   | 0.0            | 0.1                | 0.1   |
| 22                                              | 0.8                      | 18                            | DIP                   | 0.5 | 0.5 | 37.0              | 0.1            | 0.3                | 0.4   | 0.0            | 0.1                | 0.1   |
| 23                                              | 1.8                      | 14                            | ACP                   | 0.5 | 0.6 | 37.3              | 0.3            | 0.8                | 1.1   | 0.1            | 0.2                | 0.3   |
| 24                                              | 0.3                      | 16                            | DIP                   | 0.5 | 0.6 | 39.3              | 0.1            | 0.0                | 0.1   | 0.0            | 0.0                | 0.0   |
| 25                                              | 1.3                      | 12                            | ACP                   | 0.5 | 0.8 | 38.8              | 0.2            | 0.5                | 0.7   | 0.1            | 0.1                | 0.2   |
| 26                                              | 0.3                      | 22                            | STL                   | 0.2 | 0.2 | 38.3              | 0.0            | 0.0                | 0.1   | 0.0            | 0.0                | 0.0   |
| 27                                              | 0.1                      | 18                            | DIP                   | 0.5 | 0.5 | 39.0              | 0.0            | 0.0                | 0.1   | 0.0            | 0.0                | 0.0   |
| 28                                              | 0.8                      | 11                            | ACP                   | 0.5 | 0.8 | 39.5              | 0.1            | 0.4                | 0.5   | 0.0            | 0.1                | 0.1   |
| Total                                           | 32.6                     | -                             | -                     | -   | -   | -                 | 4.8            | 26.7               | 31.5  | 1.2            | 6.7                | 7.9   |

| Table B-2. Overall Pipeline Distribution Lengths and Fragility |                          |                       |      |      |                   |                |                    |             |                |                    |              |
|----------------------------------------------------------------|--------------------------|-----------------------|------|------|-------------------|----------------|--------------------|-------------|----------------|--------------------|--------------|
| Pipe Material                                                  | Total Pipe Length, miles | Average Pipe Diameter | K1   | K2   | Average PGV, cm/s | No. Leaks      |                    |             | No. Breaks     |                    |              |
|                                                                |                          |                       |      |      |                   | Ground Shaking | Ground Deformation | Total       | Ground Shaking | Ground Deformation | Total        |
| AC/ACP                                                         | 133.5                    | Small                 | 0.5  | 0.8  | 36.1              | 7.4            | 36.2               | 43.7        | 1.9            | 144.9              | 146.8        |
| CCP                                                            | 0.2                      | Small                 | 0.8  | 1.0  | 36.1              | 0.0            | 0.1                | 0.1         | 0.0            | 0.2                | 0.2          |
| CIP                                                            | 0.9                      | Small                 | 0.8  | 0.8  | 36.1              | 0.1            | 0.3                | 0.3         | 0.0            | 1.0                | 1.1          |
| DIP                                                            | 15.3                     | Large                 | 0.5  | 0.5  | 36.1              | 0.3            | 0.9                | 1.2         | 0.1            | 3.5                | 3.5          |
| PVC                                                            | 27.4                     | Small                 | 0.5  | 1.0  | 36.1              | 0.0            | 0.1                | 0.1         | 0.0            | 0.5                | 0.5          |
| STL                                                            | 5.3                      | Large                 | 0.15 | 0.15 | 36.1              | 0.0            | 0.1                | 0.1         | 0.0            | 0.4                | 0.4          |
| <b>Total</b>                                                   | <b>182.6</b>             | -                     | -    | -    | <b>36.1</b>       | <b>10.3</b>    | <b>47.2</b>        | <b>57.5</b> | <b>2.6</b>     | <b>188.9</b>       | <b>191.4</b> |

| Table B-3. Pipeline Repair Cost Estimates                                                                                                                                         |                              |                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------|
| Evaluation                                                                                                                                                                        | Total Repair Time, crew days | Total Pipeline Repair Labor and Material Cost, dollars |
| Trunk Lines                                                                                                                                                                       | 14.8                         | \$334,173                                              |
| Overall Distribution                                                                                                                                                              | 113.0                        | \$2,515,349                                            |
| (a) Total Pipeline Repair Labor and Material Cost based on crew size 4 workers, 2 crews, \$150/hr labor cost, \$2500/crew day material cost, and a \$50,000 administrative adder. |                              |                                                        |





- Turnout
- Well
- Emergency Intertie
- Pump Station
- Storage Reservoir
- City Limits



**Figure B-1**  
**Backbone Pipeline Reaches**



| Pipe Material       | Joint Type       | Soils         | Diam. | K <sub>1</sub> | Reference Sections |
|---------------------|------------------|---------------|-------|----------------|--------------------|
| Cast iron           | Cement           | All           | Small | 1.0            | 4.4.2              |
| Cast iron           | Cement           | Corrosive     | Small | 1.4            | 4.4.2              |
| Cast iron           | Cement           | Non-corrosive | Small | 0.7            | 4.4.2              |
| Cast iron           | Rubber gasket    | All           | Small | 0.8            | 4.4.2              |
| Welded steel        | Lap - Arc welded | All           | Small | 0.6            | 4.4.4              |
| Welded steel        | Lap - Arc welded | Corrosive     | Small | 0.9            | 4.4.4              |
| Welded steel        | Lap - Arc welded | Non-corrosive | Small | 0.3            | 4.4.4              |
| Welded steel        | Lap - Arc welded | All           | Large | 0.15           | 4.4.4              |
| Welded steel        | Rubber gasket    | All           | Small | 0.7            | 4.4.6              |
| Welded steel        | Screwed          | All           | Small | 1.3            | 4.4.6<br>A.3.11    |
| Welded steel        | Riveted          | All           | Small | 1.3            | 4.4.6              |
| Asbestos cement     | Rubber gasket    | All           | Small | 0.5            | 4.4.3<br>4.4.5     |
| Asbestos cement     | Cement           | All           | Small | 1.0            | 4.4.3              |
| Concrete w/Stl Cyl. | Lap - Arc Welded | All           | Large | 0.7            | 4.4.6              |
| Concrete w/Stl Cyl. | Cement           | All           | Large | 1.0            | 4.4.6              |
| Concrete w/Stl Cyl. | Rubber Gasket    | All           | Large | 0.8            | 4.4.6              |
| PVC                 | Rubber gasket    | All           | Small | 0.5            | 4.4.6              |
| Ductile iron        | Rubber gasket    | All           | Small | 0.5            | 4.4.5<br>4.4.6     |

Table 4-5. Ground Shaking - Constants for Fragility Curve

Figure B-2. ALA-Recommended K<sub>1</sub> Fragility Constants for Pipelines

| Pipe Material       | Joint Type                                            | K <sub>2</sub> | Reference Sections |
|---------------------|-------------------------------------------------------|----------------|--------------------|
| Cast iron           | Cement                                                | 1.0            | 4.4.2              |
| Cast iron           | Rubber gasket                                         | 0.8            | 4.4.2              |
| Cast iron           | Mechanical restrained                                 | 0.7            | 4.4.2              |
| Welded steel        | Arc welded, lap welds (large diameter, non corrosive) | 0.15           | 4.4.4              |
| Welded steel        | Rubber gasket                                         | 0.7            | 4.4.3              |
| Asbestos cement     | Rubber gasket                                         | 0.8            | 4.4.3              |
| Asbestos cement     | Cement                                                | 1.0            | 4.4.6              |
| Concrete w/Stl Cyl. | Welded                                                | 0.6            | 4.4.6              |
| Concrete w/Stl Cyl. | Cement                                                | 1.0            | 4.4.6              |
| Concrete w/Stl Cyl. | Rubber Gasket                                         | 0.7            | 4.4.6              |
| PVC                 | Rubber gasket                                         | 0.8            | 4.4.6              |
| Ductile iron        | Rubber gasket                                         | 0.5            | 4.4.6              |

Table 4-6. Permanent Ground Deformations - Constants for Fragility Curve

Figure B-3. ALA-Recommended K<sub>2</sub> Fragility Constants for Pipelines

## Cost Estimating Assumptions

## Appendix F

### Cost Estimating Assumptions



This appendix details West Yost's assumptions for estimating probable construction costs for the recommended water system facilities. Construction costs were developed based on a combination of data supplied by manufacturers, published industry standard cost data and curves, construction costs for similar facilities built by other public agencies, and construction costs previously estimated by West Yost for similar facilities with similar construction cost indexes.

The costs presented in this appendix are for construction only and do not include estimating or construction uncertainties (e.g., variations in final quantities) or cost estimates for engineering, legal services, environmental review, inspections, and/or contract administration. Some of these items are referred to as contingency costs and are addressed in the last section of this appendix. Construction costs presented in this appendix represent capital infrastructure costs and do not include costs for purchase of additional surface water supplies, supply reliability, or operation and maintenance.

All estimated construction costs have been adjusted to reflect August 2020 dollars for San Francisco, California. These costs should be used for conceptual cost estimates only and should be updated regularly. Construction costs presented in this appendix are not intended to represent the lowest prices in the industry for each type of construction; rather they are representative of average or typical construction costs. These planning-level construction cost estimates have been prepared for guidance in evaluating various facility improvement options and are intended only for budgetary purposes within the context of this master planning effort.

The following sections of this appendix describe the assumptions used to estimate the probable construction costs for the planning and design of recommended water system facilities for the City's water system:

- Water System Construction Costs
- Design and Construction Contingencies and Other Project Costs

### WATER SYSTEM CONSTRUCTION COSTS

The following sections present the construction cost estimates used to project probable construction costs for recommended water system facilities in the City's water system and are categorized by type of improvement, including the following:

- Treated Water Storage Reservoirs
- Municipal Groundwater Production Wells
- Treated Water Pump Stations
- Potable Water Pipelines
- Turnouts
- Pressure Reducing Valves and Isolation Valves
- Backup Power Generators

## Appendix F

### Cost Estimating Assumptions



#### Treated Water Storage Reservoirs

Table 1 summarizes the estimated construction costs for above-ground concrete and steel treated water storage reservoirs between 1.0 and 6.0 million gallons (MG). These costs generally include the installation of the storage tank, site piping, earthwork, paving, instrumentation, and related sitework. These costs are representative of construction under normal excavation and foundation conditions and would be significantly higher for special or difficult foundation requirements.

| Table 1. Construction Costs for Treated Water Storage Reservoirs <sup>(a)</sup>                                                                                                                                                                                                                                                                             |                                                             |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------|
| Capacity, MG                                                                                                                                                                                                                                                                                                                                                | Estimated Construction Cost, million dollars <sup>(b)</sup> |                    |
|                                                                                                                                                                                                                                                                                                                                                             | Above-ground Concrete                                       | Above-ground Steel |
| 1.0                                                                                                                                                                                                                                                                                                                                                         | 3.4                                                         | 2.4                |
| 2.0                                                                                                                                                                                                                                                                                                                                                         | 4.5                                                         | 3.3                |
| 3.0                                                                                                                                                                                                                                                                                                                                                         | 5.6                                                         | 4.2                |
| 4.0                                                                                                                                                                                                                                                                                                                                                         | 6.7                                                         | 5.1                |
| 5.0                                                                                                                                                                                                                                                                                                                                                         | 7.8                                                         | 6.0                |
| 6.0                                                                                                                                                                                                                                                                                                                                                         | 8.9                                                         | 6.9                |
| <p>(a) Based on August 2020 CCI for San Francisco (12,920.6).</p> <p>(b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate and do not include design and construction contingencies or other project costs. See Table 5 for recommended application of contingency and other project costs.</p> |                                                             |                    |

#### Municipal Groundwater Production Wells

Well construction consists of pilot hole drilling, water quality/soil sampling, pilot hole reaming, well construction, well development and providing the necessary housing, pump, motor, automatic control equipment, discharge piping, supervisory control and data acquisition (SCADA), and disinfection equipment. Costs also assume a backup power generator will be installed.

Construction costs for new groundwater wells are estimated to be approximately \$3,500,000 per well (assuming a well capacity between 500 – 1,000 gallons per minute [gpm]). These estimates are based on recent bids for similarly sized wells and representative of construction under normal drilling conditions. Costs would be significantly higher for special or difficult locations, or if specialized wellhead treatment is required.

#### Treated Water Pump Stations

Pump stations will be required at ground-level and below-grade reservoirs to lift water to the hydraulic grade of the City distribution system. Estimated construction costs for distribution pumping stations, as shown in Table 2, are based on enclosed stations with architectural and landscaping treatment suitable for residential areas. Pump station costs can vary considerably, depending on architectural design, pumping head, and pumping capacity. Therefore, these costs presented below are representative of construction under common or normal conditions and would be significantly higher for special or difficult conditions.



## Appendix F

### Cost Estimating Assumptions



Pump station cost estimates include the installation of the pumps, site piping, earthwork, paving, a chemical feed system (hypochlorite), on-site backup/standby power generator, SCADA, and related sitework.

| <b>Table 2. Construction Costs for Treated Water Pump Stations<sup>(a)</sup></b>                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Firm Capacity<sup>(b)</sup>, mgd</b>                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Estimated Construction Cost, million dollars<sup>(c)</sup></b> |
| 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.5                                                               |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.5                                                               |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.7                                                               |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.9                                                               |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.3                                                               |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3.2                                                               |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4.2                                                               |
| <p>(a) Based on August 2020 CCI for San Francisco (12,920.6).</p> <p>(b) Equal to the total pumping capacity with the largest pump out of service or on standby.</p> <p>(c) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate and do not include design and construction contingencies or other project costs. See Table 5 for recommended application of contingency and other project costs.</p> |                                                                   |

### Potable Water Pipelines

Unit construction costs for potable water pipelines 8 through 36 inches in diameter are provided in Table 3. These unit costs are categorized by typical pipeline construction either in developed (e.g., in urban or suburban roads) or undeveloped (e.g., across open fields or in rural roads) areas and are representative of pipeline construction under common or normal conditions. Special or difficult conditions would increase costs significantly.

The unit construction costs presented below generally include pipeline materials, trenching, placing and jointing pipe, valves, fittings, hydrants, service connections, placing imported pipe bedding, native backfill material, and partial asphalt pavement replacement, if required. However, the costs presented in Table 3 do not include jacking and boring pipe or constructing boring and receiving pits. Jack and bore costs are shown in Table 4 and should be added where required.

## Appendix F

### Cost Estimating Assumptions



**Table 3. Unit Construction Costs for Pipelines<sup>(a)</sup>**

| Pipeline Diameter, inches | Unit Construction Cost, dollars/linear foot <sup>(b)</sup> |                   |
|---------------------------|------------------------------------------------------------|-------------------|
|                           | Developed Areas                                            | Undeveloped Areas |
| 8                         | 135                                                        | 90                |
| 10                        | 165                                                        | 110               |
| 12                        | 185                                                        | 130               |
| 14                        | 200                                                        | 145               |
| 16                        | 220                                                        | 165               |
| 18                        | 240                                                        | 185               |
| 20                        | 265                                                        | 190               |
| 24                        | 290                                                        | 225               |
| 30                        | 365                                                        | 315               |
| 36                        | 470                                                        | 420               |

(a) Based on August 2020 CCI for San Francisco (12,920.6).  
 (b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate and do not include design and construction contingencies or other project costs. See Table 5 for recommended application of contingency and other project costs.

**Table 4. Unit Construction Costs for Jack and Bore<sup>(a)</sup>**

| Pipeline Size                 | Unit Construction Cost, dollars/linear foot <sup>(b)</sup> |
|-------------------------------|------------------------------------------------------------|
| 12-inch pipe (24-inch casing) | 935                                                        |
| 16-inch pipe (30-inch casing) | 1,170                                                      |
| 18-inch pipe (32-inch casing) | 1,250                                                      |
| 24-inch pipe (36-inch casing) | 1,405                                                      |

(a) Based on August 2020 CCI for San Francisco (12,920.6).  
 (b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate and do not include design and construction contingencies or other project costs. See Table 5 for recommended application of contingency and other project costs.

### Turnouts

Additional turnouts are recommended to increase supply reliability. The construction cost for a new turnout is estimated to be approximately \$313,000. This cost is representative of construction under normal conditions and would be significantly higher for special or difficult conditions.

The construction cost estimate for a turnout includes the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.

### Pressure Reducing Valves and Isolation Valves

Pressure reducing valves are required to supply water between pressure zones during peak demands and/or emergency conditions. The construction cost for a pressure reducing valve is estimated to be approximately \$282,000. This cost is representative of construction under normal conditions and would

## Appendix F

### Cost Estimating Assumptions



be significantly higher for special or difficult conditions. The construction cost for a new isolation valve is estimated to be approximately \$8,000.

The construction cost estimate for a pressure reducing valve includes the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.

### Backup Power Generators

On-site backup power generators are recommended so pumps can continue delivering water to the distribution system in the event of a power outage. These generators should be sized to meet the power demands of the pumps. The construction cost for a new, on-site backup power generator is estimated to be approximately \$200,000. This cost is representative of construction under normal conditions and would be significantly higher for special or difficult conditions.

### DESIGN AND CONSTRUCTION CONTINGENCIES AND OTHER PROJECT COSTS

Contingency and other project costs must be reviewed on a case-by-case basis, because they will vary considerably with each project. However, to assist City staff with budgeting for the recommended water system facility improvements, standard contingencies (as percentages of the base construction cost) are recommended and are divided into two categories: Design and Construction Contingency Costs and Other Project Costs.

- **Design and Construction Contingency Costs:** 35 percent  
The construction costs presented above are representative of the construction of water system facilities under normal construction conditions and schedules; consequently, it is appropriate to allow for estimating, design, and construction uncertainties unavoidably associated with the conceptual planning of projects at the master planning level. Factors such as unexpected construction conditions, the need for unforeseen mechanical items, and variations in final quantities are only a few of the items that can increase project costs. An allowance of 35 percent of the base construction cost will be included to cover such project related design and construction contingencies.
- **Other Project Costs:** 35 percent  
Other project fees have been divided into three (3) subcategories, totaling 35 percent: 10 percent engineering, 15 percent construction management, and 10 percent program implementation.
  - Engineering costs associated with new facilities include preliminary investigations and reports, right-of-way acquisition, foundation explorations, preparation of drawings and specifications during construction, surveying and staking, sampling of testing material, and start-up services. For this study, engineering costs are assumed to be 10 percent of the base construction cost estimate.
  - Construction management covers such items as contract management and inspection during construction. The cost of these items can also vary, but for the purpose of this study, it is assumed that construction management charges will equal approximately 15 percent of the base construction cost estimate.
  - Program implementation costs cover items such as legal fees, environmental/CEQA compliance requirements, financing expenses, administrative costs, and interest during construction. The cost of these items can also vary, but for the purpose of this study, it is assumed that program implementation costs will equal approximately 10 percent of the base construction cost estimate.

## Appendix F

### Cost Estimating Assumptions



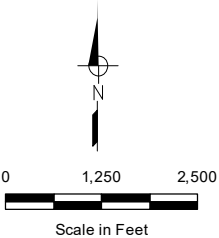
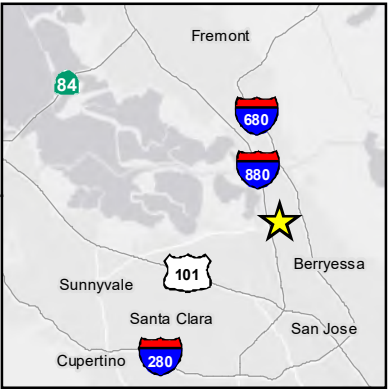
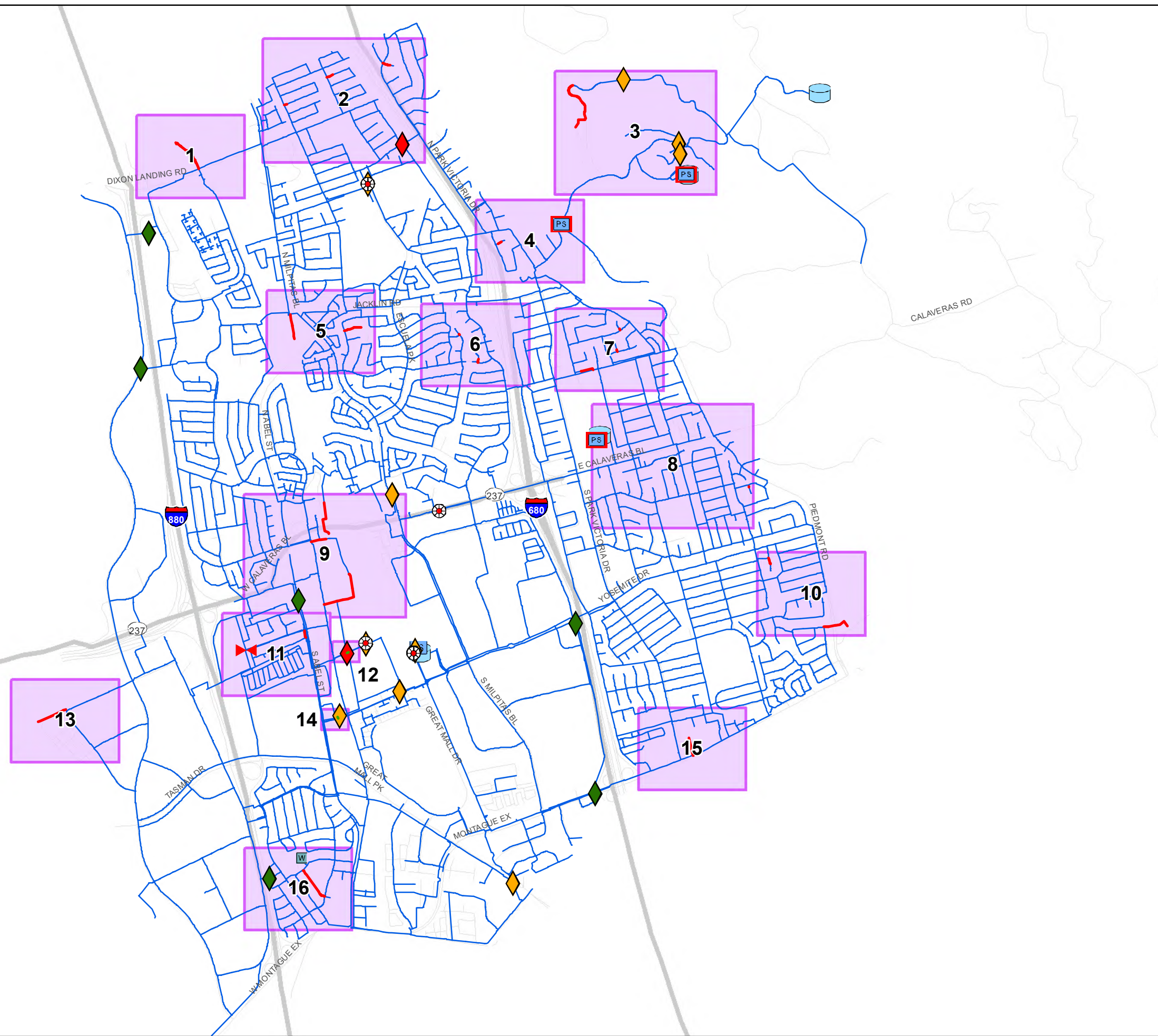
An example application of these standard mark-ups to a project with an assumed base construction cost of \$1.0 million is shown in Table 5. As shown, the total cost of all project construction contingencies (construction contingency, engineering, construction management, and program implementation costs) is 70 percent of the base construction cost for each construction project.

| <b>Table 5. Example Application of Contingency and Other Project Costs</b> |                |                      |
|----------------------------------------------------------------------------|----------------|----------------------|
| <b>Cost Component</b>                                                      | <b>Percent</b> | <b>Cost, dollars</b> |
| Estimated Base Construction Cost before Mark-ups <sup>(a)</sup>            |                | 1,000,000            |
| Design and Construction Contingencies                                      | 35             | 350,000              |
| Other Project Costs                                                        |                |                      |
| Engineering                                                                | 10             | 100,000              |
| Construction Management                                                    | 15             | 150,000              |
| Program Implementation                                                     | 10             | 100,000              |
| <b>Estimated Total Project Cost</b>                                        |                | <b>\$1,700,000</b>   |
| (a) Assumed cost of an example project.                                    |                |                      |



## Appendix G

### Capital Improvement Program Mapbook and Project Summary Sheets



**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

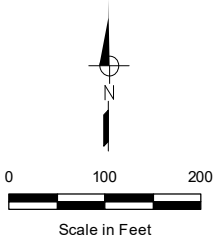
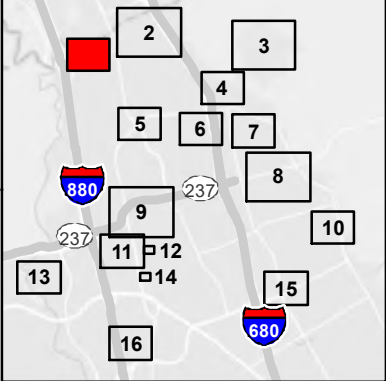
**Existing Facilities**

- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1**  
**Recommended Improvements**  
**for Existing Water System**





Recommended Facilities

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

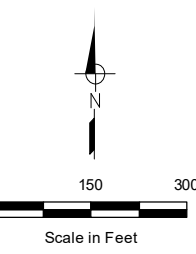
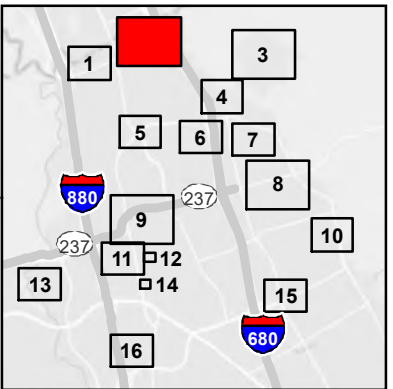
Existing Facilities

- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



Figure G-1.1  
Recommended Improvements  
for Existing Water System





**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

**Existing Facilities**

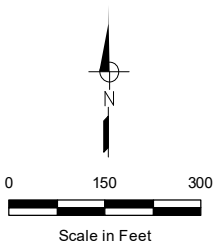
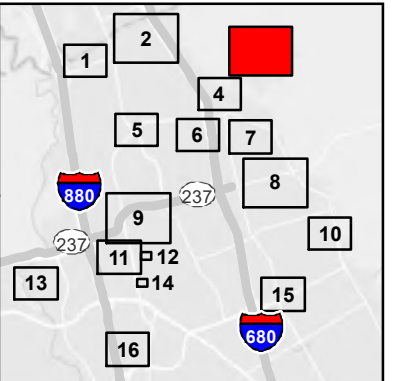
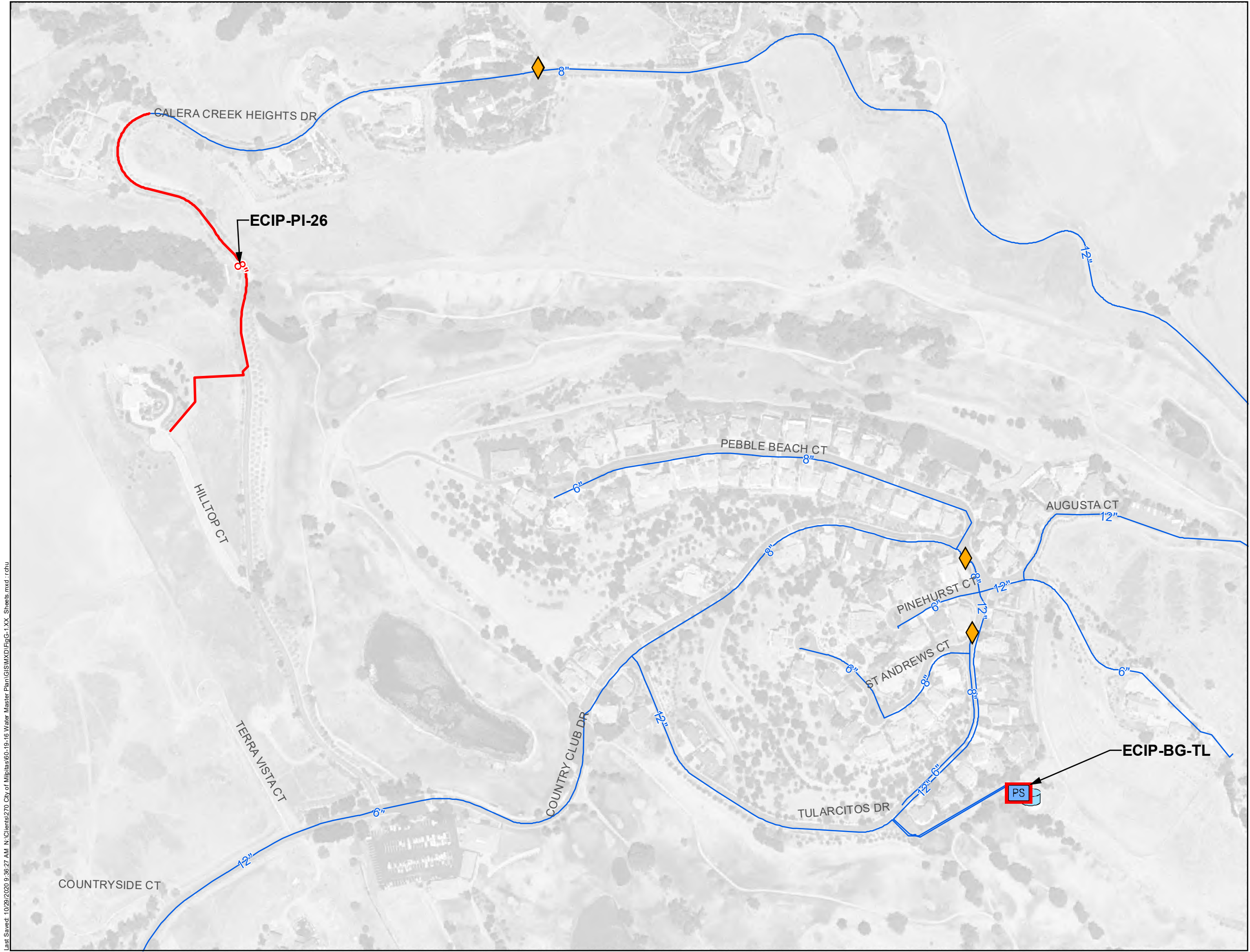
- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1.2**  
**Recommended Improvements**  
**for Existing Water System**

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**Recommended Facilities**

-  Emergency PRV
-  Improvement at Pump Station
-  Isolation Valve
-  Pipeline Upsize
-  New Pipeline

**Existing Facilities**

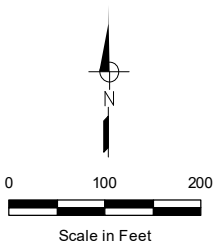
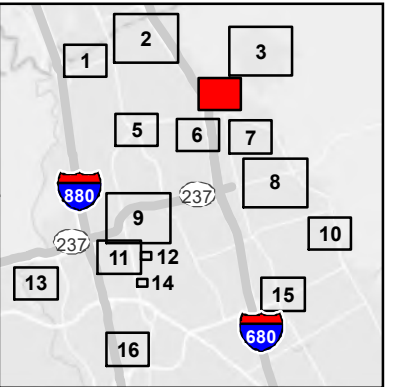
-  Existing Turnout
-  Existing Groundwater Well
-  Existing Pressure Reducing Valve
-  Existing Emergency PRV
-  Existing Pump Station
-  Existing Storage Reservoir
-  Existing Pipeline



**Figure G-1.3**  
**Recommended Improvements**  
**for Existing Water System**

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**Recommended Facilities**

-  Emergency PRV
-  Improvement at Pump Station
-  Isolation Valve
-  Pipeline Upsize
-  New Pipeline

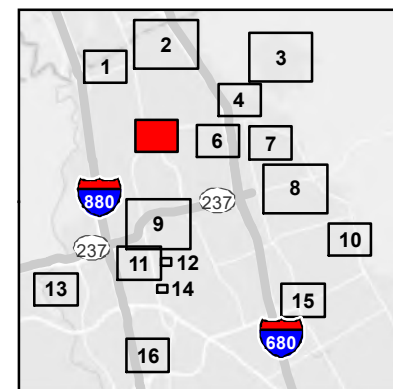
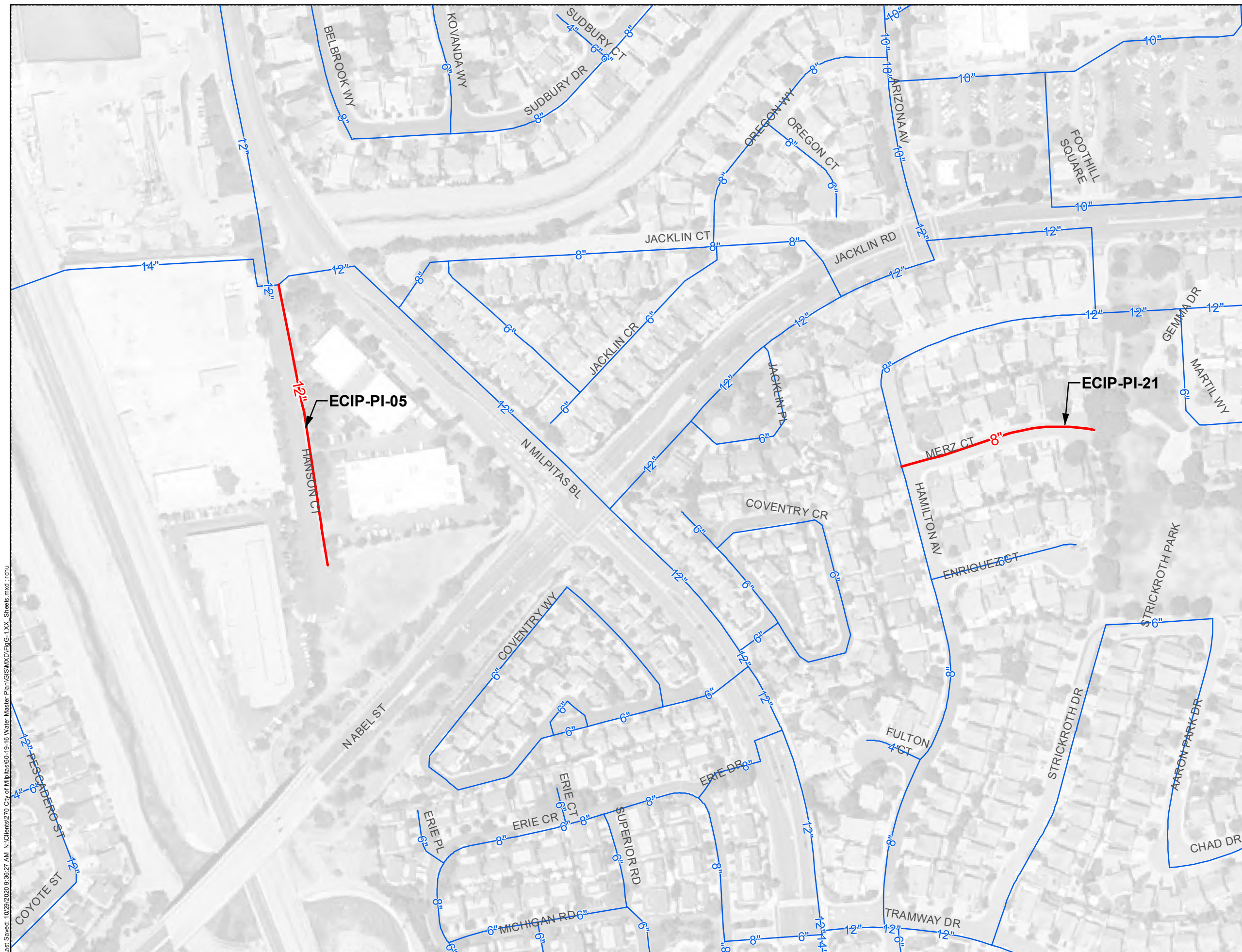
**Existing Facilities**

-  Existing Turnout
-  Existing Groundwater Well
-  Existing Pressure Reducing Valve
-  Existing Emergency PRV
-  Existing Pump Station
-  Existing Storage Reservoir
-  Existing Pipeline



**Figure G-1.4**  
**Recommended Improvements**  
**for Existing Water System**



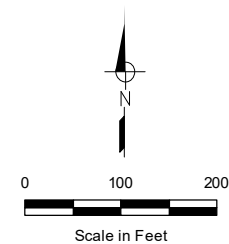
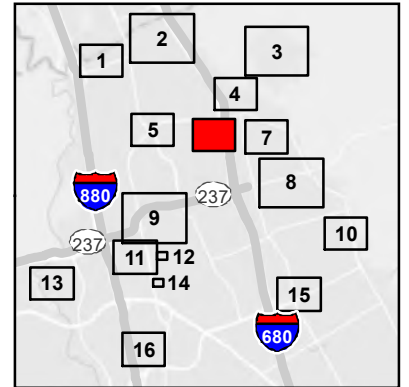
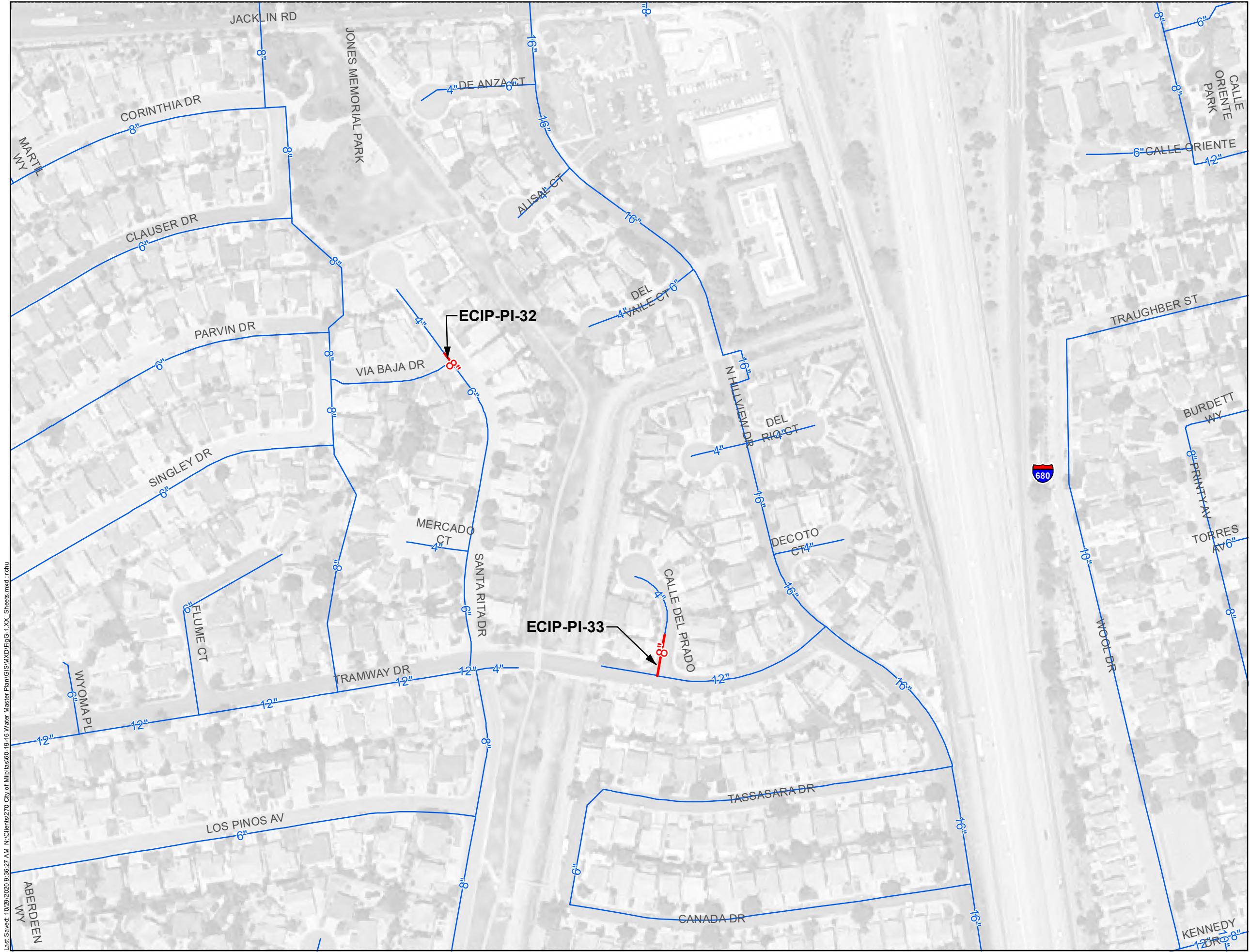


### Recommended Facilities



**Figure G-1.5**  
**Recommended Improvements**  
**for Existing Water System**





**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

**Existing Facilities**

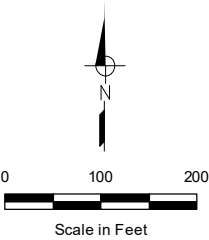
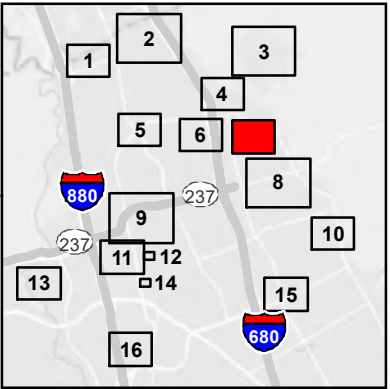
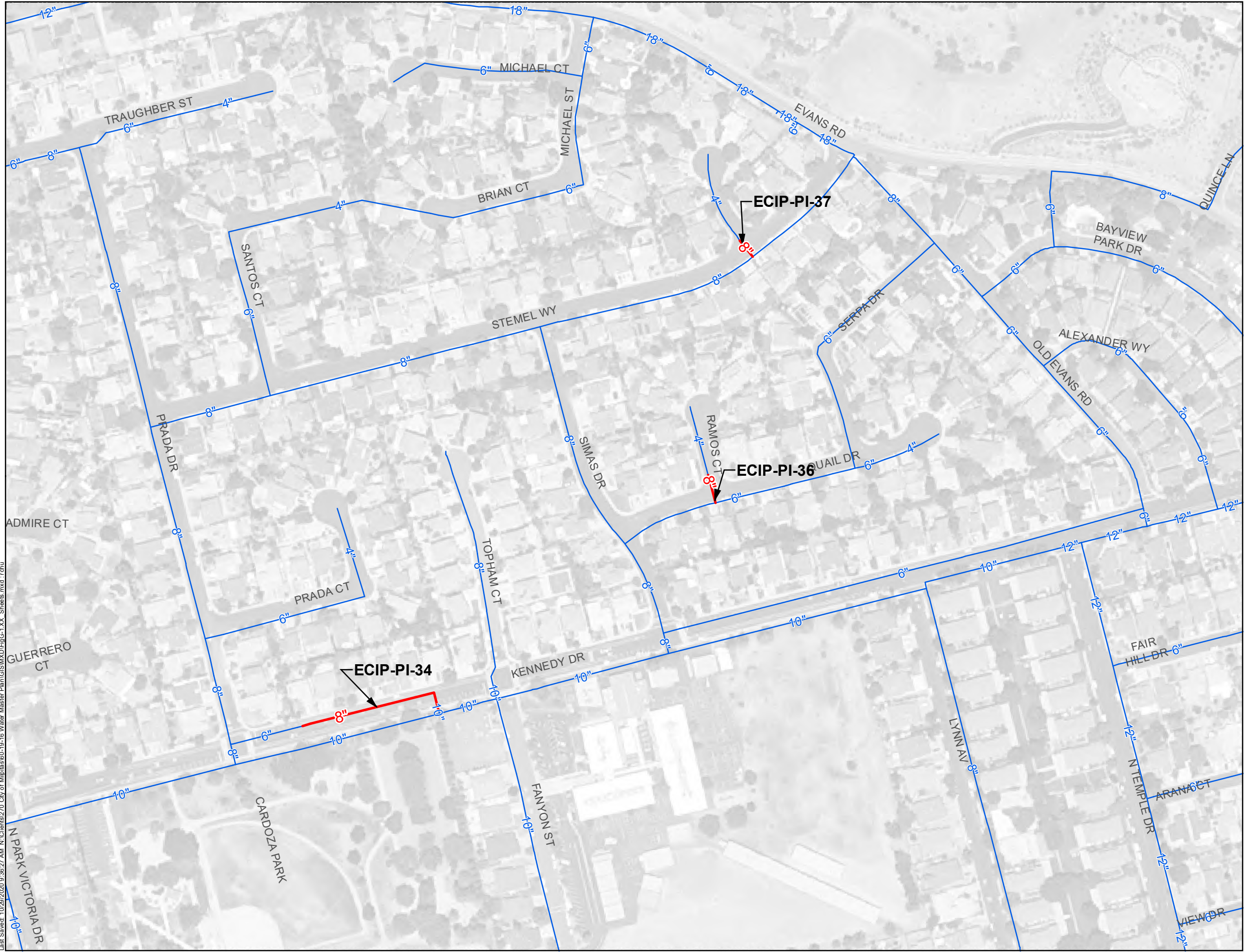
- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1.6**  
**Recommended Improvements**  
**for Existing Water System**

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**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

**Existing Facilities**

- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline

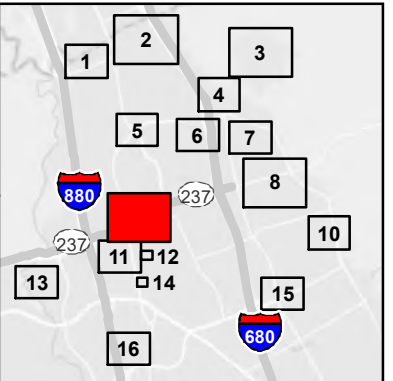
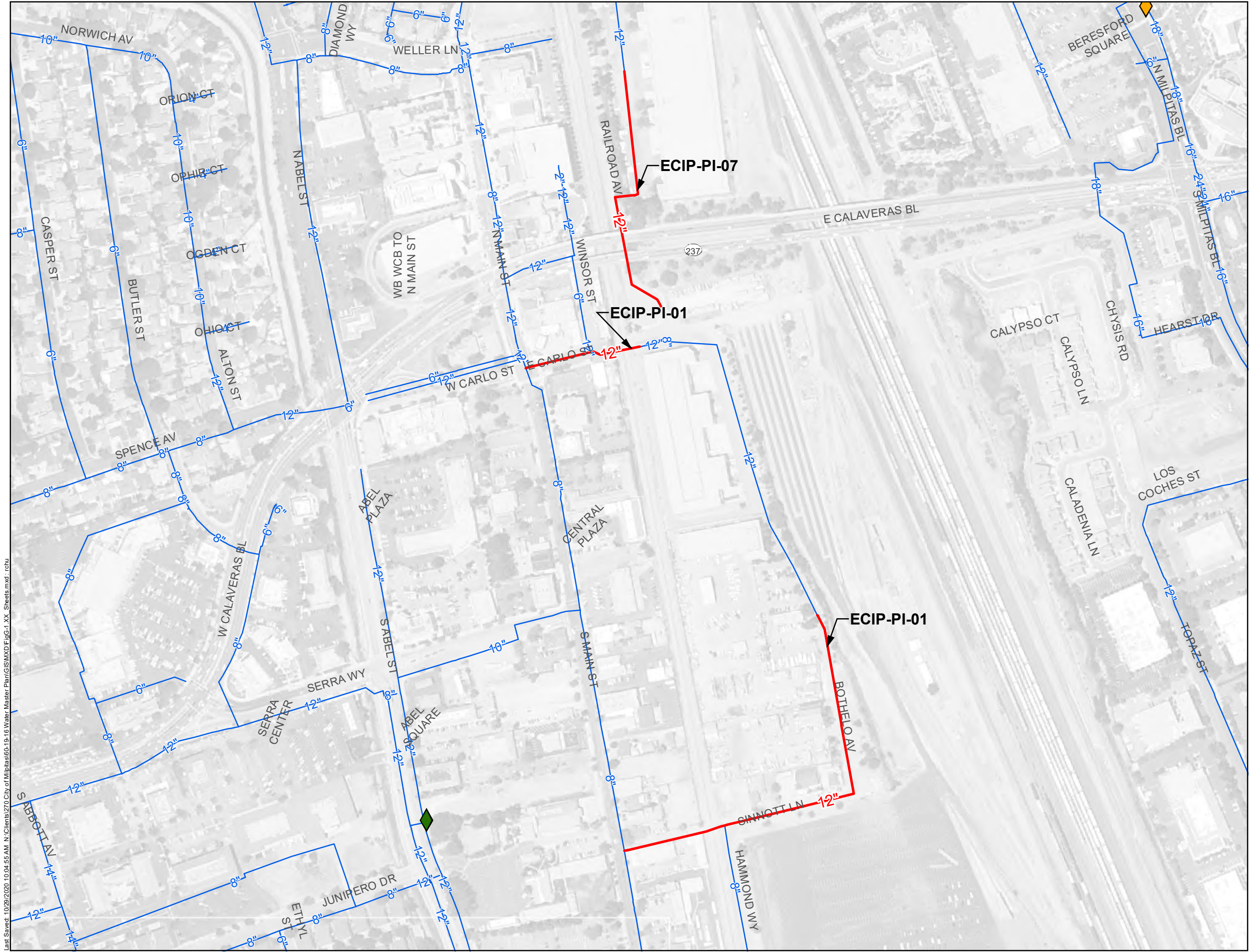


**Figure G-1.7**  
**Recommended Improvements**  
**for Existing Water System**









**Recommended Facilities**

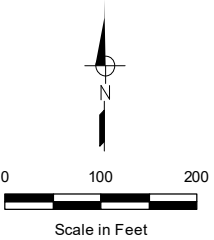
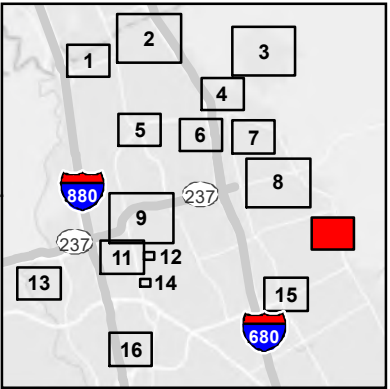
-  Emergency PRV
  -  Improvement at Pump Station
  -  Isolation Valve
  -  Pipeline Upsize
  -  New Pipeline
- Existing Facilities**
-  Existing Turnout
  -  Existing Groundwater Well
  -  Existing Pressure Reducing Valve
  -  Existing Emergency PRV
  -  Existing Pump Station
  -  Existing Storage Reservoir
  -  Existing Pipeline



**Figure G-1.9**  
**Recommended Improvements**  
**for Existing Water System**

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**Recommended Facilities**

-  Emergency PRV
-  Improvement at Pump Station
-  Isolation Valve
-  Pipeline Upsize
-  New Pipeline

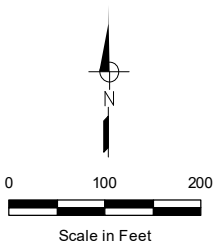
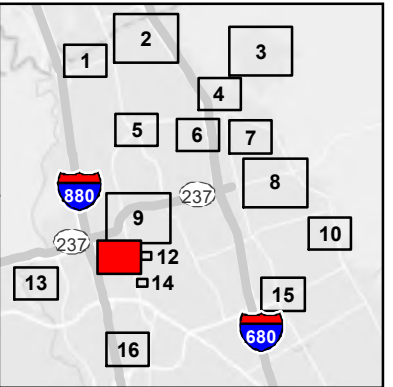
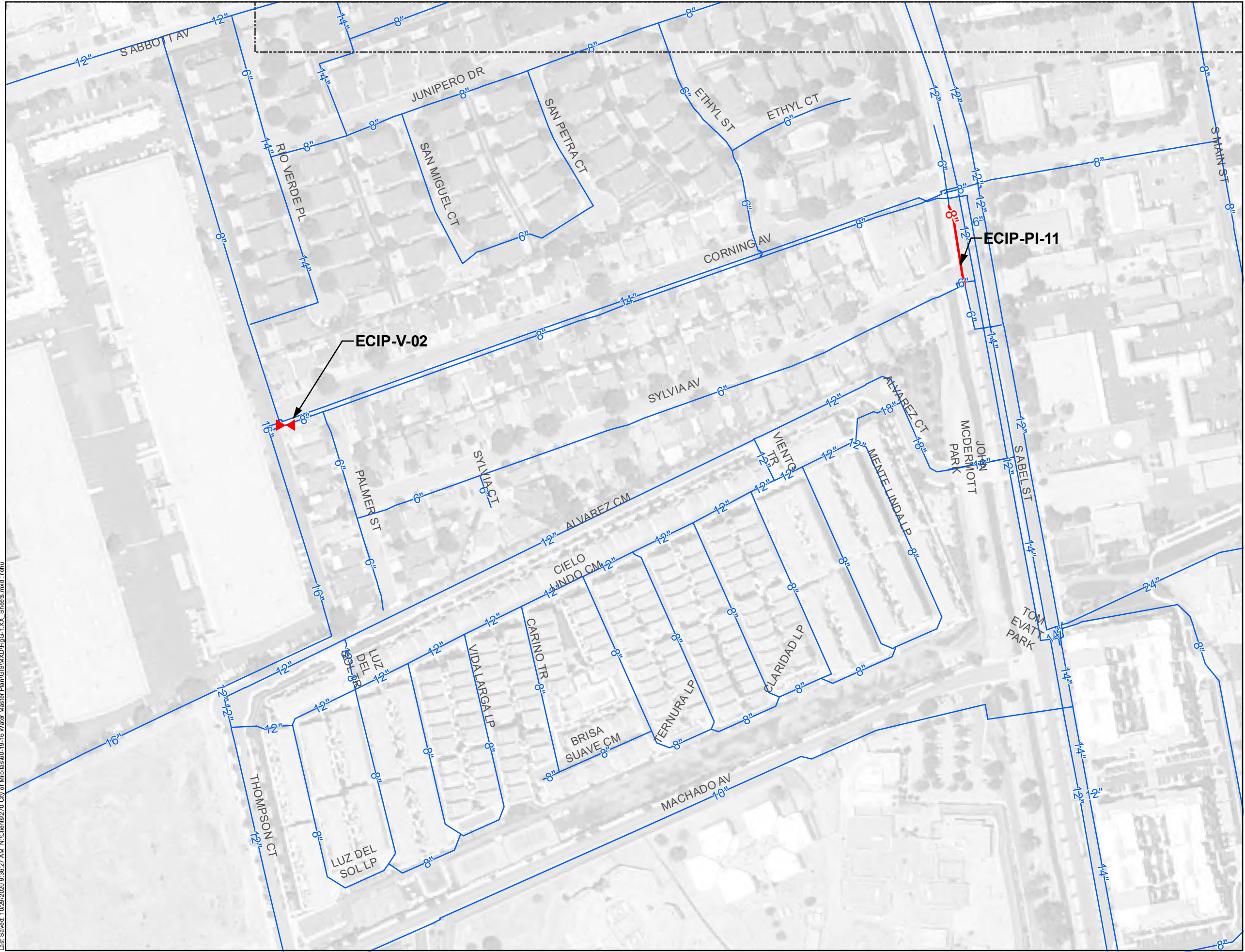
**Existing Facilities**

-  Existing Turnout
-  Existing Groundwater Well
-  Existing Pressure Reducing Valve
-  Existing Emergency PRV
-  Existing Pump Station
-  Existing Storage Reservoir
-  Existing Pipeline



**Figure G-1.10**  
**Recommended Improvements**  
**for Existing Water System**





**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

**Existing Facilities**

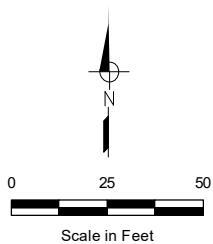
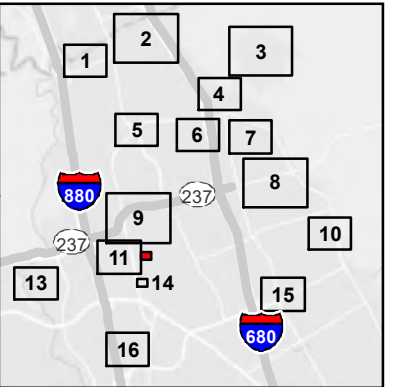
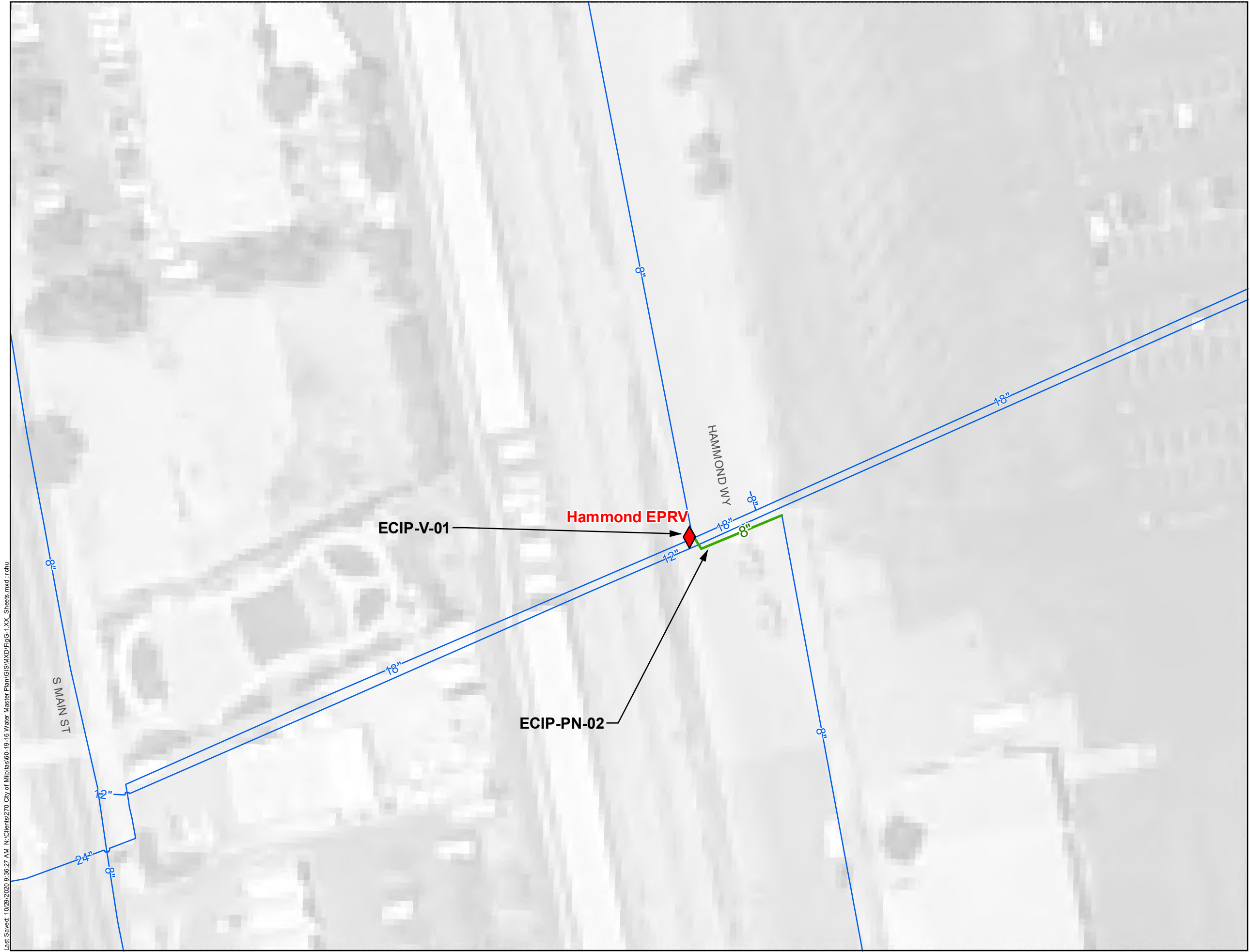
- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1.11**  
**Recommended Improvements**  
**for Existing Water System**

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**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

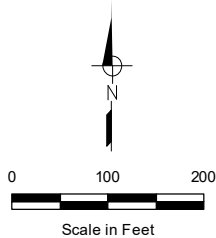
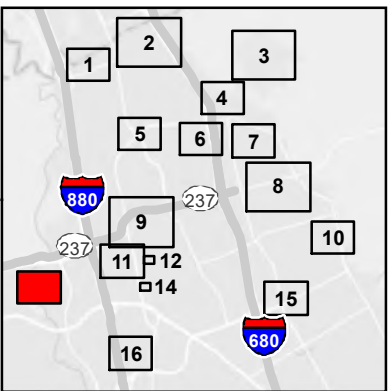
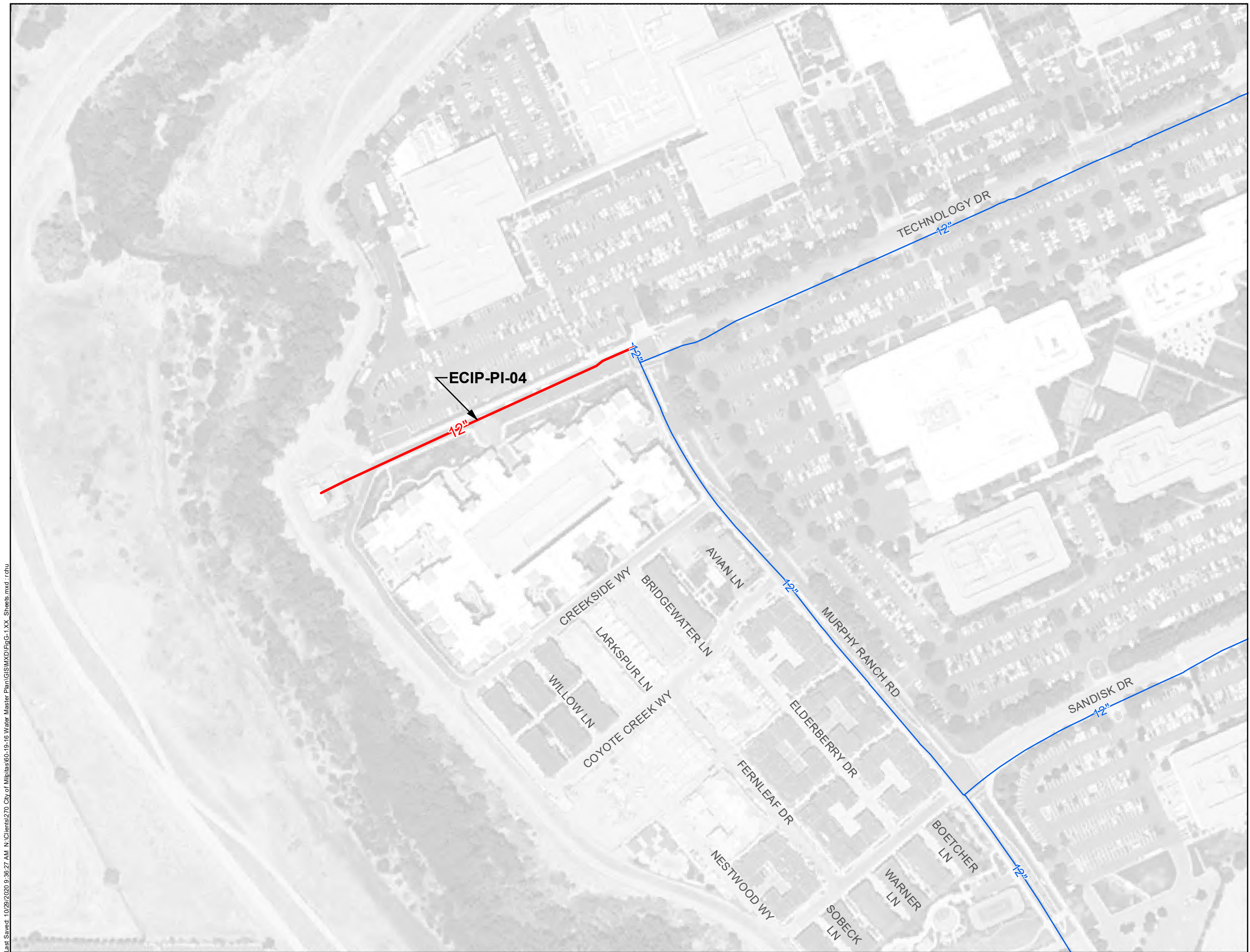
**Existing Facilities**

- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1.12**  
**Recommended Improvements**  
**for Existing Water System**

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**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

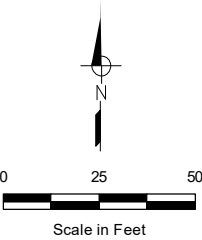
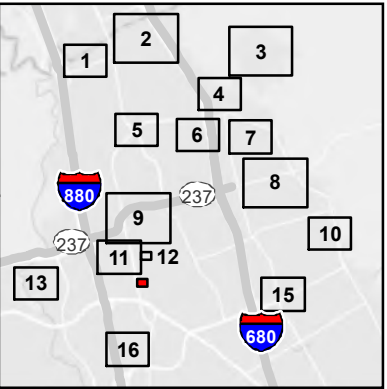
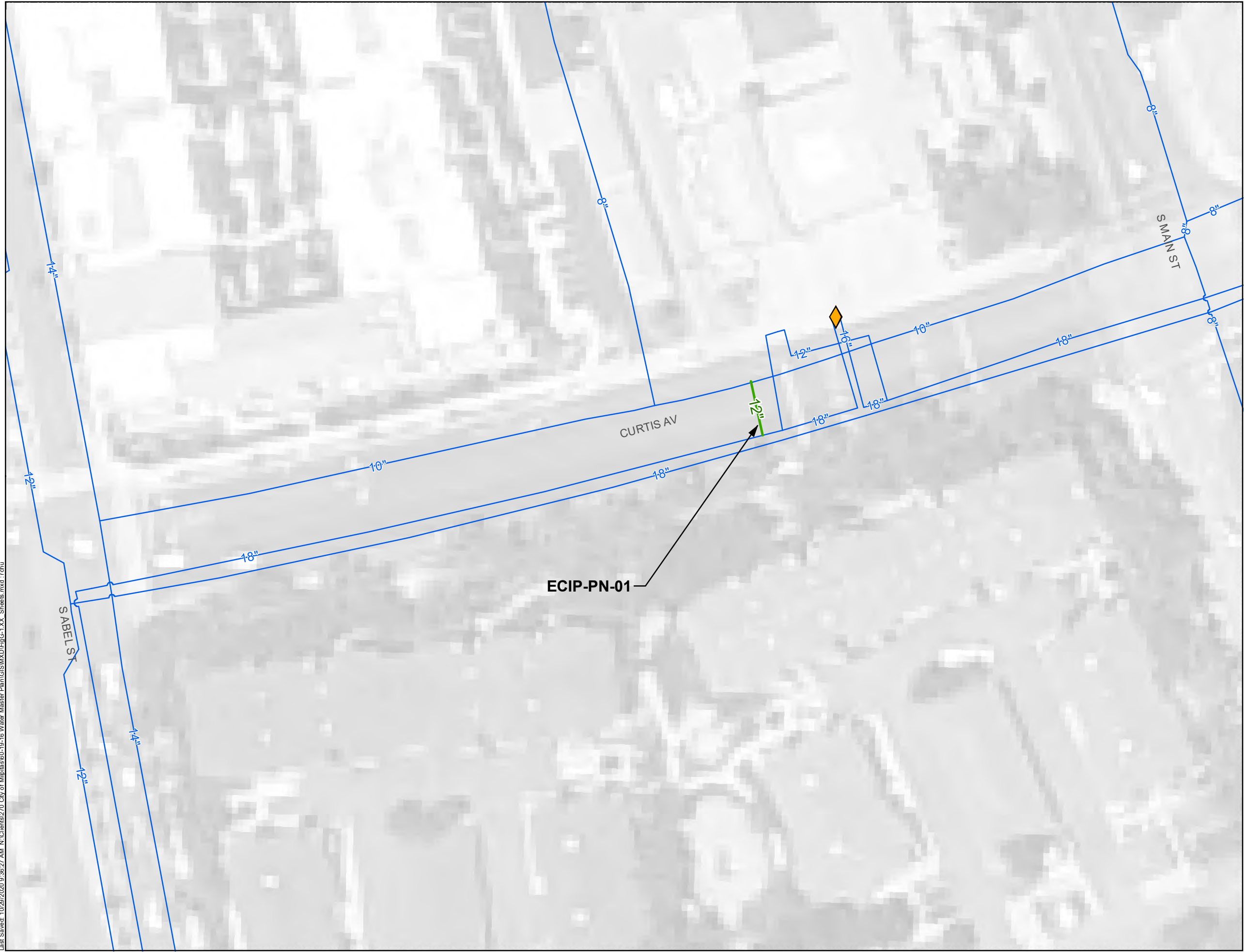
**Existing Facilities**

- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1.13**  
**Recommended Improvements**  
**for Existing Water System**





**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

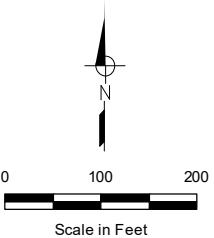
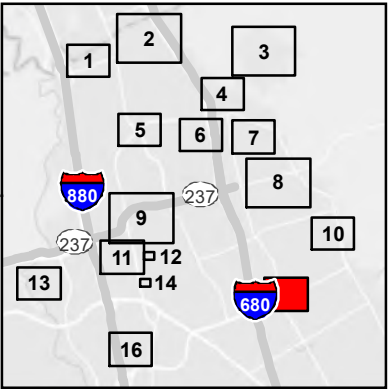
**Existing Facilities**

- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1.14**  
**Recommended Improvements**  
**for Existing Water System**





**Recommended Facilities**

-  Emergency PRV
-  Improvement at Pump Station
-  Isolation Valve
-  Pipeline Upsize
-  New Pipeline

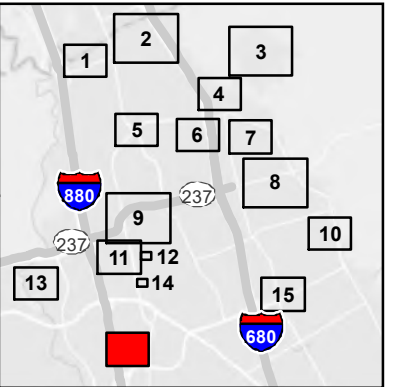
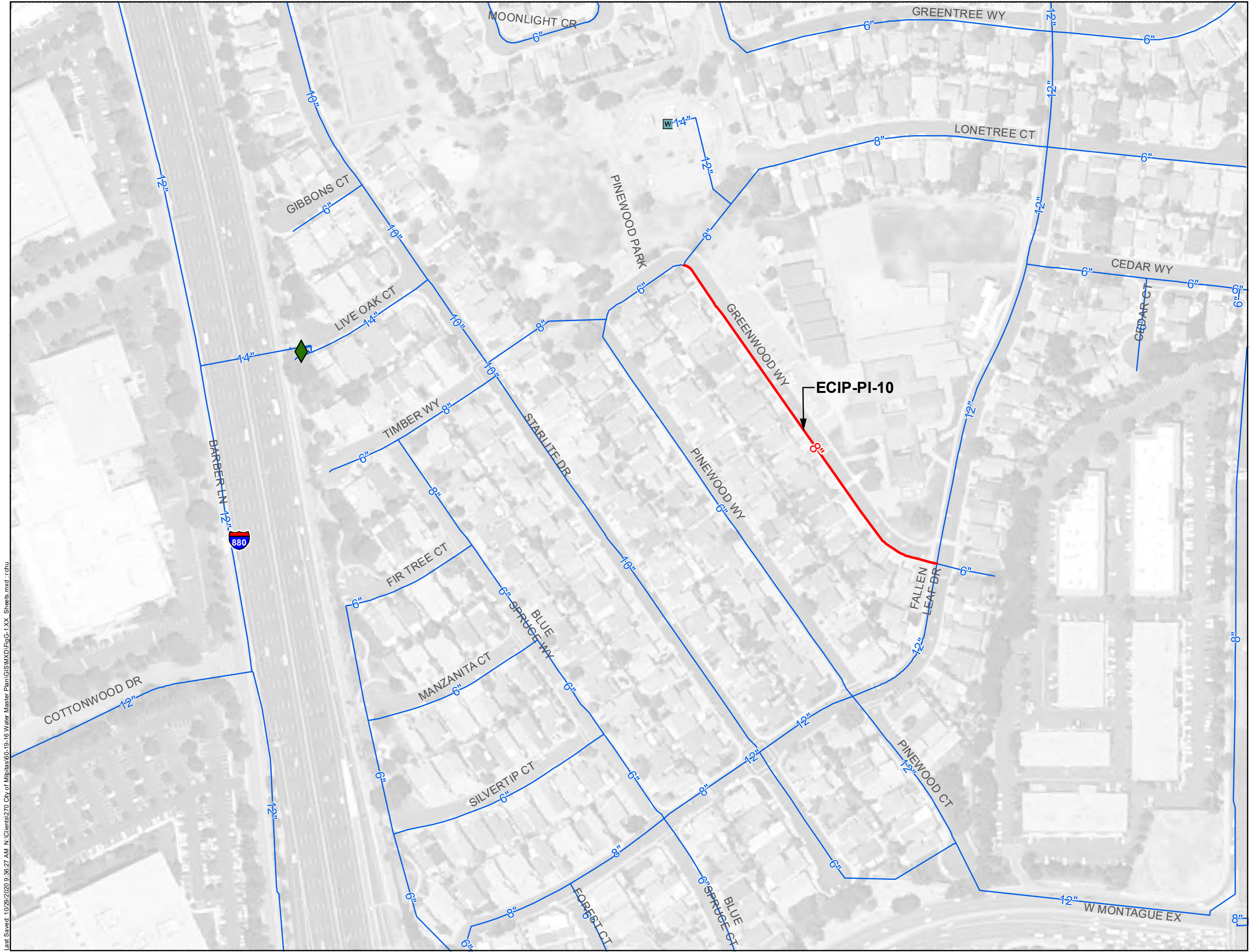
**Existing Facilities**

-  Existing Turnout
-  Existing Groundwater Well
-  Existing Pressure Reducing Valve
-  Existing Emergency PRV
-  Existing Pump Station
-  Existing Storage Reservoir
-  Existing Pipeline



**Figure G-1.15**  
**Recommended Improvements**  
**for Existing Water System**





**Recommended Facilities**

- Emergency PRV
- Improvement at Pump Station
- Isolation Valve
- Pipeline Upsize
- New Pipeline

**Existing Facilities**

- Existing Turnout
- Existing Groundwater Well
- Existing Pressure Reducing Valve
- Existing Emergency PRV
- Existing Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-1.16**  
**Recommended Improvements**  
**for Existing Water System**

**ECIP-V-01  
Hammond Emergency PRV**

CONSTRUCTION COST     \$ 282,000

CAPITAL COST            \$ 479,000

PRIORITY                  High

PURPOSE                  Fire Flow

LOCATION                   Hammond Way near Tom Evatt Park

PRESSURE ZONE        SF1/VW1

RECOMMENDED IMPROVEMENT SIZE

8-inch diameter PRV and piping.

REASON FOR IMPROVEMENT

Provide fire flows from Zone SF1 to Zone VW1.

PLANNING ASSUMPTIONS

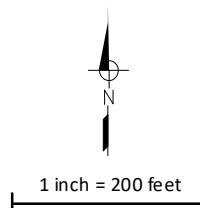
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

PRV costs include the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.



Legend

-  Emergency PRV
-  Existing SF1 Pipeline
-  Existing VW1 Pipeline



**Figure G-2.1  
City of Milpitas  
Project Summary Sheet (ECIP-V-01)**





## ECIP-PS-AY New Fire Pump at Ayer Pump Station

|                   |                   |
|-------------------|-------------------|
| CONSTRUCTION COST | \$ 1,216,733      |
| CAPITAL COST      | \$ 2,068,000      |
| PRIORITY          | Medium            |
| PURPOSE           | Fire Flow Backup  |
| LOCATION          | Ayer Pump Station |
| PRESSURE ZONE     | SF2               |

### RECOMMENDED IMPROVEMENT SIZE

Install one new fire pump at the existing Ayer Pump Station. Capacity shall be 4,00 gallons per minute (gpm) (5.76 million gallons per day (mgd)).

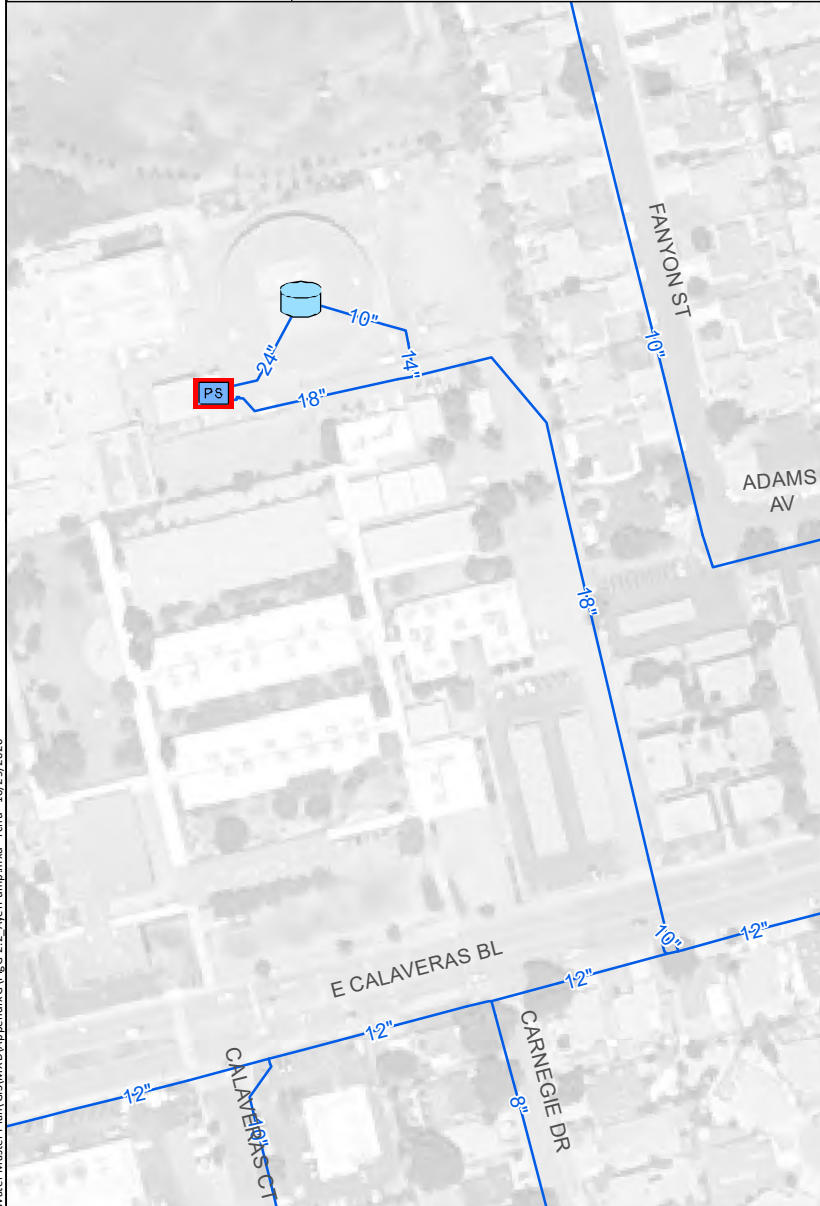
### REASON FOR IMPROVEMENT

Provide fire flows to Zone SF2 in the event of an SFPUC supply outage.

### PLANNING ASSUMPTIONS

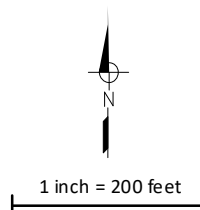
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

Pump station costs are based on enclosed stations with architectural and landscaping treatment suitable for residential areas. Since this improvement entails adding a pump to an existing pump station, costs for a new pump station (5.76 mgd firm capacity) have been discounted by 50 percent.



#### Legend

- PS Improvement at Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-2.2**  
**City of Milpitas**  
**Project Summary Sheet (ECIP-PS-AY)**





### ECIP-V-03 Diel Emergency PRV

|                   |                                              |
|-------------------|----------------------------------------------|
| CONSTRUCTION COST | \$ 282,000                                   |
| CAPITAL COST      | \$ 479,000                                   |
| PRIORITY          | Medium                                       |
| PURPOSE           | Fire Flow Backup                             |
| LOCATION          | Intersection of Coelho Street and Diel Drive |
| PRESSURE ZONE     | SF2/SF1                                      |

#### RECOMMENDED IMPROVEMENT SIZE

8-inch diameter PRV and piping.

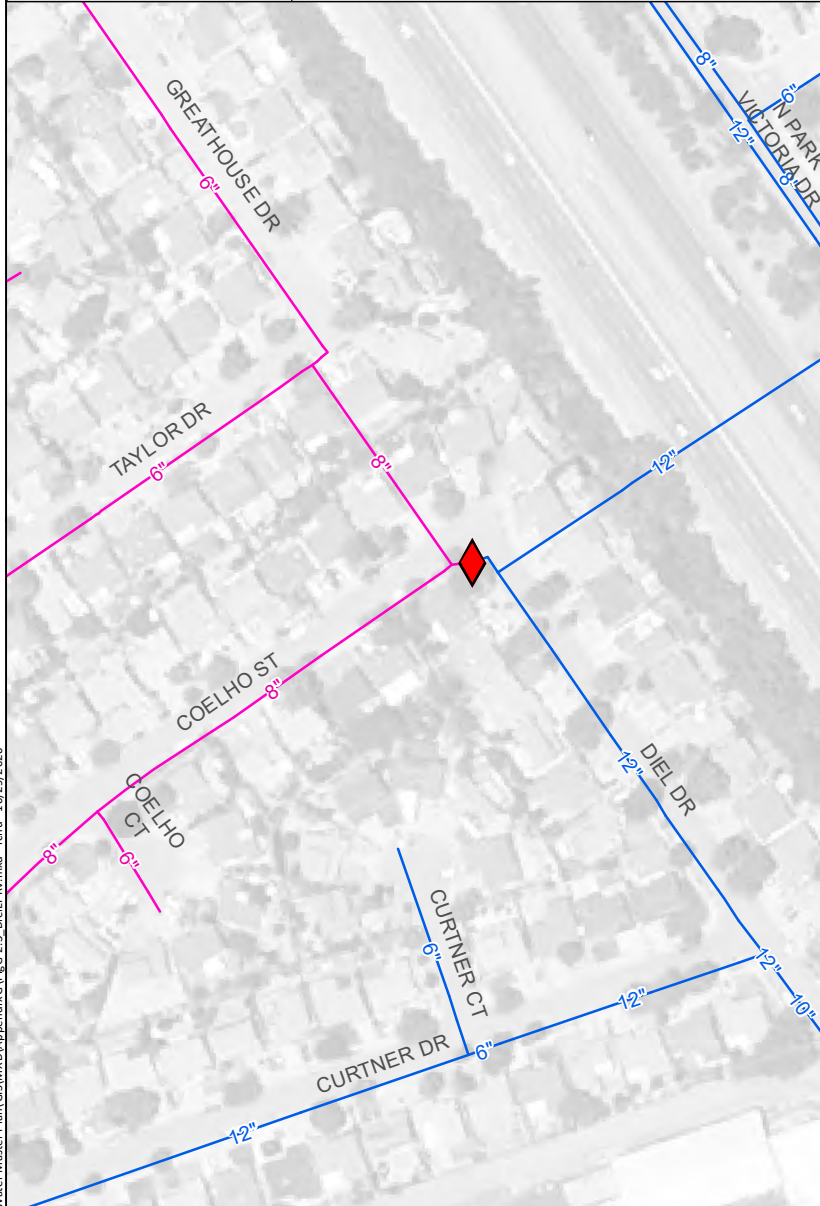
#### REASON FOR IMPROVEMENT

Supplement existing Sunnyhills PRV in providing fire flows from Zone SF2 to Zone SF1.

#### PLANNING ASSUMPTIONS

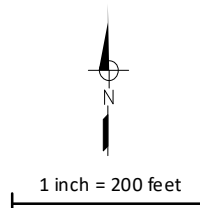
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

PRV costs include the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.



#### Legend

-  Emergency PRV
-  Existing SF1 Pipeline
-  Existing SF2 Pipeline



**Figure G-2.3**  
**City of Milpitas**  
**Project Summary Sheet (ECIP-V-03)**



## ECIP-BG-CC and ECIP-BG-TL Backup Generators at Country Club and Tularcitos Pump Stations

|                   |                                            |
|-------------------|--------------------------------------------|
| CONSTRUCTION COST | \$ 200,000 per generator (\$400,000 total) |
| CAPITAL COST      | \$ 340,000 per generator (\$680,000 total) |
| PRIORITY          | Low                                        |
| PURPOSE           | General Reliability                        |
| LOCATION          | Country Club and Tularcitos Pump Stations  |
| PRESSURE ZONE     | SF3 and SF4                                |

### RECOMMENDED IMPROVEMENT SIZE

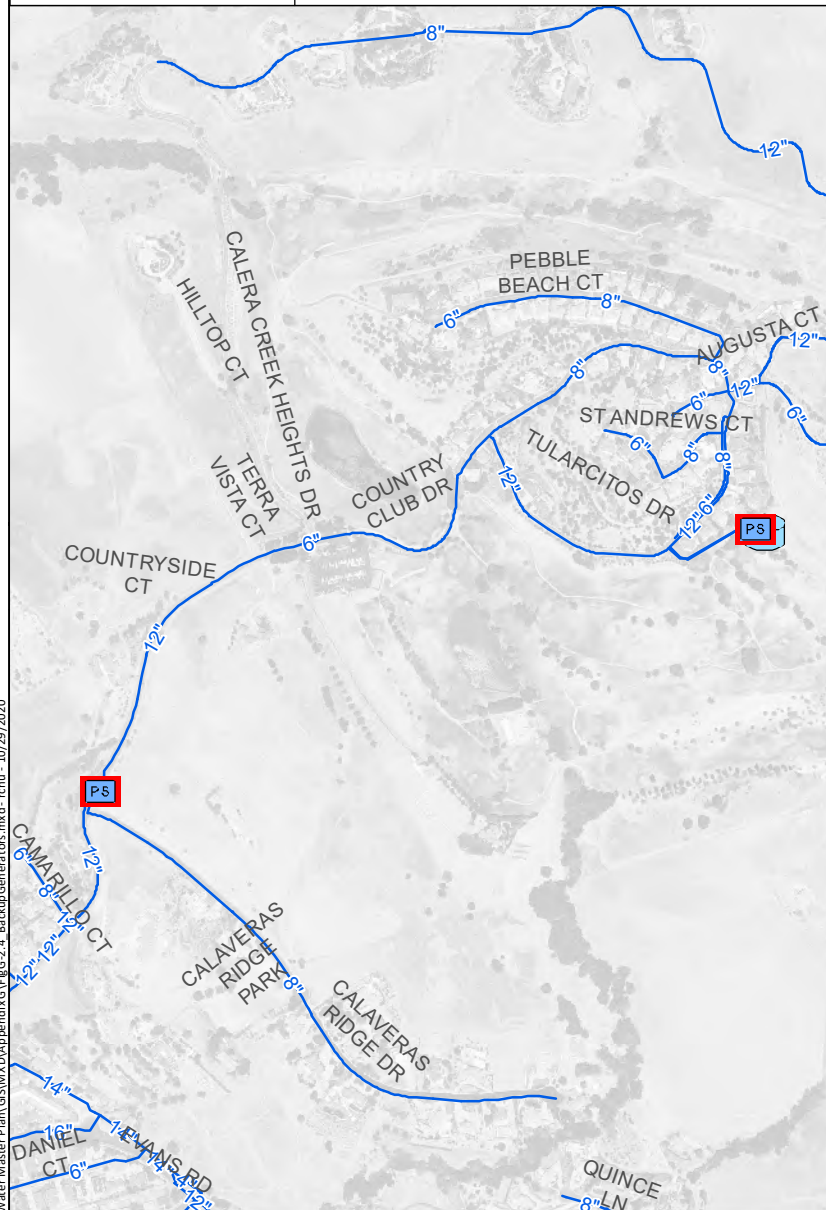
Generators shall be sized to meet the power demands of each pump station.

### REASON FOR IMPROVEMENT

Ensure continued pump operation in the event of a power outage.

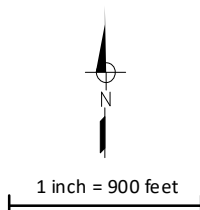
### PLANNING ASSUMPTIONS

Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).



#### Legend

- PS Improvement at Pump Station
- Existing Storage Reservoir
- Existing Pipeline



**Figure G-2.4**

**City of Milpitas - Project Summary Sheet  
(ECIP-BG-CC and ECIP-BG-TL)**



## BCIP-TO-01 Piper Turnout

CONSTRUCTION COST \$ 313,000

CAPITAL COST \$ 532,000

PRIORITY High

PURPOSE Firm Supply Capacity

LOCATION Piper Drive south of Garden Street

PRESSURE ZONE VW2

### RECOMMENDED IMPROVEMENT SIZE

Same capacity as the existing Gibraltar turnout: 10,000 gallons per minute (gpm) (14.4 million gallons per day (mgd)).

Connection from the turnout to the existing 18-inch diameter transmission main on Piper Drive shall be a 20-inch diameter pipeline.

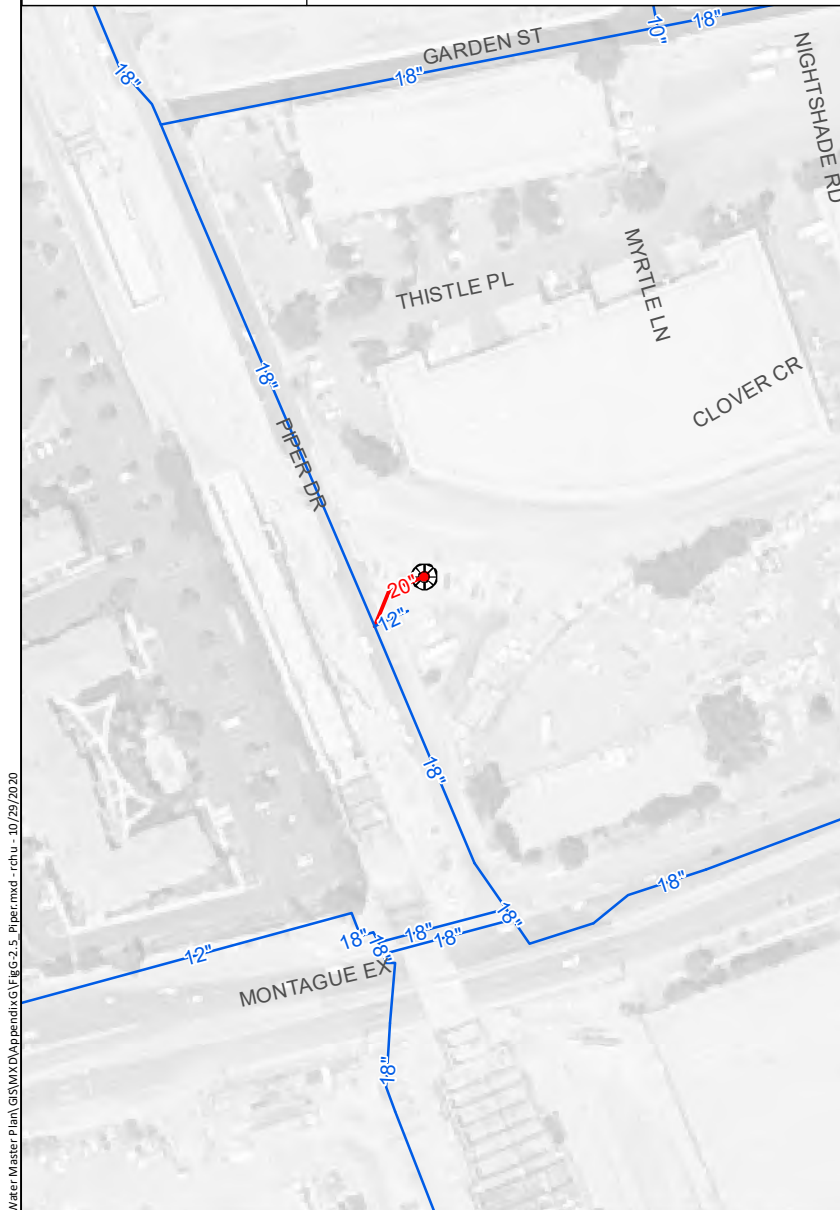
### REASON FOR IMPROVEMENT

Insufficient firm supply capacity in the Valley Water service area at buildout.

### PLANNING ASSUMPTIONS

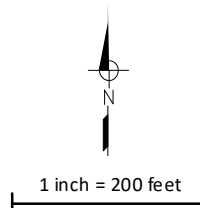
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

Turnout costs include the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.



#### Legend

-  Turnout
-  Turnout Pipeline
-  Existing Pipeline



**Figure G-2.5**  
**City of Milpitas**  
**Project Summary Sheet (BCIP-TO-01)**





**BCIP-S-01**  
**Storage Reservoir in Valley Water Service Area**

|                   |                                                   |
|-------------------|---------------------------------------------------|
| CONSTRUCTION COST | \$ 3,254,000                                      |
| CAPITAL COST      | \$ 5,532,000                                      |
| PRIORITY          | High                                              |
| PURPOSE           | Storage Capacity                                  |
| LOCATION          | Valley Water Service Area (Specific Location TBD) |
| PRESSURE ZONE     | VW1 or VW2                                        |

RECOMMENDED IMPROVEMENT SIZE

2.0 million gallons (MG).

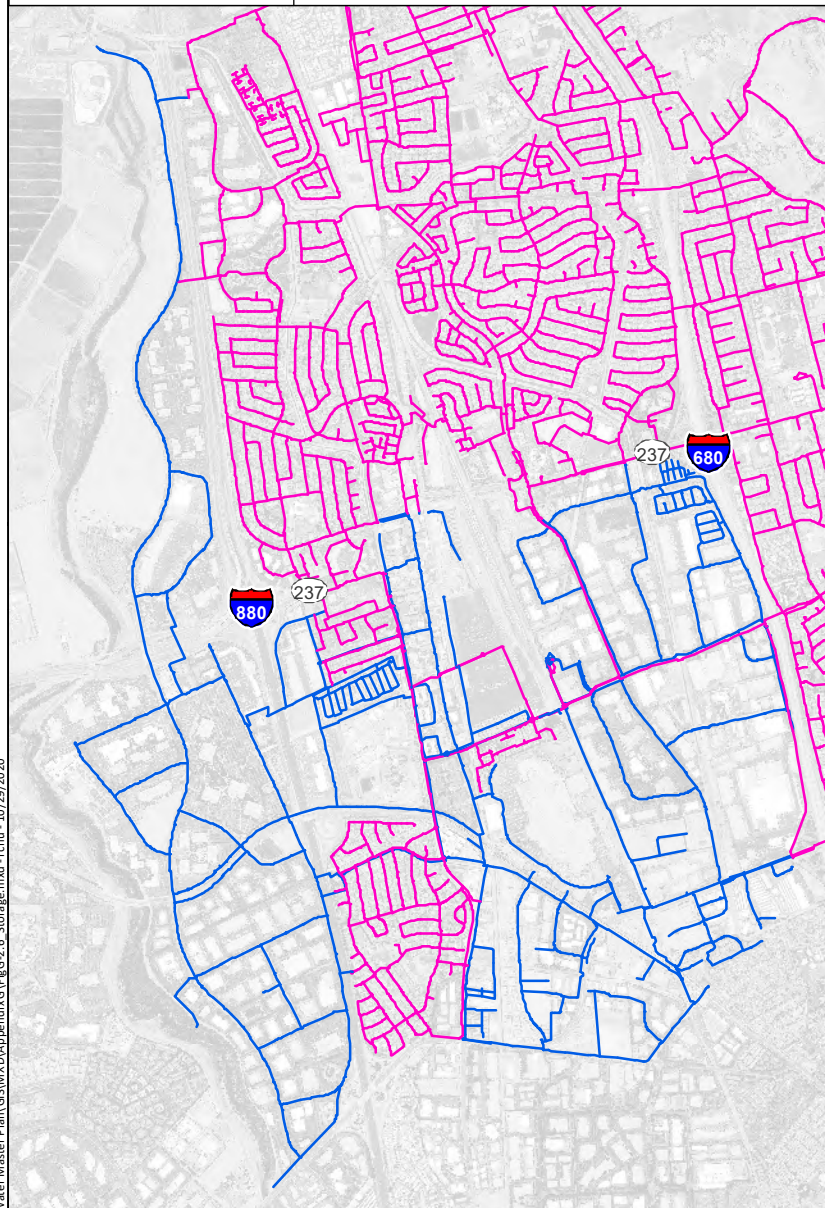
REASON FOR IMPROVEMENT

Insufficient storage capacity in the Valley Water service area at buildout.

PLANNING ASSUMPTIONS

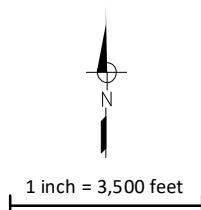
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

Storage reservoir will be aboveground steel tank. Costs include installation of the storage tank, site piping, earthwork, paving, instrumentation, and related sitework.



Legend

- Existing SFPUC Pipeline
- Existing VW Pipeline



**Figure G-2.6**  
**City of Milpitas**  
**Project Summary Sheet (BCIP-S-01)**





**BCIP-PS-01**  
**Pump Station for Reservoir in Valley Water Service Area**

|                   |                                                   |
|-------------------|---------------------------------------------------|
| CONSTRUCTION COST | \$ 2,433,466                                      |
| CAPITAL COST      | \$ 4,137,000                                      |
| PRIORITY          | High                                              |
| PURPOSE           | Deliver Stored Water from New Reservoir           |
| LOCATION          | Valley Water Service Area (Specific Location TBD) |
| PRESSURE ZONE     | VW1 or VW2                                        |

RECOMMENDED IMPROVEMENT SIZE

4,000 gallons per minute (gpm) firm capacity.

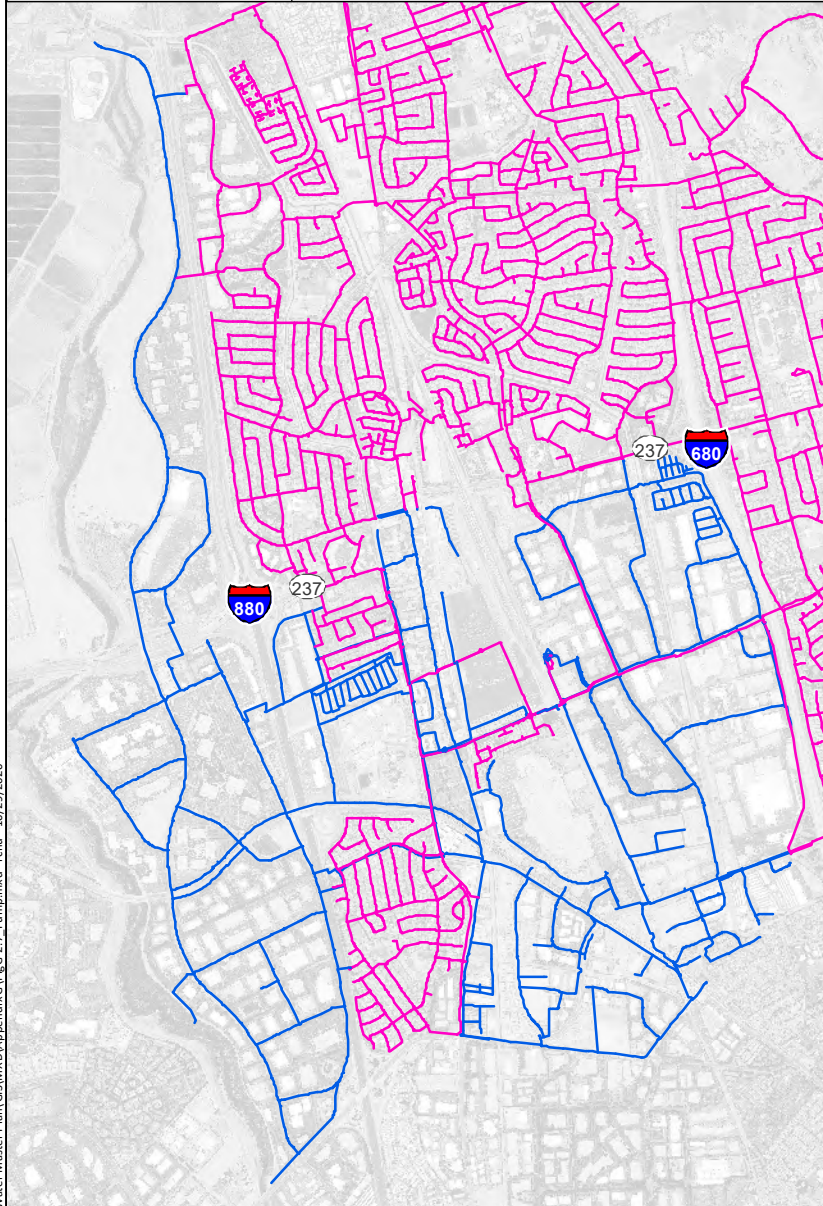
REASON FOR IMPROVEMENT

Pump station for recommended storage reservoir (BCIP-S-01).

PLANNING ASSUMPTIONS

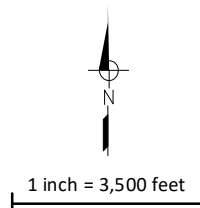
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

Costs assume an enclosed pump station with architectural and landscaping treatment suitable for residential areas.



Legend

- Existing SFPUC Pipeline
- Existing VW Pipeline



**Figure G-2.7**  
**City of Milpitas**  
**Project Summary Sheet (BCIP-PS-01)**



## BCIP-W-01 Curtis Well

CONSTRUCTION COST \$ 3,500,000

CAPITAL COST \$ 5,950,000

PRIORITY High

PURPOSE Storage Capacity (Groundwater Credit)

LOCATION Curtis Avenue near Parc Metro East

PRESSURE ZONE VW2

### RECOMMENDED IMPROVEMENT SIZE

Well capacity will be based on subsequent groundwater analysis that is not part of this report.

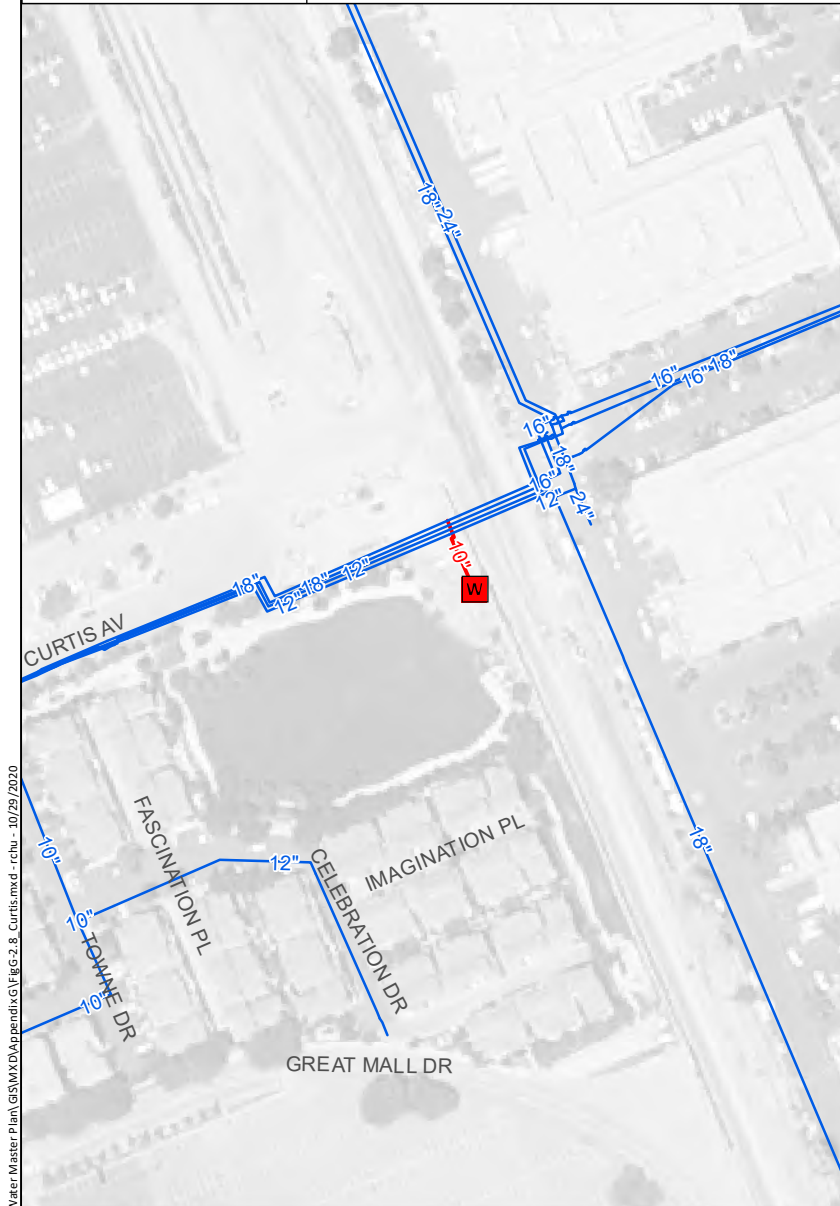
### REASON FOR IMPROVEMENT

Increase supply reliability and reduce storage requirement via emergency groundwater storage credit.

### PLANNING ASSUMPTIONS

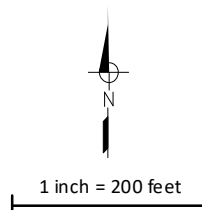
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

Well construction consists of pilot hole drilling, water quality/soil sampling, pilot hole reaming, well construction, well development and providing the necessary housing, pump, motor, automatic control equipment, discharge piping, supervisory control and data acquisition (SCADA), disinfection equipment, and a backup power generator. Costs assume a well capacity between 500 and 1,000 gpm. A higher capacity may increase costs.



#### Legend

- W Groundwater Well
- Well Pipeline
- Existing Pipeline



**Figure G-2.8**  
**City of Milpitas**  
**Project Summary Sheet (BCIP-W-01)**



**BCIP-V-01  
Cedar Emergency PRV**

|                   |                                                 |
|-------------------|-------------------------------------------------|
| CONSTRUCTION COST | \$ 282,000                                      |
| CAPITAL COST      | \$ 479,000                                      |
| PRIORITY          | High                                            |
| PURPOSE           | Fire Flow                                       |
| LOCATION          | Intersection of Cedar Way and South Main Street |
| PRESSURE ZONE     | SF1/VW1                                         |

RECOMMENDED IMPROVEMENT SIZE

8-inch diameter PRV and piping.

REASON FOR IMPROVEMENT

Provide fire flows from Zone SF1 to Zone VW1.

PLANNING ASSUMPTIONS

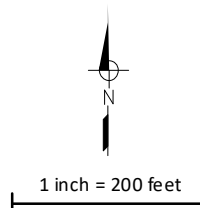
Costs are in 2020 dollars and assume normal construction conditions. Special or difficult conditions would significantly increase costs. Capital costs are rounded to the nearest thousand dollars and include mark-ups equal to 70 percent (Design and Construction Contingency: 35 percent; Engineering: 10 percent; Construction Management: 15 percent; and Program Implementation: 10 percent).

PRV costs include the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.



Legend

-  Emergency PRV
-  Existing SF1 Pipeline
-  Existing VW1 Pipeline



**Figure G-2.9  
City of Milpitas  
Project Summary Sheet (BCIP-V-01)**



**WE SUPPORT OUR COMMUNITIES**  
**WE ARE WATER FOCUSED**  
**WE TAKE PRIDE IN WHAT WE DO**  
**WE STRIVE TO BECOME OUR BEST**  
**WE DO WHAT'S RIGHT**  
**WE BELIEVE IN QUALITY**  
**WE LISTEN**  
**WE SOLVE CHALLENGING PROBLEMS**  
**WE SEE THE BIGGER PICTURE**  
**WE TAKE OWNERSHIP**  
**WE COLLABORATE**  
**WE HAVE FUN**  
**WE ARE WEST YOST**







**CITY OF MILPITAS  
AGENDA REPORT  
(AR)**

|                        |                                                                                              |
|------------------------|----------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Receive a Presentation on the Draft Milpitas Sewer Master Plan</b>                        |
| <b>Category:</b>       | Community Services and Sustainable Infrastructure                                            |
| <b>Meeting Date:</b>   | 5/18/2021                                                                                    |
| <b>Staff Contact:</b>  | <b>Tony Ndah, 408-586-2602</b>                                                               |
| <b>Recommendation:</b> | Receive a presentation on the draft Milpitas Sewer Master Plan and provide feedback to staff |

**Background:**

The City of Milpitas owns and maintains the sewer collection system, consisting of 175 miles of sewer lines and 2 pumping stations. The wastewater collected by the City's system is conveyed at an average rate of 7.5 million gallons per day (MGD) to the San Jose/Santa Clara Regional Wastewater Facility for treatment before it is discharged to the San Francisco Bay or recycled for industrial and irrigation purposes. The City of Milpitas pays a share of the capital cost of the Regional Wastewater Treatment Facility (RWF), operated by the City of San Jose, based on the City's capacity rights in proportion to the 167 million gallons per day (MGD) total capacity of the RWF. The City also pays a share of the operating cost, based on the volume of wastewater discharged to RWF. The City has rights to discharge 14.25 MGD to the RWF under its current allotment.

Based on industry standards and practices, a sanitary sewer master plan should be updated every 10 years to assess the reliability and capacity of the system. A reliable sanitary sewer system is one that has adequate storage to prevent surcharge, is optimized to efficiently convey wastewater to the treatment facility and incorporates a proactive and manageable capital improvement program. On September 17, 2019, the City Council awarded HydroScience Engineers, Inc. a Professional Services Agreement for the preparation of the sewer master plan. The Sewer Master Plan addresses sewer infrastructure needs based on long-term plans for City development under its adopted 2040 General Plan.

The City's last sanitary sewer master plan, the 2009 Sanitary Sewer Master Plan Update (2009 SSMPU), was an update of the City's 2002 Sanitary Sewer Master Plan (2002 Master Plan). The 2002 Master Plan defined the sanitary sewer system reliability improvements necessary to meet the City's 2002 sanitary sewer demand and future demand associated with future development plans for 2008, 2018, and build-out year of 2021. The 2009 SSMPU built on the 2002 Master Plan by incorporating the TASP Specific Plan Area and assessing the sanitary sewer system reliability as a result of the significant growth associated to TASP.

Since the completion of the 2009 Sewer Master Plan, the City of Milpitas has continued to experience significant growth and has recently adopted the 2040 General Plan and in the process of updating the Gateway-Main Street Specific Plan (formerly known as the Midtown Specific Plan) and the Metro Specific Plan.

**Analysis:**

The major components and recommendations of the Sewer Master Plan include the following:

1. Existing and Projected Future Sewer Demand

To develop base sanitary flows (BSF) – the flow directly contributed by the customer – wastewater flows were assigned to every contributing parcel in the City.

The following scenarios were developed and analyzed:

- **Existing Dry Weather:** Used to calibrate the hydraulic model to dry weather conditions.
- **Existing Wet Weather:** Used for calibration of wet weather conditions.
- **Future Dry Weather:** Land use categories updated based on future planned land use changes in "Opportunity Areas."
- **Future Wet Weather:** Land use categories updated based on future planned land use changes in "Opportunity Areas."

Future City sewer treatment capacity demands were projected based on land use data, the preferred method for sewer system master planning and hydraulic modeling. Land-use based demand projections geographically allocate water use based on existing consumption and future development. The City's projected sewer treatment volume to RWF does not exceed the 14.25 MGD allotment.

## 2. Evaluation of Existing Sewer System

The City's existing sewer system was evaluated based on supply, storage, and pumping capacities, as well as its ability to meet recommended performance and operational criteria. A summary of the analysis is below:

- Distribution System Supply Capacity --There are no major capacity deficiencies identified as part of this analysis. There were six pipeline segments with a recorded surcharge indicating that they are under capacity. Of these six segments, five of them have freeboard values greater than five feet, so they do not fulfill the criteria for a deficiency, and thus are not considered hydraulically deficient.

## 3. Evaluation of Future Sewer System

The City's buildout (2040) water system was evaluated based on supply, storage, and pumping capacities, as well as its ability to meet recommended performance and operational criteria. A summary of the analysis is below:

- Distribution System Supply Capacity --There were no additional capacity deficiencies identified under future conditions that were not seen under existing conditions. There is a single pipeline segment that has a freeboard of 4.7 ft., slightly less than the freeboard criteria; however, for a single pipe reach that is considered marginally deficient, replacement is not recommended without further cause. It is recommended that the City monitor this location for potential surcharging.

## 4. Asset Condition Assessment and Risk Management

As part of the City's Master Plan project, a *Sewer Utility Asset Renewal and Replacement Study* (R&R Study) was conducted. The study documents the City's Business Risk Exposure (BRE) based on the physical condition and desktop assessment of the City's collection system applying a set of factors developed to determine the relative risk of failure for each pipeline segment.

Part of evaluating the condition of the City's collection system is understanding the pipe condition based on the level of structural and/or operations and maintenance (O&M) related defects. For this part of the condition assessment, key segments of the system were selected for closed-circuit television (CCTV) investigation. CCTV work performed on approximately 20 miles of pipeline. This constitutes approximately 12% of the entire system.

In addition to the CCTV condition assessment performed using the CCTV footage, a desktop condition assessment was performed to determine the relative risk of failure of each pipeline segment. A pipeline's risk of failure is determined by a combination of the *likelihood* and the *consequence* of the failure of the pipe segment. The results of this assessment represent the City's BRE from which a capital improvement program (CIP) was developed.

The desktop risk analysis of all pipe segments revealed that 2% of mains in the system are rated to be high or extreme risk, 20% low to medium risk. Pipe segments considered high or extreme risk are at the

greatest likelihood of deterioration and/or have the highest consequence of failing. As such, pipe rehabilitation and inspection for these pipelines are prioritized in the R&R Plan. On the other hand, the most common COF drivers of high-risk rating is proximity to waterways, large pipe diameter, and proximity to high traffic flow areas. To that end, a compilation of improvement projects was identified as part of the desktop risk analysis and condition assessment; however, Staff will utilize additional nondestructive evaluation and structural health monitoring techniques over the next years to further assess the soundness of the underground infrastructure and refine the desktop risk analysis of all pipe segments

5. Recommended Capital Improvement Program

The recommended CIP for the City's existing and future sewer system includes recommendations from the existing system evaluation and the future system evaluation. The general strategy is to address the highest risk/highest priority projects in the near-term (Years 1-5) with lower risk projects deferred to the medium- (Years 6-10) and long-term (Years 11-20). The City's CIP is intended to serve as a comprehensive planning tool for budgeting and carrying out capital projects. Capital projects are designed to adhere to the City Council goals and priorities; among them is to maintain a superior level of service to the community. The total CIP cost through 2040 is approximately \$28 million (2020 dollars).

The Milpitas Sanitary Sewer Master Plan report has compiled the findings and recommendations based on analysis which tracks with industry standard procedures and has provided a phased implementation of identified improvements with planning level cost estimates. This document will be the basis of future updates and is intended to either supplement or inform supplemental reports associated but not limited to General Plans, RWF Studies, Specific Plans, and associated Sanitary Sewer Supply Assessments.

6. Next Steps

Following Council's receipt of the presentation on the draft Milpitas Sewer Master Plan, staff will incorporate any feedback received from Council to finalize the report. In addition, Staff is working on a Financial Utility Master Plan (FUMP), which will provide recommended financial strategies and the most effective expenditure of capital for meeting the present and future utility system needs.

Staff will return to Council in the 2<sup>nd</sup> quarter of FY22 to present the FUMP and seek Council approval of the FUMP and Final Milpitas Sewer Master Plan. In addition, prior to the approval of the Sewer Master Plan, staff will evaluate the environmental effects of the Recommended Capital Improvement Program to determine the appropriate level of environmental review required to comply with the California Environmental Quality Act.

**Policy Alternatives:**

Not applicable.

**Fiscal Impact:**

This is an information item for Council review and discussion with no fiscal impact.

**California Environmental Quality Act:**

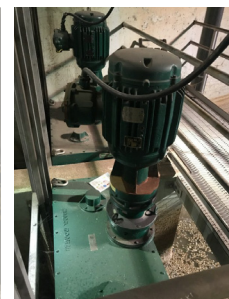
The action being considered does not constitute a "project" within the meaning of the California Environmental Quality Act ("CEQA") because no decisions will be made at this meeting with approval of the Plan to be considered at a future meeting after environmental review has been conducted.

**Recommendation:**

Receive a presentation on the draft Milpitas Sewer Master Plan and provide feedback to staff

**Attachments:**

Draft Milpitas Sewer Master Plan



# City of Milpitas Sewer Master Plan





City of Milpitas

# Sewer Master Plan

Prepared by HydroScience Engineers, Inc.



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## ABBREVIATIONS

|           |                                                                      |
|-----------|----------------------------------------------------------------------|
| A         | Amperes                                                              |
| ABS       | Acrylonitrile-Butadiene-Styrene                                      |
| AIC       | Ampere Interrupting Capacity                                         |
| BRE       | Business Risk Exposure                                               |
| BSF       | Base sanitary flow                                                   |
| CCTV      | Closed caption television                                            |
| CEQA      | California Environmental Quality Act                                 |
| CIP       | Capital Improvement Plan/Capital Improvement Program, Cast Iron Pipe |
| CIPP      | Cured-in-Place Pipe                                                  |
| City      | City of Milpitas                                                     |
| CoF       | Consequence of failure                                               |
| d         | Wastewater depth                                                     |
| D         | Pipe diameter                                                        |
| DEM       | Digital elevation model                                              |
| DIP       | Ductile Iron Pipe                                                    |
| DU        | Dwelling unit                                                        |
| DWF       | Dry weather flow                                                     |
| ESDC      | Engineering services during construction                             |
| FM        | Flow meter                                                           |
| ft, ‘     | Foot, feet, linear feet                                              |
| ft/s      | Feet per second                                                      |
| FY        | Fiscal year                                                          |
| GIS       | Geographic Information Systems/ArcGIS geodatabase                    |
| GP        | General Plan                                                         |
| gpd       | Gallons per day                                                      |
| GWI       | Groundwater infiltration                                             |
| HDPE      | High-Density Polyethylene                                            |
| HGL       | Hydraulic grade line                                                 |
| Hp        | Horsepower                                                           |
| IAP       | InfoAsset Planner by Innovyze®                                       |
| in, “     | Inch, inches                                                         |
| InfoWorks | InfoWorks ICM by Innovyze®                                           |
| kV        | Kilovolt                                                             |
| kVA       | Kilovolt-ampere                                                      |
| LAFCO     | Local Agency Formation Commission                                    |
| LoF       | Likelihood of failure                                                |
| Main LS   | Milpitas Main Lift Station                                           |
| MGD       | Millions of gallons per day                                          |
| MH        | Manhole                                                              |
| NASSCO    | National Association of Sewer Service Companies                      |

|              |                                                   |
|--------------|---------------------------------------------------|
| NAVD 88      | North American Vertical Datum of 1988             |
| NEMA         | National Electrical Manufacturers Association     |
| NGVD 29      | National Geodetic Vertical Datum of 1929          |
| NOAA         | National Oceanic and Atmospheric Administration   |
| O&M          | Operations & Maintenance                          |
| P            | Pole                                              |
| PACP         | Pipeline Assessment Certification Program         |
| ph           | phase                                             |
| PVC          | Polyvinyl Chloride                                |
| QC           | Quality control                                   |
| RCP          | Reinforced Concrete Pipe                          |
| RDI/I        | Rainfall dependent inflow and infiltration        |
| RG           | Rain gauge                                        |
| ROW          | Right-of-way                                      |
| RWF          | San Jose-Santa Clara Regional Wastewater Facility |
| RWQCB        | Regional Water Quality Control Board              |
| SBWR         | South Bay Water Recycling                         |
| SFPUC        | San Francisco Public Utility Commission           |
| SMP          | Sewer Master Plan                                 |
| SOI          | Sphere of Influence                               |
| SSMP         | Sanitary Sewer Management Plan                    |
| SSO          | Sanitary sewer overflow                           |
| TASP         | Transit Area Specific Plan                        |
| UF           | Unit flow                                         |
| UGB          | Urban Growth Boundary                             |
| USA          | Urban Service Area                                |
| USGS         | United States Geological Survey                   |
| V            | Volts                                             |
| VCP          | Vitrified Clay Pipe                               |
| Venus Way LS | Venus Way Lift Station                            |
| VFD          | Variable frequency drive                          |
| W            | Watts                                             |
| WDR          | RWQCB General Waste Discharge Requirements        |
| WWF          | Wet weather flow                                  |

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## EXECUTIVE SUMMARY

HydroScience Engineers, Inc. (HydroScience) was retained by the City of Milpitas (City), to prepare the City Sewer Master Plan (SMP) and develop a Capital Improvement Plan (CIP) based on the current (2020) and future (2040) planning horizons. This executive summary provides a concise discussion of the project elements including background information, analyses conducted, and recommendations.

### Services and Service Area

The City is in Santa Clara County and is bounded by the cities of Fremont to the north, San Jose to the south and west, and unincorporated Santa Clara County to the east. The City encompasses 14 square miles and is approximately 45 miles southeast of San Francisco (see **Figure ES-1**). The City provides wastewater collection services to a population of 77,961 according to the Department of Finance.

The wastewater collection system consists of approximately 160 miles of gravity sewers, with pipe diameters ranging from 4- to 66-inches. The collection system generally flows from east to west and south to north towards the San Francisco Bay. Most of the collection system flows by gravity to the Milpitas Main Lift Station (Main LS) then is pumped to the San Jose-Santa Clara Regional Wastewater Facility (RWF) through dual force mains. The Venus Way Lift Station (Venus Way LS) pumps sewage from a small portion of the City that is at a lower elevation up to a higher elevation where it then flows by gravity to the Main LS. **Figure ES-2** provides an overview of the wastewater collection system.

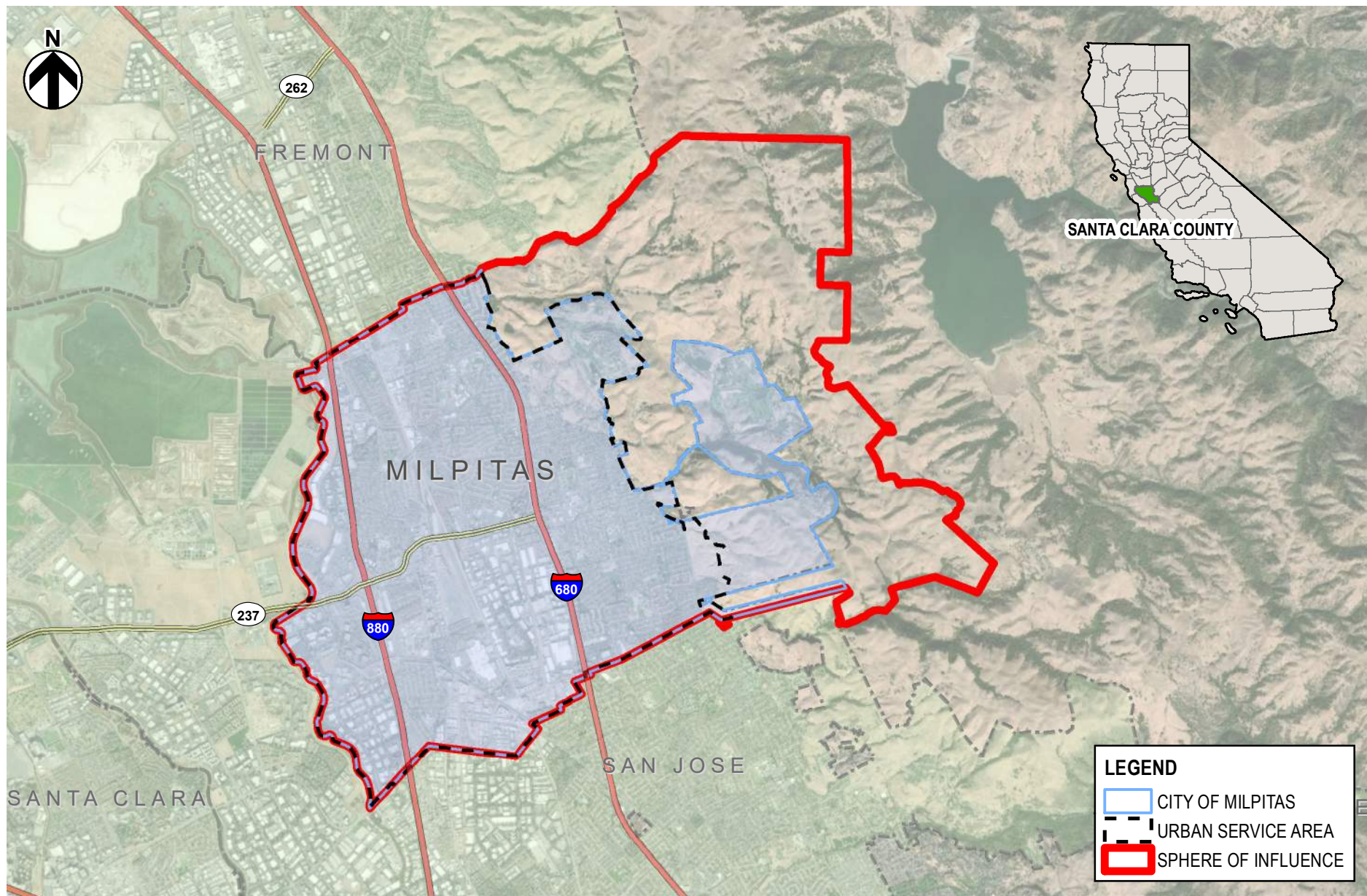
The City's wastewater collection system includes pipelines and structures of varying age, size, and material. According to the City's ArcGIS geodatabase (GIS), most the City's wastewater collection system pipelines are vitrified clay pipe (VCP) and 4- to 12-inches in diameter, and approximately 70% of all pipelines were built before 1990. The collection system also includes almost 3,000 manholes, of which approximately 60% were built before 1990. Of these manholes, 177 were identified as flow splits – manholes that allow outflow via two or more pipes.

### Condition Assessment

As part of the City's Master Plan project, a *Sewer Utility Asset Renewal and Replacement Study* (R&R Study) was conducted. The study documents the City's Business Risk Exposure (BRE) based on the physical condition and desktop assessment of the City's collection system applying a set of factors developed to determine the relative risk of failure for each pipeline segment.

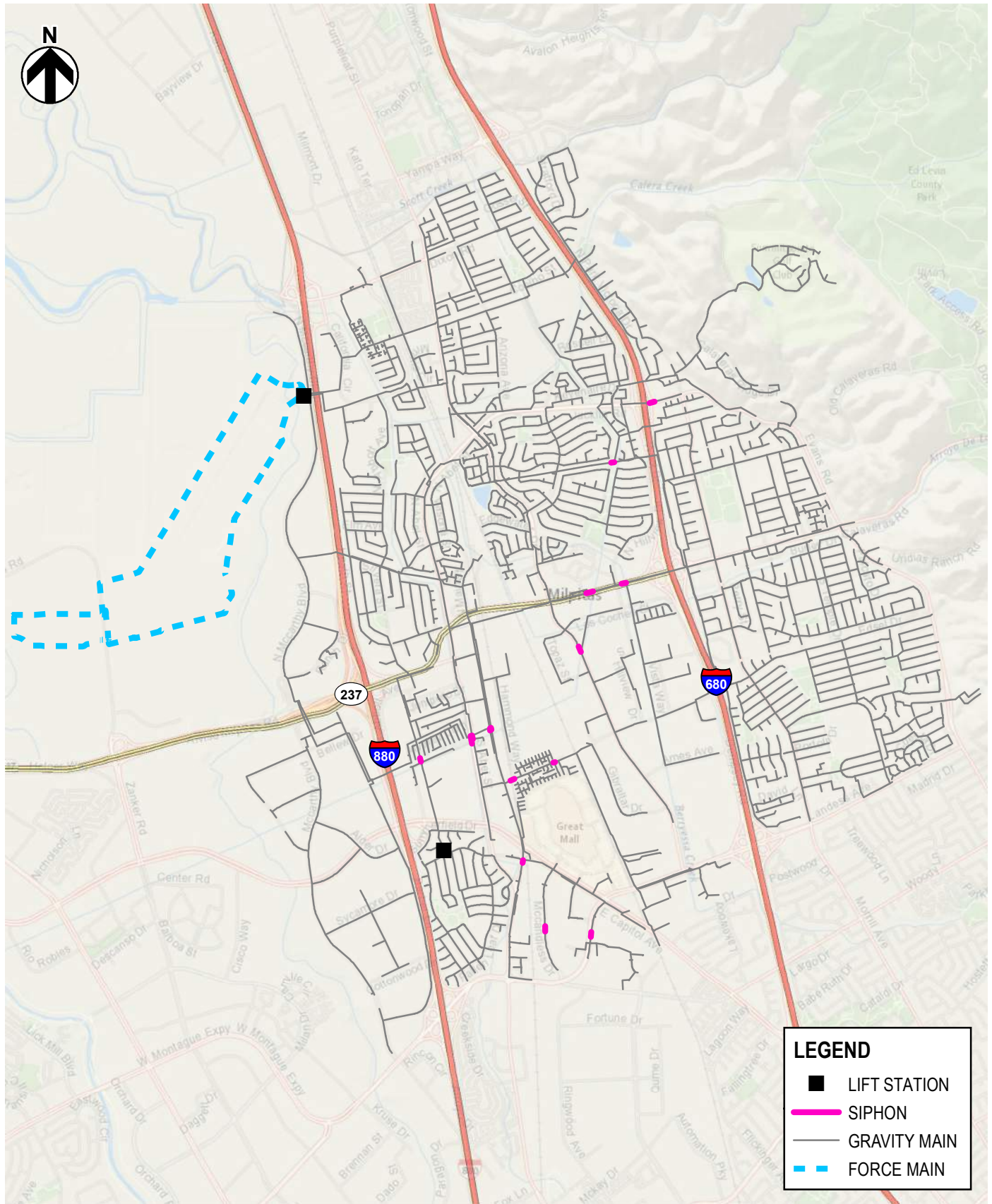
The first element of the study involved performing a field investigation using closed-circuit television (CCTV) to assess the condition of key pipeline segments in the collection system. National Plant Services Inc. (NPS) successfully inspected 105,211 ft (approximately 20 miles) of pipeline. For each pipeline segment inspected, structural and operations and maintenance (O&M) related defects were identified and graded on a scale of one (least severe) to five (most severe) based on the type and severity of the defect in accordance with the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP).





**FIGURE ES-1**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
PROJECT LOCATION MAP





**FIGURE ES-2**  
**CITY OF MILPITAS**  
**SEWER MASTER PLAN**  
**WASTEWATER COLLECTION SYSTEM OVERVIEW**

The second element of the study involved a desktop assessment of the entire collection system based on relative risk of failure of each pipeline segment. A pipeline's risk of failure is determined by a combination of the *likelihood* and the *consequence* of the failure of the segment.

Likelihood of failure (LoF) and consequence of failure (CoF) scores were assigned to each pipeline segment by considering various factor ratings with assigned factor weightings. Factor ratings were given on a scale of one (least likely to fail/least consequential) to five (most likely to fail/most consequential). The weighting of each factor was assigned based on the relative criticality of that factor, with higher weighting factors assigned to the most critical factors. The following factors, typical for sewer renewal/replacement, were selected for this Study:

**LoF Factors:**

- Pipe age
- Pipe material
- Structural condition
- Presence of pipe obstructions
- Required pipe cleaning
- Proximity to landslide zones
- Proximity to earthquake faults

Local geology (liquefaction)

**CoF Factors:**

- Sewer size (pipe diameter)
- Proximity to critical facilities
- Road type (impact to transit/traffic)
- Railroad proximity
- Easement (access restriction)
- Pipeline depth
- Proximity to waterway or waterbody

The following equations were used to calculate a risk score for each pipeline segment:

$$\text{Risk (BRE)} = \text{LoF Score} \times \text{CoF Score}$$

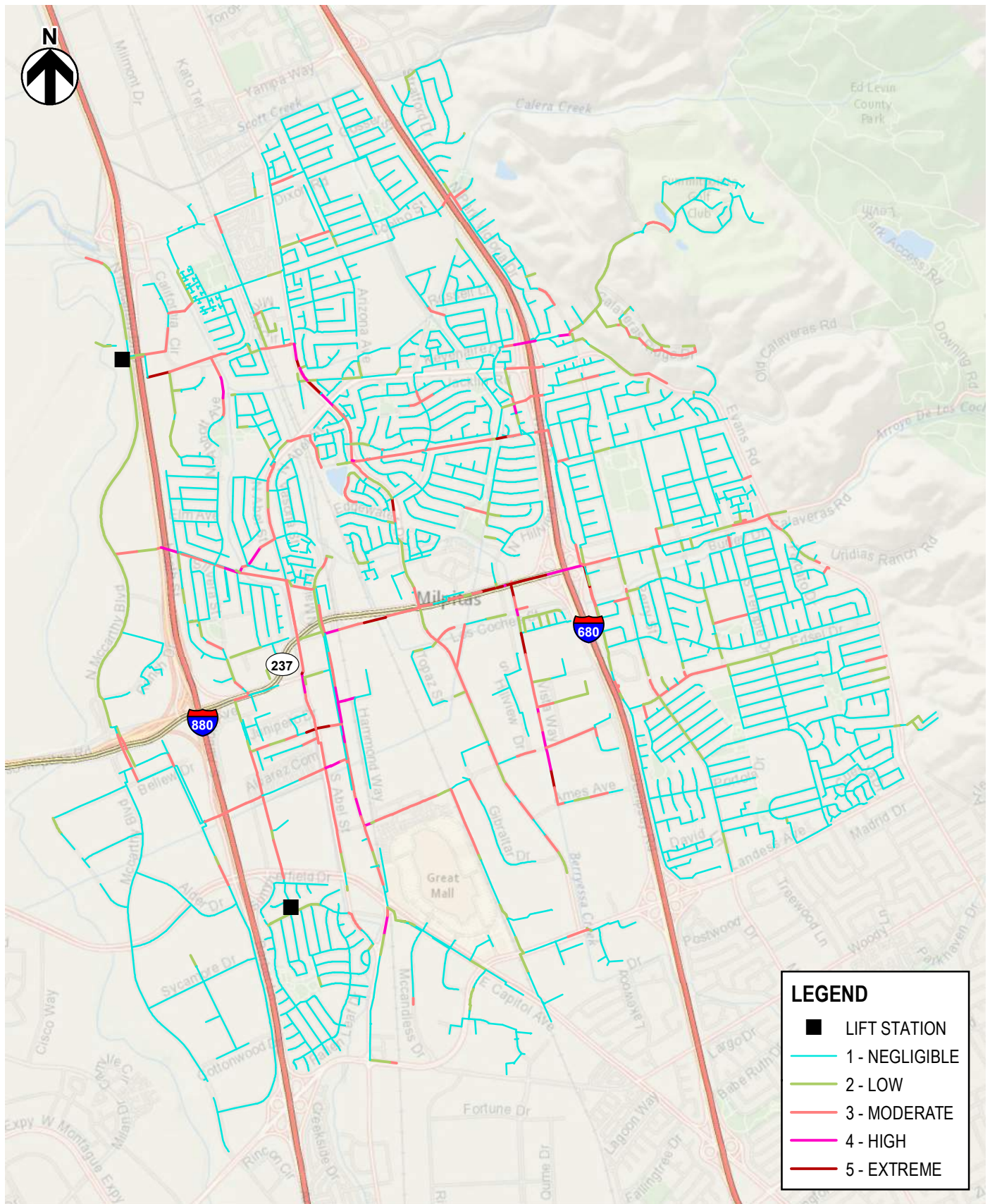
$$\text{LoF Score} = \sum (\text{LoF Rating} \times \text{LoF Weighting})$$

$$\text{CoF Score} = \sum (\text{CoF Rating} \times \text{CoF Weighting})$$

Figure ES-3 presents the resulting BRE scores for all pipelines in the entire city.

## Hydraulic Model Land Use and Network Development

To develop base sanitary flows (BSF) – the flow directly contributed by the customer – wastewater flows were assigned to every contributing parcel in the City. For planning level analysis, parcels of similar land use types are estimated to have similar wastewater flow rates either on a per parcel basis (gpd/parcel) or per acre basis (gpd/acre) and similar diurnal patterns. City General Plan (GP) land use designations were reviewed for each parcel in the City. For modeling purposes, some modifications to the land uses were warranted to ensure relevance to the sewer analysis. Land use types expected to generate similar wastewater flows were consolidated into model-based land use designations to facilitate unit flow (UF) analysis (listed in **Table 5-1**). Land uses that have little to no contribution to the sewer system were excluded from further analysis. **Figure ES-4** presents the City according to the model-based land designations.



**FIGURE ES-3**  
**CITY OF MILPITAS**  
**SEWER MASTER PLAN**  
**BUSINESS RISK EXPOSURE SCORE MAP**



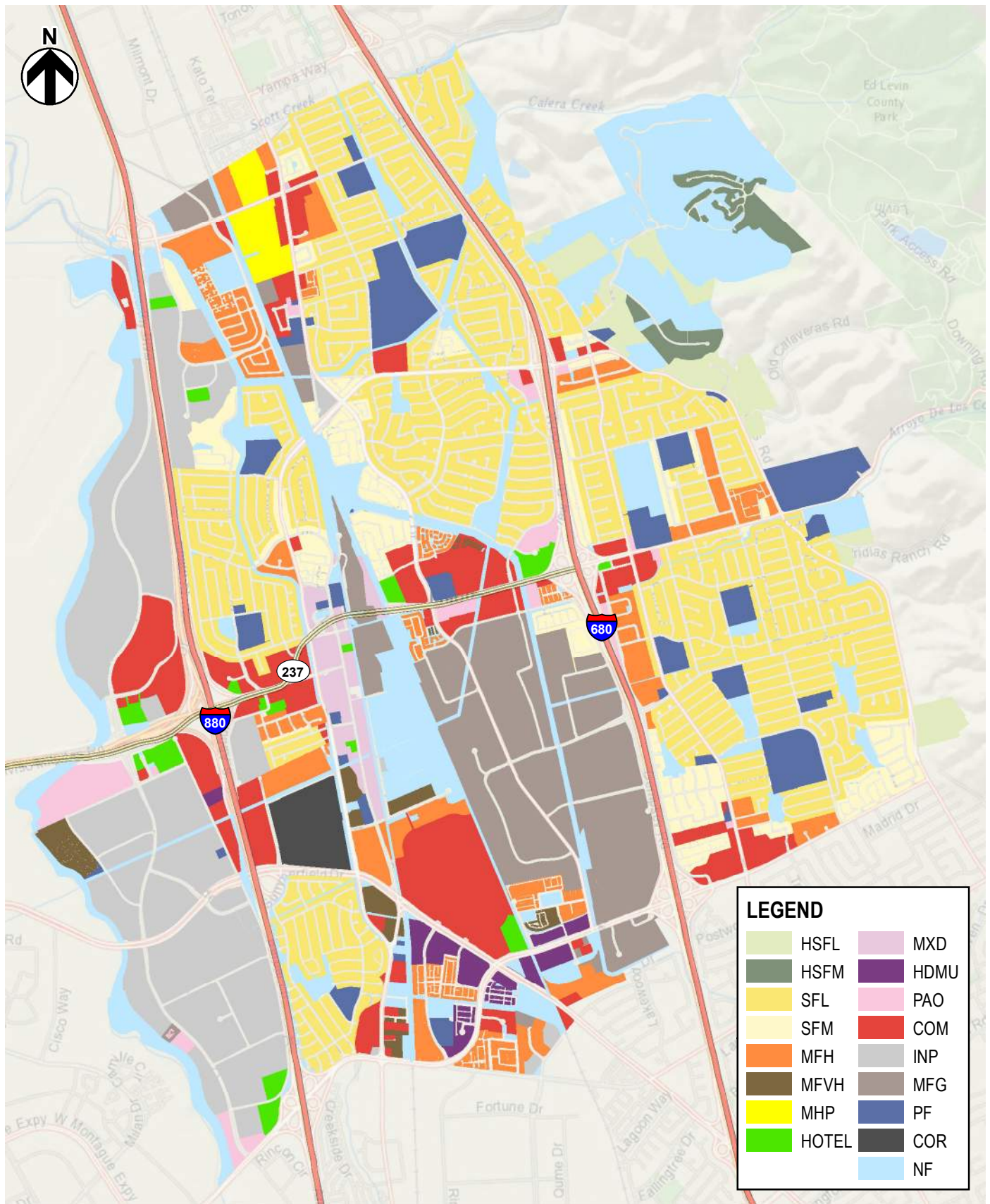
The City has identified “Opportunity Areas” which refers to parcels identified within the City that may be considered for future redevelopment. The future land uses identified in the “Opportunity Areas” were reviewed and assigned the model-based land use designations listed in **Table ES-1** according to the anticipated use, density, and wastewater flow rates.

**Table ES-1: Model-Based Land Use Designations for Existing Conditions**

| GP Land Use                               | Code      | Model-Based Land Use                                                            | Code  |
|-------------------------------------------|-----------|---------------------------------------------------------------------------------|-------|
| Hillside Very Low Density                 | HVL       | Hillside Single-Family Low Density                                              | HSFL  |
| Hillside Low Density                      | HLD       |                                                                                 |       |
| Hillside Medium Density                   | HMD       | Hillside Single Family Medium Density                                           | HSFM  |
| Valley Floor Single-Family Low Density    | SFL       | Valley Floor Single-Family Low Density                                          | SFL   |
| Valley Floor Single-Family Medium Density | SMD       | Valley Floor Single-Family Medium Density                                       | SFM   |
| Multi-Family Medium Density               | MFM       |                                                                                 |       |
| Multi-Family High Density                 | MFH       | Valley Floor Multi-Family High Density                                          | MFH   |
| Multi-Family Very High Density            | VHD       | Valley Floor Multi-Family Very High Density                                     | MFVH  |
| Mobile Home Park                          | MHP       | Mobile Home Park                                                                | MHP   |
| Mixed Use                                 | MXD       | Mixed Use                                                                       | MXD   |
| Boulevard Very High-Density Mixed Use     | BVMU      | High Density Mixed Use                                                          | HDMU  |
| Residential-Retail Mixed Use              | RRMU      |                                                                                 |       |
| Professional & Administrative Offices     | PAO       | Professional & Administrative Offices                                           | PAO   |
| General Commercial                        | GNC       | Commercial                                                                      | COM   |
| Retail Sub-Center                         | RSC       |                                                                                 |       |
| Industrial Park                           | INP       | Industrial Park                                                                 | INP   |
| Manufacturing                             | MFG       | Manufacturing                                                                   | MFG   |
| Public Facilities                         | PF        | Public Facilities <sup>1</sup>                                                  | PF    |
|                                           |           | Elmwood Correctional Facility <sup>2</sup>                                      | COR   |
| TWC, MXD, GNC, INP, HWS, RSC              |           | Hotels <sup>3</sup>                                                             | HOTEL |
| Park Open Space                           | POS       | NF                                                                              |       |
| Waterways                                 | WATERWAYS | NF                                                                              |       |
| Highway Services                          | HWS       | Parcels reviewed and model-based land use designation assigned, as appropriate. |       |
| Town Center                               | TWC       |                                                                                 |       |
| Urban Residential                         | URR       |                                                                                 |       |
| Parcels with no land use designation      | -         |                                                                                 |       |

Notes:

1. Includes schools, churches, health facilities, libraries, and fire stations.
2. The correctional facility is categorized as PF in the GP. For modeling purposes, it was given a distinct code.
3. Hotels are categorized under various land uses in the GP. They were identified and assigned a distinct code.



**FIGURE ES-4**  
 CITY OF MILPITAS  
 SEWER MASTER PLAN  
 MODEL-BASED LAND USE DESIGNATIONS - EXISTING

## Wastewater Flow Analysis

The City contracted with ADS Environmental Services (ADS) to perform dry and wet weather flow monitoring within the City collection system. ADS installed 23 FlowShark Triton flow meters throughout the City and monitored flow between November 16, 2019 and March 9, 2020. The collection system was divided into 21 sub-basins based on the location of the flow meters, and the data from the flow monitoring program was used to calibrate the hydraulic model. Dry weather flow data from the flow monitoring program was used to develop dry weather groundwater infiltration (GWI) for each sub-basin and BSF. For modeling purposes, this document defines GWI as any, and all sources of constant flow. GWI is comprised both of groundwater infiltration and any other constant flow that is generally detected during low flow periods. BSF is represented by a combination of UF factors and diurnal patterns for a given land use. The dry weather calibration involved comparing modeled flows to observed flows and iteratively adjusting GWI values, UF factors, and diurnal patterns until modeled flows were reflective of observed flows. **Table ES-2** summarizes the UF factors developed for each land use type and the total modeled dry weather flows for both existing and future conditions.

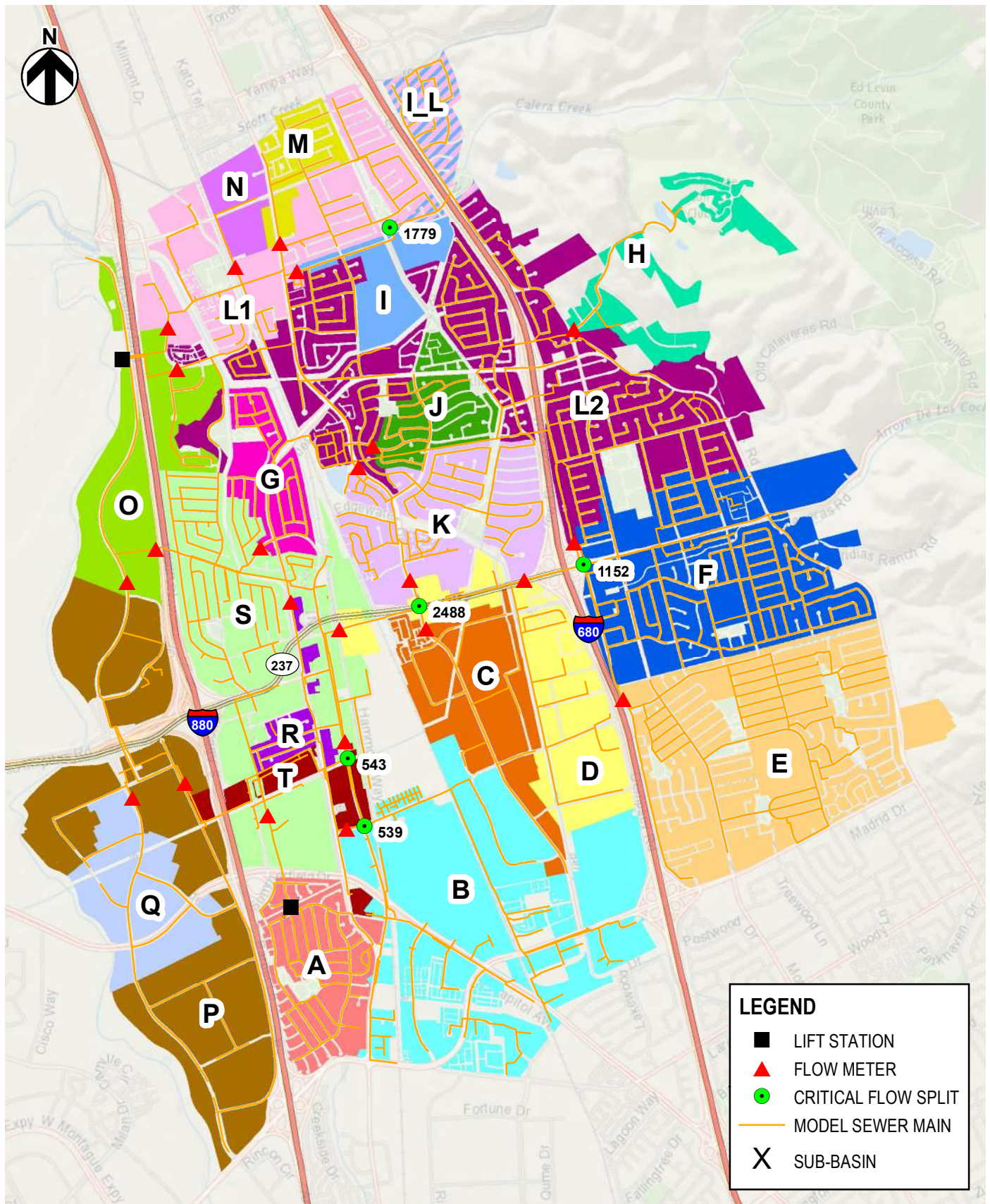
**Table ES-2: UF Factor Summary by Land Use**

| Land Use Designation           | UF Factor (gpd) | Existing Quantity | Future Quantity | Quantity Units | Existing Model BSF (MGD) | Future Model BSF (MGD)   |
|--------------------------------|-----------------|-------------------|-----------------|----------------|--------------------------|--------------------------|
| HSFL                           | 400             | 56                | 56              | Parcel         | 0.022                    | 0.022                    |
| HSFM                           | 465             | 107               | 107             | Parcel         | 0.050                    | 0.050                    |
| SFL                            | 200             | 9619              | 9677            | Parcel         | 1.924                    | 1.935                    |
| SFM                            | 1200            | 266               | 264             | Acre           | 0.319                    | 0.316                    |
| MFH                            | 1500            | 292               | 449             | Acre           | 0.438                    | 0.674                    |
| MFVH                           | 2000            | 56                | 187             | Acre           | 0.113                    | 0.373                    |
| MHP <sup>1</sup>               | -               | -                 | -               | Acre           | -                        | -                        |
| HOTEL                          | 4000            | 60                | 24              | Acre           | 0.244                    | 0.095                    |
| MXD                            | 1000            | 67                | 71              | Acre           | 0.067                    | 0.071                    |
| HDMU                           | 2200            | 64                | 175             | Acre           | 0.141                    | 0.385                    |
| PAO                            | 500             | 65                | 520             | Acre           | 0.031                    | 0.260                    |
| COM                            | 900             | 467               | 367             | Acre           | 0.420                    | 0.330                    |
| INP                            | 450             | 727               | 236             | Acre           | 0.327                    | 0.106                    |
| MFG                            | 1500            | 550               | 499             | Acre           | 0.825                    | 0.748                    |
| PF                             | 190             | 310               | 305             | Acre           | 0.059                    | 0.058                    |
| COR <sup>1</sup>               | -               | -                 | -               | -              | -                        | -                        |
| Large Dischargers <sup>2</sup> |                 | 38                | 32              | Discharger     | 1.176                    | 1.006                    |
| <b>Total</b>                   | -               | -                 | -               | -              | <b>6.157<sup>3</sup></b> | <b>6.249<sup>3</sup></b> |

Notes:

1. Mobile home parks (3) and the correctional facility were considered large dischargers and assigned flows based on water use data.
2. Large dischargers are defined as those customers that discharge a disproportionately large volume of wastewater for the parcel size and use type. They were assigned a diurnal pattern based on the original parcel land use codes.
3. Represents the total BSF. The total BSF plus the total GWI is the total DWF.





**FIGURE ES-5**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
SUB-BASIN DELINEATION



The largest storm identified during the flow monitoring period occurred on December 7, 2019 (Storm event 1); this was used to estimate the extent of rainfall-dependent inflow and infiltration (RDI/I) in each sub-basin. RDI/I is characterized by an R-factor, which represents the percentage of rainfall volume that enters the sewer system. GWI also tends to fluctuate throughout the wet season as the groundwater table rises and falls. Modeled flows were compared to observed flows for Storm event 1, and wet weather GWI values and R-factors were iteratively adjusted until modeled flows were reflective of observed flows. **Table ES-3** summarizes the calibrated R-Factors for each of the 21 sub-basins.

**Table ES-3: R-Factor Summary by Sub-Basin**

| Sub-Basin      | Total R-Factor |
|----------------|----------------|
| A              | 1.48%          |
| B              | 1.59%          |
| C              | 0.30%          |
| D              | 1.90%          |
| E              | 0.60%          |
| F              | 0.86%          |
| G              | 3.40%          |
| H              | 0.24%          |
| I              | 0.42%          |
| J              | 2.17%          |
| K              | 0.81%          |
| L1             | 0.40%          |
| L2             | 0.31%          |
| M              | 1.39%          |
| N              | 2.06%          |
| O <sup>1</sup> | 1.50%          |
| P              | 1.26%          |
| Q              | 0.60%          |
| R              | 3.71%          |
| S              | 1.64%          |
| T              | 0.64%          |

Notes:

1. There is no flow meter at the outfall for sub-basin O. Values were estimated based on surrounding sub-basins.

## Capacity Analysis

To estimate wet weather wastewater flows, a design storm is applied to the model and wet weather flows are represented based on the calibrated R-factors for each sub-basin. Under this condition, the existing and future performance of the wastewater collection system can be evaluated. For this Study, the collection system performance was evaluated using the typical 10-year 24-hour storm with a peak hour coinciding with the peak of the typical diurnal curve.

The initial deficiency criteria used to evaluate the capacity of the modeled pipes under design flow conditions was the ratio of wastewater flow depth (d) to pipe diameter (D), or d/D. In InfoWorks, if d/D is greater than one, this means the pipe is flowing full under pressure and the hydraulic grade line (HGL) is higher than the crown of the pipe. InfoWorks reports a “surcharge state” for each pipe, which is defined in **Table ES-4**.

**Table ES-4: InfoWorks Surcharge States**

| Surcharge State  | Definition                                                        | Deficiency if:                         |
|------------------|-------------------------------------------------------------------|----------------------------------------|
| < 1 <sup>1</sup> | When depth of flow is less than the diameter of the pipe          | Not considered hydraulically deficient |
| = 1              | Pipe is surcharged due to backwater from a downstream deficiency. | Not considered hydraulically deficient |
| = 2              | Pipe is hydraulically under capacity and needs to be upsized.     | Freeboard < 5 feet                     |

Notes:

1. Surcharge State = d/D

In the hydraulic model, the HGL reaching the ground surface indicates a potential SSO. Even for a pipe flowing under capacity or surcharged, if the freeboard – the distance between the ground surface and the HGL – is five feet or greater, the risk of SSO is minimal. Where pipes were shown as surcharged due to inadequate hydraulic capacity (surcharge state of “2”), a pipe was identified as deficient if the freeboard in these locations is also less than five feet.

There is a 6% increase from existing to future conditions, from 7.5 MGD to 7.9 MGD, in average dry weather flow at the outfall. **Table ES-5** presents the total system flows for all modeled conditions.

**Table ES-5: Model Flow Summary**

| Scenario | Average Dry Weather Flow (MGD) | Peak Dry Weather Flow (MGD) | Peak Wet Weather Flow (MGD) |
|----------|--------------------------------|-----------------------------|-----------------------------|
| Existing | 7.5                            | 10.4                        | 14.9                        |
| Future   | 7.9                            | 11.0                        | 18.5                        |

There were no major capacity deficiencies identified as part of this analysis. There were six pipeline segments with a recorded surcharge state of “2” indicating that they are under capacity. Of these six segments, five of them have freeboard values greater than five feet, so they do not fulfill the criteria for a deficiency, and thus are not considered hydraulically deficient. There were no additional capacity deficiencies identified under future conditions that were not seen under existing conditions.

There is a single pipeline segment that has a freeboard of 4.7 ft., slightly less than the freeboard criteria; however, for a single pipe reach that is considered marginally deficient, replacement is not recommended without further cause. It is recommended that the City monitor this location for potential surcharging. This location (MH GID 1392) is a good candidate for installing a SmartCover to monitor the wastewater level to prevent SSOs.

## Capital Improvement Plan

The City's capital improvement program (CIP) is intended to serve as a comprehensive planning tool for budgeting and carrying out capital projects. Capital projects are designed to adhere to the City Council goals and priorities; among them is to maintain a superior level of service to the community. To that end, a compilation of improvement projects was identified as part of the detailed risk and condition assessment. The PACP peak scores from the CCTV inspection and the risk scores calculated from the LoF/CoF desktop condition assessment drive the pipeline rehabilitation selection process. Using the defect coding assigned by NPS and the desktop assessment software, the pipe segments with defects were assigned a defect-level rehabilitation method.

With the rehabilitation method established for each defect code, a decision tree was established to determine the final overall rehabilitation method for the pipeline. This decision tree was prepared based on the following factors:

- CCTV structural peak score and overall peak score;
- Number of point repairs and lining recommendations by the defect-level rehabilitation methods module;
- Number of defects;
- Length of major (score of 4 or 5) and/or minor (score of 3) defects; and
- Presence of specific defects such as infiltration drippers (ID) or Reinforcement Corroded Chemical (SRCC).

Of the approximately 105,000 ft (449 segments) of sewer pipeline inspected, approximately 50,000 ft (178 segments) requires improvement. Recommended improvements include:

- Pipe Replacement
- Full Cured-In-Place Pipe (CIPP)
- Point Repair(s) by Excavation
- Sectional Liner(s)

It is noted that some pipeline segments include more than one recommended rehabilitation method.

For segments without CCTV inspection data, risk scores and diameter were used to develop a prioritized set of segments that are recommended for CCTV inspection and further analysis.

Projects are prioritized based on risk of failure along with consideration for type of proposed rehabilitation and project location. The general strategy is to address the highest risk/highest priority projects in the near-term (Years 1-5) with lower risk projects deferred to the medium- (Years 6-10) and long-term (Years 11-20).

Costs were developed to represent capital construction costs along with soft costs. Soft costs consisting of engineering design and consulting; permitting and obtaining right-of-way; and ESDC, construction management and inspection services are included in the capital project costs.

Provided below in **Table ES-6** is a proposed budget and schedule for the CIP and recommended projects over 20-years in 5-year increments. The most critical projects are scheduled for earlier implementation. It is noted that the timing of projects can be adjusted based on results of CCTV and future operating conditions. **Figure ES-6** presents the proposed improvement projects in 5-year increments.

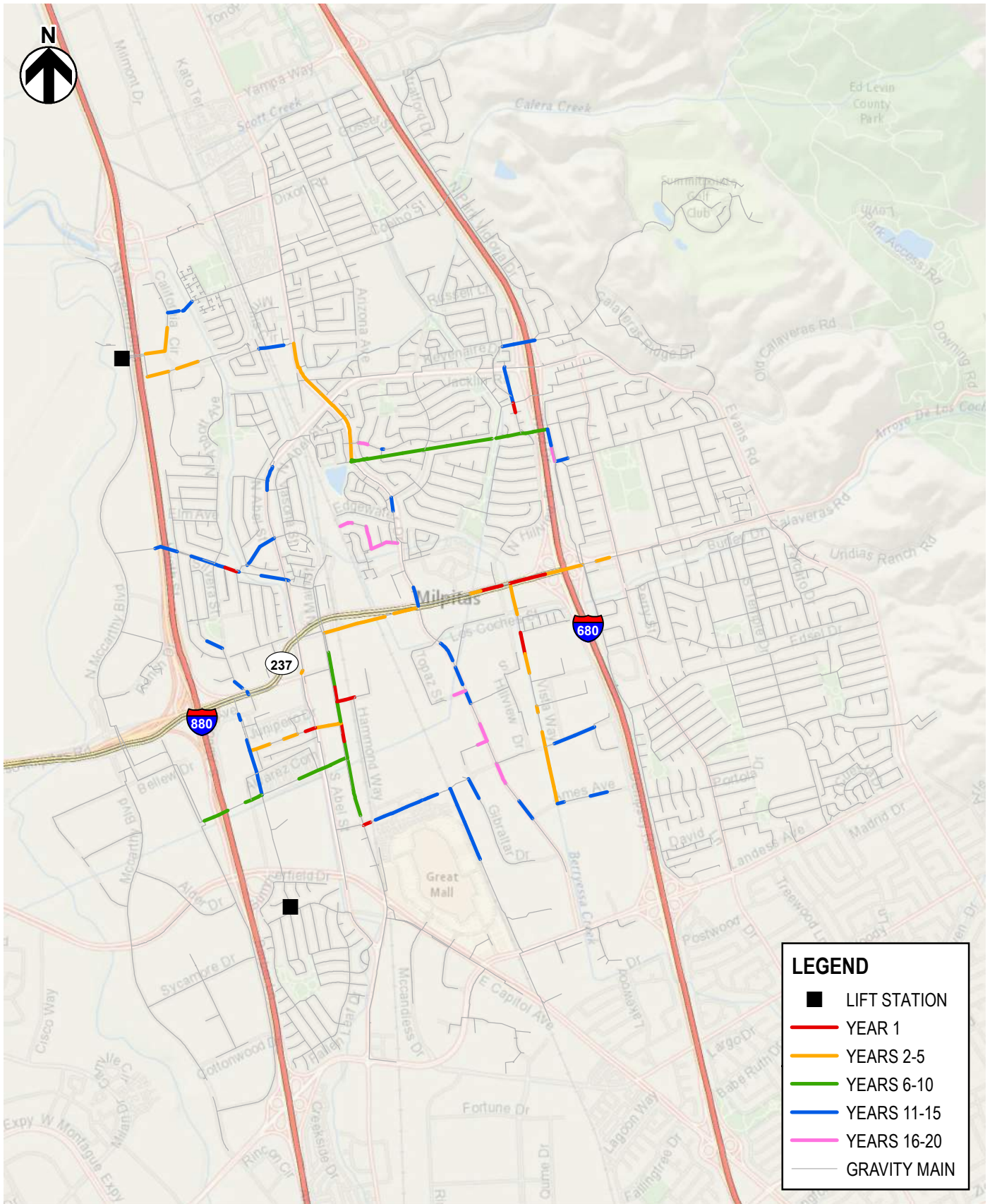
**Table ES-6: Proposed CIP Schedule and Budget**

| Projects                                                 | 5-Year<br>(2022-2026)  | 10-Year<br>(2027-2031) | 15-Year<br>(2032-2036) | 20-Year<br>(2037-2041) |
|----------------------------------------------------------|------------------------|------------------------|------------------------|------------------------|
| <b>Existing Projects</b>                                 |                        |                        |                        |                        |
| 6124 Pump Station Rehabilitation Program                 | \$200,000 <sup>1</sup> | --                     | --                     | --                     |
| 6126 Minor Sewer Projects                                | \$200,000 <sup>2</sup> | --                     | --                     | --                     |
| 6130 Main Lift Station Odor Emissions Control            | \$200,000              | --                     | --                     | --                     |
| 6131 Sanitary Sewer Cathodic Protection Improvements     | \$500,000              | --                     | --                     | --                     |
| 6134 On-Call Sewer Maintenance & Repair Services         | \$98,000               | --                     | --                     | --                     |
| <b>Total Existing Projects</b>                           | <b>\$1,198,000</b>     | <b>--</b>              | <b>--</b>              | <b>--</b>              |
| <b>Proposed Projects</b>                                 |                        |                        |                        |                        |
| CCTV large diameter and high-risk assets                 | \$400,000              | --                     | --                     | --                     |
| Highest Priority Improvements                            | \$1,562,000            | --                     | --                     | --                     |
| Medium- to High- Priority Improvements                   | \$5,266,000            | \$6,424,000            | --                     | --                     |
| Low Priority Improvements                                | --                     | --                     | \$6,888,000            | \$1,240,000            |
| Allocation for improvements identified from ongoing CCTV | \$1,250,000            | \$1,250,000            | \$1,250,000            | \$1,250,000            |
| <b>Total Proposed Projects</b>                           | <b>\$8,478,000</b>     | <b>\$7,674,000</b>     | <b>\$8,138,000</b>     | <b>\$2,490,000</b>     |
| <b>Existing and Proposed Projects</b>                    | <b>\$9,676,000</b>     | <b>\$7,674,000</b>     | <b>\$8,138,000</b>     | <b>\$2,490,000</b>     |

Notes:

1. Original allocation is \$200,000 through 2023 with \$148,000 in prior year funding from Sewer Infrastructure Fund to be allocated for other projects in FY2020-21.
2. Original allocation is \$200,000 with \$37,000 in prior year funding from Sewer Infrastructure Fund to be allocated for other projects in FY2020-21.





**FIGURE ES-6**  
**CITY OF MILPITAS**  
**SEWER MASTER PLAN**  
**CAPITAL IMPROVEMENT PROJECTS**

## SECTION 1 – INTRODUCTION AND PURPOSE

HydroScience Engineers (HydroScience) was retained by the City of Milpitas (City), to prepare the City Sewer Master Plan (SMP), which includes development of a Capital Improvement Plan (CIP) based on the current (2020) and future (2040) planning horizons. This section outlines the background and SMP objectives.

### 1.1 Background

The City's wastewater system infrastructure was constructed in the 1950s when the City was established, and it was expanded with the growth of the City. Today, the City is essentially built out. The most recent SMP was completed in 2002 with a revision completed in 2004 and an update completed in 2009.

#### 1.1.1 Previous Studies/Existing Documents

The following is a brief description of previous studies and documents reviewed and used in the preparation of this SMP.

- **City of Milpitas Capital Improvement Program 2020-2025 Final Report, July 2020:** Every year the City prepares a five-year Capital Improvement Program (CIP) that provides the City Council, staff, and the public with a comprehensive planning tool for budgeting and carrying out a range of capital projects. Also known as a Capital Budget, this document enables the City to identify estimated costs, priorities and schedules, funding sources and financing methods necessary for delivering critical services to meet community demands. The CIP is a necessary first step for planning the implementation and construction of new capital assets including public facilities such as water, sewer, and storm, and for repairs and replacements of aging infrastructure. The CIP reflects Council's priorities and policies to ensure that the needs of the community are met. The CIP documents the existing planned sewer related projects and the allocated funding for each project.
- **City of Milpitas Sewer Master Plan Revision, RMC, August 2004:** This study assessed the capacity of the wastewater collection system as well as investigated the conditions of the system. The SMP Revision updated the 2002 SMP, also completed by RMC. It provided information required for the City planning and financial efforts and defined the sanitary sewer system improvements necessary to accommodate the City's future land use development plans to the year 2018. During this study, the hydraulic model built using Hydra for the 2002 SMP was updated based on a wet weather flow monitoring program.
- **City of Milpitas Sewer Master Plan Update, RMC, December 2009:** This study was an update to the 2004 SMP Revision to reevaluate the City's sewer system capacity needs as a result of several development projects that were not considered for the 2004 SMP Revision. The Hydra hydraulic model was updated using updated large discharger information as well as updated future land use conditions. A CIP was developed to address any projected capacity deficiencies based on this updated modeling analysis.
- **Sewer System Management Plan 2016 Update, City of Milpitas, December 2016:** In accordance with the requirements of the Regional Water Quality Control Board (RWQCB), public wastewater collection system agencies are required to develop a sanitary sewer management plan (SSMP) that designates sewer system management practice to minimize

sanitary sewer overflows (SSOs) and provide reliable sewer service to the public. The 2016 SSMP describes the City's specific maintenance protocols to meet and exceed all requirements and documentation of the requirements set forth by the RWQCB General Waste Discharge Requirements (WDR).

- **Milpitas General Plan Update – Land Use Alternatives Report, De Novo Planning Group, September 2018:** State law requires that every city and county in California prepare and maintain a general planning document. As part of the General Plan (GP) update process, the City must update its GP Land Use Map. This Land Use Alternatives Report was developed as a tool to identify and evaluate a range of geographic locations ("Opportunity Areas") within the City where some changes to existing land uses may be appropriate.

The following studies were completed in conjunction with the Master Plan Study and are incorporated as appendices to the Master Plan. Where appropriate, details and summaries of findings have been included in the body of the Master Plan Study. For additional detail, the reader is directed to the appendices.

- **Sewer Utility Asset Renewal and Replacement Study, Brown and Caldwell, August 2020 (R&R Study):** This study was conducted as part of this Master Plan Study to assess the current condition of the City's wastewater collection system. This includes CCTV inspection results, an assessment of the relative risk of failure of all pipe segments in the City, as well as lift station inspection results. The purpose of this study is to provide the City with a set of priorities for asset renewal and replacement. This study is included as **Appendix A**.
- **Main and Venus Way Lift Station Inspections Report, Brown and Caldwell, May 2020 (LS Report):** This study was conducted as part of the Master Plan Study to assess the current operations and condition of the Main Lift Station (Main LS) and Venus Way Lift Station (Venus Way LS). This study presents the results of the on-site inspection performed for these two facilities. It is included as part of **Appendix A** (R&R Study App. K [App. K]).
- **Milpitas Sewer Flow Monitoring Report 2019-2020, ADS Environmental Services, April 2020:** This program was completed for the months of November 2019 – March 2020 for the purposes of measuring wastewater flows in the City's collection system. Both wet weather and dry weather flows were captured, and the resulting data was used for the calibration of the hydraulic model for this Study. This report is included as **Appendix B**.

## 1.2 Objectives

The objectives of this Master Plan project are:

- To perform a condition assessment on the current state of the collection system;
- To evaluate the hydraulic performance of the system under current conditions and under projected future conditions;
- To identify any hydraulic capacity deficiencies or pipes in poor condition, and
- To develop a CIP to address physical and hydraulic deficiencies.

These objectives were developed in collaboration with City Staff through technical review of available asset data and development of a hydraulic model. Through these analyses, projects were identified to help maintain the City's collection system level of service standards..

## 1.3 Report Organization

This Master Plan consists of ten sections followed by appendices that provide supporting documentation for the analyses present in the body of the SMP. The sections are as follows:

- **SECTION 1 – Introduction and Purpose:** This section presents the background leading to the development of this SMP, a description of previous work, and objectives and organization of the SMP.
- **SECTION 2 – Service Area and Wastewater Services:** This section describes the City as well as the related wastewater services.
- **SECTION 3 – Existing Wastewater Collection System:** This section describes the existing wastewater collection system and the overall system operation within the service area.
- **SECTION 4 – Condition Assessment:** This section presents the results of the condition assessment performed as part of the SMP, including the results of the closed-circuit television (CCTV) inspections.
- **SECTION 5 – Analysis of Land Uses for Hydraulic Modeling:** This section outlines the land use categories identified by the GP and details the methodology for using these land use categories for the development and calibration of the hydraulic model.
- **SECTION 6 – Hydraulic Model Development:** This section presents the process and assumptions associated with building the hydraulic model infrastructure and filling in any existing data gaps.
- **SECTION 7 – Wastewater Flow Analysis:** This section presents the results of the flow monitoring program and analysis of that data. This section also presents the development of the wastewater flows used to develop and calibrate the hydraulic model and the results of the model calibration.
- **SECTION 8 – Capacity Analysis:** This section presents identified hydraulic capacity-related deficiencies under existing and future modeled conditions.
- **SECTION 9 – Project Development:** This section presents the recommended improvements resulting from the condition assessment and the basis for cost development.
- **SECTION 10 – Capital Improvement Plan:** This section presents the recommended capital improvement projects, costs, and timeline for implementation.



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## SECTION 2 – SERVICE AREA AND WASTEWATER SERVICES

The City provides wastewater collection services to all customers within the City boundary. This section describes the service area and related wastewater services.

### 2.1 Service Area

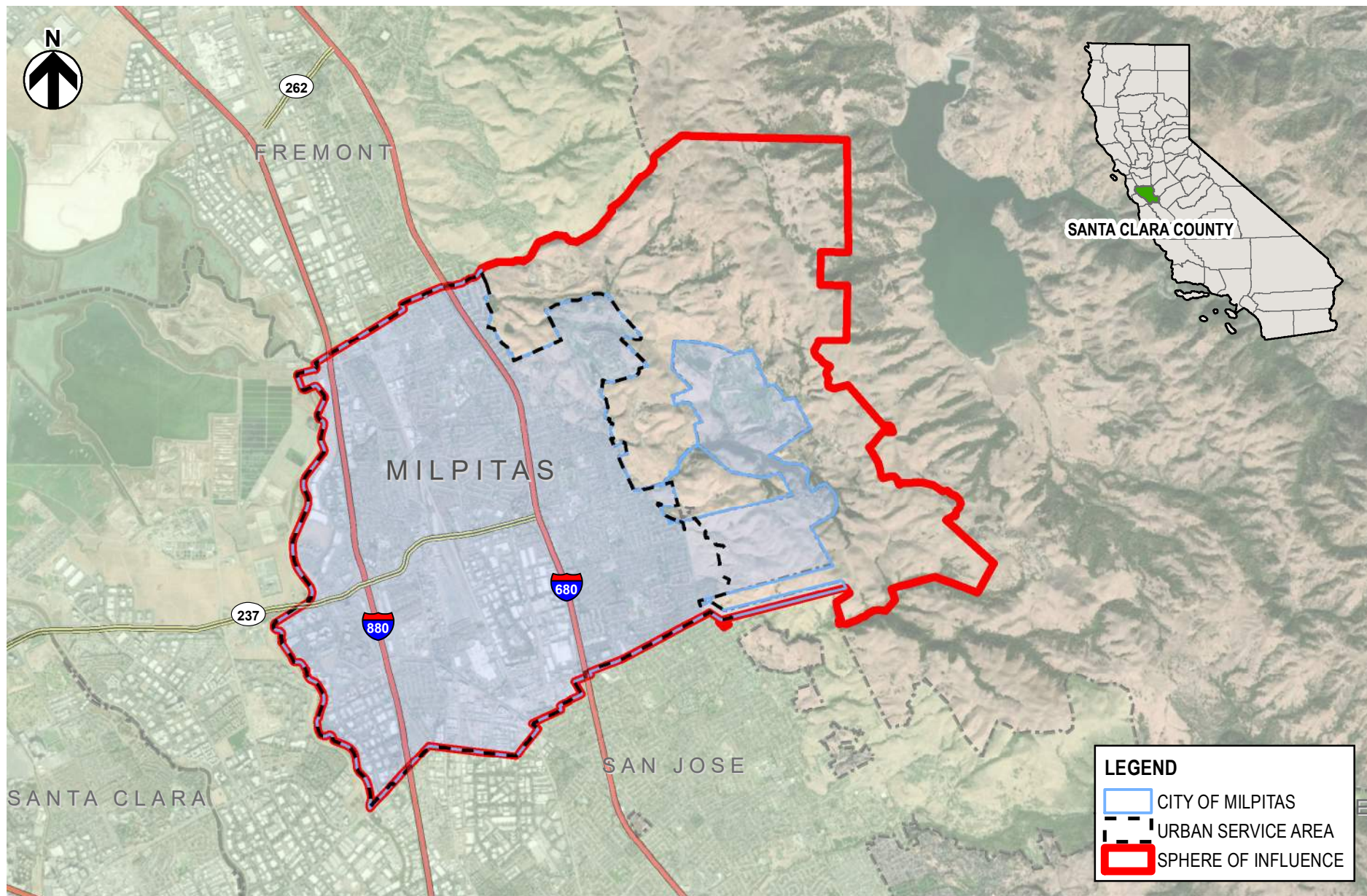
The City is located along the northern boundary of Santa Clara County at the southern tip of the San Francisco Bay, approximately 45 miles southeast of San Francisco. It is bounded by the Cities of Fremont to the north, San Jose to the south and west, and unincorporated Santa Clara County to the east (see **Figure 2-1**).

Incorporated in 1954, the City encompassed 2.9 square miles and housed a population of 825. The Ford Motor Company assembly plant was built in 1955 and this brought the start of the City's rapid growth period; this growth was maintained by the high technology industry in the 1970s. By 1992, the City encompassed 13.6 square miles, which is approximately its current area. Today, the City is almost completely built out, so any future increases in wastewater flows would come from increases in density or changes in land use through redevelopment.

Today, the City encompasses 14 square miles and provides wastewater collection services to a population of 77,961 according to the Department of Finance. There are two distinct areas of the City referred to as the "valley floor," which is relatively flat, and the "hillside" on the eastern edge of the City limits. Elevations gently slope from west to east along the valley floor from approximately 10 ft to 120 ft and up to approximately 700 ft in the hillside area. The valley floor includes a mixture of industrial, manufacturing, commercial, and residential land uses, while the hillside is reserved solely for residential use. Parks and open spaces are scattered throughout the residential areas.

The following boundaries are identified on **Figure 2-1**:

- **City Limits:** The City Limits includes the area within the City's corporate boundary, over which the City exercises land use authority and provides public services.
- **Urban Service Area (USA):** In 1998, voters in the City established an Urban Growth Boundary (UGB) limiting development in its eastern hill areas. The initiative was set to expire in 2018 but was extended through the recent passage of Measure I by Milpitas voters in November 2016. Contiguous with the UGB the USA restricts the extension of public service and infrastructure to new development in eastern areas of the City Limits.
- **Sphere of Influence (SOI):** An SOI is the probable physical boundary and service area of a local agency, as adopted by a Local Agency Formation Commission (LAFCO). An SOI includes both incorporated and unincorporated areas within which a city or special district will have primary responsibility for the provision of public facilities and services. The SOI also coincides with the Planning Area – the area included in the analysis and planning for the 20-year horizon of the City's proposed GP.



**FIGURE 2-1**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
PROJECT LOCATION MAP

## 2.1.1 Land Use

The City's current land uses, according to the GP, are listed in **Table 2-1** and displayed in **Figure 2-2**. These land uses served as the basis for the model-based land use designations and analysis, which are described in **SECTION 5**.

**Table 2-1: General Plan Land Use Categories**

| GP Land Use Categories                | Land Use Code |
|---------------------------------------|---------------|
| Hillside Very Low Density             | HVL           |
| Hillside Low Density                  | HLD           |
| Hillside Medium Density               | HMD           |
| Single-Family Low Density             | SFL           |
| Single-Family Medium Density          | SMD           |
| Multi-Family Medium Density           | MFM           |
| Multi-Family High Density             | MFH           |
| Multi-Family Very High Density        | VHD           |
| Mobile Home Park                      | MHP           |
| Urban Residential                     | URR           |
| Mixed Use                             | MXD           |
| Boulevard Very High-Density Mixed Use | BVMU          |
| Residential-Retail Mixed Use          | RRMU          |
| General Commercial                    | GNC           |
| Retail Sub-Center                     | RSC           |
| Highway Services                      | HWS           |
| Town Center                           | TWC           |
| Industrial Park                       | INP           |
| Manufacturing                         | MFG           |
| Professional & Administrative Offices | PAO           |
| Public Facilities                     | PF            |
| Park Open Space                       | POS           |
| Waterways                             | WATERWAYS     |

Source: Milpitas General Plan Update – Land Use Alternatives Report, September 2018

There are several “Opportunity Areas” identified throughout the City as areas of potential growth and/or redevelopment; these “Opportunity Areas” are identified on **Figure 2-2**. The Midtown Specific Plan and Metro Specific Plan are detailed below:

- **Midtown Specific Plan:** This plan, updated in 2010, provides a new vision for approximately 589 acres of land which is currently undergoing changes related to its growing role as a housing and employment center in Silicon Valley. This plan presents an opportunity to reinvigorate the “historic” commercial and industrial core of Milpitas and bring it into the life of the City. The overall strategy of the Midtown Specific Plan is to create a mixed-use community



that includes high-density, transit-oriented housing and a central community “gathering place,” while maintaining needed industrial, service, and commercial uses. This plan provides for up to 2,328 new dwelling units and supporting retail development, new office developments at key locations; bicycle and pedestrian trails linking the areas together and new parks to serve residential development.

- **Metro Specific Plan:** Of the 443 acres of the Metro Specific Plan, approximately 403 acres were previously included as part of the Midtown Specific Plan but have since been broken off into a new standalone specific plan. The goal of the Metro Specific Plan is to bring about an attractive and livable neighborhood that takes advantage of public investment in light rail and BART, and to transform an older light industrial district to meet high demand for housing, offices, and shopping in the Bay Area. The plan creates a structure for a walkable, transit-oriented area with a mix of land uses, which encourages walking, biking, and transit trips and minimizes vehicle trips. This type of development can accommodate substantial growth, minimize impacts on local roadways, and reduce urban sprawl at the periphery of the region.

## 2.2 Wastewater Treatment and Disposal

Wastewater from the City’s collection system is conveyed to and treated by the San Jose-Santa Clara Regional Wastewater Facility (RWF). Eight tributary agencies contribute flow to the RWF including the City of Santa Clara, Cupertino Sanitary District, West Valley Sanitation District, the City of San Jose, County Sanitation District 2-3, Burbank Sanitary District, and the City of Milpitas.

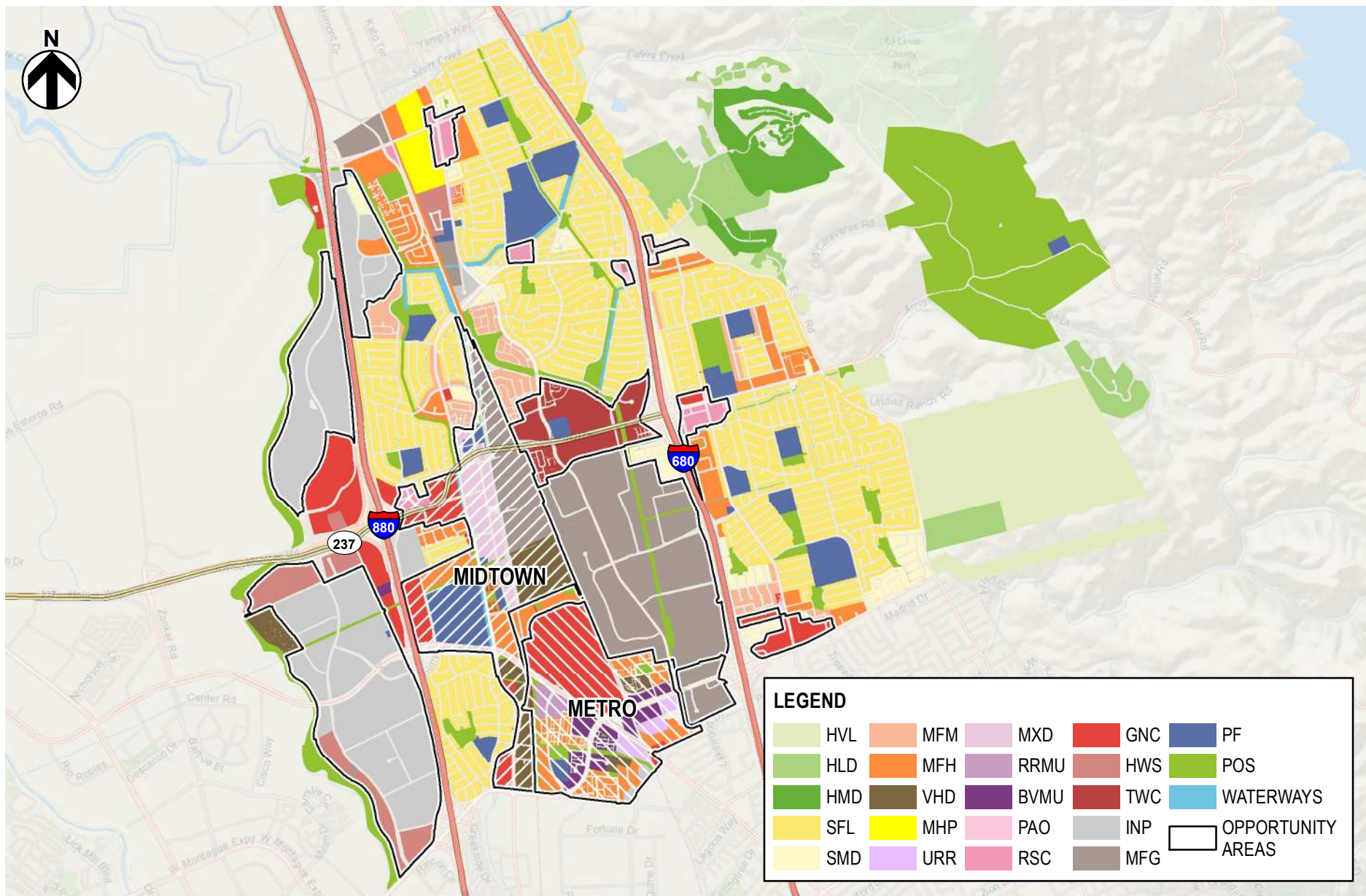
The City of Milpitas pays a share of the capital cost of the RWF, based on the City’s capacity rights in proportion to the 167 MGD total capacity of the RWF. The City also pays a share of the operating cost, based on the volume of wastewater discharged to RWF. The City has rights to discharge 14.25 MGD to the RWF under its current allotment.

To calculate dry weather flows from each agency, the RWF identifies the peak week – five-day period during June through October with the highest flows based on the plant’s influent data – and each tributary agency is asked to provide an estimate of their average flow for the peak week.

## 2.3 Recycled Water

The City purchases recycled water from the South Bay Water Recycling (SBWR) Program. The SBWR Program is an on-going, multi-year effort to use high quality recycled water produced at the RWF and distribute for irrigation, industrial, and other purposes. The SBWR Program is administered through the City of San José’s Environmental Services Division.

The City uses recycled water for irrigating public and private areas such as parks, medians, and industrial uses to supplement potable water use. The City’s existing recycled water pipeline system connects to the SBWR system near Technology Drive and Coyote Creek, southeast of the State Route 237/Interstate-880 interchange. Recycled water provided by the SBWR Program is delivered through an existing transmission line. It is then distributed through a series of mains that provide landscape irrigation to business/retail areas surrounding McCarthy Ranch and Oak Creek Industrial Park, and to central Milpitas. The City maintains and operates approximately 22.4 miles of SBWR-owned recycled water lines that serve approximately 224 service connections. The City has an agreement with SBWR to be reimbursed for its costs to operate and maintain the SBWR-owned system within the City.



**FIGURE 2-2**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
CITY GENERAL PLAN LAND USE

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## SECTION 3 – EXISTING WASTEWATER COLLECTION SYSTEM

This section describes the City's existing wastewater collection and conveyance system. Information from previous studies, regulatory documentation, field investigation, and discussions with the City Planning Department Staff were compiled herein. A wholesale review and update of the City's ArcGIS geodatabase (GIS) was conducted using an extensive database of record drawings. A summary of the updates made to the GIS is included in **Appendix C**.

### 3.1 Wastewater Collection System

According to the updated GIS, the wastewater collection system consists of 844,114 feet (ft) (approximately 160 miles) of gravity sewers ranging from pipe diameters of 4- to 66-inches. The eastern side of the City has predominantly residential customers, with the western side of the City on the valley floor dominated by industrial and manufacturing. Commercial and mixed use are scattered throughout the valley floor as well. The topography is generally flat on the valley floor, with gradual elevation drops from the southeast to the northwest. The entire system flows to the Milpitas Main Lift Station (Main LS) in the northwestern corner of the City where it is pumped to the RWF through two force mains. An additional lift station, located on Venus Way, connects a small portion of low-elevation flow to the higher-elevation gravity system. **Figure 3-1** contains an overview of the City's wastewater collection system.

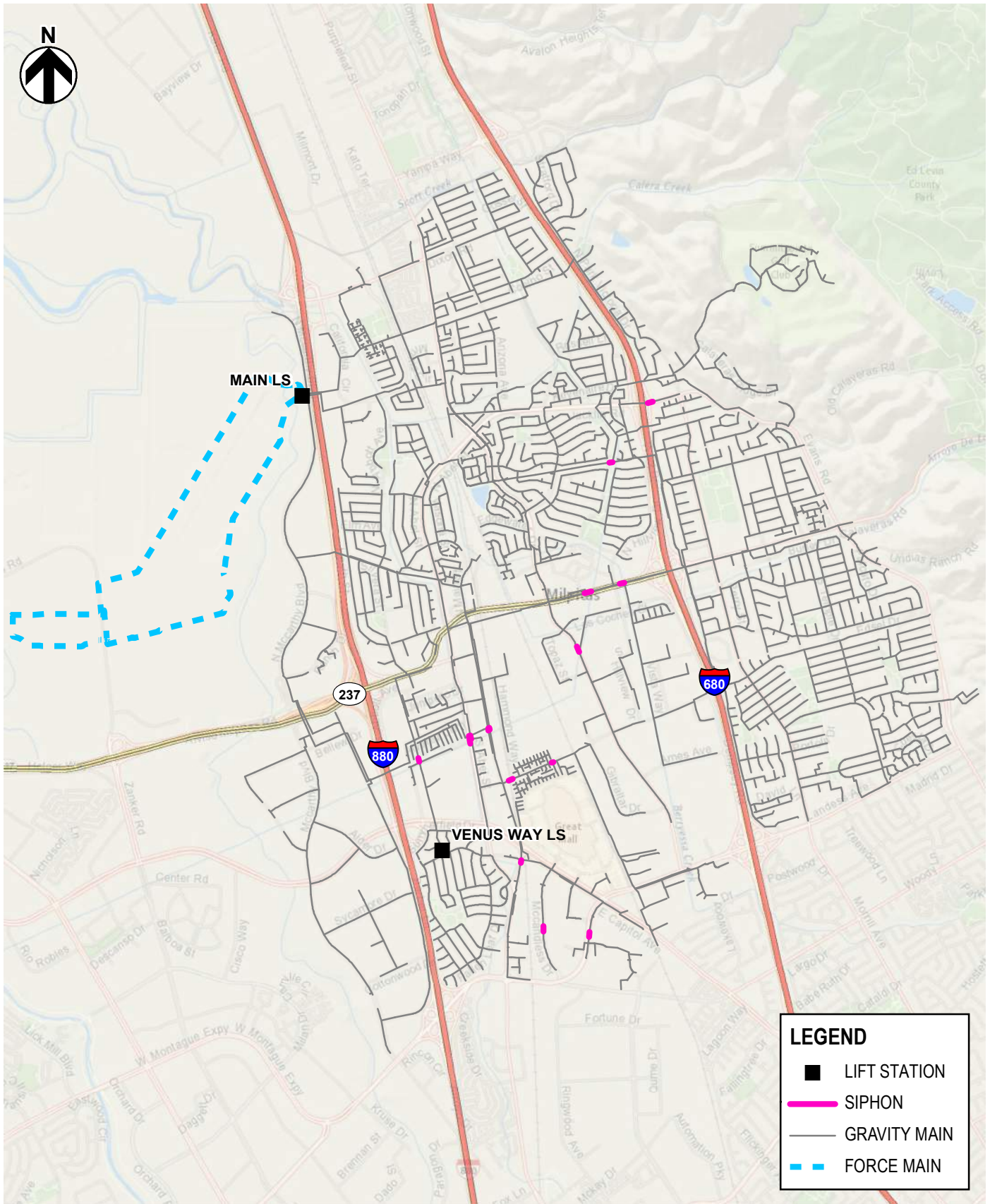
#### 3.1.1 Pipelines and Manholes

The City's wastewater collection system includes pipelines and structures of varying age, size, and material. According to the City's GIS, the majority of the City's wastewater collection system pipelines are vitrified clay pipe (VCP) and 4- to 12-inches in diameter. Approximately 70% of the system was built before 1990. **Table 3-1**, **Table 3-2**, and **Table 3-3** provide breakdowns of the distribution of existing pipe material, size, and age according to the City's GIS, and are reflected in **Figure 3-2**, **Figure 3-3**, and **Figure 3-4**.

As part of the preventative maintenance program, City Staff schedule weekly cleaning for high problem areas of the system. Areas with a moderate frequency of problems receive cleaning on a monthly or biannual basis, and low problem areas including the remainder of the system are cleaned on a recurring 18-month basis.

Based on review of record drawings and existing GIS, 15 siphons were identified throughout the collection system that divert flow under the San Francisco Public Utility Commission (SFPUC) water supply pipeline, creeks, and highways. The siphons are shown in **Figure 3-1**. As part of the preventative maintenance schedule, one problem siphon is cleaned weekly, and the others are cleaned quarterly.





**FIGURE 3-1**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
WASTEWATER COLLECTION SYSTEM OVERVIEW

**Table 3-1: Collection System Pipeline Material**

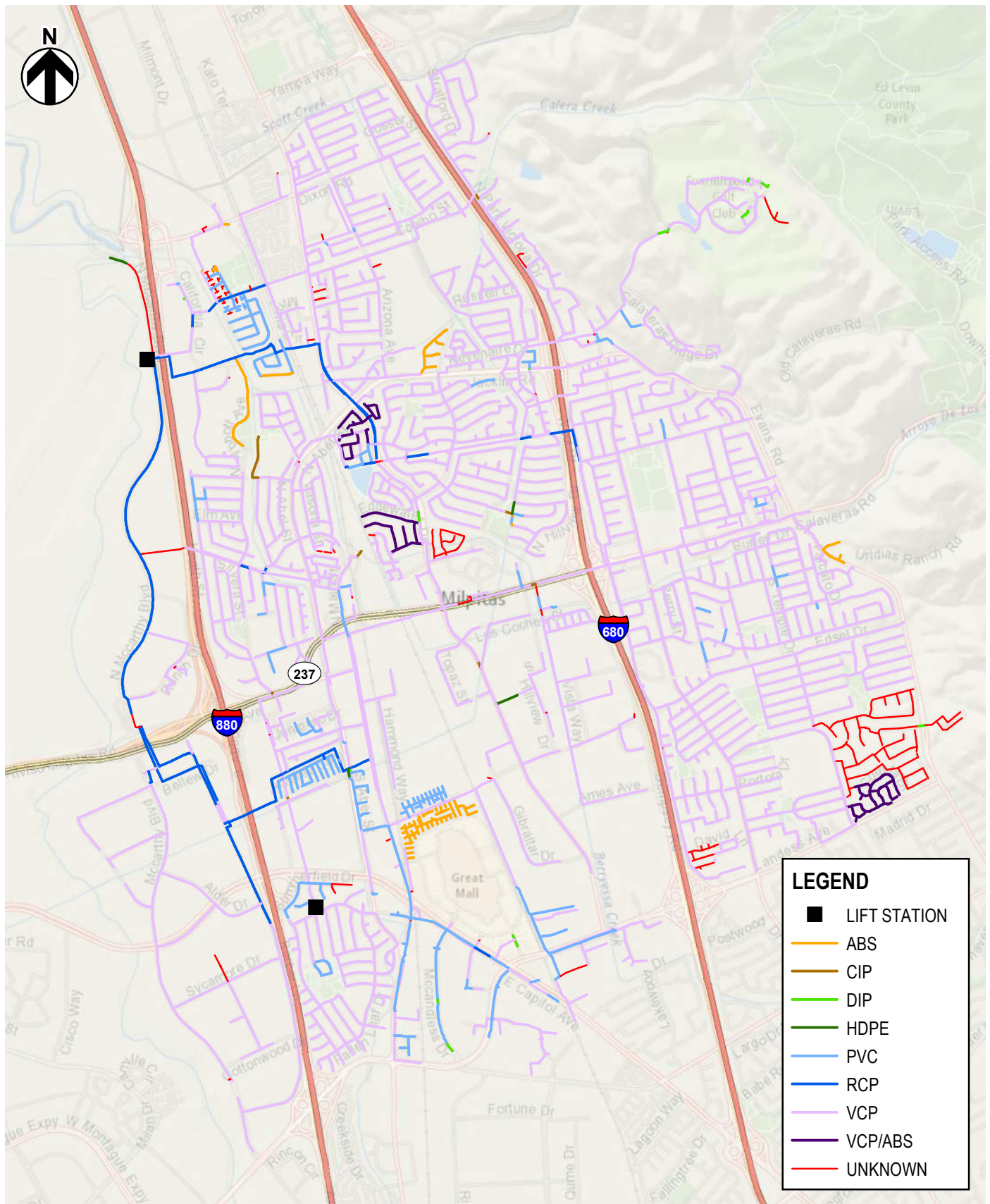
| Pipe Material                         | Total Length (ft) | Length as Percentage |
|---------------------------------------|-------------------|----------------------|
| Acrylonitrile-Butadiene-Styrene (ABS) | 13,812            | 1.64%                |
| Cast Iron Pipe (CIP)                  | 2,027             | 0.24%                |
| Ductile Iron Pipe (DIP)               | 2,017             | 0.24%                |
| High-Density Polyethylene (HDPE)      | 15,898            | 1.88%                |
| Polyvinyl Chloride (PVC)              | 59,188            | 7.01%                |
| Reinforced Concrete Pipe (RCP)        | 36,414            | 4.32%                |
| Vitrified Clay Pipe (VCP)             | 650,411           | 77.05%               |
| VCP/ABS                               | 14,337            | 1.70%                |
| Unspecified                           | 50,011            | 5.92%                |
| <b>Total</b>                          | <b>844,114</b>    | <b>100.00%</b>       |

**Table 3-2: Collection System Pipeline Diameter**

| Pipe Diameter (in) | Total Length (ft) | Length as Percentage |
|--------------------|-------------------|----------------------|
| < 8                | 392,365           | 46.48%               |
| 8-12               | 300,557           | 35.61%               |
| 15-18              | 49,886            | 5.91%                |
| 21-24              | 20,400            | 2.42%                |
| 27-30              | 24,421            | 2.89%                |
| 33-37              | 36,479            | 4.32%                |
| 39-42              | 5,756             | 0.68%                |
| 48-66              | 5,970             | 0.71%                |
| Unspecified        | 8,280             | 0.98%                |
| <b>Total</b>       | <b>844,114</b>    | <b>100.00%</b>       |

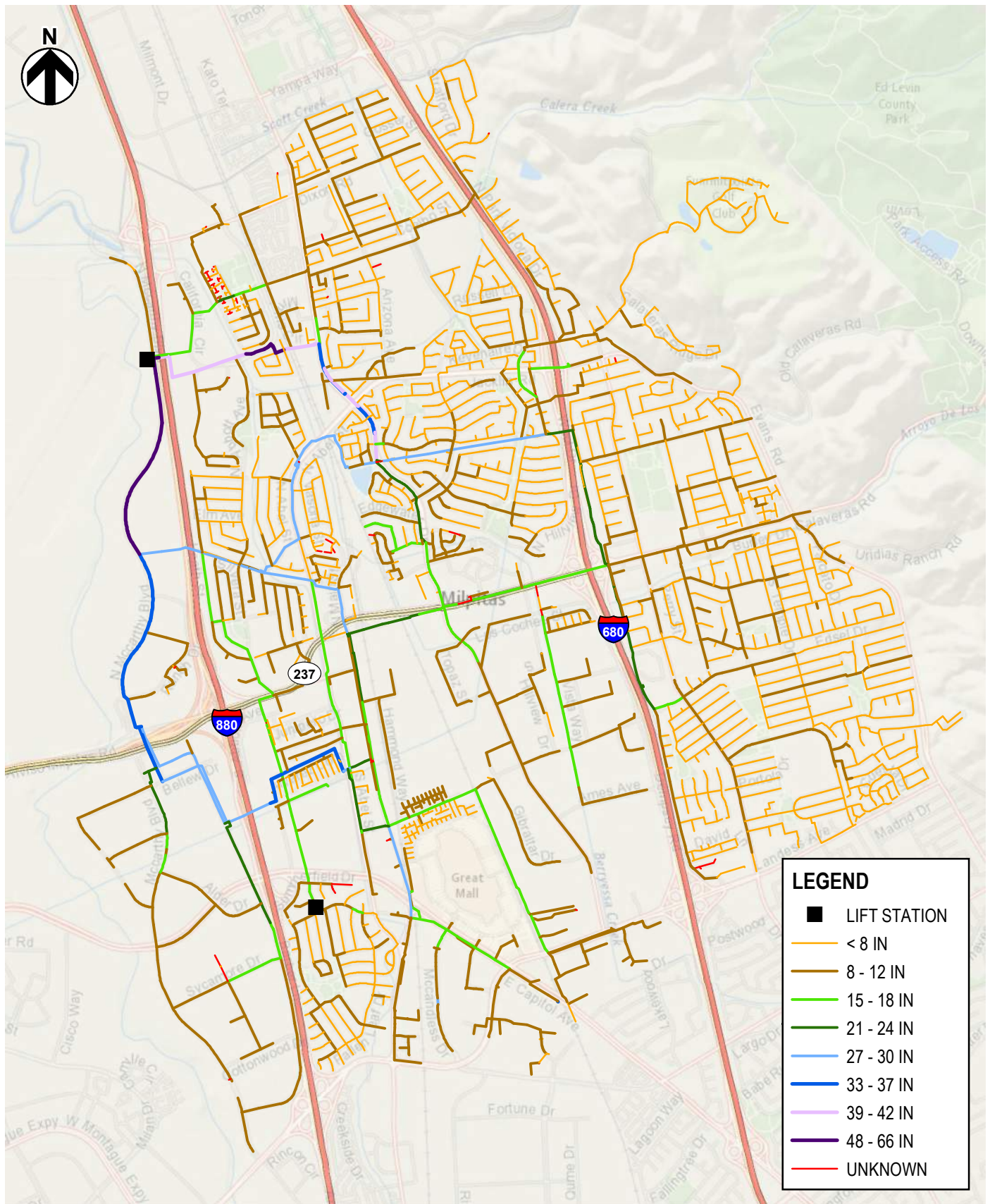
**Table 3-3: Collection System Pipeline Age**

| Installation Date | Total Length (ft) | Length as Percentage |
|-------------------|-------------------|----------------------|
| 1951-1959         | 82,527            | 9.78%                |
| 1960-1969         | 173,537           | 20.56%               |
| 1970-1979         | 146,186           | 17.32%               |
| 1980-1989         | 196,192           | 23.24%               |
| 1990-1999         | 63,195            | 7.49%                |
| 2000-2009         | 58,136            | 6.89%                |
| 2010-2019         | 23,611            | 2.80%                |
| Unspecified       | 100,729           | 11.93%               |
| <b>Total</b>      | <b>844,114</b>    | <b>100.00%</b>       |



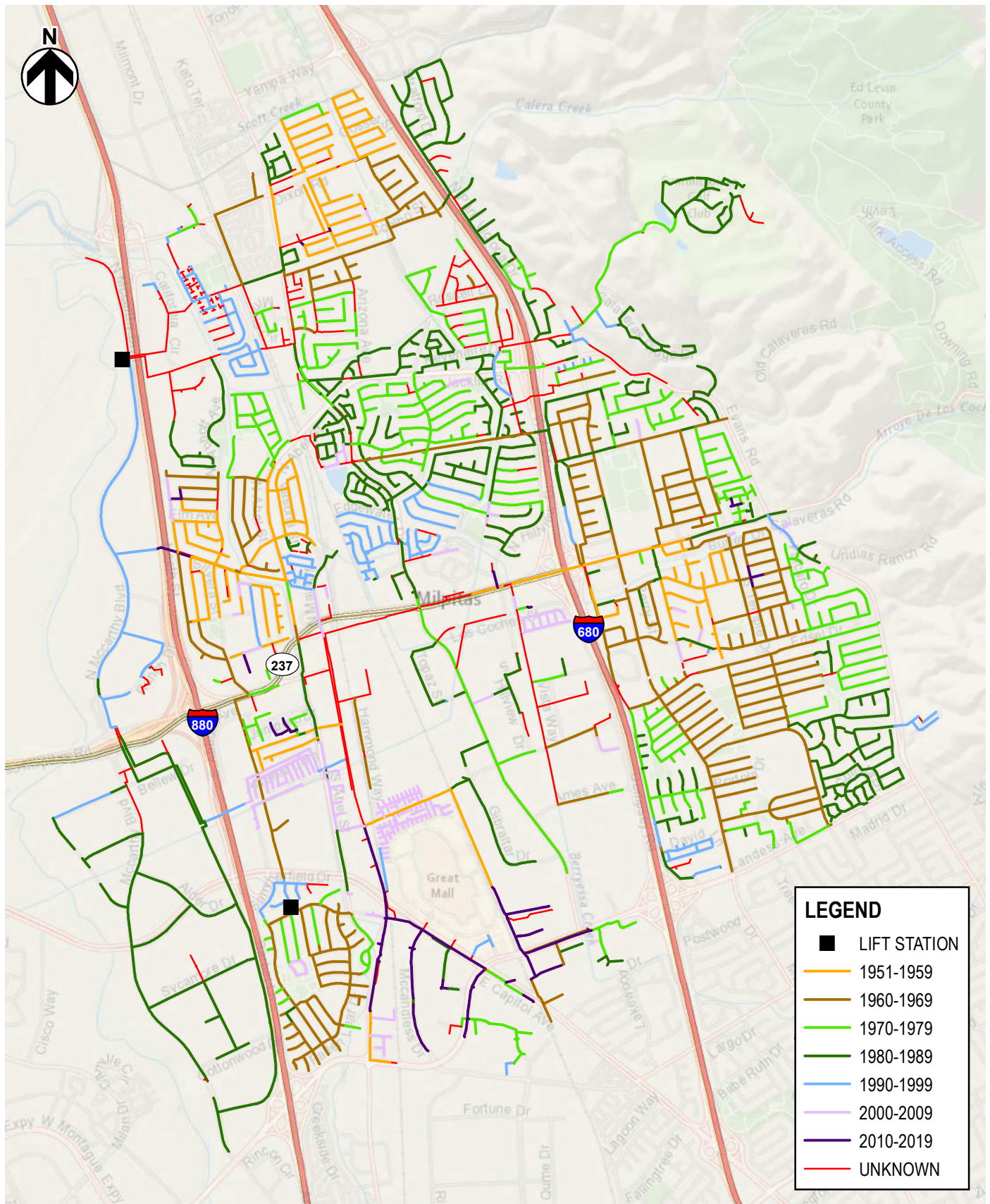
**FIGURE 3-2**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
COLLECTION SYSTEM PIPELINE MATERIAL





**FIGURE 3-3**  
**CITY OF MILPITAS**  
**SEWER MASTER PLAN**  
**COLLECTION SYSTEM PIPELINE DIAMETER**





**FIGURE 3-4**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
COLLECTION SYSTEM PIPELINE AGE

Based on the City's GIS, the collection system includes almost 3,000 manholes. Of these manholes, approximately 60% were built before 1990. **Table 3-4** provides a breakdown of the age distribution of the existing manholes based on the City's GIS.

**Table 3-4: Collection System Manhole Age**

| Installation Date | Total Count  | Count as Percentage (%) |
|-------------------|--------------|-------------------------|
| 1951-1959         | 229          | 7.69%                   |
| 1960-1969         | 440          | 14.77%                  |
| 1970-1979         | 415          | 13.93%                  |
| 1980-1989         | 631          | 21.18%                  |
| 1990-1999         | 286          | 9.60%                   |
| 2000-2009         | 204          | 6.85%                   |
| 2010-2019         | 125          | 4.20%                   |
| Unspecified       | 649          | 21.78%                  |
| <b>Total</b>      | <b>2,979</b> | <b>100.00%</b>          |

To facilitate operations and maintenance and prevent SSOs, the City has implemented SmartCover technology to monitor the wastewater collection system. They have installed 33 SmartLevel™ Monitoring Systems in sewer manholes throughout the City to provide real-time remote level monitoring to operations staff. SmartCovers can be installed under any manhole lid and can be moved to monitor areas of concern, as needed.

### **Flow Splits**

There are 177 identified flow splits throughout the City's collection system. Flow splits are manholes that allow outflow via two or more pipes. There are three types of flow splits within the City's collection system, including:

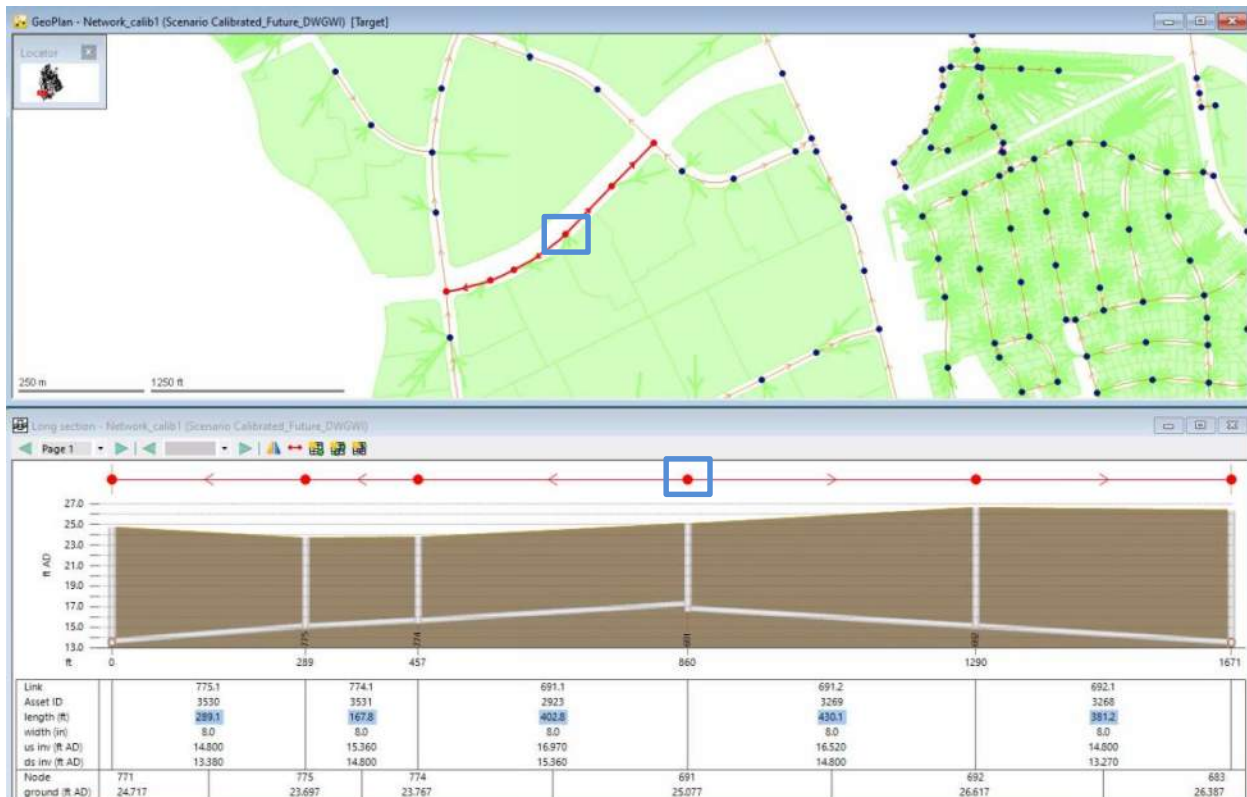
- **High point flow splits** – high points from which sewage flows in opposing directions (see **Figure 3-5**);
- **Even flow splits** – manholes where incoming flow is split proportionally in two (or more) directions where downstream pipes have matching inverts (see **Figure 3-6**); and
- **Overflow flow splits** – manhole flow splits with overflow. At an overflow split during normal flow conditions, the flow takes one path and during high flow conditions, if the manhole begins to surcharge and flow reaches a certain depth, there is an “overflow” pipeline that is activated and will carry flow (see **Figure 3-7**).

As part of the network review and hydraulic model calibration processes, three flow diversion structures (MH 1053, MH 2578, and MH 1152) were identified for inclusion in the hydraulic model. These were identified by reviewing record drawings and available CCTV information. They are described as follows:

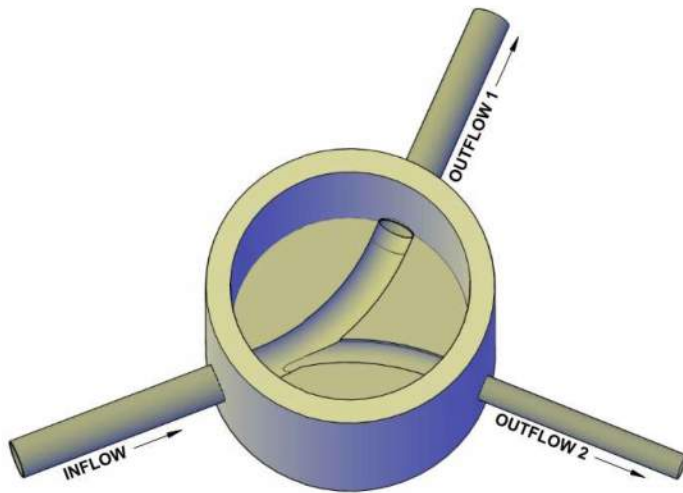
- Flow diversion structure** – alters an existing even flow split to mimic an overflow flow split. A typical flow diversion structure is depicted in **Figure 3-8**. As can be seen in the figure, during normal dry weather operating conditions, all inflow is directed to one outflow pipe by the diversion structure. During higher flow conditions as the manhole begins to surcharge, the diversion structure is overtopped, and some flow is diverted to an overflow pipe. To represent these structures in the model, the height of the overflow pipe invert was adjusted to match the height of the diversion structure.

All identified flow splits and flow diversion structures are displayed on **Figure 3-9**.

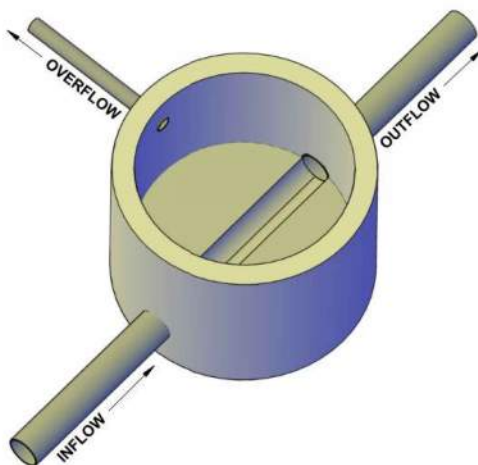
**Figure 3-5: Example High Point Flow Split**



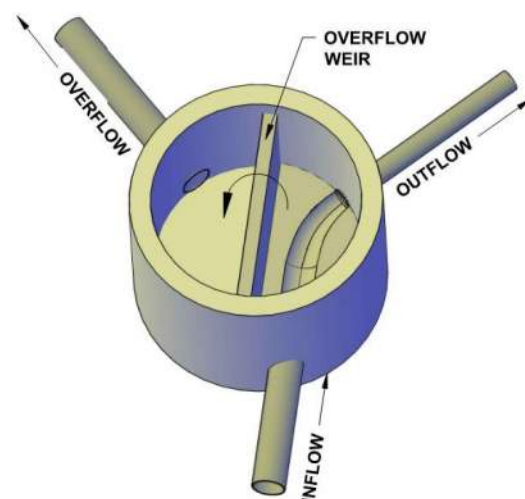
**Figure 3-6: Example Even Flow Split**



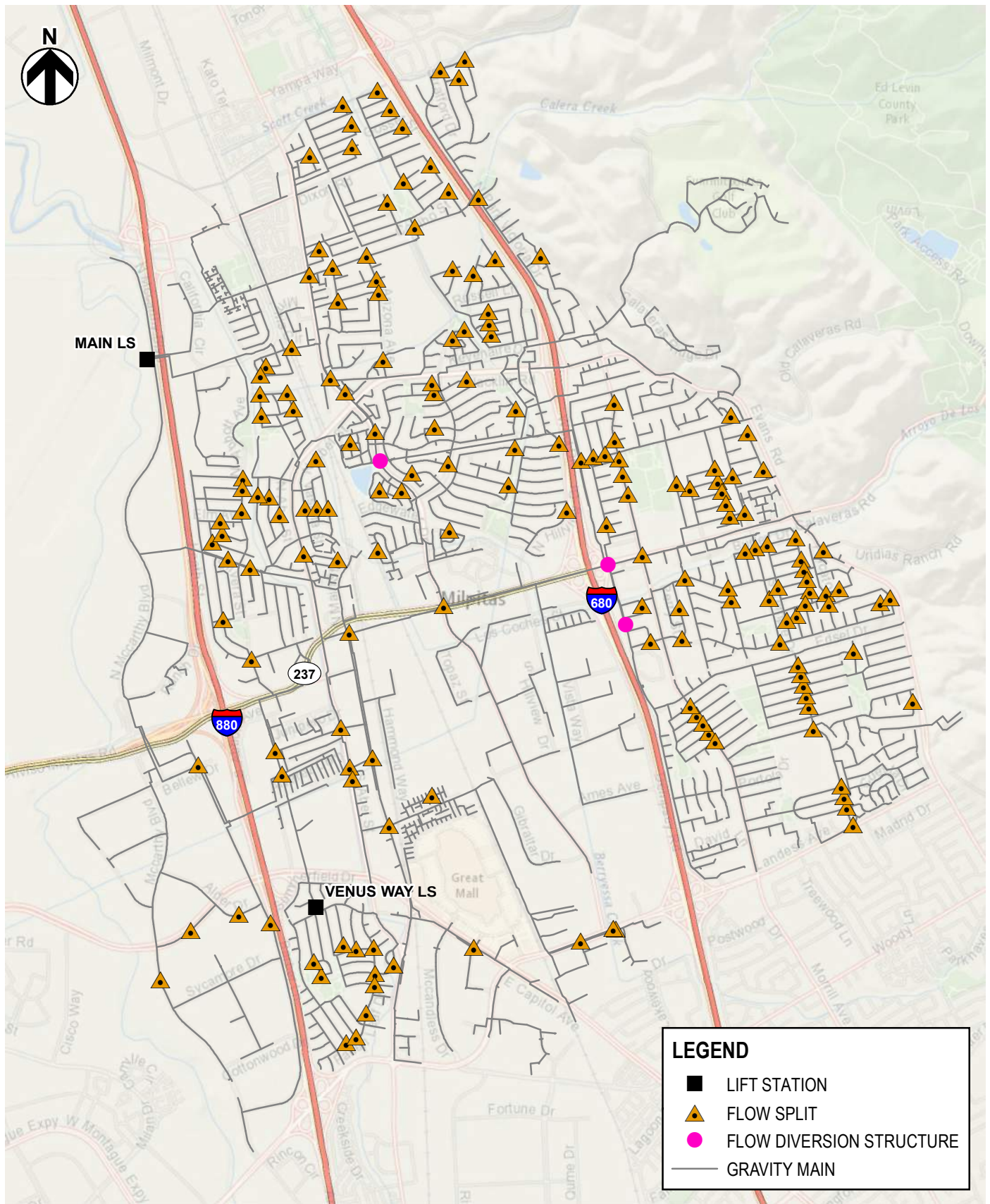
**Figure 3-7: Example Overflow Flow Split**



**Figure 3-8: Example Flow Diversion Structure**







### 3.1.2 Lift Stations

In February and March 2020, a condition assessment of the two lift stations was conducted as part of the Master Plan effort. An inspection report detailing the assessment and a full asset inventory list of the lift stations are included as part of **Appendix A** (R&R Study App. K, LS Report).

The Venus Way Lift Station (Venus Way LS) serves approximately 1,200 single-family homes surrounding Pinewood Park in the southwestern corner of the City. It is designed to lift wastewater collected from the lower elevations and transmit it the collector main parallel to, and to the east of, Interstate 880. It is a single pump (with stand-by pump) lift station, equipped with two 5 hp 3-phase 540 gpm non-clog sewage pumps in a packaged dry-well plus wet-well configuration. The wet well is a 72-inch diameter RCP wet well equipped with an aluminum hatch and safety grate. The City rehabilitated this lift station during 2008. As part of the preventative maintenance program, the Venus Way LS is inspected annually. **Table 3-5** provides a summary of the asset inventory list for the Venus Way LS; a detailed asset inventory is provided in **Appendix A** (R&R Study App. K, LS Report Sections 2.2 and 4.1).

**Table 3-5: Venus Way LS Asset Inventory List**

| Asset Name                      | Asset Description                                  | Asset Type   | Year Installed |
|---------------------------------|----------------------------------------------------|--------------|----------------|
| <b>Mechanical</b>               |                                                    |              |                |
| Pumps (2) #1 & #2               | FLYGT CP3102-441, 5 hp 3-PH 230 V Submersible Pump | Pump         | 2008           |
| Pump Guide Rails                | Reinstalled in 2008                                |              | 2008           |
| 8" Gate Valves (3), Pumps 1 & 2 | 8" Gate Valve, Pump 1 & 2                          | Valve        | 2008           |
| 8" Check Valves (2), Pump 1 & 2 | 8" Check Valve, Pump 1 & 2                         | Valve        | 2008           |
| 4" Flap Gate                    | 4' Flap Gate in Wet Well                           | Valve        | 2008           |
| 2" Combo Air/Vacuum Valve       | 2" Combo Air/Vacuum Valve                          | Valve        | 2008           |
| <b>Electrical</b>               |                                                    |              |                |
| Utility Transformer             | 240/120 V, 3-Ph, 3 W                               | Transformer  | 2000           |
| Service Pedestal                | Service Disconnect and Metering                    |              | 2008           |
| Pump Control Panel              | Starter Panel for Pumps 1 & 2 (each 5 hp)          | Panel        | 2008           |
| <b>Instrumentation</b>          |                                                    |              |                |
| Level Instrument                | Wet Well Level Sensor                              | Level Switch | 2008           |
| <b>Structural</b>               |                                                    |              |                |
| Wet Well                        | 72" Diameter RCP                                   | Tank         | 1964           |
| Valve Vault                     |                                                    | Vault        | 1964           |
| Aluminum Hatch-Vault            | Aluminum Hatch, slide-in                           | Vault        | 2008           |
| Aluminum Hatch-Wet Well         | Aluminum Hatch w/ safety grate                     | Vault        | 2008           |

All wastewater is collected at the Main LS, the terminal point in the gravity collection system, where it is pumped to the RWF. The Main LS is located to the west of Interstate 880 between North McCarthy Blvd and Coyote Creek Trail. Flow enters the lift station site through a single 54-inch diameter RCP pipe.

The site consists of three buildings that house the lift station components. The Main LS consists of four grinders and four large submersible 170 hp 3 phase 705 rpm pumps with variable frequency drives (VFDs). Pumps #1 and #6 are slated for future installation though the base assembly, piping, and rail system were installed under Project 6103/2-1066. Grinders #5-8 are also slated for future installation. According to the City's 2016 SSMP, the Main LS has a wet weather capacity of 45 MGD. **Table 3-6** provides a summary of the asset inventory list for the Main LS; a detailed asset inventory is provided in **Appendix A** (R&R Study App. K, LS Report Sections 2.2 and 3.1).

**Table 3-6: Main LS Asset Inventory Summary**

| Asset Name                                    | Asset Description                                                                                 | Asset Type   | Year Installed |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------|--------------|----------------|
| <b>Mechanical</b>                             |                                                                                                   |              |                |
| Pig Launchers (2) A & B                       | 36" Pig Launcher                                                                                  | Pig Launcher | 2002           |
| Pinch Valves (3) 1-3                          | 36" Pinch Valve                                                                                   | Valve        | 2002           |
| Mag Meter (Flow Meter A)                      | 24" Magnetic Meter                                                                                | Flow Meter   | 2002           |
| Venturi Meter – Removed in 2008               | 36" Venturi Meter (taken out)                                                                     | Flow Meter   | 1975           |
| Butterfly Valve                               | 36" Butterfly Valve, FM interconnect                                                              | Valve        | 1970           |
| Manifold Piping Butterfly Valve               | 36" diameter BFV, middle of manifold                                                              | Valve        | 2008           |
| Manifold Piping Plug Valve #1                 | 36" diameter PV, pumps 1, 2, 3                                                                    | Valve        | 2008           |
| Manifold PV #1 & #2 Actuators (2)             | plug valve electric actuator                                                                      | Actuator     | 2008           |
| Manifold Piping Plug Valve #2                 | 36" diameter PV, pumps 4, 5, 6                                                                    | Valve        | 2008           |
| Pumps (3) #2-4                                | FLYGT CP3531-775, 170 hp Submersible Pump                                                         | Pump         | 2008           |
| Pumps (4) #2-5 Piping                         | 20" Ductile Iron Vertical Discharge Pipe, 20" Ductile Iron 90 Elbow, 20" Flanged Coupling Adapter | Piping       | 2008           |
| Pumps (4) #2-5 Check Valves                   | 20" Diameter Spring Loaded Check Valve                                                            | Valve        | 2008           |
| Pumps (4) #2-5 Plug Valves                    | 20" Diameter Plug Valve                                                                           | Valve        | 2008           |
| Pump #5 (not installed yet)                   | FLYGT CP3531-775, 170 hp Submersible Pump                                                         | Pump         |                |
| Main Head Gate                                | 54" sluice gate with manual actuator                                                              | Gate         | 2008           |
| Head Gate (4) #1-4                            | 48" sluice gate with electric actuator                                                            | Gate         | 2008           |
| Grinder (2) #1 & #4                           | 5-hp electric driven                                                                              | Grinder      | 2008           |
| Grinder (2) #2 & #3                           | 10-hp electric driven                                                                             | Grinder      | 2008           |
| 2" combo air/vac valve                        |                                                                                                   |              |                |
| Force Main A B Flow Recorder                  |                                                                                                   |              |                |
| Flow Meter B                                  | This is for force main B                                                                          |              |                |
| Main Transformer                              | 1000 kVA, 12 kV-480 V, 3-ph (PG&E)                                                                | Transformer  | 2000           |
| Outdoor Utility Disconnect and Metering Panel | Outdoor NEMA 3R Enclosure                                                                         | Panel        | 2000           |
| Main Switchgear                               | Located in Existing Generator Building                                                            | Switchgear   | 2000           |

| Asset Name                                                                                                    | Asset Description                              | Asset Type   | Year Installed |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------|----------------|
| Variable Frequency Drives (4) P2-P5                                                                           | VFD for Pump (170 hp)                          | VFD          | 2008           |
| Local Disconnect for Engine Jacket Water Heater                                                               | 30A/3P                                         | Switch       | 2000           |
| Motor Control Center (2) 2 & 2A                                                                               | 600 A, 480 V, 3-ph, 3W, 65000 AIC              | MCC          | 2000           |
| Dry Type Transformers (2)                                                                                     | 30 kVA, 480-208/120 V, Dry Type                | Transformer  | 2000 & 2008    |
| Lighting panel (LP-1)                                                                                         |                                                | Panel        | 2008           |
| Lighting panel (LA)                                                                                           | 100 A, 1-ph, 3 Wire                            | Panel        | 2000           |
| Motor Control Center (2) A & B                                                                                | 400 A, 480 V, 3-ph, 3W, 65000 AIC              | MCC          | 2008           |
| Dry Type Transformer                                                                                          | 10 kVA, 480-240/120 V, Dry Type                | Transformer  | 2008           |
| Distribution panels (2) (DP-1 & DP-2)                                                                         | 125 A, NEMA Type 1                             | Panel        | 2008           |
| Dry Type Transformer                                                                                          | 75 kVA, 480-208/120 V, Dry Type                | Transformer  | 2008           |
| Local Control Panels (4) for Grinders #1-4                                                                    | LCP grinder 1                                  | Panel        | 2008           |
| Local Disconnects (4) for CU-1 (for FC-1), EF-1 (for Control Room), HP-1 (for FC-2) & FC-1 (for Control Room) | 30A/3P                                         | Switch       | 2008           |
| Local Disconnects (2) for EF-5 & SF-1 (for Wet Well)                                                          | 60A/3P                                         | Switch       | 2008           |
| Generator                                                                                                     | 1000 kVA, 480 V Diesel Driven Engine Generator | Generator    | 2000           |
| Automatic Transfer Switch                                                                                     | ATS, 1600 A                                    | Switch       | 2000           |
| <b>Instrumentation</b>                                                                                        |                                                |              |                |
| Level Switch                                                                                                  | Level High High                                | Level Switch | 2008           |
| Level Switches (2)                                                                                            | Ultrasonic level                               | Level Switch | 2008           |
| <b>Structural</b>                                                                                             |                                                |              |                |
| Pinch Valve Vaults (3) 1-3                                                                                    | Pinch Valve Vault                              | Vault        | 2002           |
| Mag Meter Vault                                                                                               | 24" Magnetic Meter Vault                       | Vault        | 2002           |
| Venturi Meter Vault                                                                                           | 36" Venturi Meter Vault                        | Vault        | 1975           |
| Butterfly Valve Vault                                                                                         | 36" Butterfly Valve Vault                      | Vault        | 1997           |
| Fuel Tank (bulk)                                                                                              | 2,000-gal UL-2085 above ground vault tank      | Tank         | 2008           |
| Fuel Tank (day)                                                                                               |                                                | Tank         | 2000           |
| Grit Chamber/Inflow Structure                                                                                 |                                                | Tank         | 2008           |
| Wet Well                                                                                                      |                                                | Tank         | 2008           |



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## SECTION 4 – CONDITION ASSESSMENT

As mentioned in **Section 1.1.1**, as part of the City’s Master Plan project, a *Sewer Utility Asset Renewal and Replacement Study* (R&R Study) was conducted. Included in this study is a condition assessment of the City’s current collection system based on a set of factors developed to determine the relative risk of failure for each pipeline segment. This section describes the development of the factors established for the Business Risk Exposure (BRE) analysis and the results of the collection system condition assessment. The R&R Study is attached as **Appendix A**.

### 4.1 CCTV Condition Assessment

Part of evaluating the condition of the City’s collection system is understanding the pipe condition based on the level of structural and/or operations and maintenance (O&M) related defects. For this part of the condition assessment, key segments of the system were selected for closed-circuit television (CCTV) investigation based on the following criteria:

- Diameter greater than 8-inches;
- Older pipe (pre-1990) and pipe materials susceptible to corrosion/failure (RCP, VCP);
- Located within high traffic areas; and
- Located within commercial/industrial areas.

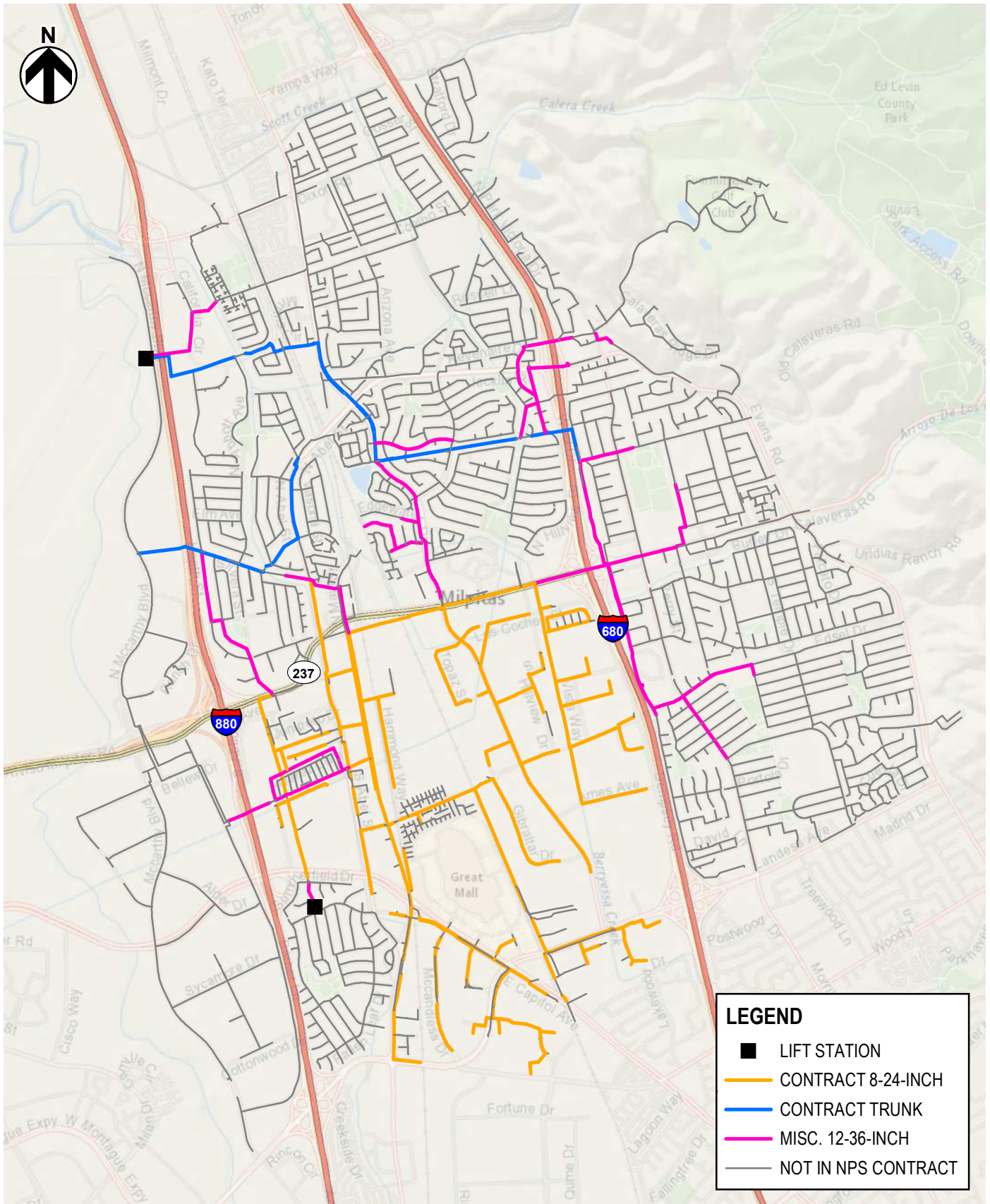
**Figure 4-1** presents the segments selected for CCTV inspection based on these criteria. The pipelines indicated as “Contract” were the priority for inspection while the “Misc” were completed as time and budget permitted.

National Plant Services Inc. (NPS) was contracted to complete the CCTV assessment (168,180 ft, 31 miles, approximately 20% of the entire system) and performed this inspection between March and May 2020. Additional details regarding the planned scope of the assessment can be found in the **Appendix A** (R&R Study Section 2.1). It is expected that additional CCTV assessment will be performed by City forces in the future as part of a City-wide CCTV program.

#### 4.1.1 CCTV Inspection Results

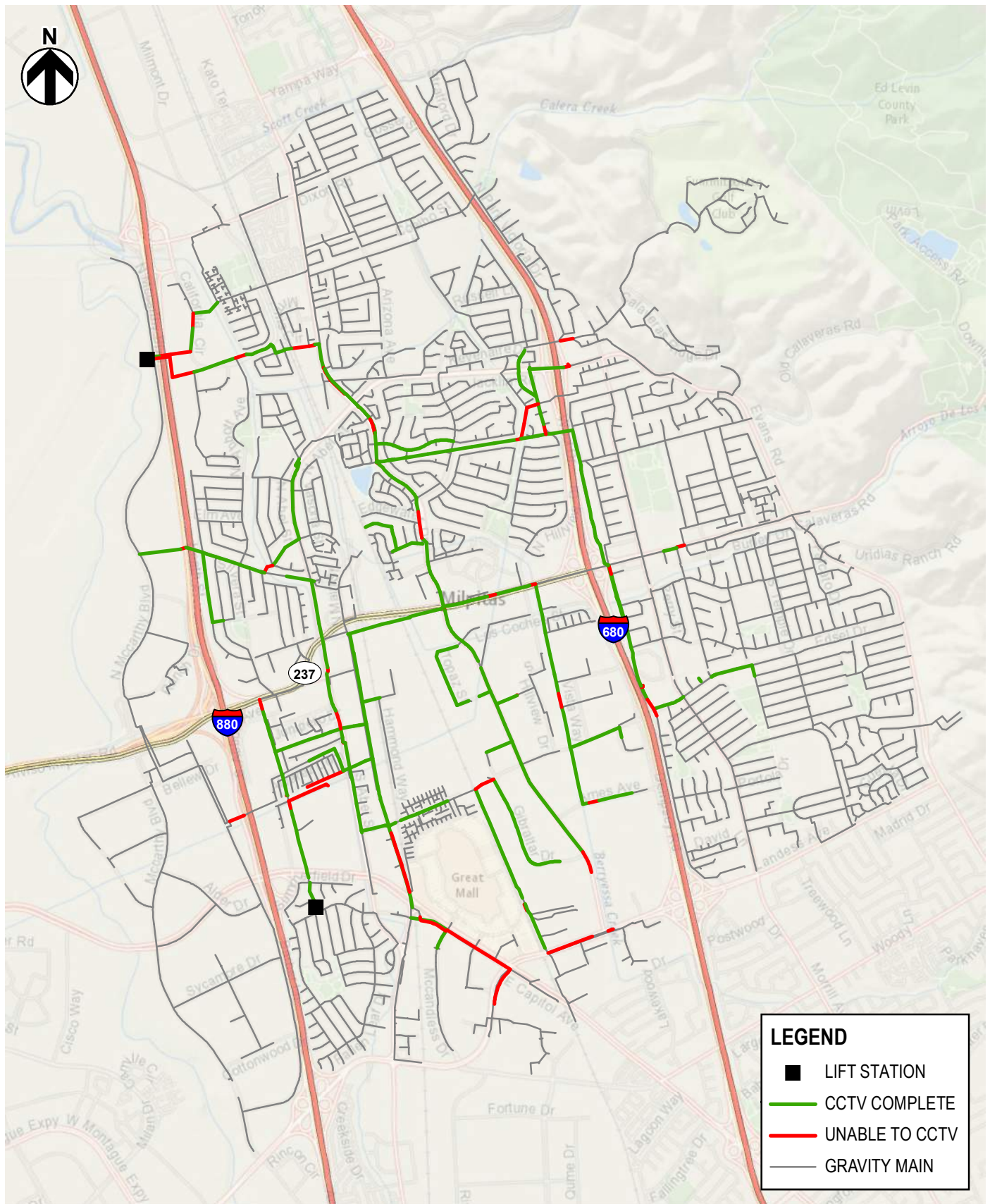
As part of the assessment work performed by NPS, NPS inspected 105,221 ft. (approximately 20 miles) of pipeline. This constitutes approximately 12% of the entire system. **Figure 4-1** shows the pipelines fully inspected by NPS in green.

There were some pipe segments where NPS attempted inspection but was unable to conduct or complete inspection. NPS reported various reasons for not completing inspection of pipe segments including the presence of siphons; manholes that were paved over or did not exist; and obstructions such as root balls, grease, and rocks. These pipe segments are shown in **Figure 4-2** in red; this includes segments for which inspection was only partially completed. Where there were obstructions observed, the survey was attempted from the next manhole in the opposite direction.



**FIGURE 4-1**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
NPS CCTV INSPECTION PLAN





**FIGURE 4-2**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
COMPLETED CCTV INSPECTION



A breakdown of the completed segments by pipe diameter is presented in **Table 4-1**.

**Table 4-1: Completed CCTV Inspection by Pipe Diameter**

| Pipe Diameter (in) | Length Inspected (ft) |
|--------------------|-----------------------|
| 8                  | 8,221                 |
| 10                 | 3,540                 |
| 12                 | 19,003                |
| 15                 | 25,552                |
| 16                 | 195                   |
| 18                 | 15,292                |
| 21                 | 10,268                |
| 24                 | 1,995                 |
| 27                 | 5,337                 |
| 30                 | 7,393                 |
| 33                 | 574                   |
| 39                 | 2,487                 |
| 42                 | 2,547                 |
| 66                 | 1,037                 |
| Unspecified        | 1,788                 |
| <b>Total</b>       | <b>105,221</b>        |

### **Defect Coding**

Defects were identified and sewer pipeline conditions were assessed according to the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP). PACP-certified NPS staff coded all inspected pipelines. As part of the quality control (QC) process, approximately 20% (89 out of 449 pipe segments) of inspection CCTV and PACP reports were additionally reviewed by PACP-certified staff. A detailed description of the QC process can be found in **Appendix A** (R&R Study Section 2.3).

For the condition assessment, the following steps were taken for each pipeline segment, which is defined from manhole to manhole:

1. Defects identified through review of CCTV footage.
2. Individual grade assigned based on the type and severity of defect(s).
3. Overall condition grade developed by assessing the type and number of defects along the segment.
4. Final condition rating assigned based on the condition grades and the potential for further deterioration and/or failure.

Per NASSCO PACP, each defect is categorized as either structural or O&M-related. Structural defects directly impair the structural condition of the pipe and are typically addressed through repairs, rehabilitation, or replacement. O&M-related conditions are those that directly affect the performance of the sewer or are indicative of potential future structural defects and are typically

addressed through maintenance, though some (such as infiltration) may require additional rehabilitation.

Both structural and O&M-related condition grades range from one to five. **Table 4-2** provides a description of each rating as well as some examples of structural and O&M-related defects at each rating.

**Table 4-2: Condition Grade Definitions**

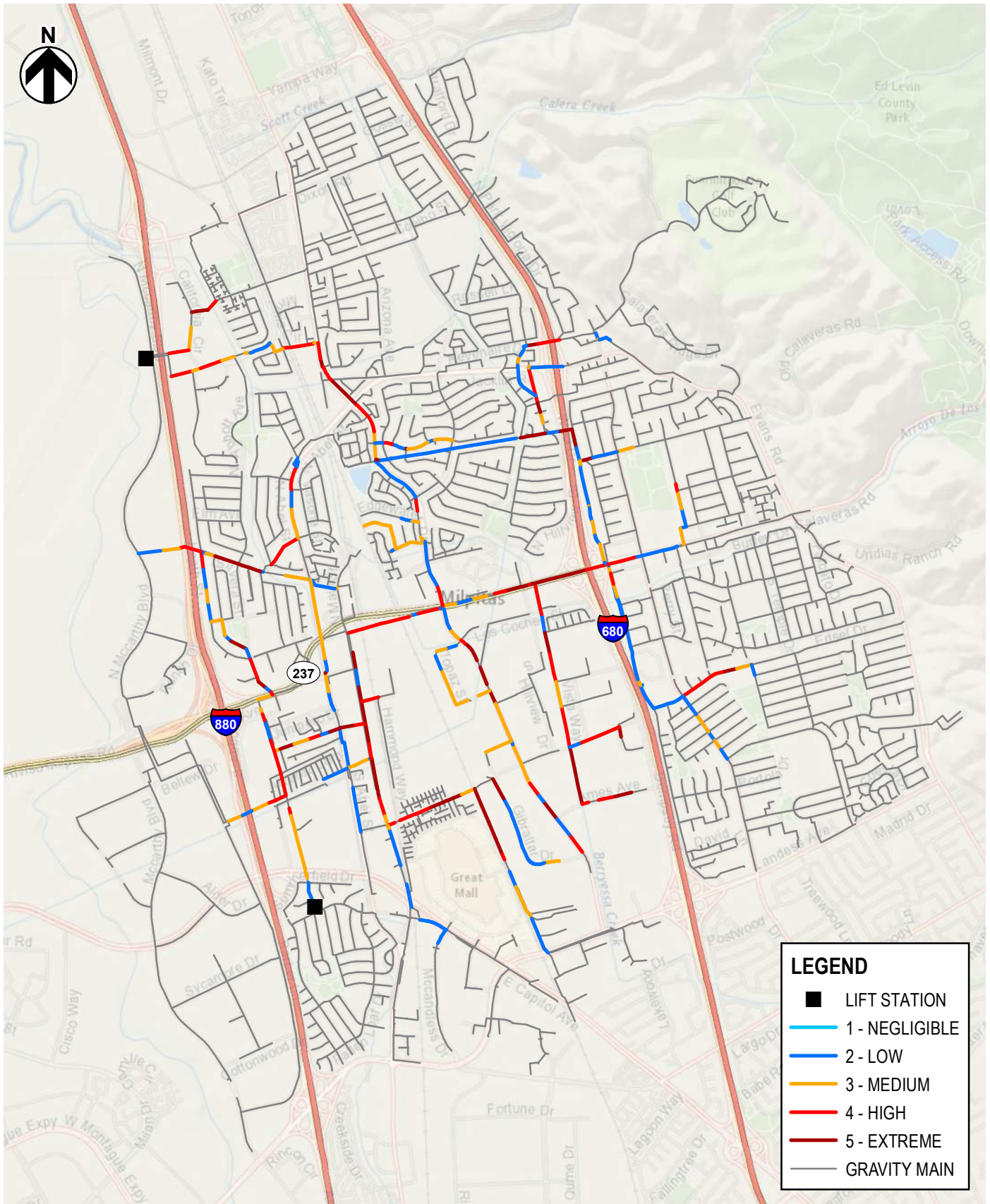
| Condition Grade | Condition Rating               | Structural Examples                                                                             | O&M Examples                                                                                                                |
|-----------------|--------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1               | Minor defect grade             | Circumferential crack; roughness increased due to surface damage; spalling of coating           | Fine roots at lateral, connection, or joint; infiltration stains on barrel, lateral, connection, or joint; vermin cockroach |
| 2               | Minor to moderate defect grade | Spiral or longitudinal crack; circumferential fracture; aggregate visible due to surface damage | Factory tap intruding <10%; infiltration weeper on barrel, lateral, connection, or joint; vermin rat                        |
| 3               | Moderate defect grade          | spiral or longitudinal fracture, lining feature blistered; medium joint offset                  | Deposits (grease, rags, gravel, etc.) attached 10-20%; medium roots at lateral, connection, or joint                        |
| 4               | Significant defect grade       | Broken pipe; surface damage with aggregate missing; large joint offset                          | Deposits attached 20-30%; medium roots at barrel; infiltration runner at barrel, lateral, connection, or joint              |
| 5               | Most significant defect grade  | Broken pipe with visible void; flexible pipe deformed >10%; collapsed pipe                      | Deposits attached >30%; root ball at barrel; infiltration gusher at barrel, lateral, connection, or joint                   |

Each defect identified along a pipeline segment is categorized and rated according to **Table 4-2**. The condition of each pipeline segment is ultimately given the following three scores:

- **Structural Peak Score** – The most severe condition grade for structural defects present in a pipeline segment.
- **O&M Peak Score** – The most severe condition grade for O&M-related defects present in a pipeline segment.
- **Overall Peak Score** – The greater of the two peak scores, either the structural or O&M peak score.

The structural and O&M peak scores are used in the BRE analysis. The structural and overall peak scores developed from this CCTV condition assessment are used to develop project recommendations for the City's CIP (see **Section 9.1.1**).

**Figure 4-3** presents the overall peak scores resulting from this PACP condition assessment. Additional detail including breakdown by pipe diameter of the structural and O&M peak scores and maps of the structural and O&M peak scores can be found in **Appendix A** (R&R Study Section 2.2.1 and Appendices D and E).



**FIGURE 4-3**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
PACP OVERALL PEAK SCORES

## 4.2 Desktop Condition Assessment

In addition to the PACP condition assessment performed using the CCTV footage, a desktop condition assessment was performed to determine the relative risk of failure of each pipeline segment. A pipeline's risk of failure is determined by a combination of the *likelihood* and the *consequence* of the failure of the pipe segment. The results of this assessment represent the City's BRE.

Likelihood of failure (LoF) and consequence of failure (CoF) scores were assigned to each pipeline segment by considering various factor ratings with assigned factor weightings. LoF and CoF ratings were given on a scale of one (least likely to fail/least consequential) to five (most likely to fail/most consequential). The weighting of each factor was assigned based on the relative criticality of that factor, with higher weighting factors assigned to the most critical LoF/CoF factors.

Both the factors and the weightings were established by industry standard along with input from the City Staff through a workshop between BC, HydroScience, and City Staff in April 2020. A summary of the discussion at this workshop can be found in **Appendix A** (R&R Study Section 3.4).

The following equations were used to calculate a risk score for each pipeline segment:

$$\begin{aligned} \text{Risk (BRE)} &= \text{LoF Score} \times \text{CoF Score} \\ \text{LoF Score} &= \sum (\text{LoF Rating} \times \text{LoF Weighting}) \\ \text{CoF Score} &= \sum (\text{CoF Rating} \times \text{CoF Weighting}) \end{aligned}$$

### 4.2.1 Likelihood of Failure (LoF)

The first factor in determining the relative risk of failure of a pipeline was the *likelihood* that the segment is unable to provide the function for which it was installed. This was determined by assigning LoF criteria and ratings based on characteristics, condition, and location of each pipeline. In cases where pipeline characteristics (age and material) were missing or unavailable, medium risk was assigned as this is the equivalent to "neutral." The following criteria were selected for this analysis and are typical for sewer renewal/replacement projects:

- **Pipe age** – In general, as a pipe ages, it has a higher likelihood to fail.
- **Pipe material** – Different pipe materials have different life expectancies and failure modes.
- **Structural condition** – Known structural defects based on 2020 CCTV inspection by NPS.
- **Presence of pipe obstructions** – Known O&M-related defects based on 2020 CCTV inspection by NPS.
- **Required pipe cleaning** – Pipe requiring more frequent cleaning are typically subject to chronic O&M issues (i.e., oil, grease, and roots) when not maintained. However, the act of cleaning with high pressure water jets can contribute to premature failure of older or compromised pipe and inadvertently remove the top layer of corroded concrete or metal pipe.



- **Proximity to landslide zones** – Landslides can pose a threat to pipe segments that are buried at a depth of three feet or less. This factor also accounts for the impact of smaller seismic events on pipe structural integrity.
- **Proximity to earthquake faults** – Pipes located in the Hayward Fault Zone are given a higher LoF rating. This factor also accounts for the impact of smaller seismic events on pipe structural integrity.
- **Local geology (liquefaction)** – A liquefaction layer from County GIS provides soil resiliency ratings to seismic events. This factor also accounts for the impact of smaller seismic events on pipe structural integrity.

Sources include the City's GIS; the City's collection system maintenance schedule; and landslide, fault, and liquefaction zoning provided by the County of Santa Clara Department of Planning and Development. The basis of scoring and weighting of each criteria is detailed in **Table 4-3**.

**Table 4-3: LoF Criteria and Ratings**

| Broad Category        | Criteria                           | LoF Rating                 |                                          |                                                                   |                                                                                                                     |                                                                                       | Criteria Weighting |
|-----------------------|------------------------------------|----------------------------|------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|
|                       |                                    | (← Least likely to fail    |                                          |                                                                   |                                                                                                                     | Most likely to fail →)                                                                |                    |
| Asset Characteristics | Installation Year                  | After 2000                 | 1985 -1999                               | 1970 – 1984 <sup>1</sup>                                          | 1955 – 1969                                                                                                         | Before 1954                                                                           | 2                  |
|                       | Pipe Material                      | Force Main, HDPE, PVC      | VCP <sup>1</sup>                         | RCP, STL, DIP, ABS, PPR                                           | -                                                                                                                   | ACP, CIP                                                                              | 2                  |
| Asset Condition       | Structural PACP Grade/ Defect Type | Grade 2 defect(s) or lower | Grade 3 defect(s) (except hinge defects) | One Grade 4 defect (except hinge defects) OR Grade 3 hinge defect | One Grade 5 defect (except soil/void/collapse deformation >10%) OR multiple Grade 4 defects OR Grade 4 hinge defect | Multiple Grade 5 defects OR one Grade 5 defect (soil/void/ collapse deformation >10%) | 5                  |
|                       | O&M PACP Grade                     | Grade 2 defect(s) or lower | Grade 3 defect(s)                        | One Grade 4 defect                                                | One Grade 5 defect or multiple Grade 4 defects                                                                      | Multiple Grade 5 defects                                                              | 5                  |
|                       | Required Pipe Cleaning             | -                          | Require annual cleaning                  | Requires quarterly cleaning                                       | Requires monthly cleaning                                                                                           | Requires weekly cleaning                                                              | 5                  |
| Asset Location        | Proximity to Landslide Zone        | Not within landslide zone  | -                                        | -                                                                 | -                                                                                                                   | Within landslide zone                                                                 | 3                  |
|                       | Proximity to Earthquake Faults     | Not within fault area      | -                                        | -                                                                 | -                                                                                                                   | Crossing or within fault area                                                         | 3                  |
|                       | Likelihood of Liquefaction         | -                          | -                                        | Prone to liquefaction                                             | High likelihood of liquefaction                                                                                     | Very high likelihood of liquefaction                                                  | 3                  |

Notes:

1. Unknown or unspecified characteristics were classified at this rating.

## 4.2.2 Consequence of Failure (CoF)

The second factor in calculating the relative risk of failure of a pipeline is the CoF, or the predicted impacts resulting from the failure of the segment. Similar to the LoF analysis, CoF criteria and ratings were assigned based on the following groups: service interruption potential, repair/overflow potential, impact to transportation/transit, response time to potential failure, cost of potential failure, and environmental impacts. The criteria were selected to align with City Council core values and priorities and are typical for sewer renewal/replacement projects.

The CoF criteria and the relationship to City Council core values and priorities are summarized in **Table 4-4**.

**Table 4-4: Council Core Values/Priorities and Related CoF Criteria**

| Council Core Value/Priority Area | Organization Category | Measure of Failure                                                                      | CoF Criteria                             |
|----------------------------------|-----------------------|-----------------------------------------------------------------------------------------|------------------------------------------|
| Superior Customer Service        | Community             | Sewer service interruptions to large areas                                              | Pipe diameter                            |
| Integrity and Accountability     |                       | Sewer service interruptions to critical and educational facilities                      | Critical facilities (proximity)          |
| Trust and Respect                |                       | Magnitude and method of public response (sewer size)                                    | Pipe diameter                            |
| Transportation and Transit       |                       | Public transit service and traffic interruptions                                        | Road type                                |
|                                  |                       | Railroad interruptions                                                                  | Railroad proximity                       |
| Governance and Administration    | Finance               | Response time to restore an asset                                                       | Easement (access restriction), road type |
|                                  |                       | Restoration costs or impact on utility rates                                            | Pipe diameter and depth                  |
| Environment                      | Environment           | State and Federal regulatory violations or public response (discharge to surface water) | Waterway/waterbody (proximity)           |

Below is a more detailed description of the selected CoF criteria outlined in **Table 4-4**:

- **Sewer size (pipe diameter)** – Larger diameter pipes are more expensive to replace and provide service to a larger service area than smaller diameter pipes.
- **Proximity to critical facilities** – Pipe proximity to an educational, police, fire, or health facility was calculated and rated for CoF. Pipelines servicing critical facilities were approximated by using a buffer of 500 feet. For context, the facility addresses were plotted as a point, so the buffer of 500 feet accounts for building size and nearby critical pipes.
- **Road type** – Different road types such as arterial or highway will impact more people than a neighborhood street. Therefore, locations where pipe intersects with major traffic conveyance routes such as freeways, state routes, arterial streets, or major roads were identified.
- **Railroad proximity** – Impacts to railroad operations and repairs on railroad property have significant cost and permitting impacts.
- **Easement (access restriction)** – Access restrictions were determined by overlaying the City GIS over an aerial basemap and manually assigning pipes which appeared to be within easements through private property or restricted areas. For example, the parking lot of a shopping mall would be assigned private but not restricted. However, if a pipe is near a swale between a park and a neighborhood, or between two properties, it was assigned “restricted access.” In a further analysis, parcels with easement information could provide a more refined outcome.
- **Pipeline depth** – Pipes that are buried deeper require more time and effort to excavate and as a result can be more costly to repair or replace.
- **Proximity to waterway or waterbody** – There are significant permitting impacts for repair or cleanup of failed pipes that discharge into a waterway or waterbody.

Data sources include the City’s GIS, Google Maps, major road locations provided by the County of Santa Clara Department of Planning and Development, and railroad and waterbody locations provided by the United States Geological Survey (USGS).

For a more detailed explanation of the City Council core values and how each criterion was rated, see Appendix A (R&R Study Section 3.2). The basis of scoring and weighting of each criteria is summarized in **Table 4-5**.

**Table 4-5: CoF Criteria and Ratings**

| Organization Category | Group                                        | Criteria                         | CoF Rating                             |                                      |                                      |                                     |                                                                              | Criteria Weighting |
|-----------------------|----------------------------------------------|----------------------------------|----------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|------------------------------------------------------------------------------|--------------------|
|                       |                                              |                                  | (< Negligible consequence              |                                      | Critical consequence >)              |                                     |                                                                              |                    |
| Community             | Service Interruptions and Overflow Potential | Pipeline Diameter <sup>1,2</sup> | < 6 in                                 | 8 – 12 in <sup>4</sup>               | 14 – 18 in                           | 18 – 24 in                          | > 24 in                                                                      | 1                  |
|                       |                                              | Critical Facilities              | -                                      | -                                    | School                               | Fire/Police                         | Hospital                                                                     | 1                  |
|                       | Transportation/Transit                       | Road Type <sup>1,3</sup>         | Neighborhood streets                   | Collector streets                    | Arterial streets                     | Expressway and state routes         | Freeways                                                                     | 1                  |
|                       |                                              | Railroad Proximity               | Not crossing or within 50' of railroad | -                                    | -                                    | -                                   | Crossing or within 50' of railroad                                           | 1                  |
| Financial             | Response Time                                | Access Restriction               | Public right-of-way                    | -                                    | Private property                     | -                                   | Limited access                                                               | 2                  |
|                       |                                              | Road Type <sup>1,3</sup>         | Neighborhood streets                   | Collector streets                    | Arterial streets                     | Expressway and state routes         | Freeways                                                                     | 2                  |
|                       | Pipeline Cost                                | Pipeline Diameter <sup>1,2</sup> | < 6 in                                 | 8 – 12 in <sup>4</sup>               | 14 – 18 in                           | 18 – 24 in                          | > 24 in                                                                      | 1                  |
|                       |                                              | Pipeline Depth                   | All others                             | -                                    | -                                    | -                                   | Greater than 10' (or special configuration requiring substantial excavation) | 1                  |
| Environment           | Environment                                  | Waterway or Waterbody            | -                                      | Within 250' of waterway or waterbody | Within 100' of waterway or waterbody | Within 50' of waterway or waterbody | Crossing waterway or waterbody                                               | 3                  |

Notes:

1. Pipe diameter and road type affect the CoF in both the broad community and financial categories.
2. Pipe Diameter weighting = 1+1 = 2; 1 (Service Interruptions and Overflow Potential) + 1 (Pipeline Cost) = 2 (overall Pipe Diameter weighting).
3. Road Type weighting = 1+2 = 3; 1 (Transportation/Transit) + 2 (Response Time) = 3 (overall Road Type weighting).
4. Unknown or unspecified characteristics were classified at this rating.



### 4.2.3 Business Risk Exposure (BRE, Risk of Failure)

The LoF and CoF scores, as described above, were automatically calculated based on the criteria and weightings laid out in **Table 4-3** and **Table 4-5** using the InfoAsset Planner (IAP) software by Innovyze, a GIS extension risk assessment tool. As described at the beginning of **Section 4.2**, the relative risk was given by the product of the LoF and CoF scores calculated by IAP. **Figure 4-4** illustrates the risk assignment for each LoF and CoF pairing.

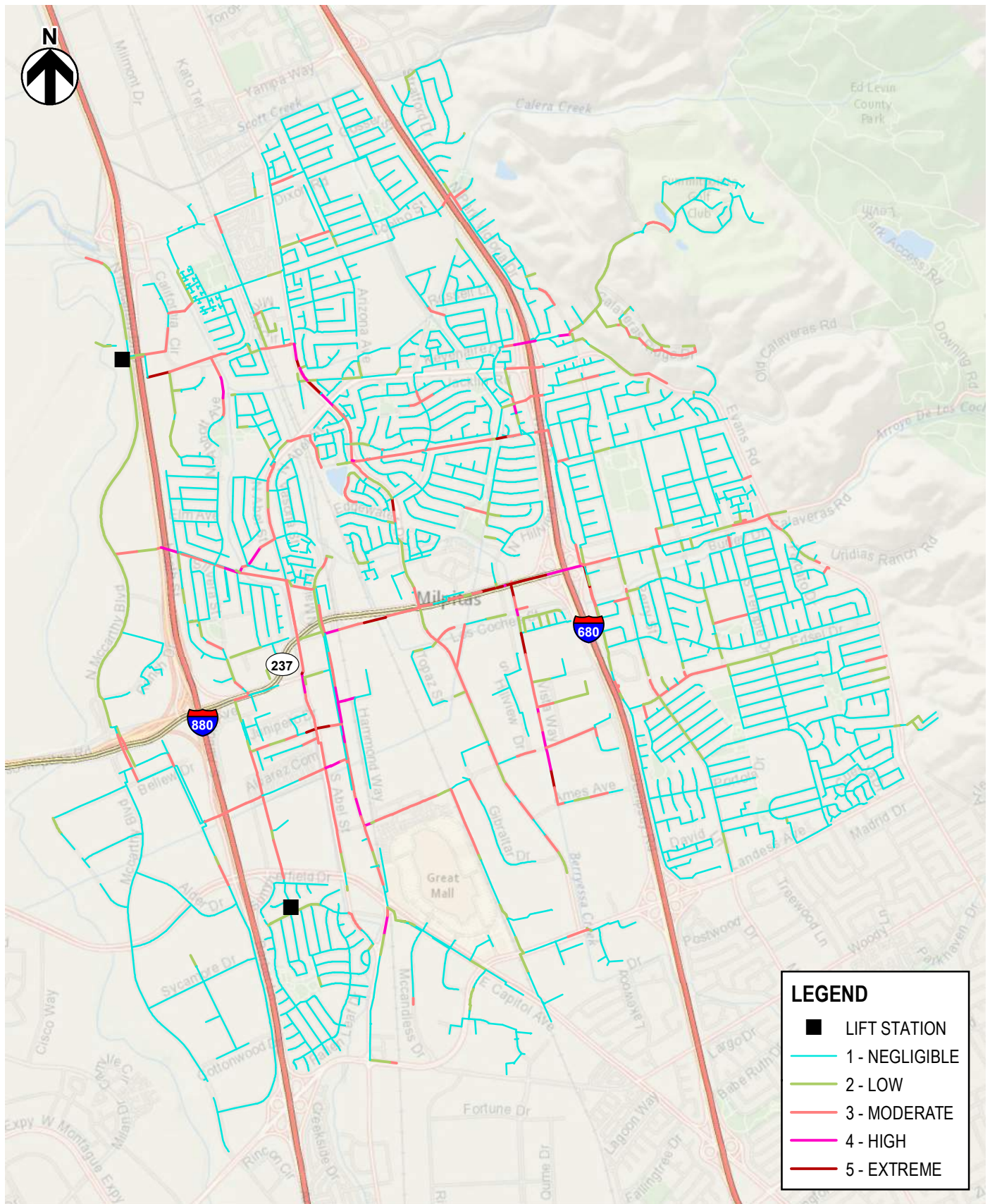
**Figure 4-4: Risk of Failure Assessment Matrix**

|                                      | Low LOF Score → High LOF Score |            |        |         |         |
|--------------------------------------|--------------------------------|------------|--------|---------|---------|
| High COF Score<br>↑<br>Low COF Score | Medium                         | Medium     | High   | Extreme | Extreme |
|                                      | Medium                         | Medium     | Medium | High    | Extreme |
|                                      | Low                            | Medium     | Medium | Medium  | High    |
|                                      | Negligible                     | Low        | Medium | Medium  | Medium  |
|                                      | Negligible                     | Negligible | Low    | Medium  | Medium  |

Total risk scores were normalized within the dataset from one (negligible risk) to five (extreme risk). **Table 4-6** provides a breakdown of the distribution of risk scores as a portion of the total length of pipe; for a more detailed breakdown of the risk scores, see **Appendix A** (R&R Study Section 3.6). **Figure 4-5** presents a map of the resulting risk scores for the entire city, and these were used to provide CCTV recommendations (see **Section 9.1.2**).

**Table 4-6: Business Risk Exposure Score Distribution by Length**

| Risk Score             | Length of Pipe (ft) | % of Total |
|------------------------|---------------------|------------|
| 1 – Negligible         | 610,497             | 77         |
| 2 – Low                | 77,844              | 10         |
| 3 – Medium             | 80,247              | 10         |
| 4 – High               | 9,674               | 1          |
| 5 – Extreme            | 5,922               | 1          |
| Blank (no facility ID) | 4,935               | < 1        |
| <b>Total</b>           | <b>789,119</b>      | <b>100</b> |



**FIGURE 4-5**  
 CITY OF MILPITAS  
 SEWER MASTER PLAN  
 BUSINESS RISK EXPOSURE SCORE MAP

### 4.3 Lift Station Condition Assessment

As part of the R&R Study, BC also performed an on-site inspection of the collection system's two lift stations – the Main LS and Venus Way LS – described in **Section 3.1**. The results of this inspection are presented in the *Main and Venus Way Lift Station Inspections Report* (LS Report) which is included in **Appendix A** (R&R Study App. K). Assets in the following categories were evaluated during the inspection of these lift stations:

- Mechanical;
- Electrical;
- Instrumentation;
- Civil; and
- Structural.

Further breakdown of these categories and the specific assets evaluated are detailed in the LS Report.

Field inspections were completed on February 11 and March 11, 2020. Each asset inspected was reported with a condition score and a performance score from one to five; the breakdown of each score is summarized in **Table 4-7**.

**Table 4-7: Condition and Performance Score Definitions**

| Score | Description       | Condition Score Meaning                                      | Performance Score Meaning                      |
|-------|-------------------|--------------------------------------------------------------|------------------------------------------------|
| 1     | Excellent/Good    | No defects observed.                                         | Functioning as intended.                       |
| 2     | Fair              | Only minor defects observed.                                 | In service, but higher than expected O&M.      |
| 3     | Neutral           |                                                              |                                                |
| 4     | Poor              | Major defects observed. Asset integrity may be compromised.  | In service, but function is highly impaired.   |
| 5     | Failing or Failed | Asset integrity is compromised. Asset may be out of service. | Not functioning as intended or out of service. |

#### 4.3.1 Main LS Inspection

**Table 4-8** presents the major deficiencies identified at the Main LS that require timely attention. A summary asset inventory list is provided in **Table 3-6**. A comprehensive list of the inspection notes and scoring for all Main LS components are included in **Appendix A** (R&R Study App. K, LS Report Section 3).

**Table 4-8: Main LS Deficiencies**

| Asset Name                            | Field Assessment/Comments                                                                                    | Condition Score | Performance Score |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------|-------------------|
| Mag Meter (Flow Meter A) <sup>1</sup> | Not in operation                                                                                             | 4               | 4                 |
| Manifold PV #2 Actuator               | Does not work                                                                                                | 5               | 5                 |
| Pump #3                               | Has exceeded useful life <sup>2</sup>                                                                        | 4               | 4                 |
| Grinder #1                            | Excessive vibration and inadequate supports                                                                  | 5               | 5                 |
| 2" Combination Air/Vacuum Valve       | None                                                                                                         | 4               | 4                 |
| Flow Meter B <sup>1</sup>             | Operable, but not accurate                                                                                   | 4               | 4                 |
| Air Vacuum 1 to 15                    | Cavitation, coating failure, and inadequate supports                                                         | 5               | 5                 |
| Variable Frequency Drive P2           | No corrosion identified, arc flash labels missing                                                            | 4               | 2                 |
| Variable Frequency Drive P3           | No corrosion identified, confirmed by City that IGBT was replaced in 2019, arc flash labels missing          | 4               | 2                 |
| Variable Frequency Drive P4           | No corrosion identified, arc flash labels missing                                                            | 4               | 2                 |
| Variable Frequency Drive P5           | No corrosion identified, confirmed by City that cooling fans were replaced in 2019, arc flash labels missing | 4               | 2                 |

Notes:

1. The City is replacing these meters as part of CIP Project 6131: Sanitary Sewer Cathodic Protection Improvements.
2. This pump has logged over 50,000 hours.

#### 4.3.2 Venus Way LS Inspection

Condition and performance scores for all assets inspected were rated as 1 – no defects and functioning as intended. A summary asset inventory list is provided in **Table 3-5**. A comprehensive list of the inspection notes and scoring for the Venus Way LS can be found in **Appendix A** (R&R Study App. K, LS Report Section 4).



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## SECTION 5 – ANALYSIS OF LAND USES FOR HYDRAULIC MODELING

To develop base sanitary flows (BSF) – the flow directly contributed by the customer – wastewater flows were assigned to every contributing parcel in the City. For planning level analysis, parcels of similar land use types are estimated to have similar wastewater flow rates either on a per parcel basis (gpd/parcel) or per acre basis (gpd/acre) and similar diurnal patterns. Thus, common land use types were consolidated, where appropriate. This section discusses the land use data used for planning level wastewater modeling.

### 5.1 Land Use Designations for Model Analysis – Existing Condition

City land use designations were available as a parcel GIS shapefile containing GP land use information for each parcel in the City. For modeling purposes, some modifications to the land uses are warranted to ensure relevance to the sewer analysis. Land use types expected to generate similar wastewater flows were consolidated into general categories to facilitate unit flow (UF) analysis. Land uses that have little to no contribution to the sewer system were excluded from further analysis.

It is noted that the consolidations made for the purpose of this Study might not correspond directly to the land use categories used for the Water Master Plan Study because these categories were established based on expected similar wastewater flow generation, which do not always directly correspond to water use.

Data cleaning was necessary to assure an accurate representation of wastewater flow from individual parcels/customers. Below is a description of the GP land use categories that required further review in order to assign the appropriate model-based land use designation (see **Table 2-1**):

- The following GP Land Use categories and parcel types were assigned as “NF” (no flow) and excluded from this analysis;
  - POS, WATERWAYS, parcels consisting of train tracks, streets, parking lots, or other open space; and parcels located in the City of San Jose or unincorporated areas not serviced by the City’s sewer system.
- All parcels with location specific land use codes (HWS, TWC, and URR) were reviewed using Google Earth Satellite and Street Views and assigned a model-based land use according to facilities present on each parcel as listed in **Table 5-1**.
- Some parcels with GP land use of BVMU were assigned to COM if commercial facilities appeared to be present;
- All hotels in the City were identified and parcels assigned to a new model-based land use code: HOTEL;
- Elmwood Correctional Facility was assigned to its own model-based land use code: COR; and
- All residential GP land use categories with parcels greater than one acre were reviewed to ensure the model-based land use designations were representative according to expected wastewater generation rates. Updated model-based land use designations were assigned, as appropriate.

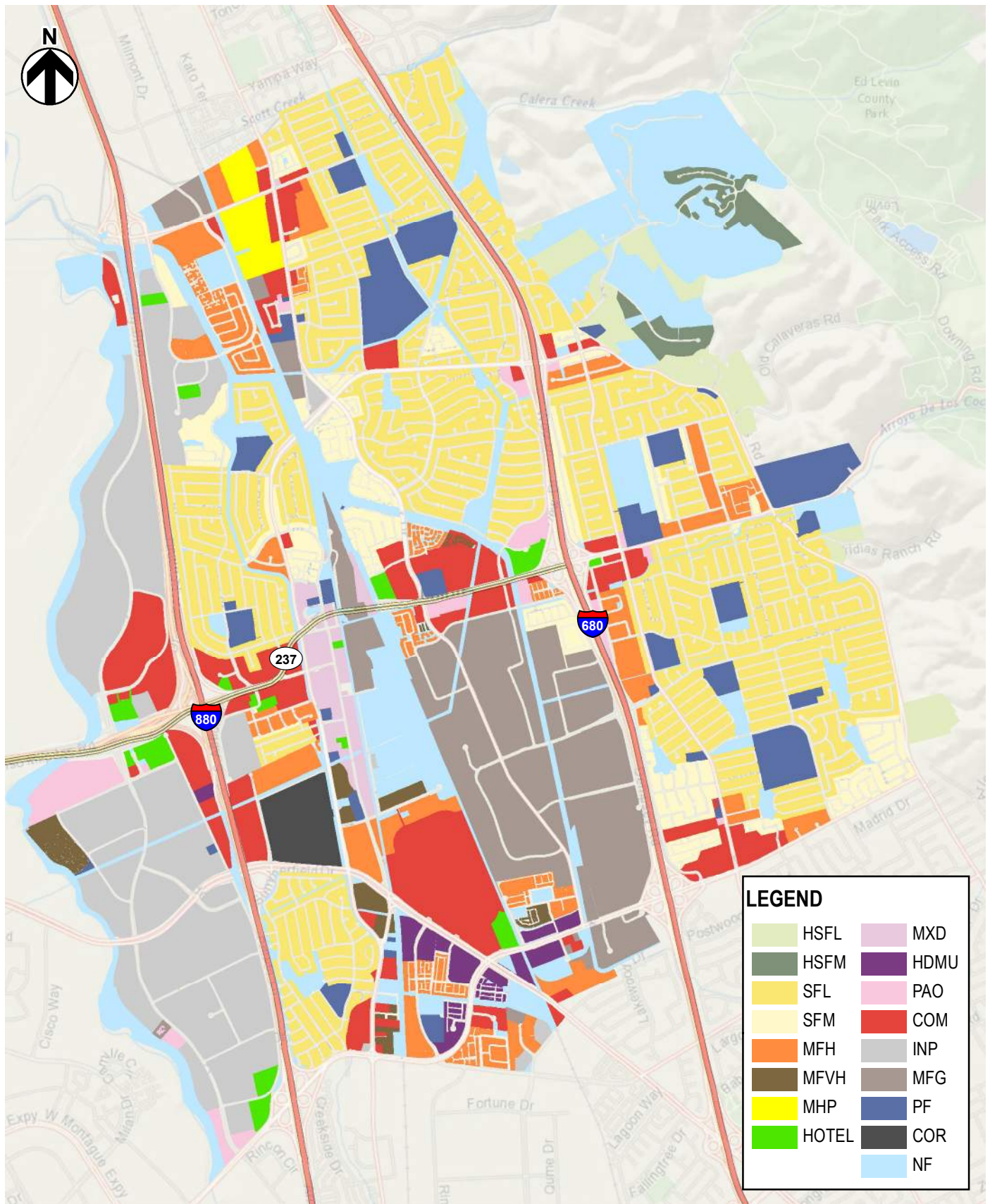
**Table 5-1** summarizes the GP land uses and associated codes included in the data set, and the model-based land uses developed for use in the model for this Study. **Figure 5-1** presents the City according to the model-based land use designations.

**Table 5-1: Model-Based Land Use Designations for Existing Conditions**

| GP Land Use                               | Code      | Model-Based Land Use                                                            | Code  |
|-------------------------------------------|-----------|---------------------------------------------------------------------------------|-------|
| Hillside Very Low Density                 | HVL       | Hillside Single-Family Low Density                                              | HSFL  |
| Hillside Low Density                      | HLD       |                                                                                 |       |
| Hillside Medium Density                   | HMD       | Hillside Single Family Medium Density                                           | HSFM  |
| Valley Floor Single-Family Low Density    | SFL       | Valley Floor Single-Family Low Density                                          | SFL   |
| Valley Floor Single-Family Medium Density | SMD       | Valley Floor Single-Family Medium Density                                       | SFM   |
| Multi-Family Medium Density               | MFM       |                                                                                 |       |
| Multi-Family High Density                 | MFH       | Valley Floor Multi-Family High Density                                          | MFH   |
| Multi-Family Very High Density            | VHD       | Valley Floor Multi-Family Very High Density                                     | MFVH  |
| Mobile Home Park                          | MHP       | Mobile Home Park                                                                | MHP   |
| Mixed Use                                 | MXD       | Mixed Use                                                                       | MXD   |
| Boulevard Very High-Density Mixed Use     | BVMU      | High Density Mixed Use                                                          | HDMU  |
| Residential-Retail Mixed Use              | RRMU      |                                                                                 |       |
| Professional & Administrative Offices     | PAO       | Professional & Administrative Offices                                           | PAO   |
| General Commercial                        | GNC       | Commercial                                                                      | COM   |
| Retail Sub-Center                         | RSC       |                                                                                 |       |
| Industrial Park                           | INP       | Industrial Park                                                                 | INP   |
| Manufacturing                             | MFG       | Manufacturing                                                                   | MFG   |
| Public Facilities                         | PF        | Public Facilities <sup>1</sup>                                                  | PF    |
|                                           |           | Elmwood Correctional Facility <sup>2</sup>                                      | COR   |
| TWC, MXD, GNC, INP, HWS, RSC              |           | Hotels <sup>3</sup>                                                             | HOTEL |
| Park Open Space                           | POS       | NF                                                                              |       |
| Waterways                                 | WATERWAYS | NF                                                                              |       |
| Highway Services                          | HWS       | Parcels reviewed and model-based land use designation assigned, as appropriate. |       |
| Town Center                               | TWC       |                                                                                 |       |
| Urban Residential                         | URR       |                                                                                 |       |
| Parcels with no land use designation      | -         |                                                                                 |       |

Notes:

1. Includes schools, churches, health facilities, libraries, and fire stations.
2. The correctional facility is categorized as PF in the GP. For modeling purposes, it was given a distinct code.
3. Hotels are categorized under various land uses in the GP. They were identified and assigned a distinct code.



**FIGURE 5-1**  
**CITY OF MILPITAS**  
**SEWER MASTER PLAN**  
**MODEL-BASED LAND USE DESIGNATIONS - EXISTING**



## 5.2 Land Use Designations for Model Analysis – Future Condition

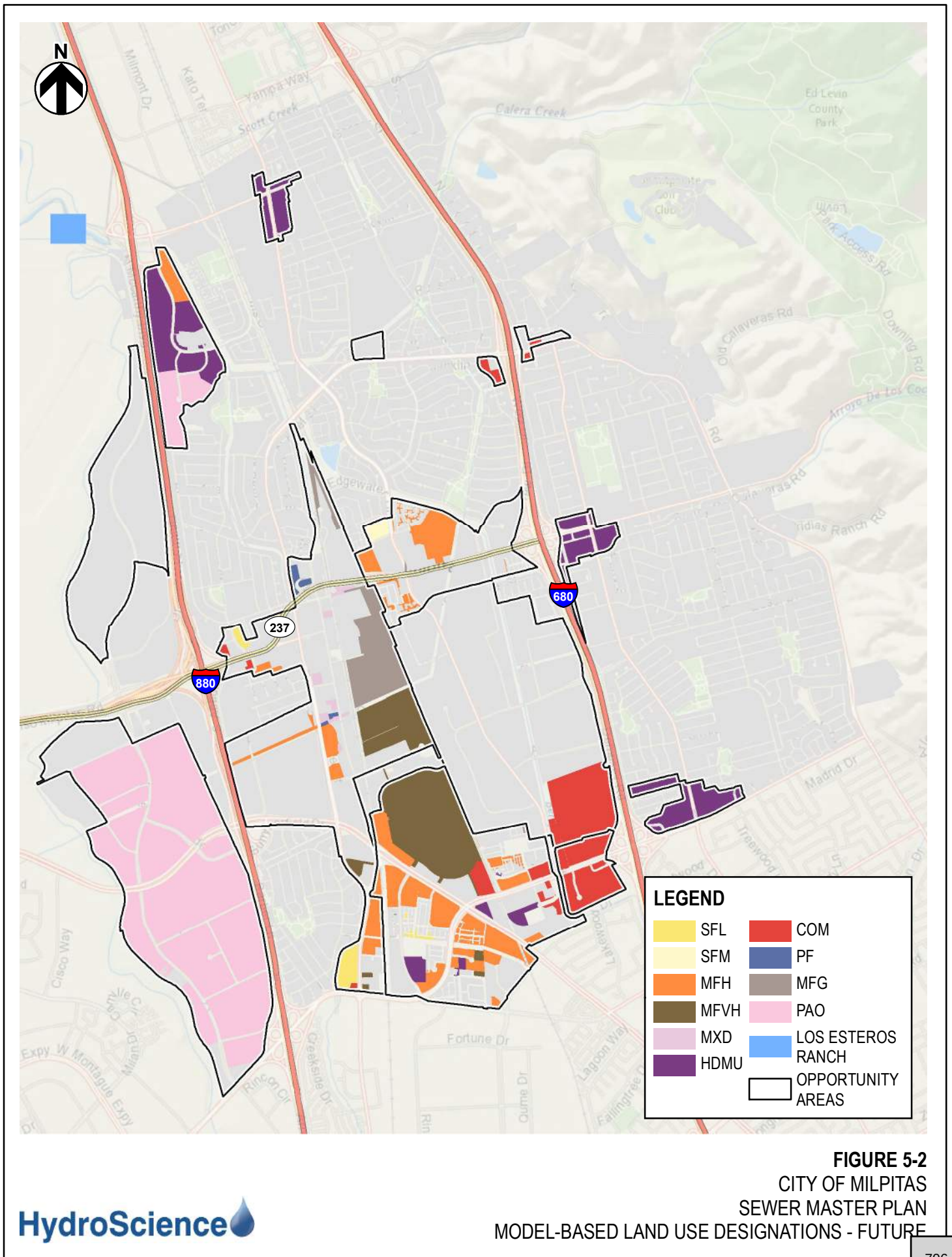
The City has identified “Opportunity Areas” (see **Section 2.1.1**) which refers to parcels identified within the City that may be considered for future redevelopment (see **Figure 2-2**). For modeling and planning purposes, it is important to understand the potential impact redevelopment can have on the wastewater collection system. Not all “Opportunity Areas” had proposed changes in land use.

Similar to the existing condition described in **Section 5.1**, the objective is to assign the model-based land use designation to the parcel according to the type of redeveloped land uses planned/anticipated within the “Opportunity Areas”. The future land uses identified in the “Opportunity Areas” were reviewed and assigned the model-based land use designations listed in **Table 5-1** according to the anticipated use, density, and wastewater flow rates.

**Table 5-2** summarizes the changes in land uses from the existing condition within “Opportunity Areas” that are proposed for redevelopment. The table identifies the redeveloped future land use, the assigned model-based land use designation, and the corresponding area. Areas listed represent the acreage within each opportunity area that is changing and does not include areas within “Opportunity Areas” where land use remains the same. **Figure 5-2** displays the identified “Opportunity Areas” where land use has changed, and the corresponding model-based land use designation within those areas.

**Table 5-2: Summary of Future Land Use Updates**

| “Opportunity Areas”                                   | Proposed Future LU | Model-Based LU | Area (acres) |
|-------------------------------------------------------|--------------------|----------------|--------------|
| Sunny Hills Neighborhood/Commercial Center            | NCMU               | HDMU           | 19.9         |
| California Circle                                     | NCMU               | HDMU           | 54.1         |
|                                                       | HDR                | MFH            | 18.3         |
| Landess Neighborhood/Commercial Center                | NCMU               | HDMU           | 38.0         |
| Calaveras & North Park Neighborhood/Commercial Center | NCMU               | HDMU           | 28.3         |
| Milpitas Town Center                                  | HDR                | MFH            | 38.1         |
| Southwestern Employment Area                          | BPR&D              | PAO            | 488.3        |
| Jacklin & 680 Neighborhood/Commercial Center East     | NC                 | COM            | 8.0          |
| Jacklin & 680 Neighborhood/Commercial Center West     | NC                 | COM            | 6.4          |
| Jacklin Neighborhood/Commercial Center                | NC                 | COM            | 9.8          |
| Midtown Specific Plan                                 | Various            | Various        | 484.3        |
| Metro Specific Plan (aka TASP)                        | HDR                | MFH            | 212.5        |
|                                                       | NC                 | COM            | 85.4         |



**FIGURE 5-2**  
 CITY OF MILPITAS  
 SEWER MASTER PLAN  
 MODEL-BASED LAND USE DESIGNATIONS - FUTURE

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## **SECTION 6 – HYDRAULIC MODEL DEVELOPMENT**

This section summarizes the history of the City's hydraulic model and describes the process of developing and building the most up-to-date version of the hydraulic model.

### **6.1 Model System Development**

The City's original hydraulic model was built using SANSYS as part of the 1994 master planning effort. As part of the 2002 master planning effort, the hydraulic model was converted to Hydra<sup>®</sup> software version 6.0 by Pizer, Inc. The Hydra<sup>®</sup> model was subsequently reviewed, updated, and calibrated as part of the 2004 and 2009 Master Plan Updates.

For this Master Plan, HydroScience recommended InfoWorks ICM by Innovyze<sup>®</sup> (InfoWorks) to model the City's collection system because it is a fully dynamic software that uses the full set of St. Venant equations to model and evaluate complicated hydraulic systems. This recommendation was based on the knowledge that the City's collection system includes 177 flow splits, which significantly increases the complexity of the system and model.

As part of the model build, a review and update of the City's GIS was conducted using an extensive database of record drawings. A summary of the updates made to the GIS is included in **Appendix C**.

The updated GIS sewer system consists of 160 miles of gravity sewer main comprised of approximately 3,500 pipe segments and 3,000 manholes. For model development, the network was pared down to approximately 2,600 pipe segments and 2,400 manholes. All pipes 8-inches and larger were included, as well as all smaller pipes that included flow splits as they can affect the direction and quantity of flow downstream. The purpose of trimming the system is to reduce complexity of the system while maintaining all critical infrastructure. Smaller diameter pipes are generally less critical to the system operation. Including all pipe segments increases the complexity of the model but does not necessarily increase the value of the model and its analysis.

#### **6.1.1 Model Network Development**

The first step in developing the model network was to identify all pipelines for inclusion in the model. Using GIS, the pipe database was queried to select all pipes 8-inches and larger. To ensure the accuracy of flow representation, smaller pipelines downstream of flow splits were hand-selected where those flow splits would affect the direction and volume of downstream flow. Where there were unselected pipe segments between selected pipes, presenting potential gaps, those pipes were also hand selected for inclusion in the model to ensure network continuity. Pipes that had a listed diameter of "0" inch or an unknown diameter were the most common reason for unselected pipe segments.

The second step in developing the model network was to identify all manholes for inclusion in the model. Using GIS, all manholes that coincided with the selected pipelines were also selected. There were some instances where there was no manhole at the end of a terminal pipe segment



or at the junction between two pipe segments. These instances were most commonly one of the following two conditions:

1. Where a terminal pipe segment has a cleanout or flushing invert at its upstream end that was not represented in GIS; or
2. Where two pipe segments were built at different times and were directly connected without a manhole at the junction.

To remedy this, manhole placeholders were inserted at these locations for inclusion in the model network to prevent errors during the import into InfoWorks. These placeholders were given unique identification numbers to differentiate them from existing manholes.

The Venus Way LS was also included in the model network and the Main LS was modeled as the outfall. **Figure 6-1** shows the final model network that was imported into InfoWorks.

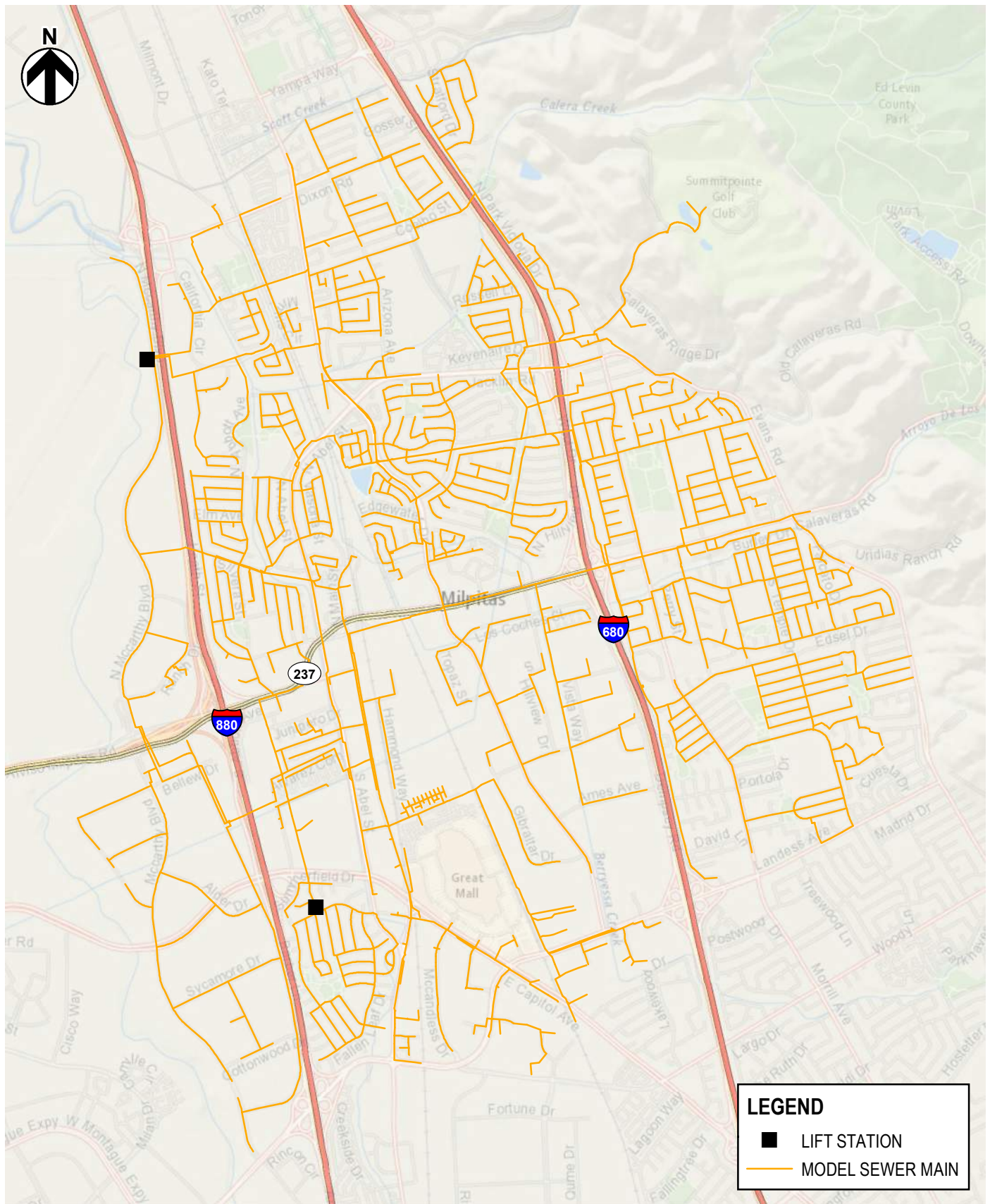
Approximately 63% of the manholes did not have rim elevations documented in the GIS. To reconcile this data gap, regional digital elevation model (DEM) data was downloaded from the USGS web database to obtain surface elevations at each manhole. Two separate DEM files were needed for coverage of the entire modeled collection system. The DEM resolution for most of the collection system (over 99% of manholes) was 1/9 arc-second (approximately 10 feet). For the remaining (~25) manholes, rim elevations were supplemented by a 1/3 arc-second (approximately 30 feet) resolution DEM. **Figure 6-2** shows the coverage for the 1/9 arc-second DEM data set.

DEM surface elevations were given in reference to the North American Vertical Datum of 1988 (NAVD 88). Most of the data in the City's existing GIS is based on the National Geodetic Vertical Datum of 1929 (NGVD 29) due to the age of the system. For consistency, NGVD 29 was established as the reference datum in the hydraulic model. To adjust from NAVD 88 to NGVD 29, the following conversion, referenced from City record drawing #2-1228, was applied:

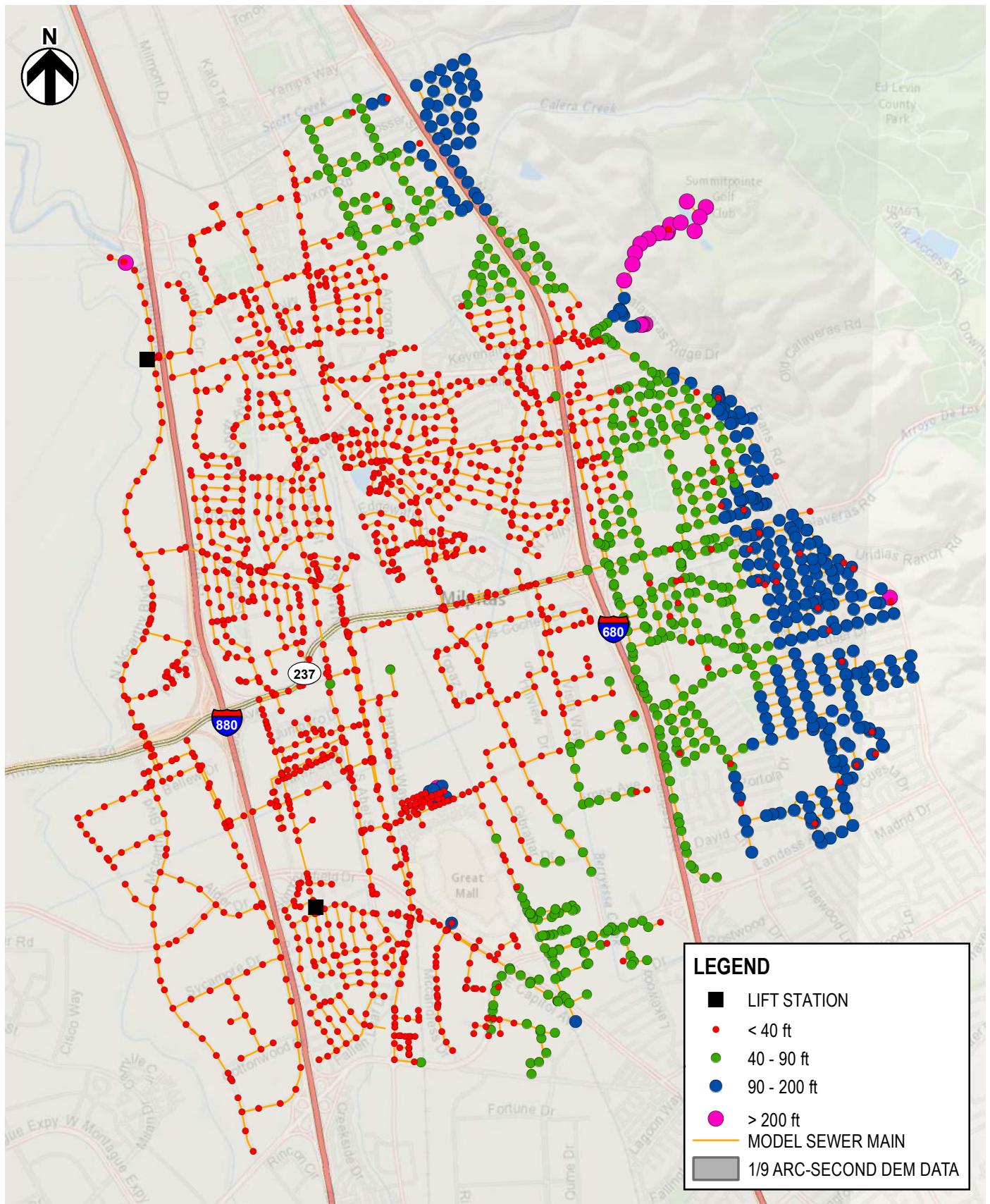
$$\text{NGVD 29} = \text{NAVD 88} - 2.743 \text{ ft}$$

This equation is a simplified representation of conversion between the two datums but is generally representative within the bounds of the City. Small differences are not expected to affect the hydraulic model results as the relative elevation differences that affect inverts and slopes would be unchanged.

Generally, rim elevations contained in the GIS were used and supplemented by DEM where no rim elevation was documented. Existing rim elevations were compared to DEM elevations for confirmation. The average discrepancy between those listed in GIS and those calculated using the DEM data was approximately 0.8 ft. The cases that had the largest discrepancies were reviewed against record drawings and adjusted, as necessary.



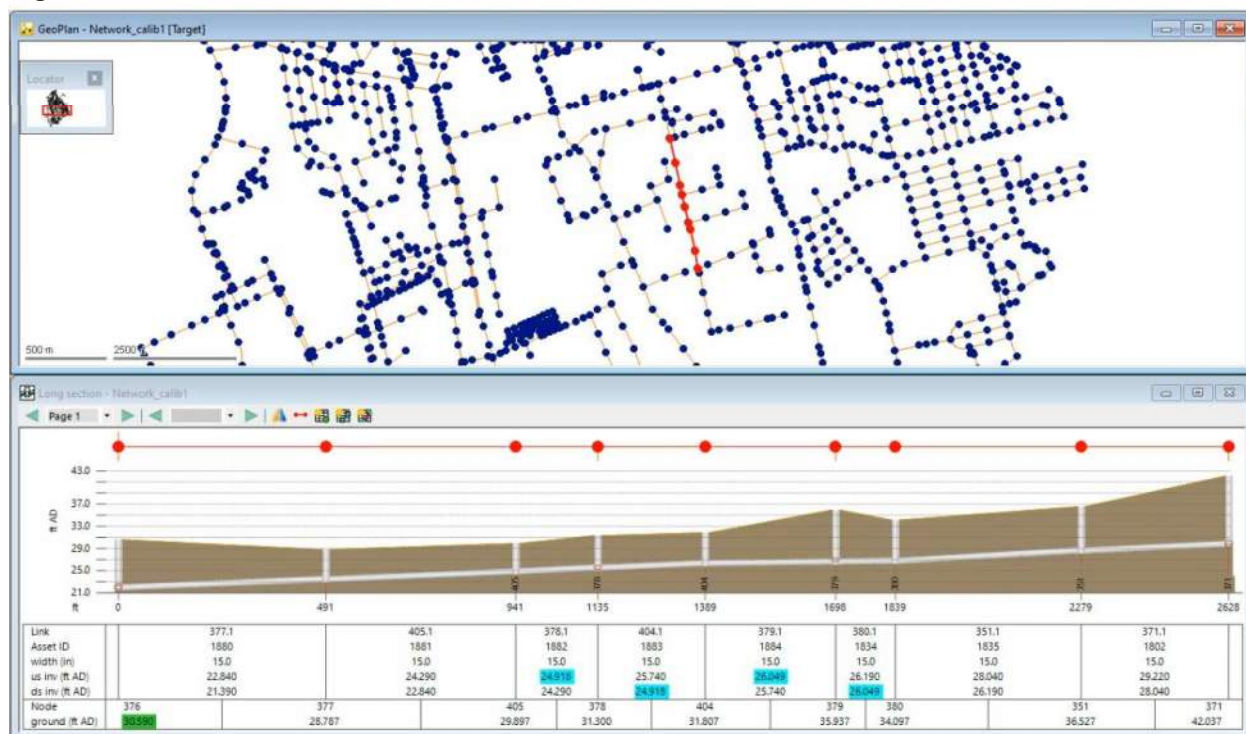
**FIGURE 6-1**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
MODEL NETWORK



**FIGURE 6-2**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
MANHOLE RIM ELEVATIONS



**Figure 6-3: InfoWorks Profile View**



## Network Review

Selected elements were imported into InfoWorks to build the hydraulic model. It is noted that the element selection and import process was iterative as errors in network continuity were identified and resolved. Upon import, InfoWorks will detect any errors when validating the network. Most validation errors encountered were related to network discontinuity and elements with missing data. Where possible, missing data, such as invert elevations or pipe diameters, were interpolated using surrounding data and the *Inference Tool* in InfoWorks.

Once all validation errors were reconciled, the system was analyzed using the pipeline *Profile View* (see **Figure 6-3**). If additional analysis was required, record drawings or CCTV were reviewed, where available. Significant adjustments were made based on differing datums referenced in the record drawings. Each update to the model data was marked with a data flag and different flags were created to represent the varying reasons for the updates. **Figure 6-4** shows the various data flags that were developed and used during the model network review process.

### 6.1.2 Load Allocation

Parcel loads were initially assigned to the nearest manhole. Quality control was performed alongside the map of the sub-basins to verify that the load allocations matched the actual flow path; adjustments were made as necessary. **Figure 6-5** is a sample showing the load allocation from the parcel centroid to the corresponding receiving manhole.



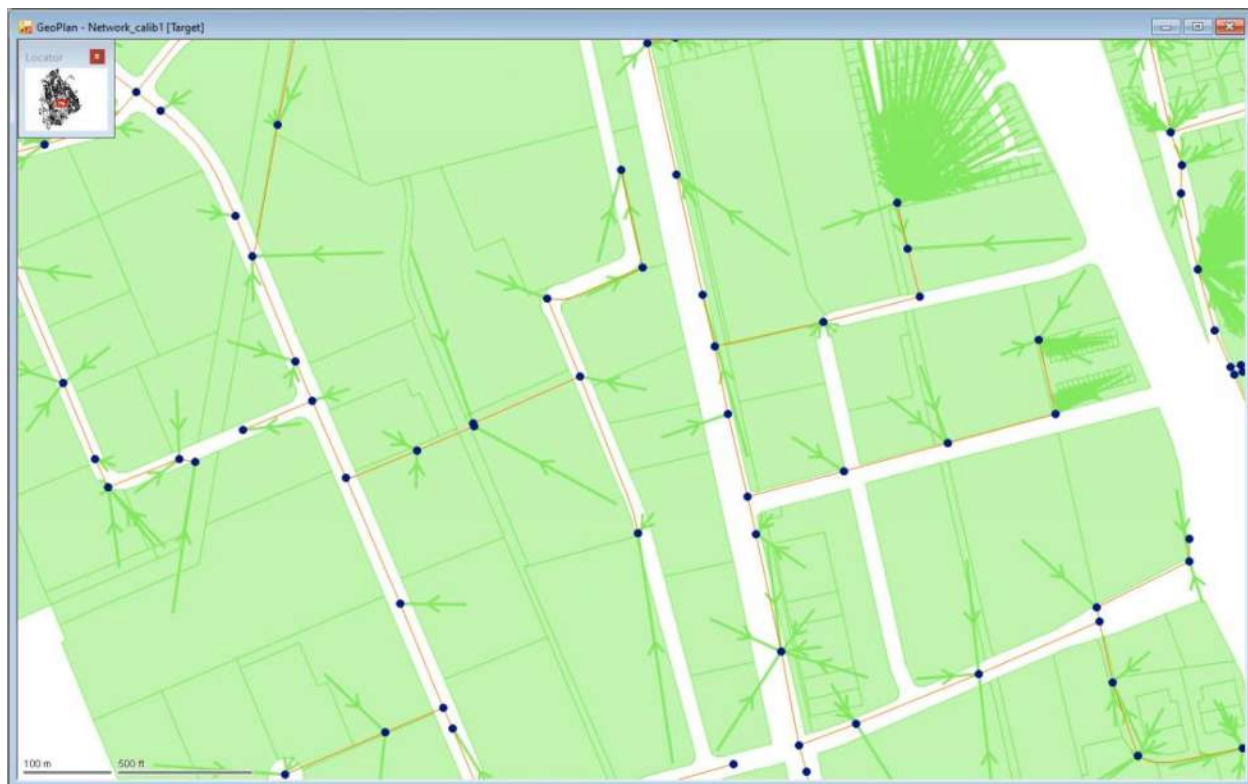
**Figure 6-4: InfoWorks Data Flags**

| Name | Display Colour | Obsolete                 | Description                          |
|------|----------------|--------------------------|--------------------------------------|
| #A   |                | <input type="checkbox"/> | Asset Data                           |
| #D   |                | <input type="checkbox"/> | System Default                       |
| #G   |                | <input type="checkbox"/> | Data From GeoPlan                    |
| #I   |                | <input type="checkbox"/> | Model Import                         |
| #S   |                | <input type="checkbox"/> | System Calculated                    |
| #V   |                | <input type="checkbox"/> | CSV Import                           |
| CCTV |                | <input type="checkbox"/> | Estimated from CCTV footage          |
| DEM  |                | <input type="checkbox"/> | DEM elevation source                 |
| DTM  |                | <input type="checkbox"/> | Datum adjustment                     |
| DWG  |                | <input type="checkbox"/> | Drawing elevation source             |
| INT  |                | <input type="checkbox"/> | Interpolated elevation               |
| NRBY |                | <input type="checkbox"/> | Rim based on near-by rims            |
| RLV  |                | <input type="checkbox"/> | Relative adjustment based on drawing |
| SIPH |                | <input type="checkbox"/> | Siphon                               |
| SLP  |                | <input type="checkbox"/> | Calculated from slope                |
| UPD  |                | <input type="checkbox"/> | Updated during calibration           |

Notes:

1. Descriptions that are highlighted gray are system defaults.

**Figure 6-5: Sample Load Allocation**



## 6.2 Scenario Development

InfoWorks can create many different scenarios within the same model. The following scenarios were developed and analyzed:

1. **Existing Dry Weather:** Used to calibrate the hydraulic model to dry weather conditions and to evaluate hydraulic deficiencies under existing dry weather conditions. Two alternatives were evaluated under this scenario:
  - With obstructions: includes adjustments made to account for flow obstructions as described in **Section 7.3.4**. This scenario was used for dry weather calibration.
  - Design conditions: inverts at flow splits with obstructions returned to the elevations they are designed to operate at. This scenario assumes the flow obstructions have been removed/cleaned and the flow splits are operating as intended. This scenario was used to evaluate hydraulic deficiencies under existing dry weather conditions.
2. **Existing Wet Weather:** Used for calibration of wet weather conditions. This scenario accounts for an elevated water table and R-factors to model wet weather conditions and to evaluate hydraulic deficiencies under existing wet weather conditions. Two alternatives were evaluated under this scenario:
  - With obstructions: includes adjustments made to account for flow obstructions as described in **Section 7.3.4**. This scenario was used for wet weather calibration.
  - Design conditions: inverts at flow splits with obstructions returned to the elevations they are designed to operate at. This scenario assumes the flow obstructions have been removed/cleaned and the flow splits are operating as intended. This scenario was used to evaluate hydraulic deficiencies under existing wet weather conditions.
3. **Future Dry Weather:** Land use categories updated based on future planned land use changes in “Opportunity Areas” (see **Sections 2.1.1** and **5.2**) and dry weather GWI included. This scenario was used to evaluate hydraulic deficiencies under future dry weather conditions assuming flow obstructions are addressed and no longer present.
4. **Future Wet Weather:** Land use categories updated based on future planned land use changes in “Opportunity Areas” and GWI adjusted to match wet weather calibration. This scenario was used to evaluate hydraulic deficiencies under future design storm/wet weather conditions assuming flow obstructions are addressed and no longer present.

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## SECTION 7 – WASTEWATER FLOW ANALYSIS

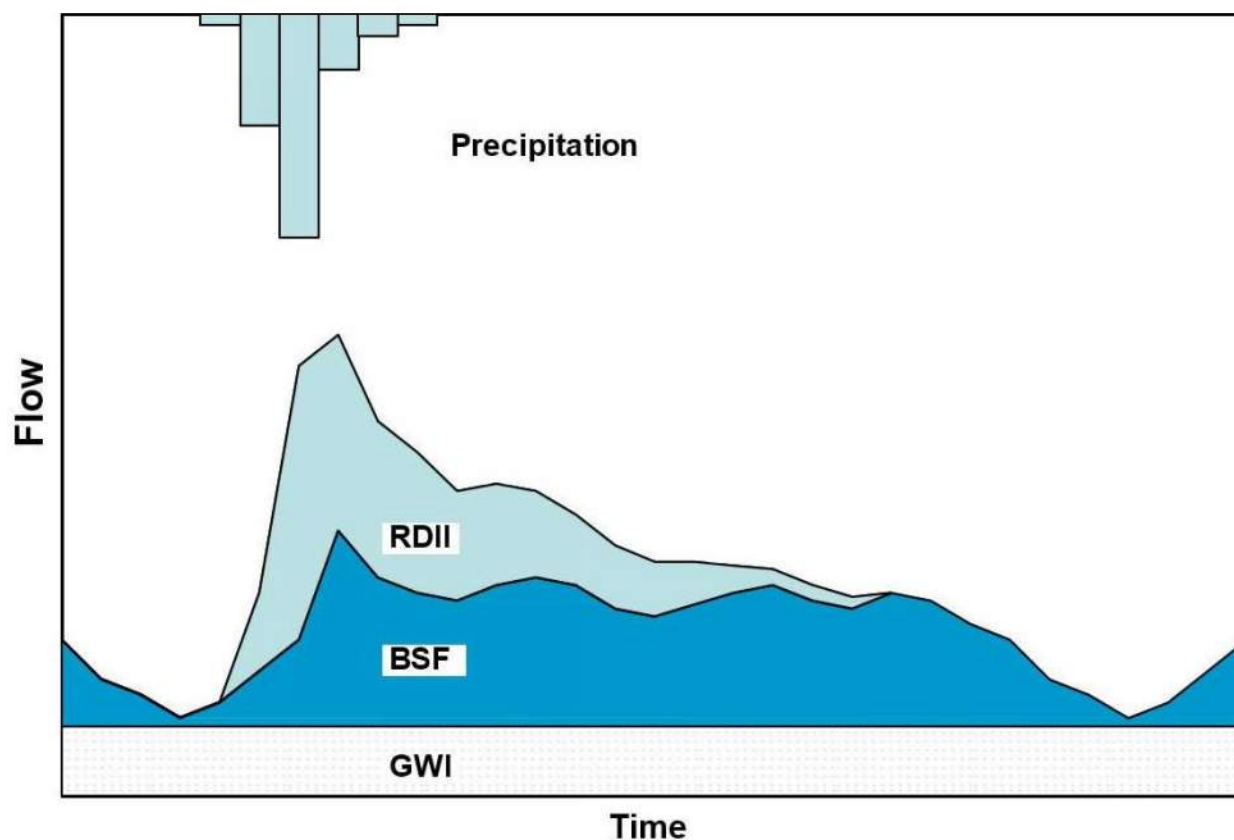
For this study, the flow monitoring data collected by the City was used for model calibration. This section summarizes typical wastewater flow components, summarizes the City's flow monitoring program, describes the basis for developing design wastewater flows used to model the City's collection system, and presents the results of the model calibration.

### 7.1 Typical Wastewater Flow Components

Wastewater flows consist of three primary flow components: groundwater infiltration (GWI), base sanitary flow (BSF), and rainfall dependent inflow and infiltration (RDI/I) as illustrated in **Figure 7-1**.

- **GWI** – For modeling purposes, this document defines GWI as any, and all sources of constant flow. GWI is comprised both of groundwater infiltration and any other constant flow that is generally detected during low flow periods. Constant flows can be associated with leaking faucets, running toilets, and/or manufacturing or industrial processes, etc. This can also capture any meter reading variance at extremely low flows. GWI is seasonal where dry

**Figure 7-1: Typical Wastewater Flow Components**



Source: Rainfall Dependent Inflow and Infiltration from the EPA SWMM 5 Hydrology Manual



weather GWI (summer) is typically less than wet weather GWI (winter) due to the elevated water table that occurs during the rainy season.

- **BSF** – This represents the direct diurnal flow contributions from customers. This is represented by a combination of unit flows and diurnal patterns, which is further detailed in **Section 7.3** below.
- **RDI/I** – This is the volume of rainfall that enters the wastewater collection system through various avenues (holes in manhole covers, elevated water table, etc.).

To understand hydraulic capacity of a wastewater collection system, both dry weather flow (DWF) and wet weather flow (WWF) conditions are evaluated. DWF includes both dry weather GWI and BSF while WWF includes wet weather GWI, BSF, and RDI/I.

The flow monitoring and rainfall data collected by the City was evaluated for each of the components, and this process is described in the following sections.

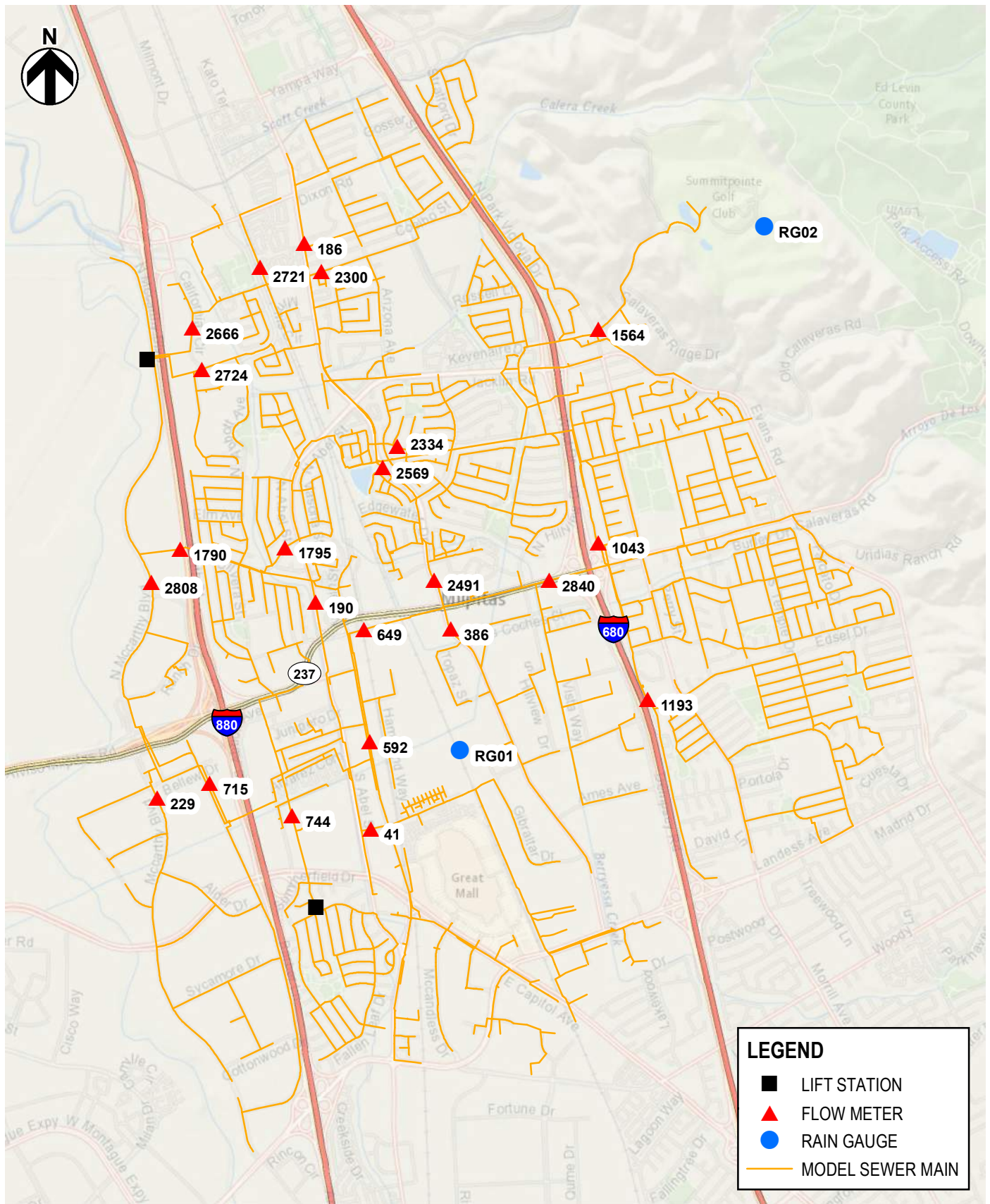
## 7.2 Flow Monitoring Program

The City contracted with ADS Environmental Services (ADS) to perform dry and wet weather flow monitoring within the City collection system. ADS installed 23 ADS FlowShark Triton flow meters throughout the City and monitored flow between November 16, 2019 and March 9, 2020. This type of meter is a velocity flow meter installed in collection system manholes to measure both depth and velocity at either a 5- or 15-minute intervals for the duration of the flow monitoring period. Depth, velocity, and flow (calculated using the Continuity Equation) were presented in the *Milpitas Sewer Flow Monitoring Report 2019-2020* (ADS Report) in the form of daily averages, and additional data was provided separately in the form of hourly averages. The ADS Report is included as **Appendix B**.

Rain gauges were also installed in two distinct locations for the duration of the monitoring period – one was placed on the valley floor at the Gibraltar Reservoir (RG01) and the other was placed on the hillside near the Summitpointe Golf Club (RG02). Depth of precipitation was presented in the ADS Report in the form of hourly averages to the nearest hundredth of an inch. The raw data was recorded in 5-minute increments to the nearest hundredth of an inch.

The locations of all flow meters and rain gauges are shown in **Figure 7-2**. Flow meters are identified according to the GID of the manhole in which they were installed.

**Table 7-1** summarizes the recorded depths, velocities, and flows for each flow meter.



**FIGURE 7-2**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
FLOW MONITORS AND RAIN GAUGES

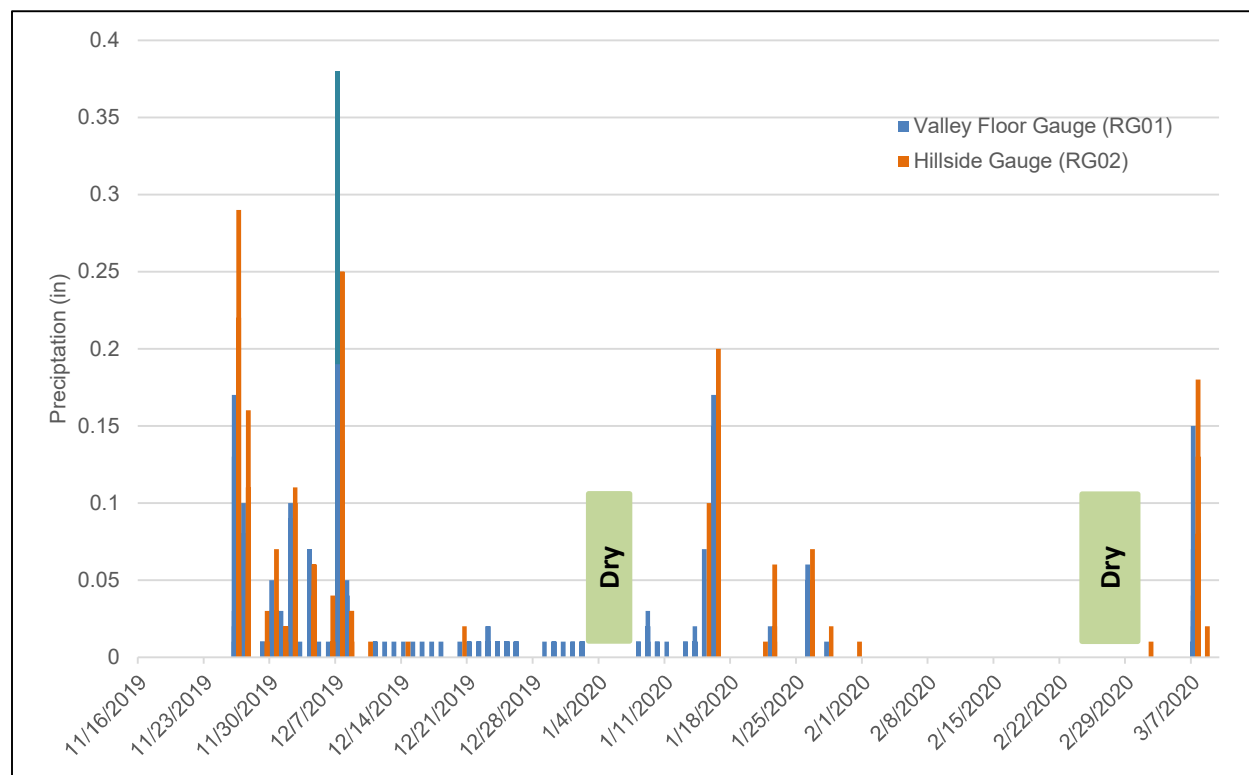
**Table 7-1: Flow Monitoring Data Summary**

| Flow Meter        | Nominal Pipe Dia. (in) <sup>1</sup> | Depth (in) <sup>2</sup> |         |         | Velocity (ft/s) <sup>2</sup> |         |         | Flow (MGD) <sup>2</sup> |         |         |
|-------------------|-------------------------------------|-------------------------|---------|---------|------------------------------|---------|---------|-------------------------|---------|---------|
|                   |                                     | Average                 | Minimum | Maximum | Average                      | Minimum | Maximum | Average                 | Minimum | Maximum |
| 41                | 24                                  | 6.515                   | 4.000   | 9.340   | 1.543                        | 0.780   | 2.060   | 0.708                   | 0.189   | 1.310   |
| 186               | 8                                   | 1.540                   | 0.780   | 2.060   | 1.540                        | 0.780   | 2.060   | 1.540                   | 0.780   | 2.060   |
| 190               | 18                                  | 2.465                   | 1.820   | 3.200   | 0.959                        | 0.500   | 1.320   | 0.093                   | 0.031   | 0.160   |
| 226               | 21                                  | 3.466                   | 1.810   | 5.100   | 0.591                        | 0.240   | 0.840   | 0.103                   | 0.021   | 0.232   |
| 386               | 16                                  | 6.427                   | 5.190   | 9.000   | 1.375                        | 1.060   | 1.880   | 0.511                   | 0.291   | 1.071   |
| 592 <sup>3</sup>  | 18                                  | 3.682                   | 1.280   | 5.620   | 1.534                        | 0.430   | 2.130   | 0.276                   | 0.016   | 0.644   |
| 649               | 21                                  | 8.655                   | 6.660   | 11.190  | 1.236                        | 0.860   | 1.600   | 0.776                   | 0.406   | 1.361   |
| 715               | 30                                  | 0.959                   | 0.500   | 1.320   | 0.959                        | 0.500   | 1.320   | 0.959                   | 0.500   | 1.320   |
| 744               | 15                                  | 0.094                   | 0.032   | 0.160   | 0.094                        | 0.032   | 0.160   | 0.094                   | 0.032   | 0.160   |
| 1043              | 21                                  | 5.252                   | 3.420   | 7.270   | 3.999                        | 2.220   | 4.800   | 1.263                   | 0.378   | 2.277   |
| 1193              | 21                                  | 0.590                   | 0.240   | 0.840   | 0.590                        | 0.240   | 0.840   | 0.590                   | 0.240   | 0.840   |
| 1564              | 8                                   | 0.590                   | 0.240   | 0.840   | 0.590                        | 0.240   | 0.840   | 0.590                   | 0.240   | 0.840   |
| 1790              | 30                                  | 0.590                   | 0.240   | 0.840   | 0.590                        | 0.240   | 0.840   | 0.590                   | 0.240   | 0.840   |
| 1795              | 27                                  | 9.483                   | 6.360   | 12.140  | 0.399                        | 0.220   | 0.510   | 0.300                   | 0.091   | 0.460   |
| 2300              | 10                                  | 1.647                   | 1.020   | 2.350   | 1.402                        | 0.450   | 2.690   | 0.056                   | 0.009   | 0.154   |
| 2334              | 12                                  | 2.123                   | 1.620   | 2.580   | 2.770                        | 1.460   | 3.460   | 0.175                   | 0.063   | 0.263   |
| 2491              | 15                                  | 2.345                   | 1.110   | 3.850   | 2.356                        | 0.510   | 3.700   | 0.216                   | 0.014   | 0.592   |
| 2569              | 21                                  | 6.434                   | 4.390   | 8.470   | 1.051                        | 0.540   | 1.600   | 0.441                   | 0.148   | 0.828   |
| 2666              | 18                                  | 8.746                   | 5.850   | 20.960  | 1.741                        | 0.880   | 2.160   | 0.949                   | 0.385   | 1.371   |
| 2721              | 8                                   | 6.229                   | 3.950   | 7.900   | 1.053                        | 0.590   | 1.420   | 0.198                   | 0.091   | 0.312   |
| 2724              | 42                                  | 18.342                  | 13.520  | 22.120  | 0.779                        | 0.510   | 1.000   | 2.041                   | 0.876   | 3.205   |
| 2808              | 36                                  | 8.737                   | 5.860   | 11.120  | 2.257                        | 1.320   | 2.920   | 2.007                   | 0.643   | 3.438   |
| 2840 <sup>4</sup> | 15                                  | 1.995                   | 1.810   | 2.250   | 1.384                        | 1.080   | 1.660   | 0.087                   | 0.060   | 0.120   |

Notes:

1. Pipe diameter listed in GIS. ADS measured internal pipe diameters in the field which are recorded in the ADS Report. Nominal pipe diameters listed in GIS were used in the hydraulic model.
2. These values are calculated using hourly averages. These may differ slightly from the ADS Report since those values are based on all field data collected.
3. Initially identified as FM 602 in the ADS Report, was placed further downstream in manhole GID 592.
4. FM 2840 was directly downstream of a flow diversion structure which diverts wastewater flows away from the flow meter, resulting in extremely low recorded flows at this site.

**Figure 7-3: Rainfall during Monitoring Period**



Rainfall measured by both rain gauges for the duration of the monitoring period is shown in **Figure 7-3**. The flow monitoring program was designed to capture both WWF and DWF, thus, the flow meters and rain gauges provided the data necessary to estimate both dry weather and wet weather GWI and RDI/I.

The following dry weather and wet weather periods, as shown on **Figure 7-3**, were identified and used for the model calibration and analysis. Dry weather period 1 and Storm event 1 were used primarily, unless there was insufficient data for the flow meter, then Dry weather period 2 or Storm event 2 was used:

- Dry weather period 1: February 24 – March 3, 2020
- Dry weather period 2: January 4 – 8, 2020
- Storm event 1: December 7, 2019
- Storm event 2: November 26, 2019



The maximum rainfall from either of these days are listed in **Table 7-2**, along with the National Oceanic and Atmospheric Administration (NOAA) precipitation frequency estimates for Milpitas, CA. The largest storms were between a 1- and 2-year storm or smaller than a 1-year storm frequency.

**Table 7-2: NOAA Rainfall Frequency vs. Rain Gauge Data**

| NOAA Frequency Estimates <sup>1</sup> |        |        |        |         | Rain Gauge Data <sup>2</sup> |      |
|---------------------------------------|--------|--------|--------|---------|------------------------------|------|
| Duration                              | 1-year | 2-year | 5-year | 10-year | RG01                         | RG02 |
| 1-hr:                                 | 0.34   | 0.43   | 0.56   | 0.66    | 0.38                         | 0.29 |
| 2-hr:                                 | 0.50   | 0.63   | 0.80   | 0.95    | 0.57                         | 0.51 |
| 6-hr:                                 | 0.85   | 1.06   | 1.36   | 1.62    | 0.64                         | 0.76 |
| 12-hr:                                | 1.10   | 1.40   | 1.82   | 2.18    | 0.66                         | 0.92 |
| 24-hr:                                | 1.37   | 1.79   | 2.36   | 2.83    | 0.95                         | 1.30 |

Notes:

1. NOAA Atlas 14 Volume 6 Version 2 precipitation frequency estimates for Milpitas, CA
2. Maximum Rain by Rain Gauge (Total Inches by Duration)

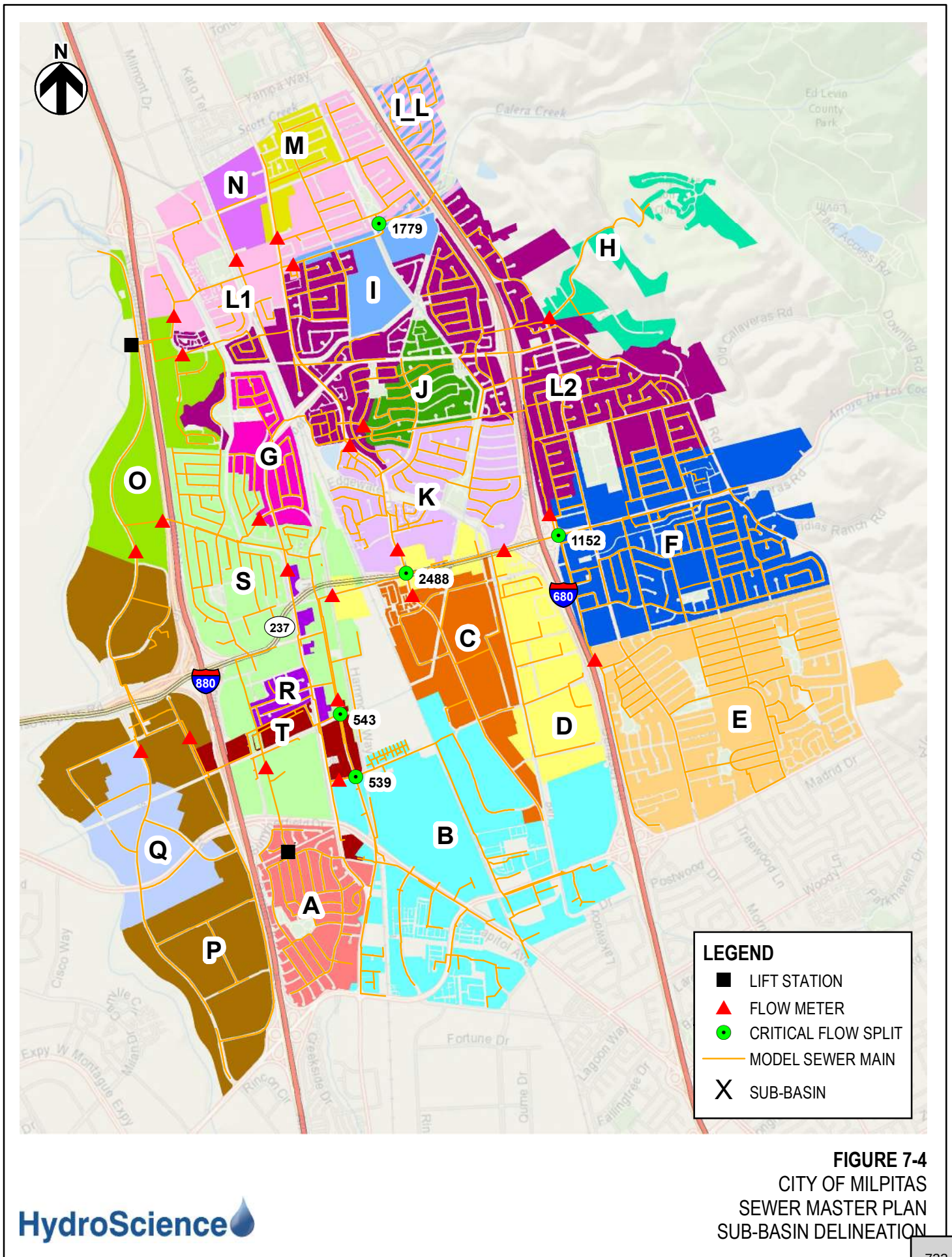
## 7.2.1 Flow Meter Sewer Sub-Basins

The flow meters served as the basis for the delineation of tributary sewer sub-basins in the City for calibration purposes. Generally, for sub-basins located at the most upstream ends of the collection system, all flow from the sub-basin is captured by a single flow meter which in turn flows to downstream sub-basins. Where there are flow splits, flow can be directed to more than one downstream sub-basin so it is important to understand the flow behavior at each flow split in order to properly delineate sub-basin boundaries.

The identification of all flow splits (see **Section 3.1.1**) was imperative to track the flow through the system. They were each reviewed and identified as either a “non-critical” or “critical” flow split, as follows:

- **Non-Critical Flow Split:** In these cases, the flow is split then returns to the same sub-basin or flow path before it reaches the downstream flow meter. These flows splits and flow are fully contained within a single subbasin.
- **Critical Flow Split:** These are flow splits that divert flow to two different downstream sub-basins (or flow meters). All critical flow splits were evaluated using the City’s most current GIS geodatabase and the City’s extensive library of as-built record drawings.

There are 177 identified flow splits, of which five are considered critical, as shown in **Figure 7-4**. For critical flow splits, the ratio of flow was estimated based on the slopes and diameters of the outgoing pipes.



**FIGURE 7-4**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
SUB-BASIN DELINEATION

The results of the sub-basin delineation are displayed on **Figure 7-4**. The flow meters immediately upstream of each sub-basin and those that are capturing the flow of each sub-basin are listed in **Table 7-3**. **Figure 7-5** is a diagram summarizing flow through the sub-basins and the flow meters in the entire system, including all critical flow splits.

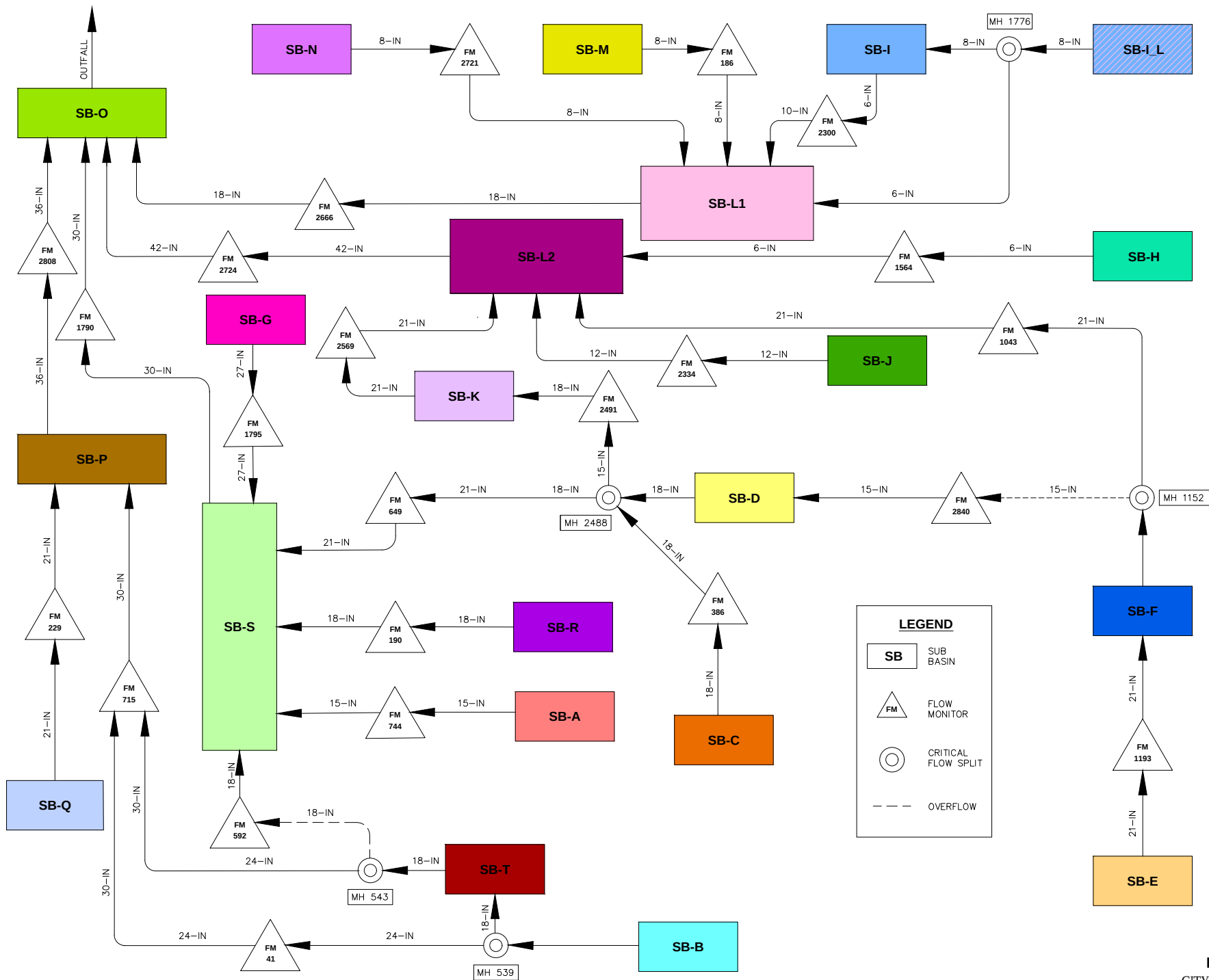
**Table 7-3: Sub-Basins and Corresponding Flow Meters**

| Sub-Basin       | Upstream Flow Meters           | Capturing Flow Meters |
|-----------------|--------------------------------|-----------------------|
| A               | N/A                            | 744                   |
| B <sup>1</sup>  | N/A                            | 41                    |
| C               | N/A                            | 386                   |
| D               | 386 & 2840                     | 649 & 2491            |
| E               | N/A                            | 1193                  |
| F               | 1193                           | 1043 & 2840           |
| G               | N/A                            | 1795                  |
| H               | N/A                            | 1564                  |
| I <sup>2</sup>  | N/A                            | 2300                  |
| J               | N/A                            | 2334                  |
| K               | 2491                           | 2569                  |
| L1 <sup>2</sup> | 186, 2721                      | 2666                  |
| L2              | 1043, 1564, 2300, 2334, & 2569 | 2724                  |
| M               | N/A                            | 186                   |
| N               | N/A                            | 2721                  |
| O               | 1790, 2666, 2724, & 2808       | OUTFALL               |
| P               | 229 & 715                      | 2808                  |
| Q               | N/A                            | 229                   |
| R               | N/A                            | 190                   |
| S               | 190, 592, 649, 744, & 1795     | 1790                  |
| T               | 41                             | 592 & 715             |

Notes:

1. Flow from sub-basin B splits at MH 539. FM 41 captures a portion of the flow from sub-basin B and the remainder continues downstream to sub-basin T.
2. Flow from parcels upstream of MH 1776 splits and flows to sub-basins I and L1 downstream.

A summary of the various contributing land uses within each sub-basin is shown in **Table 7-4**. The area of each parcel was calculated using the geometry calculator tool in GIS.



**FIGURE 7-5**  
CITY OF  
SEWER MAIN  
SCHEMATIC FLOW DIAGRAM  
724



**Table 7-4: Total Acreage of Each Land Use by Sub-Basin**

| LU Code                | A          | B <sup>1</sup> | C          | D          | E           | F           | G         | H          | I <sup>2</sup> | J         | K          | L1 <sup>2</sup> | L2          | M         | N         | O          | P          | Q          | R         | S          | T <sup>1</sup> | Total         |
|------------------------|------------|----------------|------------|------------|-------------|-------------|-----------|------------|----------------|-----------|------------|-----------------|-------------|-----------|-----------|------------|------------|------------|-----------|------------|----------------|---------------|
| HSFL (DU) <sup>3</sup> | -          | -              | -          | -          | 22 (17)     | 9 (4)       | -         | 39 (8)     | 3 (3)          | -         | -          | 2 (2)           | 71 (22)     | -         | -         | -          | -          | -          | -         | -          | -              | 146 (56)      |
| HSFM (DU) <sup>3</sup> | -          | -              | -          | -          | -           | -           | -         | 67 (107)   | -              | -         | -          | -               | -           | -         | -         | -          | -          | -          | -         | -          | -              | 67 (107)      |
| SFL (DU) <sup>3</sup>  | 115 (982)  | -              | -          | -          | 227 (1,586) | 228 (1,500) | 50 (331)  | 4 (9)      | 42 (208)       | 72 (490)  | 86 (571)   | 108 (716)       | 320 (2,028) | 32 (229)  | -         | -          | -          | -          | 12 (101)  | 131 (868)  | -              | 1,427 (9,619) |
| SFM                    | -          | -              | -          | 17         | 87          | 8           | 13        | -          | -              | 7         | 32         | 11              | 67          | 6         | -         | 7          | -          | -          | 1         | 10         | -              | 266           |
| MFH                    | -          | 93             | 8          | 3          | 25          | 52          | 1         | -          | -              | -         | 6          | 57              | 46          | -         | 12        | -          | -          | -          | 7         | 15         | 48             | 373           |
| MFVH                   | 3          | 20             | 1          | -          | -           | -           | -         | -          | -              | -         | 2          | -               | -           | -         | -         | -          | 19         | 2          | -         | -          | 27             | 72            |
| MHP                    | -          | -              | -          | -          | -           | -           | -         | -          | -              | -         | -          | 13              | -           | -         | 39        | -          | -          | -          | -         | -          | -              | 52            |
| HOTEL                  | -          | 5              | -          | -          | -           | 1           | -         | -          | -              | -         | 14         | 3               | -           | -         | -         | 3          | 28         | -          | -         | 7          | 2              | 62            |
| MXD                    | -          | -              | -          | -          | -           | -           | -         | -          | -              | -         | -          | -               | -           | <1        | -         | -          | -          | -          | 12        | 45         | 10             | 67            |
| HDMU                   | -          | 46             | -          | -          | -           | -           | -         | -          | -              | -         | -          | -               | -           | -         | -         | -          | -          | -          | -         | -          | 18             | 64            |
| PAO                    | -          | -              | -          | 10         | 1           | 6           | -         | -          | -              | -         | 9          | 2               | 6           | -         | -         | -          | 54         | -          | -         | -          | -              | 87            |
| COM                    | 13         | 108            | 12         | 17         | 39          | 21          | 2         | -          | -              | -         | 38         | 15              | 18          | 16        | 4         | 9          | 86         | -          | 1         | 59         | 45             | 502           |
| INP                    | -          | 5              | -          | -          | -           | -           | -         | -          | -              | -         | -          | 21              | 5           | -         | -         | 188        | 347        | 148        | -         | 22         | 2              | 738           |
| MFG                    | -          | 150            | 171        | 154        | -           | -           | -         | -          | -              | -         | -          | 24              | 12          | -         | -         | -          | 2          | -          | -         | 25         | 50             | 588           |
| PF                     | 7          | 6              | -          | 7          | 54          | 89          | 12        | -          | 36             | -         | <1         | 10              | 62          | 3         | -         | -          | 1          | 1          | 1         | 17         | 5              | 311           |
| COR                    | -          | -              | -          | -          | -           | -           | -         | -          | -              | -         | -          | -               | -           | -         | -         | -          | -          | -          | -         | 62         | -              | 62            |
| <b>Total</b>           | <b>138</b> | <b>432</b>     | <b>192</b> | <b>210</b> | <b>454</b>  | <b>414</b>  | <b>78</b> | <b>110</b> | <b>81</b>      | <b>79</b> | <b>187</b> | <b>266</b>      | <b>606</b>  | <b>57</b> | <b>55</b> | <b>207</b> | <b>537</b> | <b>151</b> | <b>34</b> | <b>393</b> | <b>207</b>     | <b>4,889</b>  |

Notes:

1. Flow from sub-basin B splits at MH 539. Areas are based on the estimate that 75% of flow from sub-basin B parcels flow to meter 41, and 25% flow from these parcels downstream to sub-basin T.
2. Areas are based on the estimate that 60% of parcels upstream of flow split at MH 1776 flows to sub-basin I, and 40% flows to sub-basin L1.
3. HSFL, HSFM, and SFL are analyzed based on number of dwelling units in UF factor analysis with the assumption that there is one dwelling unit per parcel.
4. The City encompasses 8,680 acres. The area contributing sanitary flows is 4,884 acres. Non-contributing areas include park, streets, railroads, waterways, and other open spaces. Only parcels contributing sanitary flows are included in this table.

### 7.3 Dry Weather Flow (DWF)

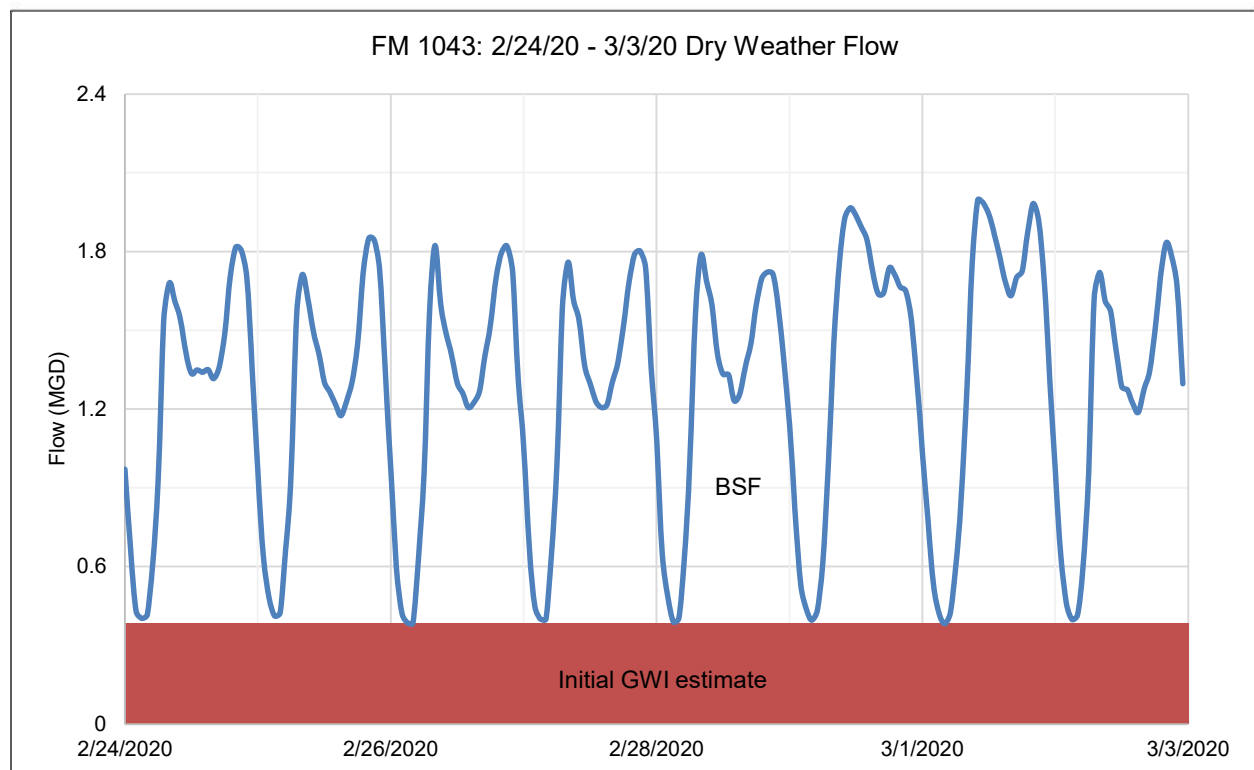
The dry weather periods were analyzed to establish dry weather GWI and BSF inclusive of the diurnal patterns for groups of land uses. The process for developing each of the components and the results are discussed below.

#### 7.3.1 Dry Weather GWI

To isolate BSF, an estimate of GWI was developed. The daily minimum flow was calculated to serve as the initial basis for the GWI estimate. **Figure 7-6** presents an example of the DWF and corresponding estimated GWI for FM 1043. Once GWI estimates were developed for each flow meter, upstream contributing flow meters, outlined in **Table 7-3**, were subtracted to develop an estimate of dry weather GWI by sub-basin. Because GWI is not affected by human activity, and therefore should be the same for weekdays and weekend, there is only one value for GWI.

Using these initial values, a unique unit GWI (gpd/acre) was calculated for each sub-basin by dividing the total estimated GWI by the total contributing sub-basin acreage. This unit GWI was then applied to each parcel by multiplying the parcel area by the unit GWI for the respective sub-basin. These initial GWI estimates served as a starting point for model calibration and were further refined during the calibration using an iterative process, as described in **Section 7.3.4** below.

**Figure 7-6: Dry Weather Flow**



### 7.3.2 Base Sanitary Flow (BSF)

The GWI estimates developed for each sub-basin and estimated wastewater flows of identified large dischargers were subtracted from the total weekday DWF for the corresponding sub-basin. The remaining BSF was then used to estimate the UF factors for each land use category. These UF factors represent the average daily contribution to BSF by each parcel according to land use. The analysis was initiated in the most terminal/upstream sub-basins with the fewest land use types, and UF factors were iteratively adjusted until the calculated BSF matched the observed BSF at the corresponding flow meter. UF factors were calibrated to weekday flows; diurnal patterns were then adjusted to account for differences between weekday and weekend discharge patterns.

#### Large Dischargers

For this analysis, large dischargers are defined as those customers that discharge a disproportionately large volume of wastewater for the parcel size and use type. Large dischargers are typically treated as point sources for hydraulic modeling purposes. The City provided wintertime water use data for January thru March 2019 for non-single family residential, commercial, and industrial customers to estimate wastewater flows. It is preferable to use water data from the winter period to estimate wastewater flows as it is a closer representation of indoor water use, since less water is consumed for irrigation.

Wastewater flows were estimated at approximately 85% of winter water use. Estimated flows greater than 10,000 gpd were linked to a respective parcel, and a unit flow (gpd/acre) was calculated by dividing the total estimated wastewater flow by the total area of the contributing parcel(s). The gpd/acre for each flagged large discharger was compared to the respective land use based UF factor. Each flagged discharger was ultimately classified as a large discharger if the gpd/acre was at least twice the UF factor or more for its respective land use.

**Table 7-5** lists the identified large dischargers and **Figure 7-7** shows the location of the associated parcels.

**Table 7-5: Large Dischargers**

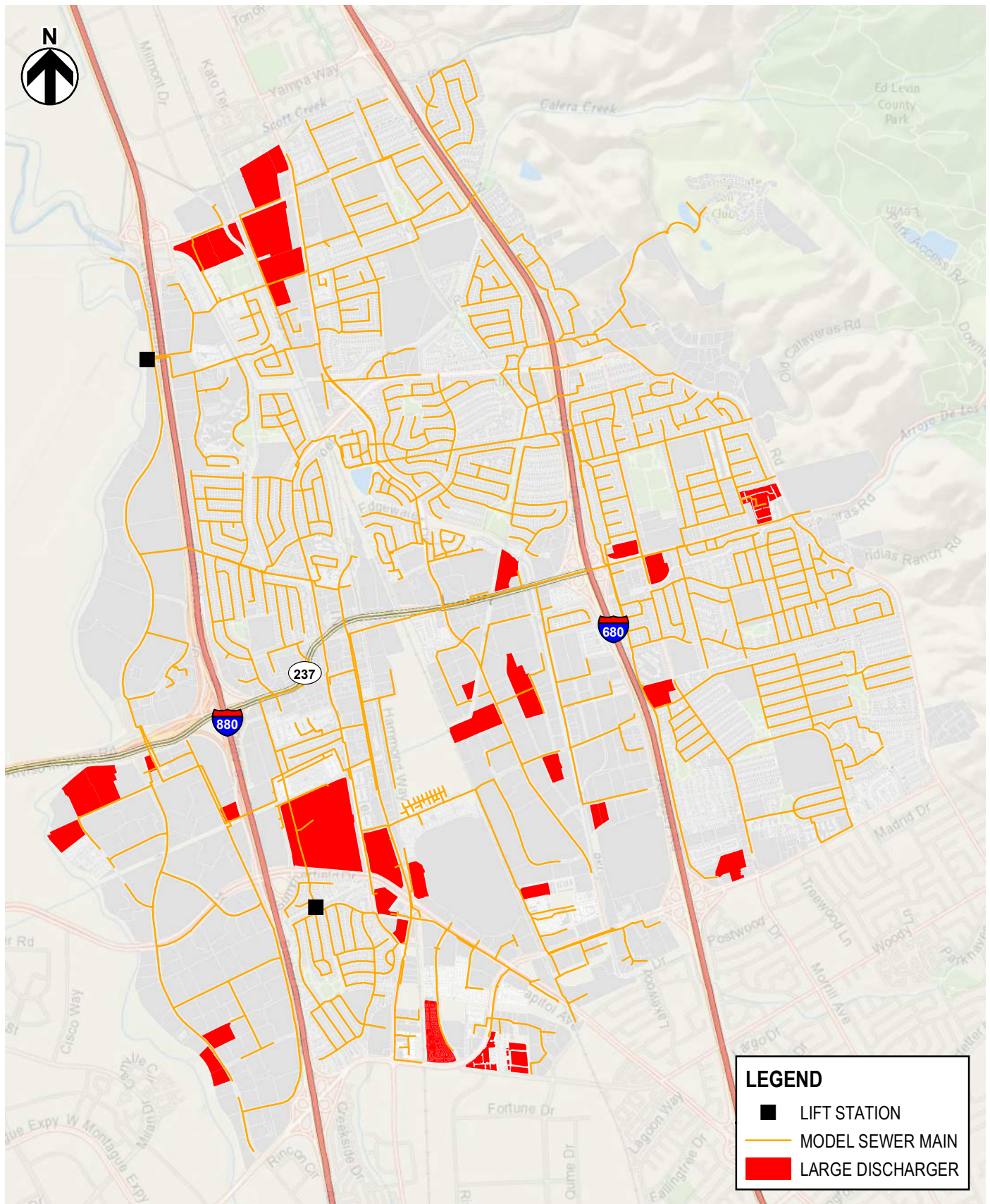
| Rank            | Location <sup>1</sup> | Estimated Wastewater Flows (gpd) <sup>1</sup> | Model-Based Land Use | Sub-Basin |
|-----------------|-----------------------|-----------------------------------------------|----------------------|-----------|
| 1               | Abel St.              | 157,678                                       | COR                  | S         |
| 2               | Hillview Dr           | 148,562                                       | MFG                  | C         |
| 3               | Ames Ave              | 74,079                                        | MFG                  | D         |
| 4               | Hillview Dr           | 63,137                                        | MFG                  | C         |
| 5               | Abel St               | 49,821                                        | MFVH                 | T         |
| 6               | Main St               | 39,341                                        | MFH                  | B         |
| 7               | Milmont Dr            | 38,377                                        | MFH                  | L         |
| 8               | Dixon Landing Rd      | 35,426                                        | MFH                  | L         |
| 9 <sup>2</sup>  | McCandless Dr         | 32,594                                        | MFH                  | B         |
| 10 <sup>2</sup> | Poppylane Townhouses  | 31,158                                        | MFH                  | F         |
| 11              | Murphy Ranch Rd       | 30,694                                        | MFVH                 | P         |

| Rank            | Location <sup>1</sup> | Estimated Wastewater Flows (gpd) <sup>1</sup> | Model-Based Land Use | Sub-Basin |
|-----------------|-----------------------|-----------------------------------------------|----------------------|-----------|
| 12              | Dixon Landing Rd      | 30,134                                        | MHP                  | N         |
| 13              | Main St               | 28,747                                        | COM                  | B         |
| 14              | Technology Dr         | 27,964                                        | PAO                  | P         |
| 15              | McCarthy Blvd         | 26,312                                        | INP                  | P         |
| 16              | Landess Ave           | 24,423                                        | COM                  | E         |
| 17              | Wilson Way            | 23,433                                        | MHP                  | N         |
| 18              | Milpitas Blvd         | 23,142                                        | MFG                  | L         |
| 19              | Milpitas Blvd         | 20,737                                        | MFG                  | C         |
| 20              | McCarthy Blvd         | 20,566                                        | INP                  | P         |
| 21              | Park Victoria Dr      | 19,454                                        | MFH                  | E         |
| 22              | Main St               | 16,927                                        | MFVH                 | A         |
| 23              | McCarthy Blvd         | 16,610                                        | INP                  | P         |
| 24              | Technology Dr         | 16,467                                        | PAO                  | P         |
| 25              | N Milpitas Blvd       | 16,315                                        | MFH                  | N         |
| 26              | Calaveras Blvd        | 16,229                                        | COM                  | F         |
| 27              | Barber Ln             | 15,806                                        | COM                  | T         |
| 28              | Amalfi Loop           | 15,335                                        | MFH                  | B         |
| 29 <sup>2</sup> | Trento Loop           | 15,036                                        | MFH                  | B         |
| 30              | Turquoise St          | 13,357                                        | MFG                  | C         |
| 31              | Yosemite Rd           | 11,858                                        | MFG                  | C         |
| 32              | Trade Zone Blvd       | 11,696                                        | MFH                  | B         |
| 33              | Ames Ave              | 11,181                                        | MFG                  | D         |
| 34              | Milpitas Blvd         | 11,044                                        | MHP                  | L         |
| 35              | Cypress Dr            | 10,928                                        | HOTEL                | P         |
| 36              | Park Victoria Dr      | 10,795                                        | COM                  | F         |
| 37              | Calaveras Blvd        | 10,616                                        | COM                  | D         |
| 38              | Milmont Dr            | 9,664                                         | COM                  | L         |
| <b>Total</b>    | -                     | <b>1,175,643</b>                              | -                    | -         |

Notes:

1. Source: January-March 2019 water meter customer billing data provided by the City multiplied by 85% - assumed portion of water use that contributes to wastewater flows.
2. One meter (or multiple meters) provides water to multiple parcels.





**FIGURE 7-7**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
LARGE DISCHARGERS

### 7.3.3 Diurnal Patterns

To account for hourly flow fluctuations, a set of diurnal flow patterns were established for different land use categories for both weekday and weekend conditions. To estimate these patterns, sub-basins with predominately residential, industrial, manufacturing, and commercial land uses were identified.

- **Residential:** Sub-basins H (valley floor) and J (hillside) are comprised of only residential land uses, so the average of these two sub-basins was used to develop the weekday residential diurnal pattern. Two separate weekend diurnal patterns were developed for valley floor and hillside residential land uses. No significant variation was observed during the weekday.
- **Industrial:** Flow in sub-basin Q is 95% industrial. This sub-basin was used to develop industrial diurnal patterns.
- **Manufacturing:** Sub-basin C is comprised of 95% manufacturing land use and was used to develop manufacturing diurnal patterns.
- **Commercial:** Sub-basin B has the highest portion of flow from commercial land uses, which is comprised of 32% commercial flow. It is noted that sub-basin B flow is comprised of approximately 1/3 commercial, 1/3 residential, and 1/3 manufacturing. Residential and manufacturing land use diurnal patterns were established using other sub-basins providing the basis for 2/3 of the flow contribution to the sub-basin. The remaining flow and pattern was used to develop the third diurnal pattern (commercial), accordingly.
- **Correctional Facility:** A diurnal pattern was developed for the correctional facility. The pattern is similar to the residential diurnal pattern but is slightly flattened and roughly based on FM 1790, which is downstream of the correctional facility. There is no variation in weekday and weekend patterns for the correctional facility.

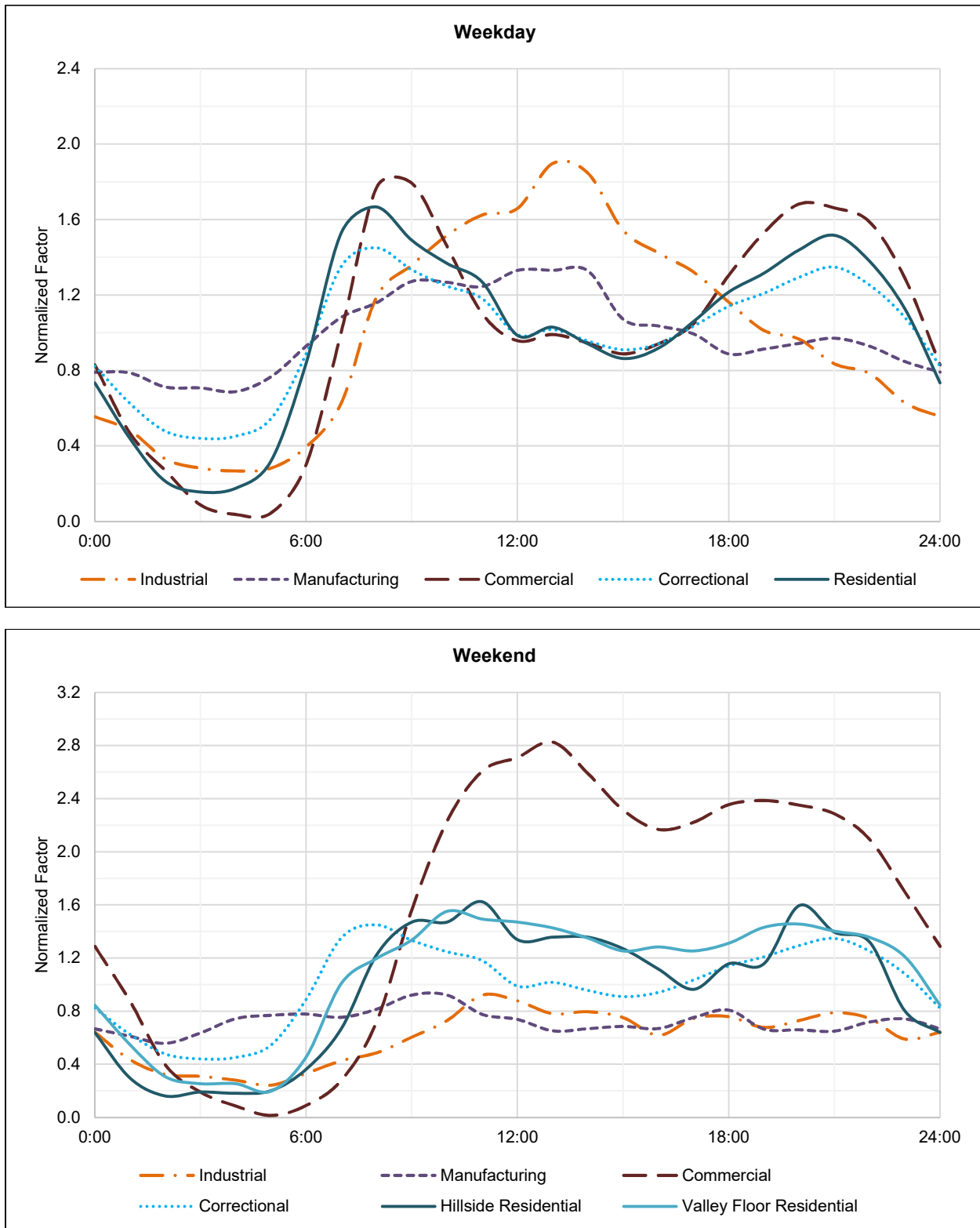
Diurnal patterns were adjusted iteratively for weekday and weekend to match measured flows during the calibration process discussed below.

**Figure 7-8** displays the calibrated set of weekday and weekend diurnal patterns developed.

### 7.3.4 Dry Weather Calibration

Initial GWI and base flow estimates, along with diurnal patterns, were added to the model. Large dischargers were assigned the diurnal pattern that corresponds to the original land use listed in **Table 7-5**. After each model run, iterative adjustments were made while comparing the modeled versus the observed flow at each flow meter (see **Figure 7-10**). Adjustments were made to GWI for each sub-basin, UF factors, and diurnal patterns. The process is iteration intensive as one change to a sub-basin affects everything downstream. Thus, the focus was to start with the terminal sub-basins that are in the most upstream areas with the fewest land use types and unknowns, followed by downstream sub-basins.

**Figure 7-8: Diurnal Patterns**

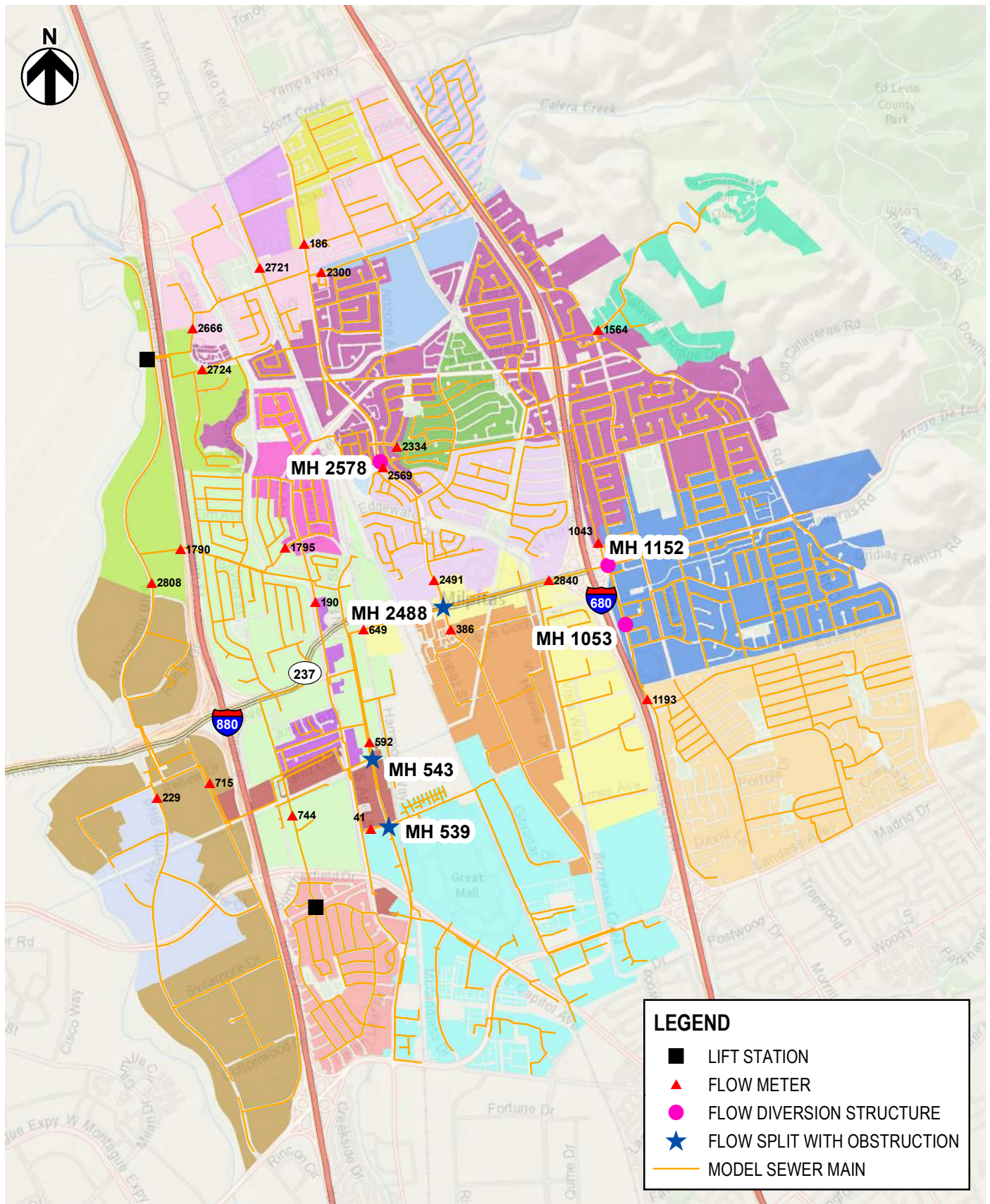


## **Flow Obstructions**

Where there were consistent discrepancies between modeled and observed flows, CCTV was reviewed to analyze upstream critical flow splits. It was discovered that four of the five critical flow splits were not operating as intended. The key findings and changes that were made in the model to represent these findings are described below and identified on **Figure 7-9**. These adjustments for obstructions were removed for the capacity analysis as detailed in **Section 8.3**.

1. MH 539 is a critical flow split at the intersection of Curtis Avenue and Main Street. There are two pipes flowing into the manhole from the south and the east. During dry weather conditions, all flow should exit the manhole to the west to FM 41 as part of sub-basin B. The outlet to the north is slightly elevated and serves as an overflow flow split flowing to sub-basin T. During CCTV review, a large grease buildup was identified at the manhole. The grease buildup diverts a large portion of the flow entering the manhole from the east to the north to sub-basin T instead of west to FM 41 as part of sub-basin B. To account for this in the model, the upstream pipe invert flowing to the north was adjusted until, as visually estimated using CCTV, approximately two-thirds of the peak flow entering the manhole from the east was flowing north.
2. MH 543 is a critical flow split located where Tom Evatt Park intersects Main Street just downstream of the critical flow split at MH 539. During review of the CCTV for MH 543, it was discovered that there is also a large obstruction here. Based on what was observed in the CCTV, under normal conditions, the flow entering this manhole from the south should flow exclusively to the west during dry weather and the pipe exiting to the north would function as an overflow flow split. Due to a large obstruction at this manhole, some of the flow is being diverted to the north, activating the flow split. To account for this obstruction in the model, the upstream pipe invert of the segment flowing to the north was adjusted to simulate the flow diversion by the obstruction. This invert was adjusted until the modeled flows at FM 592 and FM 715, which are capturing the flow of sub-basin T, approximately matched the observed flows.
3. MH 2488 is a critical flow split located in sub-basin D. After reviewing CCTV, a large obstruction was also observed at this manhole. Under normal conditions, based on the pipe inverts observed in the CCTV, all flow entering this manhole from the south and the east should flow to the north. However, due to the large buildup, a large proportion of the flow is diverted to the west. To account for this obstruction, the upstream pipe invert of the segment exiting this manhole to the north was adjusted until the modeled flows matched the observed flows at FM 649 and FM 2491, which are located just downstream of this flow split to the west and north, respectively.
4. MHs 1053, 1152, and 2578, as discussed in **Section 3.1.1**, are flow diversion structures, and MH 1152 is a critical flow split. As part of the calibration process, the inverts of the overflow segments exiting each of these manholes was adjusted to reflect the operation of the flow diversion structures in the field.





**FIGURE 7-9**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
FLOW DIVERSION AND OBSTRUCTION

After completing all UF factor and GWI adjustments, and adjusting inverts at flow splits/diversion structures, the modeled flows were determined to align as close to the observed flows as reasonably possible. **Table 7-6** presents the final calibrated UF factors.

The final modeled average DWF at the outfall is 7.55 MGD. The total modeled GWI, which represents both GWI and other continuous flow contributions, is 1.40 MGD. There is no reliable flow data for the outfall at the Main LS; thus, GWI values in sub-basin O were estimated based on the GWI of the nearby sub-basins.

**Figure 7-10** presents a sample of the final modeled versus observed flows for dry weather. This chart includes Sunday and Monday, so both weekend and weekday dry weather calibration are represented. Calibration charts for all flow meters are included as **Appendix D**.

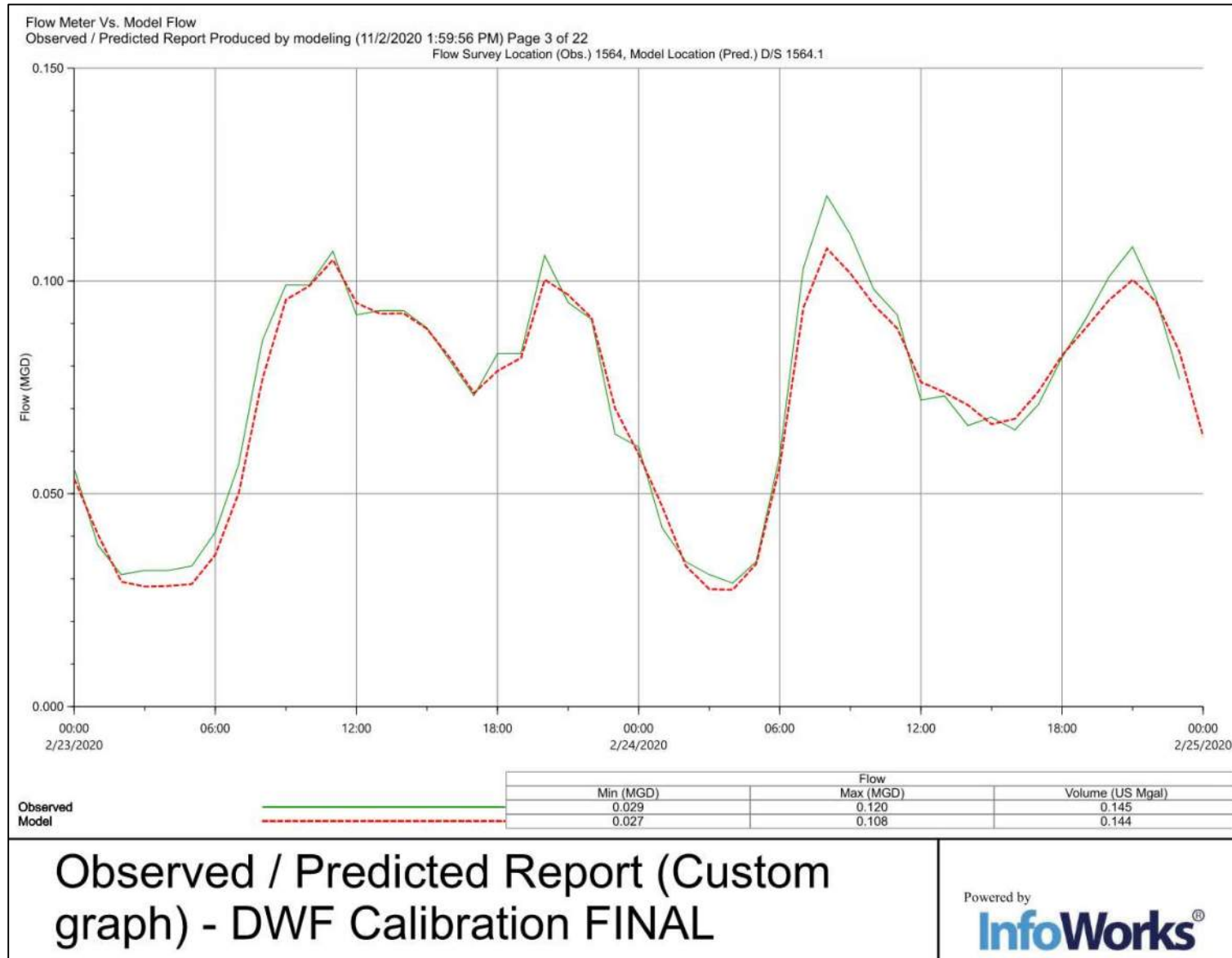
**Table 7-6: Calibrated UF Factors**

| Land Use Designation           | UF Factor | Units      | Quantity | Flow (MGD)               | Diurnal Pattern          |
|--------------------------------|-----------|------------|----------|--------------------------|--------------------------|
| HSFL                           | 400       | gpd/parcel | 56       | 0.022                    | Hillside Residential     |
| HSFM                           | 465       | gpd/parcel | 107      | 0.050                    | Hillside Residential     |
| SFL                            | 200       | gpd/parcel | 9619     | 1.924                    | Valley Floor Residential |
| SFM                            | 1200      | gpd/acre   | 266      | 0.319                    | Valley Floor Residential |
| MFH                            | 1500      | gpd/acre   | 292      | 0.438                    | Valley Floor Residential |
| MFVH                           | 2000      | gpd/acre   | 56       | 0.113                    | Valley Floor Residential |
| MHP <sup>1</sup>               | -         | -          | -        | -                        | Valley Floor Residential |
| HOTEL                          | 4000      | gpd/acre   | 60       | 0.244                    | Valley Floor Residential |
| MXD                            | 1000      | gpd/acre   | 67       | 0.067                    | Commercial               |
| HDMU                           | 2200      | gpd/acre   | 64       | 0.141                    | Commercial               |
| PAO                            | 500       | gpd/acre   | 65       | 0.031                    | Industrial               |
| COM                            | 900       | gpd/acre   | 467      | 0.420                    | Commercial               |
| INP                            | 450       | gpd/acre   | 727      | 0.327                    | Industrial               |
| MFG                            | 1500      | gpd/acre   | 550      | 0.825                    | Manufacturing            |
| PF                             | 190       | gpd/acre   | 310      | 0.059                    | Commercial               |
| COR <sup>1</sup>               | -         | -          | -        | -                        | Correctional             |
| Large Dischargers <sup>2</sup> | Various   | -          | -        | 1.176                    | Various                  |
| <b>Total</b>                   | -         | -          | -        | <b>6.157<sup>3</sup></b> | -                        |

Notes:

1. All three mobile home parks and the correctional facility were identified as large dischargers and assigned flows based on water use data as described in **Section 7.3.2**.
2. Large dischargers were assigned a diurnal pattern based on their original land use codes, which are listed in **Table 7-5**.
3. Represents the total BSF. The total BSF plus the total GWI is the total DWF.

**Figure 7-10: Example of Dry Weather Model Calibration Charts**



**Figure 7-10** presents a comparison between modeled and observed dry weather weekday flows. For the overall system, modeled flows are 3.4% higher than the observed flows on an average dry weekday and are within 10% (higher) of the measured flows on the average dry weekend. A calibration within 5% is considered a good representation of actual conditions and having modeled flows higher than measured flows assures that the model is conservative in its representation of the collection system.

**Table 7-7: Calibrated Model vs. Observed Weekday Dry Weather Flow Comparison**

| Flow Meter           | Sub-Basin      | Model Avg Flow (MGD) | Observed Avg Flow (MGD) | % Difference |
|----------------------|----------------|----------------------|-------------------------|--------------|
| 744                  | A              | 0.273                | 0.270                   | 1.2%         |
| 41 <sup>1</sup>      | B              | 0.540                | 0.565                   | -4.4%        |
| 386                  | C              | 0.566                | 0.576                   | -1.8%        |
| 649 <sup>2</sup>     | D              | 0.892                | 0.862                   | 3.5%         |
| 2491 <sup>2</sup>    | D              | 0.103                | 0.133                   | -22.9%       |
|                      | <b>D Total</b> | <b>0.995</b>         | <b>0.995</b>            | <b>-0.1%</b> |
| 1193                 | E              | 0.588                | 0.580                   | 1.3%         |
| 1043                 | F              | 1.219                | 1.248                   | -2.4%        |
| 1795                 | G              | 0.258                | 0.271                   | -4.6%        |
| 1564                 | H              | 0.073                | 0.074                   | -2.3%        |
| 2300                 | I              | 0.059                | 0.056                   | 5.3%         |
| 2334                 | J              | 0.163                | 0.167                   | -2.2%        |
| 2569                 | K              | 0.383                | 0.357                   | 7.5%         |
| 2666                 | L1             | 0.867                | 0.889                   | -2.5%        |
| 2724                 | L2             | 2.442                | 2.036                   | 19.9%        |
| 186                  | M              | 0.113                | 0.123                   | -7.5%        |
| 2721                 | N              | 0.198                | 0.199                   | -0.7%        |
| 2808                 | P              | 1.755                | 1.837                   | -4.5%        |
| 229                  | Q              | 0.091                | 0.086                   | 6.2%         |
| 190                  | R              | 0.081                | 0.087                   | -7.1%        |
| 1790                 | S              | 2.267                | 1.934                   | 17.2%        |
| 592 <sup>1,3</sup>   | T              | 0.194                | 0.191                   | 1.5%         |
| 715 <sup>1,3</sup>   | T              | 0.990                | 1.027                   | -3.6%        |
|                      | <b>T Total</b> | <b>1.184</b>         | <b>1.219</b>            | <b>-2.8%</b> |
| OUTFALL <sup>4</sup> | O              | 7.492                | -                       | -            |

Notes:

1. Flows are affected by the obstruction in MH 539 - a critical flow split.
2. Flows are affected by the obstruction in MH 2488 - a critical flow split.
3. Flows are affected by the obstruction in MH 543 - a critical flow split.
4. The flows of sub-basin O capture the entire system. There are not any measured flows at this location, so there is nothing to compare the modeled flows to.



## 7.4 Wet Weather Flow (WWF)

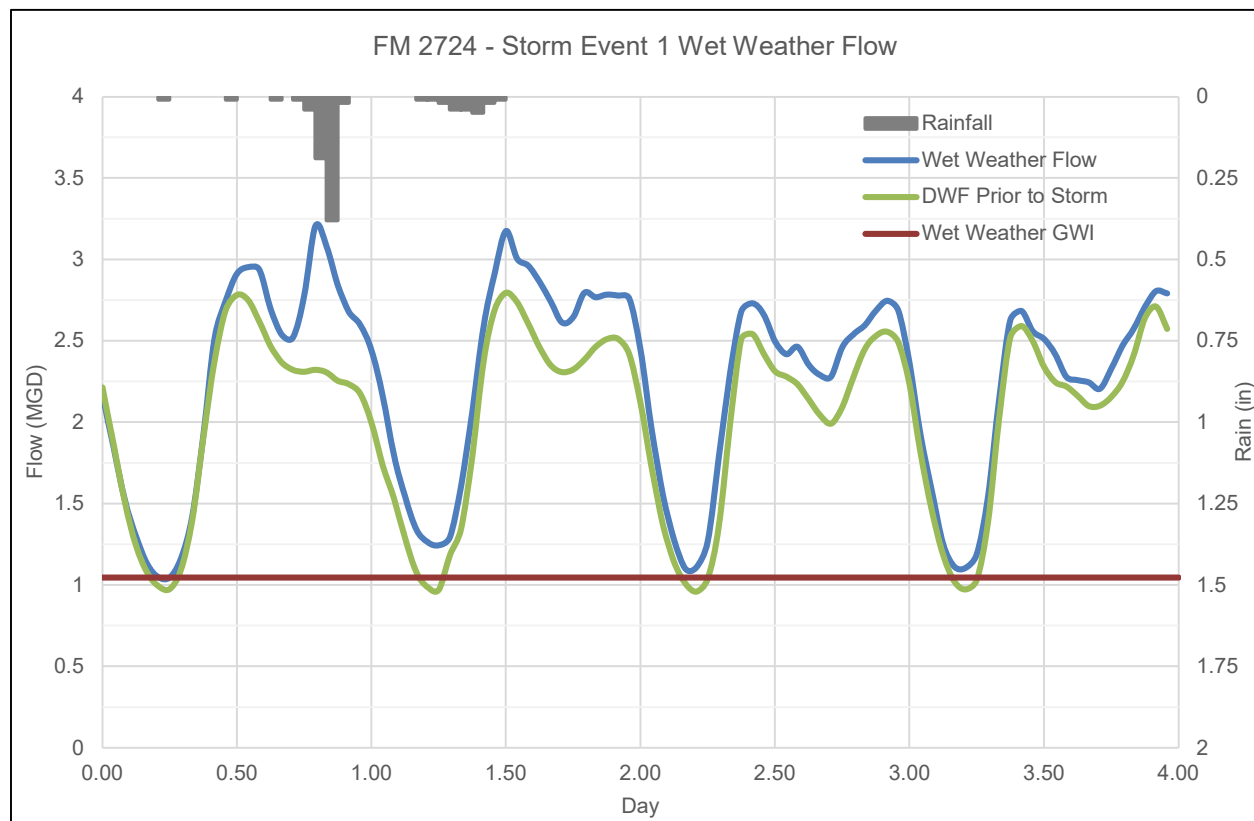
The remaining components of wastewater flow are additional wet weather GWI related to an elevated groundwater table and the RDI/I as illustrated in **Figure 7-1**. GWI levels typically fluctuate as the water table rises during the wet season and falls during the dry season; GWI values were adjusted to account for the seasonal variation. RDI/I is the flow that enters the system through manhole covers and through temporarily increased groundwater infiltration driven by rainfall.

### 7.4.1 RDI/I Volume

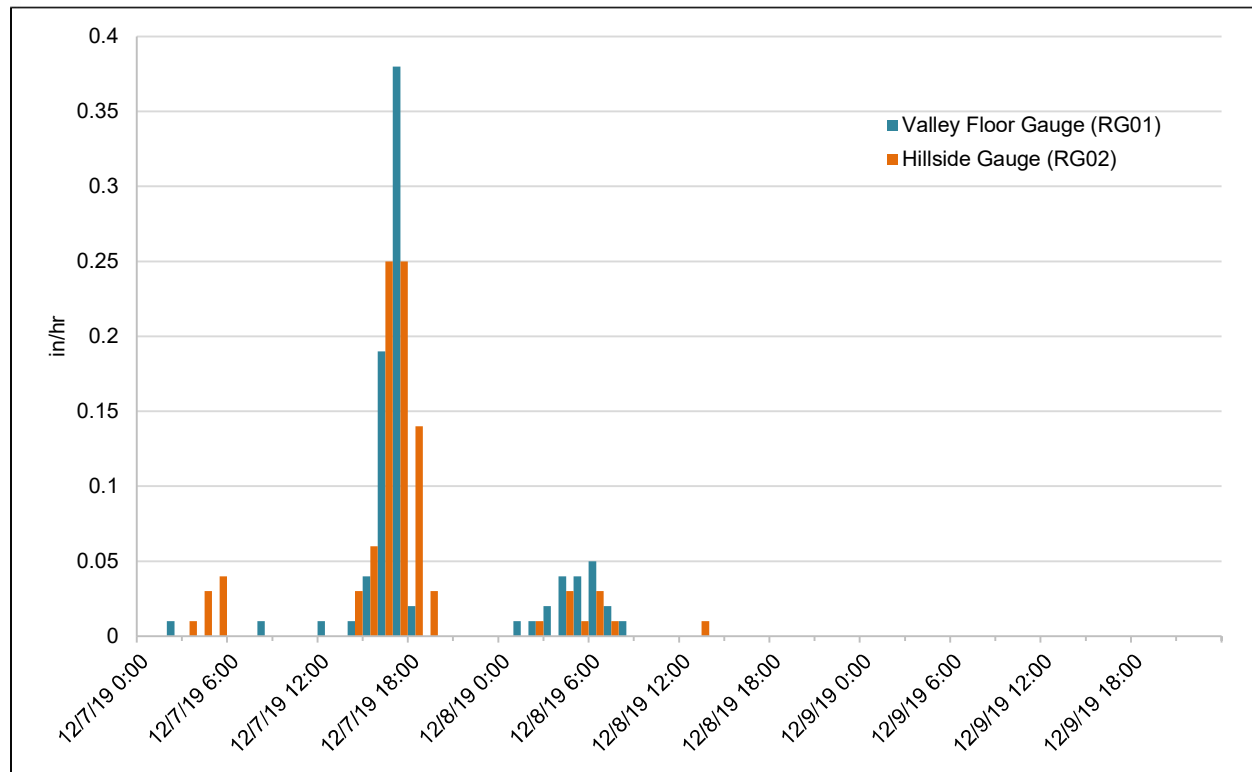
The volume of RDI/I is calculated by subtracting the volume of DWF in the system from the volume of total wet weather flow, as shown in **Figure 7-11**. For this study, the volume of RDI/I and corresponding R-factor was calculated for the 24-hour period following the start of Storm event 1. Because GWI tends to fluctuate over the course of the wet season as the water table rises and falls, dry weather data from just prior to the storm was used for RDI/I calculations. DWF prior to the storm was subtracted from the storm flow for RDI/I calculations.

**Figure 7-11** is an example of the flows at FM 2724 during the storm period.

**Figure 7-11: Wet Weather Flow**



**Figure 7-12: Storm Rainfall**



## 7.4.2 Total Rainfall

The volume of rain that fell on each sub-basin is calculated by multiplying the depth of rain by the total area contributing sanitary flows in each respective sub-basin. The areas of each sub-basin are listed in **Table 7-4**. This acreage excludes parcels with no wastewater flows (NF designation – see **Figure 5-1**) such as streets and areas of open space. To calculate the rainfall volume for this initial analysis, each sub-basin was matched to a corresponding rain gauge (RG01 or RG02) based on proximity and elevation. Sub-basin H is the only sub-basin located on the hillside, so this was matched to RG02. The remainder of the sub-basins were matched with RG01 on the valley floor. **Figure 7-12** presents the rainfall for Storm event 1 for both rain gauges.

## 7.4.3 R-Factor Development

The R-factor represents the percentage of rainfall that enters the City's sewer system by volume: the ratio of RDI/I to total volume of rain. An initial R-factor was calculated for each sub-basin based on the flow data and was iteratively adjusted for the wet weather model calibration process.

There is no separate estimation of antecedent moisture conditions in the soil. It is best to use at least a 2-year storm to estimate R-factors, as it will more likely represent conditions similar to a large representative design storm. For this analysis, the storm selected for the R-factor calculation and calibration was Storm event 1, which was the largest storm available during the flow monitoring period. Storm event 1 was less than a 1-year 24-hour storm, but between a 1- and 2-year 2-hour storm.

Once the RDI/I and total volume of rainfall are calculated, the R-factor is a simple calculation of RDI/I volume divided by rainfall volume, resulting in the estimated portion of rainfall that enters the wastewater collection system. These values were also iteratively adjusted during the model calibration process.

#### **7.4.4 Wet Weather Calibration**

To initiate the wet weather calibration process, the observed rainfall collected at both rain gauges for Storm event 1 was added to the model (see **Figure 7-12**). During the calibration process, it was noted that the peak flows for all valley floor sub-basin meters occurred approximately three hours prior to the peak rainfall, which was clearly elevated related to rainfall as compared to dry weather flow. It appears that there may have been an error in the timestamps of RG01, so the rainfall was shifted three hours earlier.

##### **Wet Weather GWI**

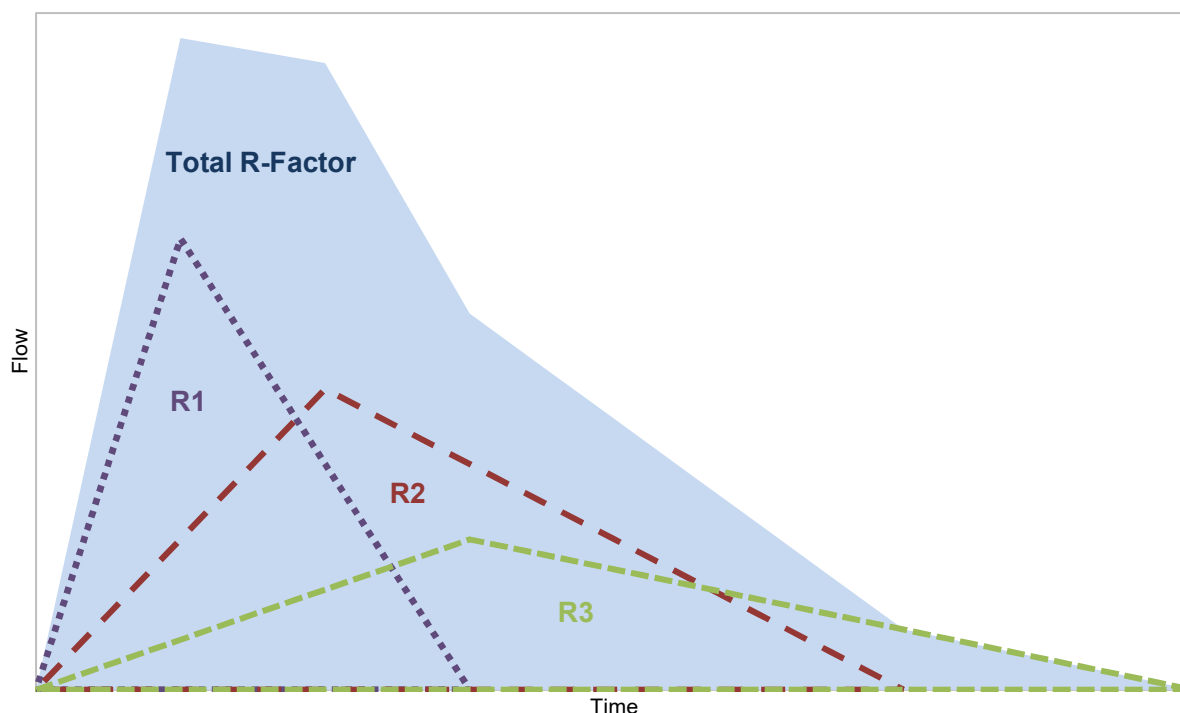
GWI fluctuates over the course of the year, increasing during the wet season as the water table rises. The extent that the water table rises and falls is site specific and can be affected by geology, surface water features, and tides. By extension, wet weather GWI changes are also site specific and can also depend on the condition of the pipelines. In the wet weather calibration scenarios of the model, GWI values established during the dry weather calibration process were iteratively increased to reflect the elevated water table more accurately during the wet season as displayed by an increase in the minimum flows.

##### **RDI/I R-Factor**

The RDI/I is estimated using the R-factor, or the percentage of rainfall that enters a sewer system as described in **Section 7.4.1**, and the Tri-Triangular Method. The Tri-Triangular Method, which is the industry standard for representing wet weather flows, involves summing three separate hydrographs to derive a single unit hydrograph. The total R-factor is divided into three separate values, represented as triangles (see **Figure 7-13**), based on the speed at which rainfall enters the sewer system, as described below:

- **Rapid (R1)** – Stormwater inflow that enters the sewer system most rapidly, typically through entry points such as holes in manhole covers. The peak of this triangle occurs one to three hours after the start of the rainfall.
- **Intermediate (R2)** – A combination of rapid stormwater inflow and slow rainfall-dependent infiltration.
- **Slow (R3)** – Long term delayed rainfall-dependent infiltration. The peak of this triangle occurs the longest time after the start of the rainfall, and the effects of this infiltration can continue long after the end of the rainfall.

**Figure 7-13: Tri-Triangular R-Factor Method**



The initial estimated R-factors (R1, R2, and R3) for each sub-basin were input into the model, which generated the total R-factors. Total R-factors are simply the sum of the individual R-factors ( $R1 + R2 + R3$ ). The entered R-factors were iteratively adjusted for each sub-basin by comparing modeled flows to observed flows at each flow meter during the day of, and the two days following, the storm. During this part of the calibration process, it is critical to capture the peak flows as accurately as possible to avoid underestimating capacity deficiencies.

The final calibrated R-factors for each sub-basin are presented in **Table 7-8**.

For wet weather calibration of the system, average modeled flows representing Storm event 1 and one day following the storm are 3.3% higher than measured flows. Modeled peak WWF for Storm event 1 are 2.3% higher than measured peak flows. A calibration within 5% is considered a good representation of actual conditions and having modeled flows higher than measured flows assures that the model is conservative in its representation of the collection system.

A sample wet weather calibration chart is displayed in **Figure 7-14**. Wet weather calibration charts for all flow meters are attached as **Appendix E**.



**Table 7-8: Final Calibrated R-Factors**

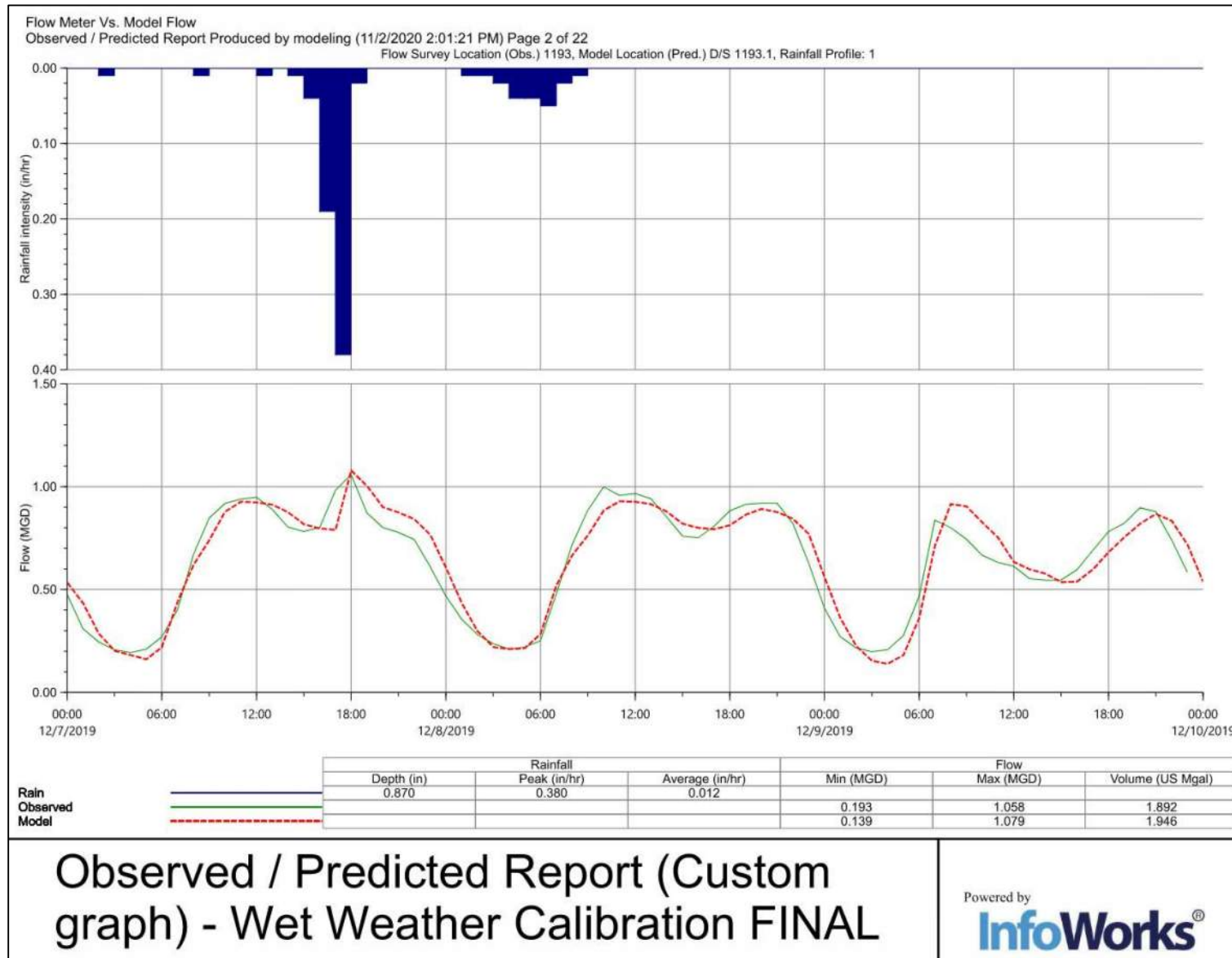
| Sub-Basin                  | Acreage      | R1           | R2           | R3           | Total R-Factor |
|----------------------------|--------------|--------------|--------------|--------------|----------------|
| A                          | 138          | 0.40%        | 0.85%        | 0.23%        | 1.48%          |
| B                          | 433          | 0.80%        | 0.66%        | 0.13%        | 1.59%          |
| C                          | 192          | 0.27%        | 0.00%        | 0.02%        | 0.30%          |
| D                          | 208          | 0.26%        | 1.64%        | 0.00%        | 1.90%          |
| E                          | 455          | 0.53%        | 0.00%        | 0.07%        | 0.60%          |
| F                          | 414          | 0.67%        | 0.00%        | 0.19%        | 0.86%          |
| G                          | 78           | 1.27%        | 2.14%        | 0.00%        | 3.40%          |
| H                          | 110          | 0.24%        | 0.00%        | 0.00%        | 0.24%          |
| I                          | 81           | 0.08%        | 0.35%        | 0.00%        | 0.42%          |
| J                          | 79           | 0.00%        | 0.67%        | 1.50%        | 2.17%          |
| K                          | 187          | 0.10%        | 0.56%        | 0.15%        | 0.81%          |
| L1                         | 266          | 0.09%        | 0.17%        | 0.14%        | 0.40%          |
| L2                         | 607          | 0.09%        | 0.17%        | 0.05%        | 0.31%          |
| M                          | 57           | 1.07%        | 0.26%        | 0.07%        | 1.39%          |
| N                          | 55           | 0.55%        | 1.17%        | 0.34%        | 2.06%          |
| O <sup>1</sup>             | 207          | 0.70%        | 0.40%        | 0.40%        | 1.50%          |
| P                          | 537          | 0.59%        | 0.30%        | 0.37%        | 1.26%          |
| Q                          | 151          | 0.45%        | 0.00%        | 0.15%        | 0.60%          |
| R                          | 34           | 1.30%        | 2.41%        | 0.00%        | 3.71%          |
| S                          | 393          | 0.00%        | 1.30%        | 0.34%        | 1.64%          |
| T                          | 207          | 0.25%        | 0.12%        | 0.26%        | 0.64%          |
| <b>Average<sup>2</sup></b> | <b>4,889</b> | <b>0.40%</b> | <b>0.45%</b> | <b>0.19%</b> | <b>1.04%</b>   |

Notes:

1. There is no flow meter at the outfall for sub-basin O. Values were estimated based on surrounding sub-basins.
2. The average represents the weighted average by sub-basin area.

In summary, total R-factors for each subbasin ranges from 0.24% up to 3.71%, which represents the percentage of rainfall entering the collection system. A low R-factor would be less than 3% and 10% is considered high. The weighted average for the entire system is 1.04%; this is considered a relatively watertight system with limited rainfall entering the collection system.

**Figure 7-14: Example of Wet Weather Model Calibration Charts**



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## SECTION 8 – CAPACITY ANALYSIS

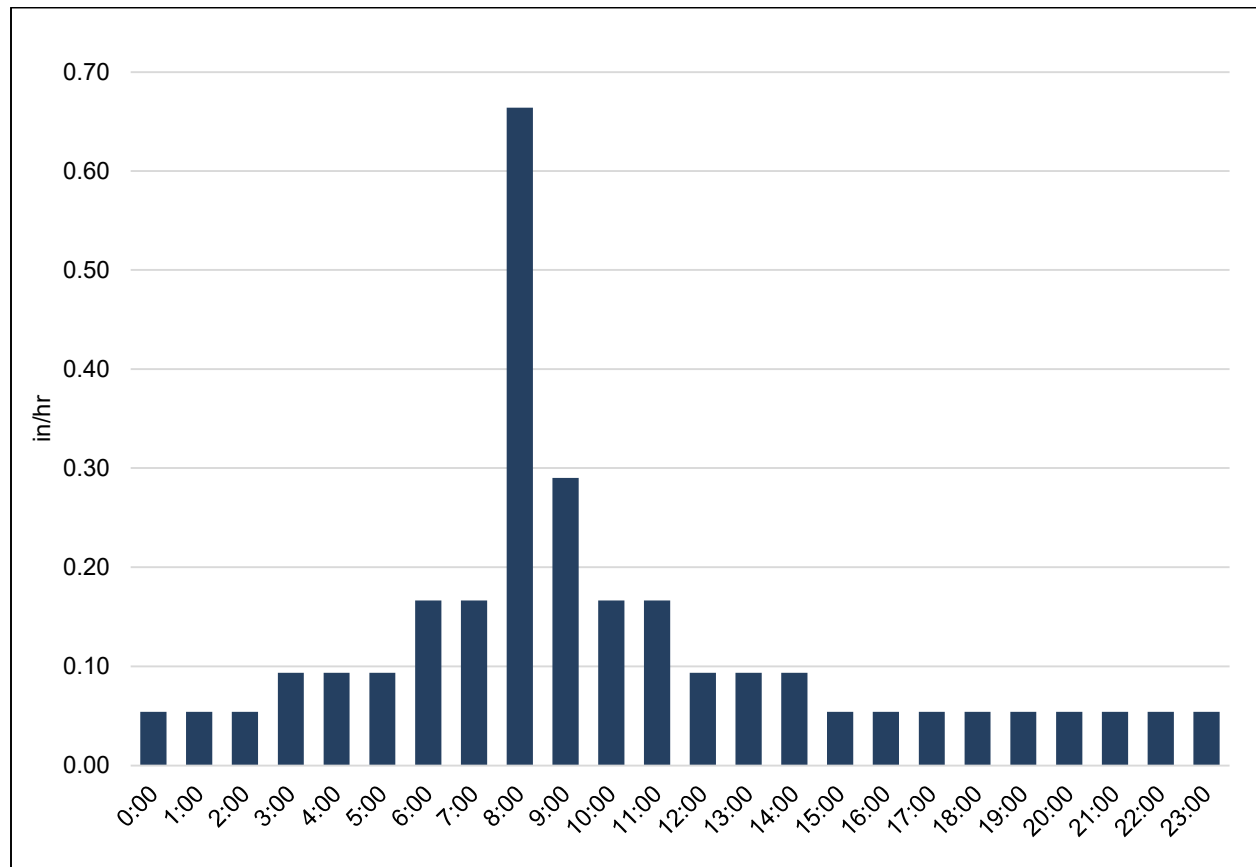
The hydraulic analysis for the collection system was evaluated under design storm for existing and future land use conditions. This section describes the analysis and the resulting deficiencies.

### 8.1 Design Storm

To estimate WWF, a design storm is applied to the model and wet weather flows are represented based on the calibrated R-factors for each sub-basin. A range of storms was considered for the design condition of this study. Both the 2002 and 2009 Master Plans used a 10-year, 4-hour constant distribution storm. Often, a 10-year 24-hour storm is used with a peak hour coinciding with the peak of the typical diurnal curve. A 5-year 24-hour storm was also available in the event that a 10-year 24-hour storm caused exceedingly large flows due to high rates of RDI/I.

For this study, the typical 10-year 24-hour storm with a peak hour coinciding with the peak of the typical diurnal curve was deemed appropriate.

**Figure 8-1: 10-Year 24-Hour Design Storm**



Source: NOAA Atlas 14 Volume 6 Version 2 precipitation frequency estimates in inches for Milpitas, California (<https://hdsc.nws.noaa.gov/hdsc/pfds>).



## 8.2 Deficiency Criteria

The initial deficiency criteria used to evaluate the capacity of the modeled pipes under design flow conditions was the ratio of wastewater flow depth (d) to pipe diameter (D), or d/D. In InfoWorks, if d/D is greater than one, this means the pipe is flowing full under pressure and the hydraulic grade line (HGL) is higher than the crown of the pipe. InfoWorks also reports a “surcharge state” for each pipe, and **Table 8-1** summarizes the definition of each surcharge state.

In the hydraulic model, the HGL reaching the ground surface indicates a potential SSO. Even for a pipe flowing under capacity or surcharged, if the freeboard – the distance between the ground surface and the HGL – is five feet or greater, the risk of SSO is minimal. Where pipes were shown as surcharged due to inadequate hydraulic capacity (surcharge state of “2”), a pipe was identified as deficient if the freeboard in these locations is also less than five feet.

**Table 8-1: InfoWorks Surcharge States**

| Surcharge State  | Definition                                                        | Deficiency if:                         |
|------------------|-------------------------------------------------------------------|----------------------------------------|
| < 1 <sup>1</sup> | When depth of flow is less than the diameter of the pipe          | Not considered hydraulically deficient |
| = 1              | Pipe is surcharged due to backwater from a downstream deficiency. | Not considered hydraulically deficient |
| = 2              | Pipe is hydraulically under capacity and needs to be upsized.     | Freeboard < 5 feet                     |

Notes:

1. Surcharge State = d/D

## 8.3 Assumed Condition

As detailed in **Section 7.3.4**, there were three critical flow splits identified in the system as having major flow obstructions that drastically changed the flow path of wastewater – likely from grease buildup at MH 539, MH 543, and MH 2488. During the dry weather calibration process, these flow splits were modified in the model to match the wastewater flows observed in the system. For the hydraulic analysis, system performance was evaluated based on the assumption that these obstructions have been cleared and the system is operating as intended.

## 8.4 Future Condition

**Section 5.2** presents the process used to update the land use for potential future redevelopment areas in the City to estimate future wastewater flows. For the hydraulic analysis of the system under future conditions, calibrated GWI, UF factors, and R-factors developed above were applied to the updated land uses for projected future buildout conditions. The same design storm was used for both existing and future conditions.

### 8.4.1 Large Dischargers

If parcels were identified as large dischargers under existing conditions and located within “Opportunity Areas” (see **Figure 2-2** and **Figure 5-2**), the existing land use was compared to the future land use; where the land uses differed, the future land use UF factor was applied. If there

was no change to the land use, then the large discharger wastewater flow (see **Table 7-5**) under existing conditions was maintained for the future scenario.

**Table 8-2** lists the large dischargers that were removed from the future condition and replaced with the future land use UF factors.

**Table 8-2: Summary of Large Discharger Sites Planned for Redevelopment**

| Rank | Location <sup>1</sup> | Existing Land Use | Future Land Use |
|------|-----------------------|-------------------|-----------------|
| 13   | Main St               | COM               | MFH             |
| 15   | McCarthy Blvd         | INP               | PAO             |
| 16   | Landess Ave           | COM               | HDMU            |
| 20   | McCarthy Blvd         | INP               | PAO             |
| 23   | McCarthy Blvd         | INP               | PAO             |
| 26   | Calaveras Blvd        | COM               | HDMU            |
| 36   | Park Victoria Dr      | COM               | HDMU            |

Notes:

1. Source: January-March 2019 water meter customer billing data provided by the City multiplied by 85% - assumed portion of water use that contributes to wastewater flows.

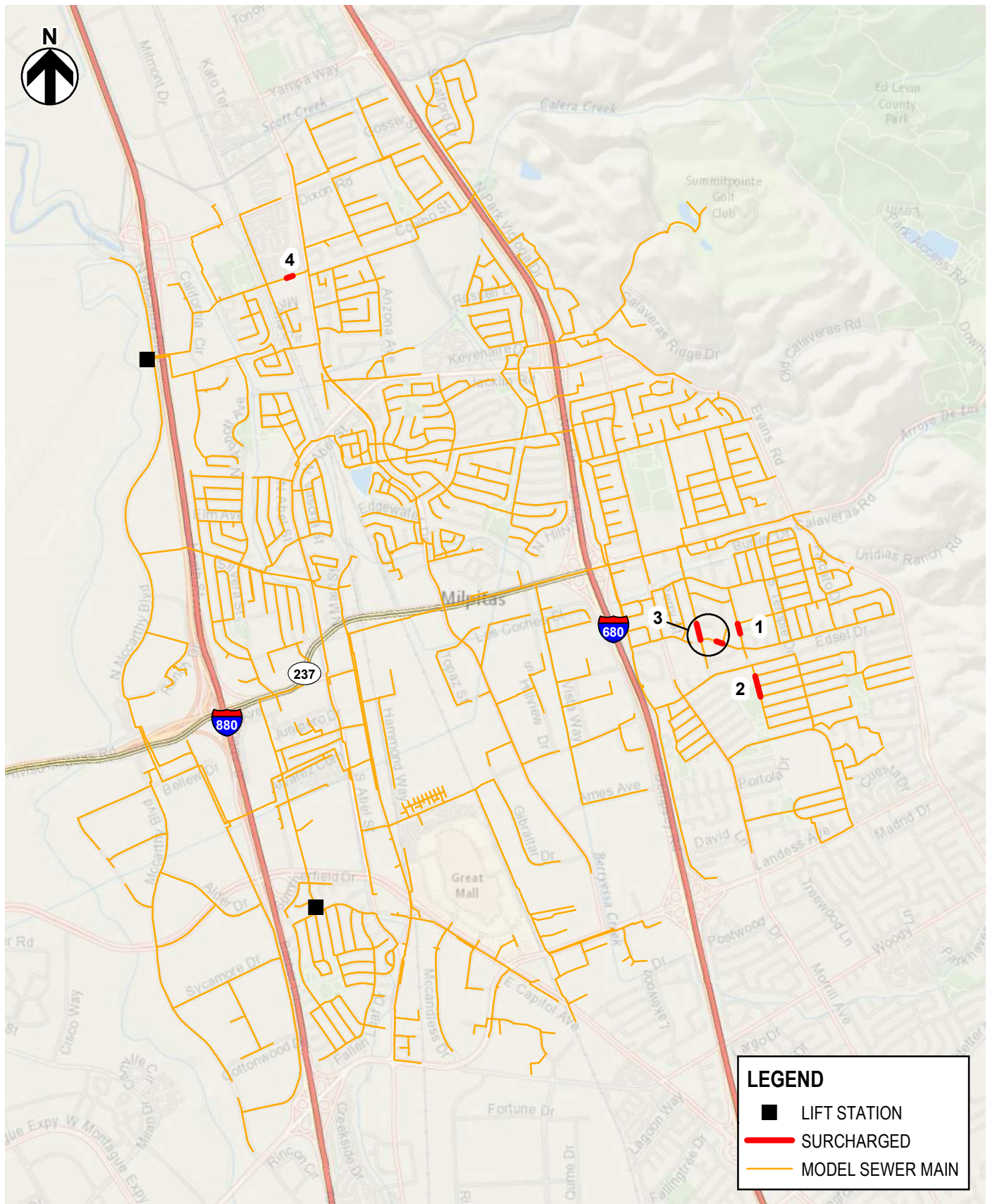
Los Esteros Ranch, which is located at the intersection of McCarthy Blvd and Dixon Landing Road, is connected to the City collection system. This land use was added to the modeled system in accordance with the City's agreement with Los Esteros Ranch. The agreement between the City and Los Esteros Ranch, attached as **Appendix F**, states that they have a maximum allowable water usage of 50,000 gpd among the three parcels included in the agreement. Applying the same method identified for other large dischargers (see **Section 7.3.2**), it was assumed that wastewater flows constitute approximately 85% of water usage. Los Esteros Ranch was assigned a wastewater flow of 42,500 gpd and was added as a large discharger for the future condition. The area of the three contributing parcels was measured using the Measure tool in Bluebeam Revu 2016 and calibrated using the scale bar displayed on Exhibit "A" of the Los Esteros Ranch Agreement.

## 8.5 Hydraulic Capacity Deficiencies

Under dry weather conditions, **Table 8-3** shows a 6% increase to 7.9 MGD in average flow for future conditions at the outfall.

**Table 8-3: Model Flow Summary**

| Scenario | Average DWF (MGD) | Peak DWF (MGD) | Peak WWF (MGD) |
|----------|-------------------|----------------|----------------|
| Existing | 7.5               | 10.4           | 14.9           |
| Future   | 7.9               | 11.0           | 18.5           |



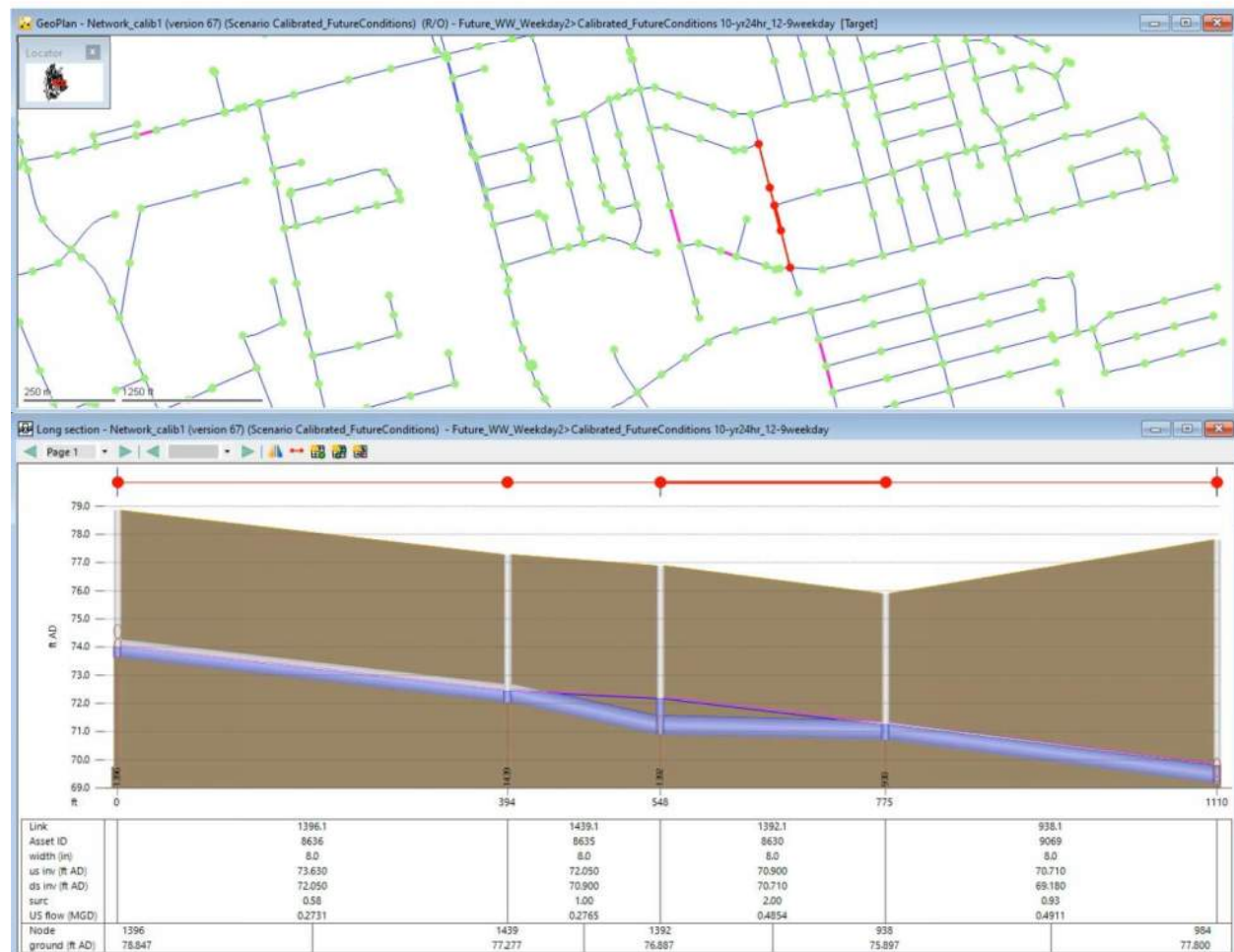
**FIGURE 8-2**  
**CITY OF MILPITAS**  
**SEWER MASTER PLAN**  
**SURCHARGED PIPELINE SEGMENTS**

Under all scenarios, there were no additional surcharged segments identified under future conditions that were not seen under existing conditions. It is expected that this is because the City is largely built out and system improvements implemented with development have addressed potential deficiencies.

There were six pipe segments with a recorded surcharge state of “2” (see **Section 8.2**) under both existing and future conditions indicating that they are under capacity. These segments are displayed on **Figure 8-2**. Provided below is a description of each of these pipelines:

- **Surcharged Location 1:** This pipe segment drops below the minimum freeboard deficiency criteria (see **Table 8-1**) with a freeboard of 4.7 ft, shown in **Figure 8-3**. For a single pipe reach, replacement is not recommended without further cause. It is recommended that the City monitor this location for surcharging. This location (MH GID 1392) is a good candidate for installing a SmartCover to monitor the wastewater level and prevent SSOs.
- **Surcharged Location 2:** These two surcharged segments are 6-inch mains. Freeboard at these locations is greater than five feet, so they do not exceed the criteria for a capacity deficiency and therefore are not considered deficient. In general, it is recommended that all future sewer mains in the collection system are constructed with minimum diameters of 8-inches.

**Figure 8-3: Surcharged Location 1 with 4.7 feet of Freeboard**





- **Surcharged Location 3:** These two surcharged segments are 10-inch pipes. Freeboard at these locations is greater than five feet, so they do not exceed the criteria for a capacity deficiency and therefore are not considered deficient.
- **Surcharged Location 4:** This pipe, identified as under capacity (GID 17506), is located to the west of the intersection between N. Milpitas Blvd. and Washington Dr. In GIS, this segment was identified as an 8-inch pipe; however, both upstream and downstream pipes were identified as 12-inch pipes. During the review of record drawings, it was unclear if this pipe has been upsized to match the neighboring pipes. In the model, this segment experiences surcharging during wet weather as an 8-inch pipe, however, when this segment is upsized to 12-inches to match the neighboring pipe diameters, there is no longer surcharging. An improvement project is not recommended at this location as the freeboard is over ten feet and does not meet the threshold for deficiency identified in **Table 8-1**.

## SECTION 9 – PROJECT DEVELOPMENT

Based on the condition assessment described in **SECTION 4**, projects were recommended to address prioritized defects identified in the collection system. This section describes the prioritization process and a summary of the project cost development. Results of this project development and selection translate into a prioritized CIP for the wastewater collection system.

### 9.1 Rehabilitation Selection Methodology

The PACP peak scores from the CCTV inspection and the risk scores calculated from the LoF/CoF desktop condition assessment drive the pipeline rehabilitation selection process. Below is a summary of the methodology implemented for both inspected and non-inspected pipe.

#### 9.1.1 CCTV Inspected Segments

For segments with CCTV inspection data, a two-step process was used to determine the final rehabilitation recommendation. Using the defect coding assigned by NPS and the IAP software, the pipe segments with defects were assigned one of the following defect-level rehabilitation methods:

- Replace;
- Cured-in-place pipeline (CIPP);
- Point repair by excavation; or
- Sectional liner.

When the user assigns a rehabilitation method for each defect code, IAP assigns the respective rehabilitation method to each segment based on the associated defect coding.

**Table 9-1** presents a sample of the assigned rehabilitation methods for all structural defects with a score of 5. A full list of all defect codes and associated rehabilitation methods can be found in **Appendix A** (R&R Study App. H).

With the rehabilitation method established for each defect code, a decision tree was established to determine the final overall rehabilitation method for the pipeline. This decision tree was prepared based on the following factors:

- CCTV structural peak score and overall peak score;
- Number of point repairs and lining recommendations by the defect-level rehabilitation methods module;
- Number of defects;
- Length of major (score of 4 or 5) and/or minor (score of 3) defects; and
- Presence of specific defects such as infiltration drippers (ID) or Reinforcement Corroded Chemical (SRCC).

**Figure 9-1** presents a schematic of the established decision tree. Pipeline segments with CCTV inspection data are filtered by their PACP peak scores. Then, they are analyzed based on the number of point repairs and lining recommendations established by the defect-level rehabilitation methods module as well as the number of defects, length of defects, and presence of specified minor, but not negligible, defects. When multiple rehabilitation options were recommended, a cost analysis was performed to determine the best action. For example, if a segment was recommended to receive ten sectional liners, a full liner would be more cost-effective.

**Table 9-1: Sample of Defect Codes with Associated Rehabilitation Methods**

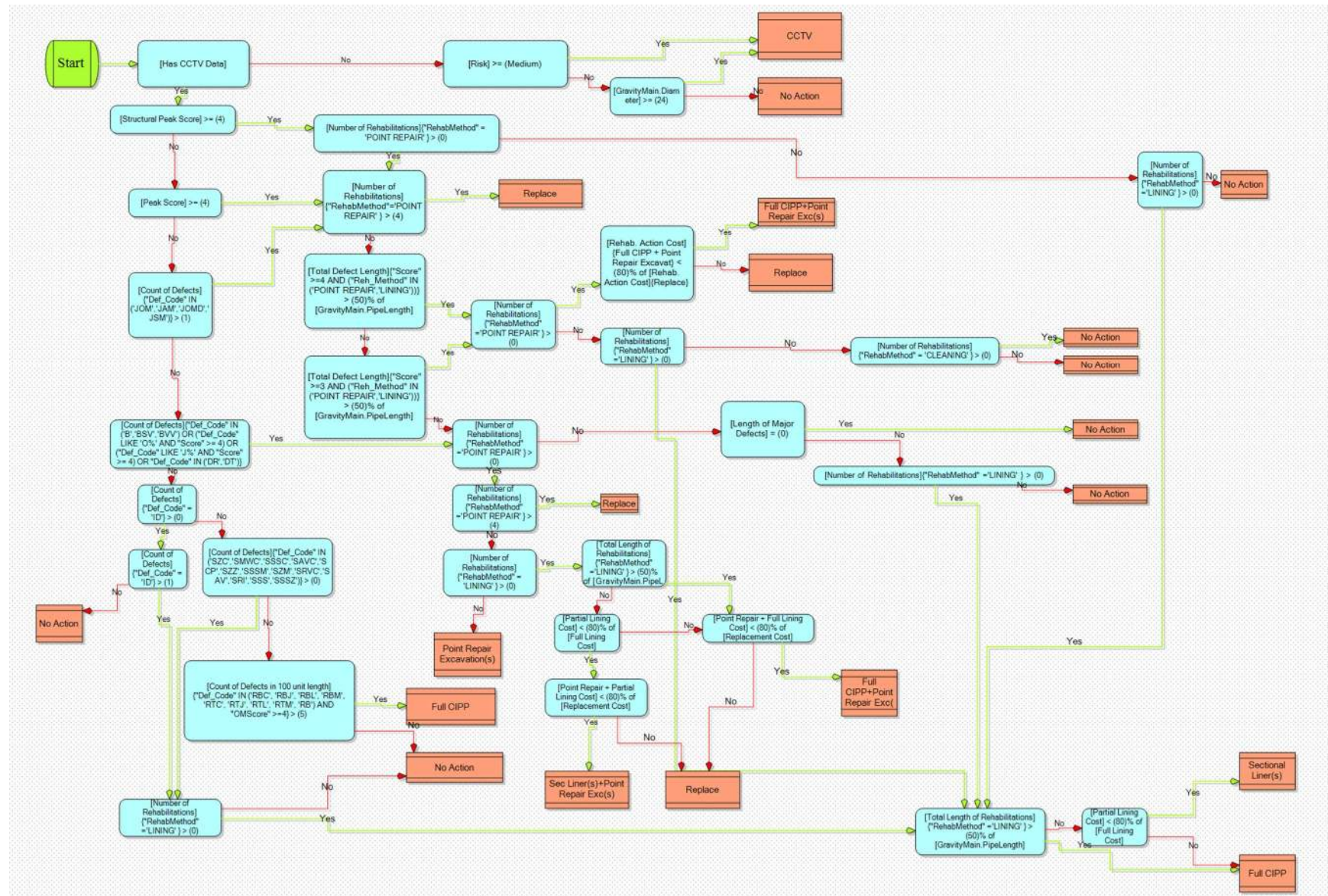
| Defect Code | Score | Defect Type | Description                       | Rehabilitation Method |
|-------------|-------|-------------|-----------------------------------|-----------------------|
| BSV         | 5     | Structural  | Broken Soil Visible               | Point repair          |
| BVV         | 5     | Structural  | Broken Void Visible               | Point repair          |
| DI          | 5     | Structural  | Dropped Invert                    | Point repair          |
| DV          | 5     | Structural  | Deformed Vertical Brick           | Point repair          |
| HSV         | 5     | Structural  | Hole Soil Visible                 | Point repair          |
| HVV         | 5     | Structural  | Hole Void Visible                 | Point repair          |
| SMW         | 5     | Structural  | Missing Wall                      | Point repair          |
| SMWC        | 5     | Structural  | Missing Wall Chemical             | Point repair          |
| SMWM        | 5     | Structural  | Missing Wall Chemical             | Point repair          |
| SMWZ        | 5     | Structural  | Missing Wall Unknown              | Point repair          |
| SRC         | 5     | Structural  | Reinforcement Corroded            | Point repair          |
| SRCC        | 5     | Structural  | Reinforcement Corroded Chemical   | Point repair          |
| SRCM        | 5     | Structural  | Reinforcement Corroded Mechanical | Point repair          |
| SRCZ        | 5     | Structural  | Reinforcement Corroded Unknown    | Point repair          |
| SRP         | 5     | Structural  | Reinforcement Projecting          | Lining                |
| SRVM        | 5     | Structural  | Reinforcement Visible Mechanical  | Lining                |
| SRVZ        | 5     | Structural  | Reinforcement Visible Unknown     | Lining                |
| XB          | 5     | Structural  | Collapse Brick Sewer              | Point repair          |
| XP          | 5     | Structural  | Collapse Pipe Sewer               | Point repair          |

**Figure 9-2** displays the final rehabilitation methods recommended for each segment based on the decision tree. For a table of the recommended rehabilitation method for each segment, see **Appendix A** (R&R Study App. A).

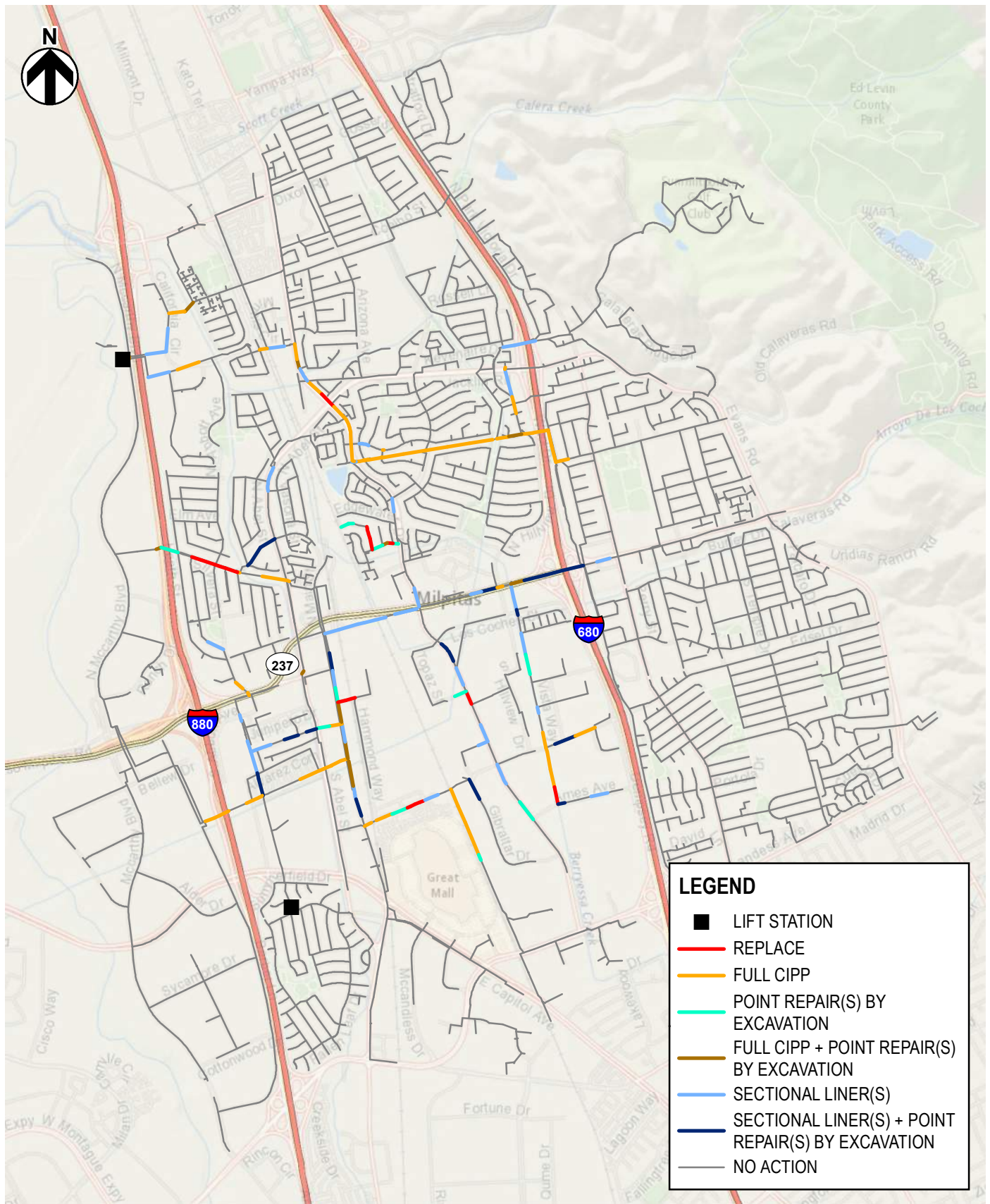
### 9.1.2 Segments without CCTV Inspection

For segments without CCTV inspection data, risk scores and diameter were used to develop a prioritized set of segments that are recommended for CCTV inspection and further analysis. Pipeline segments with a risk score of medium or higher (greater than or equal to three) – see **Section 4.2.3** – were included as part of this CCTV recommendation. Additionally, all pipelines with a diameter of 24-inches or greater are recommended for prioritized CCTV regardless of the associated risk rating. **Figure 9-3** presents the segments recommended to prioritize for CCTV.

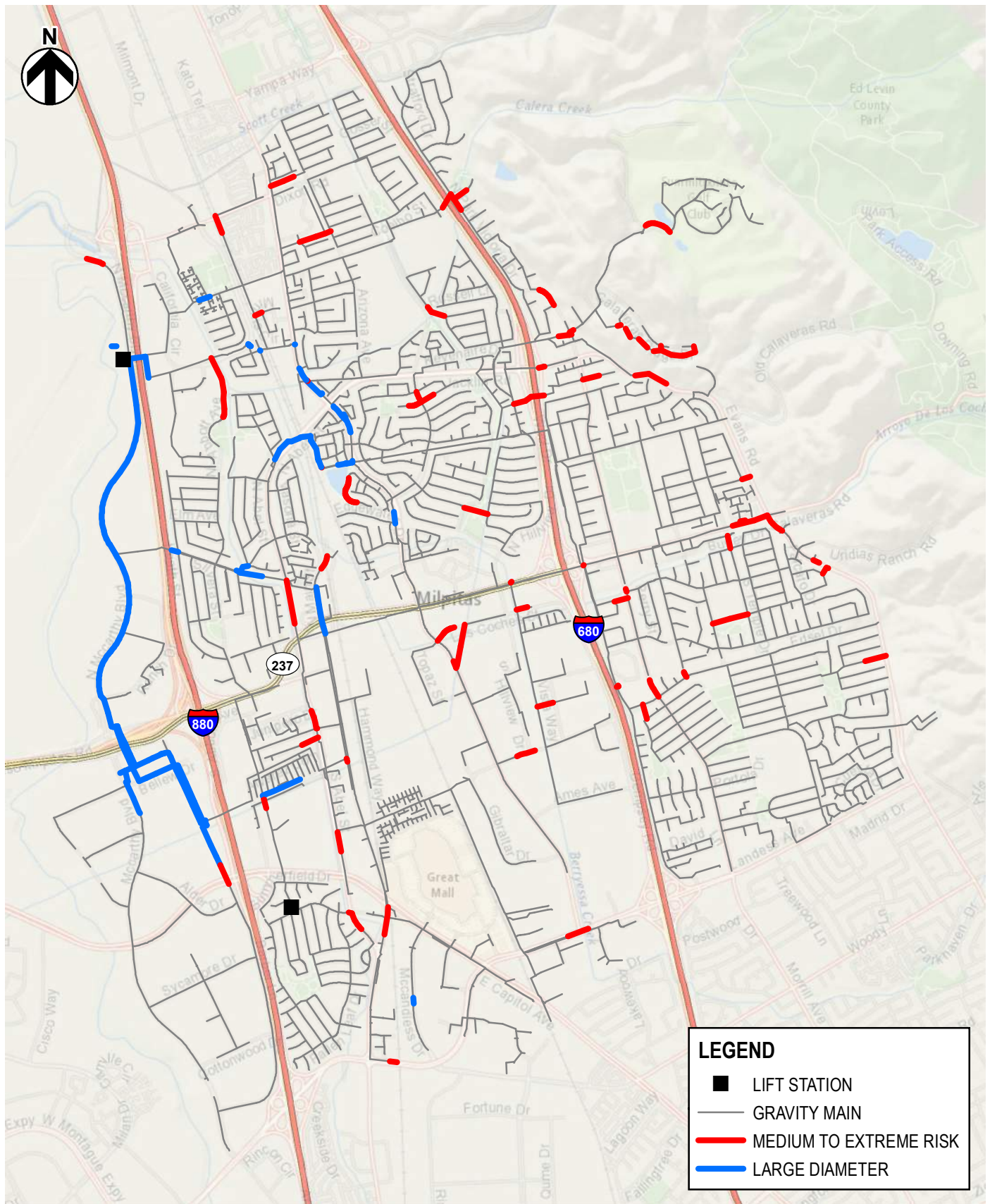
**Figure 9-1: Rehabilitation Decision Tree**







**FIGURE 9-2**  
 CITY OF MILPITAS  
 SEWER MASTER PLAN  
 RECOMMENDED REHABILITATION METHOD



**FIGURE 9-3**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
RECOMMENDED CCTV PRIORITY

## 9.2 Basis of Cost Assumptions

A cost estimate was developed for each type of rehabilitation method. Provided is a description of the basis for unit cost development and associated project-specific costs for pipelines, resurfacing, manholes, pumping systems, structural rehabilitation, protective coatings, bypass and redundancy, and electrical equipment. The purpose of approximating construction costs is to appropriate a conservative level of funding for each identified rehabilitation project included within the proposed scope of the City's upcoming CIP. **Appendix A** (R&R Study App. J) contains details of the preliminary cost estimates for all projects analyzed as part of this SMP.

### 9.2.1 CCTV Costs

CCTV costs were estimated based on diameter and length. Unit costs are conservative to account for the added cost for specialized techniques, such as laser profiling for large diameter pipe, and general quality control review. Unit costs are provided in **Table 9-2**.

**Table 9-2: CCTV Unit Costs**

| Pipe Diameter (in) | Unit Cost (\$/ft) |
|--------------------|-------------------|
| Up to 18           | \$4               |
| 19 to 24           | \$5               |
| 25 to 36           | \$6               |
| 37 to 66           | \$8               |

### 9.2.2 Pipeline Unit Costs

Unit costs for pipelines were estimated based on recent project bid tabulation for similar Capital Improvement Projects in the Bay Area as well as experience estimating the cost of similar local rehabilitation projects.

#### **Pipeline Replacement and Rehabilitation**

For the purposes of this SMP, in general, pipeline replacement projects are estimated using a loaded construction cost estimate of approximately \$35/inch-diameter per foot of pipeline replaced. The loaded pipeline unit cost was developed using relevant pipeline replacement project cost of construction bid averages divided by the total foot-inches (the length of pipe multiplied by the diameter in inches) of pipeline included within the scope of each specific project. Budgetary values for sewer bypassing and traffic control are also approximated using assumed construction quantities and according to the unit cost estimation summary provided in **Table 9-3**. The construction contingency provides an allotment of funds designated for unexpected issues that can change the scope of the project. For conceptual planning and cost comparisons of pipeline projects, the following parameters and associated unit costs were globally applied to recommended pipeline projects. Detailed unit costs for each improvement type according to size and depth are detailed in **Appendix A** (R&R Study App. J).



**Table 9-3: Pipeline Improvement Unit Cost Summary**

| Cost Parameter                           | Unit Cost          | Unit Criteria                                                  |
|------------------------------------------|--------------------|----------------------------------------------------------------|
| Pipeline Replacement <sup>1</sup>        | \$35               | Per inch-diameter per pipeline foot-length                     |
| Full Pipe Length CIPP                    | \$16               | Per inch-diameter per pipeline foot-length                     |
| Point Repair by Excavation               | \$600 - \$10,500   | Per inch-diameter per pipeline foot-length, depending on depth |
| Sectional Liner                          | \$3,000 – \$15,000 | Per repair, depends upon pipeline diameter                     |
| Mobilization/Demobilization              | 5%                 | Cost of construction                                           |
| Sewer Bypassing <sup>2</sup>             | 10%                | Cost of construction                                           |
| Traffic Control During Construction      | \$10k - \$15k      | Per roadway traffic rating                                     |
| Construction Cost and Market Contingency | 30%                | Construction Subtotal                                          |

Notes:

1. Loaded cost including costs associated with earthwork, demolition, sheeting, shoring & bracing, paving, and testing and commissioning. Pavement repair assumes minimum four-foot-wide trench per running foot.
2. Sewer bypassing costs typically requires expected flow capacity to determine hydraulic sizing of temporary equipment and materials.

### 9.2.3 Soft Costs

Soft costs are additional project costs that are not considered to be contractor construction costs. These costs include engineering design, permitting, construction administration, and construction management. Typical soft costs include the following:

- Engineering design and consulting is expected to also address California Environmental Quality Act (CEQA) requirements to identify significant environmental impacts, if any.
- Permitting, land acquisition and obtaining right-of-way (ROW) are dependent on the project. For existing City facilities, the cost is expected to be less than if an easement is needed to be obtained through a property. The cost is also expected to be a function of the total cost. A range of percentages were applied to each project.
- Engineering services during construction (ESDC) and construction management costs are those costs associated with the administration of the contract and management of the project, ensuring the project is constructed as designed.
- The annual inflation of cost that would occur over time for a future project.

**Table 9-4** provides a summary of the parameters used for estimating the soft costs. Soft costs were applied to all projects.

**Table 9-4: Soft Cost Estimating Parameters**

| Cost Parameter                                       | Cost | Applied to:           |
|------------------------------------------------------|------|-----------------------|
| Engineering Design and Consulting Services           | 15%  | Construction Subtotal |
| Permitting, land acquisition, and obtaining ROW      | 7%   | Construction Subtotal |
| ESDC, Construction Management, & Inspection Services | 12%  | Construction Subtotal |
| Annual Inflation                                     | 3%   | Project Total         |



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## SECTION 10 – CAPITAL IMPROVEMENT PLAN

This section presents a summary of the prioritized set of CIP projects developed as a culmination of the condition assessment (CCTV inspection, desktop inspection, and lift station inspection) presented in **SECTION 4** and the project development summarized in **SECTION 9**. Recommendations include budget estimates and targeted timelines for project implementation based on the prioritization laid out in **SECTION 9**.

### 10.1 Existing CIP Projects

Every year, the City prepares a five-year CIP that provides the City Council, staff, and public with a comprehensive planning tool for budgeting and carrying out a range of capital projects. To ensure that the recommendations provided as part of this Master Plan Study align with recent, ongoing, and planned projects, a review of the City's 2020-2025 CIP was conducted. **Table 10-1** presents recent and ongoing wastewater collection system and lift station improvement projects per the 2020-2025 CIP.

**Table 10-1: Recent Sewer Improvement Projects**

| Project ID | Project                                         | Description                                                                                                                                                                                                                                                         | Status                                                                                                     |
|------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 6119       | Sanitary Sewer Condition Assessment Program     | Citywide sanitary sewer condition assessment program to determine the condition of the City's sanitary sewer system.                                                                                                                                                | This phase to be completed during FY 2020/21.                                                              |
| 6124       | Pump Station Rehabilitation Program             | Rehabilitation or replacement of wastewater pumps at Main LS and Venus LS to safely discharge sewage.                                                                                                                                                               | Replacement of pump no. 3 and purchase of portable backup generator at the Main LS planned for FY 2020-21. |
| 6126       | Minor Sewer Projects                            | Ongoing analysis, engineering, and implementation of various minor modifications and improvements to existing sewer systems.                                                                                                                                        | Transfer switch at Venus and pavement restoration at the Main LS are planned for FY 2020-21.               |
| 6130       | Main LS Odor Emissions Control                  | Installation of odor emission controls at the Main LS to address concerns regarding elevated levels of hydrogen sulfide and other odorous compounds at the facility.                                                                                                | Design started in FY2018-19 and construction started during spring 2020.                                   |
| 6131       | Sanitary Sewer Cathodic Protection Improvements | Assessment, design, and installation of cathodic protection system along City's steel sewer force main from the Main LS to the RWF. Includes replacement of two existing magnetic flow meters at the Main LS with proper isolation to prevent reading interference. | Assessment and design started in FY 2019-20.                                                               |
| 6134       | On-Call Sewer Maintenance & Repair Services     | On-call repair and maintenance services at all City sewer infrastructure, assets, and appurtenances.                                                                                                                                                                | Ongoing                                                                                                    |
| Plan       | Sewer Line Replacement at E. Curtis             | Design and construction of sanitary sewer main replacement/upgrade on E. Curtis Avenue from S. Main Street to the E. Curtis cul-de-sac. This project will be financed through TASP Impact Fees.                                                                     | 2023-2024                                                                                                  |

**Table 10-2** provides a summary of the 2020-2025 allocation for each of the projects and the sources of funding for each per the City's Capital Improvement Program 2020-2025 Final Report.

**Table 10-2: Existing CIP Financing for 2020-2025**

| Projects                                                   | Sewer Infrastructure Fund | Sewer Fund | Sewer Treatment Fund | Total     |
|------------------------------------------------------------|---------------------------|------------|----------------------|-----------|
| 6119 Sanitary Sewer Condition Assessment Prgm <sup>1</sup> | (\$50,000)                | (\$74,000) | \$0                  | \$ 0      |
| 6124 Pump Station Rehabilitation Program <sup>2</sup>      | \$52,000                  | \$0        | \$0                  | \$52,000  |
| 6126 Minor Sewer Projects <sup>3</sup>                     | \$163,000                 | \$0        | \$0                  | \$163,000 |
| 6130 Main Lift Station Odor Emissions Control              | \$0                       | \$0        | \$200,000            | \$200,000 |
| 6131 Sanitary Sewer Cathodic Protection Improvements       | \$500,000                 | \$0        | \$0                  | \$500,000 |
| 6134 On-Call Sewer Maintenance & Repair Services           | \$24,000                  | \$74,000   | \$0                  | \$98,000  |
| Total Existing Projects                                    | \$689,000                 | \$0        | \$200,000            | \$889,000 |

Notes:

1. The total \$124,000 in prior year funding from Sewer Fund and Sewer Infrastructure Fund to be allocated for other projects in FY2020-21. There is no further allocation for this program according to the Capital Improvement Program 2020-2025 Final Report
2. This is the net allocation. Original allocation is \$200,000 with \$148,000 in prior year funding from Sewer Infrastructure Fund to be allocated for other projects in FY2020-21.
3. This is the net allocation. Original allocation is \$200,000 with \$37,000 in prior year funding from Sewer Infrastructure Fund to be allocated for other projects in FY2020-21.

Sewer CIP are largely funded by the Sewer Infrastructure Fund. Other funding sources include the Sewer Fund (user rate structure) and the Sewer Treatment Fund (sewer connection fees). The funds are described in the CIP 2020-2025 Final Report as follows:

- **Sewer Infrastructure Fund:** Monies set aside to replace aging infrastructure for sewer related projects.
- **Sewer Fund:** Enterprise fund which receives revenue from sewer rates for sewer related improvements.
- **Sewer Treatment Fund:** Funded from fees collected from developers connecting to the Sewer System. Funds restricted for sewer related projects.

## 10.2 Proposed CIP Projects

Three alternatives to project phasing were evaluated in developing the proposed CIP phases. The first alternative addresses CIP projects based on BRE grades without consideration of project location, prioritizing the highest risk projects. The second alternative approach groups projects geographically within the sewer basin. The third alternative, which was selected for implementation, was a hybrid approach where pipelines with significant defects were prioritized in the first year and each subsequent year considered risk, type of rehabilitation, and geographic location. The general strategy is to address the highest risk/highest priority projects in the near-term (Years 1-5) with lower risk projects deferred to the medium- (Years 6-10) and long-term (Years 11-20). The objective was to budget for approximately \$1.5M-\$2M annually. Depending on funding availability, projects can slide up or down CIP phases while maintaining project priority.

The detailed risk assessment, basis for selecting rehabilitation methods, prioritization of improvements, and the related construction costs (construction and contingency) are provided in **Appendix A** (R&R Study).

Soft costs, as described in **Section 9.2.3**, consisting of engineering design and consulting; permitting and ROW; and ESDC, construction management and inspection services are included in the capital project costs provided. The following sections present the recommended projects for implementation and the proposed timeframe.

### 10.2.1 CCTV Inspection

Approximately 105,000 ft (449 segments) of sewer main was inspected as part of the condition assessment. The remaining 685,000 ft was analyzed using the desktop assessment. Medium- to extreme-risk pipes and large diameter pipes are recommended for CCTV inspection. Large diameter pipe is defined as 24-inch diameter or greater. **Figure 9-3** presents the recommended CCTV inspection map of these highest priority areas. These inspections total 55,000 ft, with an estimated cost totaling approximately \$400,000 based on the unit costs provided in **Section 9.2.1**.

It is noted that the CCTV inspection work may generate additional improvement projects that may augment the proposed CIP. There is an existing CIP project (6126) that is intended to address minor sewer projects that currently allocates \$50,000 annually. It is recommended that the City increase the annual allowance to \$250,000 (\$1.25M every five years) to budget for improvements needed to address defects as they are discovered during new CCTV inspections.

### 10.2.2 Pipeline Improvements

Of the approximately 105,000 ft (449 segments) of sewer pipeline inspected, approximately 50,000 ft (178 segments, see **Figure 9-2**) requires improvement. Recommended improvements include:

- Pipe Replacement
- Full Cured-In-Place Pipe (CIPP)
- Point Repair(s) by Excavation
- Sectional Liner(s)

It is noted that some pipeline segments include more than one recommended rehabilitation method.



The highest priority improvements are those segments identified to have significant defects during the condition assessment and thus rated as highest risk of failure. These projects are proposed for immediate improvement (Year 1) to reduce the likelihood of a catastrophic failure and are summarized in **Table 10-3**. The proposed method of rehabilitation is provided along with the capital cost for the collective improvements.

**Table 10-3: Highest Priority Pipe with Significant Defects (Year 1: 2022)**

| Average Risk Grade                                   | Street Name                | Diameter (in) | Length (ft) | Material | Recommended Rehabilitation Method              | Construction Cost  |
|------------------------------------------------------|----------------------------|---------------|-------------|----------|------------------------------------------------|--------------------|
| 5.0                                                  | Coming Ave                 | 8             | 234         | VCP      | Sectional Liner(s), Point Repair(s)            | \$30,000           |
| 5.0                                                  | E Calaveras Blvd           | 15            | 1305        | VCP      | Sectional Liner(s), Point Repair(s), Full CIPP | \$273,000          |
| 5.0                                                  | Just East of S Hillview Dr | 15            | 491         | VCP      | Sectional Liner(s), Full CIPP                  | \$50,000           |
| 4.0                                                  | Curtis Ave                 | 18            | 172         | VCP      | Sectional Liner(s)                             | \$39,000           |
| 4.0                                                  | Marylinn Dr                | 27            | 292         | VCP, RCP | Pipe Replacement, Full CIPP, Point Repair(s)   | \$322,000          |
| 4.0                                                  | N Hillview Dr              | 12            | 218         | VCP      | Sectional Liner(s)                             | \$32,000           |
| 4.0                                                  | S Main St                  | 18, 21        | 733         | VCP      | Sectional Liner(s), Point Repair(s)            | \$67,000           |
| 4.0                                                  | Sinnot Ln                  | 12            | 398         | VCP      | Full CIPP, Point Repair(s)                     | \$139,000          |
| <b>Construction Subtotal</b>                         |                            |               |             |          |                                                | <b>\$952,000</b>   |
| Construction Contingency                             |                            |               |             |          | 30%                                            | \$286,000          |
| Engineering Design and Consulting Services           |                            |               |             |          | 15%                                            | \$143,000          |
| Permitting and Right of Way (ROW)                    |                            |               |             |          | 7%                                             | \$67,000           |
| ESDC, Construction Management, & Inspection Services |                            |               |             |          | 12%                                            | \$114,000          |
| <b>Total Year 1 Project Costs</b>                    |                            |               |             |          |                                                | <b>\$1,562,000</b> |

Additional high- and some medium-priority improvements are recommended for implementation in the first five years after addressing the highest risk improvements shown in **Table 10-3**. These improvements are listed in **Table 10-4** and include the next priority projects, which also combine pipes with rehabilitation needs (of any risk grading) along the same street for efficiency.

**Table 10-4: Medium- to High-Priority Improvements (Years 2-5: 2023-2026)**

| Average Risk Grade                                   | Street Name                             | Diameter (in)  | Length (ft) | Material | Recommended Rehabilitation Method              | Construction Cost  |
|------------------------------------------------------|-----------------------------------------|----------------|-------------|----------|------------------------------------------------|--------------------|
| 5.0                                                  | S Abel St                               | 18             | 66          | VCP      | Point Repair(s), Sectional Liner(s)            | \$32,000           |
| 3.9                                                  | Just East of S Hillview Dr <sup>1</sup> | 12, 15         | 2,947       | VCP      | Full CIPP, Point Repair(s), Sectional Liner(s) | \$503,000          |
| 3.7                                                  | N Milpitas Blvd                         | 33, 39         | 3,062       | RCP      | Full CIPP, Sectional Liner(s)                  | \$1,776,000        |
| 3.5                                                  | Nimitz Fwy and California Cir           | 18, 42         | 1,974       | VCP, RCP | Full CIPP, Sectional Liner(s)                  | \$474,000          |
| 3.3                                                  | E Calaveras Blvd <sup>1</sup>           | 12, 15, 18, 21 | 3,336       | VCP      | Full CIPP, Point Repair(s), Sectional Liner(s) | \$286,000          |
| 3.2                                                  | Coming Ave <sup>1</sup>                 | 8              | 1,374       | VCP      | Full CIPP                                      | \$140,000          |
| <b>Construction Subtotal</b>                         |                                         |                |             |          |                                                | <b>\$3,211,000</b> |
| Contingency                                          |                                         |                |             |          | 30%                                            | \$963,000          |
| Engineering Design and Consulting Services           |                                         |                |             |          | 15%                                            | \$482,000          |
| Permitting and Right of Way (ROW)                    |                                         |                |             |          | 7%                                             | \$225,000          |
| ESDC, Construction Management, & Inspection Services |                                         |                |             |          | 12%                                            | \$385,000          |
| <b>Total Year 2-5 Project Costs</b>                  |                                         |                |             |          |                                                | <b>\$5,266,000</b> |

Notes:

1. This street had some rehabilitation addressed in Year 1.

After addressing all high-priority, and some medium-priority, improvements in the first five years, the remaining medium-priority improvements are proposed for the next five-year period (Years 6-10). These improvements are listed in **Table 10-5**.

**Table 10-5: Medium-Priority Improvements (Years 6-10: 2027-2031)**

| Average Risk Grade                                   | Street Name                    | Diameter (in) | Length (ft) | Material | Recommended Rehabilitation Method      | Construction Cost  |
|------------------------------------------------------|--------------------------------|---------------|-------------|----------|----------------------------------------|--------------------|
| 3.3                                                  | S Main St <sup>1</sup>         | 18, 21        | 2,882       | VCP      | Point Repair(s) and Sectional Liner(s) | \$427,000          |
| 2.9                                                  | Machado Ave                    | 24, 30        | 2,939       | RCP, VCP | Full CIPP, Sectional Liner(s)          | \$1,006,000        |
| 2.8                                                  | B/w Tramway Dr & Los Pinos Ave | 24, 30        | 4,473       | VCP, RCP | Full CIPP, Sectional Liner(s)          | \$2,484,000        |
| <b>Construction Subtotal</b>                         |                                |               |             |          |                                        | <b>\$3,917,000</b> |
| Contingency                                          |                                |               |             |          | 30%                                    | \$1,175,000        |
| Engineering Design and Consulting Services           |                                |               |             |          | 15%                                    | \$588,000          |
| Permitting and Right of Way (ROW)                    |                                |               |             |          | 7%                                     | \$274,000          |
| ESDC, Construction Management, & Inspection Services |                                |               |             |          | 12%                                    | \$470,000          |
| <b>Total Year 6-10 Project Costs</b>                 |                                |               |             |          |                                        | <b>\$6,424,000</b> |

Notes:

1. This street had some rehabilitation addressed in Year 1.

Low- and very low-priority improvements are proposed in the longer-term CIP (Years 11-20). The next two five-year increments are proposed in **Table 10-6** and **Table 10-7**. While these pipelines pose a small risk of failure, it is expected that they can continue to operate without significant likelihood of immediate failure.

**Table 10-6: Low-Priority Improvements (Years 11-15: 2032-2036)**

| Average Risk Grade                                   | Street Name                                               | Diameter (in) | Length (ft) | Material     | Recommended Rehabilitation Method                                | Construction Cost  |
|------------------------------------------------------|-----------------------------------------------------------|---------------|-------------|--------------|------------------------------------------------------------------|--------------------|
| 3.1                                                  | Marylinn Dr                                               | 27, 30        | 2,841       | RCP, VCP, SS | Full CIPP, Pipe Replacement, Point Repair(s), Sectional Liner(s) | \$1,472,000        |
| 3.0                                                  | Ames Ave                                                  | 12            | 533         | VCP          | Point Repair(s), Sectional Liner(s)                              | \$50,000           |
| 3.0                                                  | Connection b/w N Milpitas Blvd & Summerwind Way           | 42            | 563         | RCP          | Full CIPP, Sectional Liner(s)                                    | \$176,000          |
| 3.0                                                  | Curtis Ave                                                | 15, 18        | 1,457       | VCP          | Full CIPP, Pipe Replacement, Point Repair(s), Sectional Liner(s) | \$572,000          |
| 3.0                                                  | Gibraltar Dr                                              | 12            | 502         | VCP          | Point Repair(s), Sectional Liner(s)                              | \$46,000           |
| 3.0                                                  | Kennedy Dr                                                | 12            | 276         | VCP          | Full CIPP                                                        | \$82,000           |
| 3.0                                                  | N Abel St                                                 | 27            | 543         | VCP          | Sectional Liner(s)                                               | \$103,000          |
| 3.0                                                  | N McCarthy Blvd                                           | 18            | 44          | VCP          | Sectional Liner(s)                                               | \$31,000           |
| 3.0                                                  | N Milpitas Blvd                                           | 15            | 423         | VCP          | Sectional Liner(s)                                               | \$122,000          |
| 3.0                                                  | River Rock Rd                                             | 18            | 561         | VCP, RCP     | Full CIPP                                                        | \$238,000          |
| 3.0                                                  | S Abbott Ave                                              | 15, 16        | 285         | VCP, CIP     | Sectional Liner(s), Full CIPP                                    | \$103,000          |
| 3.0                                                  | S Milpitas Blvd                                           | 8, 12, 18     | 1,695       | VCP          | Point Repair(s), Sectional Liner(s)                              | \$135,000          |
| 3.0                                                  | Fwy Crossing near Fox Hollow Ct                           | 12            | 748         | VCP          | Sectional Liner(s)                                               | \$49,000           |
| 3.0                                                  | Smithwood St                                              | 15            | 388         | VCP          | Sectional Liner(s)                                               | \$19,000           |
| 3.0                                                  | Tramway Dr                                                | 12            | 38          | VCP          | Full CIPP                                                        | \$19,000           |
| 3.0                                                  | Venus Way                                                 | 8             | 46          | VCP          | Point Repair(s)                                                  | \$12,000           |
| 3.0                                                  | Wool Dr                                                   | 24            | 368         | VCP          | Full CIPP                                                        | \$168,000          |
| 3.0                                                  | Yosemite Dr                                               | 8             | 970         | VCP          | Full CIPP, Pt Repair(s), Sectional Liner(s)                      | \$88,000           |
| 2.8                                                  | Great Mall Dr                                             | 15            | 1,724       | VCP          | Full CIPP, Pt Repair(s), Sectional Liner(s)                      | \$448,000          |
| 2.7                                                  | Connection to SW Community Starting from W Calaveras Blvd | 15            | 1,419       | VCP          | Full CIPP, Pt Repair(s), Sectional Liner(s)                      | \$168,000          |
| 2.3                                                  | N Hillview Dr                                             | 12            | 833         | VCP, DIP     | Full CIPP, Sectional Liner(s)                                    | \$99,000           |
| <b>Construction Subtotal</b>                         |                                                           |               |             |              |                                                                  | <b>\$4,200,000</b> |
| Contingency                                          |                                                           |               |             |              | 30%                                                              | \$1,260,000        |
| Engineering Design and Consulting Services           |                                                           |               |             |              | 15%                                                              | \$630,000          |
| Permitting and Right of Way (ROW)                    |                                                           |               |             |              | 7%                                                               | \$294,000          |
| ESDC, Construction Management, & Inspection Services |                                                           |               |             |              | 12%                                                              | \$504,000          |
| <b>Total Year 11-15 Project Costs</b>                |                                                           |               |             |              |                                                                  | <b>\$6,888,000</b> |



**Table 10-7: Very Low-Priority Improvements (Years 16-20: 2037-2041)**

| Average Risk Grade                                   | Street Name                                     | Diameter (in) | Length (ft) | Material | Recommended Rehabilitation Method    | Construction Cost  |
|------------------------------------------------------|-------------------------------------------------|---------------|-------------|----------|--------------------------------------|--------------------|
| 2.0                                                  | S Milpitas Blvd                                 | 8, 12         | 893         | VCP      | Sectional Liner(s)                   | \$75,000           |
| 2.0                                                  | Turquoise St                                    | 10            | 275         | VCP      | Point Repair(s)                      | \$25,000           |
| 2.0                                                  | Tramway Dr                                      | 12            | 220         | VCP      | Sectional Liner(s)                   | \$18,000           |
| 1.0                                                  | Connection b/w S Milpitas Blvd and Gibraltar Ct | 12            | 231         | VCP      | Sectional Liner(s)                   | \$29,000           |
| 1.0                                                  | Meadowland Dr                                   | 15            | 816         | Unknown  | Pipe Replacement and Point Repair(s) | \$354,000          |
| 1.0                                                  | Silverlake Dr                                   | 15            | 621         | Unknown  | Full CIPP and Point Repair(s)        | \$86,000           |
| 1.0                                                  | Wool Dr                                         | 24            | 368         | RCP      | Full CIPP                            | \$169,000          |
| <b>Construction Subtotal</b>                         |                                                 |               |             |          |                                      | <b>\$756,000</b>   |
| Contingency                                          |                                                 |               |             |          | 30%                                  | \$227,000          |
| Engineering Design and Consulting Services           |                                                 |               |             |          | 15%                                  | \$113,000          |
| Permitting and Right of Way (ROW)                    |                                                 |               |             |          | 7%                                   | \$53,000           |
| ESDC, Construction Management, & Inspection Services |                                                 |               |             |          | 12%                                  | \$91,000           |
| <b>Total Year 16-20 Project Costs</b>                |                                                 |               |             |          |                                      | <b>\$1,240,000</b> |

### 10.2.3 Lift Station

The Main LS and Venus Way LS were inspected, and major deficiencies were catalogued in the LS Report, as summarized in **Section 4.3** and detailed in **Appendix A** (R&R Study App. K). There are no immediate needs for the Venus Way LS. For the Main LS, the highest scoring deficiencies are identified **Table 10-8** and presented in order of priority according to both the condition and performance scores for the specific asset. Per City's 2019-24 CIP, project 6124, an allowance of \$100,000 annual investment from FY 2019-20 through FY 2022-23 is planned to address these rehabilitation needs.

**Table 10-8: Main LS Deficiencies**

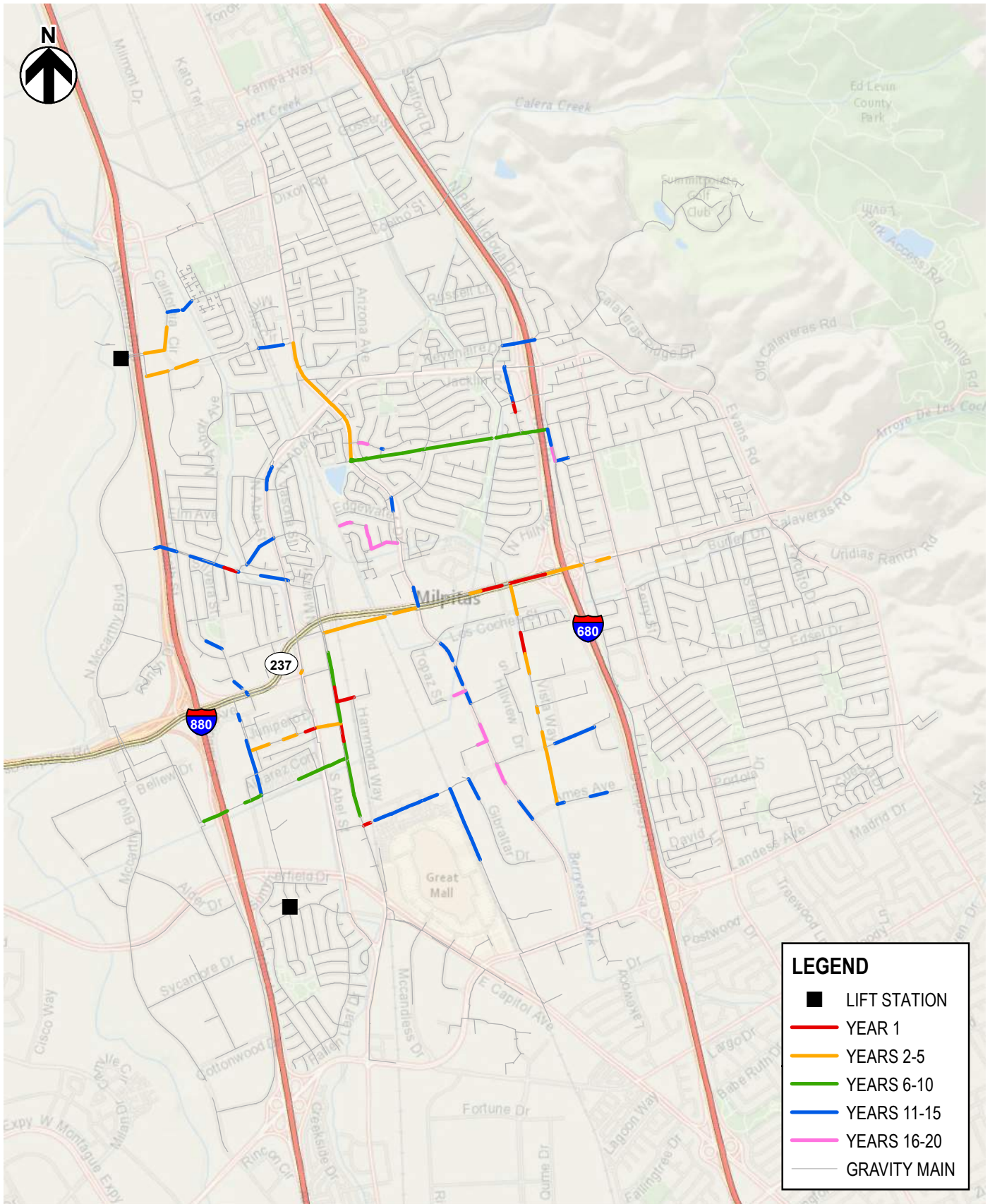
| Asset Name                            | Field Assessment/Comments                                                                                    | Condition Score | Performance Score |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------|-------------------|
| Manifold PV #2 Actuator               | Does not work                                                                                                | 5               | 5                 |
| Grinder #1                            | Excessive vibration and inadequate supports                                                                  | 5               | 5                 |
| Air Vacuum 1 to 15                    | Cavitation, coating failure, and inadequate supports                                                         | 5               | 5                 |
| Mag Meter (Flow Meter A) <sup>1</sup> | Not in operation                                                                                             | 4               | 4                 |
| Pump #3                               | Has exceeded useful life <sup>2</sup>                                                                        | 4               | 4                 |
| 2" Combination Air/Vacuum Valve       | None                                                                                                         | 4               | 4                 |
| Flow Meter B <sup>1</sup>             | Operable, but not accurate                                                                                   | 4               | 4                 |
| Variable Frequency Drive P2           | No corrosion identified, arc flash labels missing                                                            | 4               | 2                 |
| Variable Frequency Drive P3           | No corrosion identified, confirmed by City that IGBT was replaced in 2019, arc flash labels missing          | 4               | 2                 |
| Variable Frequency Drive P4           | No corrosion identified, arc flash labels missing                                                            | 4               | 2                 |
| Variable Frequency Drive P5           | No corrosion identified, confirmed by City that cooling fans were replaced in 2019, arc flash labels missing | 4               | 2                 |

Notes:

1. The City is replacing these meters as part of CIP Project 6131: Sanitary Sewer Cathodic Protection Improvements.
2. This pump has logged over 50,000 hours.

### 10.3 CIP Budget and Schedule

The sewer CIP is funded by the sewer enterprise fund which includes the user rate structure and sewer connection fees. Provided below in **Table 10-9** is a proposed budget and schedule for the CIP and recommended projects over 20-years in 5-year increments. The most critical projects are scheduled for earlier implementation. It is noted that the timing of projects can be adjusted based on results of CCTV and future operating conditions. **Figure 10-1** presents the proposed improvement projects in 5-year increments.



**FIGURE 10-1**  
CITY OF MILPITAS  
SEWER MASTER PLAN  
CAPITAL IMPROVEMENT PROJECTS

**Table 10-9: Proposed CIP Schedule and Budget**

| Projects                                                 | 5-Year<br>(2022-2026)  | 10-Year<br>(2027-2031) | 15-Year<br>(2032-2036) | 20-Year<br>(2037-2041) |
|----------------------------------------------------------|------------------------|------------------------|------------------------|------------------------|
| <b>Existing Projects</b>                                 |                        |                        |                        |                        |
| 6124 Pump Station Rehabilitation Program                 | \$200,000 <sup>1</sup> | --                     | --                     | --                     |
| 6126 Minor Sewer Projects                                | \$200,000 <sup>2</sup> | --                     | --                     | --                     |
| 6130 Main Lift Station Odor Emissions Control            | \$200,000              | --                     | --                     | --                     |
| 6131 Sanitary Sewer Cathodic Protection Improvements     | \$500,000              | --                     | --                     | --                     |
| 6134 On-Call Sewer Maintenance & Repair Services         | \$98,000               | --                     | --                     | --                     |
| <b>Total Existing Projects</b>                           | <b>\$1,198,000</b>     | --                     | --                     | --                     |
| <b>Proposed Projects</b>                                 |                        |                        |                        |                        |
| CCTV large diameter and high-risk assets                 | \$400,000              | --                     | --                     | --                     |
| Highest Priority Improvements                            | \$1,562,000            | --                     | --                     | --                     |
| Medium- to High- Priority Improvements                   | \$5,266,000            | \$6,424,000            | --                     | --                     |
| Low Priority Improvements                                | --                     | --                     | \$6,888,000            | \$1,240,000            |
| Allocation for improvements identified from ongoing CCTV | \$1,250,000            | \$1,250,000            | \$1,250,000            | \$1,250,000            |
| <b>Total Proposed Projects</b>                           | <b>\$8,478,000</b>     | <b>\$7,674,000</b>     | <b>\$8,138,000</b>     | <b>\$2,490,000</b>     |
| <b>Existing and Proposed Projects</b>                    | <b>\$9,676,000</b>     | <b>\$7,674,000</b>     | <b>\$8,138,000</b>     | <b>\$2,490,000</b>     |

Notes:

1. Original allocation is \$200,000 through 2023 with \$148,000 in prior year funding from Sewer Infrastructure Fund to be allocated for other projects in FY2020-21.
2. Original allocation is \$200,000 with \$37,000 in prior year funding from Sewer Infrastructure Fund to be allocated for other projects in FY2020-21.

## 10.4 Other Recommendations

During the CCTV inspection performed by NPS, there were instances of large grease buildup in various locations throughout the wastewater collection system. As explained previously, the presence of grease buildup and other blockages, particularly at, or near, critical flow splits, can significantly impact collection system operations, particularly at flow splits, which are generally intended to mitigate high flows and provide redundancy. This redundancy aids the system's ability to handle higher flows during wet weather events and as the water table rises during the wet season. When flow splits are not operating properly, this can drastically impact the system operation, particularly during wet weather events.

It is recommended that the City cleans the locations identified as having grease buildup. Locations should also be vacuumed to remove blockages from moving further downstream. In addition, stricter FOG Control Program guidelines and increased inspections may be necessary to prevent FOG discharges to the wastewater collection system.



It is expected that there will be additional O&M costs related to the following:

- In-house CCTV inspection;
- Additional cleaning related to the act of inspection and as a result of discovering blockages; and
- Implementing a stricter FOG Control Program/increased inspections of grease traps.

In addition to the projects summarized herein, the City is evaluating the need to rehabilitate or replace Force Main A (FM-A), which conveys wastewater from the Main LS to the RWF (see **Figure 3-1**). Built in 1974, FM-A was identified as requiring inspection because the soils surrounding the pipeline are very corrosive. The City contracted with a third party to perform cleaning and CCTV inspection of FM-A to determine the internal condition. The inspection was not fully completed due to unforeseen obstacles.

It is recommended that the City perform a complete condition assessment of FM-A to verify the internal condition of the pipeline and determine the best options for rehabilitation or replacement. The City's report generated by the engineering department is included as **Appendix G**.

Initial City estimates to rehabilitate or replace FM-A are approximately \$1M to complete the force main assessment and maintenance of the appurtenances and an additional \$25M to replace the force main. Both of these costs were included as capital projects requiring consideration for an upcoming CIP, in addition to the amounts specified in **Section 10.3**.

**APPENDIX A**  
City of Milpitas  
Sewer Master Plan Study  
Sewer Utility Asset Renewal and Replacement Study

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Due to the size of the file, this Appendix is provided as a separate document.





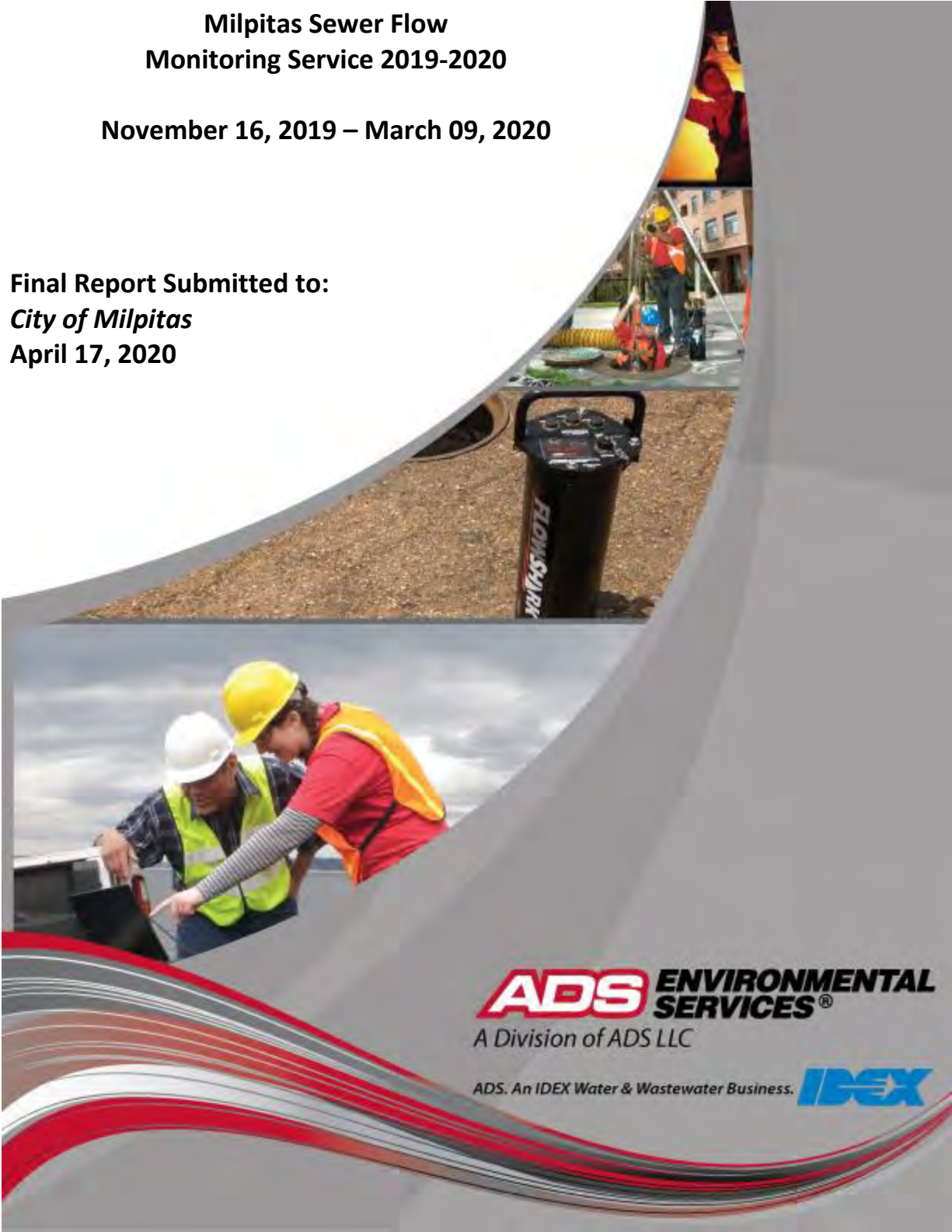
**APPENDIX B**  
City of Milpitas  
Sewer Master Plan Study  
Milpitas Sewer Flow Monitoring Report 2019-2020

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**Milpitas Sewer Flow  
Monitoring Service 2019-2020**

**November 16, 2019 – March 09, 2020**

**Final Report Submitted to:**  
***City of Milpitas***  
**April 17, 2020**



**ADS ENVIRONMENTAL  
SERVICES®**

A Division of ADS LLC

ADS. An IDEX Water & Wastewater Business.





# **Milpitas Sewer Flow Monitoring Service 2019 - 2020**

Prepared for:

**Theodore Alicante  
City of Milpitas  
455 E. Calaveras Boulevard  
Milpitas, CA 95035**

Prepared by:

**ADS, LLC**  
**15201 Springdale Street**  
**Huntington Beach, CA 92649**



April 17, 2020

Theodore Alicante  
City of Milpitas  
455 E. Calaveras Boulevard  
Milpitas, CA 95035

SUBJECT: Milpitas Sewer Flow Monitoring Service 2019 - 2020

Dear Theodore,

ADS is pleased to submit the report for the Milpitas Sewer Flow Monitoring Service 2019 - 2020 conducted on behalf of the City of Milpitas. The metering was contracted for ninety (90) days at twenty-three (23) flow monitor and two (2) rain gauge locations. The study period is November 16, 2019 - March 09, 2020. All available data has been provided.

The report contains hourly averaged depth, velocity, and quantity hydrographs as well as daily long tables for the metering period in pdf format. Depth, quantity, and velocity entities for each monitoring location have been provided on Prism.

In addition, we would be happy to further explain any details about the report that may seem unclear. Should you have any questions or comments, you may contact the Project Manager, Paul Mitchell at (714) 379-9778 ext 223.

It has been our pleasure to serve you in the performance of this project. Thank you for choosing ADS products and services to meet your flow monitoring needs.

Sincerely,  
ADS ENVIRONMENTAL SERVICES

Mackenzie Michaud  
Data Analyst

### Introduction

City of Milpitas entered into an agreement with ADS Environmental Services to conduct flow monitoring at twenty-three (23) metering points in the City of Milpitas Collection System. The study was conducted over a ninety (90) day period. The study period is November 16, 2019 - March 09, 2020. The primary objective of the monitoring was to determine current flows for wet weather planning purposes.

### Project Scope

The scope of this study involved using flow monitors to quantify wastewater flows at the designated locations. Specifically, the study included the following key components.

- Investigate the proposed flow-monitoring sites for adequate hydraulic conditions.
- Flow monitor installations.
- Flow monitor confirmations and data collections.
- Flow data analysis.

Equipment installation was completed on November 15, 2019. The study period began on November 16, 2019 and was completed on March 09, 2020 .

### Flow Monitoring Equipment



The **ADS FlowShark Triton** monitor was selected for this project. This flow monitor is an area velocity flow monitor that uses both the Continuity and Manning's equations to measure flow.

The ADS FlowShark Triton monitor consists of data acquisition sensors and a battery-powered microcomputer. The microcomputer includes a processor unit, data storage, and an on-board clock to control and synchronize the sensor recordings. The monitor was programmed to acquire and store depth of flow and velocity readings at 5-minute intervals.

The FS Triton monitor features cross-checking using multiple technologies in each sensor for continuous running of comparisons and tolerances. The FS Triton monitor can support two (2) sets of sensors. The sensor option used for this project was:

**The Peak Combo Sensor** installed at the bottom of the pipe includes three types of data acquisition technologies.

The **up looking ultrasonic depth** uses sound waves from two independent transceivers to measure the distance from the sensor upward toward the flow surface; applying the speed of sound in the water and the temperature measured by sensor to calculate depth.

The **pressure depth** is calculated by using a piezo-resistive crystal to determine the difference between hydrostatic and atmospheric pressure. The pressure sensor is temperature compensated and vented to the atmosphere through a

desiccant filled breather tube.

To obtain **peak velocity**, the sensor sends an ultrasonic signal at an angle upward through the widest cross-section of the oncoming flow. The signal is reflected by suspended particles, air bubbles, or organic matter with a frequency shift proportional to the velocity of the reflecting objects. The reflected signal is received by the sensor and processed using digital spectrum analysis to determine the peak flow velocity.

## Installation

Installation of flow monitoring equipment typically proceeds in four steps. First, the site is investigated for safety and to determine physical and hydraulic suitability for the flow monitoring equipment. Second, the equipment is physically installed at the selected location. Third, the monitor is tested to assure proper operation of the velocity and depth of flow sensors and verify that the monitor clock is operational and synchronized to the master computer clock. Fourth, the depth and velocity sensors are confirmed and line confirmations are performed.

In pipes up to 42 inches in diameter, the sensors were mounted on expandable stainless steel rings, inserted at least a foot upstream into influent pipes and tightened against the inside walls of the pipes. Influent pipe installations reduce the influences of turbulence and backwater often caused by changes in channel geometry in manholes.





## Data Collection, Confirmation, and Quality Assurance

Data collects were done remotely via wireless connect on a weekly basis via ADS Field Representatives. During the monitoring period, field crews visit each monitoring location to verify proper monitor operation and document field conditions. The following quality assurance steps are taken to assure the integrity of the collected data:

**Measure power supplies:** monitors were powered by dry cell battery packs. Voltages were recorded and battery packs replaced, as necessary. Separate batteries provided back-up power to memory allowing primary batteries to be replaced without loss of data.

**Clock synchronization:** Field crews synchronized monitor clocks to master clocks.

**Confirm depth and velocity readings:** Field crews descended into meter manholes to manually measure depths and velocities and compare them meter readings to confirm that they agreed. They also measured silt levels, if any, in the inverts of the pipes. Silt areas were subtracted from flow areas to compute true areas of flow.

**Confirm average velocities through cross-sectional velocity profiles:** Since ADS velocity sensors measure peak velocity, field crews collected cross-sectional velocity profiles in order to develop a relationship between peak and average velocity in lines that meet the hydraulic criteria.

**Upload and Review Data:** Data collected from the monitors were uploaded and reviewed by a Data Analyst for completeness, outliers and deviations in the flow patterns, which indicate system anomalies or equipment failure.

## Flow Quantification Methods

There are two main equations used to measure open channel flow: the **Continuity Equation** and the **Manning Equation**. The Continuity Equation, which is considered the most accurate, can be used if both depth of flow and velocity are available. In cases where velocity measurements are not available or not practical to obtain, the Manning Equation can be used to estimate velocity from the depth data based on certain physical characteristics of the pipe (i.e. the slope and roughness of the pipe being measured). However, the Manning equation assumes uniform, steady flow hydraulic conditions with non-varying roughness, which are typically invalid assumptions in most sanitary sewers. The Continuity Equation was used exclusively for this study.

### Continuity Equation

The Continuity Equation states that the flow quantity (Q) is equal to the wetted area (A) multiplied by the average velocity (V) of the flow.

$$Q = A * V$$

This equation is applicable in a variety of conditions including backwater, surcharge, and reverse flow.

## Data Analysis and Presentation

### Data Analysis

A flow monitor is typically programmed to collect data at either 15-minute or 5-minute intervals throughout the monitoring period. The monitor stores raw data consisting of (1) the ultrasonic depth, (2) the peak velocity and (3) the pressure depth. The data is imported into ADS's proprietary software and is examined by a data analyst to verify its integrity. The data analyst also reviews the daily field reports and site visit records to identify conditions that would affect the collected data.

Velocity profiles and the line confirmation data developed by the field personnel are reviewed by the data analyst to

identify inconsistencies and verify data integrity. Velocity profiles are reviewed and an average to peak velocity ratio is calculated for the site. This ratio is used in converting the peak velocity measured by the sensor to the average velocity used in the Continuity equation. The data analyst selects which depth sensor entity will be used to calculate the final depth information. Silt levels present at each site visit are reviewed and representative silt levels established.

Occasionally the velocity sensor's performance may be compromised resulting in invalid readings sporadically during the monitoring period. This is generally caused by excessive debris (silt) blocking the sensor's crystals, shallow flows ( $\sim < 1''$ ) that may drop below the top of the sensor or very clear flows lacking the particles needed to measure rate. In order to use the Continuity equation to quantify the flow during these periods, a Data Analyst and/or Engineer will use the site's historical pipe curve (depth vs. velocity) data along with valid field confirmations to reconstitute and replace the false velocity recordings with expected velocity readings for a given historical depth along the curve.

Selections for the above parameters can be constant or can change during the monitoring period. While the data analysis process is described in a linear manner, it often requires an iterative approach to accurately complete.

## Data Presentation

This type of flow monitoring project generates a large volume of data. To facilitate review of the data, results have been provided in graphical and tabular formats. The flow data is presented graphically in the form of scattergraphs and hydrographs. Hydrographs are based on 5-minute averaging. Tables are provided in daily average format. These tables show the flow rate for each day, along with the daily minimum and maximums, the times they were observed, the total daily flow, and total flow for the month (or monitoring period). The following explanation of terms may aid in interpretation of the tables and hydrographs.

**DEPTH** - Final calculated depth measurement (in inches)

**QUANTITY** - Final calculated flow rate (in MGD)

**VELOCITY** - Final calculated flow velocity (in feet per second)

**REPORT TOTAL** - Total volume of flow recorded for the indicated time period (in MG)

## Site Commentary

### Site Information

| MIL_0041        |       |
|-----------------|-------|
| Pipe Dimensions | 23    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0041 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that both free flow and mild backwater flows were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                   |                   |
|--------------------------|-------------------|-------------------|-------------------|
| Item                     | Depth (in)        | Velocity (ft/s)   | Quantity (MGD)    |
| Average                  | 6.51              | 1.54              | 0.709             |
| Minimum                  | 3.96              | 0.73              | 0.178             |
| Maximum                  | 9.42              | 2.30              | 1.647             |
| Time of Minimum          | 2/1/2020 5:05 AM  | 3/2/2020 3:25 AM  | 1/7/2020 5:20 AM  |
| Time of Maximum          | 2/26/2020 8:40 AM | 2/1/2020 12:40 PM | 2/1/2020 12:40 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0041

Site Address /Location: S Abel St and Curtis Ave, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.418531°

Longitude:

-121.904896°

Pipe Size (H x W)

23.00"x23.50"

Pipe Shape

Circular

Manhole #

#0041

System Characteristics

Residential/Commercial

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Thursday, November 14, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

5:37:00 AM

Pipe Size (HxW)

23.00"x23.50"

Depth of Flow (Wet DOF) (in)

5.50"

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.40'

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Smooth flow with medium depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

7'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

784



ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325



# SCATTERGRAPH REPORT

MIL\_0041

Flow Monitor

**MIL\_0041**

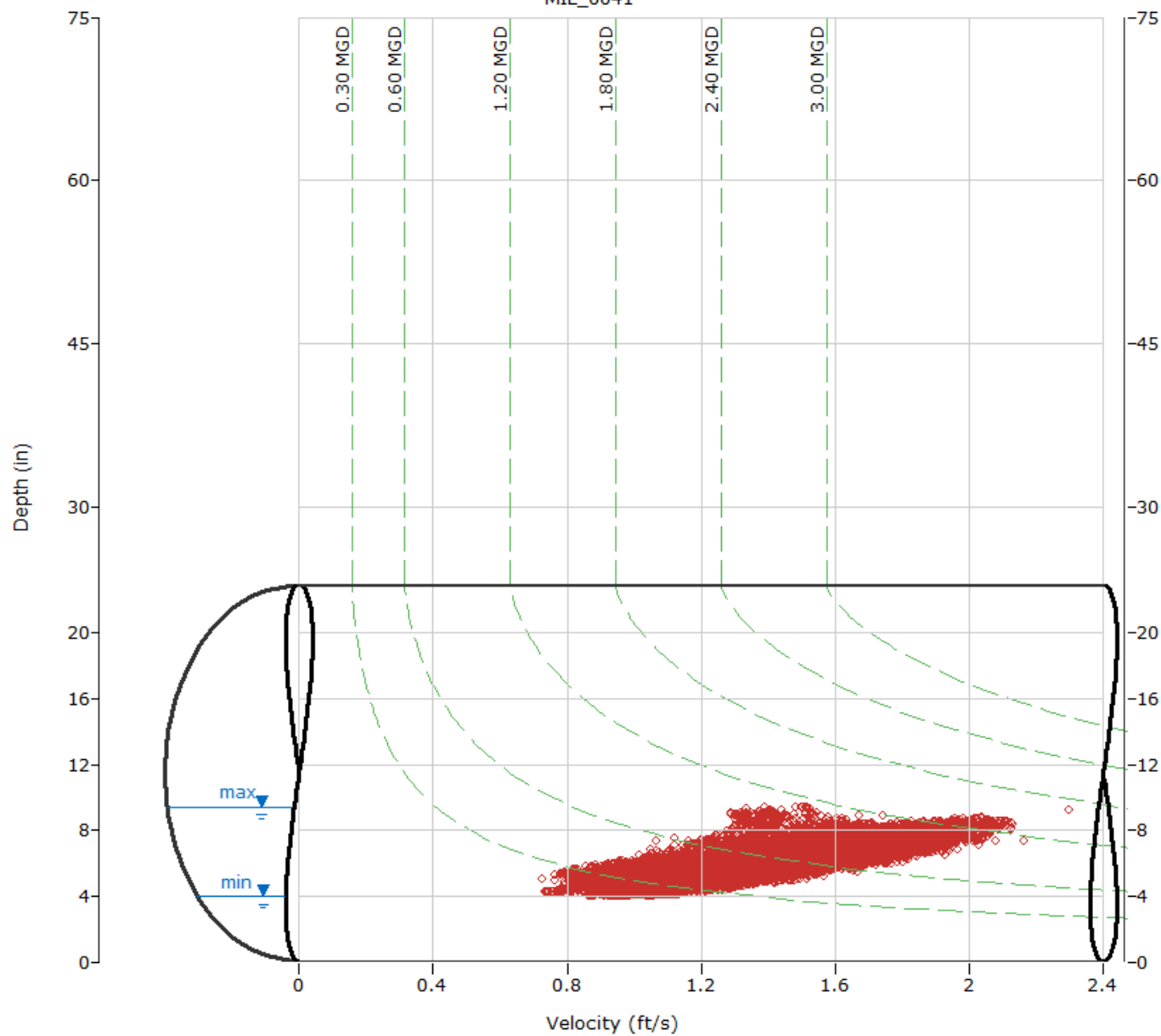
Pipe Height  
23.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



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# HYDROGRAPH REPORT

MIL\_0041

Flow Monitor

**MIL\_0041**

Pipe Height

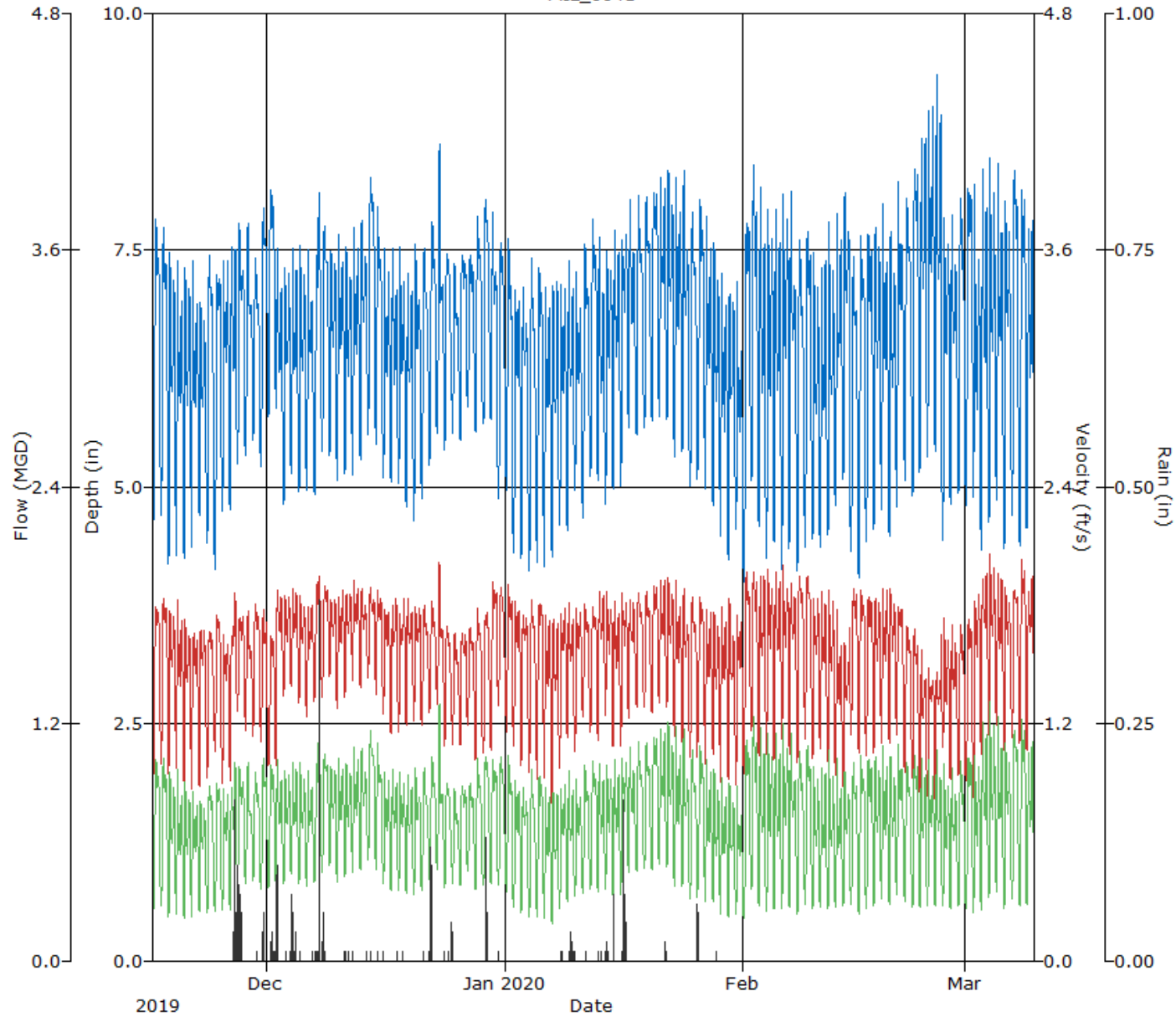
23.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth
- Velocity
- Quantity
- Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0041, Pipe Height: 23.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 05:15      | 4.62 | 12:05 | 7.88 | 6.62 | 05:25           | 0.88 | 11:25 | 1.93 | 1.52 | 05:25                     | 0.241 | 11:25 | 1.094 | 0.726 | 0.726 |           |
| 11/17/2019 | 05:20      | 4.67 | 11:25 | 8.34 | 6.52 | 05:20           | 0.97 | 11:25 | 1.95 | 1.56 | 05:20                     | 0.270 | 11:25 | 1.217 | 0.723 | 0.723 |           |
| 11/18/2019 | 04:15      | 4.15 | 08:30 | 7.55 | 6.01 | 03:05           | 0.85 | 08:15 | 1.83 | 1.47 | 04:05                     | 0.210 | 08:15 | 0.985 | 0.608 | 0.608 |           |
| 11/19/2019 | 04:55      | 4.19 | 08:20 | 7.48 | 5.96 | 04:55           | 0.88 | 08:15 | 1.91 | 1.46 | 04:55                     | 0.208 | 08:15 | 1.027 | 0.596 | 0.596 |           |
| 11/20/2019 | 04:15      | 4.19 | 08:35 | 7.39 | 5.98 | 05:40           | 0.79 | 08:30 | 1.81 | 1.40 | 04:35                     | 0.196 | 08:30 | 0.954 | 0.575 | 0.575 |           |
| 11/21/2019 | 04:25      | 4.31 | 08:30 | 7.43 | 6.00 | 05:10           | 0.80 | 11:05 | 1.80 | 1.40 | 05:10                     | 0.205 | 08:30 | 0.900 | 0.575 | 0.575 |           |
| 11/22/2019 | 05:15      | 4.66 | 08:55 | 7.07 | 5.95 | 03:35           | 0.81 | 08:40 | 1.78 | 1.43 | 03:35                     | 0.226 | 08:40 | 0.879 | 0.576 | 0.576 |           |
| 11/23/2019 | 05:00      | 4.37 | 11:55 | 7.48 | 6.29 | 04:45           | 0.88 | 10:40 | 1.81 | 1.43 | 04:45                     | 0.225 | 12:10 | 0.942 | 0.630 | 0.630 |           |
| 11/24/2019 | 04:45      | 4.02 | 12:40 | 7.30 | 6.19 | 06:05           | 1.01 | 17:25 | 1.81 | 1.48 | 04:45                     | 0.232 | 12:30 | 0.935 | 0.644 | 0.644 |           |
| 11/25/2019 | 05:15      | 4.66 | 09:10 | 7.50 | 6.34 | 05:15           | 0.79 | 20:50 | 1.71 | 1.39 | 05:15                     | 0.219 | 09:15 | 0.919 | 0.616 | 0.616 |           |
| 11/26/2019 | 04:20      | 4.70 | 12:15 | 8.19 | 6.41 | 04:20           | 0.81 | 20:35 | 1.95 | 1.52 | 04:20                     | 0.227 | 12:20 | 1.088 | 0.682 | 0.682 |           |
| 11/27/2019 | 05:15      | 5.22 | 09:50 | 7.91 | 6.72 | 02:25           | 1.16 | 10:15 | 1.83 | 1.58 | 05:15                     | 0.388 | 10:10 | 1.047 | 0.746 | 0.746 |           |
| 11/28/2019 | 06:40      | 5.31 | 12:10 | 7.83 | 6.58 | 05:05           | 1.05 | 10:45 | 1.87 | 1.52 | 05:05                     | 0.353 | 12:05 | 1.052 | 0.699 | 0.699 |           |
| 11/29/2019 | 05:00      | 5.46 | 12:00 | 7.46 | 6.63 | 04:45           | 1.08 | 11:35 | 1.88 | 1.57 | 04:45                     | 0.375 | 11:35 | 0.998 | 0.729 | 0.729 |           |
| 11/30/2019 | 05:40      | 5.20 | 13:30 | 7.97 | 6.83 | 05:10           | 0.99 | 12:35 | 1.83 | 1.51 | 05:10                     | 0.320 | 12:35 | 1.066 | 0.737 | 0.737 |           |
| 12/01/2019 | 05:40      | 5.70 | 11:20 | 8.27 | 7.25 | 05:30           | 0.95 | 13:35 | 1.81 | 1.37 | 05:40                     | 0.349 | 13:35 | 1.088 | 0.725 | 0.725 | 0.06      |
| 12/02/2019 | 04:40      | 5.80 | 09:10 | 7.62 | 6.59 | 05:10           | 0.94 | 08:45 | 2.00 | 1.57 | 05:10                     | 0.357 | 08:45 | 1.080 | 0.719 | 0.719 | 0.30      |
| 12/03/2019 | 04:55      | 4.79 | 08:35 | 7.45 | 6.30 | 04:15           | 1.31 | 22:25 | 1.94 | 1.66 | 04:15                     | 0.380 | 08:45 | 1.018 | 0.719 | 0.719 | 0.01      |
| 12/04/2019 | 03:10      | 5.10 | 08:40 | 7.65 | 6.44 | 03:15           | 1.34 | 08:45 | 1.96 | 1.69 | 03:15                     | 0.420 | 08:45 | 1.089 | 0.749 | 0.749 | 0.39      |
| 12/05/2019 | 04:55      | 4.93 | 08:35 | 7.69 | 6.41 | 02:40           | 1.25 | 08:15 | 1.91 | 1.63 | 04:50                     | 0.384 | 09:10 | 1.046 | 0.723 | 0.723 | 0.01      |
| 12/06/2019 | 04:20      | 4.94 | 09:00 | 7.58 | 6.37 | 05:10           | 1.17 | 20:00 | 1.87 | 1.61 | 05:10                     | 0.351 | 08:45 | 1.014 | 0.705 | 0.705 | 0.01      |
| 12/07/2019 | 05:10      | 4.91 | 18:40 | 8.25 | 6.63 | 04:30           | 1.25 | 12:05 | 2.08 | 1.70 | 04:30                     | 0.376 | 18:40 | 1.266 | 0.795 | 0.795 | 0.67      |
| 12/08/2019 | 06:00      | 5.35 | 12:25 | 7.84 | 6.84 | 05:25           | 1.28 | 13:35 | 1.97 | 1.70 | 05:25                     | 0.433 | 13:35 | 1.083 | 0.822 | 0.822 | 0.20      |
| 12/09/2019 | 04:55      | 5.30 | 08:50 | 7.64 | 6.59 | 02:20           | 1.35 | 23:05 | 1.92 | 1.68 | 04:45                     | 0.468 | 23:05 | 1.041 | 0.767 | 0.767 |           |
| 12/10/2019 | 04:10      | 5.03 | 09:05 | 7.79 | 6.55 | 04:05           | 1.22 | 23:30 | 2.03 | 1.64 | 04:10                     | 0.377 | 08:40 | 1.086 | 0.747 | 0.747 |           |
| 12/11/2019 | 04:45      | 5.11 | 08:45 | 7.68 | 6.43 | 04:20           | 1.32 | 12:20 | 1.93 | 1.67 | 04:45                     | 0.418 | 08:50 | 1.060 | 0.740 | 0.740 |           |
| 12/12/2019 | 04:20      | 5.10 | 08:45 | 7.84 | 6.55 | 04:10           | 1.39 | 20:55 | 2.03 | 1.72 | 04:20                     | 0.438 | 08:55 | 1.152 | 0.782 | 0.782 | 0.01      |
| 12/13/2019 | 05:05      | 5.27 | 08:45 | 7.93 | 6.72 | 04:45           | 1.32 | 09:40 | 2.01 | 1.68 | 04:45                     | 0.437 | 09:40 | 1.150 | 0.791 | 0.791 | 0.01      |
| 12/14/2019 | 05:00      | 5.51 | 13:30 | 8.30 | 7.22 | 05:00           | 1.42 | 10:45 | 2.05 | 1.70 | 05:00                     | 0.498 | 10:45 | 1.202 | 0.890 | 0.890 | 0.01      |
| 12/15/2019 | 05:20      | 5.43 | 11:10 | 8.56 | 6.91 | 04:35           | 1.32 | 11:15 | 2.01 | 1.69 | 05:20                     | 0.455 | 11:15 | 1.269 | 0.830 | 0.830 | 0.01      |
| 12/16/2019 | 04:40      | 5.08 | 08:35 | 7.61 | 6.38 | 05:10           | 1.19 | 10:10 | 1.85 | 1.61 | 05:10                     | 0.372 | 08:30 | 0.990 | 0.705 | 0.705 | 0.01      |
| 12/17/2019 | 04:25      | 5.04 | 08:50 | 7.62 | 6.40 | 03:35           | 1.11 | 21:45 | 1.90 | 1.58 | 03:55                     | 0.345 | 09:05 | 0.993 | 0.698 | 0.698 | 0.01      |
| 12/18/2019 | 04:45      | 5.02 | 09:00 | 7.65 | 6.39 | 05:00           | 1.11 | 22:00 | 1.89 | 1.57 | 05:00                     | 0.343 | 08:55 | 1.001 | 0.694 | 0.694 | 0.01      |
| 12/19/2019 | 04:30      | 4.75 | 09:05 | 7.28 | 6.19 | 04:20           | 1.11 | 08:55 | 1.93 | 1.60 | 04:20                     | 0.318 | 08:55 | 0.997 | 0.677 | 0.677 |           |
| 12/20/2019 | 04:55      | 4.61 | 09:35 | 7.61 | 6.29 | 03:30           | 1.15 | 09:30 | 1.83 | 1.59 | 04:50                     | 0.323 | 09:30 | 1.004 | 0.690 | 0.690 |           |
| 12/21/2019 | 05:25      | 4.85 | 12:10 | 7.56 | 6.46 | 04:20           | 1.17 | 11:15 | 1.91 | 1.57 | 05:20                     | 0.346 | 11:15 | 1.012 | 0.708 | 0.708 |           |
| 12/22/2019 | 04:25      | 5.21 | 13:25 | 7.83 | 6.75 | 04:20           | 1.23 | 13:10 | 1.87 | 1.58 | 04:20                     | 0.400 | 13:10 | 1.067 | 0.754 | 0.754 | 0.41      |
| 12/23/2019 | 06:15      | 5.50 | 13:10 | 8.75 | 6.92 | 06:30           | 1.23 | 14:40 | 2.11 | 1.64 | 06:15                     | 0.433 | 13:10 | 1.357 | 0.814 | 0.814 |           |
| 12/24/2019 | 04:55      | 5.36 | 11:55 | 7.50 | 6.69 | 04:50           | 1.06 | 13:55 | 1.77 | 1.47 | 04:55                     | 0.358 | 13:05 | 0.945 | 0.691 | 0.691 |           |
| 12/25/2019 | 04:45      | 5.54 | 11:35 | 7.38 | 6.52 | 05:10           | 1.06 | 11:35 | 1.74 | 1.42 | 05:10                     | 0.375 | 11:35 | 0.916 | 0.642 | 0.642 |           |
| 12/26/2019 | 04:45      | 5.46 | 12:50 | 7.47 | 6.76 | 04:10           | 1.06 | 12:05 | 1.81 | 1.46 | 05:25                     | 0.373 | 12:05 | 0.966 | 0.698 | 0.698 |           |
| 12/27/2019 | 04:05      | 5.79 | 12:25 | 7.49 | 6.84 | 04:05           | 1.17 | 12:10 | 1.79 | 1.50 | 04:05                     | 0.442 | 12:10 | 0.954 | 0.722 | 0.722 |           |
| 12/28/2019 | 05:00      | 5.54 | 12:20 | 7.94 | 6.87 | 04:25           | 0.97 | 12:25 | 1.85 | 1.47 | 04:25                     | 0.348 | 12:25 | 1.076 | 0.723 | 0.723 |           |
| 12/29/2019 | 06:10      | 5.64 | 12:40 | 8.04 | 7.02 | 05:10           | 1.00 | 12:10 | 1.83 | 1.49 | 05:10                     | 0.364 | 12:10 | 1.083 | 0.759 | 0.759 | 0.22      |
| 12/30/2019 | 05:15      | 5.67 | 10:50 | 7.96 | 6.85 | 05:05           | 1.00 | 12:00 | 2.04 | 1.61 | 05:05                     | 0.365 | 12:00 | 1.086 | 0.785 | 0.785 | 30        |
| 12/31/2019 | 04:25      | 4.83 | 11:15 | 7.71 | 6.53 | 03:55           | 1.16 | 11:10 | 1.97 | 1.67 | 04:20                     | 0.345 | 11:10 | 1.102 | 0.763 | 0.763 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 01/01/2020 | 06:25      | 4.93 | 13:00 | 7.65 | 6.43 | 06:00           | 1.10 | 13:00 | 1.96 | 1.60 | 06:20                     | 0.332 | 13:00 | 1.088 | 0.719 | 0.719 | 0.02      |
| 01/02/2020 | 05:05      | 4.24 | 09:50 | 7.29 | 5.99 | 05:05           | 1.03 | 09:35 | 1.93 | 1.56 | 05:05                     | 0.250 | 09:40 | 0.995 | 0.637 | 0.637 |           |
| 01/03/2020 | 04:10      | 4.22 | 09:55 | 7.20 | 5.95 | 05:00           | 0.92 | 09:50 | 1.86 | 1.52 | 05:00                     | 0.220 | 09:50 | 0.943 | 0.618 | 0.618 |           |
| 01/04/2020 | 05:30      | 4.08 | 13:20 | 7.48 | 5.97 | 05:45           | 0.93 | 13:35 | 1.90 | 1.49 | 05:30                     | 0.213 | 13:35 | 1.021 | 0.617 | 0.617 |           |
| 01/05/2020 | 05:25      | 4.14 | 11:15 | 7.37 | 6.08 | 05:30           | 0.83 | 20:35 | 1.94 | 1.51 | 05:30                     | 0.196 | 12:55 | 0.981 | 0.645 | 0.645 |           |
| 01/06/2020 | 05:15      | 4.07 | 08:45 | 7.21 | 5.83 | 04:25           | 0.90 | 08:50 | 1.85 | 1.43 | 05:15                     | 0.204 | 08:50 | 0.938 | 0.566 | 0.566 |           |
| 01/07/2020 | 04:30      | 4.21 | 08:50 | 7.25 | 5.93 | 05:20           | 0.73 | 09:20 | 1.82 | 1.38 | 05:20                     | 0.178 | 09:00 | 0.918 | 0.564 | 0.564 |           |
| 01/08/2020 | 03:55      | 4.51 | 08:45 | 7.34 | 6.12 | 03:55           | 0.95 | 08:30 | 1.91 | 1.51 | 03:55                     | 0.249 | 08:35 | 0.988 | 0.635 | 0.635 |           |
| 01/09/2020 | 04:50      | 4.53 | 08:50 | 7.52 | 6.14 | 03:55           | 1.07 | 08:25 | 1.90 | 1.54 | 03:55                     | 0.286 | 08:50 | 1.022 | 0.647 | 0.647 |           |
| 01/10/2020 | 05:05      | 4.95 | 08:40 | 7.35 | 6.21 | 04:05           | 1.01 | 08:40 | 1.85 | 1.54 | 05:05                     | 0.305 | 08:40 | 0.969 | 0.655 | 0.655 |           |
| 01/11/2020 | 05:30      | 4.65 | 12:40 | 7.60 | 6.39 | 05:15           | 1.13 | 11:45 | 1.92 | 1.58 | 05:15                     | 0.314 | 11:45 | 1.033 | 0.706 | 0.706 |           |
| 01/12/2020 | 05:10      | 5.10 | 13:25 | 7.90 | 6.73 | 05:40           | 1.07 | 12:45 | 1.91 | 1.57 | 05:40                     | 0.336 | 12:45 | 1.082 | 0.753 | 0.753 |           |
| 01/13/2020 | 04:10      | 5.05 | 08:15 | 7.91 | 6.33 | 05:00           | 1.05 | 09:10 | 1.99 | 1.62 | 05:00                     | 0.328 | 09:10 | 1.077 | 0.703 | 0.703 |           |
| 01/14/2020 | 05:10      | 4.78 | 08:55 | 7.56 | 6.29 | 04:50           | 1.17 | 08:00 | 1.94 | 1.60 | 04:50                     | 0.338 | 08:55 | 1.044 | 0.690 | 0.690 |           |
| 01/15/2020 | 04:20      | 4.96 | 08:50 | 7.82 | 6.52 | 04:00           | 1.01 | 08:10 | 1.90 | 1.52 | 04:00                     | 0.308 | 08:40 | 1.061 | 0.696 | 0.696 |           |
| 01/16/2020 | 05:15      | 4.98 | 21:30 | 7.71 | 6.70 | 03:10           | 1.04 | 08:20 | 2.00 | 1.57 | 04:05                     | 0.320 | 08:20 | 1.102 | 0.747 | 0.747 |           |
| 01/17/2020 | 05:10      | 5.60 | 08:45 | 8.05 | 6.90 | 04:25           | 1.19 | 09:15 | 1.87 | 1.60 | 04:25                     | 0.431 | 09:15 | 1.109 | 0.785 | 0.785 |           |
| 01/18/2020 | 05:10      | 5.54 | 11:35 | 8.13 | 6.95 | 05:00           | 1.19 | 10:30 | 1.93 | 1.64 | 05:00                     | 0.423 | 11:35 | 1.137 | 0.815 | 0.815 |           |
| 01/19/2020 | 05:20      | 5.61 | 12:45 | 8.09 | 7.03 | 05:00           | 1.20 | 12:25 | 1.97 | 1.64 | 05:00                     | 0.435 | 12:25 | 1.175 | 0.827 | 0.827 |           |
| 01/20/2020 | 05:15      | 5.67 | 16:15 | 8.32 | 7.24 | 05:10           | 1.21 | 20:05 | 2.02 | 1.67 | 05:10                     | 0.443 | 20:05 | 1.214 | 0.878 | 0.878 |           |
| 01/21/2020 | 04:25      | 5.72 | 08:50 | 8.43 | 7.21 | 02:55           | 1.24 | 10:25 | 2.05 | 1.68 | 04:20                     | 0.470 | 09:00 | 1.224 | 0.877 | 0.877 |           |
| 01/22/2020 | 05:10      | 5.69 | 08:55 | 8.40 | 7.11 | 04:00           | 1.19 | 08:55 | 2.00 | 1.65 | 04:00                     | 0.441 | 08:55 | 1.261 | 0.843 | 0.843 |           |
| 01/23/2020 | 04:15      | 5.29 | 08:45 | 8.43 | 6.88 | 03:55           | 1.08 | 08:40 | 2.00 | 1.57 | 03:55                     | 0.358 | 08:40 | 1.264 | 0.771 | 0.771 |           |
| 01/24/2020 | 04:50      | 5.32 | 09:45 | 8.45 | 6.87 | 03:50           | 1.08 | 09:35 | 1.98 | 1.54 | 05:00                     | 0.364 | 09:35 | 1.247 | 0.755 | 0.755 |           |
| 01/25/2020 | 05:50      | 4.98 | 11:50 | 7.98 | 6.71 | 05:45           | 0.97 | 11:45 | 1.98 | 1.53 | 05:45                     | 0.297 | 11:45 | 1.162 | 0.736 | 0.736 |           |
| 01/26/2020 | 04:55      | 4.98 | 12:10 | 8.07 | 6.83 | 04:50           | 1.00 | 12:40 | 1.91 | 1.55 | 04:50                     | 0.303 | 12:40 | 1.125 | 0.765 | 0.765 |           |
| 01/27/2020 | 04:20      | 4.95 | 08:40 | 7.98 | 6.44 | 05:20           | 0.95 | 09:10 | 1.90 | 1.46 | 05:20                     | 0.288 | 09:10 | 1.098 | 0.659 | 0.659 |           |
| 01/28/2020 | 04:00      | 4.76 | 08:50 | 7.68 | 6.20 | 04:10           | 0.95 | 08:45 | 1.86 | 1.45 | 04:05                     | 0.273 | 08:45 | 1.037 | 0.618 | 0.618 |           |
| 01/29/2020 | 04:20      | 4.40 | 08:40 | 7.37 | 5.94 | 04:25           | 0.81 | 08:35 | 1.87 | 1.44 | 04:25                     | 0.205 | 08:35 | 0.985 | 0.584 | 0.584 |           |
| 01/30/2020 | 05:05      | 4.11 | 09:00 | 7.30 | 5.92 | 05:05           | 0.87 | 08:25 | 1.93 | 1.41 | 05:05                     | 0.201 | 09:15 | 0.966 | 0.572 | 0.572 |           |
| 01/31/2020 | 05:15      | 4.48 | 08:30 | 7.35 | 5.81 | 05:10           | 0.86 | 08:35 | 1.88 | 1.45 | 05:10                     | 0.224 | 08:35 | 0.985 | 0.566 | 0.566 |           |
| 02/01/2020 | 05:05      | 3.96 | 12:40 | 9.25 | 6.29 | 04:40           | 0.87 | 12:40 | 2.30 | 1.56 | 04:55                     | 0.191 | 12:40 | 1.647 | 0.714 | 0.714 |           |
| 02/02/2020 | 06:00      | 5.04 | 12:40 | 8.45 | 6.90 | 04:50           | 1.11 | 20:10 | 2.04 | 1.65 | 04:50                     | 0.343 | 12:00 | 1.266 | 0.828 | 0.828 |           |
| 02/03/2020 | 04:10      | 4.56 | 08:40 | 8.31 | 6.47 | 05:00           | 0.96 | 08:50 | 2.02 | 1.58 | 05:00                     | 0.264 | 08:50 | 1.250 | 0.728 | 0.728 |           |
| 02/04/2020 | 04:05      | 4.23 | 09:00 | 8.06 | 6.25 | 04:50           | 0.97 | 09:20 | 2.06 | 1.61 | 04:50                     | 0.236 | 08:40 | 1.214 | 0.707 | 0.707 |           |
| 02/05/2020 | 03:45      | 4.37 | 08:55 | 8.14 | 6.26 | 05:00           | 0.96 | 08:45 | 2.13 | 1.58 | 05:00                     | 0.243 | 08:50 | 1.279 | 0.694 | 0.694 |           |
| 02/06/2020 | 03:45      | 4.08 | 08:40 | 8.23 | 6.35 | 04:35           | 1.08 | 08:15 | 2.08 | 1.61 | 03:45                     | 0.248 | 08:25 | 1.262 | 0.725 | 0.725 |           |
| 02/07/2020 | 03:50      | 4.23 | 08:55 | 8.30 | 6.39 | 04:00           | 0.98 | 08:30 | 1.96 | 1.60 | 04:00                     | 0.250 | 08:55 | 1.202 | 0.722 | 0.722 |           |
| 02/08/2020 | 05:15      | 4.07 | 13:00 | 7.64 | 6.20 | 05:35           | 0.97 | 12:45 | 2.06 | 1.62 | 05:35                     | 0.224 | 12:50 | 1.128 | 0.709 | 0.709 |           |
| 02/09/2020 | 04:45      | 4.30 | 12:15 | 7.75 | 6.34 | 07:10           | 1.02 | 12:25 | 2.01 | 1.65 | 04:45                     | 0.263 | 12:25 | 1.137 | 0.741 | 0.741 |           |
| 02/10/2020 | 04:05      | 4.43 | 08:35 | 7.57 | 6.02 | 05:00           | 0.98 | 08:25 | 2.01 | 1.55 | 05:00                     | 0.252 | 08:25 | 1.095 | 0.638 | 0.638 |           |
| 02/11/2020 | 04:35      | 4.33 | 10:30 | 7.60 | 6.03 | 04:10           | 1.02 | 10:30 | 2.02 | 1.54 | 04:10                     | 0.260 | 10:30 | 1.108 | 0.639 | 0.639 |           |
| 02/12/2020 | 04:50      | 4.48 | 08:35 | 8.01 | 6.15 | 04:15           | 0.96 | 08:05 | 1.91 | 1.50 | 04:15                     | 0.252 | 08:40 | 1.117 | 0.642 | 0.642 |           |
| 02/13/2020 | 04:30      | 4.78 | 09:00 | 7.96 | 6.47 | 04:10           | 0.84 | 08:10 | 1.90 | 1.37 | 04:10                     | 0.242 | 08:10 | 1.090 | 0.627 | 0.627 |           |
| 02/14/2020 | 05:10      | 5.02 | 08:45 | 8.19 | 6.87 | 04:15           | 0.83 | 09:00 | 1.68 | 1.31 | 04:15                     | 0.258 | 09:00 | 1.020 | 0.645 | 0.645 |           |
| 02/15/2020 | 04:35      | 4.27 | 12:35 | 7.50 | 6.23 | 06:00           | 1.02 | 12:15 | 2.02 | 1.64 | 06:00                     | 0.257 | 12:15 | 1.063 | 0.712 | 0.712 |           |
| 02/16/2020 | 05:10      | 3.99 | 12:10 | 7.74 | 6.22 | 06:05           | 1.02 | 12:00 | 2.00 | 1.59 | 05:10                     | 0.231 | 12:00 | 1.121 | 0.699 | 0.699 |           |
| 02/17/2020 | 05:10      | 4.39 | 11:35 | 7.68 | 6.46 | 04:40           | 1.00 | 10:05 | 1.96 | 1.58 | 04:40                     | 0.257 | 10:05 | 1.088 | 0.728 | 0.728 |           |
| 02/18/2020 | 05:00      | 4.52 | 09:15 | 7.87 | 6.33 | 04:55           | 1.02 | 09:15 | 1.96 | 1.54 | 04:55                     | 0.269 | 09:15 | 1.128 | 0.681 | 0.681 |           |
| 02/19/2020 | 04:10      | 4.73 | 08:55 | 8.11 | 6.40 | 05:10           | 1.04 | 08:45 | 1.93 | 1.55 | 05:10                     | 0.297 | 08:50 | 1.151 | 0.695 | 0.695 |           |
| 02/20/2020 | 05:00      | 4.46 | 09:05 | 7.88 | 6.20 | 04:00           | 1.05 | 08:30 | 2.01 | 1.58 | 04:00                     | 0.276 | 09:00 | 1.142 | 0.680 | 0.680 |           |
| 02/21/2020 | 04:15      | 4.77 | 09:25 | 8.37 | 6.69 | 03:45           | 1.05 | 09:30 | 1.85 | 1.60 | 03:45                     | 0.304 | 09:30 | 1.155 | 0.761 | 0.761 |           |
| 02/22/2020 | 05:40      | 5.03 | 11:25 | 8.11 | 6.88 | 04:40           | 0.88 | 11:20 | 1.80 | 1.41 | 04:40                     | 0.273 | 11:20 | 1.077 | 0.702 | 0.702 |           |
| 02/23/2020 | 05:40      | 4.84 | 12:55 | 8.41 | 7.11 | 04:25           | 0.86 | 12:45 | 1.77 | 1.37 | 04:25                     | 0.260 | 12:45 | 1.114 | 0.720 | 0.720 |           |
| 02/24/2020 | 03:40      | 5.07 | 09:00 | 8.91 | 7.24 | 04:15           | 0.80 | 09:05 | 1.74 | 1.24 | 04:15                     | 0.253 | 09:05 | 1.182 | 0.663 |       |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 04:15      | 5.23 | 08:45 | 9.10 | 7.45 | 05:00           | 0.76 | 08:45 | 1.54 | 1.25 | 05:00                     | 0.250 | 08:45 | 1.083 | 0.695 | 0.695 |           |
| 02/26/2020 | 04:25      | 5.32 | 08:40 | 9.42 | 7.39 | 04:30           | 0.78 | 22:50 | 1.78 | 1.28 | 04:30                     | 0.261 | 08:15 | 1.106 | 0.696 | 0.696 |           |
| 02/27/2020 | 04:40      | 4.39 | 08:40 | 7.99 | 6.36 | 03:10           | 0.93 | 08:10 | 1.87 | 1.41 | 03:10                     | 0.249 | 08:35 | 1.082 | 0.624 | 0.624 |           |
| 02/28/2020 | 04:35      | 4.79 | 08:50 | 8.04 | 6.54 | 03:40           | 0.86 | 08:20 | 1.78 | 1.37 | 03:40                     | 0.252 | 08:45 | 1.045 | 0.633 | 0.633 |           |
| 02/29/2020 | 05:15      | 4.88 | 11:55 | 8.11 | 6.79 | 06:10           | 0.86 | 11:55 | 1.77 | 1.39 | 06:10                     | 0.255 | 11:55 | 1.061 | 0.682 | 0.682 |           |
| 03/01/2020 | 05:35      | 4.76 | 11:05 | 8.19 | 6.93 | 04:55           | 0.79 | 11:00 | 1.80 | 1.40 | 04:55                     | 0.232 | 11:00 | 1.089 | 0.715 | 0.715 |           |
| 03/02/2020 | 04:50      | 4.86 | 08:40 | 8.48 | 6.34 | 03:25           | 0.73 | 09:00 | 1.95 | 1.47 | 03:25                     | 0.222 | 09:00 | 1.101 | 0.650 | 0.650 |           |
| 03/03/2020 | 04:30      | 4.29 | 09:00 | 8.65 | 6.46 | 04:50           | 0.96 | 21:30 | 2.03 | 1.64 | 04:50                     | 0.243 | 09:05 | 1.319 | 0.759 | 0.759 |           |
| 03/04/2020 | 04:45      | 4.59 | 08:20 | 8.56 | 6.65 | 03:50           | 1.10 | 08:10 | 2.13 | 1.68 | 03:50                     | 0.302 | 08:25 | 1.362 | 0.802 | 0.802 |           |
| 03/05/2020 | 04:30      | 4.80 | 08:45 | 8.55 | 6.71 | 04:25           | 1.14 | 08:45 | 2.07 | 1.66 | 04:25                     | 0.328 | 08:45 | 1.333 | 0.791 | 0.791 |           |
| 03/06/2020 | 04:55      | 4.29 | 08:50 | 8.10 | 6.52 | 04:45           | 1.01 | 08:45 | 1.96 | 1.59 | 04:50                     | 0.248 | 08:45 | 1.174 | 0.740 | 0.740 |           |
| 03/07/2020 | 05:10      | 4.64 | 12:15 | 8.39 | 6.91 | 05:10           | 1.10 | 12:50 | 1.95 | 1.64 | 05:10                     | 0.304 | 12:50 | 1.214 | 0.829 | 0.829 |           |
| 03/08/2020 | 05:15      | 4.36 | 11:20 | 8.18 | 6.66 | 04:40           | 1.00 | 11:20 | 2.12 | 1.67 | 04:40                     | 0.252 | 11:20 | 1.286 | 0.812 | 0.812 |           |
| 03/09/2020 | 04:00      | 4.54 | 20:30 | 7.88 | 6.40 | 04:05           | 1.00 | 20:40 | 1.98 | 1.61 | 04:05                     | 0.266 | 20:30 | 1.140 | 0.728 | 0.727 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 81.489                    | 4.90      |
| Avg   | 6.51       | 1.54            | 0.709                     |           |

## Site Commentary

### Site Information

| MIL_0186        |       |
|-----------------|-------|
| Pipe Dimensions | 8     |
| Silt Level      | 1.63" |

### Overview

Site MIL\_0186 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Surge conditions were experienced at this location. Review of the scattergraph shows free flow conditions during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Data confidence is less than typical due to sediment. A data gap also occurs beginning February 02, 2020 through February 14, 2020 and another data gap on March 02, 2020 through March 05, 2020 resulting from a meter malfunction.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                    |                    |
|--------------------------|-------------------|--------------------|--------------------|
| Item                     | Depth (in)        | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 4.25              | 1.45               | 0.133              |
| Minimum                  | 2.64              | 0.71               | 0.030              |
| Maximum                  | 8.80              | 2.50               | 0.482              |
| Time of Minimum          | 2/23/2020 3:35 AM | 11/18/2019 3:25 AM | 11/18/2019 3:25 AM |
| Time of Maximum          | 3/6/2020 2:15 PM  | 12/4/2019 5:30 AM  | 12/4/2019 5:30 AM  |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period. 90 days of data provided.

| Percent Uptime  |    |
|-----------------|----|
| Depth (in)      | 88 |
| Velocity (ft/s) | 88 |
| Quantity (MGD)  | 88 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_0186**

|                         |                                   |            |              |                   |               |
|-------------------------|-----------------------------------|------------|--------------|-------------------|---------------|
| Site Address /Location: | N Milpitas Blvd and Sunnyhills Ct |            |              | Monitor Series    | Location Type |
| Site Access Details:    | Drive                             | Latitude:  | 37.454452°   | TRITON+           | Temporary     |
|                         |                                   | Longitude: | -121.910707° | Pipe Size (H x W) | Pipe Shape    |
|                         |                                   |            |              | 8.0" x 8.0"       | Circular      |



|           |                        |
|-----------|------------------------|
| Manhole # | System Characteristics |
| 186       | Residential            |
| Access    | Traffic                |
| Drive     | Medium                 |



### Installation Information

|                                |                                 |
|--------------------------------|---------------------------------|
| Installation Date:             | Installation Type:              |
| Tuesday, November 12, 2019     | Doppler Standard Ring and Crank |
| Monitoring Location (Sensors): | Monitor Location:               |
| Upstream 0-5 FT                | Manhole                         |
| Sensors / Devices:             | Pressure Sensor Range (psi)     |
| Peak Combo (CS4)               | 0 - 5 psi                       |

### Installation Confirmation:

|                                 |                             |
|---------------------------------|-----------------------------|
| Confirmation Time:              | Pipe Size (HxW)             |
| 3:47:18 AM                      | 8.0" x 8.0"                 |
| Depth of Flow (Wet DOF) (in)    | Range (Air DOF) (in)        |
| 3.75                            | 0.00"                       |
| Downlooker Physical Offset (in) | Measurement Confidence (in) |
| NA                              | 0.25"                       |
| Peak Velocity (fps)             | Velocity Sensor Offset (in) |
| 0.91                            | 0"                          |
| Silt (in)                       | Silt Type                   |
| 1.63                            |                             |

### Hydraulic Comments:

Medium depth with moderate velocity

### Manhole / Pipe Information:

|                               |                             |
|-------------------------------|-----------------------------|
| Manhole Depth (Approx. FT):   | Manhole Configuration       |
| 7'                            | Single                      |
| Manhole Material:             | Manhole Condition:          |
| Concrete                      | Good                        |
| Manhole Opening Diameter (in) | Manhole Diameter (Approx.): |
| 26"                           | 54"                         |
| Manhole Cover                 | Manhole Frame               |
| Unbolted                      | Normal                      |
| Active Drop Connections       | Air Quality:                |
| No                            | Normal                      |
| Pipe Material                 | Pipe Condition:             |
| PVC                           | Good                        |

### Communication Information:

|                    |                          |
|--------------------|--------------------------|
| Communication Type | Antenna Location         |
| Wireless           | Manhole Pick / Vent Hole |

### Additional Site Info. / Comments:

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# SCATTERGRAPH REPORT

MIL\_0186

Flow Monitor

**MIL\_0186**

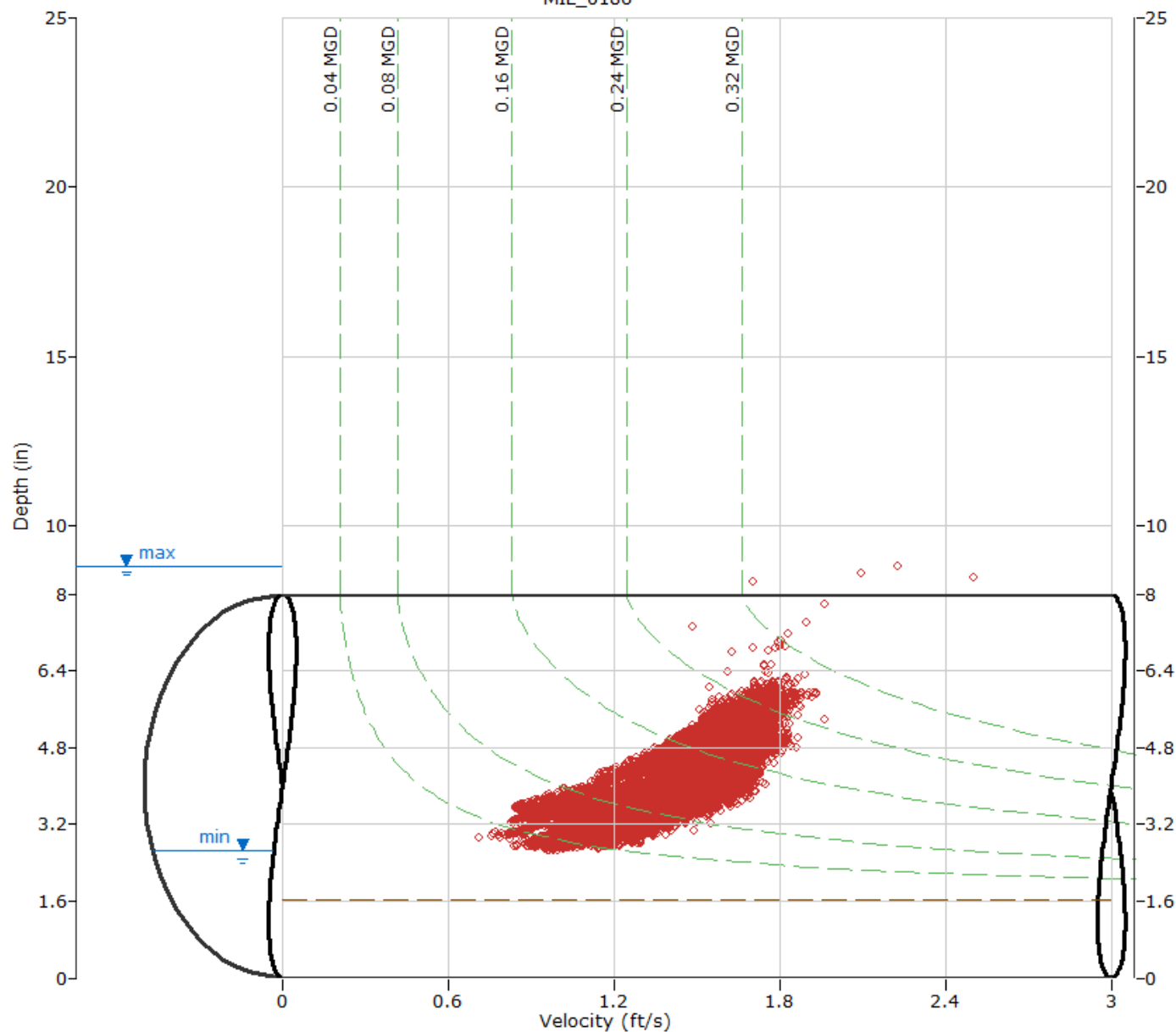
Pipe Height  
8.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



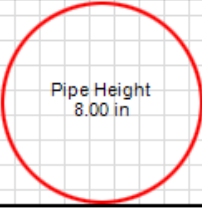
ADS ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_0186

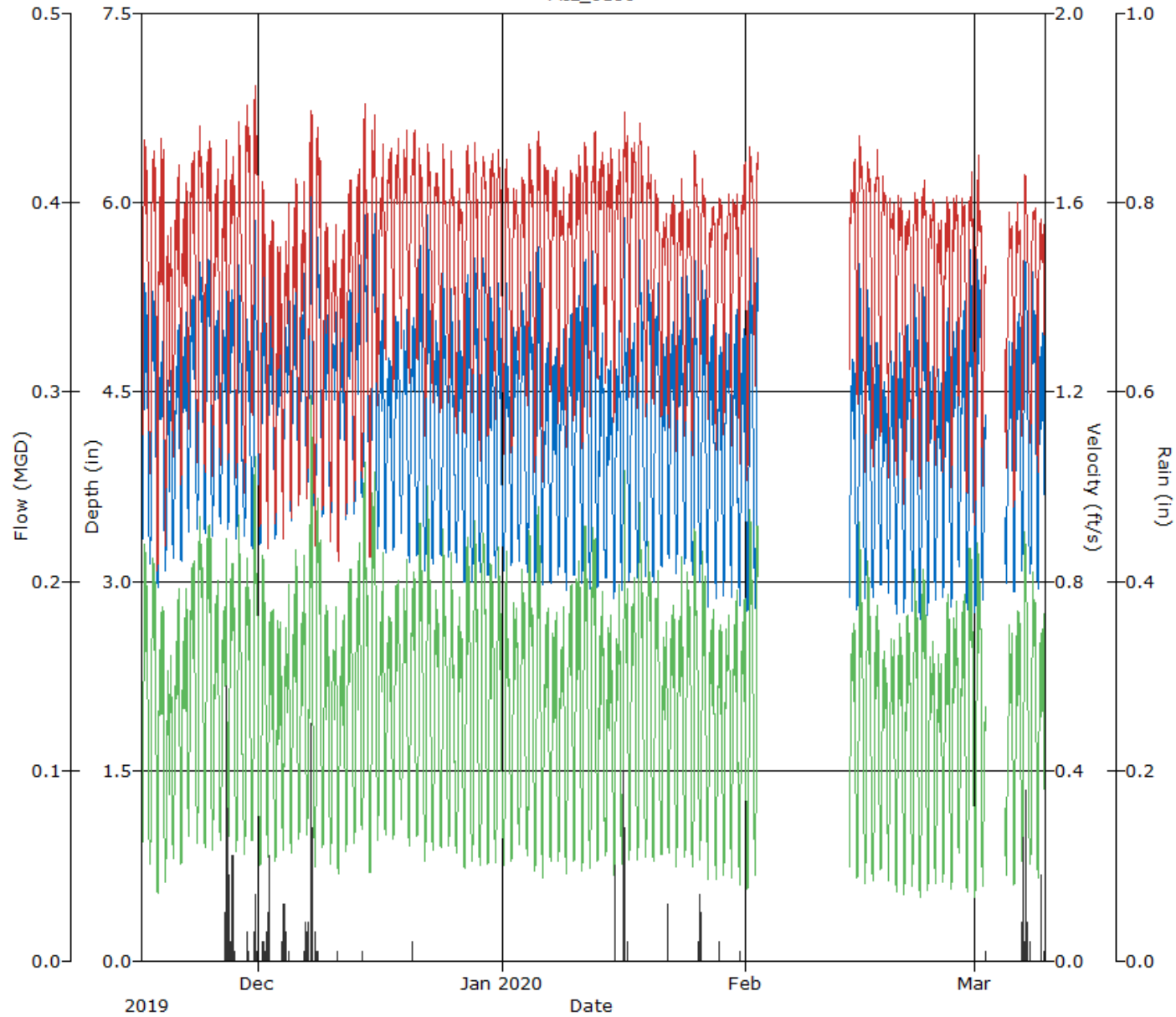
Flow Monitor  
**MIL\_0186**



Pipe Height  
8.00 in

Report Period  
11/16/2019  
To  
3/9/2020

**Legend**  
— Depth  
— Velocity  
— Quantity  
— Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0186, Pipe Height: 8.00 in, Silt: 1.63 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 05:15      | 3.20 | 12:20 | 5.64 | 4.37 | 05:55           | 1.05 | 10:50 | 1.77 | 1.48 | 05:15                     | 0.057 | 12:20 | 0.237 | 0.143 | 0.143 |           |
| 11/17/2019 | 03:40      | 3.11 | 11:25 | 5.54 | 4.33 | 04:25           | 0.98 | 10:45 | 1.76 | 1.44 | 04:25                     | 0.048 | 11:30 | 0.230 | 0.139 | 0.139 |           |
| 11/18/2019 | 03:05      | 2.88 | 18:05 | 5.00 | 4.10 | 03:25           | 0.71 | 18:20 | 1.84 | 1.40 | 03:25                     | 0.030 | 17:35 | 0.203 | 0.123 | 0.123 |           |
| 11/19/2019 | 04:00      | 3.00 | 19:00 | 4.98 | 3.98 | 04:00           | 0.83 | 17:40 | 1.69 | 1.32 | 04:00                     | 0.037 | 19:00 | 0.187 | 0.108 | 0.108 |           |
| 11/20/2019 | 03:45      | 3.15 | 20:10 | 5.37 | 4.22 | 03:25           | 1.00 | 19:40 | 1.74 | 1.44 | 03:25                     | 0.051 | 20:10 | 0.223 | 0.130 | 0.130 |           |
| 11/21/2019 | 03:05      | 3.12 | 18:15 | 5.37 | 4.27 | 03:55           | 0.95 | 19:15 | 1.70 | 1.41 | 03:55                     | 0.047 | 19:15 | 0.216 | 0.130 | 0.130 |           |
| 11/22/2019 | 01:50      | 3.18 | 14:25 | 6.22 | 4.64 | 01:50           | 0.96 | 14:25 | 1.87 | 1.51 | 01:50                     | 0.049 | 14:25 | 0.289 | 0.159 | 0.159 |           |
| 11/23/2019 | 04:40      | 3.36 | 17:35 | 5.69 | 4.62 | 04:40           | 1.02 | 14:05 | 1.87 | 1.48 | 04:40                     | 0.058 | 14:05 | 0.246 | 0.156 | 0.156 |           |
| 11/24/2019 | 04:05      | 3.32 | 14:10 | 6.25 | 4.65 | 04:05           | 0.93 | 14:10 | 1.83 | 1.47 | 04:05                     | 0.052 | 14:10 | 0.285 | 0.157 | 0.157 |           |
| 11/25/2019 | 03:40      | 3.31 | 18:30 | 5.37 | 4.41 | 04:00           | 1.00 | 18:30 | 1.71 | 1.42 | 03:40                     | 0.055 | 18:30 | 0.219 | 0.138 | 0.138 |           |
| 11/26/2019 | 02:20      | 3.39 | 20:15 | 5.60 | 4.41 | 02:20           | 0.99 | 19:20 | 1.77 | 1.43 | 02:20                     | 0.057 | 20:15 | 0.238 | 0.139 | 0.139 | 0.63      |
| 11/27/2019 | 03:15      | 3.37 | 20:10 | 5.55 | 4.51 | 03:25           | 0.97 | 20:10 | 1.73 | 1.45 | 03:25                     | 0.057 | 20:10 | 0.232 | 0.147 | 0.147 | 0.77      |
| 11/28/2019 | 04:25      | 3.27 | 11:00 | 5.69 | 4.34 | 05:15           | 0.99 | 11:00 | 1.85 | 1.43 | 04:25                     | 0.054 | 11:00 | 0.256 | 0.137 | 0.137 | 0.05      |
| 11/29/2019 | 03:55      | 3.29 | 17:40 | 5.39 | 4.24 | 03:50           | 0.91 | 17:40 | 1.97 | 1.48 | 03:50                     | 0.050 | 17:40 | 0.253 | 0.136 | 0.136 |           |
| 11/30/2019 | 04:10      | 3.20 | 11:50 | 6.33 | 4.48 | 03:00           | 1.06 | 13:00 | 1.90 | 1.52 | 03:00                     | 0.057 | 11:50 | 0.300 | 0.154 | 0.154 | 0.14      |
| 12/01/2019 | 05:10      | 3.23 | 13:35 | 5.79 | 4.46 | 02:25           | 0.87 | 13:35 | 1.68 | 1.32 | 05:05                     | 0.046 | 13:35 | 0.239 | 0.133 | 0.133 | 0.06      |
| 12/02/2019 | 04:35      | 3.51 | 12:00 | 5.39 | 4.47 | 04:10           | 0.85 | 18:40 | 1.66 | 1.30 | 04:10                     | 0.053 | 12:00 | 0.210 | 0.130 | 0.130 | 0.36      |
| 12/03/2019 | 03:55      | 3.30 | 11:25 | 5.34 | 4.34 | 03:55           | 0.87 | 11:15 | 1.65 | 1.25 | 03:55                     | 0.048 | 11:25 | 0.195 | 0.119 | 0.119 | 0.44      |
| 12/04/2019 | 02:35      | 3.53 | 05:30 | 8.48 | 4.49 | 02:35           | 0.84 | 05:30 | 2.50 | 1.32 | 02:35                     | 0.053 | 05:30 | 0.482 | 0.132 | 0.132 |           |
| 12/05/2019 | 02:15      | 3.42 | 18:15 | 6.88 | 4.50 | 02:15           | 0.91 | 18:45 | 1.83 | 1.34 | 02:15                     | 0.053 | 18:15 | 0.295 | 0.136 | 0.136 | 0.06      |
| 12/06/2019 | 05:05      | 3.53 | 17:50 | 6.03 | 4.54 | 03:25           | 0.87 | 17:50 | 1.79 | 1.34 | 03:25                     | 0.057 | 17:50 | 0.268 | 0.137 | 0.137 |           |
| 12/07/2019 | 04:25      | 3.57 | 06:55 | 8.34 | 4.79 | 02:55           | 0.87 | 18:40 | 1.91 | 1.42 | 02:55                     | 0.057 | 17:25 | 0.330 | 0.160 | 0.160 | 0.84      |
| 12/08/2019 | 03:40      | 3.32 | 10:55 | 5.95 | 4.65 | 03:40           | 0.86 | 11:20 | 1.86 | 1.39 | 03:40                     | 0.048 | 10:55 | 0.269 | 0.151 | 0.151 | 0.10      |
| 12/09/2019 | 02:55      | 3.49 | 12:55 | 5.47 | 4.43 | 02:55           | 0.94 | 12:55 | 1.65 | 1.31 | 02:55                     | 0.057 | 12:55 | 0.217 | 0.128 | 0.128 | 0.01      |
| 12/10/2019 | 03:10      | 3.34 | 19:00 | 5.46 | 4.38 | 03:10           | 0.87 | 19:00 | 1.65 | 1.29 | 03:10                     | 0.049 | 19:00 | 0.217 | 0.124 | 0.124 |           |
| 12/11/2019 | 03:40      | 3.25 | 20:05 | 5.32 | 4.32 | 03:40           | 0.83 | 20:05 | 1.61 | 1.26 | 03:40                     | 0.044 | 20:05 | 0.204 | 0.120 | 0.120 | 0.00      |
| 12/12/2019 | 03:45      | 3.45 | 12:40 | 5.53 | 4.52 | 03:45           | 0.92 | 19:15 | 1.75 | 1.37 | 03:45                     | 0.055 | 19:15 | 0.233 | 0.140 | 0.140 | 0.02      |
| 12/13/2019 | 04:10      | 3.49 | 18:25 | 7.77 | 4.54 | 04:10           | 0.94 | 18:25 | 1.96 | 1.38 | 04:10                     | 0.058 | 18:25 | 0.374 | 0.142 | 0.142 |           |
| 12/14/2019 | 03:10      | 3.61 | 11:45 | 6.10 | 4.71 | 03:10           | 0.99 | 10:50 | 1.93 | 1.40 | 03:10                     | 0.065 | 10:50 | 0.282 | 0.154 | 0.154 |           |
| 12/15/2019 | 05:15      | 3.26 | 18:30 | 6.35 | 4.70 | 05:15           | 0.83 | 19:50 | 1.82 | 1.40 | 05:15                     | 0.045 | 18:30 | 0.280 | 0.158 | 0.158 |           |
| 12/16/2019 | 03:15      | 3.25 | 19:00 | 5.69 | 4.33 | 02:40           | 1.14 | 18:50 | 1.76 | 1.50 | 03:05                     | 0.061 | 19:00 | 0.242 | 0.141 | 0.141 |           |
| 12/17/2019 | 03:35      | 3.17 | 11:35 | 5.00 | 4.15 | 04:55           | 1.21 | 19:10 | 1.76 | 1.55 | 04:55                     | 0.063 | 11:30 | 0.201 | 0.135 | 0.135 |           |
| 12/18/2019 | 03:35      | 3.19 | 13:25 | 5.40 | 4.28 | 02:05           | 1.10 | 14:15 | 1.80 | 1.54 | 03:35                     | 0.059 | 13:25 | 0.223 | 0.142 | 0.142 |           |
| 12/19/2019 | 04:20      | 3.32 | 20:25 | 5.64 | 4.29 | 04:20           | 1.26 | 20:25 | 1.80 | 1.55 | 04:20                     | 0.070 | 20:25 | 0.247 | 0.143 | 0.143 |           |
| 12/20/2019 | 03:25      | 3.07 | 18:50 | 5.49 | 4.24 | 03:25           | 1.14 | 20:50 | 1.79 | 1.55 | 03:25                     | 0.053 | 18:50 | 0.234 | 0.141 | 0.141 |           |
| 12/21/2019 | 03:40      | 3.16 | 10:30 | 6.15 | 4.39 | 05:15           | 1.14 | 13:25 | 1.77 | 1.51 | 05:15                     | 0.061 | 11:10 | 0.267 | 0.146 | 0.146 |           |
| 12/22/2019 | 04:00      | 3.03 | 13:10 | 6.16 | 4.35 | 05:20           | 1.03 | 13:10 | 1.80 | 1.48 | 05:20                     | 0.047 | 13:10 | 0.276 | 0.143 | 0.143 |           |
| 12/23/2019 | 03:55      | 3.10 | 15:05 | 5.78 | 4.20 | 03:55           | 1.16 | 11:40 | 1.79 | 1.50 | 03:55                     | 0.055 | 15:05 | 0.244 | 0.135 | 0.135 |           |
| 12/24/2019 | 03:20      | 3.16 | 12:15 | 5.83 | 4.29 | 04:35           | 1.07 | 12:25 | 1.80 | 1.48 | 03:20                     | 0.054 | 12:30 | 0.247 | 0.138 | 0.138 |           |
| 12/25/2019 | 05:30      | 3.14 | 11:35 | 5.87 | 4.13 | 03:25           | 1.12 | 11:35 | 1.81 | 1.49 | 05:35                     | 0.057 | 11:35 | 0.261 | 0.129 | 0.129 |           |
| 12/26/2019 | 05:35      | 3.10 | 11:45 | 5.49 | 4.14 | 03:30           | 1.07 | 11:45 | 1.69 | 1.44 | 05:25                     | 0.053 | 11:45 | 0.223 | 0.126 | 0.126 |           |
| 12/27/2019 | 04:30      | 2.92 | 13:50 | 5.86 | 4.20 | 04:30           | 1.07 | 13:20 | 1.75 | 1.49 | 04:30                     | 0.044 | 13:50 | 0.250 | 0.135 | 0.135 |           |
| 12/28/2019 | 04:10      | 2.96 | 10:50 | 6.81 | 4.29 | 03:15           | 1.09 | 10:45 | 1.79 | 1.48 | 03:10                     | 0.049 | 10:50 | 0.302 | 0.139 | 0.139 |           |
| 12/29/2019 | 04:05      | 2.99 | 12:00 | 5.94 | 4.37 | 05:10           | 0.99 | 18:35 | 1.78 | 1.47 | 05:05                     | 0.046 | 12:00 | 0.250 | 0.144 | 0.144 |           |
| 12/30/2019 | 04:00      | 3.00 | 11:20 | 5.74 | 4.19 | 04:05           | 1.00 | 17:30 | 1.74 | 1.50 | 04:05                     | 0.044 | 11:20 | 0.229 | 0.135 | 0.135 |           |
| 12/31/2019 | 04:20      | 2.98 | 12:55 | 5.49 | 4.20 | 02:00           | 1.08 | 11:10 | 1.74 | 1.50 | 04:20                     | 0.048 | 12:55 | 0.230 | 0.135 | 0.135 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:30      | 3.00 | 12:40 | 5.79 | 4.11 | 05:20           | 0.99 | 12:55 | 1.73 | 1.45 | 05:20                     | 0.045 | 12:40 | 0.243 | 0.126 | 0.126 | 0.10  |           |
| 01/02/2020 | 02:55      | 3.05 | 05:20 | 8.60 | 4.21 | 02:55           | 1.03 | 05:20 | 2.10 | 1.45 | 02:55                     | 0.047 | 05:20 | 0.404 | 0.131 | 0.131 |       |           |
| 01/03/2020 | 03:40      | 3.15 | 11:25 | 5.54 | 4.28 | 04:05           | 1.13 | 11:25 | 1.69 | 1.48 | 03:40                     | 0.061 | 11:25 | 0.226 | 0.136 | 0.136 |       |           |
| 01/04/2020 | 04:25      | 2.98 | 11:45 | 5.85 | 4.27 | 04:30           | 1.02 | 10:25 | 1.79 | 1.49 | 04:30                     | 0.046 | 11:45 | 0.252 | 0.139 | 0.139 |       |           |
| 01/05/2020 | 04:30      | 2.96 | 13:05 | 6.15 | 4.33 | 03:30           | 0.97 | 13:05 | 1.78 | 1.46 | 04:30                     | 0.042 | 13:05 | 0.272 | 0.142 | 0.142 |       |           |
| 01/06/2020 | 03:10      | 2.93 | 19:00 | 5.10 | 4.06 | 03:10           | 0.94 | 10:05 | 1.73 | 1.51 | 03:10                     | 0.039 | 19:00 | 0.203 | 0.128 | 0.128 |       |           |
| 01/07/2020 | 02:00      | 2.91 | 18:45 | 5.29 | 3.99 | 03:25           | 1.06 | 19:15 | 1.76 | 1.51 | 02:00                     | 0.047 | 18:45 | 0.214 | 0.123 | 0.123 |       |           |
| 01/08/2020 | 04:25      | 3.01 | 18:15 | 5.36 | 4.12 | 04:20           | 1.09 | 20:40 | 1.69 | 1.47 | 04:20                     | 0.049 | 18:15 | 0.209 | 0.127 | 0.127 |       |           |
| 01/09/2020 | 03:20      | 2.91 | 19:10 | 5.53 | 4.21 | 03:35           | 1.03 | 18:55 | 1.75 | 1.47 | 03:35                     | 0.042 | 19:15 | 0.226 | 0.133 | 0.133 |       |           |
| 01/10/2020 | 03:40      | 2.97 | 12:00 | 5.53 | 4.22 | 04:35           | 1.12 | 13:50 | 1.74 | 1.49 | 03:40                     | 0.048 | 19:25 | 0.227 | 0.135 | 0.135 |       |           |
| 01/11/2020 | 03:30      | 2.94 | 10:45 | 6.03 | 4.34 | 03:35           | 1.01 | 10:50 | 1.79 | 1.49 | 03:35                     | 0.043 | 10:45 | 0.267 | 0.144 | 0.144 |       |           |
| 01/12/2020 | 04:15      | 2.91 | 18:55 | 5.99 | 4.35 | 04:55           | 1.08 | 18:50 | 1.82 | 1.53 | 04:10                     | 0.045 | 18:55 | 0.268 | 0.147 | 0.147 |       |           |
| 01/13/2020 | 02:50      | 2.91 | 18:30 | 5.22 | 3.96 | 02:50           | 1.09 | 20:00 | 1.74 | 1.54 | 02:50                     | 0.045 | 18:30 | 0.213 | 0.124 | 0.124 |       |           |
| 01/14/2020 | 04:55      | 2.96 | 21:00 | 4.97 | 4.01 | 05:10           | 1.12 | 20:50 | 1.74 | 1.54 | 05:10                     | 0.048 | 21:00 | 0.198 | 0.127 | 0.106 |       |           |
| 01/15/2020 | 05:10      | 2.84 | 21:15 | 5.56 | 4.02 | 06:00           | 1.09 | 21:05 | 1.79 | 1.52 | 05:35                     | 0.044 | 21:20 | 0.227 | 0.126 | 0.126 |       |           |
| 01/16/2020 | 05:40      | 2.91 | 13:55 | 6.07 | 4.18 | 06:00           | 1.15 | 12:45 | 1.83 | 1.57 | 05:30                     | 0.048 | 13:45 | 0.269 | 0.140 | 0.140 |       |           |
| 01/17/2020 | 04:10      | 2.98 | 21:15 | 5.31 | 4.18 | 04:10           | 1.13 | 12:30 | 1.80 | 1.55 | 04:10                     | 0.049 | 19:25 | 0.224 | 0.138 | 0.138 |       |           |
| 01/18/2020 | 05:20      | 2.98 | 14:10 | 6.16 | 4.32 | 05:20           | 1.13 | 14:30 | 1.81 | 1.53 | 05:20                     | 0.049 | 14:10 | 0.272 | 0.145 | 0.145 |       |           |
| 01/19/2020 | 06:55      | 3.01 | 13:40 | 5.86 | 4.31 | 08:00           | 1.08 | 13:05 | 1.79 | 1.49 | 06:55                     | 0.050 | 13:40 | 0.253 | 0.141 | 0.141 |       |           |
| 01/20/2020 | 05:35      | 2.93 | 18:50 | 5.77 | 4.29 | 04:50           | 1.13 | 17:50 | 1.77 | 1.47 | 05:35                     | 0.048 | 18:50 | 0.236 | 0.136 | 0.136 |       |           |
| 01/21/2020 | 06:15      | 3.05 | 13:10 | 5.09 | 4.12 | 07:00           | 1.08 | 20:30 | 1.66 | 1.43 | 06:15                     | 0.052 | 20:30 | 0.189 | 0.124 | 0.124 |       |           |
| 01/22/2020 | 05:15      | 3.12 | 13:45 | 5.34 | 4.22 | 05:20           | 1.04 | 21:00 | 1.69 | 1.45 | 05:20                     | 0.051 | 20:35 | 0.208 | 0.130 | 0.130 |       |           |
| 01/23/2020 | 02:55      | 3.04 | 19:40 | 5.66 | 4.29 | 02:40           | 1.04 | 19:20 | 1.70 | 1.44 | 03:30                     | 0.048 | 20:25 | 0.231 | 0.134 | 0.123 |       |           |
| 01/24/2020 | 05:30      | 3.10 | 13:25 | 6.38 | 4.33 | 05:00           | 1.08 | 12:15 | 1.71 | 1.42 | 05:30                     | 0.052 | 13:25 | 0.258 | 0.135 | 0.135 |       |           |
| 01/25/2020 | 05:40      | 3.02 | 12:20 | 5.91 | 4.20 | 05:30           | 1.03 | 11:00 | 1.84 | 1.47 | 05:40                     | 0.047 | 12:20 | 0.257 | 0.133 | 0.133 |       |           |
| 01/26/2020 | 03:30      | 2.97 | 11:15 | 5.69 | 4.25 | 03:05           | 1.14 | 11:05 | 1.68 | 1.49 | 03:25                     | 0.050 | 11:15 | 0.227 | 0.136 | 0.136 |       |           |
| 01/27/2020 | 04:50      | 2.78 | 11:25 | 5.34 | 4.09 | 05:10           | 1.07 | 08:05 | 1.67 | 1.44 | 03:50                     | 0.041 | 20:15 | 0.206 | 0.124 | 0.113 |       |           |
| 01/28/2020 | 04:45      | 2.79 | 22:10 | 5.13 | 4.03 | 04:00           | 1.04 | 19:25 | 1.66 | 1.47 | 04:45                     | 0.039 | 20:15 | 0.193 | 0.123 | 0.123 |       |           |
| 01/29/2020 | 03:55      | 2.83 | 20:40 | 5.37 | 4.11 | 03:35           | 1.05 | 21:40 | 1.66 | 1.46 | 03:35                     | 0.042 | 20:40 | 0.211 | 0.125 | 0.125 |       |           |
| 01/30/2020 | 03:40      | 2.84 | 19:55 | 5.43 | 4.09 | 03:20           | 1.03 | 16:15 | 1.70 | 1.47 | 03:40                     | 0.042 | 19:50 | 0.214 | 0.126 | 0.126 |       |           |
| 01/31/2020 | 05:10      | 2.77 | 19:25 | 5.28 | 4.05 | 04:05           | 0.95 | 20:05 | 1.77 | 1.50 | 04:05                     | 0.036 | 21:50 | 0.213 | 0.127 | 0.127 |       |           |
| 02/01/2020 | 04:45      | 2.73 | 14:55 | 6.17 | 4.26 | 02:50           | 0.94 | 12:20 | 1.76 | 1.46 | 04:55                     | 0.035 | 11:35 | 0.266 | 0.138 | 0.138 |       |           |
| 02/02/2020 | 04:45      | 2.75 | 10:30 | 6.14 | 4.00 | 04:20           | 1.15 | 12:20 | 1.75 | 1.49 | 04:45                     | 0.041 | 10:30 | 0.261 | 0.125 | 0.076 |       |           |
| 02/03/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/04/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/05/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/06/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/07/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/08/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/09/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/10/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/11/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/12/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/13/2020 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |       |           |
| 02/14/2020 | 05:00      | 2.84 | 19:35 | 5.05 | 4.19 | 05:00           | 1.10 | 20:30 | 1.78 | 1.60 | 05:00                     | 0.043 | 19:35 | 0.199 | 0.140 | 0.112 |       |           |
| 02/15/2020 | 05:15      | 2.69 | 11:50 | 5.78 | 4.08 | 05:50           | 1.13 | 11:50 | 1.77 | 1.54 | 05:15                     | 0.039 | 11:50 | 0.251 | 0.133 | 0.133 |       |           |
| 02/16/2020 | 04:55      | 2.81 | 11:05 | 5.62 | 4.11 | 03:10           | 0.97 | 16:55 | 1.78 | 1.47 | 05:05                     | 0.037 | 11:05 | 0.232 | 0.129 | 0.129 |       |           |
| 02/17/2020 | 04:05      | 2.85 | 19:40 | 5.43 | 3.94 | 04:20           | 0.98 | 17:20 | 1.76 | 1.46 | 04:15                     | 0.039 | 19:40 | 0.218 | 0.119 | 0.119 |       |           |
| 02/18/2020 | 04:15      | 2.90 | 13:20 | 4.65 | 3.87 | 02:40           | 1.03 | 14:10 | 1.75 | 1.48 | 04:15                     | 0.043 | 13:40 | 0.167 | 0.115 | 0.115 |       |           |
| 02/19/2020 | 02:50      | 2.87 | 12:50 | 5.24 | 3.98 | 02:35           | 0.97 | 08:50 | 1.76 | 1.44 | 02:35                     | 0.039 | 12:50 | 0.200 | 0.118 | 0.118 |       |           |
| 02/20/2020 | 03:15      | 2.71 | 11:45 | 5.28 | 3.99 | 03:15           | 0.95 | 18:45 | 1.66 | 1.44 | 03:15                     | 0.033 | 11:45 | 0.201 | 0.119 | 0.119 |       |           |
| 02/21/2020 | 02:55      | 2.68 | 18:20 | 5.48 | 4.01 | 03:00           | 0.92 | 18:45 | 1.68 | 1.41 | 02:55                     | 0.032 | 18:20 | 0.211 | 0.118 | 0.118 |       |           |
| 02/22/2020 | 04:25      | 2.70 | 13:40 | 5.70 | 4.10 | 04:20           | 0.96 | 13:40 | 1.67 | 1.42 | 04:25                     | 0.033 | 13:40 | 0.232 | 0.124 | 0.124 |       |           |
| 02/23/2020 | 03:35      | 2.64 | 12:40 | 5.61 | 4.16 | 03:30           | 0.96 | 17:35 | 1.73 | 1.42 | 03:30                     | 0.031 | 13:35 | 0.232 | 0.129 | 0.129 |       |           |
| 02/24/2020 | 03:50      | 2.70 | 11:45 | 6.05 | 3.94 | 03:45           | 0.99 | 21:25 | 1.69 | 1.43 | 03:50                     | 0.034 | 11:45 | 0.232 | 0.115 | 0.115 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total |           |
| 02/25/2020 | 03:40      | 2.82 | 21:00 | 5.11 | 3.95 | 04:50           | 1.01 | 21:00 | 1.62 | 1.40 | 03:40                     | 0.039 | 21:00 | 0.192 | 0.113 | 0.113 | 0.01      |
| 02/26/2020 | 02:45      | 2.74 | 19:15 | 5.58 | 4.13 | 02:35           | 0.95 | 19:05 | 1.64 | 1.43 | 02:45                     | 0.034 | 19:15 | 0.219 | 0.125 | 0.125 |           |
| 02/27/2020 | 02:45      | 2.70 | 11:45 | 5.42 | 4.14 | 03:10           | 0.91 | 16:35 | 1.62 | 1.44 | 03:10                     | 0.032 | 11:40 | 0.206 | 0.127 | 0.127 |           |
| 02/28/2020 | 04:20      | 3.05 | 18:30 | 5.46 | 4.24 | 04:20           | 1.14 | 19:50 | 1.64 | 1.46 | 04:20                     | 0.052 | 19:50 | 0.212 | 0.133 | 0.133 |           |
| 02/29/2020 | 04:15      | 2.72 | 10:40 | 5.87 | 4.28 | 04:35           | 0.90 | 18:10 | 1.70 | 1.41 | 04:35                     | 0.032 | 10:40 | 0.235 | 0.134 | 0.134 |           |
| 03/01/2020 | 05:15      | 2.73 | 11:45 | 5.96 | 4.27 | 04:20           | 0.84 | 13:25 | 1.72 | 1.40 | 04:20                     | 0.030 | 11:45 | 0.245 | 0.133 | 0.133 |           |
| 03/02/2020 | 03:30      | 2.82 | 07:45 | 4.60 | 3.48 | 02:50           | 0.95 | 07:30 | 1.52 | 1.24 | 03:25                     | 0.037 | 07:45 | 0.148 | 0.079 | 0.034 |           |
| 03/03/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/04/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/05/2020 | 03:40      | 2.93 | 12:45 | 5.21 | 4.10 | 02:30           | 0.94 | 12:45 | 1.60 | 1.41 | 02:30                     | 0.039 | 12:45 | 0.196 | 0.121 | 0.121 |           |
| 03/06/2020 | 04:20      | 2.85 | 14:15 | 8.80 | 4.14 | 04:05           | 0.92 | 14:15 | 2.23 | 1.40 | 04:05                     | 0.036 | 14:15 | 0.429 | 0.123 | 0.123 | 0.58      |
| 03/07/2020 | 05:05      | 3.01 | 14:15 | 5.90 | 4.41 | 05:05           | 1.07 | 15:10 | 1.77 | 1.44 | 05:05                     | 0.048 | 15:10 | 0.257 | 0.141 | 0.141 |           |
| 03/08/2020 | 04:30      | 2.96 | 12:35 | 5.73 | 4.30 | 04:30           | 1.04 | 14:05 | 1.63 | 1.42 | 04:30                     | 0.045 | 12:35 | 0.227 | 0.133 | 0.133 | 0.02      |
| 03/09/2020 | 04:05      | 2.91 | 20:05 | 5.34 | 4.08 | 04:05           | 1.01 | 12:40 | 1.60 | 1.39 | 04:05                     | 0.041 | 20:00 | 0.202 | 0.119 | 0.119 | 0.11      |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 13.410                    | 5.26      |
| Avg   | 4.25       | 1.45            | 0.133                     |           |



## Site Commentary

### Site Information

| MIL_0190        |       |
|-----------------|-------|
| Pipe Dimensions | 18    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0190 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed upstream of site MIL\_1790. (See MIL\_1790 Site Commentary for More Details)

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                    |                    |
|--------------------------|--------------------|--------------------|--------------------|
| Item                     | Depth (in)         | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 2.47               | 0.96               | 0.093              |
| Minimum                  | 1.80               | 0.41               | 0.024              |
| Maximum                  | 3.29               | 1.47               | 0.198              |
| Time of Minimum          | 11/22/2019 4:00 AM | 11/22/2019 3:50 AM | 11/22/2019 3:50 AM |
| Time of Maximum          | 12/12/2019 1:55 PM | 3/6/2020 9:10 AM   | 3/6/2020 9:10 AM   |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0190

Site Address /Location: N Abel St and Weller Ln

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: middle of N bound lanes

Latitude:

37.432482°

Longitude:

-121.909452°

Pipe Size (H x W)

18.0" x 18.0"

Pipe Shape

Circular

Manhole #

190

System Characteristics

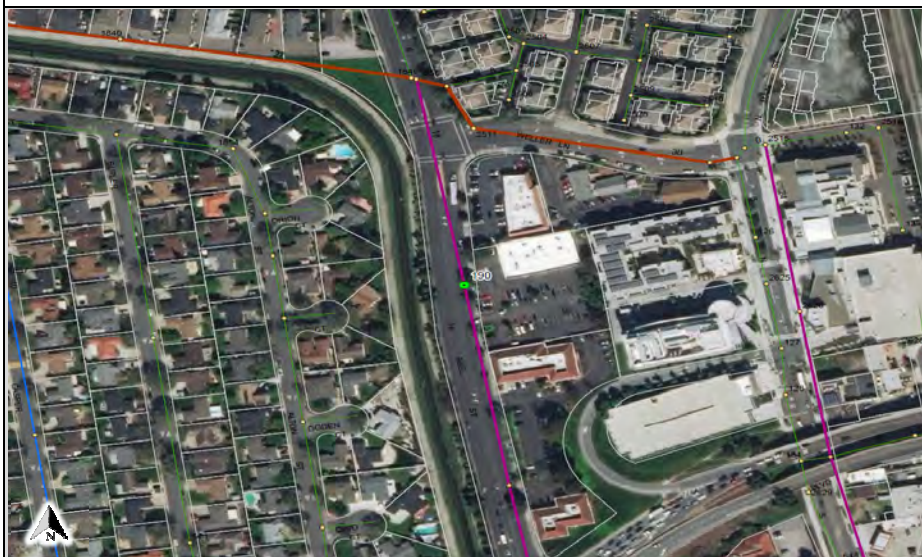
Residential

Access

Traffic

Drive

Heavy



### Installation Information

Installation Date:

Wednesday, November 13, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

10:04:15 AM

Pipe Size (HxW)

18.0" x 18.0"

Depth of Flow (Wet DOF) (in)

3.00

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

0.97

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

### Hydraulic Comments:

Smooth shallow flow with moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

8'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Vitrified Clay Pipe

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

798

ADS Project Name: Milpitas.WWTFM.CA19-20

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_0190

Flow Monitor

**MIL\_0190**

Pipe Height  
18.00 in.

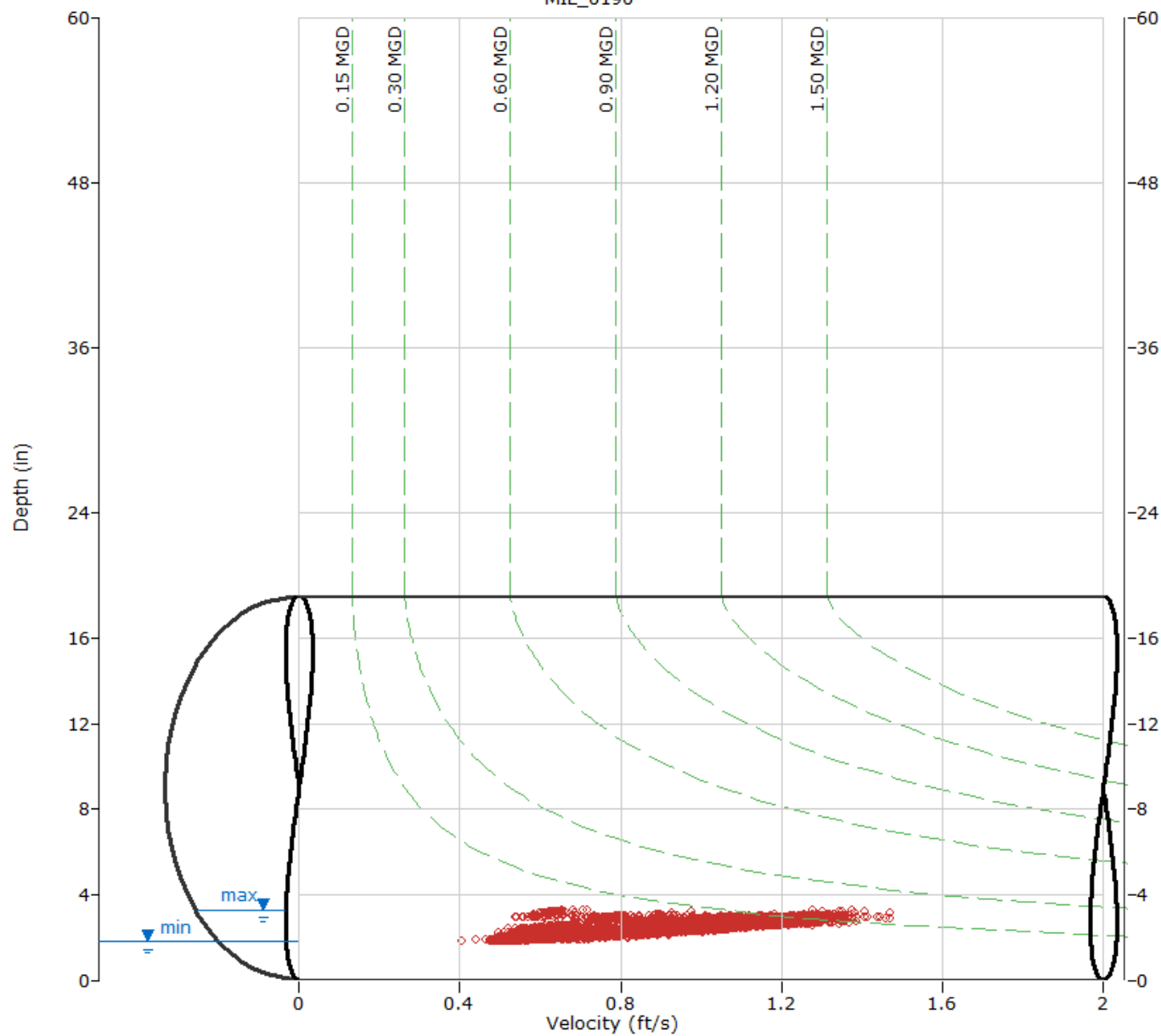
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES

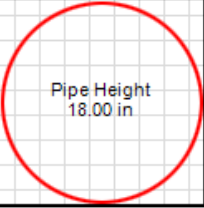


# HYDROGRAPH REPORT

MIL\_0190

Flow Monitor

**MIL\_0190**



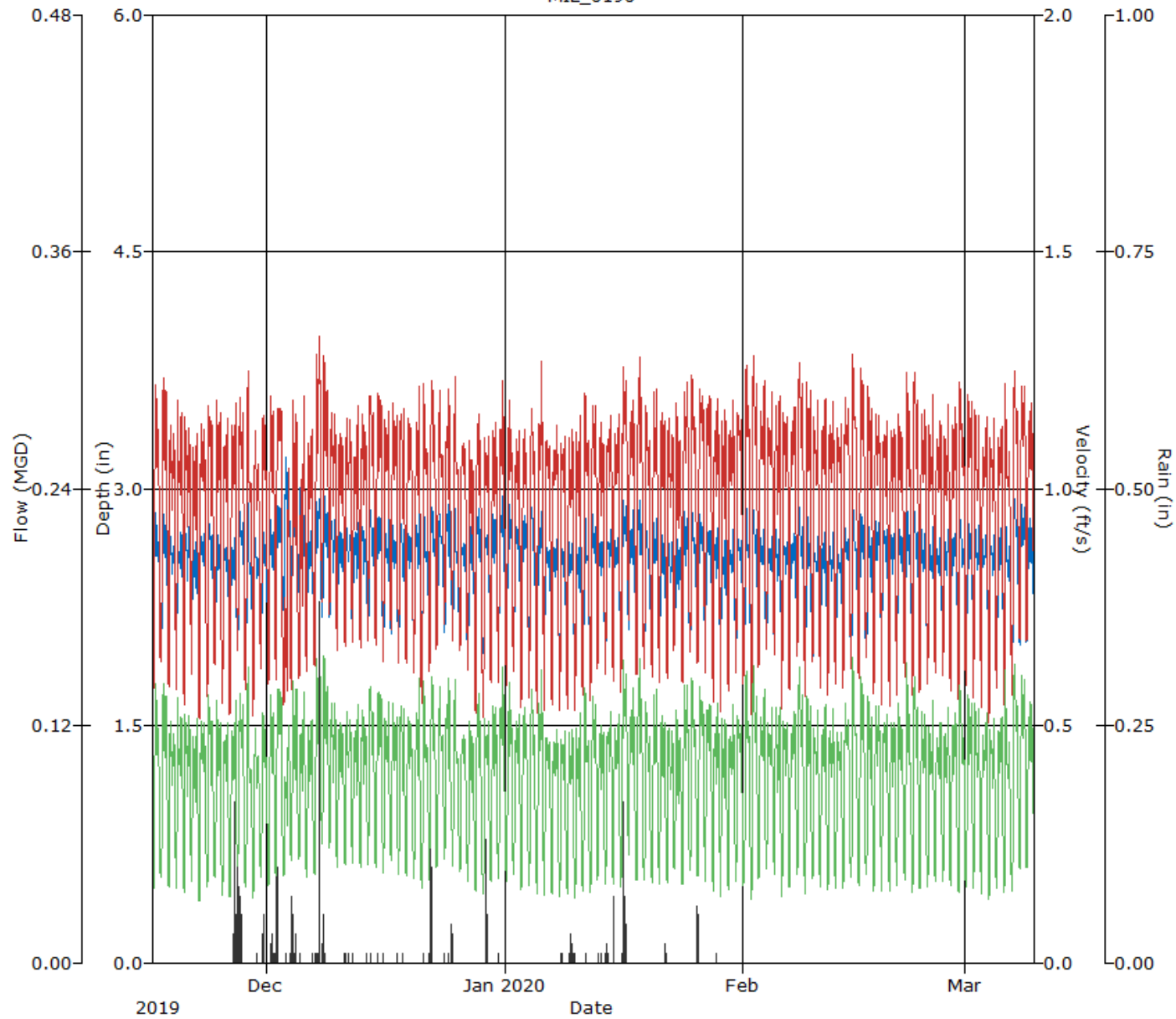
Pipe Height  
18.00 in.

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth
- Velocity
- Quantity
- Rain





Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0190, Pipe Height: 18.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 05:40      | 1.91 | 11:20 | 2.88 | 2.45 | 05:30           | 0.55 | 12:55 | 1.35 | 0.96 | 05:30                     | 0.036 | 13:00 | 0.155 | 0.093 | 0.093 |           |
| 11/17/2019 | 05:05      | 1.95 | 11:00 | 3.02 | 2.48 | 04:10           | 0.58 | 10:55 | 1.36 | 0.98 | 04:10                     | 0.040 | 10:55 | 0.172 | 0.097 | 0.097 |           |
| 11/18/2019 | 03:55      | 1.91 | 11:05 | 2.74 | 2.42 | 03:45           | 0.53 | 20:00 | 1.23 | 0.94 | 03:45                     | 0.034 | 11:10 | 0.130 | 0.089 | 0.089 |           |
| 11/19/2019 | 05:35      | 1.89 | 09:05 | 2.81 | 2.44 | 05:35           | 0.54 | 18:45 | 1.38 | 0.95 | 05:35                     | 0.034 | 18:45 | 0.150 | 0.091 | 0.091 |           |
| 11/20/2019 | 04:35      | 1.91 | 19:10 | 2.80 | 2.46 | 04:25           | 0.49 | 08:35 | 1.25 | 0.94 | 04:25                     | 0.032 | 19:05 | 0.137 | 0.091 | 0.091 |           |
| 11/21/2019 | 04:40      | 1.95 | 21:10 | 2.88 | 2.41 | 04:40           | 0.55 | 18:35 | 1.19 | 0.92 | 04:40                     | 0.037 | 21:15 | 0.138 | 0.086 | 0.086 |           |
| 11/22/2019 | 04:00      | 1.80 | 10:45 | 2.76 | 2.41 | 03:50           | 0.41 | 10:25 | 1.23 | 0.93 | 03:50                     | 0.024 | 10:35 | 0.134 | 0.088 | 0.088 |           |
| 11/23/2019 | 03:20      | 1.96 | 10:15 | 2.91 | 2.46 | 05:00           | 0.54 | 11:15 | 1.30 | 0.94 | 05:00                     | 0.037 | 10:15 | 0.150 | 0.092 | 0.092 |           |
| 11/24/2019 | 03:40      | 1.98 | 12:35 | 2.81 | 2.44 | 03:35           | 0.57 | 21:55 | 1.25 | 0.96 | 03:35                     | 0.039 | 22:00 | 0.141 | 0.092 | 0.092 |           |
| 11/25/2019 | 05:35      | 1.83 | 21:30 | 2.69 | 2.38 | 04:20           | 0.53 | 20:30 | 1.20 | 0.93 | 05:35                     | 0.032 | 18:50 | 0.126 | 0.087 | 0.087 |           |
| 11/26/2019 | 05:40      | 1.84 | 21:15 | 2.87 | 2.39 | 03:50           | 0.44 | 12:50 | 1.28 | 0.93 | 03:50                     | 0.027 | 21:15 | 0.147 | 0.088 | 0.088 | 0.36      |
| 11/27/2019 | 05:25      | 2.00 | 12:45 | 2.95 | 2.52 | 05:10           | 0.61 | 12:40 | 1.29 | 0.98 | 05:10                     | 0.043 | 12:40 | 0.157 | 0.099 | 0.099 | 0.63      |
| 11/28/2019 | 05:25      | 1.92 | 12:45 | 3.00 | 2.41 | 06:25           | 0.52 | 12:50 | 1.30 | 0.93 | 06:25                     | 0.034 | 12:50 | 0.160 | 0.088 | 0.088 |           |
| 11/29/2019 | 05:40      | 1.85 | 10:35 | 2.74 | 2.35 | 04:40           | 0.50 | 12:25 | 1.24 | 0.90 | 05:50                     | 0.031 | 10:35 | 0.135 | 0.082 | 0.082 |           |
| 11/30/2019 | 05:35      | 1.99 | 11:05 | 2.78 | 2.42 | 05:15           | 0.58 | 14:20 | 1.22 | 0.94 | 05:15                     | 0.040 | 11:05 | 0.135 | 0.089 | 0.089 | 0.10      |
| 12/01/2019 | 06:25      | 1.92 | 11:30 | 2.84 | 2.43 | 06:25           | 0.55 | 11:30 | 1.29 | 0.94 | 06:25                     | 0.036 | 11:30 | 0.150 | 0.091 | 0.091 | 0.06      |
| 12/02/2019 | 05:15      | 1.92 | 09:00 | 2.95 | 2.56 | 04:10           | 0.55 | 09:00 | 1.20 | 1.00 | 04:10                     | 0.037 | 09:00 | 0.147 | 0.104 | 0.104 | 0.30      |
| 12/03/2019 | 06:05      | 2.19 | 13:25 | 3.24 | 2.75 | 03:50           | 0.50 | 18:45 | 1.12 | 0.74 | 03:50                     | 0.041 | 20:10 | 0.130 | 0.082 | 0.082 | 0.01      |
| 12/04/2019 | 02:15      | 2.36 | 11:10 | 2.98 | 2.72 | 05:15           | 0.52 | 09:10 | 1.26 | 0.91 | 04:00                     | 0.048 | 09:10 | 0.153 | 0.101 | 0.101 | 0.39      |
| 12/05/2019 | 04:45      | 2.33 | 15:10 | 3.18 | 2.67 | 04:55           | 0.57 | 21:45 | 1.25 | 0.87 | 04:55                     | 0.050 | 15:15 | 0.152 | 0.094 | 0.094 | 0.01      |
| 12/06/2019 | 03:50      | 2.01 | 19:25 | 2.89 | 2.49 | 05:20           | 0.58 | 19:25 | 1.28 | 0.95 | 03:20                     | 0.041 | 19:25 | 0.152 | 0.094 | 0.094 | 0.01      |
| 12/07/2019 | 05:25      | 2.01 | 21:05 | 2.98 | 2.58 | 05:15           | 0.59 | 12:50 | 1.44 | 1.03 | 05:15                     | 0.042 | 12:50 | 0.174 | 0.108 | 0.108 | 0.67      |
| 12/08/2019 | 04:25      | 2.18 | 10:50 | 2.99 | 2.63 | 05:15           | 0.72 | 10:55 | 1.37 | 1.07 | 05:15                     | 0.056 | 10:55 | 0.170 | 0.113 | 0.113 | 0.20      |
| 12/09/2019 | 03:50      | 2.16 | 21:25 | 2.84 | 2.55 | 04:05           | 0.65 | 22:00 | 1.28 | 1.00 | 04:05                     | 0.050 | 11:30 | 0.144 | 0.101 | 0.101 |           |
| 12/10/2019 | 04:35      | 2.05 | 19:00 | 2.77 | 2.50 | 03:40           | 0.61 | 11:00 | 1.23 | 0.96 | 03:40                     | 0.044 | 11:00 | 0.134 | 0.094 | 0.094 |           |
| 12/11/2019 | 03:45      | 2.07 | 09:10 | 2.79 | 2.50 | 05:00           | 0.64 | 20:55 | 1.25 | 0.97 | 05:00                     | 0.047 | 20:00 | 0.137 | 0.095 | 0.095 | 0.03      |
| 12/12/2019 | 03:45      | 2.08 | 13:55 | 3.29 | 2.50 | 03:55           | 0.63 | 13:50 | 1.38 | 0.97 | 03:55                     | 0.047 | 13:55 | 0.196 | 0.095 | 0.095 | 0.01      |
| 12/13/2019 | 05:00      | 2.02 | 14:00 | 2.87 | 2.49 | 05:10           | 0.62 | 13:50 | 1.25 | 0.97 | 05:10                     | 0.044 | 10:40 | 0.144 | 0.095 | 0.095 | 0.01      |
| 12/14/2019 | 05:35      | 2.05 | 11:05 | 2.90 | 2.53 | 04:55           | 0.66 | 12:05 | 1.30 | 1.01 | 05:35                     | 0.048 | 11:00 | 0.150 | 0.102 | 0.102 | 0.01      |
| 12/15/2019 | 04:20      | 2.04 | 20:50 | 2.85 | 2.53 | 05:20           | 0.64 | 13:45 | 1.29 | 1.00 | 05:20                     | 0.046 | 13:45 | 0.149 | 0.101 | 0.101 | 0.01      |
| 12/16/2019 | 04:10      | 2.01 | 21:15 | 2.89 | 2.48 | 03:50           | 0.59 | 11:25 | 1.27 | 0.98 | 03:50                     | 0.042 | 21:15 | 0.145 | 0.096 | 0.096 | 0.01      |
| 12/17/2019 | 04:45      | 2.05 | 10:10 | 2.80 | 2.49 | 05:20           | 0.62 | 20:55 | 1.33 | 1.00 | 05:20                     | 0.045 | 20:55 | 0.142 | 0.098 | 0.098 | 0.01      |
| 12/18/2019 | 04:45      | 1.99 | 14:30 | 2.81 | 2.48 | 05:30           | 0.58 | 22:00 | 1.36 | 0.98 | 05:30                     | 0.040 | 22:00 | 0.148 | 0.096 | 0.096 | 0.01      |
| 12/19/2019 | 03:50      | 1.98 | 13:05 | 2.77 | 2.47 | 04:50           | 0.57 | 09:30 | 1.24 | 0.97 | 04:50                     | 0.040 | 09:10 | 0.138 | 0.094 | 0.094 |           |
| 12/20/2019 | 04:20      | 1.98 | 20:55 | 2.92 | 2.49 | 04:00           | 0.54 | 20:55 | 1.29 | 0.95 | 04:00                     | 0.038 | 20:55 | 0.155 | 0.093 | 0.093 |           |
| 12/21/2019 | 05:40      | 1.97 | 11:05 | 2.92 | 2.46 | 05:30           | 0.49 | 11:05 | 1.35 | 0.94 | 05:30                     | 0.034 | 11:05 | 0.162 | 0.092 | 0.092 | 0.01      |
| 12/22/2019 | 06:25      | 1.94 | 11:10 | 2.91 | 2.50 | 05:15           | 0.52 | 11:00 | 1.38 | 0.99 | 05:15                     | 0.035 | 11:00 | 0.163 | 0.099 | 0.099 | 0.41      |
| 12/23/2019 | 05:10      | 2.04 | 13:40 | 2.91 | 2.52 | 03:40           | 0.63 | 10:45 | 1.32 | 0.97 | 03:40                     | 0.045 | 13:40 | 0.154 | 0.097 | 0.097 |           |
| 12/24/2019 | 05:25      | 2.07 | 18:25 | 2.95 | 2.54 | 04:55           | 0.64 | 20:25 | 1.25 | 0.98 | 04:55                     | 0.047 | 18:30 | 0.150 | 0.099 | 0.099 |           |
| 12/25/2019 | 06:00      | 2.02 | 12:30 | 2.94 | 2.47 | 05:30           | 0.65 | 14:30 | 1.47 | 0.96 | 05:55                     | 0.047 | 14:30 | 0.174 | 0.093 | 0.093 | 0.08      |
| 12/26/2019 | 04:55      | 2.00 | 10:40 | 2.70 | 2.42 | 05:10           | 0.63 | 19:45 | 1.20 | 0.94 | 04:55                     | 0.044 | 19:45 | 0.128 | 0.088 | 0.088 |           |
| 12/27/2019 | 04:50      | 1.94 | 13:05 | 2.82 | 2.44 | 04:45           | 0.53 | 19:35 | 1.17 | 0.91 | 04:45                     | 0.035 | 13:05 | 0.134 | 0.087 | 0.087 |           |
| 12/28/2019 | 06:30      | 1.95 | 14:20 | 2.93 | 2.48 | 06:20           | 0.49 | 14:30 | 1.22 | 0.91 | 06:20                     | 0.033 | 14:30 | 0.145 | 0.090 | 0.090 |           |
| 12/29/2019 | 06:05      | 1.94 | 10:30 | 2.84 | 2.45 | 05:40           | 0.50 | 21:30 | 1.19 | 0.89 | 05:50                     | 0.033 | 20:05 | 0.133 | 0.087 | 0.087 |           |
| 12/30/2019 | 04:45      | 1.99 | 12:55 | 2.91 | 2.50 | 05:45           | 0.56 | 12:55 | 1.21 | 0.92 | 05:45                     | 0.039 | 12:55 | 0.145 | 0.092 | 0.092 |           |
| 12/31/2019 | 05:15      | 2.01 | 19:25 | 3.00 | 2.56 | 04:20           | 0.54 | 19:00 | 1.26 | 0.95 | 05:05                     | 0.039 | 19:25 | 0.157 | 0.098 | 0.098 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 06:05      | 2.01 | 17:10 | 3.07 | 2.51 | 06:15           | 0.56 | 17:10 | 1.31 | 0.93 | 06:15                     | 0.039 | 17:10 | 0.170 | 0.093 | 0.093 |       |           |
| 01/02/2020 | 05:30      | 2.04 | 21:25 | 2.85 | 2.50 | 04:45           | 0.59 | 15:10 | 1.19 | 0.92 | 04:45                     | 0.042 | 21:20 | 0.134 | 0.091 | 0.091 |       |           |
| 01/03/2020 | 05:20      | 1.96 | 13:10 | 2.87 | 2.48 | 04:25           | 0.50 | 12:40 | 1.19 | 0.90 | 04:25                     | 0.035 | 13:05 | 0.138 | 0.089 | 0.089 |       |           |
| 01/04/2020 | 05:50      | 2.01 | 13:20 | 2.91 | 2.50 | 05:15           | 0.54 | 12:40 | 1.21 | 0.92 | 05:15                     | 0.038 | 12:40 | 0.144 | 0.092 | 0.092 |       |           |
| 01/05/2020 | 05:55      | 1.93 | 21:00 | 3.01 | 2.47 | 05:40           | 0.50 | 21:00 | 1.34 | 0.93 | 05:40                     | 0.033 | 21:00 | 0.168 | 0.093 | 0.093 |       |           |
| 01/06/2020 | 05:00      | 1.86 | 20:55 | 2.72 | 2.40 | 04:45           | 0.46 | 11:20 | 1.22 | 0.93 | 04:45                     | 0.029 | 12:05 | 0.128 | 0.087 | 0.087 |       |           |
| 01/07/2020 | 04:55      | 1.85 | 21:00 | 2.80 | 2.38 | 04:55           | 0.50 | 20:55 | 1.30 | 0.92 | 04:55                     | 0.031 | 20:55 | 0.148 | 0.086 | 0.086 |       |           |
| 01/08/2020 | 05:30      | 1.84 | 21:25 | 2.77 | 2.39 | 05:20           | 0.50 | 21:15 | 1.20 | 0.92 | 05:30                     | 0.031 | 21:15 | 0.131 | 0.086 | 0.086 |       |           |
| 01/09/2020 | 05:00      | 1.88 | 08:55 | 2.71 | 2.41 | 04:45           | 0.51 | 21:15 | 1.19 | 0.92 | 04:55                     | 0.033 | 21:15 | 0.127 | 0.087 | 0.087 |       |           |
| 01/10/2020 | 05:10      | 1.82 | 20:40 | 2.78 | 2.38 | 04:55           | 0.50 | 09:35 | 1.26 | 0.93 | 05:10                     | 0.030 | 09:35 | 0.135 | 0.086 | 0.086 | 0.02  |           |
| 01/11/2020 | 05:25      | 1.87 | 11:10 | 2.93 | 2.43 | 05:05           | 0.52 | 12:40 | 1.32 | 0.94 | 05:05                     | 0.033 | 12:40 | 0.154 | 0.091 | 0.091 | 0.18  |           |
| 01/12/2020 | 05:10      | 1.88 | 11:15 | 2.92 | 2.46 | 05:35           | 0.54 | 19:05 | 1.29 | 0.96 | 05:35                     | 0.034 | 11:15 | 0.147 | 0.094 | 0.094 | 0.02  |           |
| 01/13/2020 | 03:45      | 1.94 | 20:45 | 2.81 | 2.43 | 04:25           | 0.58 | 20:45 | 1.18 | 0.95 | 04:25                     | 0.040 | 20:45 | 0.134 | 0.091 | 0.091 | 0.11  |           |
| 01/14/2020 | 03:35      | 1.90 | 19:45 | 2.82 | 2.44 | 02:25           | 0.57 | 19:40 | 1.31 | 0.96 | 03:25                     | 0.038 | 19:40 | 0.149 | 0.092 | 0.092 | 0.07  |           |
| 01/15/2020 | 04:55      | 1.91 | 21:10 | 2.77 | 2.44 | 04:45           | 0.56 | 19:35 | 1.23 | 0.95 | 04:45                     | 0.037 | 21:10 | 0.137 | 0.091 | 0.091 | 0.66  |           |
| 01/16/2020 | 04:30      | 1.93 | 12:40 | 3.22 | 2.52 | 03:20           | 0.54 | 12:50 | 1.38 | 1.00 | 03:50                     | 0.036 | 12:40 | 0.186 | 0.102 | 0.102 |       |           |
| 01/17/2020 | 04:40      | 2.08 | 19:05 | 2.90 | 2.54 | 04:45           | 0.71 | 10:55 | 1.29 | 1.03 | 04:45                     | 0.052 | 19:00 | 0.149 | 0.103 | 0.103 |       |           |
| 01/18/2020 | 05:40      | 1.98 | 14:40 | 3.02 | 2.51 | 03:40           | 0.55 | 14:40 | 1.35 | 0.99 | 03:40                     | 0.040 | 14:40 | 0.170 | 0.099 | 0.099 |       |           |
| 01/19/2020 | 04:35      | 1.95 | 10:40 | 2.84 | 2.43 | 04:10           | 0.58 | 14:00 | 1.32 | 0.95 | 04:10                     | 0.039 | 14:00 | 0.146 | 0.090 | 0.090 |       |           |
| 01/20/2020 | 05:20      | 1.95 | 20:05 | 2.85 | 2.44 | 06:10           | 0.55 | 11:00 | 1.35 | 0.97 | 06:10                     | 0.038 | 11:00 | 0.149 | 0.093 | 0.093 |       |           |
| 01/21/2020 | 04:55      | 1.94 | 21:00 | 2.85 | 2.45 | 05:10           | 0.57 | 21:05 | 1.27 | 0.97 | 05:10                     | 0.038 | 21:05 | 0.147 | 0.094 | 0.094 |       |           |
| 01/22/2020 | 05:25      | 1.92 | 09:10 | 2.74 | 2.41 | 05:30           | 0.55 | 08:55 | 1.25 | 0.96 | 05:25                     | 0.036 | 09:00 | 0.135 | 0.090 | 0.090 | 0.03  |           |
| 01/23/2020 | 05:20      | 2.01 | 09:20 | 2.76 | 2.42 | 02:45           | 0.59 | 09:00 | 1.29 | 0.96 | 02:45                     | 0.042 | 11:55 | 0.138 | 0.090 | 0.090 |       |           |
| 01/24/2020 | 05:05      | 1.92 | 19:45 | 3.01 | 2.49 | 05:10           | 0.54 | 19:45 | 1.32 | 1.00 | 05:10                     | 0.035 | 19:45 | 0.165 | 0.099 | 0.099 |       |           |
| 01/25/2020 | 06:20      | 2.00 | 10:45 | 2.93 | 2.49 | 06:05           | 0.55 | 10:25 | 1.32 | 1.00 | 06:05                     | 0.039 | 10:25 | 0.157 | 0.099 | 0.099 |       |           |
| 01/26/2020 | 04:15      | 1.97 | 11:55 | 2.87 | 2.49 | 03:45           | 0.58 | 11:55 | 1.30 | 1.00 | 03:45                     | 0.040 | 11:55 | 0.152 | 0.099 | 0.099 | 0.16  |           |
| 01/27/2020 | 04:40      | 1.97 | 19:45 | 2.78 | 2.48 | 04:20           | 0.55 | 08:35 | 1.30 | 1.00 | 04:20                     | 0.037 | 21:05 | 0.139 | 0.098 | 0.098 |       |           |
| 01/28/2020 | 04:50      | 1.91 | 20:30 | 2.83 | 2.44 | 04:40           | 0.51 | 20:25 | 1.27 | 0.97 | 04:50                     | 0.033 | 20:25 | 0.145 | 0.092 | 0.092 | 0.01  |           |
| 01/29/2020 | 05:25      | 1.83 | 09:15 | 2.79 | 2.39 | 05:10           | 0.48 | 19:20 | 1.28 | 0.94 | 05:10                     | 0.029 | 09:10 | 0.136 | 0.088 | 0.088 |       |           |
| 01/30/2020 | 05:15      | 1.90 | 19:40 | 2.79 | 2.40 | 04:50           | 0.54 | 19:35 | 1.27 | 0.96 | 04:50                     | 0.035 | 19:40 | 0.143 | 0.090 | 0.090 |       |           |
| 01/31/2020 | 04:00      | 1.95 | 09:05 | 2.74 | 2.46 | 04:40           | 0.57 | 13:50 | 1.25 | 1.00 | 04:40                     | 0.039 | 13:50 | 0.135 | 0.096 | 0.096 |       |           |
| 02/01/2020 | 04:10      | 1.90 | 14:10 | 2.91 | 2.45 | 03:50           | 0.54 | 20:10 | 1.37 | 0.99 | 03:50                     | 0.035 | 14:10 | 0.157 | 0.097 | 0.097 |       |           |
| 02/02/2020 | 05:35      | 1.83 | 12:15 | 2.88 | 2.45 | 05:30           | 0.50 | 12:35 | 1.46 | 0.99 | 05:30                     | 0.031 | 12:35 | 0.171 | 0.097 | 0.097 |       |           |
| 02/03/2020 | 03:55      | 1.95 | 21:05 | 2.87 | 2.45 | 04:05           | 0.56 | 21:00 | 1.33 | 0.99 | 04:05                     | 0.037 | 21:00 | 0.157 | 0.096 | 0.096 |       |           |
| 02/04/2020 | 04:00      | 2.02 | 20:05 | 2.74 | 2.45 | 03:10           | 0.63 | 22:10 | 1.28 | 1.00 | 04:00                     | 0.046 | 20:20 | 0.139 | 0.096 | 0.096 |       |           |
| 02/05/2020 | 05:30      | 1.98 | 10:20 | 2.82 | 2.45 | 06:00           | 0.60 | 20:55 | 1.37 | 0.99 | 06:00                     | 0.041 | 20:55 | 0.145 | 0.094 | 0.094 |       |           |
| 02/06/2020 | 04:20      | 1.84 | 10:55 | 2.70 | 2.41 | 03:20           | 0.51 | 21:25 | 1.23 | 0.96 | 03:00                     | 0.033 | 21:25 | 0.130 | 0.091 | 0.091 |       |           |
| 02/07/2020 | 05:15      | 1.88 | 20:35 | 2.75 | 2.42 | 05:05           | 0.50 | 20:35 | 1.28 | 0.97 | 05:05                     | 0.033 | 20:35 | 0.141 | 0.092 | 0.092 |       |           |
| 02/08/2020 | 05:20      | 1.98 | 09:45 | 3.01 | 2.47 | 04:05           | 0.61 | 09:40 | 1.41 | 1.02 | 05:05                     | 0.042 | 09:40 | 0.173 | 0.099 | 0.099 |       |           |
| 02/09/2020 | 06:10      | 1.83 | 13:15 | 2.90 | 2.40 | 06:10           | 0.52 | 10:50 | 1.30 | 0.96 | 06:10                     | 0.032 | 10:50 | 0.149 | 0.091 | 0.091 |       |           |
| 02/10/2020 | 05:20      | 1.91 | 21:15 | 2.76 | 2.41 | 03:50           | 0.60 | 07:55 | 1.34 | 0.98 | 03:50                     | 0.039 | 07:55 | 0.136 | 0.092 | 0.092 |       |           |
| 02/11/2020 | 04:35      | 1.91 | 21:25 | 2.82 | 2.42 | 04:25           | 0.53 | 21:20 | 1.27 | 0.97 | 04:25                     | 0.035 | 21:20 | 0.144 | 0.092 | 0.092 |       |           |
| 02/12/2020 | 04:05      | 1.87 | 21:25 | 2.76 | 2.42 | 03:45           | 0.51 | 20:00 | 1.21 | 0.98 | 03:45                     | 0.033 | 21:25 | 0.133 | 0.093 | 0.093 |       |           |
| 02/13/2020 | 04:50      | 1.88 | 08:50 | 2.75 | 2.40 | 04:20           | 0.55 | 22:45 | 1.22 | 0.97 | 05:00                     | 0.035 | 09:00 | 0.129 | 0.090 | 0.090 |       |           |
| 02/14/2020 | 05:05      | 1.88 | 11:05 | 2.77 | 2.44 | 03:20           | 0.53 | 20:40 | 1.32 | 0.99 | 03:20                     | 0.034 | 20:40 | 0.141 | 0.095 | 0.095 |       |           |
| 02/15/2020 | 03:25      | 1.99 | 09:30 | 2.99 | 2.48 | 04:20           | 0.60 | 09:20 | 1.44 | 1.01 | 04:20                     | 0.042 | 09:20 | 0.176 | 0.100 | 0.100 |       |           |
| 02/16/2020 | 05:15      | 1.90 | 13:40 | 2.88 | 2.45 | 05:25           | 0.57 | 14:10 | 1.28 | 0.99 | 05:25                     | 0.037 | 13:45 | 0.151 | 0.097 | 0.097 |       |           |
| 02/17/2020 | 05:05      | 1.94 | 10:50 | 2.86 | 2.43 | 04:50           | 0.55 | 12:35 | 1.29 | 0.98 | 04:50                     | 0.037 | 10:45 | 0.148 | 0.094 | 0.094 |       |           |
| 02/18/2020 | 03:35      | 1.87 | 18:10 | 2.84 | 2.45 | 03:45           | 0.54 | 18:10 | 1.20 | 0.95 | 03:30                     | 0.034 | 18:10 | 0.139 | 0.092 | 0.092 |       |           |
| 02/19/2020 | 04:10      | 1.95 | 12:05 | 2.82 | 2.47 | 04:15           | 0.53 | 20:45 | 1.21 | 0.94 | 04:10                     | 0.035 | 20:45 | 0.137 | 0.092 | 0.092 |       |           |
| 02/20/2020 | 04:55      | 1.91 | 12:45 | 2.77 | 2.45 | 05:05           | 0.51 | 18:45 | 1.22 | 0.93 | 05:05                     | 0.033 | 20:30 | 0.131 | 0.090 | 0.090 |       |           |
| 02/21/2020 | 05:15      | 1.97 | 09:30 | 2.86 | 2.48 | 04:35           | 0.53 | 18:45 | 1.27 | 0.95 | 04:35                     | 0.036 | 09:30 | 0.140 | 0.093 | 0.093 |       |           |
| 02/22/2020 | 06:10      | 1.97 | 11:10 | 3.00 | 2.48 | 05:55           | 0.56 | 11:50 | 1.27 | 0.96 | 05:55                     | 0.038 | 11:10 | 0.158 | 0.095 | 0.095 |       |           |
| 02/23/2020 | 05:15      | 1.87 | 11:25 | 2.87 | 2.45 | 06:00           | 0.54 | 10:10 | 1.35 | 0.98 | 06:00                     | 0.034 | 10:10 | 0.152 | 0.096 | 0.096 |       |           |
| 02/24/2020 | 03:55      | 1.89 | 19:50 | 2.81 | 2.43 | 04:05           | 0.48 | 19:40 | 1.25 | 0.97 | 04:05                     | 0.031 | 19:40 | 0.142 | 0.093 | 0.093 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 04:55      | 1.88 | 21:15 | 2.81 | 2.42 | 04:40           | 0.52 | 19:55 | 1.26 | 0.95 | 04:40                     | 0.034 | 21:10 | 0.139 | 0.090 | 0.090 |           |
| 02/26/2020 | 05:05      | 1.92 | 21:15 | 2.74 | 2.42 | 04:50           | 0.55 | 20:30 | 1.27 | 0.96 | 04:55                     | 0.036 | 20:30 | 0.135 | 0.091 | 0.091 |           |
| 02/27/2020 | 04:55      | 1.94 | 20:55 | 2.78 | 2.44 | 05:00           | 0.57 | 08:50 | 1.26 | 0.96 | 05:00                     | 0.038 | 20:30 | 0.138 | 0.091 | 0.091 |           |
| 02/28/2020 | 05:10      | 1.91 | 20:35 | 2.75 | 2.44 | 05:05           | 0.51 | 20:45 | 1.21 | 0.95 | 05:05                     | 0.033 | 21:20 | 0.132 | 0.091 | 0.091 |           |
| 02/29/2020 | 06:15      | 1.89 | 09:35 | 2.93 | 2.43 | 06:10           | 0.52 | 09:30 | 1.29 | 0.95 | 06:15                     | 0.033 | 09:35 | 0.156 | 0.091 | 0.091 |           |
| 03/01/2020 | 05:00      | 1.90 | 21:10 | 2.84 | 2.44 | 06:10           | 0.55 | 12:30 | 1.33 | 0.96 | 06:10                     | 0.036 | 12:30 | 0.148 | 0.093 | 0.093 |           |
| 03/02/2020 | 04:30      | 1.93 | 09:15 | 2.85 | 2.46 | 04:20           | 0.54 | 09:10 | 1.30 | 0.95 | 04:20                     | 0.036 | 09:10 | 0.149 | 0.092 | 0.092 |           |
| 03/03/2020 | 05:40      | 1.90 | 21:40 | 2.79 | 2.44 | 05:20           | 0.52 | 19:10 | 1.22 | 0.93 | 05:20                     | 0.034 | 19:10 | 0.136 | 0.089 | 0.089 |           |
| 03/04/2020 | 04:55      | 1.86 | 21:10 | 2.77 | 2.41 | 05:05           | 0.48 | 21:05 | 1.21 | 0.92 | 05:05                     | 0.030 | 21:05 | 0.135 | 0.088 | 0.088 |           |
| 03/05/2020 | 04:10      | 1.91 | 20:55 | 2.78 | 2.44 | 03:30           | 0.55 | 18:55 | 1.16 | 0.94 | 03:35                     | 0.036 | 21:10 | 0.129 | 0.091 | 0.091 |           |
| 03/06/2020 | 04:50      | 1.89 | 09:25 | 3.19 | 2.42 | 04:45           | 0.51 | 09:10 | 1.47 | 0.93 | 04:45                     | 0.033 | 09:10 | 0.198 | 0.088 | 0.088 |           |
| 03/07/2020 | 05:30      | 1.88 | 13:55 | 3.03 | 2.52 | 05:10           | 0.54 | 16:10 | 1.31 | 1.00 | 05:25                     | 0.034 | 13:55 | 0.166 | 0.102 | 0.102 |           |
| 03/08/2020 | 05:30      | 1.98 | 17:50 | 3.10 | 2.56 | 05:30           | 0.66 | 13:35 | 1.33 | 1.03 | 05:30                     | 0.045 | 17:50 | 0.173 | 0.105 | 0.105 |           |
| 03/09/2020 | 03:50      | 2.01 | 11:50 | 2.91 | 2.49 | 03:45           | 0.63 | 11:40 | 1.24 | 0.99 | 03:45                     | 0.044 | 11:50 | 0.145 | 0.098 | 0.098 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 10.748                    | 4.90      |
| Avg   | 2.47       | 0.96            | 0.093                     |           |

## Site Commentary

### Site Information

| MIL_0229        |       |
|-----------------|-------|
| Pipe Dimensions | 21    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0229 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed upstream of site MIL\_2808. (See MIL\_2808 Site Commentary for More Details)

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                    |                    |
|--------------------------|--------------------|--------------------|--------------------|
| Item                     | Depth (in)         | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 3.46               | 0.59               | 0.103              |
| Minimum                  | 1.78               | 0.19               | 0.021              |
| Maximum                  | 5.18               | 0.94               | 0.253              |
| Time of Minimum          | 11/29/2019 7:00 AM | 2/26/2020 4:00 AM  | 11/29/2019 7:05 AM |
| Time of Maximum          | 12/6/2019 3:20 PM  | 11/21/2019 9:05 AM | 1/21/2020 1:55 PM  |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0229

Site Address /Location:

Bellew Dr and McCarthy Blvd

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details:

In right lane of road

Latitude:

37.420574°

Longitude:

-121.921605°

Pipe Size (H x W)

21.0" x 21.0"

Pipe Shape

Circular

Manhole #

229

System Characteristics

Residential/Commercial

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

4:21:29 AM

Pipe Size (HxW)

21.0" x 21.0"

Depth of Flow (Wet DOF) (in)

2.25

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

0.25

Velocity Sensor Offset (in)

0"

Silt (in)

0.25"

Silt Type

Soft / Loose

### Hydraulic Comments:

Shallow depth with slow velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

15'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

805



ADS Project Name:

Milpitas.WWTFM.CA19-20

28

ADS Project Number:

22431

# SCATTERGRAPH REPORT

MIL\_0229

Flow Monitor

**MIL\_0229**

Pipe Height  
21.00 in

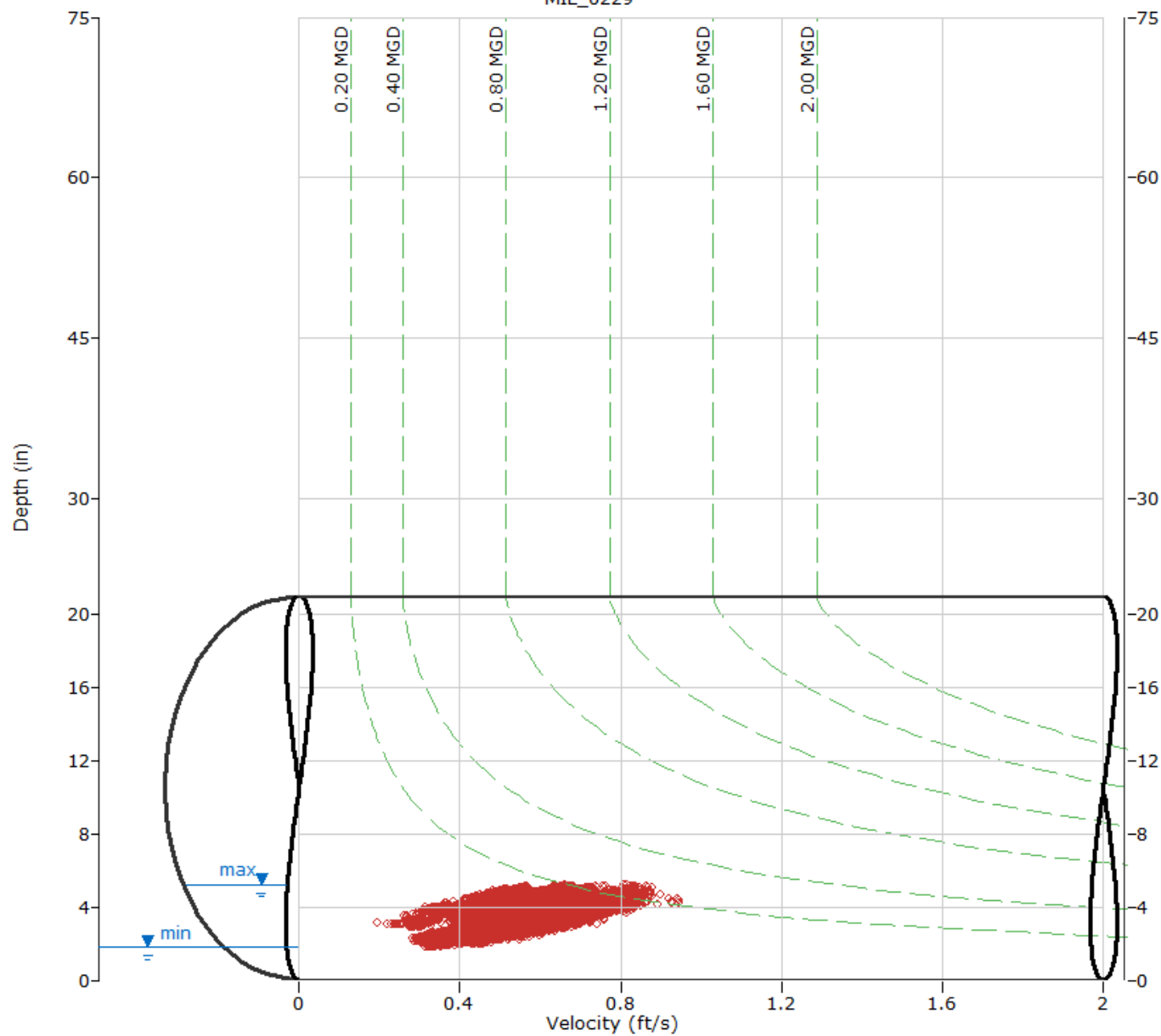
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

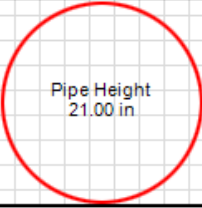
**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_0229

Flow Monitor  
**MIL\_0229**

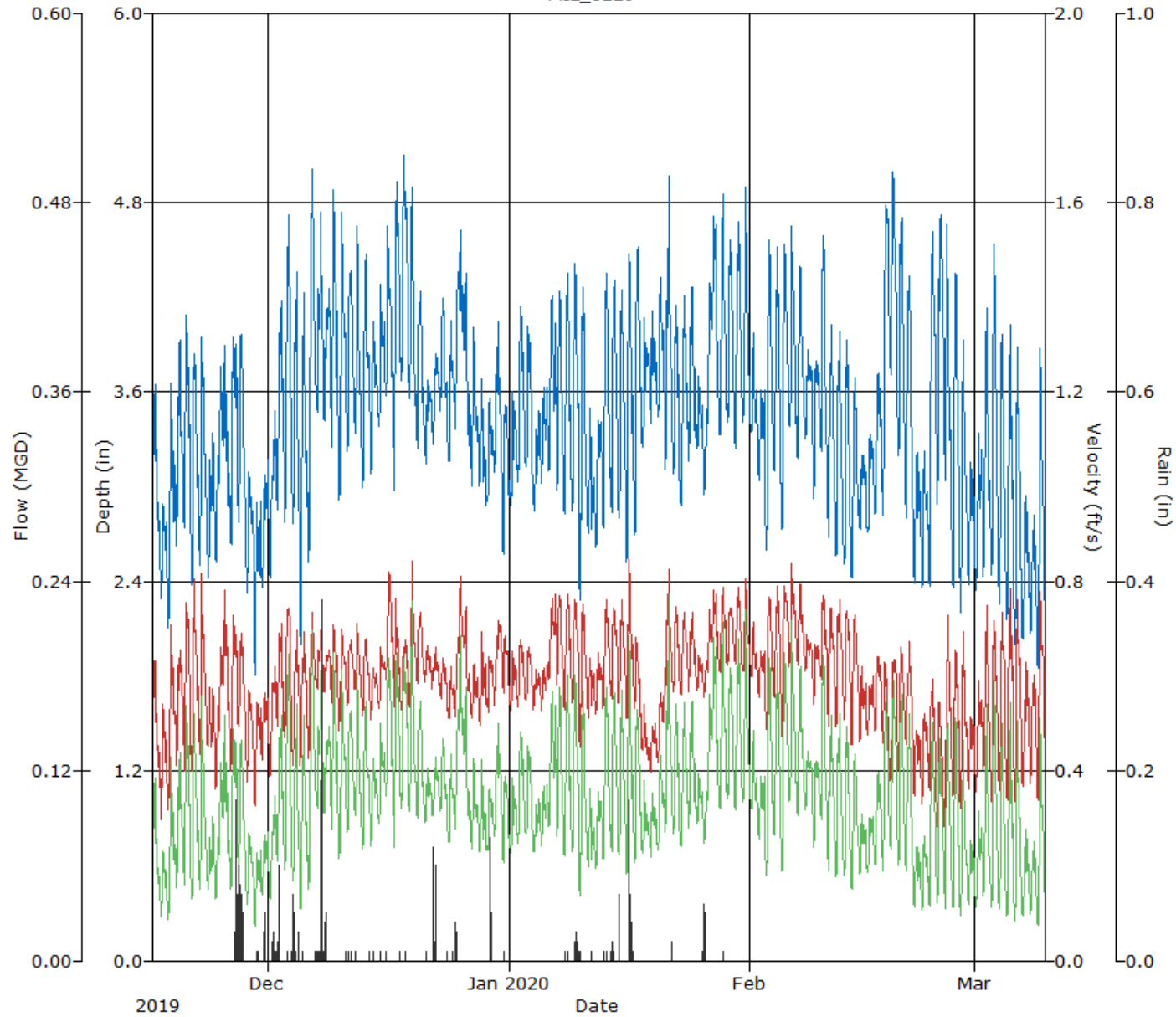


Pipe Height  
21.00 in

Report Period  
11/16/2019  
To  
3/9/2020

Legend  

- Depth
- Velocity
- Quantity
- Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0229, Pipe Height: 21.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 21:15      | 2.61 | 10:30 | 4.06 | 3.16 | 23:25           | 0.39 | 10:30 | 0.75 | 0.52 | 20:50                     | 0.044 | 10:30 | 0.157 | 0.079 | 0.079 |           |
| 11/17/2019 | 07:10      | 2.27 | 10:00 | 3.04 | 2.63 | 05:30           | 0.28 | 09:55 | 0.62 | 0.43 | 05:30                     | 0.026 | 09:55 | 0.085 | 0.050 | 0.050 |           |
| 11/18/2019 | 03:25      | 2.07 | 10:15 | 3.89 | 2.91 | 02:45           | 0.29 | 10:10 | 0.78 | 0.52 | 03:15                     | 0.023 | 10:15 | 0.153 | 0.072 | 0.072 |           |
| 11/19/2019 | 05:55      | 2.56 | 15:45 | 4.10 | 3.30 | 05:45           | 0.35 | 15:55 | 0.74 | 0.57 | 05:55                     | 0.038 | 15:55 | 0.155 | 0.091 | 0.091 |           |
| 11/20/2019 | 03:35      | 2.72 | 09:40 | 4.27 | 3.35 | 03:40           | 0.37 | 09:40 | 0.82 | 0.59 | 03:40                     | 0.044 | 09:40 | 0.185 | 0.099 | 0.099 |           |
| 11/21/2019 | 03:55      | 2.34 | 09:10 | 4.19 | 3.17 | 03:30           | 0.39 | 09:05 | 0.94 | 0.58 | 03:30                     | 0.037 | 09:05 | 0.208 | 0.091 | 0.091 |           |
| 11/22/2019 | 04:40      | 2.46 | 09:15 | 4.42 | 3.20 | 04:00           | 0.40 | 09:20 | 0.94 | 0.60 | 04:00                     | 0.041 | 09:15 | 0.225 | 0.093 | 0.093 |           |
| 11/23/2019 | 07:30      | 2.40 | 21:55 | 3.38 | 2.90 | 15:45           | 0.42 | 08:25 | 0.61 | 0.50 | 07:35                     | 0.043 | 22:00 | 0.095 | 0.066 | 0.066 |           |
| 11/24/2019 | 07:05      | 2.49 | 21:15 | 3.92 | 3.07 | 06:50           | 0.34 | 20:55 | 0.68 | 0.50 | 07:05                     | 0.036 | 21:15 | 0.134 | 0.073 | 0.073 |           |
| 11/25/2019 | 20:45      | 2.82 | 08:30 | 3.95 | 3.32 | 23:50           | 0.48 | 08:40 | 0.83 | 0.62 | 23:55                     | 0.063 | 08:25 | 0.168 | 0.098 | 0.098 |           |
| 11/26/2019 | 06:05      | 2.61 | 21:05 | 4.22 | 3.37 | 04:05           | 0.38 | 21:05 | 0.79 | 0.59 | 04:05                     | 0.044 | 21:05 | 0.176 | 0.099 | 0.099 | 0.36      |
| 11/27/2019 | 05:55      | 2.73 | 10:00 | 4.09 | 3.37 | 02:35           | 0.46 | 12:50 | 0.78 | 0.60 | 06:00                     | 0.057 | 10:00 | 0.154 | 0.099 | 0.099 | 0.63      |
| 11/28/2019 | 05:35      | 2.21 | 12:00 | 3.37 | 2.75 | 05:40           | 0.34 | 12:00 | 0.63 | 0.49 | 05:40                     | 0.030 | 12:00 | 0.101 | 0.060 | 0.060 |           |
| 11/29/2019 | 07:00      | 1.78 | 14:15 | 3.10 | 2.51 | 06:00           | 0.31 | 17:20 | 0.64 | 0.46 | 07:05                     | 0.021 | 14:15 | 0.084 | 0.050 | 0.050 |           |
| 11/30/2019 | 06:05      | 2.34 | 22:05 | 3.32 | 2.79 | 04:10           | 0.41 | 12:45 | 0.63 | 0.51 | 04:10                     | 0.040 | 12:45 | 0.096 | 0.063 | 0.063 |           |
| 12/01/2019 | 05:55      | 2.39 | 20:25 | 3.57 | 2.95 | 07:50           | 0.37 | 21:50 | 0.63 | 0.51 | 07:50                     | 0.037 | 20:25 | 0.110 | 0.070 | 0.070 |           |
| 12/02/2019 | 04:25      | 2.82 | 18:10 | 4.36 | 3.59 | 23:55           | 0.47 | 10:05 | 0.76 | 0.61 | 04:25                     | 0.060 | 18:10 | 0.169 | 0.110 | 0.110 |           |
| 12/03/2019 | 04:05      | 2.73 | 14:55 | 4.79 | 3.72 | 04:05           | 0.43 | 14:00 | 0.80 | 0.62 | 04:05                     | 0.051 | 14:00 | 0.212 | 0.120 | 0.120 |           |
| 12/04/2019 | 23:55      | 2.51 | 16:25 | 4.47 | 3.40 | 03:00           | 0.39 | 16:40 | 0.74 | 0.56 | 05:00                     | 0.048 | 16:40 | 0.174 | 0.095 | 0.095 |           |
| 12/05/2019 | 05:30      | 1.98 | 13:15 | 4.45 | 3.16 | 03:55           | 0.39 | 13:15 | 0.76 | 0.57 | 03:55                     | 0.030 | 13:15 | 0.182 | 0.088 | 0.088 |           |
| 12/06/2019 | 03:25      | 2.50 | 15:20 | 5.18 | 3.79 | 04:55           | 0.41 | 15:20 | 0.82 | 0.59 | 04:15                     | 0.043 | 15:20 | 0.243 | 0.121 | 0.121 |           |
| 12/07/2019 | 06:10      | 3.39 | 18:20 | 4.95 | 3.99 | 06:10           | 0.56 | 18:20 | 0.71 | 0.63 | 06:10                     | 0.092 | 18:20 | 0.199 | 0.130 | 0.130 |           |
| 12/08/2019 | 05:50      | 3.37 | 21:05 | 4.61 | 3.89 | 05:50           | 0.56 | 21:05 | 0.69 | 0.62 | 05:50                     | 0.091 | 21:05 | 0.173 | 0.124 | 0.124 | 0.20      |
| 12/09/2019 | 03:15      | 3.25 | 09:30 | 5.02 | 4.05 | 03:15           | 0.54 | 09:30 | 0.72 | 0.63 | 03:15                     | 0.083 | 09:30 | 0.205 | 0.134 | 0.134 |           |
| 12/10/2019 | 03:25      | 2.87 | 13:45 | 5.11 | 3.81 | 02:15           | 0.47 | 13:45 | 0.75 | 0.60 | 02:45                     | 0.063 | 13:45 | 0.221 | 0.119 | 0.119 |           |
| 12/11/2019 | 04:20      | 3.21 | 14:25 | 4.50 | 3.86 | 04:20           | 0.54 | 17:30 | 0.71 | 0.62 | 04:20                     | 0.081 | 14:25 | 0.166 | 0.123 | 0.123 |           |
| 12/12/2019 | 04:15      | 3.32 | 13:55 | 4.71 | 3.81 | 01:45           | 0.54 | 14:00 | 0.74 | 0.62 | 23:30                     | 0.088 | 14:00 | 0.191 | 0.122 | 0.122 |           |
| 12/13/2019 | 03:50      | 2.97 | 14:50 | 4.64 | 3.73 | 04:25           | 0.48 | 15:10 | 0.72 | 0.61 | 04:25                     | 0.065 | 14:50 | 0.177 | 0.116 | 0.116 |           |
| 12/14/2019 | 06:50      | 3.07 | 14:40 | 4.17 | 3.59 | 05:55           | 0.50 | 12:25 | 0.67 | 0.57 | 06:20                     | 0.070 | 12:25 | 0.138 | 0.102 | 0.102 |           |
| 12/15/2019 | 06:05      | 3.37 | 11:10 | 4.31 | 3.78 | 07:05           | 0.52 | 11:10 | 0.66 | 0.60 | 07:05                     | 0.085 | 11:10 | 0.153 | 0.115 | 0.115 |           |
| 12/16/2019 | 03:35      | 3.55 | 10:00 | 4.86 | 4.00 | 03:35           | 0.52 | 10:05 | 0.86 | 0.70 | 03:35                     | 0.090 | 10:05 | 0.216 | 0.146 | 0.146 |           |
| 12/17/2019 | 04:05      | 2.95 | 13:35 | 5.04 | 4.10 | 05:40           | 0.51 | 09:35 | 0.83 | 0.64 | 04:05                     | 0.069 | 13:40 | 0.217 | 0.140 | 0.140 |           |
| 12/18/2019 | 03:35      | 3.66 | 11:45 | 5.16 | 4.41 | 03:35           | 0.53 | 14:10 | 0.69 | 0.61 | 03:35                     | 0.096 | 10:15 | 0.199 | 0.148 | 0.148 |           |
| 12/19/2019 | 22:35      | 3.46 | 11:05 | 4.99 | 4.03 | 03:45           | 0.52 | 12:15 | 0.87 | 0.66 | 04:20                     | 0.092 | 12:15 | 0.235 | 0.141 | 0.141 |           |
| 12/20/2019 | 05:40      | 3.22 | 15:45 | 4.28 | 3.76 | 04:25           | 0.55 | 14:55 | 0.79 | 0.66 | 04:25                     | 0.085 | 14:55 | 0.177 | 0.126 | 0.126 |           |
| 12/21/2019 | 07:00      | 3.12 | 11:35 | 3.79 | 3.44 | 04:35           | 0.58 | 11:30 | 0.71 | 0.62 | 04:35                     | 0.086 | 11:30 | 0.135 | 0.104 | 0.104 |           |
| 12/22/2019 | 06:25      | 3.24 | 14:30 | 3.92 | 3.60 | 02:15           | 0.55 | 14:30 | 0.72 | 0.62 | 02:15                     | 0.088 | 14:30 | 0.143 | 0.110 | 0.110 |           |
| 12/23/2019 | 03:30      | 3.46 | 11:30 | 4.27 | 3.78 | 06:05           | 0.52 | 04:20 | 0.71 | 0.59 | 06:20                     | 0.090 | 14:05 | 0.148 | 0.113 | 0.113 |           |
| 12/24/2019 | 06:35      | 3.14 | 12:15 | 4.13 | 3.58 | 04:45           | 0.49 | 12:30 | 0.65 | 0.56 | 07:15                     | 0.072 | 12:30 | 0.139 | 0.099 | 0.099 |           |
| 12/25/2019 | 05:00      | 3.34 | 18:30 | 4.66 | 4.10 | 03:10           | 0.50 | 18:25 | 0.84 | 0.66 | 04:45                     | 0.080 | 18:25 | 0.215 | 0.145 | 0.145 |           |
| 12/26/2019 | 19:55      | 3.21 | 01:00 | 4.41 | 3.84 | 23:00           | 0.51 | 12:05 | 0.76 | 0.65 | 18:55                     | 0.085 | 12:25 | 0.178 | 0.128 | 0.128 |           |
| 12/27/2019 | 05:45      | 2.99 | 11:20 | 4.07 | 3.50 | 04:00           | 0.47 | 12:10 | 0.64 | 0.57 | 04:00                     | 0.066 | 11:25 | 0.132 | 0.098 | 0.098 |           |
| 12/28/2019 | 05:00      | 2.98 | 12:50 | 4.09 | 3.21 | 06:45           | 0.48 | 13:00 | 0.74 | 0.57 | 06:45                     | 0.066 | 12:50 | 0.151 | 0.086 | 0.086 |           |
| 12/29/2019 | 02:10      | 2.86 | 12:15 | 3.60 | 3.21 | 07:20           | 0.50 | 17:45 | 0.76 | 0.59 | 07:20                     | 0.066 | 12:15 | 0.123 | 0.090 | 0.090 | 0.22      |
| 12/30/2019 | 02:20      | 3.07 | 11:20 | 4.08 | 3.53 | 02:55           | 0.52 | 18:35 | 0.76 | 0.65 | 02:55                     | 0.074 | 14:50 | 0.155 | 0.113 | 0.113 |           |
| 12/31/2019 | 06:45      | 2.53 | 11:50 | 3.64 | 3.15 | 04:55           | 0.54 | 00:55 | 0.71 | 0.64 | 06:40                     | 0.058 | 11:50 | 0.122 | 0.094 | 0.094 |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:40      | 2.87 | 12:50 | 3.74 | 3.21 | 03:45           | 0.49 | 16:50 | 0.70 | 0.59 | 05:40                     | 0.064 | 12:50 | 0.126 | 0.089 | 0.089 |       |           |
| 01/02/2020 | 03:20      | 2.99 | 13:10 | 4.21 | 3.60 | 04:30           | 0.51 | 09:45 | 0.72 | 0.62 | 04:30                     | 0.070 | 13:10 | 0.157 | 0.111 | 0.111 |       |           |
| 01/03/2020 | 07:15      | 3.10 | 10:40 | 4.07 | 3.56 | 02:45           | 0.52 | 12:35 | 0.68 | 0.61 | 02:45                     | 0.075 | 10:15 | 0.143 | 0.107 | 0.107 |       |           |
| 01/04/2020 | 07:10      | 2.81 | 11:55 | 3.54 | 3.16 | 06:05           | 0.52 | 22:35 | 0.64 | 0.58 | 07:40                     | 0.066 | 19:35 | 0.109 | 0.085 | 0.085 |       |           |
| 01/05/2020 | 04:40      | 3.01 | 21:40 | 3.76 | 3.35 | 04:40           | 0.51 | 10:30 | 0.68 | 0.58 | 04:40                     | 0.070 | 21:35 | 0.120 | 0.094 | 0.094 |       |           |
| 01/06/2020 | 04:15      | 3.08 | 13:40 | 4.30 | 3.70 | 04:15           | 0.59 | 22:15 | 0.81 | 0.68 | 04:15                     | 0.084 | 13:35 | 0.181 | 0.128 | 0.128 |       |           |
| 01/07/2020 | 05:35      | 2.96 | 12:10 | 4.45 | 3.63 | 05:35           | 0.54 | 12:10 | 0.84 | 0.69 | 05:35                     | 0.072 | 12:10 | 0.202 | 0.126 | 0.126 |       |           |
| 01/08/2020 | 03:05      | 2.81 | 13:30 | 4.50 | 3.56 | 03:10           | 0.51 | 13:30 | 0.82 | 0.66 | 03:10                     | 0.063 | 13:30 | 0.199 | 0.119 | 0.119 |       |           |
| 01/09/2020 | 04:00      | 2.82 | 13:40 | 4.58 | 3.63 | 04:25           | 0.53 | 11:40 | 0.79 | 0.66 | 04:25                     | 0.066 | 11:40 | 0.197 | 0.122 | 0.122 | 0.18  |           |
| 01/10/2020 | 04:45      | 2.27 | 12:25 | 4.52 | 3.35 | 04:45           | 0.44 | 14:40 | 0.79 | 0.62 | 04:45                     | 0.040 | 12:25 | 0.193 | 0.105 | 0.105 | 0.02  |           |
| 01/11/2020 | 06:05      | 2.68 | 12:20 | 3.62 | 2.96 | 05:55           | 0.49 | 10:40 | 0.68 | 0.58 | 05:55                     | 0.057 | 12:20 | 0.118 | 0.078 | 0.078 | 0.01  |           |
| 01/12/2020 | 05:25      | 2.59 | 11:35 | 3.55 | 3.08 | 02:45           | 0.51 | 18:50 | 0.67 | 0.59 | 03:15                     | 0.057 | 11:30 | 0.115 | 0.084 | 0.084 |       |           |
| 01/13/2020 | 04:15      | 2.71 | 13:30 | 4.56 | 3.56 | 03:50           | 0.50 | 14:10 | 0.79 | 0.65 | 03:50                     | 0.060 | 13:30 | 0.190 | 0.117 | 0.117 |       |           |
| 01/14/2020 | 05:50      | 2.81 | 14:20 | 4.47 | 3.55 | 05:45           | 0.54 | 13:30 | 0.82 | 0.66 | 05:45                     | 0.067 | 13:30 | 0.191 | 0.117 | 0.117 | 0.11  |           |
| 01/15/2020 | 04:35      | 2.78 | 13:35 | 4.31 | 3.52 | 05:30           | 0.52 | 13:55 | 0.78 | 0.65 | 05:30                     | 0.063 | 13:30 | 0.175 | 0.115 | 0.115 | 0.07  |           |
| 01/16/2020 | 03:10      | 2.52 | 12:35 | 4.66 | 3.47 | 04:30           | 0.49 | 12:35 | 0.90 | 0.65 | 04:30                     | 0.053 | 12:35 | 0.231 | 0.114 | 0.114 | 0.66  |           |
| 01/17/2020 | 05:45      | 2.65 | 13:50 | 4.59 | 3.69 | 23:15           | 0.47 | 10:25 | 0.75 | 0.59 | 05:45                     | 0.059 | 13:35 | 0.173 | 0.111 | 0.111 |       |           |
| 01/18/2020 | 05:55      | 3.23 | 10:25 | 4.08 | 3.64 | 19:50           | 0.41 | 00:50 | 0.61 | 0.47 | 05:40                     | 0.064 | 10:00 | 0.120 | 0.085 | 0.085 |       |           |
| 01/19/2020 | 05:45      | 3.37 | 10:50 | 4.21 | 3.74 | 05:50           | 0.38 | 04:35 | 0.59 | 0.45 | 05:50                     | 0.061 | 19:50 | 0.112 | 0.085 | 0.085 |       |           |
| 01/20/2020 | 05:40      | 3.43 | 13:15 | 4.39 | 3.86 | 04:10           | 0.41 | 18:20 | 0.69 | 0.49 | 04:40                     | 0.068 | 13:20 | 0.139 | 0.098 | 0.098 |       |           |
| 01/21/2020 | 03:25      | 3.10 | 13:55 | 5.06 | 3.86 | 03:25           | 0.57 | 13:55 | 0.88 | 0.67 | 03:25                     | 0.081 | 13:55 | 0.253 | 0.135 | 0.135 |       |           |
| 01/22/2020 | 23:55      | 3.01 | 13:50 | 4.24 | 3.57 | 04:10           | 0.55 | 13:40 | 0.77 | 0.65 | 04:10                     | 0.077 | 13:40 | 0.172 | 0.116 | 0.116 |       |           |
| 01/23/2020 | 04:35      | 2.88 | 14:10 | 4.30 | 3.56 | 02:45           | 0.54 | 14:15 | 0.76 | 0.66 | 04:40                     | 0.070 | 14:15 | 0.175 | 0.117 | 0.117 | 0.03  |           |
| 01/24/2020 | 03:30      | 3.15 | 14:25 | 4.33 | 3.69 | 03:20           | 0.54 | 16:10 | 0.76 | 0.66 | 03:20                     | 0.080 | 14:30 | 0.174 | 0.122 | 0.122 |       |           |
| 01/25/2020 | 06:55      | 3.23 | 01:30 | 4.08 | 3.46 | 06:45           | 0.56 | 01:30 | 0.71 | 0.61 | 06:55                     | 0.085 | 01:30 | 0.150 | 0.103 | 0.103 |       |           |
| 01/26/2020 | 04:55      | 2.91 | 22:05 | 4.36 | 3.51 | 04:10           | 0.54 | 19:10 | 0.76 | 0.63 | 04:10                     | 0.072 | 20:45 | 0.173 | 0.110 | 0.110 | 0.16  |           |
| 01/27/2020 | 23:55      | 3.53 | 09:20 | 4.87 | 4.19 | 23:45           | 0.63 | 09:15 | 0.82 | 0.71 | 23:55                     | 0.108 | 09:15 | 0.224 | 0.157 | 0.157 |       |           |
| 01/28/2020 | 03:35      | 3.31 | 13:25 | 4.91 | 3.99 | 04:45           | 0.59 | 13:30 | 0.81 | 0.69 | 04:45                     | 0.094 | 13:30 | 0.223 | 0.145 | 0.145 |       |           |
| 01/29/2020 | 02:50      | 3.38 | 10:05 | 4.68 | 3.96 | 01:55           | 0.59 | 17:05 | 0.79 | 0.70 | 23:55                     | 0.098 | 10:05 | 0.197 | 0.143 | 0.143 |       |           |
| 01/30/2020 | 03:25      | 3.22 | 13:50 | 4.74 | 3.94 | 05:45           | 0.60 | 13:10 | 0.83 | 0.70 | 05:45                     | 0.092 | 13:10 | 0.215 | 0.143 | 0.143 |       |           |
| 01/31/2020 | 04:05      | 3.39 | 11:00 | 5.13 | 3.96 | 03:05           | 0.58 | 10:50 | 0.87 | 0.69 | 03:05                     | 0.097 | 10:55 | 0.252 | 0.142 | 0.142 |       |           |
| 02/01/2020 | 07:20      | 3.33 | 13:00 | 3.99 | 3.55 | 07:25           | 0.59 | 11:00 | 0.77 | 0.64 | 07:25                     | 0.093 | 11:00 | 0.151 | 0.113 | 0.113 |       |           |
| 02/02/2020 | 23:30      | 2.95 | 21:20 | 3.84 | 3.32 | 23:30           | 0.51 | 21:20 | 0.70 | 0.61 | 23:30                     | 0.068 | 21:20 | 0.135 | 0.096 | 0.096 |       |           |
| 02/03/2020 | 04:15      | 2.57 | 13:55 | 4.66 | 3.59 | 04:15           | 0.48 | 13:30 | 0.78 | 0.65 | 04:15                     | 0.053 | 13:45 | 0.197 | 0.120 | 0.120 |       |           |
| 02/04/2020 | 03:25      | 3.07 | 13:20 | 4.65 | 3.72 | 23:30           | 0.54 | 13:15 | 0.84 | 0.67 | 23:30                     | 0.077 | 13:15 | 0.215 | 0.129 | 0.129 |       |           |
| 02/05/2020 | 04:05      | 2.71 | 13:35 | 4.61 | 3.69 | 03:55           | 0.45 | 16:10 | 0.81 | 0.67 | 04:00                     | 0.054 | 13:35 | 0.200 | 0.129 | 0.129 |       |           |
| 02/06/2020 | 23:50      | 3.35 | 09:30 | 4.84 | 3.89 | 02:45           | 0.60 | 09:20 | 0.87 | 0.72 | 02:45                     | 0.097 | 09:20 | 0.234 | 0.145 | 0.145 |       |           |
| 02/07/2020 | 04:05      | 3.17 | 09:45 | 4.60 | 3.77 | 06:20           | 0.60 | 12:40 | 0.87 | 0.70 | 05:30                     | 0.091 | 09:40 | 0.207 | 0.135 | 0.135 |       |           |
| 02/08/2020 | 04:15      | 3.30 | 13:25 | 3.92 | 3.61 | 04:05           | 0.59 | 08:40 | 0.72 | 0.65 | 04:05                     | 0.093 | 13:25 | 0.139 | 0.117 | 0.117 |       |           |
| 02/09/2020 | 06:10      | 2.89 | 14:05 | 3.93 | 3.50 | 06:05           | 0.52 | 11:40 | 0.70 | 0.63 | 06:05                     | 0.067 | 14:05 | 0.138 | 0.107 | 0.107 |       |           |
| 02/10/2020 | 05:00      | 3.09 | 13:25 | 4.69 | 3.75 | 05:15           | 0.56 | 14:20 | 0.81 | 0.68 | 05:15                     | 0.083 | 13:25 | 0.207 | 0.130 | 0.130 |       |           |
| 02/11/2020 | 05:30      | 2.66 | 13:35 | 4.19 | 3.33 | 05:35           | 0.48 | 07:35 | 0.83 | 0.64 | 05:35                     | 0.055 | 07:35 | 0.176 | 0.104 | 0.104 |       |           |
| 02/12/2020 | 04:55      | 2.56 | 14:15 | 4.22 | 3.24 | 05:00           | 0.47 | 14:15 | 0.79 | 0.64 | 05:00                     | 0.051 | 14:15 | 0.177 | 0.101 | 0.101 |       |           |
| 02/13/2020 | 03:10      | 2.49 | 13:35 | 4.09 | 3.16 | 04:35           | 0.50 | 15:40 | 0.79 | 0.65 | 04:35                     | 0.053 | 13:35 | 0.167 | 0.098 | 0.098 |       |           |
| 02/14/2020 | 04:10      | 2.41 | 13:35 | 3.78 | 3.07 | 04:30           | 0.45 | 12:20 | 0.75 | 0.62 | 04:35                     | 0.045 | 13:35 | 0.139 | 0.090 | 0.090 |       |           |
| 02/15/2020 | 05:55      | 2.73 | 14:00 | 3.40 | 2.99 | 04:55           | 0.45 | 00:55 | 0.65 | 0.54 | 04:55                     | 0.054 | 14:00 | 0.100 | 0.074 | 0.074 |       |           |
| 02/16/2020 | 04:50      | 2.69 | 11:55 | 3.61 | 3.05 | 04:45           | 0.46 | 19:55 | 0.67 | 0.55 | 04:45                     | 0.054 | 11:55 | 0.117 | 0.077 | 0.077 |       |           |
| 02/17/2020 | 03:15      | 2.81 | 12:15 | 3.90 | 3.31 | 04:10           | 0.46 | 13:30 | 0.70 | 0.57 | 03:40                     | 0.058 | 12:00 | 0.132 | 0.092 | 0.092 |       |           |
| 02/18/2020 | 03:45      | 2.79 | 13:45 | 4.86 | 3.99 | 23:45           | 0.41 | 13:55 | 0.70 | 0.54 | 03:45                     | 0.055 | 13:55 | 0.188 | 0.113 | 0.113 |       |           |
| 02/19/2020 | 05:35      | 3.69 | 11:30 | 5.10 | 4.33 | 02:45           | 0.37 | 11:55 | 0.68 | 0.53 | 05:35                     | 0.069 | 13:55 | 0.185 | 0.125 | 0.125 |       |           |
| 02/20/2020 | 06:00      | 3.18 | 14:20 | 4.75 | 3.93 | 04:00           | 0.37 | 10:25 | 0.79 | 0.54 | 04:00                     | 0.056 | 10:25 | 0.203 | 0.113 | 0.113 |       |           |
| 02/21/2020 | 03:55      | 2.76 | 13:25 | 4.48 | 3.53 | 03:50           | 0.43 | 14:10 | 0.70 | 0.55 | 03:50                     | 0.052 | 13:30 | 0.169 | 0.099 | 0.099 |       |           |
| 02/22/2020 | 03:05      | 2.35 | 20:25 | 3.40 | 2.84 | 03:00           | 0.31 | 09:55 | 0.55 | 0.44 | 03:00                     | 0.029 | 09:55 | 0.087 | 0.056 | 0.056 |       |           |
| 02/23/2020 | 06:35      | 2.34 | 14:10 | 3.39 | 2.80 | 05:10           | 0.32 | 20:05 | 0.55 | 0.44 | 06:30                     | 0.030 | 14:10 | 0.088 | 0.055 | 0.055 |       |           |
| 02/24/2020 | 04:10      | 2.34 | 14:15 | 4.75 | 3.60 | 02:05           | 0.31 | 13:15 | 0.64 | 0.47 | 02:05                     | 0.031 | 13:25 | 0.164 | 0.088 | 0.088 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total |           |
| 02/25/2020 | 04:30      | 2.86 | 16:30 | 4.82 | 3.96 | 04:40           | 0.27 | 10:00 | 0.60 | 0.42 | 04:40                     | 0.035 | 13:30 | 0.153 | 0.089 | 0.089 |           |
| 02/26/2020 | 22:40      | 2.73 | 11:10 | 4.73 | 3.60 | 04:00           | 0.19 | 12:05 | 0.80 | 0.48 | 04:00                     | 0.028 | 14:30 | 0.180 | 0.089 | 0.089 |           |
| 02/27/2020 | 04:45      | 2.33 | 13:30 | 4.55 | 3.32 | 03:45           | 0.33 | 13:30 | 0.70 | 0.51 | 03:45                     | 0.031 | 13:30 | 0.173 | 0.086 | 0.086 |           |
| 02/28/2020 | 05:50      | 2.14 | 11:45 | 4.13 | 3.06 | 05:55           | 0.29 | 14:40 | 0.77 | 0.50 | 05:55                     | 0.024 | 14:40 | 0.156 | 0.075 | 0.075 |           |
| 02/29/2020 | 05:40      | 2.37 | 18:55 | 3.32 | 2.80 | 05:20           | 0.34 | 15:20 | 0.57 | 0.45 | 05:20                     | 0.033 | 15:20 | 0.086 | 0.057 | 0.057 |           |
| 03/01/2020 | 05:20      | 2.33 | 11:40 | 3.68 | 2.83 | 05:35           | 0.34 | 11:35 | 0.71 | 0.48 | 05:35                     | 0.032 | 11:35 | 0.127 | 0.062 | 0.062 |           |
| 03/02/2020 | 03:20      | 2.42 | 13:20 | 4.39 | 3.20 | 03:30           | 0.39 | 13:50 | 0.80 | 0.55 | 03:30                     | 0.039 | 13:20 | 0.181 | 0.087 | 0.087 |           |
| 03/03/2020 | 03:40      | 2.43 | 13:25 | 4.60 | 3.34 | 02:45           | 0.32 | 10:10 | 0.75 | 0.54 | 03:35                     | 0.032 | 13:15 | 0.188 | 0.093 | 0.093 |           |
| 03/04/2020 | 04:00      | 2.24 | 10:50 | 4.19 | 3.06 | 03:50           | 0.34 | 13:50 | 0.85 | 0.55 | 03:50                     | 0.030 | 13:50 | 0.180 | 0.082 | 0.082 |           |
| 03/05/2020 | 03:45      | 2.14 | 13:05 | 4.09 | 2.97 | 05:00           | 0.31 | 13:50 | 0.80 | 0.56 | 05:00                     | 0.027 | 14:00 | 0.168 | 0.081 | 0.081 |           |
| 03/06/2020 | 03:20      | 1.98 | 13:30 | 4.29 | 2.83 | 03:20           | 0.32 | 13:25 | 0.86 | 0.55 | 03:20                     | 0.024 | 13:25 | 0.189 | 0.075 | 0.075 |           |
| 03/07/2020 | 03:55      | 2.01 | 16:15 | 3.02 | 2.48 | 03:50           | 0.34 | 16:35 | 0.66 | 0.49 | 03:50                     | 0.026 | 16:35 | 0.089 | 0.052 | 0.052 |           |
| 03/08/2020 | 05:25      | 2.03 | 14:05 | 3.00 | 2.40 | 04:35           | 0.35 | 14:05 | 0.67 | 0.49 | 04:35                     | 0.028 | 14:05 | 0.091 | 0.050 | 0.050 |           |
| 03/09/2020 | 03:00      | 1.84 | 10:50 | 3.95 | 2.82 | 05:15           | 0.32 | 10:30 | 0.82 | 0.58 | 03:25                     | 0.022 | 10:30 | 0.161 | 0.079 | 0.079 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 11.840                    | 4.90      |
| Avg   | 3.46       | 0.59            | 0.103                     |           |

## Site Commentary

### Site Information

| MIL_0386        |       |
|-----------------|-------|
| Pipe Dimensions | 18    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0386 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows free flow conditions during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed upstream of sites MIL\_0649 and MIL\_2491. (See MIL\_0649 and MIL\_2491 Site Commentary for More Details)

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                  |                    |                    |
|--------------------------|------------------|--------------------|--------------------|
| Item                     | Depth (in)       | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 6.43             | 1.38               | 0.512              |
| Minimum                  | 5.11             | 0.93               | 0.262              |
| Maximum                  | 9.17             | 2.04               | 1.187              |
| Time of Minimum          | 2/9/2020 4:10 AM | 12/26/2019 2:40 AM | 12/26/2019 2:40 AM |
| Time of Maximum          | 2/6/2020 1:35 PM | 1/16/2020 10:45 AM | 2/6/2020 1:35 PM   |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0386

Site Address /Location: Milpitas Blvd and Los Coches St, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.430913°

Longitude:

-121.898992°

Pipe Size (H x W)

18.00"x18.00"

Pipe Shape

Circular

Manhole #

#0386

System Characteristics

Residential/Commercial

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Friday, November 15, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

8:54:00 AM

Pipe Size (HxW)

18.00"x18.00"

Depth of Flow (Wet DOF) (in)

7.25"

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.76'

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Smooth flow with medium depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

14'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

812

ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325



# SCATTERGRAPH REPORT

MIL\_0386

Flow Monitor

**MIL\_0386**

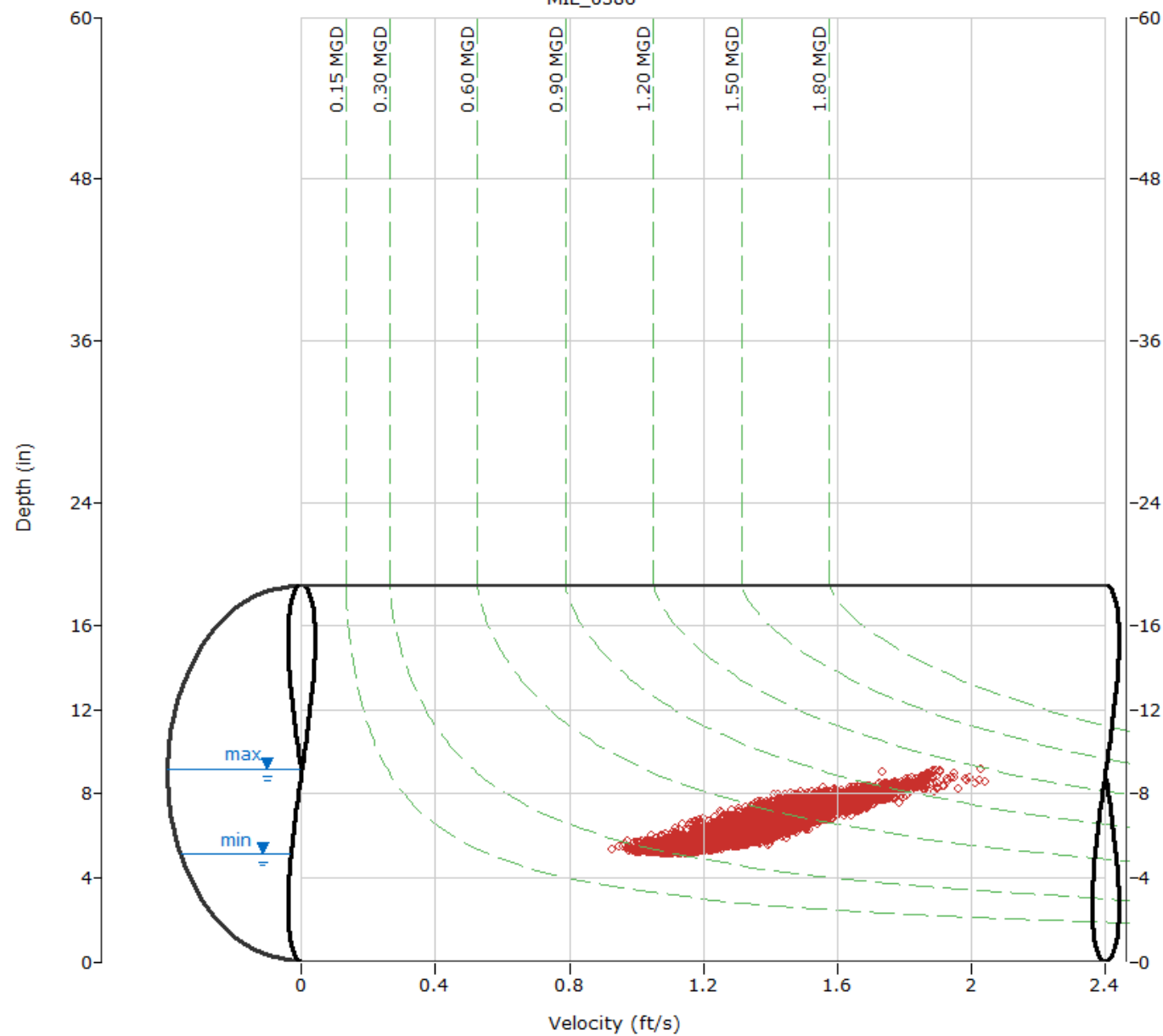
Pipe Height  
18.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



**ADS** ENVIRONMENTAL  
SERVICES

# HYDROGRAPH REPORT

MIL\_0386

Flow Monitor

**MIL\_0386**

Pipe Height

18.00 in.

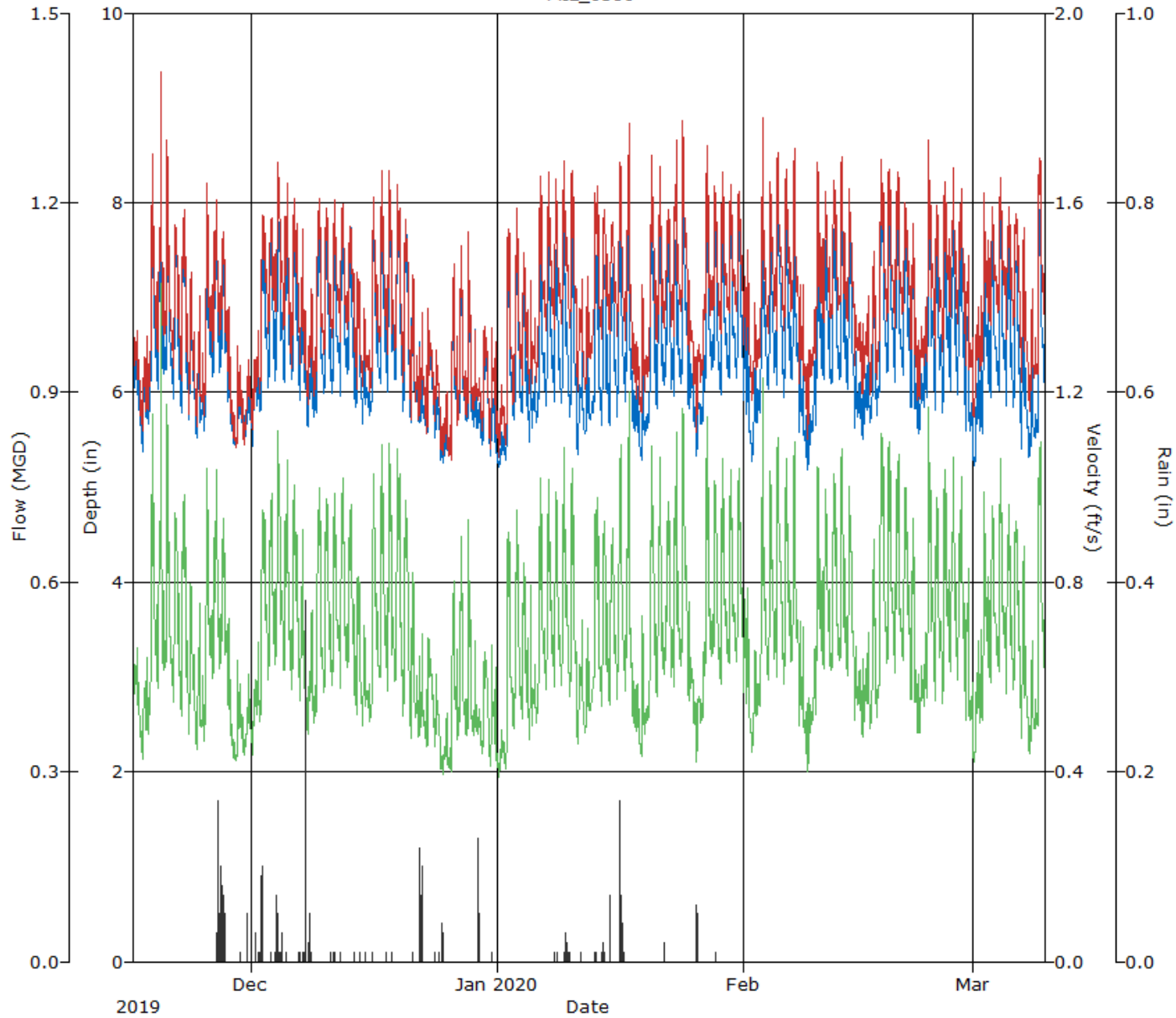
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth
- Velocity
- Quantity
- Rain

ADS ENVIRONMENTAL SERVICES



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0386, Pipe Height: 18.00 in, Silt: 0.00 in

# Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 22:30      | 5.72 | 14:55 | 6.75 | 6.11 | 16:20           | 1.11 | 14:55 | 1.42 | 1.27 | 16:20                     | 0.360 | 14:55 | 0.557 | 0.434 | 0.434 |           |
| 11/17/2019 | 06:15      | 5.34 | 19:25 | 6.81 | 5.80 | 16:55           | 0.97 | 19:15 | 1.42 | 1.20 | 16:55                     | 0.295 | 19:20 | 0.560 | 0.382 | 0.382 |           |
| 11/18/2019 | 00:35      | 5.50 | 13:15 | 8.86 | 6.79 | 02:55           | 1.09 | 13:10 | 1.87 | 1.40 | 00:35                     | 0.334 | 13:15 | 1.046 | 0.564 | 0.564 |           |
| 11/19/2019 | 04:35      | 5.95 | 15:20 | 9.13 | 6.85 | 02:55           | 1.23 | 15:00 | 1.95 | 1.44 | 04:30                     | 0.415 | 15:00 | 1.109 | 0.581 | 0.581 |           |
| 11/20/2019 | 23:25      | 5.95 | 09:30 | 8.58 | 6.73 | 15:40           | 1.19 | 10:15 | 1.83 | 1.41 | 03:15                     | 0.417 | 10:15 | 0.976 | 0.557 | 0.557 |           |
| 11/21/2019 | 04:40      | 5.86 | 09:45 | 7.84 | 6.69 | 04:40           | 1.22 | 09:45 | 1.65 | 1.40 | 04:40                     | 0.392 | 09:45 | 0.790 | 0.545 | 0.545 |           |
| 11/22/2019 | 04:10      | 5.75 | 14:35 | 7.98 | 6.74 | 11:50           | 1.18 | 10:00 | 1.68 | 1.39 | 04:25                     | 0.384 | 08:05 | 0.813 | 0.550 | 0.550 |           |
| 11/23/2019 | 04:40      | 5.58 | 06:50 | 7.14 | 6.26 | 04:40           | 1.11 | 08:40 | 1.50 | 1.29 | 04:40                     | 0.336 | 08:40 | 0.630 | 0.458 | 0.458 |           |
| 11/24/2019 | 03:10      | 5.42 | 11:05 | 7.13 | 5.97 | 00:45           | 1.00 | 11:05 | 1.50 | 1.23 | 00:45                     | 0.310 | 11:05 | 0.632 | 0.409 | 0.409 |           |
| 11/25/2019 | 00:00      | 5.54 | 08:40 | 8.17 | 6.61 | 01:45           | 1.12 | 08:40 | 1.77 | 1.38 | 00:15                     | 0.338 | 08:40 | 0.890 | 0.532 | 0.532 |           |
| 11/26/2019 | 04:00      | 6.11 | 16:30 | 8.15 | 6.84 | 03:30           | 1.12 | 16:30 | 1.70 | 1.43 | 03:30                     | 0.402 | 16:30 | 0.854 | 0.572 | 0.572 | 0.36      |
| 11/27/2019 | 00:10      | 6.10 | 09:50 | 7.64 | 6.78 | 20:50           | 1.16 | 08:35 | 1.62 | 1.41 | 20:50                     | 0.430 | 09:45 | 0.745 | 0.557 | 0.557 | 0.63      |
| 11/28/2019 | 20:00      | 5.34 | 02:55 | 6.98 | 5.85 | 10:45           | 0.98 | 02:50 | 1.41 | 1.20 | 20:00                     | 0.299 | 02:50 | 0.578 | 0.388 | 0.388 |           |
| 11/29/2019 | 04:00      | 5.43 | 07:10 | 6.91 | 5.81 | 03:10           | 0.96 | 07:05 | 1.47 | 1.17 | 03:10                     | 0.282 | 07:05 | 0.593 | 0.375 | 0.375 | 0.02      |
| 11/30/2019 | 06:15      | 5.40 | 17:30 | 6.70 | 5.75 | 01:20           | 0.95 | 10:45 | 1.38 | 1.17 | 01:20                     | 0.277 | 17:30 | 0.516 | 0.370 | 0.370 | 0.10      |
| 12/01/2019 | 03:10      | 5.38 | 21:20 | 7.14 | 5.92 | 13:30           | 1.05 | 21:25 | 1.46 | 1.21 | 04:30                     | 0.311 | 21:20 | 0.613 | 0.398 | 0.398 | 0.06      |
| 12/02/2019 | 03:55      | 5.70 | 11:10 | 7.83 | 6.72 | 00:30           | 1.12 | 11:05 | 1.67 | 1.42 | 00:30                     | 0.348 | 11:10 | 0.792 | 0.559 | 0.559 | 0.30      |
| 12/03/2019 | 03:55      | 5.96 | 09:55 | 7.99 | 6.80 | 04:00           | 1.28 | 13:05 | 1.64 | 1.45 | 04:00                     | 0.422 | 10:00 | 0.792 | 0.578 | 0.578 | 0.01      |
| 12/04/2019 | 00:15      | 6.04 | 09:35 | 8.27 | 6.96 | 16:00           | 1.29 | 09:25 | 1.75 | 1.50 | 00:10                     | 0.455 | 09:25 | 0.893 | 0.614 | 0.614 | 0.39      |
| 12/05/2019 | 03:40      | 6.08 | 13:35 | 8.08 | 6.90 | 23:55           | 1.26 | 14:50 | 1.67 | 1.45 | 02:15                     | 0.446 | 13:40 | 0.828 | 0.590 | 0.590 | 0.01      |
| 12/06/2019 | 00:35      | 6.08 | 09:20 | 8.26 | 6.83 | 01:05           | 1.24 | 09:15 | 1.72 | 1.44 | 00:30                     | 0.422 | 09:15 | 0.875 | 0.576 | 0.576 | 0.01      |
| 12/07/2019 | 23:55      | 5.61 | 12:25 | 7.69 | 6.39 | 13:30           | 1.12 | 12:05 | 1.61 | 1.34 | 23:55                     | 0.357 | 12:25 | 0.745 | 0.491 | 0.491 | 0.67      |
| 12/08/2019 | 03:35      | 5.56 | 15:40 | 7.18 | 5.97 | 21:05           | 1.09 | 14:10 | 1.52 | 1.26 | 03:35                     | 0.338 | 15:40 | 0.605 | 0.418 | 0.418 | 0.20      |
| 12/09/2019 | 04:45      | 5.68 | 13:15 | 7.99 | 6.74 | 01:10           | 1.14 | 13:15 | 1.71 | 1.43 | 01:10                     | 0.368 | 13:15 | 0.835 | 0.564 | 0.564 |           |
| 12/10/2019 | 04:45      | 5.93 | 15:10 | 7.90 | 6.78 | 04:25           | 1.25 | 16:30 | 1.70 | 1.44 | 04:25                     | 0.416 | 15:10 | 0.813 | 0.571 | 0.571 |           |
| 12/11/2019 | 04:50      | 5.88 | 11:05 | 7.72 | 6.69 | 05:00           | 1.27 | 12:50 | 1.78 | 1.43 | 04:45                     | 0.411 | 12:50 | 0.811 | 0.559 | 0.559 | 0.03      |
| 12/12/2019 | 05:00      | 5.92 | 12:10 | 7.98 | 6.82 | 03:50           | 1.28 | 10:30 | 1.69 | 1.44 | 03:55                     | 0.423 | 12:20 | 0.824 | 0.577 | 0.577 | 0.01      |
| 12/13/2019 | 04:40      | 5.97 | 14:10 | 7.87 | 6.79 | 01:25           | 1.29 | 14:00 | 1.61 | 1.44 | 04:35                     | 0.432 | 14:00 | 0.765 | 0.570 | 0.570 | 0.01      |
| 12/14/2019 | 06:10      | 5.72 | 12:55 | 7.28 | 6.39 | 06:10           | 1.18 | 12:55 | 1.60 | 1.32 | 06:10                     | 0.368 | 12:55 | 0.693 | 0.483 | 0.483 | 0.01      |
| 12/15/2019 | 06:05      | 5.55 | 06:35 | 7.19 | 6.04 | 11:40           | 1.08 | 06:40 | 1.53 | 1.27 | 06:05                     | 0.338 | 06:40 | 0.644 | 0.428 | 0.428 | 0.01      |
| 12/16/2019 | 03:25      | 5.72 | 11:10 | 8.53 | 6.73 | 00:50           | 1.17 | 11:10 | 1.75 | 1.41 | 03:25                     | 0.372 | 11:10 | 0.931 | 0.557 | 0.557 | 0.01      |
| 12/17/2019 | 05:00      | 6.01 | 10:35 | 8.28 | 6.93 | 00:10           | 1.25 | 10:35 | 1.76 | 1.45 | 05:15                     | 0.432 | 10:35 | 0.900 | 0.593 | 0.593 | 0.01      |
| 12/18/2019 | 03:15      | 5.93 | 09:20 | 8.48 | 6.89 | 03:10           | 1.26 | 09:20 | 1.80 | 1.43 | 03:10                     | 0.414 | 09:20 | 0.952 | 0.583 | 0.583 | 0.01      |
| 12/19/2019 | 05:55      | 6.04 | 10:30 | 8.31 | 6.93 | 05:55           | 1.25 | 10:25 | 1.71 | 1.42 | 05:55                     | 0.419 | 10:30 | 0.880 | 0.584 | 0.584 |           |
| 12/20/2019 | 04:05      | 5.76 | 12:50 | 8.05 | 6.74 | 21:10           | 1.13 | 17:00 | 1.68 | 1.39 | 04:05                     | 0.381 | 17:05 | 0.822 | 0.550 | 0.550 |           |
| 12/21/2019 | 04:15      | 5.60 | 09:25 | 7.29 | 6.25 | 03:00           | 1.02 | 11:10 | 1.52 | 1.27 | 03:00                     | 0.319 | 09:30 | 0.657 | 0.452 | 0.452 | 0.01      |
| 12/22/2019 | 03:20      | 5.43 | 14:25 | 7.01 | 5.93 | 23:25           | 1.04 | 14:20 | 1.49 | 1.22 | 03:25                     | 0.313 | 14:25 | 0.607 | 0.402 | 0.402 | 0.41      |
| 12/23/2019 | 05:50      | 5.50 | 09:50 | 6.95 | 6.12 | 04:50           | 1.00 | 07:30 | 1.53 | 1.25 | 04:50                     | 0.308 | 07:30 | 0.604 | 0.429 | 0.429 |           |
| 12/24/2019 | 20:20      | 5.23 | 07:10 | 6.67 | 5.68 | 22:25           | 0.98 | 07:05 | 1.38 | 1.18 | 22:25                     | 0.275 | 07:05 | 0.531 | 0.367 | 0.367 | 0.02      |
| 12/25/2019 | 03:55      | 5.20 | 15:55 | 6.31 | 5.42 | 21:25           | 1.01 | 15:55 | 1.31 | 1.11 | 05:40                     | 0.279 | 15:55 | 0.469 | 0.323 | 0.323 | 0.08      |
| 12/26/2019 | 04:40      | 5.26 | 13:20 | 7.15 | 6.15 | 02:40           | 0.93 | 11:10 | 1.51 | 1.25 | 02:40                     | 0.262 | 11:10 | 0.636 | 0.437 | 0.437 |           |
| 12/27/2019 | 00:40      | 5.66 | 11:05 | 8.06 | 6.27 | 03:25           | 1.07 | 11:05 | 1.64 | 1.27 | 03:25                     | 0.328 | 11:05 | 0.812 | 0.457 | 0.457 |           |
| 12/28/2019 | 05:55      | 5.64 | 10:20 | 8.01 | 6.18 | 23:05           | 1.00 | 10:10 | 1.68 | 1.26 | 23:05                     | 0.312 | 10:20 | 0.817 | 0.442 | 0.442 |           |
| 12/29/2019 | 23:55      | 5.46 | 05:15 | 6.77 | 5.83 | 09:50           | 1.03 | 06:00 | 1.44 | 1.21 | 09:50                     | 0.311 | 05:10 | 0.542 | 0.388 | 0.388 | 0.22      |
| 12/30/2019 | 04:40      | 5.38 | 10:10 | 6.95 | 5.96 | 02:30           | 1.05 | 08:45 | 1.46 | 1.23 | 04:35                     | 0.304 | 10:10 | 0.586 | 0.407 | 0.407 |           |
| 12/31/2019 | 04:55      | 5.30 | 08:40 | 7.04 | 5.71 | 22:00           | 0.98 | 07:25 | 1.46 | 1.20 | 22:00                     | 0.280 | 08:35 | 0.583 | 0.375 | 0.375 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 06:25      | 5.16 | 13:40 | 5.66 | 5.37 | 05:50           | 0.99 | 13:40 | 1.26 | 1.14 | 05:50                     | 0.274 | 13:40 | 0.388 | 0.326 | 0.326 |       |           |
| 01/02/2020 | 03:20      | 5.20 | 07:15 | 8.56 | 6.25 | 03:10           | 1.01 | 07:20 | 1.85 | 1.31 | 03:10                     | 0.278 | 07:15 | 0.988 | 0.471 | 0.471 |       |           |
| 01/03/2020 | 01:45      | 5.66 | 12:30 | 7.75 | 6.41 | 00:40           | 1.13 | 12:20 | 1.71 | 1.35 | 04:55                     | 0.354 | 12:20 | 0.799 | 0.501 | 0.501 |       |           |
| 01/04/2020 | 23:55      | 5.63 | 10:30 | 7.39 | 6.34 | 03:55           | 1.18 | 10:25 | 1.57 | 1.35 | 03:55                     | 0.370 | 10:25 | 0.694 | 0.489 | 0.489 |       |           |
| 01/05/2020 | 03:25      | 5.43 | 07:05 | 7.24 | 5.90 | 22:50           | 1.07 | 05:45 | 1.59 | 1.28 | 22:50                     | 0.335 | 07:05 | 0.666 | 0.419 | 0.419 |       |           |
| 01/06/2020 | 01:05      | 5.58 | 13:00 | 7.78 | 6.56 | 01:15           | 1.22 | 12:50 | 1.77 | 1.45 | 01:15                     | 0.370 | 12:50 | 0.831 | 0.550 | 0.550 |       |           |
| 01/07/2020 | 03:45      | 5.76 | 14:20 | 7.85 | 6.63 | 00:35           | 1.31 | 14:20 | 1.80 | 1.47 | 03:40                     | 0.413 | 14:20 | 0.860 | 0.566 | 0.566 |       |           |
| 01/08/2020 | 05:45      | 5.81 | 15:05 | 7.66 | 6.58 | 05:45           | 1.31 | 10:30 | 1.70 | 1.46 | 05:45                     | 0.419 | 10:35 | 0.779 | 0.557 | 0.557 |       | 0.02      |
| 01/09/2020 | 03:30      | 5.78 | 10:00 | 7.94 | 6.64 | 15:40           | 1.30 | 10:45 | 1.75 | 1.49 | 03:30                     | 0.416 | 10:45 | 0.848 | 0.574 | 0.574 | 0.18  |           |
| 01/10/2020 | 05:30      | 5.65 | 10:35 | 7.90 | 6.48 | 20:30           | 1.30 | 10:25 | 1.80 | 1.46 | 05:30                     | 0.404 | 10:30 | 0.864 | 0.548 | 0.548 | 0.02  |           |
| 01/11/2020 | 03:45      | 5.31 | 18:00 | 7.01 | 5.83 | 23:55           | 1.16 | 17:45 | 1.55 | 1.31 | 04:45                     | 0.331 | 17:55 | 0.632 | 0.421 | 0.421 | 0.01  |           |
| 01/12/2020 | 03:35      | 5.53 | 09:00 | 6.88 | 5.83 | 10:50           | 1.07 | 08:45 | 1.53 | 1.29 | 01:30                     | 0.334 | 09:00 | 0.612 | 0.416 | 0.416 |       |           |
| 01/13/2020 | 04:30      | 5.74 | 17:35 | 7.65 | 6.56 | 00:00           | 1.27 | 13:00 | 1.69 | 1.47 | 00:05                     | 0.400 | 13:00 | 0.778 | 0.557 | 0.557 |       | 0.02      |
| 01/14/2020 | 04:55      | 5.59 | 13:05 | 7.67 | 6.46 | 16:25           | 1.16 | 10:05 | 1.69 | 1.45 | 04:50                     | 0.390 | 13:05 | 0.771 | 0.538 | 0.538 |       | 0.11      |
| 01/15/2020 | 04:55      | 5.62 | 12:15 | 7.56 | 6.48 | 04:20           | 1.31 | 11:45 | 1.68 | 1.45 | 04:55                     | 0.400 | 11:45 | 0.746 | 0.539 | 0.539 |       | 0.07      |
| 01/16/2020 | 04:00      | 5.69 | 14:00 | 8.78 | 6.74 | 04:10           | 1.31 | 10:45 | 2.04 | 1.49 | 04:00                     | 0.406 | 13:50 | 1.097 | 0.588 | 0.588 | 0.66  |           |
| 01/17/2020 | 04:30      | 5.83 | 15:00 | 8.83 | 6.72 | 04:30           | 1.29 | 15:00 | 1.90 | 1.46 | 04:30                     | 0.414 | 15:00 | 1.058 | 0.574 | 0.574 |       |           |
| 01/18/2020 | 22:45      | 5.41 | 16:05 | 6.86 | 5.76 | 22:45           | 1.15 | 16:10 | 1.45 | 1.25 | 22:45                     | 0.332 | 16:10 | 0.580 | 0.396 | 0.396 |       |           |
| 01/19/2020 | 04:40      | 5.20 | 08:45 | 6.94 | 5.66 | 04:35           | 1.12 | 08:45 | 1.50 | 1.24 | 04:35                     | 0.307 | 08:45 | 0.609 | 0.384 | 0.384 |       |           |
| 01/20/2020 | 00:05      | 5.56 | 12:25 | 8.11 | 6.65 | 04:35           | 1.21 | 12:20 | 1.77 | 1.45 | 00:25                     | 0.371 | 12:25 | 0.881 | 0.562 | 0.562 |       |           |
| 01/21/2020 | 05:20      | 5.67 | 12:40 | 8.18 | 6.61 | 05:20           | 1.26 | 14:00 | 1.89 | 1.44 | 05:20                     | 0.389 | 14:00 | 0.938 | 0.552 | 0.552 |       |           |
| 01/22/2020 | 00:45      | 5.95 | 17:00 | 7.99 | 6.74 | 00:45           | 1.30 | 17:00 | 1.75 | 1.46 | 00:45                     | 0.427 | 17:00 | 0.855 | 0.574 | 0.574 |       | 0.03      |
| 01/23/2020 | 00:30      | 5.86 | 14:55 | 8.36 | 6.79 | 05:55           | 1.31 | 14:50 | 1.96 | 1.49 | 06:00                     | 0.424 | 14:50 | 1.004 | 0.593 | 0.593 |       |           |
| 01/24/2020 | 01:40      | 6.04 | 11:00 | 8.67 | 6.90 | 03:15           | 1.31 | 10:50 | 2.01 | 1.52 | 01:40                     | 0.450 | 10:55 | 1.078 | 0.617 | 0.617 |       |           |
| 01/25/2020 | 22:30      | 5.50 | 07:00 | 6.85 | 6.08 | 22:20           | 1.04 | 06:20 | 1.50 | 1.31 | 22:20                     | 0.313 | 06:20 | 0.594 | 0.447 | 0.447 |       |           |
| 01/26/2020 | 05:05      | 5.29 | 00:15 | 6.25 | 5.71 | 02:25           | 1.09 | 00:10 | 1.40 | 1.25 | 04:50                     | 0.310 | 00:10 | 0.494 | 0.389 | 0.389 |       | 0.16      |
| 01/27/2020 | 00:40      | 5.84 | 10:40 | 8.42 | 6.83 | 00:20           | 1.27 | 10:35 | 1.86 | 1.46 | 00:40                     | 0.413 | 10:35 | 0.974 | 0.588 | 0.588 |       |           |
| 01/28/2020 | 04:50      | 6.06 | 13:10 | 7.91 | 6.83 | 04:40           | 1.32 | 13:10 | 1.71 | 1.47 | 04:45                     | 0.449 | 13:10 | 0.828 | 0.590 | 0.590 |       | 0.01      |
| 01/29/2020 | 04:40      | 5.93 | 08:15 | 8.02 | 6.76 | 03:20           | 1.24 | 08:00 | 1.74 | 1.46 | 03:20                     | 0.422 | 08:20 | 0.848 | 0.578 | 0.578 |       |           |
| 01/30/2020 | 04:55      | 6.08 | 11:05 | 8.09 | 6.81 | 11:45           | 1.33 | 11:00 | 1.72 | 1.47 | 05:00                     | 0.456 | 11:00 | 0.851 | 0.588 | 0.588 |       |           |
| 01/31/2020 | 05:05      | 6.06 | 12:30 | 8.18 | 6.84 | 05:00           | 1.33 | 12:30 | 1.74 | 1.48 | 05:05                     | 0.450 | 12:30 | 0.876 | 0.593 | 0.593 |       |           |
| 02/01/2020 | 23:55      | 5.46 | 14:15 | 7.17 | 6.12 | 23:50           | 1.20 | 14:15 | 1.58 | 1.36 | 23:50                     | 0.352 | 14:15 | 0.670 | 0.470 | 0.470 |       |           |
| 02/02/2020 | 02:25      | 5.23 | 15:15 | 6.83 | 5.73 | 03:20           | 1.11 | 15:05 | 1.50 | 1.27 | 03:20                     | 0.312 | 15:10 | 0.591 | 0.398 | 0.398 |       |           |
| 02/03/2020 | 02:20      | 5.74 | 13:10 | 8.54 | 6.79 | 22:45           | 1.20 | 13:05 | 1.90 | 1.46 | 02:25                     | 0.394 | 13:05 | 1.010 | 0.585 | 0.585 |       |           |
| 02/04/2020 | 03:55      | 5.94 | 11:05 | 7.86 | 6.77 | 22:10           | 1.27 | 10:25 | 1.69 | 1.46 | 03:50                     | 0.430 | 10:25 | 0.797 | 0.580 | 0.580 |       |           |
| 02/05/2020 | 06:40      | 6.04 | 09:45 | 8.07 | 6.90 | 17:45           | 1.30 | 08:25 | 1.77 | 1.49 | 06:20                     | 0.442 | 09:40 | 0.875 | 0.604 | 0.604 |       |           |
| 02/06/2020 | 04:40      | 5.87 | 13:35 | 9.17 | 6.75 | 04:40           | 1.29 | 13:35 | 2.03 | 1.48 | 04:40                     | 0.416 | 13:35 | 1.187 | 0.584 | 0.584 |       |           |
| 02/07/2020 | 02:05      | 5.99 | 11:25 | 7.98 | 6.73 | 15:35           | 1.31 | 11:15 | 1.78 | 1.48 | 02:10                     | 0.445 | 11:15 | 0.855 | 0.580 | 0.580 |       |           |
| 02/08/2020 | 23:50      | 5.25 | 14:35 | 6.79 | 5.85 | 23:50           | 1.13 | 14:40 | 1.47 | 1.29 | 23:50                     | 0.313 | 14:35 | 0.579 | 0.418 | 0.418 |       |           |
| 02/09/2020 | 04:10      | 5.11 | 01:40 | 6.27 | 5.62 | 03:30           | 1.00 | 00:20 | 1.38 | 1.24 | 03:30                     | 0.280 | 01:40 | 0.477 | 0.378 | 0.378 |       |           |
| 02/10/2020 | 04:55      | 5.33 | 09:00 | 7.84 | 6.66 | 04:55           | 1.20 | 11:30 | 1.77 | 1.45 | 04:55                     | 0.340 | 11:30 | 0.841 | 0.563 | 0.563 |       |           |
| 02/11/2020 | 06:05      | 6.04 | 11:35 | 7.73 | 6.80 | 04:50           | 1.31 | 10:15 | 1.67 | 1.47 | 04:55                     | 0.442 | 11:35 | 0.779 | 0.584 | 0.584 |       |           |
| 02/12/2020 | 04:00      | 5.95 | 09:35 | 7.82 | 6.82 | 04:15           | 1.31 | 11:50 | 1.72 | 1.49 | 04:15                     | 0.431 | 11:50 | 0.817 | 0.593 | 0.593 |       |           |
| 02/13/2020 | 05:20      | 6.07 | 10:20 | 7.93 | 6.83 | 01:50           | 1.34 | 10:05 | 1.75 | 1.48 | 01:50                     | 0.462 | 10:15 | 0.838 | 0.593 | 0.593 |       |           |
| 02/14/2020 | 06:05      | 5.96 | 13:15 | 7.72 | 6.75 | 16:25           | 1.25 | 10:25 | 1.67 | 1.46 | 06:00                     | 0.430 | 10:25 | 0.777 | 0.577 | 0.577 |       |           |
| 02/15/2020 | 23:05      | 5.56 | 17:10 | 6.63 | 5.93 | 22:35           | 1.15 | 17:05 | 1.44 | 1.30 | 22:35                     | 0.349 | 17:05 | 0.548 | 0.428 | 0.428 |       |           |
| 02/16/2020 | 01:55      | 5.41 | 18:55 | 6.93 | 5.89 | 00:40           | 1.10 | 18:55 | 1.50 | 1.28 | 00:40                     | 0.328 | 18:55 | 0.608 | 0.418 | 0.418 |       |           |
| 02/17/2020 | 01:35      | 5.60 | 13:45 | 7.68 | 6.25 | 03:35           | 1.09 | 13:45 | 1.55 | 1.31 | 03:35                     | 0.337 | 13:45 | 0.719 | 0.467 | 0.467 |       |           |
| 02/18/2020 | 00:00      | 5.81 | 12:10 | 8.37 | 6.96 | 00:00           | 1.21 | 08:45 | 1.73 | 1.47 | 00:00                     | 0.387 | 12:15 | 0.883 | 0.607 | 0.607 |       |           |
| 02/19/2020 | 05:40      | 6.09 | 09:40 | 8.43 | 6.98 | 02:25           | 1.33 | 09:35 | 1.78 | 1.49 | 02:25                     | 0.454 | 09:35 | 0.933 | 0.614 | 0.614 |       |           |
| 02/20/2020 | 02:30      | 5.95 | 16:25 | 8.21 | 6.95 | 02:35           | 1.31 | 16:30 | 1.74 | 1.49 | 02:30                     | 0.431 | 16:30 | 0.880 | 0.612 | 0.612 |       |           |
| 02/21/2020 | 07:10      | 6.09 | 13:20 | 7.89 | 6.86 | 00:35           | 1.33 | 12:30 | 1.71 | 1.47 | 07:10                     | 0.461 | 12:30 | 0.813 | 0.592 | 0.592 |       |           |
| 02/22/2020 | 23:10      | 5.58 | 12:30 | 8.05 | 6.34 | 23:45           | 1.01 | 12:30 | 1.69 | 1.35 | 23:45                     | 0.312 | 12:30 | 0.838 | 0.491 | 0.491 |       |           |
| 02/23/2020 | 03:50      | 5.50 | 23:25 | 6.61 | 5.93 | 06:35           | 1.11 | 02:05 | 1.39 | 1.27 | 03:50                     | 0.338 | 02:25 | 0.514 | 0.418 | 0.418 |       |           |
| 02/24/2020 | 04:45      | 5.87 | 10:55 | 8.81 | 6.87 | 02:20           | 1.24 | 10:45 | 1.87 | 1.45 | 04:40                     | 0.404 | 10:50 | 1.032 | 0.589 | 0.589 |       |           |
|            |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |       |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 04:35      | 5.79 | 09:30 | 7.84 | 6.74 | 04:30           | 1.27 | 09:20 | 1.71 | 1.45 | 04:30                     | 0.405 | 09:25 | 0.814 | 0.569 | 0.569 |           |
| 02/26/2020 | 04:35      | 5.77 | 14:20 | 7.91 | 6.76 | 04:00           | 1.25 | 13:15 | 1.66 | 1.47 | 04:00                     | 0.395 | 13:30 | 0.789 | 0.580 | 0.580 |           |
| 02/27/2020 | 02:05      | 5.82 | 12:25 | 8.09 | 6.76 | 17:40           | 1.25 | 12:25 | 1.79 | 1.48 | 02:05                     | 0.424 | 12:25 | 0.893 | 0.583 | 0.583 |           |
| 02/28/2020 | 00:35      | 5.92 | 14:45 | 7.85 | 6.79 | 00:40           | 1.32 | 12:40 | 1.68 | 1.48 | 00:35                     | 0.432 | 14:45 | 0.792 | 0.589 | 0.589 |           |
| 02/29/2020 | 02:50      | 5.53 | 10:10 | 7.26 | 6.08 | 22:55           | 1.12 | 10:00 | 1.56 | 1.33 | 20:50                     | 0.358 | 10:10 | 0.673 | 0.454 | 0.454 |           |
| 03/01/2020 | 03:20      | 5.20 | 18:05 | 7.05 | 5.66 | 03:00           | 1.00 | 18:05 | 1.53 | 1.25 | 03:00                     | 0.273 | 18:05 | 0.636 | 0.387 | 0.387 |           |
| 03/02/2020 | 03:25      | 5.55 | 09:20 | 7.66 | 6.56 | 02:50           | 1.22 | 09:05 | 1.68 | 1.43 | 02:55                     | 0.366 | 09:15 | 0.770 | 0.545 | 0.545 |           |
| 03/03/2020 | 04:45      | 5.92 | 11:35 | 7.83 | 6.68 | 04:35           | 1.32 | 11:35 | 1.73 | 1.46 | 04:35                     | 0.432 | 11:35 | 0.827 | 0.566 | 0.566 |           |
| 03/04/2020 | 06:10      | 5.93 | 12:10 | 8.10 | 6.75 | 03:20           | 1.32 | 12:10 | 1.77 | 1.48 | 03:20                     | 0.434 | 12:10 | 0.882 | 0.582 | 0.582 |           |
| 03/05/2020 | 04:20      | 5.83 | 12:00 | 7.83 | 6.69 | 04:40           | 1.27 | 10:50 | 1.65 | 1.47 | 04:40                     | 0.409 | 12:05 | 0.769 | 0.572 | 0.572 |           |
| 03/06/2020 | 01:55      | 5.48 | 08:45 | 7.65 | 6.65 | 01:55           | 1.28 | 08:25 | 1.66 | 1.47 | 01:55                     | 0.376 | 08:25 | 0.744 | 0.566 | 0.566 |           |
| 03/07/2020 | 02:00      | 5.39 | 08:00 | 7.36 | 6.06 | 01:45           | 1.17 | 08:00 | 1.62 | 1.35 | 01:45                     | 0.341 | 08:00 | 0.709 | 0.459 | 0.459 |           |
| 03/08/2020 | 02:00      | 5.24 | 13:35 | 6.52 | 5.65 | 18:20           | 1.10 | 13:35 | 1.46 | 1.26 | 03:50                     | 0.316 | 13:35 | 0.544 | 0.390 | 0.390 |           |
| 03/09/2020 | 04:00      | 5.52 | 12:25 | 8.08 | 6.66 | 01:15           | 1.20 | 09:05 | 1.77 | 1.46 | 03:50                     | 0.361 | 12:20 | 0.875 | 0.570 | 0.569 |           |

#### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 58.839                    | 4.90      |
| Avg   | 6.43       | 1.38            | 0.512                     |           |

## Site Commentary

### Site Information

| MIL_0602        |       |
|-----------------|-------|
| Pipe Dimensions | 18    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0602 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows free flow conditions during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                  |                  |                  |
|--------------------------|------------------|------------------|------------------|
| Item                     | Depth (in)       | Velocity (ft/s)  | Quantity (MGD)   |
| Average                  | 3.67             | 1.53             | 0.274            |
| Minimum                  | 1.21             | 0.39             | 0.014            |
| Maximum                  | 6.31             | 2.37             | 0.844            |
| Time of Minimum          | 3/7/2020 5:50 AM | 3/9/2020 4:30 AM | 3/9/2020 5:55 AM |
| Time of Maximum          | 1/7/2020 8:40 AM | 1/7/2020 8:40 AM | 1/7/2020 8:40 AM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0602

Site Address /Location: Main St and Curtis Ave

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details:

Parking lane

Latitude:

37.424137°

Longitude:

-121.905174°

Pipe Size (H x W)

18.0" x 18.0"

Pipe Shape

Circular

Manhole #

602

System Characteristics

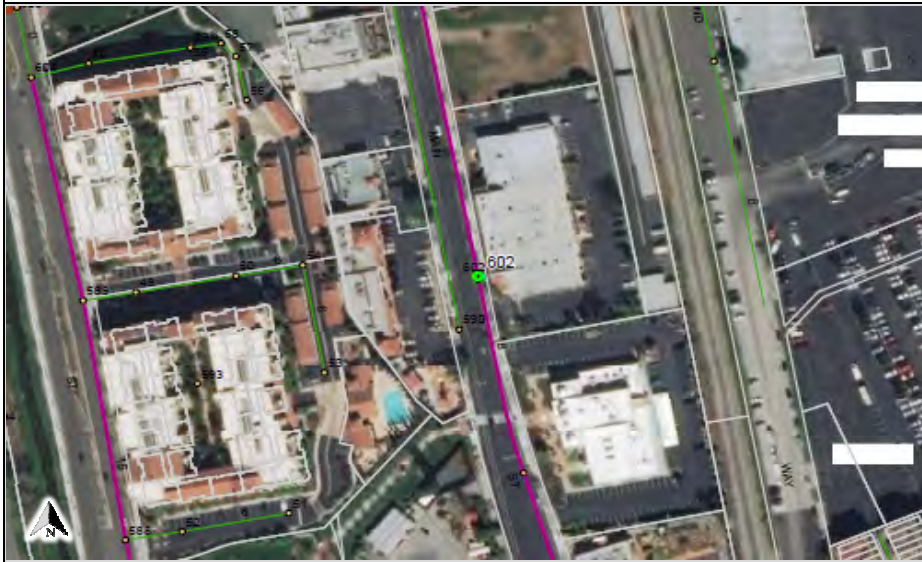
Residential/Commercial

Access

Drive

Traffic

Light



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

9:11:40 AM

Pipe Size (HxW)

18.0" x 18.0"

Depth of Flow (Wet DOF) (in)

6.25

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.52

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

### Hydraulic Comments:

Smooth flow with medium depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

7'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

819

ADS Project Name: Milpitas.WWTFM.CA19-20

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_0602

Flow Monitor

**MIL\_0602**

Pipe Height  
18.00 in

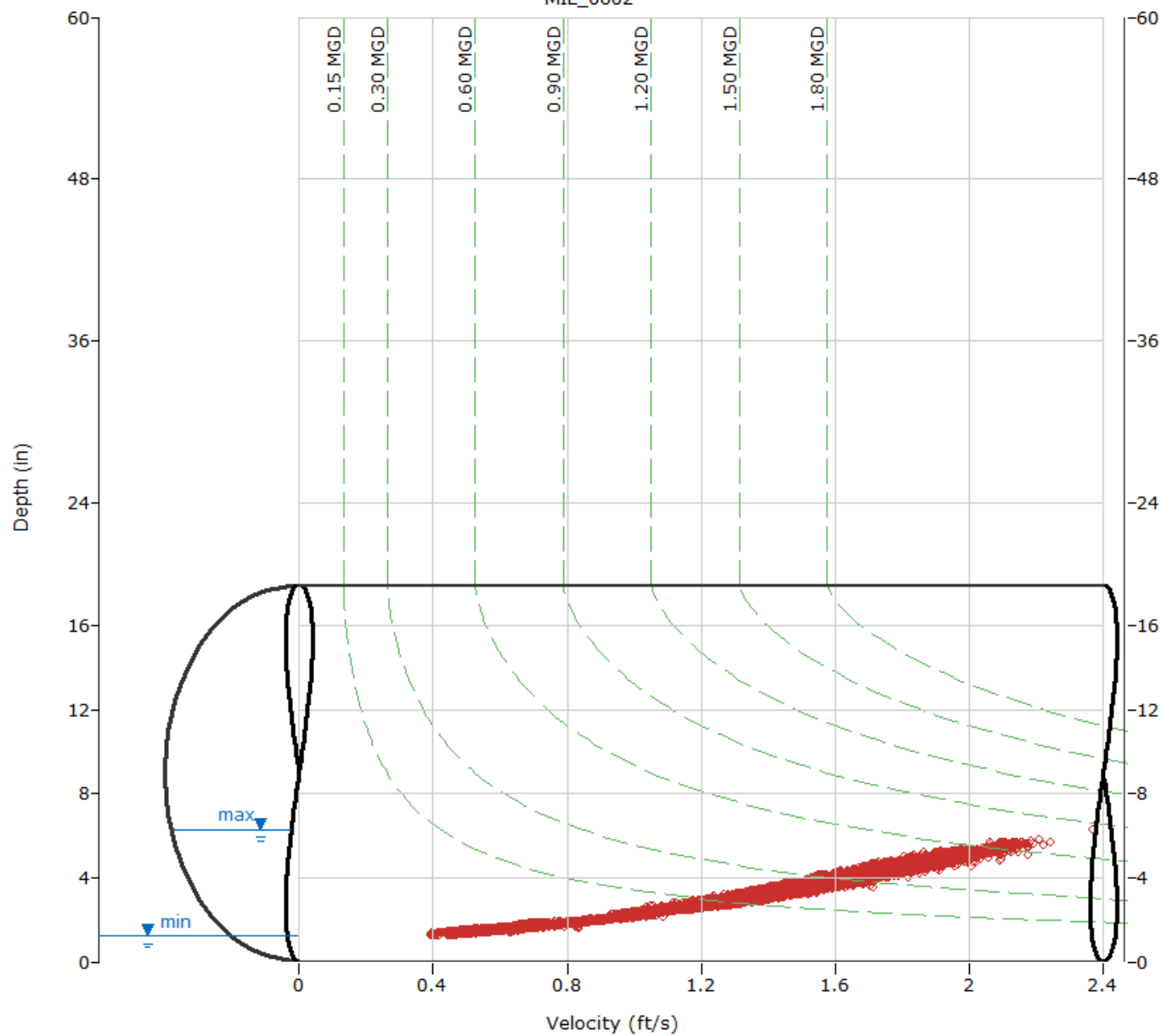
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES

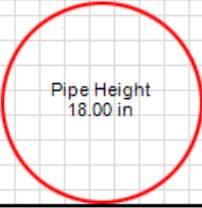




# HYDROGRAPH REPORT

MIL\_0602

Flow Monitor  
**MIL\_0602**

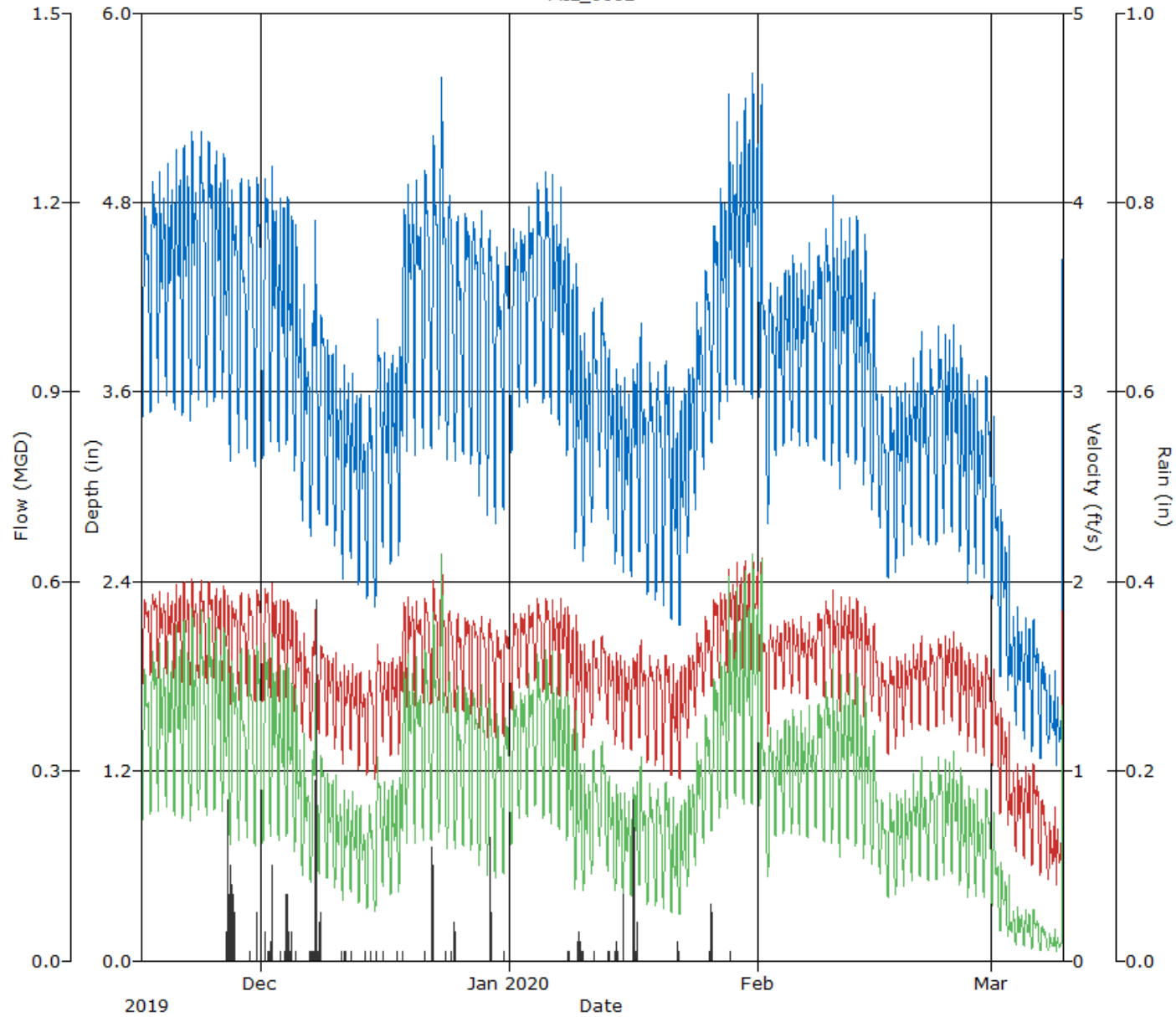


Pipe Height  
18.00 in.

Report Period  
11/16/2019  
To  
3/9/2020

**Legend**  

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0602, Pipe Height: 18.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 03:55      | 3.43 | 12:05 | 4.79 | 4.22 | 05:55           | 1.45 | 12:35 | 1.95 | 1.74 | 05:55                     | 0.222 | 11:55 | 0.473 | 0.361 | 0.361 |           |
| 11/17/2019 | 06:00      | 3.44 | 13:00 | 4.96 | 4.37 | 05:00           | 1.48 | 15:05 | 2.01 | 1.78 | 06:05                     | 0.226 | 11:20 | 0.502 | 0.388 | 0.388 |           |
| 11/18/2019 | 04:40      | 3.52 | 08:45 | 5.09 | 4.35 | 03:50           | 1.47 | 08:30 | 1.99 | 1.75 | 04:40                     | 0.233 | 08:30 | 0.527 | 0.379 | 0.379 |           |
| 11/19/2019 | 04:25      | 3.57 | 08:55 | 5.11 | 4.40 | 04:35           | 1.49 | 08:45 | 2.00 | 1.76 | 04:35                     | 0.240 | 08:45 | 0.531 | 0.386 | 0.386 |           |
| 11/20/2019 | 04:20      | 3.46 | 08:55 | 5.21 | 4.41 | 03:10           | 1.44 | 09:15 | 2.05 | 1.76 | 04:20                     | 0.225 | 09:15 | 0.557 | 0.387 | 0.387 |           |
| 11/21/2019 | 04:35      | 3.44 | 09:05 | 5.26 | 4.42 | 04:25           | 1.45 | 08:55 | 2.07 | 1.76 | 04:25                     | 0.222 | 08:55 | 0.571 | 0.390 | 0.390 |           |
| 11/22/2019 | 03:55      | 3.41 | 08:45 | 5.30 | 4.43 | 05:10           | 1.44 | 09:00 | 2.06 | 1.76 | 05:10                     | 0.217 | 09:00 | 0.578 | 0.392 | 0.392 |           |
| 11/23/2019 | 05:00      | 3.54 | 12:50 | 5.29 | 4.53 | 03:30           | 1.47 | 12:20 | 2.03 | 1.78 | 05:05                     | 0.236 | 12:20 | 0.565 | 0.410 | 0.410 |           |
| 11/24/2019 | 05:40      | 3.48 | 12:15 | 5.21 | 4.51 | 04:45           | 1.45 | 12:05 | 2.05 | 1.78 | 05:40                     | 0.225 | 12:05 | 0.560 | 0.407 | 0.407 |           |
| 11/25/2019 | 04:40      | 3.53 | 09:20 | 5.17 | 4.44 | 04:35           | 1.48 | 09:25 | 2.01 | 1.76 | 04:40                     | 0.234 | 09:25 | 0.545 | 0.391 | 0.391 |           |
| 11/26/2019 | 05:00      | 3.53 | 10:05 | 5.16 | 4.34 | 04:55           | 1.45 | 20:50 | 2.03 | 1.73 | 04:55                     | 0.229 | 20:50 | 0.540 | 0.373 | 0.373 | 0.36      |
| 11/27/2019 | 05:25      | 3.13 | 09:50 | 5.00 | 4.24 | 05:30           | 1.33 | 09:25 | 1.93 | 1.71 | 05:30                     | 0.176 | 10:00 | 0.495 | 0.358 | 0.358 | 0.63      |
| 11/28/2019 | 06:30      | 3.20 | 12:15 | 4.99 | 4.12 | 05:45           | 1.36 | 12:45 | 1.99 | 1.68 | 05:45                     | 0.188 | 12:45 | 0.508 | 0.339 | 0.339 |           |
| 11/29/2019 | 05:25      | 3.23 | 12:05 | 4.96 | 4.26 | 05:10           | 1.38 | 11:30 | 1.94 | 1.73 | 05:10                     | 0.192 | 12:10 | 0.495 | 0.364 | 0.364 | 0.02      |
| 11/30/2019 | 05:50      | 3.11 | 12:45 | 4.98 | 4.20 | 05:35           | 1.34 | 12:25 | 2.09 | 1.72 | 05:40                     | 0.178 | 12:25 | 0.523 | 0.359 | 0.359 | 0.10      |
| 12/01/2019 | 05:50      | 3.16 | 12:50 | 4.97 | 4.26 | 05:35           | 1.35 | 11:35 | 2.09 | 1.74 | 05:35                     | 0.184 | 11:35 | 0.512 | 0.371 | 0.371 | 0.06      |
| 12/02/2019 | 04:45      | 3.27 | 09:20 | 5.08 | 4.22 | 03:55           | 1.38 | 09:25 | 2.18 | 1.72 | 04:50                     | 0.195 | 09:25 | 0.574 | 0.358 | 0.358 | 0.30      |
| 12/03/2019 | 05:05      | 3.20 | 08:45 | 4.86 | 4.12 | 05:05           | 1.35 | 20:10 | 2.02 | 1.68 | 05:05                     | 0.185 | 20:10 | 0.484 | 0.339 | 0.339 | 0.01      |
| 12/04/2019 | 03:20      | 3.25 | 08:55 | 4.96 | 4.11 | 02:30           | 1.35 | 08:40 | 1.93 | 1.67 | 03:15                     | 0.192 | 08:45 | 0.491 | 0.335 | 0.335 | 0.39      |
| 12/05/2019 | 05:05      | 3.07 | 08:40 | 4.79 | 3.83 | 04:45           | 1.30 | 08:35 | 1.88 | 1.58 | 05:05                     | 0.169 | 08:35 | 0.458 | 0.286 | 0.286 | 0.01      |
| 12/06/2019 | 04:30      | 2.77 | 09:00 | 4.35 | 3.49 | 02:55           | 1.19 | 08:55 | 1.77 | 1.46 | 04:35                     | 0.133 | 08:55 | 0.375 | 0.232 | 0.232 | 0.01      |
| 12/07/2019 | 05:55      | 2.67 | 18:50 | 4.84 | 3.62 | 05:40           | 1.14 | 18:45 | 1.96 | 1.50 | 05:40                     | 0.121 | 18:45 | 0.483 | 0.256 | 0.256 | 0.67      |
| 12/08/2019 | 06:10      | 2.80 | 12:25 | 4.12 | 3.61 | 05:30           | 1.19 | 13:10 | 1.69 | 1.50 | 06:25                     | 0.136 | 13:10 | 0.329 | 0.250 | 0.250 | 0.20      |
| 12/09/2019 | 05:20      | 2.74 | 09:00 | 4.03 | 3.40 | 05:15           | 1.17 | 08:55 | 1.66 | 1.44 | 05:15                     | 0.129 | 08:55 | 0.315 | 0.219 | 0.219 |           |
| 12/10/2019 | 05:10      | 2.61 | 09:05 | 3.96 | 3.26 | 04:15           | 1.08 | 08:10 | 1.70 | 1.39 | 04:15                     | 0.112 | 08:40 | 0.304 | 0.200 | 0.200 |           |
| 12/11/2019 | 05:00      | 2.40 | 08:50 | 3.89 | 3.18 | 04:20           | 1.02 | 08:45 | 1.63 | 1.35 | 05:05                     | 0.093 | 08:45 | 0.296 | 0.189 | 0.189 | 0.03      |
| 12/12/2019 | 05:35      | 2.53 | 08:40 | 3.78 | 3.16 | 05:30           | 1.10 | 08:40 | 1.60 | 1.36 | 05:30                     | 0.107 | 08:40 | 0.279 | 0.187 | 0.187 | 0.01      |
| 12/13/2019 | 04:30      | 2.37 | 09:00 | 3.63 | 3.04 | 04:10           | 1.00 | 09:45 | 1.55 | 1.31 | 04:25                     | 0.089 | 08:45 | 0.252 | 0.170 | 0.170 | 0.01      |
| 12/14/2019 | 05:25      | 2.28 | 13:30 | 3.62 | 3.03 | 05:45           | 0.97 | 11:45 | 1.57 | 1.30 | 05:45                     | 0.081 | 11:45 | 0.253 | 0.170 | 0.170 | 0.01      |
| 12/15/2019 | 06:05      | 2.23 | 11:20 | 4.43 | 3.25 | 06:40           | 0.93 | 11:20 | 1.80 | 1.37 | 05:55                     | 0.077 | 11:20 | 0.393 | 0.205 | 0.205 | 0.01      |
| 12/16/2019 | 05:20      | 2.60 | 09:40 | 3.87 | 3.28 | 05:10           | 1.04 | 08:45 | 1.61 | 1.39 | 05:10                     | 0.105 | 09:40 | 0.288 | 0.202 | 0.202 | 0.01      |
| 12/17/2019 | 05:10      | 2.51 | 09:20 | 3.86 | 3.28 | 05:00           | 1.07 | 09:25 | 1.61 | 1.39 | 05:00                     | 0.103 | 09:25 | 0.288 | 0.202 | 0.202 | 0.01      |
| 12/18/2019 | 04:50      | 2.55 | 21:45 | 4.78 | 3.68 | 04:15           | 1.08 | 21:40 | 1.92 | 1.52 | 04:55                     | 0.107 | 21:45 | 0.467 | 0.270 | 0.270 | 0.01      |
| 12/19/2019 | 04:40      | 3.19 | 09:10 | 4.95 | 4.25 | 04:40           | 1.32 | 08:55 | 1.99 | 1.69 | 04:40                     | 0.181 | 09:00 | 0.506 | 0.355 | 0.355 |           |
| 12/20/2019 | 05:05      | 3.16 | 09:40 | 4.98 | 4.25 | 03:45           | 1.32 | 09:40 | 1.98 | 1.68 | 05:10                     | 0.179 | 09:40 | 0.511 | 0.354 | 0.354 |           |
| 12/21/2019 | 05:25      | 3.23 | 12:20 | 5.04 | 4.32 | 05:30           | 1.35 | 11:35 | 1.96 | 1.70 | 05:30                     | 0.188 | 11:40 | 0.508 | 0.368 | 0.368 | 0.01      |
| 12/22/2019 | 06:00      | 3.22 | 13:30 | 5.28 | 4.35 | 04:30           | 1.34 | 13:35 | 2.05 | 1.71 | 04:35                     | 0.186 | 13:35 | 0.573 | 0.374 | 0.374 | 0.41      |
| 12/23/2019 | 05:35      | 3.32 | 13:15 | 5.71 | 4.47 | 05:30           | 1.35 | 12:15 | 2.19 | 1.73 | 05:30                     | 0.195 | 12:15 | 0.666 | 0.396 | 0.396 |           |
| 12/24/2019 | 05:05      | 3.16 | 12:05 | 4.87 | 4.19 | 04:55           | 1.27 | 10:40 | 1.88 | 1.64 | 04:55                     | 0.173 | 12:05 | 0.467 | 0.339 | 0.339 | 0.02      |
| 12/25/2019 | 04:55      | 3.15 | 12:25 | 4.75 | 4.00 | 05:00           | 1.29 | 19:25 | 1.87 | 1.59 | 04:55                     | 0.173 | 12:20 | 0.444 | 0.308 | 0.308 | 0.08      |
| 12/26/2019 | 05:00      | 3.18 | 12:05 | 4.75 | 4.18 | 05:10           | 1.30 | 22:50 | 1.87 | 1.64 | 04:55                     | 0.177 | 10:55 | 0.440 | 0.337 | 0.337 |           |
| 12/27/2019 | 04:20      | 3.10 | 13:20 | 4.71 | 4.11 | 04:15           | 1.28 | 09:45 | 1.96 | 1.62 | 04:15                     | 0.168 | 09:45 | 0.443 | 0.326 | 0.326 |           |
| 12/28/2019 | 04:35      | 2.91 | 12:30 | 4.79 | 4.00 | 04:30           | 1.21 | 12:20 | 1.88 | 1.59 | 04:30                     | 0.145 | 12:25 | 0.455 | 0.309 | 0.309 |           |
| 12/29/2019 | 06:25      | 2.81 | 13:25 | 4.65 | 3.93 | 06:20           | 1.17 | 13:55 | 1.84 | 1.57 | 06:20                     | 0.133 | 13:25 | 0.422 | 0.298 | 0.298 | 0.22      |
| 12/30/2019 | 05:55      | 2.75 | 11:10 | 4.54 | 3.81 | 05:30           | 1.15 | 11:20 | 1.81 | 1.53 | 05:30                     | 0.128 | 11:20 | 0.408 | 0.278 | 0.278 |           |
| 12/31/2019 | 04:45      | 2.84 | 11:20 | 4.53 | 3.89 | 05:15           | 1.17 | 12:40 | 1.91 | 1.55 | 05:15                     | 0.136 | 12:40 | 0.419 | 0.290 | 0.290 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:40      | 3.20 | 12:25 | 4.65 | 4.06 | 06:35           | 1.30 | 12:05 | 1.88 | 1.62 | 06:35                     | 0.181 | 19:10 | 0.436 | 0.321 | 0.321 |       |           |
| 01/02/2020 | 04:35      | 3.49 | 10:25 | 4.64 | 4.23 | 04:05           | 1.42 | 21:00 | 1.86 | 1.69 | 04:05                     | 0.223 | 10:35 | 0.431 | 0.351 | 0.351 |       |           |
| 01/03/2020 | 04:25      | 3.50 | 10:10 | 4.83 | 4.30 | 04:55           | 1.43 | 10:05 | 1.89 | 1.71 | 04:20                     | 0.223 | 10:10 | 0.465 | 0.363 | 0.363 |       |           |
| 01/04/2020 | 04:10      | 3.61 | 11:55 | 4.94 | 4.36 | 04:20           | 1.45 | 16:40 | 2.01 | 1.72 | 04:20                     | 0.238 | 12:15 | 0.500 | 0.373 | 0.373 |       |           |
| 01/05/2020 | 04:45      | 3.52 | 12:10 | 5.06 | 4.38 | 05:25           | 1.40 | 13:50 | 2.06 | 1.72 | 05:25                     | 0.221 | 13:50 | 0.525 | 0.376 | 0.376 |       |           |
| 01/06/2020 | 04:35      | 3.46 | 08:55 | 5.05 | 4.25 | 05:15           | 1.40 | 08:50 | 1.94 | 1.69 | 05:05                     | 0.216 | 08:50 | 0.508 | 0.353 | 0.353 |       |           |
| 01/07/2020 | 04:50      | 3.38 | 08:40 | 6.31 | 4.14 | 04:25           | 1.36 | 08:40 | 2.37 | 1.68 | 04:25                     | 0.204 | 08:40 | 0.844 | 0.339 | 0.339 |       |           |
| 01/08/2020 | 04:45      | 3.16 | 08:35 | 4.79 | 3.81 | 04:40           | 1.36 | 08:35 | 1.94 | 1.59 | 04:40                     | 0.183 | 08:35 | 0.471 | 0.285 | 0.285 |       |           |
| 01/09/2020 | 05:05      | 2.58 | 08:50 | 4.57 | 3.44 | 05:00           | 1.09 | 08:35 | 1.90 | 1.46 | 05:00                     | 0.110 | 08:35 | 0.425 | 0.230 | 0.230 | 0.02  |           |
| 01/10/2020 | 04:15      | 2.51 | 08:40 | 4.12 | 3.33 | 05:20           | 1.11 | 08:40 | 1.70 | 1.44 | 04:55                     | 0.108 | 08:40 | 0.334 | 0.215 | 0.215 | 0.18  |           |
| 01/11/2020 | 05:40      | 2.76 | 12:55 | 4.14 | 3.54 | 05:40           | 1.23 | 12:55 | 1.70 | 1.50 | 05:40                     | 0.137 | 12:55 | 0.337 | 0.243 | 0.243 | 0.02  |           |
| 01/12/2020 | 06:00      | 3.09 | 12:45 | 4.22 | 3.73 | 06:00           | 1.36 | 12:45 | 1.72 | 1.57 | 06:00                     | 0.178 | 12:45 | 0.350 | 0.271 | 0.271 | 0.01  |           |
| 01/13/2020 | 05:20      | 2.74 | 09:00 | 3.91 | 3.36 | 05:20           | 1.23 | 09:00 | 1.63 | 1.46 | 05:20                     | 0.135 | 09:00 | 0.298 | 0.218 | 0.218 | 0.02  |           |
| 01/14/2020 | 05:20      | 2.49 | 09:05 | 3.78 | 3.17 | 05:20           | 1.12 | 09:00 | 1.67 | 1.41 | 05:20                     | 0.107 | 09:00 | 0.292 | 0.195 | 0.195 | 0.11  |           |
| 01/15/2020 | 04:30      | 2.45 | 09:05 | 3.71 | 3.12 | 05:10           | 1.11 | 08:55 | 1.60 | 1.39 | 03:55                     | 0.104 | 09:05 | 0.271 | 0.188 | 0.188 | 0.07  |           |
| 01/16/2020 | 05:30      | 2.42 | 21:40 | 3.82 | 3.26 | 05:25           | 1.08 | 21:40 | 1.64 | 1.43 | 05:25                     | 0.099 | 21:40 | 0.289 | 0.208 | 0.208 | 0.66  |           |
| 01/17/2020 | 05:25      | 2.58 | 09:20 | 4.05 | 3.27 | 05:15           | 1.15 | 09:30 | 1.72 | 1.44 | 05:15                     | 0.116 | 09:30 | 0.329 | 0.209 | 0.209 |       |           |
| 01/18/2020 | 05:25      | 2.31 | 11:10 | 3.83 | 3.14 | 05:25           | 1.02 | 11:25 | 1.63 | 1.38 | 05:25                     | 0.087 | 11:45 | 0.287 | 0.192 | 0.192 |       |           |
| 01/19/2020 | 05:25      | 2.28 | 12:55 | 3.75 | 3.11 | 05:15           | 0.98 | 12:30 | 1.60 | 1.37 | 05:15                     | 0.083 | 12:55 | 0.274 | 0.188 | 0.188 |       |           |
| 01/20/2020 | 05:30      | 2.23 | 12:00 | 3.81 | 3.16 | 04:30           | 1.00 | 13:05 | 1.65 | 1.38 | 05:30                     | 0.081 | 13:05 | 0.289 | 0.195 | 0.195 |       |           |
| 01/21/2020 | 04:40      | 2.14 | 09:00 | 3.72 | 2.87 | 04:40           | 0.95 | 09:05 | 1.60 | 1.28 | 04:40                     | 0.073 | 08:55 | 0.272 | 0.155 | 0.155 |       |           |
| 01/22/2020 | 04:25      | 2.11 | 21:30 | 3.63 | 2.93 | 04:55           | 0.95 | 09:10 | 1.71 | 1.30 | 05:20                     | 0.071 | 09:10 | 0.278 | 0.165 | 0.165 |       |           |
| 01/23/2020 | 04:20      | 2.57 | 09:00 | 3.80 | 3.28 | 04:50           | 1.15 | 08:55 | 1.71 | 1.44 | 04:50                     | 0.116 | 08:55 | 0.301 | 0.209 | 0.209 | 0.03  |           |
| 01/24/2020 | 05:00      | 2.84 | 09:05 | 4.18 | 3.62 | 05:15           | 1.27 | 09:05 | 1.76 | 1.55 | 05:15                     | 0.148 | 09:05 | 0.355 | 0.259 | 0.259 |       |           |
| 01/25/2020 | 05:05      | 3.09 | 11:50 | 4.39 | 3.89 | 05:05           | 1.37 | 13:55 | 1.85 | 1.63 | 05:05                     | 0.179 | 11:50 | 0.394 | 0.302 | 0.302 |       |           |
| 01/26/2020 | 05:00      | 3.27 | 12:50 | 4.69 | 4.12 | 05:25           | 1.43 | 13:00 | 1.93 | 1.73 | 05:25                     | 0.202 | 12:50 | 0.457 | 0.347 | 0.347 | 0.16  |           |
| 01/27/2020 | 05:10      | 3.40 | 08:50 | 4.98 | 4.26 | 05:10           | 1.47 | 09:20 | 2.02 | 1.76 | 05:10                     | 0.221 | 09:20 | 0.509 | 0.368 | 0.368 |       |           |
| 01/28/2020 | 04:25      | 3.53 | 09:10 | 5.57 | 4.53 | 02:45           | 1.50 | 09:10 | 2.09 | 1.82 | 04:25                     | 0.239 | 09:10 | 0.630 | 0.418 | 0.418 |       |           |
| 01/29/2020 | 04:50      | 3.63 | 09:05 | 5.41 | 4.54 | 04:10           | 1.54 | 09:05 | 2.18 | 1.83 | 04:55                     | 0.255 | 09:05 | 0.628 | 0.422 | 0.422 |       |           |
| 01/30/2020 | 04:35      | 3.58 | 08:55 | 5.55 | 4.62 | 04:10           | 1.52 | 09:20 | 2.16 | 1.85 | 04:35                     | 0.245 | 09:00 | 0.640 | 0.437 | 0.437 |       |           |
| 01/31/2020 | 05:25      | 3.53 | 08:55 | 5.72 | 4.67 | 04:20           | 1.50 | 08:55 | 2.18 | 1.87 | 05:30                     | 0.242 | 08:55 | 0.682 | 0.448 | 0.448 |       |           |
| 02/01/2020 | 12:50      | 2.55 | 12:05 | 5.81 | 4.22 | 12:50           | 1.17 | 11:15 | 2.22 | 1.72 | 12:50                     | 0.115 | 12:05 | 0.706 | 0.359 | 0.359 |       |           |
| 02/02/2020 | 05:00      | 2.76 | 12:55 | 4.30 | 3.71 | 05:50           | 1.15 | 12:30 | 1.80 | 1.55 | 05:50                     | 0.127 | 12:30 | 0.377 | 0.271 | 0.271 |       |           |
| 02/03/2020 | 04:35      | 3.18 | 08:55 | 4.30 | 3.82 | 05:15           | 1.40 | 08:45 | 1.80 | 1.62 | 04:35                     | 0.194 | 08:50 | 0.375 | 0.290 | 0.290 |       |           |
| 02/04/2020 | 04:35      | 3.25 | 08:50 | 4.45 | 3.93 | 04:35           | 1.42 | 08:40 | 1.85 | 1.65 | 04:35                     | 0.199 | 08:40 | 0.404 | 0.309 | 0.309 |       |           |
| 02/05/2020 | 04:40      | 3.27 | 09:05 | 4.53 | 3.96 | 05:20           | 1.40 | 09:00 | 1.83 | 1.64 | 04:40                     | 0.199 | 09:00 | 0.412 | 0.309 | 0.309 |       |           |
| 02/06/2020 | 04:20      | 3.24 | 08:45 | 4.50 | 3.96 | 04:20           | 1.39 | 08:40 | 1.91 | 1.64 | 04:20                     | 0.194 | 08:40 | 0.426 | 0.310 | 0.310 |       |           |
| 02/07/2020 | 03:50      | 3.25 | 09:00 | 4.58 | 3.97 | 03:55           | 1.35 | 09:05 | 1.83 | 1.61 | 03:55                     | 0.189 | 09:05 | 0.418 | 0.304 | 0.304 |       |           |
| 02/08/2020 | 06:10      | 3.25 | 13:30 | 4.48 | 4.03 | 06:10           | 1.44 | 13:20 | 1.87 | 1.69 | 06:10                     | 0.202 | 13:20 | 0.412 | 0.328 | 0.328 |       |           |
| 02/09/2020 | 06:00      | 3.13 | 12:30 | 4.65 | 4.07 | 06:25           | 1.36 | 12:35 | 1.93 | 1.71 | 06:25                     | 0.182 | 12:35 | 0.452 | 0.338 | 0.338 |       |           |
| 02/10/2020 | 05:00      | 3.07 | 08:15 | 5.65 | 4.03 | 05:00           | 1.37 | 08:15 | 2.24 | 1.69 | 05:00                     | 0.177 | 08:15 | 0.688 | 0.328 | 0.328 |       |           |
| 02/11/2020 | 04:10      | 2.98 | 08:40 | 4.80 | 4.01 | 04:40           | 1.27 | 08:55 | 1.99 | 1.69 | 04:40                     | 0.157 | 08:55 | 0.482 | 0.329 | 0.329 |       |           |
| 02/12/2020 | 04:50      | 3.17 | 08:40 | 4.84 | 4.07 | 05:20           | 1.39 | 08:50 | 1.96 | 1.70 | 04:55                     | 0.188 | 08:50 | 0.483 | 0.335 | 0.335 |       |           |
| 02/13/2020 | 04:30      | 3.12 | 08:40 | 4.81 | 3.95 | 04:25           | 1.32 | 09:00 | 1.95 | 1.67 | 04:35                     | 0.176 | 09:00 | 0.472 | 0.315 | 0.315 |       |           |
| 02/14/2020 | 04:40      | 3.00 | 08:55 | 4.67 | 3.80 | 03:55           | 1.27 | 09:25 | 1.89 | 1.62 | 04:40                     | 0.159 | 08:55 | 0.442 | 0.289 | 0.289 |       |           |
| 02/15/2020 | 05:50      | 2.83 | 11:30 | 4.28 | 3.54 | 04:50           | 1.29 | 11:20 | 1.80 | 1.56 | 05:40                     | 0.150 | 11:20 | 0.373 | 0.251 | 0.251 |       |           |
| 02/16/2020 | 04:55      | 2.73 | 11:35 | 3.61 | 3.19 | 04:55           | 1.24 | 11:00 | 1.59 | 1.44 | 04:55                     | 0.135 | 12:20 | 0.259 | 0.198 | 0.198 |       |           |
| 02/17/2020 | 04:55      | 2.42 | 10:05 | 3.66 | 3.10 | 05:00           | 1.05 | 10:00 | 1.62 | 1.40 | 05:00                     | 0.096 | 10:00 | 0.268 | 0.188 | 0.188 |       |           |
| 02/18/2020 | 04:30      | 2.45 | 09:00 | 3.64 | 3.11 | 04:25           | 1.10 | 09:50 | 1.62 | 1.41 | 04:25                     | 0.103 | 08:55 | 0.267 | 0.190 | 0.190 |       |           |
| 02/19/2020 | 04:55      | 2.54 | 09:10 | 3.69 | 3.18 | 05:40           | 1.17 | 09:35 | 1.62 | 1.44 | 05:05                     | 0.116 | 09:10 | 0.273 | 0.199 | 0.199 |       |           |
| 02/20/2020 | 05:10      | 2.62 | 10:10 | 3.89 | 3.31 | 03:50           | 1.19 | 10:10 | 1.69 | 1.49 | 03:50                     | 0.124 | 10:10 | 0.308 | 0.218 | 0.218 |       |           |
| 02/21/2020 | 04:40      | 2.67 | 09:40 | 4.02 | 3.32 | 05:05           | 1.22 | 09:35 | 1.75 | 1.49 | 04:55                     | 0.130 | 09:35 | 0.332 | 0.220 | 0.220 |       |           |
| 02/22/2020 | 05:30      | 2.62 | 11:30 | 3.89 | 3.37 | 04:45           | 1.18 | 11:30 | 1.70 | 1.50 | 04:45                     | 0.123 | 11:30 | 0.308 | 0.227 | 0.227 |       |           |
| 02/23/2020 | 05:40      | 2.60 | 12:40 | 4.05 | 3.45 | 06:05           | 1.20 | 12:35 | 1.72 | 1.53 | 06:05                     | 0.123 | 12:35 | 0.330 | 0.240 | 0.240 |       |           |
| 02/24/2020 | 05:00      | 2.68 | 08:45 | 4.05 | 3.40 | 05:05           | 1.24 | 08:35 | 1.73 | 1.52 | 04:55                     | 0.132 | 08:35 | 0.331 | 0.232 | 0.232 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total |           |
| 02/25/2020 | 04:55      | 2.69 | 08:50 | 4.14 | 3.41 | 05:20           | 1.20 | 08:50 | 1.79 | 1.52 | 05:20                     | 0.129 | 08:50 | 0.356 | 0.233 | 0.233 |           |
| 02/26/2020 | 04:50      | 2.56 | 08:30 | 3.94 | 3.22 | 04:30           | 1.18 | 08:40 | 1.69 | 1.45 | 04:50                     | 0.118 | 08:40 | 0.312 | 0.205 | 0.205 |           |
| 02/27/2020 | 04:55      | 2.38 | 08:30 | 3.75 | 3.15 | 04:55           | 1.10 | 08:40 | 1.66 | 1.42 | 04:55                     | 0.098 | 08:40 | 0.287 | 0.195 | 0.195 |           |
| 02/28/2020 | 04:55      | 2.43 | 08:55 | 3.71 | 3.09 | 04:25           | 1.09 | 08:55 | 1.63 | 1.38 | 04:55                     | 0.101 | 08:55 | 0.277 | 0.184 | 0.184 |           |
| 02/29/2020 | 05:35      | 2.41 | 11:10 | 3.72 | 3.17 | 05:35           | 1.06 | 13:15 | 1.64 | 1.41 | 05:35                     | 0.097 | 11:10 | 0.278 | 0.196 | 0.196 |           |
| 03/01/2020 | 05:45      | 2.27 | 11:15 | 3.47 | 2.79 | 05:40           | 1.00 | 11:10 | 1.55 | 1.27 | 05:40                     | 0.084 | 11:15 | 0.238 | 0.145 | 0.145 |           |
| 03/02/2020 | 05:05      | 1.78 | 08:40 | 2.97 | 2.36 | 04:45           | 0.77 | 08:40 | 1.39 | 1.07 | 04:50                     | 0.045 | 08:40 | 0.171 | 0.098 | 0.098 |           |
| 03/03/2020 | 04:30      | 1.69 | 08:55 | 2.80 | 2.00 | 04:50           | 0.70 | 08:55 | 1.32 | 0.88 | 04:30                     | 0.039 | 08:55 | 0.149 | 0.063 | 0.063 |           |
| 03/04/2020 | 05:30      | 1.46 | 08:50 | 2.30 | 1.87 | 03:35           | 0.56 | 09:10 | 1.07 | 0.81 | 05:30                     | 0.025 | 08:55 | 0.091 | 0.053 | 0.053 |           |
| 03/05/2020 | 05:30      | 1.38 | 21:00 | 2.29 | 1.83 | 04:35           | 0.52 | 09:10 | 1.06 | 0.81 | 05:15                     | 0.022 | 21:00 | 0.087 | 0.051 | 0.051 |           |
| 03/06/2020 | 04:45      | 1.31 | 09:00 | 2.19 | 1.82 | 04:00           | 0.49 | 08:10 | 1.09 | 0.81 | 04:45                     | 0.019 | 08:20 | 0.084 | 0.051 | 0.051 |           |
| 03/07/2020 | 05:50      | 1.21 | 13:40 | 1.92 | 1.67 | 05:00           | 0.45 | 13:45 | 0.88 | 0.69 | 05:50                     | 0.015 | 13:45 | 0.058 | 0.038 | 0.038 |           |
| 03/08/2020 | 06:00      | 1.37 | 10:30 | 1.89 | 1.51 | 05:20           | 0.42 | 08:50 | 0.83 | 0.58 | 05:20                     | 0.017 | 10:30 | 0.050 | 0.027 | 0.027 |           |
| 03/09/2020 | 06:35      | 1.23 | 21:50 | 5.37 | 1.75 | 04:30           | 0.39 | 21:50 | 2.13 | 0.70 | 05:55                     | 0.014 | 21:50 | 0.608 | 0.060 | 0.060 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 31.478                    | 4.90      |
| Avg   | 3.67       | 1.53            | 0.274                     |           |



## Site Commentary

### Site Information

| MIL_0649        |       |
|-----------------|-------|
| Pipe Dimensions | 21.5  |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0649 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed upstream of site MIL\_1790 and downstream of the combined flows of sites MIL\_0386 and MIL\_2840. A review of balancing with the combined flows of MIL\_0386 and MIL\_2840 into MIL\_0649 and MIL\_2491 shows a net flow between the sites of 0.426 MGD.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                   |                   |
|--------------------------|--------------------|-------------------|-------------------|
| Item                     | Depth (in)         | Velocity (ft/s)   | Quantity (MGD)    |
| Average                  | 8.66               | 1.24              | 0.777             |
| Minimum                  | 6.64               | 0.82              | 0.386             |
| Maximum                  | 11.63              | 1.64              | 1.448             |
| Time of Minimum          | 3/1/2020 3:15 AM   | 2/1/2020 11:40 PM | 2/17/2020 1:55 AM |
| Time of Maximum          | 2/18/2020 11:55 AM | 12/5/2019 2:35 PM | 1/9/2020 10:45 AM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0649

Site Address /Location: 79 Railroad Avenue

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details:

Drive

Latitude:

37.430840°

Longitude:

-121.905657

Pipe Size (H x W)

21.50" x 21.50"

Pipe Shape

Circular

Manhole #

649

System Characteristics

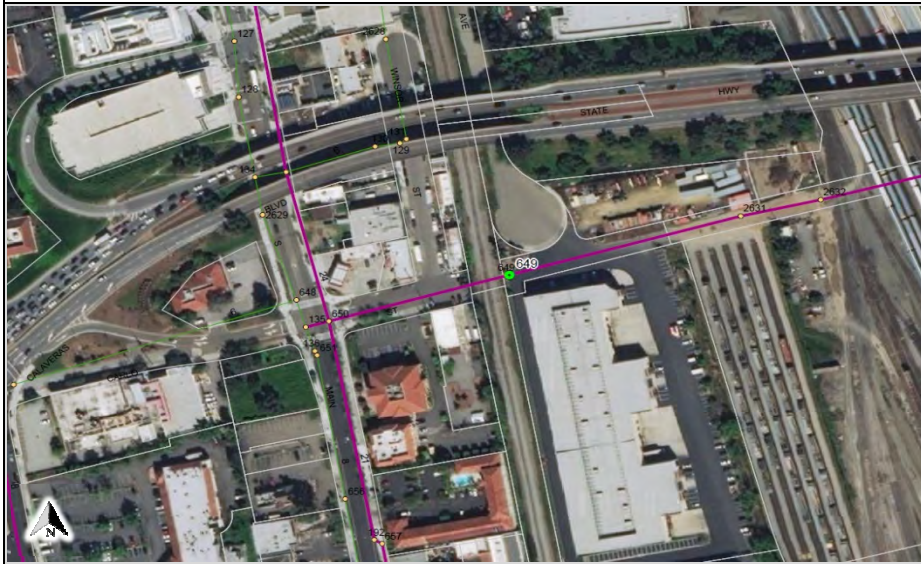
Residential/Commercial

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

10:22:26 AM

Pipe Size (HxW)

21.50" x 21.50"

Depth of Flow (Wet DOF) (in)

10.50

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.61

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

### Hydraulic Comments:

Smooth deep flow with moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

10'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

826



ADS Project Name: Milpitas.WWTFM.CA19-20

49

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_0649

Flow Monitor

**MIL\_0649**

Pipe Height  
21.50 in

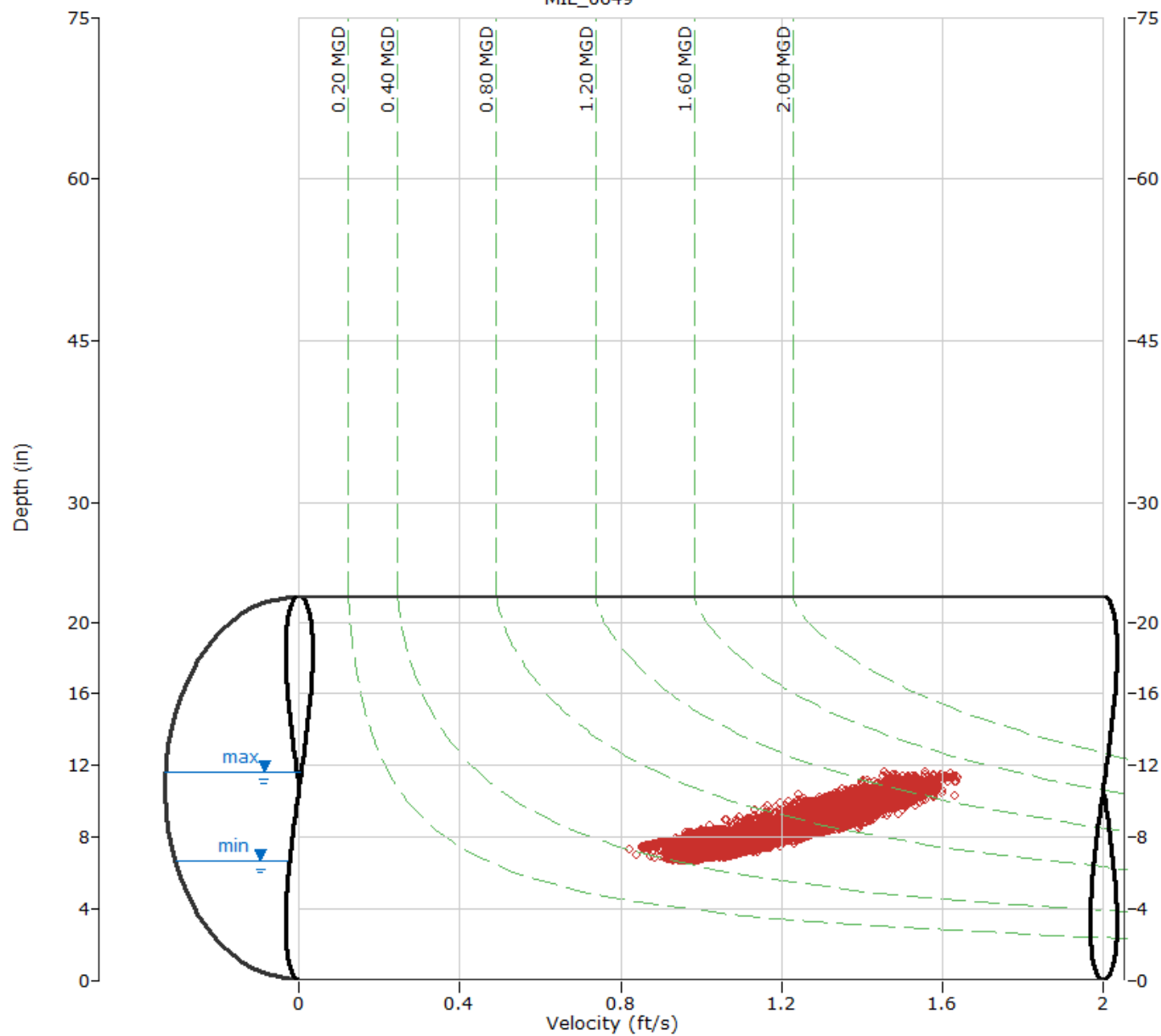
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

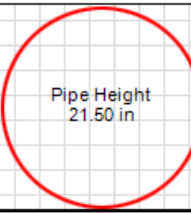
**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_0649

Flow Monitor  
**MIL\_0649**

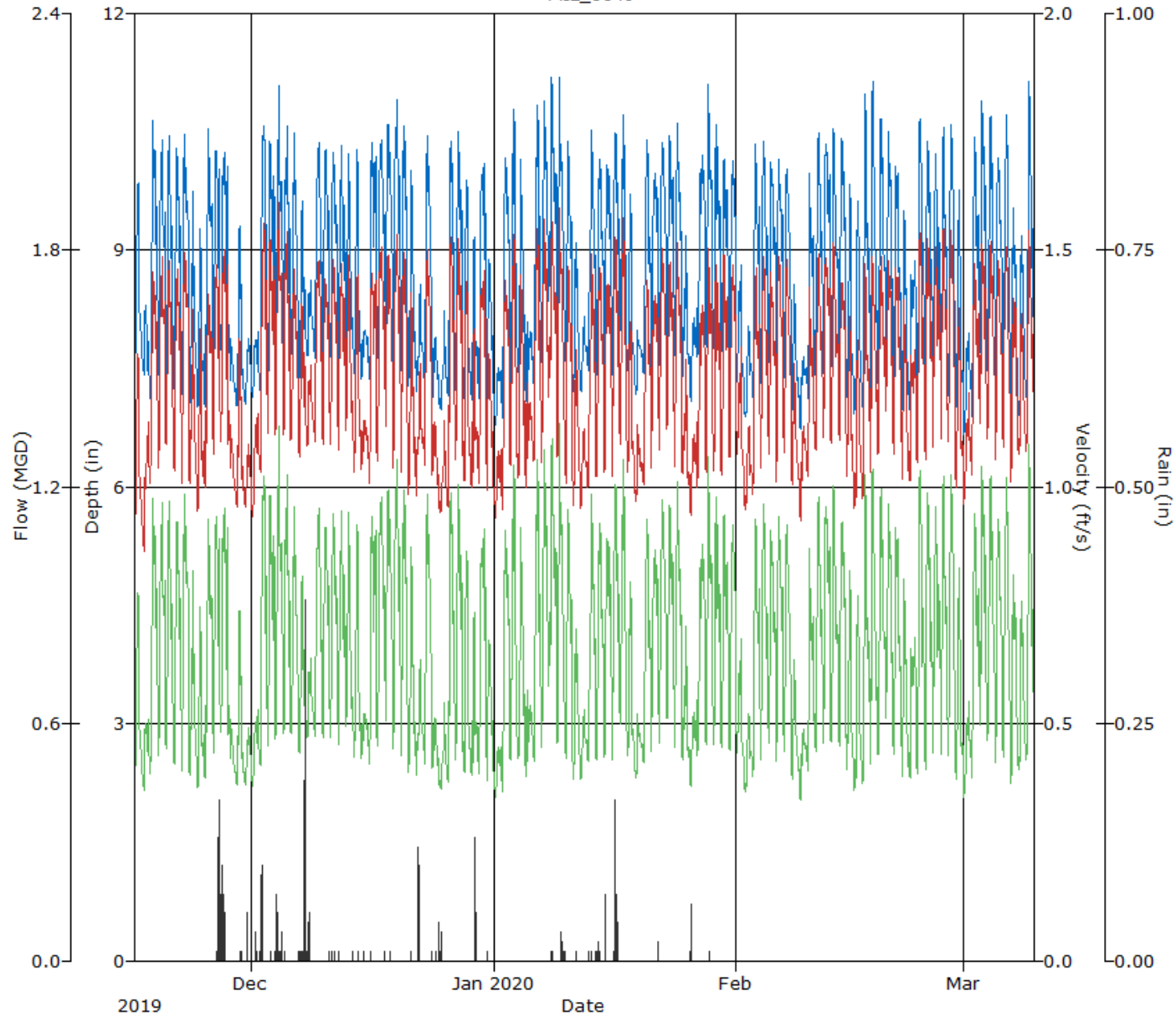


Pipe Height  
21.50 in

Report Period  
11/16/2019  
To  
3/9/2020

**Legend**  

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0649, Pipe Height: 21.50 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 11/16/2019 | 04:20      | 7.62 | 12:25 | 10.26 | 8.49 | 04:45           | 0.93 | 12:30 | 1.34 | 1.07 | 04:00                     | 0.480 | 12:30 | 1.024 | 0.648 | 0.648 |       |           |
| 11/17/2019 | 23:55      | 7.22 | 15:05 | 8.57  | 7.75 | 06:20           | 0.85 | 15:05 | 1.24 | 0.99 | 06:20                     | 0.423 | 15:05 | 0.748 | 0.527 | 0.527 |       |           |
| 11/18/2019 | 00:55      | 7.00 | 10:15 | 11.13 | 9.05 | 03:35           | 1.00 | 10:15 | 1.54 | 1.27 | 00:55                     | 0.462 | 10:15 | 1.311 | 0.848 | 0.848 |       |           |
| 11/19/2019 | 04:50      | 7.37 | 15:50 | 10.61 | 9.09 | 05:15           | 1.01 | 15:50 | 1.55 | 1.30 | 05:15                     | 0.504 | 15:50 | 1.244 | 0.865 | 0.865 |       |           |
| 11/20/2019 | 03:30      | 7.27 | 12:30 | 10.87 | 8.85 | 03:30           | 1.06 | 12:30 | 1.54 | 1.28 | 03:30                     | 0.514 | 12:30 | 1.273 | 0.823 | 0.823 |       |           |
| 11/21/2019 | 04:20      | 7.18 | 11:05 | 10.80 | 9.00 | 04:25           | 1.03 | 11:00 | 1.53 | 1.30 | 04:20                     | 0.489 | 11:00 | 1.251 | 0.854 | 0.854 |       |           |
| 11/22/2019 | 04:40      | 7.12 | 11:40 | 11.16 | 9.10 | 04:40           | 0.99 | 11:35 | 1.63 | 1.32 | 04:40                     | 0.464 | 11:35 | 1.382 | 0.879 | 0.879 |       |           |
| 11/23/2019 | 05:05      | 7.01 | 12:10 | 9.90  | 8.01 | 04:55           | 1.00 | 12:45 | 1.41 | 1.13 | 05:00                     | 0.459 | 12:10 | 1.014 | 0.633 | 0.633 |       |           |
| 11/24/2019 | 03:25      | 6.97 | 13:00 | 9.71  | 7.79 | 03:20           | 0.93 | 12:05 | 1.39 | 1.09 | 03:25                     | 0.425 | 13:00 | 0.984 | 0.587 | 0.587 |       |           |
| 11/25/2019 | 03:50      | 6.96 | 12:35 | 10.77 | 8.89 | 02:10           | 0.97 | 12:30 | 1.45 | 1.24 | 02:10                     | 0.443 | 12:30 | 1.184 | 0.803 | 0.803 |       |           |
| 11/26/2019 | 04:20      | 7.31 | 09:40 | 10.62 | 9.16 | 04:10           | 1.05 | 10:10 | 1.52 | 1.32 | 04:20                     | 0.518 | 10:10 | 1.212 | 0.883 | 0.883 | 0.36  |           |
| 11/27/2019 | 03:20      | 7.70 | 10:05 | 10.48 | 9.23 | 03:15           | 1.09 | 13:05 | 1.54 | 1.34 | 03:15                     | 0.569 | 13:10 | 1.198 | 0.906 | 0.906 | 0.63  |           |
| 11/28/2019 | 20:20      | 7.16 | 00:00 | 8.75  | 7.60 | 23:50           | 0.90 | 00:00 | 1.26 | 1.07 | 23:50                     | 0.433 | 00:00 | 0.787 | 0.555 | 0.555 |       |           |
| 11/29/2019 | 04:20      | 7.00 | 14:10 | 9.99  | 7.88 | 22:45           | 0.92 | 13:55 | 1.42 | 1.10 | 04:15                     | 0.435 | 09:15 | 1.034 | 0.603 | 0.603 |       |           |
| 11/30/2019 | 06:30      | 6.97 | 17:45 | 8.05  | 7.47 | 06:25           | 0.93 | 17:35 | 1.13 | 1.02 | 06:25                     | 0.427 | 17:45 | 0.627 | 0.513 | 0.513 | 0.10  |           |
| 12/01/2019 | 06:05      | 7.08 | 21:35 | 8.27  | 7.55 | 06:05           | 0.91 | 21:40 | 1.20 | 1.05 | 06:05                     | 0.427 | 21:40 | 0.695 | 0.537 | 0.537 | 0.06  |           |
| 12/02/2019 | 04:15      | 7.16 | 13:35 | 10.70 | 9.14 | 04:10           | 1.02 | 10:40 | 1.63 | 1.34 | 04:10                     | 0.483 | 10:40 | 1.255 | 0.905 | 0.905 | 0.30  |           |
| 12/03/2019 | 04:20      | 7.30 | 10:05 | 10.72 | 8.96 | 04:10           | 1.10 | 10:10 | 1.56 | 1.34 | 04:10                     | 0.536 | 10:10 | 1.261 | 0.870 | 0.870 | 0.01  |           |
| 12/04/2019 | 02:45      | 7.45 | 12:15 | 11.41 | 9.35 | 02:20           | 1.11 | 12:10 | 1.64 | 1.39 | 02:45                     | 0.557 | 12:10 | 1.436 | 0.957 | 0.957 | 0.39  |           |
| 12/05/2019 | 03:30      | 7.61 | 14:40 | 11.30 | 9.20 | 03:35           | 1.10 | 14:35 | 1.64 | 1.35 | 03:35                     | 0.569 | 14:35 | 1.418 | 0.908 | 0.908 | 0.01  |           |
| 12/06/2019 | 02:15      | 7.60 | 12:40 | 10.59 | 9.00 | 01:40           | 1.02 | 17:50 | 1.48 | 1.29 | 01:40                     | 0.536 | 12:55 | 1.173 | 0.843 | 0.843 | 0.01  |           |
| 12/07/2019 | 06:00      | 7.33 | 11:50 | 9.77  | 8.30 | 06:05           | 1.05 | 11:45 | 1.49 | 1.21 | 06:05                     | 0.516 | 11:50 | 1.068 | 0.710 | 0.710 | 0.67  |           |
| 12/08/2019 | 04:15      | 7.64 | 07:45 | 9.62  | 8.11 | 05:40           | 1.08 | 07:45 | 1.43 | 1.17 | 04:15                     | 0.562 | 07:45 | 1.008 | 0.659 | 0.659 | 0.20  |           |
| 12/09/2019 | 04:40      | 7.53 | 16:50 | 10.46 | 9.15 | 04:35           | 1.08 | 13:35 | 1.53 | 1.32 | 04:35                     | 0.549 | 13:35 | 1.179 | 0.887 | 0.887 |       |           |
| 12/10/2019 | 05:10      | 7.57 | 12:00 | 10.57 | 9.13 | 04:00           | 1.08 | 10:35 | 1.49 | 1.31 | 05:00                     | 0.557 | 11:55 | 1.179 | 0.872 | 0.872 |       |           |
| 12/11/2019 | 04:20      | 7.58 | 13:20 | 10.40 | 9.07 | 04:05           | 1.08 | 12:35 | 1.51 | 1.31 | 04:00                     | 0.554 | 13:20 | 1.173 | 0.867 | 0.867 | 0.03  |           |
| 12/12/2019 | 04:30      | 7.49 | 12:45 | 10.46 | 9.06 | 04:20           | 1.07 | 13:25 | 1.50 | 1.31 | 04:20                     | 0.539 | 12:40 | 1.173 | 0.865 | 0.865 | 0.01  |           |
| 12/13/2019 | 01:50      | 7.61 | 12:20 | 10.35 | 8.74 | 01:55           | 1.09 | 12:20 | 1.52 | 1.27 | 01:55                     | 0.564 | 12:20 | 1.180 | 0.796 | 0.796 | 0.01  |           |
| 12/14/2019 | 04:10      | 7.39 | 13:25 | 10.37 | 8.35 | 03:45           | 1.01 | 13:50 | 1.48 | 1.19 | 03:45                     | 0.506 | 13:25 | 1.129 | 0.707 | 0.707 | 0.01  |           |
| 12/15/2019 | 03:10      | 7.25 | 06:55 | 8.09  | 7.78 | 09:10           | 1.00 | 06:50 | 1.17 | 1.10 | 06:20                     | 0.487 | 06:50 | 0.655 | 0.584 | 0.584 | 0.01  |           |
| 12/16/2019 | 03:45      | 7.35 | 08:25 | 10.48 | 9.18 | 03:40           | 1.00 | 12:55 | 1.49 | 1.29 | 03:45                     | 0.493 | 12:50 | 1.171 | 0.875 | 0.875 | 0.01  |           |
| 12/17/2019 | 05:15      | 7.52 | 16:55 | 10.65 | 9.38 | 03:55           | 1.04 | 16:50 | 1.56 | 1.34 | 05:15                     | 0.528 | 16:50 | 1.256 | 0.934 | 0.934 | 0.01  |           |
| 12/18/2019 | 04:20      | 7.59 | 12:50 | 10.77 | 9.53 | 04:20           | 1.07 | 12:45 | 1.51 | 1.36 | 04:20                     | 0.549 | 12:45 | 1.232 | 0.953 | 0.953 | 0.01  |           |
| 12/19/2019 | 04:35      | 7.56 | 13:25 | 11.00 | 9.49 | 04:35           | 1.02 | 13:05 | 1.56 | 1.34 | 04:35                     | 0.522 | 13:05 | 1.299 | 0.945 | 0.945 |       |           |
| 12/20/2019 | 05:05      | 7.32 | 14:20 | 10.74 | 9.30 | 05:00           | 1.00 | 14:20 | 1.53 | 1.32 | 05:00                     | 0.489 | 14:20 | 1.247 | 0.902 | 0.902 |       |           |
| 12/21/2019 | 04:25      | 7.24 | 11:25 | 10.10 | 8.35 | 05:40           | 0.97 | 11:20 | 1.46 | 1.16 | 04:30                     | 0.472 | 11:20 | 1.095 | 0.688 | 0.688 | 0.01  |           |
| 12/22/2019 | 03:25      | 7.15 | 14:35 | 8.70  | 7.74 | 03:25           | 0.97 | 14:35 | 1.29 | 1.10 | 03:25                     | 0.457 | 14:35 | 0.795 | 0.584 | 0.584 | 0.41  |           |
| 12/23/2019 | 04:40      | 7.12 | 11:35 | 10.73 | 9.01 | 04:05           | 1.04 | 11:35 | 1.53 | 1.31 | 04:45                     | 0.491 | 11:35 | 1.244 | 0.867 | 0.867 |       |           |
| 12/24/2019 | 03:10      | 7.11 | 00:10 | 8.79  | 7.55 | 18:30           | 0.96 | 00:10 | 1.31 | 1.07 | 23:40                     | 0.478 | 00:10 | 0.821 | 0.548 | 0.548 |       |           |
| 12/25/2019 | 06:00      | 6.95 | 16:10 | 8.45  | 7.42 | 01:20           | 0.93 | 16:10 | 1.19 | 1.02 | 05:45                     | 0.426 | 16:10 | 0.706 | 0.509 | 0.509 | 0.08  |           |
| 12/26/2019 | 03:10      | 7.13 | 13:20 | 10.47 | 8.91 | 01:20           | 0.90 | 13:30 | 1.60 | 1.28 | 01:55                     | 0.445 | 13:30 | 1.254 | 0.842 | 0.842 |       |           |
| 12/27/2019 | 02:50      | 7.15 | 11:00 | 10.96 | 9.02 | 02:50           | 1.04 | 10:50 | 1.56 | 1.32 | 02:50                     | 0.491 | 11:00 | 1.290 | 0.873 | 0.873 |       |           |
| 12/28/2019 | 06:15      | 7.08 | 13:50 | 10.07 | 8.28 | 06:10           | 0.99 | 14:15 | 1.47 | 1.20 | 06:10                     | 0.466 | 14:15 | 1.097 | 0.708 | 0.708 |       |           |
| 12/29/2019 | 07:30      | 7.01 | 09:20 | 9.47  | 7.84 | 01:55           | 0.94 | 10:10 | 1.37 | 1.12 | 01:55                     | 0.451 | 09:20 | 0.945 | 0.609 | 0.609 |       |           |
| 12/30/2019 | 03:35      | 7.11 | 18:55 | 10.29 | 8.95 | 02:50           | 1.00 | 18:40 | 1.58 | 1.28 | 03:00                     | 0.473 | 18:40 | 1.199 | 0.839 | 0.839 |       |           |
| 12/31/2019 | 05:10      | 6.91 | 08:50 | 9.14  | 7.96 | 05:10           | 0.97 | 08:50 | 1.34 | 1.14 | 05:10                     | 0.441 | 08:50 | 0.885 | 0.631 | 0.631 |       |           |

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 06:35      | 6.75 | 14:05 | 7.61  | 7.22 | 06:10           | 0.89 | 02:20 | 1.10 | 1.02 | 06:10                     | 0.393 | 13:55 | 0.564 | 0.489 | 0.489 |       |           |
| 01/02/2020 | 03:35      | 6.84 | 07:40 | 10.59 | 8.94 | 04:15           | 0.87 | 07:35 | 1.58 | 1.26 | 04:15                     | 0.396 | 07:35 | 1.263 | 0.828 | 0.828 |       |           |
| 01/03/2020 | 03:05      | 7.23 | 15:20 | 10.97 | 8.90 | 22:35           | 0.94 | 15:15 | 1.57 | 1.28 | 05:05                     | 0.482 | 15:15 | 1.297 | 0.835 | 0.835 |       |           |
| 01/04/2020 | 03:30      | 7.42 | 11:35 | 10.41 | 8.44 | 03:30           | 1.01 | 11:10 | 1.58 | 1.21 | 03:30                     | 0.503 | 11:10 | 1.209 | 0.729 | 0.729 |       |           |
| 01/05/2020 | 03:35      | 7.06 | 07:20 | 8.31  | 7.67 | 03:35           | 0.98 | 07:15 | 1.27 | 1.12 | 03:35                     | 0.457 | 07:15 | 0.736 | 0.585 | 0.585 |       |           |
| 01/06/2020 | 04:35      | 7.15 | 13:10 | 11.00 | 9.07 | 01:25           | 1.03 | 12:20 | 1.59 | 1.31 | 04:35                     | 0.493 | 15:35 | 1.322 | 0.876 | 0.876 |       |           |
| 01/07/2020 | 04:00      | 7.48 | 12:40 | 11.07 | 9.28 | 03:50           | 1.03 | 12:35 | 1.60 | 1.32 | 03:55                     | 0.522 | 12:35 | 1.349 | 0.907 | 0.907 |       |           |
| 01/08/2020 | 04:30      | 7.94 | 12:35 | 11.43 | 9.75 | 00:55           | 1.10 | 12:35 | 1.60 | 1.38 | 04:30                     | 0.617 | 12:35 | 1.405 | 1.002 | 1.002 |       |           |
| 01/09/2020 | 03:50      | 7.55 | 10:45 | 11.57 | 9.35 | 03:45           | 1.04 | 10:50 | 1.62 | 1.33 | 03:45                     | 0.531 | 10:45 | 1.448 | 0.919 | 0.919 | 0.18  |           |
| 01/10/2020 | 05:15      | 7.50 | 12:35 | 10.49 | 9.02 | 05:40           | 1.00 | 12:30 | 1.49 | 1.27 | 05:40                     | 0.507 | 12:30 | 1.177 | 0.839 | 0.839 | 0.02  |           |
| 01/11/2020 | 06:15      | 7.15 | 13:55 | 9.43  | 8.01 | 03:25           | 0.92 | 13:55 | 1.35 | 1.12 | 03:25                     | 0.438 | 13:55 | 0.925 | 0.625 | 0.625 | 0.01  |           |
| 01/12/2020 | 04:00      | 7.19 | 14:20 | 8.26  | 7.67 | 03:00           | 0.86 | 15:30 | 1.16 | 1.04 | 03:00                     | 0.416 | 15:30 | 0.668 | 0.546 | 0.546 |       |           |
| 01/13/2020 | 04:40      | 7.37 | 13:15 | 10.57 | 8.93 | 01:20           | 0.98 | 13:15 | 1.52 | 1.25 | 04:35                     | 0.487 | 13:15 | 1.212 | 0.816 | 0.816 |       |           |
| 01/14/2020 | 04:55      | 7.37 | 13:10 | 10.29 | 8.99 | 04:55           | 1.01 | 15:05 | 1.50 | 1.28 | 04:55                     | 0.499 | 15:15 | 1.148 | 0.839 | 0.839 | 0.11  |           |
| 01/15/2020 | 04:40      | 7.36 | 12:15 | 10.21 | 9.12 | 04:35           | 1.02 | 12:10 | 1.45 | 1.30 | 04:35                     | 0.502 | 12:05 | 1.107 | 0.865 | 0.865 | 0.07  |           |
| 01/16/2020 | 04:30      | 7.39 | 14:05 | 10.85 | 9.26 | 04:10           | 1.01 | 14:05 | 1.57 | 1.33 | 04:10                     | 0.505 | 14:05 | 1.293 | 0.904 | 0.904 | 0.66  |           |
| 01/17/2020 | 04:55      | 7.83 | 15:35 | 10.79 | 9.11 | 04:50           | 1.06 | 15:05 | 1.58 | 1.31 | 04:50                     | 0.570 | 15:30 | 1.292 | 0.874 | 0.874 |       |           |
| 01/18/2020 | 06:25      | 7.42 | 12:35 | 9.73  | 8.13 | 04:05           | 0.98 | 11:50 | 1.42 | 1.14 | 04:05                     | 0.487 | 11:50 | 0.989 | 0.653 | 0.653 |       |           |
| 01/19/2020 | 05:00      | 7.11 | 09:00 | 8.23  | 7.62 | 00:20           | 0.95 | 09:00 | 1.20 | 1.05 | 05:10                     | 0.448 | 09:00 | 0.690 | 0.543 | 0.543 |       |           |
| 01/20/2020 | 05:00      | 7.38 | 14:50 | 10.46 | 8.94 | 05:00           | 0.98 | 15:20 | 1.47 | 1.24 | 05:00                     | 0.484 | 15:20 | 1.148 | 0.814 | 0.814 |       |           |
| 01/21/2020 | 04:10      | 7.42 | 12:45 | 10.15 | 9.18 | 04:10           | 1.01 | 09:40 | 1.45 | 1.29 | 04:10                     | 0.503 | 12:45 | 1.099 | 0.866 | 0.866 |       |           |
| 01/22/2020 | 04:15      | 7.49 | 12:50 | 10.51 | 9.24 | 04:15           | 1.06 | 12:45 | 1.56 | 1.33 | 04:15                     | 0.536 | 12:45 | 1.232 | 0.903 | 0.903 |       |           |
| 01/23/2020 | 04:20      | 7.68 | 09:05 | 10.54 | 9.36 | 03:50           | 1.10 | 15:30 | 1.49 | 1.32 | 04:20                     | 0.578 | 09:05 | 1.179 | 0.910 | 0.910 | 0.03  |           |
| 01/24/2020 | 04:55      | 7.63 | 12:40 | 10.83 | 9.25 | 04:50           | 1.03 | 11:00 | 1.56 | 1.30 | 04:50                     | 0.534 | 11:15 | 1.267 | 0.887 | 0.887 |       |           |
| 01/25/2020 | 03:30      | 7.34 | 15:05 | 9.45  | 8.02 | 20:55           | 0.93 | 15:00 | 1.33 | 1.10 | 20:55                     | 0.482 | 15:05 | 0.912 | 0.611 | 0.611 |       |           |
| 01/26/2020 | 05:20      | 7.02 | 21:40 | 8.97  | 7.69 | 08:45           | 0.92 | 21:35 | 1.26 | 1.03 | 05:20                     | 0.431 | 21:40 | 0.807 | 0.543 | 0.543 | 0.16  |           |
| 01/27/2020 | 00:55      | 7.55 | 15:45 | 10.43 | 9.27 | 00:25           | 0.95 | 15:35 | 1.43 | 1.25 | 00:25                     | 0.492 | 15:40 | 1.120 | 0.852 | 0.852 |       |           |
| 01/28/2020 | 05:05      | 7.64 | 10:00 | 11.35 | 9.43 | 05:05           | 1.00 | 10:35 | 1.52 | 1.28 | 05:05                     | 0.520 | 10:05 | 1.324 | 0.897 | 0.897 |       |           |
| 01/29/2020 | 04:35      | 7.60 | 09:45 | 10.80 | 9.18 | 04:35           | 1.01 | 09:40 | 1.53 | 1.26 | 04:35                     | 0.520 | 09:40 | 1.250 | 0.848 | 0.848 |       |           |
| 01/30/2020 | 02:15      | 7.68 | 11:20 | 10.28 | 9.06 | 02:10           | 1.01 | 11:15 | 1.53 | 1.28 | 02:10                     | 0.529 | 11:15 | 1.176 | 0.849 | 0.849 |       |           |
| 01/31/2020 | 05:10      | 7.40 | 12:30 | 10.35 | 9.01 | 03:55           | 1.01 | 14:20 | 1.51 | 1.30 | 03:55                     | 0.512 | 12:35 | 1.150 | 0.856 | 0.856 |       |           |
| 02/01/2020 | 03:45      | 7.26 | 14:45 | 9.12  | 7.86 | 23:40           | 0.82 | 08:45 | 1.35 | 1.13 | 23:40                     | 0.399 | 14:45 | 0.878 | 0.614 | 0.614 |       |           |
| 02/02/2020 | 02:45      | 6.88 | 15:30 | 8.12  | 7.40 | 21:05           | 0.92 | 12:25 | 1.18 | 1.03 | 06:15                     | 0.425 | 12:25 | 0.663 | 0.514 | 0.514 |       |           |
| 02/03/2020 | 02:35      | 7.10 | 10:35 | 10.44 | 8.94 | 00:55           | 0.97 | 10:30 | 1.51 | 1.26 | 02:40                     | 0.462 | 10:30 | 1.182 | 0.822 | 0.822 |       |           |
| 02/04/2020 | 04:10      | 7.26 | 13:20 | 10.51 | 8.97 | 03:55           | 1.02 | 13:00 | 1.53 | 1.28 | 04:20                     | 0.498 | 13:00 | 1.203 | 0.840 | 0.840 |       |           |
| 02/05/2020 | 04:20      | 7.46 | 10:00 | 10.20 | 9.12 | 04:30           | 1.03 | 09:35 | 1.48 | 1.30 | 04:30                     | 0.521 | 09:35 | 1.121 | 0.863 | 0.863 |       |           |
| 02/06/2020 | 04:50      | 7.38 | 13:50 | 10.35 | 9.07 | 04:50           | 0.99 | 13:45 | 1.55 | 1.30 | 04:50                     | 0.492 | 13:45 | 1.202 | 0.863 | 0.863 |       |           |
| 02/07/2020 | 02:25      | 7.30 | 11:00 | 10.23 | 8.93 | 02:20           | 1.05 | 10:55 | 1.55 | 1.30 | 02:20                     | 0.512 | 10:55 | 1.181 | 0.842 | 0.842 |       |           |
| 02/08/2020 | 04:05      | 6.92 | 11:30 | 8.67  | 7.59 | 22:20           | 0.95 | 11:35 | 1.28 | 1.10 | 04:05                     | 0.452 | 11:35 | 0.789 | 0.569 | 0.569 |       |           |
| 02/09/2020 | 04:35      | 6.70 | 13:35 | 7.72  | 7.29 | 05:20           | 0.91 | 11:55 | 1.16 | 1.05 | 05:05                     | 0.398 | 11:55 | 0.606 | 0.513 | 0.513 |       |           |
| 02/10/2020 | 04:30      | 7.08 | 08:10 | 10.11 | 8.52 | 00:45           | 0.92 | 08:10 | 1.46 | 1.21 | 00:50                     | 0.462 | 08:10 | 1.095 | 0.739 | 0.739 |       |           |
| 02/11/2020 | 04:30      | 7.26 | 13:00 | 10.71 | 9.08 | 04:10           | 1.05 | 13:05 | 1.54 | 1.31 | 04:30                     | 0.519 | 13:05 | 1.248 | 0.868 | 0.868 |       |           |
| 02/12/2020 | 04:30      | 7.23 | 12:05 | 10.47 | 9.29 | 04:25           | 1.06 | 09:55 | 1.53 | 1.34 | 04:25                     | 0.510 | 12:05 | 1.199 | 0.914 | 0.914 |       |           |
| 02/13/2020 | 02:15      | 7.42 | 10:40 | 10.69 | 9.06 | 02:15           | 1.07 | 10:30 | 1.55 | 1.31 | 02:15                     | 0.535 | 10:35 | 1.254 | 0.869 | 0.869 |       |           |
| 02/14/2020 | 04:35      | 7.35 | 13:10 | 10.56 | 9.17 | 05:05           | 1.08 | 10:35 | 1.47 | 1.31 | 05:05                     | 0.536 | 13:10 | 1.165 | 0.879 | 0.879 |       |           |
| 02/15/2020 | 03:25      | 6.97 | 11:50 | 10.38 | 8.15 | 02:10           | 0.90 | 11:45 | 1.44 | 1.16 | 02:10                     | 0.432 | 11:45 | 1.117 | 0.669 | 0.669 |       |           |
| 02/16/2020 | 02:15      | 6.86 | 12:30 | 10.02 | 7.96 | 04:30           | 0.88 | 12:35 | 1.41 | 1.10 | 02:55                     | 0.417 | 12:35 | 1.046 | 0.614 | 0.614 |       |           |
| 02/17/2020 | 04:45      | 6.98 | 12:30 | 11.07 | 8.66 | 01:55           | 0.84 | 12:25 | 1.50 | 1.20 | 01:55                     | 0.386 | 12:25 | 1.265 | 0.756 | 0.756 |       |           |
| 02/18/2020 | 04:00      | 7.08 | 11:55 | 11.63 | 9.17 | 03:35           | 0.97 | 11:55 | 1.56 | 1.28 | 03:35                     | 0.465 | 11:55 | 1.399 | 0.861 | 0.861 |       |           |
| 02/19/2020 | 04:35      | 7.26 | 11:20 | 10.90 | 9.04 | 02:05           | 1.04 | 13:45 | 1.53 | 1.29 | 02:05                     | 0.503 | 11:25 | 1.236 | 0.857 | 0.857 |       |           |
| 02/20/2020 | 04:30      | 7.37 | 12:45 | 10.65 | 9.14 | 03:00           | 1.09 | 16:20 | 1.52 | 1.33 | 04:25                     | 0.546 | 12:30 | 1.208 | 0.886 | 0.886 |       |           |
| 02/21/2020 | 03:25      | 7.27 | 10:10 | 10.24 | 8.74 | 03:10           | 1.05 | 14:50 | 1.52 | 1.29 | 03:10                     | 0.508 | 10:10 | 1.156 | 0.813 | 0.813 |       |           |
| 02/22/2020 | 04:45      | 6.91 | 13:15 | 9.92  | 8.12 | 06:40           | 0.90 | 10:55 | 1.47 | 1.20 | 06:40                     | 0.407 | 13:15 | 1.064 | 0.686 | 0.686 |       |           |
| 02/23/2020 | 06:05      | 6.85 | 20:15 | 9.05  | 7.96 | 05:50           | 0.94 | 19:55 | 1.36 | 1.16 | 05:50                     | 0.426 | 19:55 | 0.872 | 0.643 | 0.643 |       |           |
| 02/24/2020 | 04:30      | 6.86 | 10:45 | 11.18 | 8.92 | 04:20           | 0.93 | 11:05 | 1.60 | 1.33 | 04:20                     | 0.419 | 11:05 | 1.364 | 0.867 | 0.867 |       |           |

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 02/25/2020 | 04:55      | 6.92 | 14:00 | 10.51 | 8.85 | 04:35           | 1.04 | 12:30 | 1.56 | 1.32 | 04:55                     | 0.472 | 13:55 | 1.234 | 0.849 | 0.849 |       |           |
| 02/26/2020 | 04:35      | 6.97 | 10:25 | 10.67 | 8.86 | 04:30           | 1.03 | 13:30 | 1.56 | 1.34 | 04:30                     | 0.472 | 10:20 | 1.228 | 0.856 | 0.856 |       |           |
| 02/27/2020 | 04:45      | 7.05 | 12:40 | 10.71 | 9.02 | 04:40           | 1.07 | 12:45 | 1.57 | 1.36 | 04:40                     | 0.498 | 12:45 | 1.274 | 0.896 | 0.896 |       |           |
| 02/28/2020 | 02:20      | 7.09 | 10:35 | 10.78 | 8.92 | 00:30           | 1.07 | 11:40 | 1.58 | 1.33 | 02:20                     | 0.509 | 10:30 | 1.286 | 0.868 | 0.868 |       |           |
| 02/29/2020 | 03:05      | 6.92 | 11:00 | 10.62 | 7.97 | 02:50           | 0.98 | 11:00 | 1.51 | 1.15 | 03:00                     | 0.444 | 11:00 | 1.208 | 0.642 | 0.642 |       |           |
| 03/01/2020 | 03:15      | 6.64 | 18:20 | 8.11  | 7.30 | 03:05           | 0.93 | 18:25 | 1.24 | 1.07 | 03:05                     | 0.400 | 18:25 | 0.696 | 0.524 | 0.524 |       |           |
| 03/02/2020 | 03:20      | 6.85 | 10:35 | 10.66 | 8.91 | 03:10           | 1.01 | 10:40 | 1.55 | 1.28 | 03:15                     | 0.453 | 10:40 | 1.249 | 0.836 | 0.836 |       |           |
| 03/03/2020 | 05:20      | 7.40 | 10:05 | 11.11 | 9.27 | 03:20           | 1.07 | 10:10 | 1.61 | 1.33 | 05:15                     | 0.539 | 10:10 | 1.364 | 0.909 | 0.909 |       |           |
| 03/04/2020 | 03:30      | 7.22 | 09:10 | 11.00 | 9.17 | 03:10           | 1.05 | 12:20 | 1.54 | 1.33 | 03:10                     | 0.506 | 09:05 | 1.285 | 0.899 | 0.899 |       |           |
| 03/05/2020 | 04:40      | 7.10 | 13:30 | 10.54 | 9.04 | 04:30           | 1.04 | 13:25 | 1.57 | 1.32 | 04:35                     | 0.490 | 13:30 | 1.242 | 0.868 | 0.868 |       |           |
| 03/06/2020 | 02:10      | 6.88 | 15:40 | 10.99 | 8.95 | 02:10           | 1.03 | 14:15 | 1.55 | 1.32 | 02:10                     | 0.462 | 15:35 | 1.273 | 0.863 | 0.863 |       |           |
| 03/07/2020 | 02:25      | 6.80 | 11:35 | 10.26 | 8.12 | 02:45           | 0.91 | 17:45 | 1.49 | 1.23 | 02:45                     | 0.404 | 11:35 | 1.111 | 0.706 | 0.706 |       |           |
| 03/08/2020 | 02:15      | 6.84 | 10:40 | 9.79  | 7.88 | 02:20           | 1.06 | 10:40 | 1.42 | 1.20 | 02:15                     | 0.472 | 10:40 | 1.029 | 0.655 | 0.655 |       |           |
| 03/09/2020 | 03:25      | 7.04 | 12:00 | 11.45 | 9.16 | 01:50           | 1.06 | 13:30 | 1.59 | 1.32 | 03:25                     | 0.495 | 13:30 | 1.388 | 0.895 | 0.895 |       |           |

#### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 89.337                    | 4.90      |
| Avg   | 8.66       | 1.24            | 0.777                     |           |

## Site Commentary

### Site Information

| MIL_0715        |       |
|-----------------|-------|
| Pipe Dimensions | 30.5  |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0715 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Due to meter malfunction, data confidence is less than typical during January 27, 2020 through February 04, 2020. Also a data gap occurred beginning January 05, 2020 through January 09, 2020.

This location was installed upstream of site MIL\_2808. (See MIL\_2808 Site Commentary for More Details)

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                   |                   |
|--------------------------|-------------------|-------------------|-------------------|
| Item                     | Depth (in)        | Velocity (ft/s)   | Quantity (MGD)    |
| Average                  | 7.53              | 1.46              | 0.969             |
| Minimum                  | 4.42              | 0.41              | 0.120             |
| Maximum                  | 10.33             | 2.18              | 2.069             |
| Time of Minimum          | 1/30/2020 5:55 AM | 1/30/2020 5:40 AM | 1/30/2020 5:40 AM |
| Time of Maximum          | 3/8/2020 1:30 PM  | 3/3/2020 9:20 AM  | 3/8/2020 1:45 PM  |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |    |
|-----------------|----|
| Depth (in)      | 96 |
| Velocity (ft/s) | 96 |
| Quantity (MGD)  | 96 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0715

Site Address /Location: Barber Ln and Bellew Dr

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: In Parking Lot

Latitude:

37.421203°

Longitude:

-121.917399

Pipe Size (H x W)

30.5" x 30.0"

Pipe Shape

Circular

Manhole #

715

System Characteristics

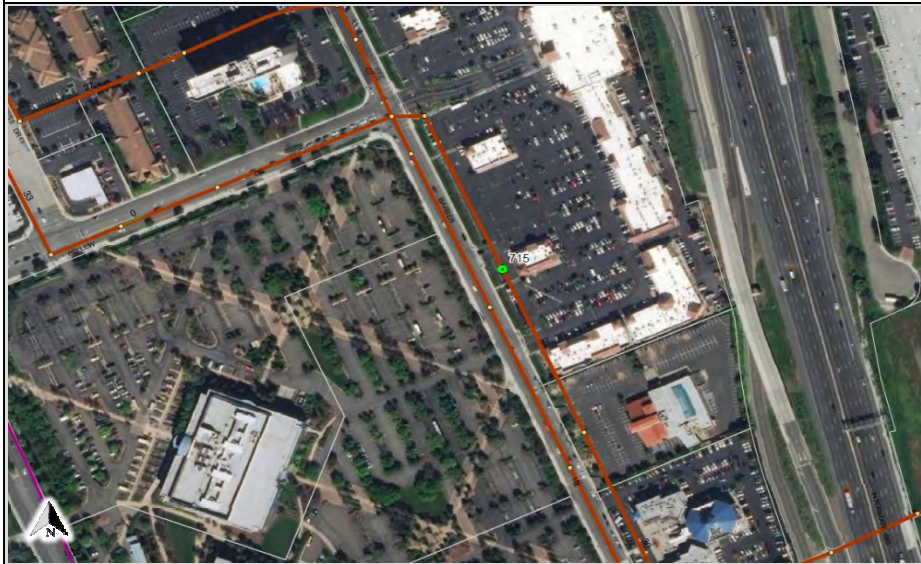
Residential/Commercial

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

5:47:56 AM

Pipe Size (HxW)

30.5" x 30.0"

Depth of Flow (Wet DOF) (in)

5.63

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.03

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

### Hydraulic Comments:

Smooth flow with medium depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

5'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

833



ADS Project Name: Milpitas.WWTFM.CA19-20

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_0715

Flow Monitor

**MIL\_0715**

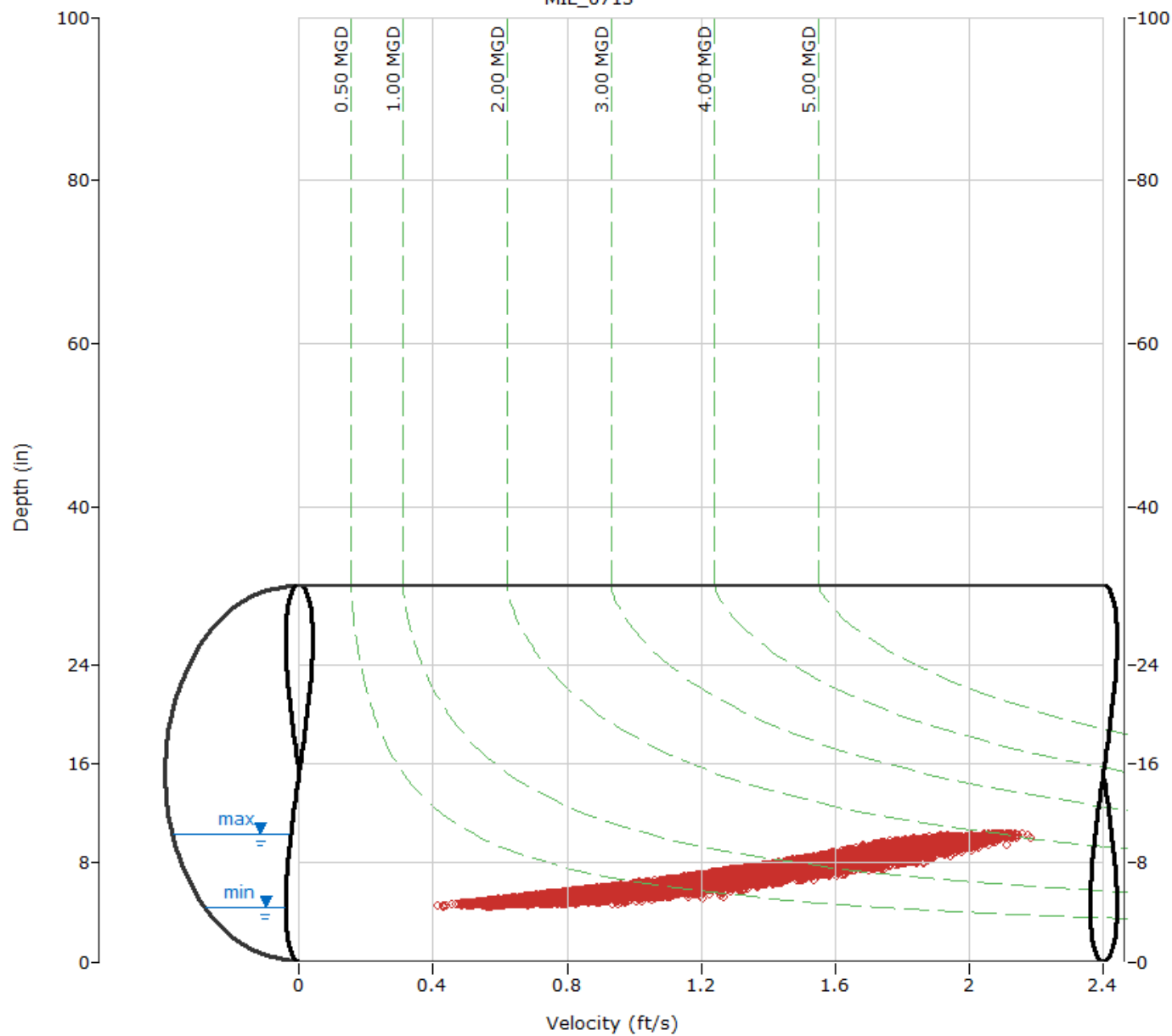
Pipe Height  
30.50 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



**ADS** ENVIRONMENTAL  
SERVICES

# HYDROGRAPH REPORT

MIL\_0715

Flow Monitor

**MIL\_0715**

Pipe Height

30.50 in

Report Period

11/16/2019  
To  
3/9/2020

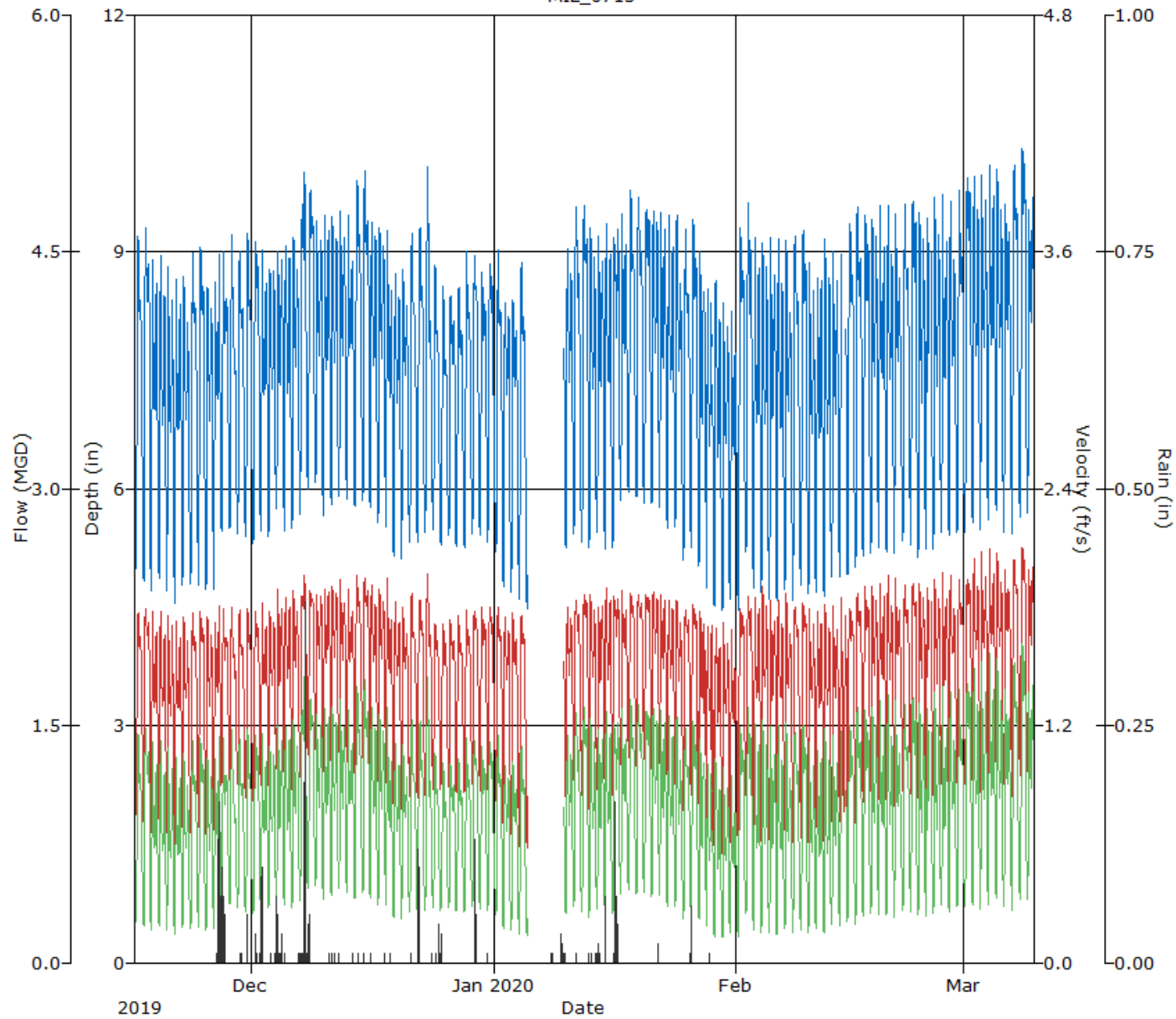
Legend

Depth

Velocity

Quantity

Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0715, Pipe Height: 30.50 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 06:25      | 4.95 | 11:55 | 9.20  | 7.43 | 05:00           | 0.66 | 13:45 | 1.88 | 1.39 | 05:00                     | 0.225 | 13:45 | 1.517 | 0.912 | 0.912 |           |
| 11/17/2019 | 06:10      | 4.81 | 12:15 | 9.36  | 7.49 | 04:55           | 0.58 | 11:45 | 1.87 | 1.40 | 04:55                     | 0.196 | 12:40 | 1.544 | 0.939 | 0.939 |           |
| 11/18/2019 | 05:25      | 4.68 | 09:20 | 8.94  | 7.09 | 03:45           | 0.61 | 09:05 | 1.84 | 1.31 | 05:25                     | 0.204 | 09:10 | 1.436 | 0.802 | 0.802 |           |
| 11/19/2019 | 05:55      | 4.84 | 09:30 | 8.99  | 7.09 | 05:10           | 0.56 | 08:40 | 1.87 | 1.32 | 05:10                     | 0.185 | 09:35 | 1.465 | 0.803 | 0.803 |           |
| 11/20/2019 | 05:15      | 4.68 | 09:20 | 8.90  | 6.97 | 04:00           | 0.65 | 09:00 | 1.92 | 1.31 | 05:15                     | 0.204 | 09:00 | 1.464 | 0.777 | 0.777 |           |
| 11/21/2019 | 05:25      | 4.52 | 09:15 | 8.71  | 6.93 | 03:50           | 0.56 | 09:15 | 1.80 | 1.29 | 05:25                     | 0.178 | 09:15 | 1.368 | 0.764 | 0.764 |           |
| 11/22/2019 | 05:20      | 4.76 | 09:35 | 8.75  | 6.99 | 06:40           | 0.61 | 09:05 | 1.81 | 1.32 | 04:25                     | 0.206 | 09:05 | 1.353 | 0.781 | 0.781 |           |
| 11/23/2019 | 06:05      | 4.77 | 13:05 | 9.03  | 7.27 | 06:10           | 0.51 | 12:00 | 1.84 | 1.37 | 06:10                     | 0.165 | 12:05 | 1.445 | 0.871 | 0.871 |           |
| 11/24/2019 | 05:50      | 4.75 | 13:20 | 9.10  | 7.35 | 05:25           | 0.57 | 11:00 | 1.93 | 1.39 | 05:25                     | 0.188 | 11:55 | 1.492 | 0.907 | 0.907 |           |
| 11/25/2019 | 05:15      | 4.71 | 09:55 | 8.66  | 6.99 | 04:40           | 0.54 | 09:40 | 1.87 | 1.31 | 04:40                     | 0.174 | 09:40 | 1.400 | 0.782 | 0.782 |           |
| 11/26/2019 | 05:25      | 4.71 | 21:35 | 9.03  | 7.16 | 04:35           | 0.58 | 21:35 | 1.94 | 1.36 | 04:35                     | 0.189 | 21:35 | 1.553 | 0.845 | 0.845 | 0.36      |
| 11/27/2019 | 05:35      | 5.44 | 10:30 | 9.06  | 7.54 | 06:10           | 0.76 | 09:30 | 1.89 | 1.45 | 06:10                     | 0.301 | 10:35 | 1.493 | 0.942 | 0.942 | 0.63      |
| 11/28/2019 | 05:35      | 5.48 | 13:20 | 9.29  | 7.36 | 06:45           | 0.76 | 13:10 | 1.86 | 1.40 | 06:45                     | 0.304 | 13:10 | 1.546 | 0.882 | 0.882 |           |
| 11/29/2019 | 06:20      | 5.39 | 12:55 | 9.04  | 7.47 | 06:10           | 0.80 | 14:10 | 1.90 | 1.43 | 06:10                     | 0.309 | 14:10 | 1.487 | 0.916 | 0.916 |           |
| 11/30/2019 | 06:40      | 5.38 | 13:25 | 9.28  | 7.49 | 06:10           | 0.72 | 13:45 | 1.86 | 1.41 | 06:10                     | 0.278 | 13:45 | 1.535 | 0.918 | 0.918 | 0.10      |
| 12/01/2019 | 06:05      | 5.30 | 13:40 | 9.13  | 7.59 | 06:25           | 0.69 | 14:35 | 1.85 | 1.42 | 06:25                     | 0.260 | 14:35 | 1.504 | 0.946 | 0.946 | 0.06      |
| 12/02/2019 | 05:50      | 5.43 | 09:50 | 9.15  | 7.45 | 04:10           | 0.81 | 09:45 | 1.89 | 1.43 | 05:55                     | 0.316 | 09:50 | 1.538 | 0.914 | 0.914 | 0.30      |
| 12/03/2019 | 05:40      | 5.38 | 09:35 | 8.83  | 7.41 | 05:55           | 0.72 | 09:50 | 1.84 | 1.44 | 05:55                     | 0.276 | 09:50 | 1.422 | 0.909 | 0.909 | 0.01      |
| 12/04/2019 | 04:05      | 5.72 | 09:30 | 9.05  | 7.58 | 04:20           | 0.84 | 09:50 | 1.98 | 1.50 | 04:20                     | 0.351 | 09:50 | 1.582 | 0.972 | 0.972 | 0.39      |
| 12/05/2019 | 05:15      | 5.46 | 09:35 | 9.13  | 7.59 | 05:15           | 0.81 | 09:10 | 1.90 | 1.48 | 05:15                     | 0.317 | 09:40 | 1.541 | 0.974 | 0.974 | 0.01      |
| 12/06/2019 | 05:20      | 5.48 | 09:35 | 9.24  | 7.69 | 04:50           | 0.76 | 09:40 | 1.94 | 1.50 | 04:50                     | 0.305 | 09:40 | 1.596 | 0.997 | 0.997 | 0.01      |
| 12/07/2019 | 06:20      | 5.65 | 19:20 | 10.08 | 8.16 | 06:00           | 0.81 | 18:50 | 2.02 | 1.57 | 06:00                     | 0.336 | 19:15 | 1.862 | 1.156 | 1.156 | 0.67      |
| 12/08/2019 | 06:20      | 5.97 | 13:30 | 9.78  | 8.36 | 07:00           | 0.94 | 11:20 | 1.98 | 1.61 | 07:00                     | 0.421 | 11:20 | 1.737 | 1.209 | 1.209 | 0.20      |
| 12/09/2019 | 05:40      | 6.05 | 09:35 | 9.47  | 7.99 | 05:20           | 0.95 | 09:40 | 1.93 | 1.58 | 05:20                     | 0.436 | 09:40 | 1.642 | 1.093 | 1.093 |           |
| 12/10/2019 | 05:05      | 5.65 | 09:40 | 9.52  | 7.86 | 05:05           | 0.81 | 09:15 | 2.02 | 1.57 | 05:05                     | 0.333 | 09:15 | 1.711 | 1.079 | 1.079 |           |
| 12/11/2019 | 05:30      | 5.79 | 09:30 | 9.50  | 7.89 | 04:45           | 0.88 | 11:20 | 1.98 | 1.59 | 04:45                     | 0.383 | 09:20 | 1.675 | 1.091 | 1.091 | 0.03      |
| 12/12/2019 | 05:15      | 5.89 | 09:25 | 9.54  | 7.94 | 04:55           | 0.89 | 09:10 | 2.01 | 1.59 | 04:55                     | 0.395 | 10:00 | 1.723 | 1.096 | 1.096 | 0.01      |
| 12/13/2019 | 05:10      | 5.86 | 09:30 | 9.52  | 7.91 | 05:15           | 0.86 | 10:10 | 1.95 | 1.54 | 05:15                     | 0.375 | 10:10 | 1.667 | 1.061 | 1.061 | 0.01      |
| 12/14/2019 | 05:55      | 5.74 | 13:40 | 9.92  | 8.18 | 05:15           | 0.85 | 12:35 | 2.02 | 1.59 | 05:15                     | 0.367 | 12:35 | 1.810 | 1.164 | 1.164 | 0.01      |
| 12/15/2019 | 06:15      | 5.82 | 12:05 | 10.12 | 8.29 | 05:30           | 0.93 | 12:35 | 2.00 | 1.62 | 06:50                     | 0.406 | 12:15 | 1.842 | 1.209 | 1.209 | 0.01      |
| 12/16/2019 | 05:25      | 5.74 | 09:25 | 9.43  | 7.88 | 06:15           | 0.87 | 08:55 | 2.01 | 1.56 | 05:45                     | 0.373 | 09:20 | 1.665 | 1.069 | 1.069 | 0.01      |
| 12/17/2019 | 05:10      | 5.54 | 09:30 | 9.36  | 7.81 | 05:10           | 0.78 | 10:10 | 1.94 | 1.54 | 05:10                     | 0.313 | 10:10 | 1.616 | 1.049 | 1.049 | 0.01      |
| 12/18/2019 | 05:25      | 5.50 | 09:35 | 9.34  | 7.55 | 05:15           | 0.77 | 09:30 | 2.01 | 1.51 | 05:15                     | 0.307 | 09:30 | 1.678 | 0.982 | 0.982 | 0.01      |
| 12/19/2019 | 05:30      | 5.13 | 10:15 | 8.79  | 7.25 | 05:50           | 0.64 | 08:50 | 1.89 | 1.44 | 05:50                     | 0.229 | 09:25 | 1.436 | 0.889 | 0.889 |           |
| 12/20/2019 | 05:55      | 5.08 | 10:25 | 8.81  | 7.33 | 05:50           | 0.66 | 10:40 | 1.98 | 1.44 | 05:50                     | 0.233 | 10:40 | 1.522 | 0.899 | 0.899 |           |
| 12/21/2019 | 06:00      | 5.31 | 12:50 | 9.30  | 7.52 | 06:20           | 0.71 | 13:35 | 1.94 | 1.46 | 06:20                     | 0.268 | 13:35 | 1.597 | 0.958 | 0.958 | 0.01      |
| 12/22/2019 | 05:40      | 5.29 | 14:10 | 9.35  | 7.61 | 06:40           | 0.71 | 12:35 | 1.91 | 1.47 | 06:40                     | 0.270 | 14:05 | 1.590 | 0.984 | 0.984 | 0.41      |
| 12/23/2019 | 05:20      | 5.43 | 13:45 | 10.14 | 7.69 | 05:50           | 0.75 | 12:40 | 2.04 | 1.50 | 05:50                     | 0.292 | 12:40 | 1.875 | 1.018 | 1.018 |           |
| 12/24/2019 | 05:50      | 5.47 | 12:45 | 8.86  | 7.36 | 06:20           | 0.76 | 12:45 | 1.79 | 1.42 | 06:20                     | 0.300 | 12:45 | 1.394 | 0.891 | 0.891 |           |
| 12/25/2019 | 05:55      | 5.28 | 13:15 | 8.66  | 7.00 | 05:55           | 0.76 | 14:20 | 1.80 | 1.38 | 05:55                     | 0.286 | 13:20 | 1.330 | 0.806 | 0.806 | 0.08      |
| 12/26/2019 | 05:45      | 5.37 | 12:50 | 8.46  | 7.23 | 06:20           | 0.75 | 11:25 | 1.83 | 1.43 | 06:20                     | 0.290 | 11:25 | 1.327 | 0.877 | 0.877 |           |
| 12/27/2019 | 04:50      | 5.23 | 11:35 | 8.59  | 7.23 | 06:50           | 0.73 | 11:45 | 1.80 | 1.42 | 06:50                     | 0.280 | 11:45 | 1.339 | 0.873 | 0.873 |           |
| 12/28/2019 | 06:00      | 5.24 | 13:05 | 9.09  | 7.34 | 07:00           | 0.71 | 13:05 | 1.84 | 1.42 | 07:00                     | 0.265 | 13:05 | 1.481 | 0.900 | 0.900 |           |
| 12/29/2019 | 06:05      | 5.41 | 13:05 | 8.96  | 7.45 | 05:05           | 0.74 | 19:05 | 1.85 | 1.44 | 05:05                     | 0.288 | 13:55 | 1.445 | 0.933 | 0.933 |           |
| 12/30/2019 | 05:55      | 5.39 | 12:15 | 8.77  | 7.44 | 06:05           | 0.74 | 11:50 | 1.88 | 1.48 | 06:05                     | 0.285 | 11:55 | 1.436 | 0.947 | 0.947 |           |
| 12/31/2019 | 05:45      | 5.30 | 13:50 | 8.87  | 7.44 | 06:30           | 0.73 | 13:10 | 1.85 | 1.47 | 06:30                     | 0.276 | 13:10 | 1.431 | 0.941 | 0.941 |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 01/01/2020 | 07:15      | 5.16 | 13:40 | 9.05 | 7.28 | 05:45           | 0.70 | 12:50 | 1.87 | 1.43 | 07:35                     | 0.256 | 12:50 | 1.471 | 0.897 | 0.897 |           |
| 01/02/2020 | 06:05      | 4.74 | 11:00 | 8.50 | 7.00 | 04:45           | 0.55 | 10:05 | 1.84 | 1.37 | 06:20                     | 0.180 | 10:35 | 1.303 | 0.816 | 0.816 |           |
| 01/03/2020 | 05:25      | 4.67 | 11:00 | 8.44 | 6.97 | 05:35           | 0.49 | 10:05 | 1.86 | 1.36 | 05:35                     | 0.152 | 10:05 | 1.315 | 0.805 | 0.805 |           |
| 01/04/2020 | 05:25      | 4.58 | 13:10 | 8.88 | 7.03 | 05:50           | 0.46 | 11:30 | 1.86 | 1.36 | 05:50                     | 0.140 | 13:15 | 1.431 | 0.838 | 0.838 |           |
| 01/05/2020 | 06:30      | 4.46 | 00:00 | 7.34 | 5.48 | 05:25           | 0.49 | 00:00 | 1.48 | 0.92 | 05:25                     | 0.151 | 00:00 | 0.882 | 0.395 | 0.136 |           |
| 01/06/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 01/07/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 01/08/2020 | 00:00      |      | 00:00 |      |      |                 |      |       |      |      |                           |       |       |       |       |       | 0.02      |
| 01/09/2020 | 00:00      |      | 00:00 |      |      |                 |      |       |      |      |                           |       |       |       |       |       | 0.18      |
| 01/10/2020 | 05:00      | 5.24 | 09:25 | 9.13 | 7.53 | 04:35           | 0.69 | 09:25 | 1.92 | 1.46 | 04:35                     | 0.259 | 09:25 | 1.555 | 0.954 | 0.950 | 0.02      |
| 01/11/2020 | 06:25      | 5.41 | 12:05 | 9.62 | 7.81 | 06:25           | 0.79 | 13:55 | 1.95 | 1.52 | 06:25                     | 0.306 | 13:55 | 1.677 | 1.044 | 1.044 | 0.01      |
| 01/12/2020 | 05:55      | 5.29 | 13:55 | 9.60 | 7.87 | 06:55           | 0.71 | 13:35 | 1.95 | 1.54 | 06:55                     | 0.271 | 13:35 | 1.696 | 1.079 | 1.079 |           |
| 01/13/2020 | 05:15      | 5.24 | 09:30 | 9.35 | 7.51 | 05:15           | 0.67 | 08:55 | 1.91 | 1.49 | 05:15                     | 0.249 | 09:25 | 1.598 | 0.966 | 0.966 | 0.02      |
| 01/14/2020 | 05:30      | 5.42 | 09:30 | 9.25 | 7.54 | 05:45           | 0.76 | 21:20 | 1.90 | 1.47 | 05:45                     | 0.293 | 09:30 | 1.517 | 0.957 | 0.957 | 0.11      |
| 01/15/2020 | 05:20      | 5.23 | 09:25 | 9.38 | 7.55 | 05:35           | 0.68 | 09:15 | 1.95 | 1.49 | 05:35                     | 0.253 | 09:40 | 1.645 | 0.981 | 0.981 | 0.07      |
| 01/16/2020 | 05:10      | 5.23 | 21:20 | 9.32 | 7.82 | 05:50           | 0.69 | 09:40 | 1.91 | 1.55 | 05:50                     | 0.260 | 22:05 | 1.571 | 1.069 | 1.069 | 0.66      |
| 01/17/2020 | 04:40      | 5.84 | 09:20 | 9.49 | 7.97 | 05:10           | 0.89 | 09:45 | 2.01 | 1.57 | 05:10                     | 0.385 | 09:45 | 1.716 | 1.095 | 1.095 |           |
| 01/18/2020 | 05:40      | 5.93 | 12:00 | 9.83 | 8.11 | 05:25           | 0.89 | 12:10 | 1.93 | 1.59 | 05:25                     | 0.395 | 12:10 | 1.726 | 1.141 | 1.141 |           |
| 01/19/2020 | 05:25      | 5.87 | 13:15 | 9.72 | 8.09 | 05:40           | 0.88 | 11:05 | 1.96 | 1.58 | 05:40                     | 0.385 | 11:05 | 1.684 | 1.133 | 1.133 |           |
| 01/20/2020 | 05:45      | 5.79 | 13:15 | 9.57 | 8.16 | 04:55           | 0.86 | 12:00 | 1.96 | 1.61 | 04:55                     | 0.373 | 12:00 | 1.687 | 1.172 | 1.172 |           |
| 01/21/2020 | 04:50      | 5.78 | 09:05 | 9.62 | 7.96 | 04:55           | 0.86 | 08:55 | 2.04 | 1.59 | 04:55                     | 0.367 | 08:55 | 1.767 | 1.103 | 1.103 |           |
| 01/22/2020 | 04:45      | 5.74 | 09:10 | 9.55 | 7.85 | 05:40           | 0.85 | 21:10 | 2.00 | 1.55 | 05:40                     | 0.364 | 21:10 | 1.668 | 1.056 | 1.056 | 0.03      |
| 01/23/2020 | 04:35      | 5.47 | 08:55 | 9.59 | 7.70 | 05:05           | 0.81 | 08:55 | 1.93 | 1.50 | 05:05                     | 0.321 | 08:55 | 1.673 | 1.002 | 1.002 |           |
| 01/24/2020 | 05:35      | 5.49 | 10:20 | 9.49 | 7.61 | 05:15           | 0.78 | 09:40 | 1.89 | 1.47 | 05:15                     | 0.312 | 10:35 | 1.616 | 0.967 | 0.967 |           |
| 01/25/2020 | 05:35      | 5.07 | 12:40 | 9.33 | 7.53 | 05:45           | 0.62 | 12:05 | 1.85 | 1.46 | 05:45                     | 0.220 | 12:05 | 1.520 | 0.968 | 0.968 |           |
| 01/26/2020 | 05:15      | 5.13 | 12:55 | 9.46 | 7.67 | 04:35           | 0.72 | 11:50 | 1.92 | 1.49 | 05:00                     | 0.260 | 11:50 | 1.591 | 1.006 | 1.006 | 0.16      |
| 01/27/2020 | 05:30      | 4.99 | 09:20 | 9.06 | 7.08 | 06:35           | 0.62 | 20:30 | 1.85 | 1.35 | 05:25                     | 0.217 | 09:25 | 1.467 | 0.831 | 0.658 |           |
| 01/28/2020 | 05:50      | 4.73 | 09:00 | 8.68 | 6.92 | 20:00           | 0.44 | 08:55 | 1.82 | 1.31 | 06:10                     | 0.167 | 08:55 | 1.371 | 0.779 | 0.649 | 0.01      |
| 01/29/2020 | 04:55      | 4.47 | 08:25 | 8.63 | 6.70 | 05:00           | 0.44 | 08:15 | 1.79 | 1.31 | 05:00                     | 0.129 | 08:20 | 1.341 | 0.713 | 0.609 |           |
| 01/30/2020 | 05:55      | 4.42 | 09:45 | 8.51 | 6.66 | 05:40           | 0.41 | 10:10 | 1.80 | 1.26 | 05:40                     | 0.120 | 09:45 | 1.298 | 0.705 | 0.705 |           |
| 01/31/2020 | 05:10      | 4.58 | 09:35 | 8.37 | 6.64 | 05:45           | 0.50 | 09:40 | 1.76 | 1.25 | 05:45                     | 0.155 | 09:40 | 1.268 | 0.688 | 0.688 |           |
| 02/01/2020 | 05:55      | 4.44 | 13:35 | 9.49 | 7.23 | 06:15           | 0.43 | 13:20 | 1.85 | 1.36 | 06:15                     | 0.126 | 13:20 | 1.566 | 0.886 | 0.886 |           |
| 02/02/2020 | 05:45      | 5.17 | 13:00 | 9.69 | 7.67 | 06:15           | 0.67 | 12:45 | 1.93 | 1.48 | 06:15                     | 0.242 | 12:45 | 1.687 | 1.009 | 1.009 |           |
| 02/03/2020 | 05:35      | 4.71 | 09:20 | 9.25 | 7.18 | 04:55           | 0.55 | 09:35 | 1.97 | 1.39 | 05:25                     | 0.174 | 09:35 | 1.621 | 0.865 | 0.865 |           |
| 02/04/2020 | 05:15      | 4.68 | 09:20 | 9.14 | 7.17 | 05:50           | 0.50 | 09:50 | 1.98 | 1.40 | 05:50                     | 0.160 | 09:50 | 1.592 | 0.873 | 0.873 |           |
| 02/05/2020 | 05:10      | 4.59 | 09:30 | 9.27 | 7.09 | 05:35           | 0.51 | 09:40 | 1.88 | 1.37 | 05:35                     | 0.157 | 09:40 | 1.554 | 0.838 | 0.838 |           |
| 02/06/2020 | 05:00      | 4.57 | 09:20 | 9.22 | 7.04 | 04:45           | 0.47 | 09:25 | 1.94 | 1.36 | 04:45                     | 0.143 | 09:25 | 1.592 | 0.825 | 0.825 |           |
| 02/07/2020 | 04:55      | 4.73 | 09:30 | 9.22 | 7.12 | 04:55           | 0.52 | 09:20 | 2.01 | 1.37 | 04:55                     | 0.166 | 09:20 | 1.643 | 0.840 | 0.840 |           |
| 02/08/2020 | 06:25      | 4.56 | 12:30 | 9.21 | 7.29 | 06:30           | 0.50 | 11:00 | 1.85 | 1.41 | 06:30                     | 0.149 | 13:05 | 1.487 | 0.910 | 0.910 |           |
| 02/09/2020 | 06:00      | 4.75 | 13:05 | 9.32 | 7.46 | 06:00           | 0.52 | 12:40 | 1.88 | 1.43 | 06:00                     | 0.167 | 12:40 | 1.545 | 0.955 | 0.955 |           |
| 02/10/2020 | 05:40      | 4.65 | 09:20 | 8.93 | 6.98 | 04:20           | 0.50 | 09:35 | 1.84 | 1.35 | 05:20                     | 0.158 | 09:35 | 1.440 | 0.806 | 0.806 |           |
| 02/11/2020 | 05:25      | 4.67 | 09:15 | 8.80 | 6.99 | 04:40           | 0.53 | 08:45 | 1.89 | 1.35 | 04:40                     | 0.171 | 09:05 | 1.425 | 0.806 | 0.806 |           |
| 02/12/2020 | 05:35      | 4.61 | 09:20 | 9.22 | 7.04 | 04:30           | 0.51 | 09:05 | 1.97 | 1.34 | 05:35                     | 0.163 | 09:05 | 1.602 | 0.810 | 0.810 |           |
| 02/13/2020 | 05:55      | 4.87 | 09:20 | 9.05 | 7.15 | 05:30           | 0.59 | 09:35 | 1.96 | 1.37 | 05:30                     | 0.198 | 09:35 | 1.570 | 0.840 | 0.840 |           |
| 02/14/2020 | 05:20      | 4.87 | 09:20 | 9.02 | 6.65 | 05:55           | 0.58 | 08:50 | 1.89 | 1.26 | 05:55                     | 0.193 | 09:15 | 1.489 | 0.717 | 0.359 |           |
| 02/15/2020 | 05:35      | 4.89 | 13:15 | 9.39 | 7.63 | 05:40           | 0.64 | 13:25 | 1.86 | 1.49 | 05:40                     | 0.214 | 13:25 | 1.572 | 0.999 | 0.999 |           |
| 02/16/2020 | 05:55      | 4.99 | 12:30 | 9.59 | 7.70 | 06:35           | 0.59 | 12:05 | 1.91 | 1.50 | 06:35                     | 0.206 | 12:05 | 1.643 | 1.032 | 1.032 |           |
| 02/17/2020 | 05:50      | 5.13 | 11:00 | 9.50 | 7.80 | 05:25           | 0.67 | 10:40 | 1.96 | 1.52 | 06:05                     | 0.238 | 11:10 | 1.674 | 1.057 | 1.057 |           |
| 02/18/2020 | 05:20      | 5.16 | 09:45 | 9.45 | 7.58 | 05:40           | 0.72 | 10:10 | 1.95 | 1.49 | 05:40                     | 0.260 | 09:45 | 1.654 | 0.987 | 0.987 |           |
| 02/19/2020 | 05:15      | 5.24 | 09:25 | 9.63 | 7.60 | 05:55           | 0.70 | 09:55 | 1.96 | 1.49 | 05:55                     | 0.263 | 09:30 | 1.698 | 0.989 | 0.989 |           |
| 02/20/2020 | 05:30      | 5.18 | 09:30 | 9.66 | 7.59 | 04:30           | 0.68 | 09:15 | 2.01 | 1.50 | 04:30                     | 0.251 | 09:30 | 1.737 | 0.995 | 0.995 |           |
| 02/21/2020 | 05:00      | 5.15 | 09:45 | 9.55 | 7.57 | 04:45           | 0.65 | 09:40 | 2.02 | 1.49 | 04:45                     | 0.235 | 09:40 | 1.746 | 0.988 | 0.988 |           |
| 02/22/2020 | 07:05      | 5.33 | 13:20 | 9.64 | 7.80 | 07:25           | 0.73 | 14:05 | 1.99 | 1.54 | 07:25                     | 0.276 | 14:05 | 1.713 | 1.061 | 1.061 |           |
| 02/23/2020 | 07:45      | 5.27 | 14:20 | 9.65 | 7.91 | 08:00           | 0.74 | 12:45 | 1.99 | 1.55 | 08:00                     | 0.275 | 14:20 | 1.711 | 1.103 | 1.103 |           |
| 02/24/2020 | 06:00      | 5.11 | 10:35 | 9.58 | 7.50 | 05:15           | 0.68 | 10:25 | 1.99 | 1.50 | 05:15                     | 0.251 | 10:25 | 1.713 | 0.980 | 0.980 |           |

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 06:00      | 5.21 | 10:20 | 9.50  | 7.40 | 06:25           | 0.70 | 09:30 | 2.00 | 1.45 | 06:25                     | 0.258 | 10:30 | 1.690 | 0.942 | 0.674 |           |
| 02/26/2020 | 05:10      | 5.21 | 09:15 | 9.76  | 7.63 | 05:05           | 0.69 | 08:50 | 2.07 | 1.51 | 05:05                     | 0.255 | 08:50 | 1.790 | 1.009 | 1.009 |           |
| 02/27/2020 | 05:20      | 5.43 | 09:15 | 9.84  | 7.73 | 05:30           | 0.76 | 09:00 | 2.05 | 1.53 | 05:30                     | 0.297 | 09:00 | 1.821 | 1.034 | 1.034 |           |
| 02/28/2020 | 05:30      | 5.39 | 09:25 | 9.70  | 7.73 | 05:25           | 0.74 | 09:35 | 2.03 | 1.54 | 05:25                     | 0.285 | 09:35 | 1.784 | 1.040 | 1.040 |           |
| 02/29/2020 | 05:50      | 5.41 | 13:45 | 9.92  | 7.93 | 05:45           | 0.83 | 13:35 | 2.04 | 1.57 | 05:45                     | 0.321 | 13:35 | 1.836 | 1.110 | 1.110 |           |
| 03/01/2020 | 06:05      | 5.44 | 13:15 | 9.97  | 8.20 | 06:10           | 0.75 | 11:50 | 2.09 | 1.60 | 06:10                     | 0.292 | 11:50 | 1.882 | 1.197 | 1.197 |           |
| 03/02/2020 | 05:10      | 5.56 | 09:20 | 10.01 | 7.97 | 05:35           | 0.79 | 09:45 | 2.08 | 1.59 | 05:35                     | 0.318 | 09:15 | 1.905 | 1.119 | 1.119 |           |
| 03/03/2020 | 05:25      | 5.45 | 09:45 | 10.15 | 8.02 | 05:20           | 0.75 | 09:20 | 2.18 | 1.60 | 05:20                     | 0.294 | 09:45 | 2.004 | 1.148 | 1.148 |           |
| 03/04/2020 | 05:35      | 5.59 | 09:25 | 10.16 | 8.10 | 05:35           | 0.79 | 09:20 | 2.18 | 1.62 | 05:35                     | 0.319 | 09:20 | 2.041 | 1.174 | 1.174 |           |
| 03/05/2020 | 05:25      | 5.71 | 09:35 | 10.10 | 8.11 | 05:30           | 0.82 | 09:05 | 2.14 | 1.65 | 05:30                     | 0.341 | 09:35 | 1.971 | 1.183 | 1.183 |           |
| 03/06/2020 | 05:40      | 5.43 | 09:55 | 9.69  | 7.97 | 05:40           | 0.73 | 09:45 | 2.04 | 1.60 | 05:40                     | 0.285 | 09:45 | 1.789 | 1.132 | 1.132 |           |
| 03/07/2020 | 06:10      | 5.39 | 13:25 | 10.11 | 8.26 | 06:05           | 0.73 | 17:05 | 2.11 | 1.65 | 06:05                     | 0.281 | 13:05 | 1.947 | 1.243 | 1.243 |           |
| 03/08/2020 | 07:05      | 5.62 | 13:30 | 10.33 | 8.44 | 06:30           | 0.83 | 13:45 | 2.16 | 1.68 | 06:30                     | 0.345 | 13:45 | 2.069 | 1.309 | 1.309 |           |
| 03/09/2020 | 05:55      | 5.69 | 22:20 | 9.71  | 8.15 | 04:50           | 0.83 | 21:40 | 2.07 | 1.65 | 04:50                     | 0.350 | 21:40 | 1.825 | 1.199 | 1.198 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 105.605                   | 4.90      |
| Avg   | 7.53       | 1.46            | 0.969                     |           |

## Site Commentary

### Site Information

| MIL_0744        |       |
|-----------------|-------|
| Pipe Dimensions | 15    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_0744 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Surcharged conditions were experienced at this location. Review of the scattergraph shows that both free flow and backwater conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                  |                   |                  |
|--------------------------|------------------|-------------------|------------------|
| Item                     | Depth (in)       | Velocity (ft/s)   | Quantity (MGD)   |
| Average                  | 6.17             | 0.94              | 0.283            |
| Minimum                  | 2.74             | 0.16              | 0.080            |
| Maximum                  | 34.98            | 1.78              | 1.416            |
| Time of Minimum          | 3/1/2020 5:45 AM | 2/27/2020 5:30 PM | 2/6/2020 3:40 AM |
| Time of Maximum          | 3/8/2020 2:15 PM | 3/8/2020 2:15 PM  | 3/8/2020 2:15 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period. Site installed later than other sites on November 22, 2019. Uptime reflects time in service.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_0744

Site Address /Location:

Thompson Court and Machado Avenue

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details:

Drive

Latitude:

37.419309°

Longitude:

-121.911002°

Pipe Size (H x W)

15.0" x 15.0"

Pipe Shape

Circular

Manhole #

744

System Characteristics

Residential

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

6:52:52 AM

Pipe Size (HxW)

15.0" x 15.0"

Depth of Flow (Wet DOF) (in)

5.50

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.05

Velocity Sensor Offset (in)

0"

Silt

0"

Silt Type

### Hydraulic Comments:

Smooth flow with medium depth and velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

5'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

840



ADS Project Name:

Milpitas.WWTFM.CA19-20

ADS Project Number:

22431



# SCATTERGRAPH REPORT

MIL\_0744

Flow Monitor

**MIL\_0744**

Pipe Height  
15.00 in

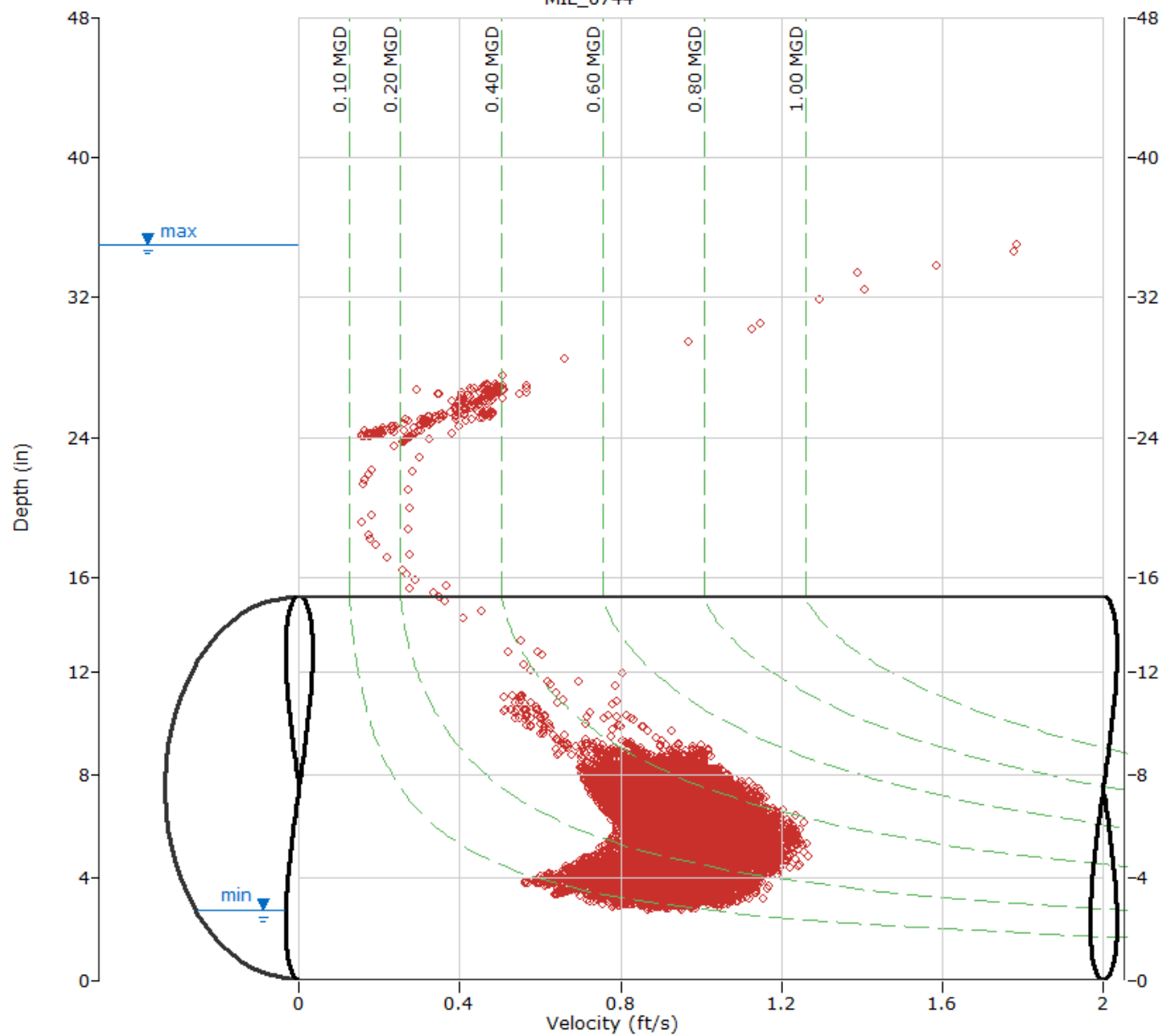
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

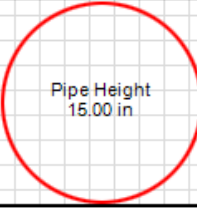
**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_0744

Flow Monitor  
**MIL\_0744**

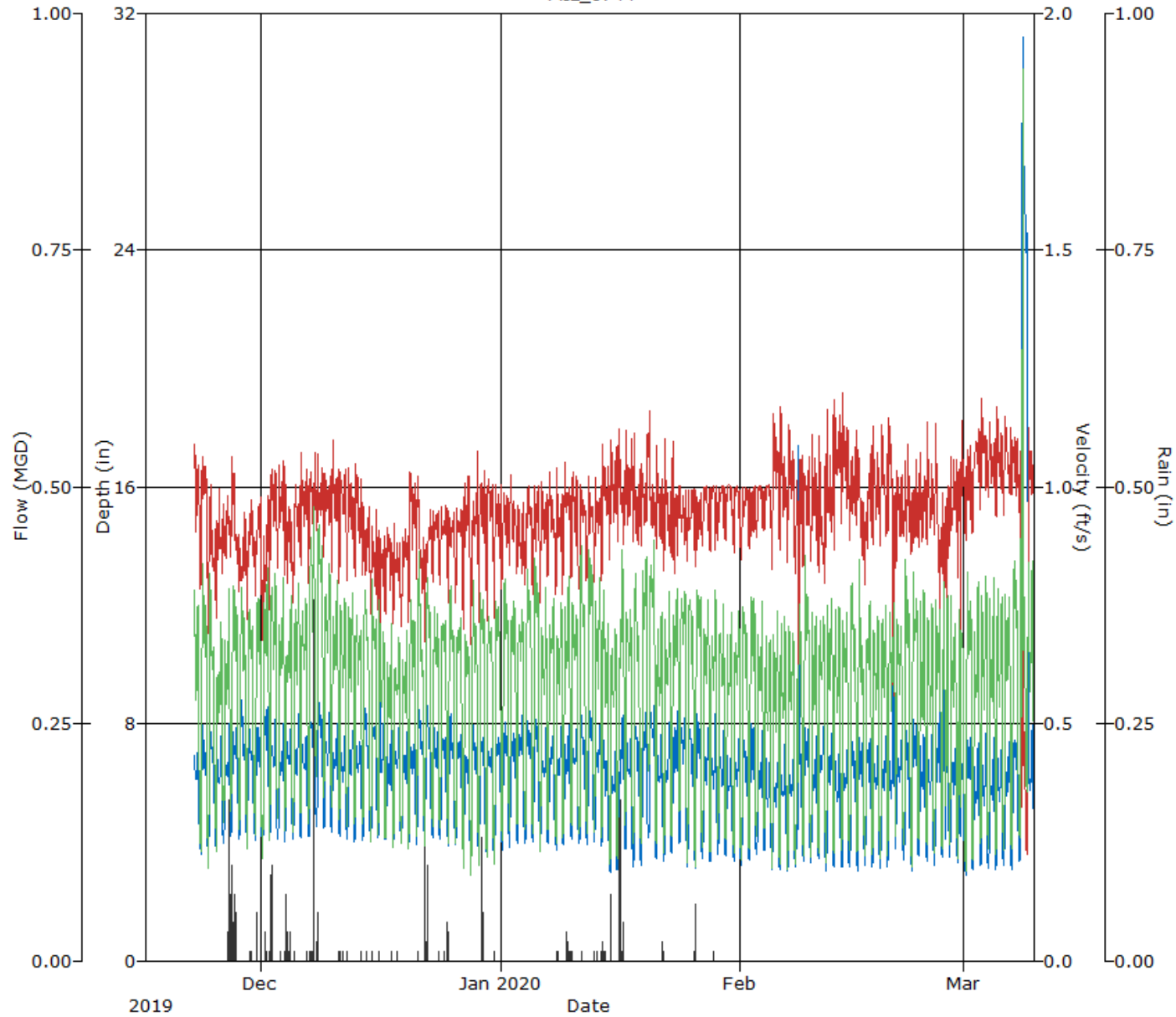


Pipe Height  
15.00 in.

Report Period  
11/16/2019  
To  
3/9/2020

**Legend**  

- Depth
- Velocity
- Quantity
- Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_0744, Pipe Height: 15.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 00:00      |      | 00:00 |       |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 11/17/2019 | 00:00      |      | 00:00 |       |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 11/18/2019 | 00:00      |      | 00:00 |       |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 11/19/2019 | 00:00      |      | 00:00 |       |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 11/20/2019 | 00:00      |      | 00:00 |       |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 11/21/2019 | 00:00      |      | 00:00 |       |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 11/22/2019 | 23:50      | 5.35 | 22:20 | 7.49  | 6.47 | 14:55           | 0.82 | 09:25 | 1.13 | 1.01 | 15:05                     | 0.250 | 22:25 | 0.403 | 0.333 | 0.214 |           |
| 11/23/2019 | 05:40      | 3.43 | 10:55 | 8.49  | 5.95 | 03:20           | 0.67 | 19:05 | 1.12 | 0.96 | 05:25                     | 0.099 | 10:35 | 0.451 | 0.289 | 0.289 |           |
| 11/24/2019 | 05:30      | 3.43 | 10:25 | 8.27  | 6.10 | 05:25           | 0.64 | 14:15 | 1.09 | 0.87 | 05:25                     | 0.088 | 10:25 | 0.454 | 0.270 | 0.270 |           |
| 11/25/2019 | 05:05      | 3.63 | 19:40 | 7.82  | 5.81 | 05:10           | 0.61 | 13:25 | 1.06 | 0.87 | 05:10                     | 0.091 | 21:50 | 0.428 | 0.250 | 0.250 |           |
| 11/26/2019 | 03:10      | 3.81 | 21:40 | 8.27  | 6.02 | 03:20           | 0.64 | 16:55 | 1.06 | 0.91 | 03:20                     | 0.103 | 21:45 | 0.435 | 0.272 | 0.272 | 0.36      |
| 11/27/2019 | 03:05      | 4.05 | 19:20 | 8.19  | 6.46 | 02:20           | 0.73 | 06:40 | 1.10 | 0.93 | 03:10                     | 0.130 | 09:55 | 0.412 | 0.305 | 0.305 | 0.63      |
| 11/28/2019 | 05:25      | 4.07 | 12:05 | 9.02  | 6.58 | 05:45           | 0.72 | 21:55 | 1.09 | 0.85 | 05:40                     | 0.126 | 14:30 | 0.469 | 0.285 | 0.285 |           |
| 11/29/2019 | 05:35      | 3.84 | 11:10 | 8.30  | 6.25 | 05:35           | 0.69 | 19:50 | 1.11 | 0.88 | 05:35                     | 0.110 | 10:00 | 0.437 | 0.281 | 0.281 | 0.02      |
| 11/30/2019 | 06:05      | 3.92 | 10:55 | 8.34  | 6.32 | 05:45           | 0.67 | 21:35 | 1.09 | 0.89 | 05:45                     | 0.111 | 14:00 | 0.456 | 0.287 | 0.287 | 0.10      |
| 12/01/2019 | 06:10      | 3.73 | 20:30 | 8.83  | 6.59 | 05:45           | 0.56 | 00:00 | 1.12 | 0.84 | 05:55                     | 0.088 | 20:30 | 0.451 | 0.285 | 0.285 | 0.06      |
| 12/02/2019 | 03:30      | 3.89 | 21:20 | 8.59  | 6.30 | 03:00           | 0.61 | 17:55 | 1.12 | 0.94 | 03:00                     | 0.105 | 21:15 | 0.458 | 0.303 | 0.303 | 0.30      |
| 12/03/2019 | 04:20      | 3.93 | 21:40 | 8.37  | 6.16 | 03:30           | 0.71 | 23:40 | 1.12 | 0.95 | 03:30                     | 0.131 | 20:00 | 0.416 | 0.295 | 0.295 | 0.01      |
| 12/04/2019 | 03:45      | 3.94 | 19:55 | 8.06  | 6.37 | 04:05           | 0.69 | 07:10 | 1.14 | 0.89 | 04:05                     | 0.129 | 21:20 | 0.425 | 0.287 | 0.287 | 0.39      |
| 12/05/2019 | 03:35      | 3.90 | 21:45 | 8.49  | 6.25 | 03:15           | 0.64 | 09:45 | 1.07 | 0.91 | 03:40                     | 0.107 | 09:45 | 0.433 | 0.290 | 0.290 | 0.01      |
| 12/06/2019 | 05:10      | 4.03 | 20:55 | 7.82  | 6.20 | 04:10           | 0.71 | 07:30 | 1.12 | 0.95 | 04:10                     | 0.126 | 19:30 | 0.422 | 0.296 | 0.296 | 0.01      |
| 12/07/2019 | 05:15      | 4.06 | 19:10 | 9.08  | 6.79 | 03:10           | 0.74 | 00:00 | 1.07 | 0.96 | 03:30                     | 0.131 | 19:45 | 0.501 | 0.340 | 0.340 | 0.67      |
| 12/08/2019 | 05:05      | 4.47 | 10:05 | 9.22  | 7.10 | 03:50           | 0.77 | 08:05 | 1.12 | 0.98 | 03:50                     | 0.179 | 09:45 | 0.508 | 0.363 | 0.363 | 0.20      |
| 12/09/2019 | 05:15      | 4.35 | 21:05 | 8.75  | 6.50 | 02:55           | 0.80 | 07:05 | 1.12 | 0.97 | 02:55                     | 0.160 | 21:10 | 0.458 | 0.321 | 0.321 |           |
| 12/10/2019 | 02:40      | 4.22 | 21:55 | 8.12  | 6.28 | 03:25           | 0.68 | 07:05 | 1.13 | 0.96 | 03:25                     | 0.126 | 21:05 | 0.417 | 0.305 | 0.305 |           |
| 12/11/2019 | 03:15      | 4.08 | 21:05 | 7.89  | 6.10 | 03:30           | 0.71 | 07:10 | 1.14 | 0.96 | 04:05                     | 0.135 | 08:45 | 0.408 | 0.294 | 0.294 | 0.03      |
| 12/12/2019 | 03:25      | 3.80 | 22:20 | 8.06  | 6.16 | 04:00           | 0.69 | 07:55 | 1.11 | 0.94 | 04:00                     | 0.123 | 21:55 | 0.434 | 0.293 | 0.293 | 0.01      |
| 12/13/2019 | 05:05      | 3.88 | 20:45 | 7.81  | 6.09 | 04:00           | 0.71 | 07:25 | 1.12 | 0.94 | 04:00                     | 0.131 | 09:15 | 0.386 | 0.286 | 0.286 | 0.01      |
| 12/14/2019 | 05:35      | 3.92 | 13:45 | 8.88  | 6.45 | 03:55           | 0.70 | 00:20 | 1.07 | 0.89 | 03:10                     | 0.128 | 11:55 | 0.433 | 0.290 | 0.290 | 0.01      |
| 12/15/2019 | 05:20      | 3.90 | 10:55 | 8.49  | 6.59 | 04:50           | 0.68 | 23:55 | 1.09 | 0.85 | 05:40                     | 0.115 | 10:15 | 0.444 | 0.286 | 0.286 | 0.01      |
| 12/16/2019 | 03:35      | 3.88 | 09:10 | 10.28 | 6.53 | 09:35           | 0.54 | 00:00 | 1.06 | 0.82 | 03:35                     | 0.113 | 08:35 | 0.440 | 0.272 | 0.272 | 0.01      |
| 12/17/2019 | 05:00      | 3.92 | 21:20 | 7.91  | 5.99 | 02:50           | 0.62 | 12:35 | 1.05 | 0.84 | 03:25                     | 0.105 | 21:20 | 0.376 | 0.252 | 0.252 | 0.01      |
| 12/18/2019 | 03:15      | 3.76 | 21:55 | 8.23  | 6.22 | 04:05           | 0.59 | 23:40 | 1.00 | 0.82 | 03:15                     | 0.094 | 21:50 | 0.372 | 0.259 | 0.259 | 0.01      |
| 12/19/2019 | 03:25      | 3.79 | 22:55 | 7.85  | 6.15 | 03:30           | 0.58 | 07:05 | 0.97 | 0.83 | 03:25                     | 0.093 | 21:40 | 0.369 | 0.259 | 0.259 |           |
| 12/20/2019 | 03:25      | 3.78 | 21:20 | 7.56  | 6.10 | 03:35           | 0.61 | 07:30 | 1.12 | 0.91 | 03:35                     | 0.097 | 08:40 | 0.399 | 0.282 | 0.282 |           |
| 12/21/2019 | 03:40      | 3.74 | 11:40 | 8.58  | 6.50 | 04:10           | 0.67 | 07:30 | 1.06 | 0.89 | 03:45                     | 0.109 | 11:15 | 0.458 | 0.294 | 0.294 | 0.01      |
| 12/22/2019 | 05:35      | 3.73 | 13:45 | 9.05  | 6.67 | 06:00           | 0.62 | 00:10 | 0.97 | 0.85 | 05:45                     | 0.098 | 13:45 | 0.417 | 0.295 | 0.295 | 0.41      |
| 12/23/2019 | 05:10      | 4.00 | 10:20 | 8.07  | 6.28 | 05:10           | 0.77 | 23:55 | 0.97 | 0.90 | 05:10                     | 0.132 | 10:20 | 0.383 | 0.287 | 0.287 |           |
| 12/24/2019 | 05:00      | 3.90 | 19:30 | 7.77  | 6.23 | 05:00           | 0.76 | 23:25 | 0.97 | 0.90 | 05:00                     | 0.124 | 19:30 | 0.369 | 0.283 | 0.283 | 0.02      |
| 12/25/2019 | 05:35      | 3.79 | 14:00 | 8.71  | 6.43 | 05:35           | 0.74 | 00:05 | 0.96 | 0.89 | 05:35                     | 0.116 | 14:00 | 0.409 | 0.291 | 0.291 | 0.08      |
| 12/26/2019 | 05:05      | 3.79 | 19:15 | 8.07  | 6.15 | 05:05           | 0.74 | 23:50 | 0.97 | 0.89 | 05:05                     | 0.116 | 19:15 | 0.383 | 0.278 | 0.278 |           |
| 12/27/2019 | 05:25      | 3.33 | 13:20 | 7.24  | 5.73 | 05:25           | 0.64 | 11:35 | 1.10 | 0.91 | 05:25                     | 0.084 | 11:40 | 0.385 | 0.259 | 0.259 |           |
| 12/28/2019 | 05:10      | 3.31 | 12:10 | 8.23  | 5.96 | 04:00           | 0.61 | 00:00 | 1.10 | 0.90 | 05:10                     | 0.083 | 12:05 | 0.417 | 0.272 | 0.272 |           |
| 12/29/2019 | 05:45      | 3.36 | 21:50 | 8.00  | 5.98 | 03:55           | 0.63 | 00:30 | 1.10 | 0.94 | 05:45                     | 0.086 | 17:05 | 0.416 | 0.283 | 0.283 | 0.22      |
| 12/30/2019 | 03:50      | 3.56 | 13:15 | 7.37  | 5.84 | 03:50           | 0.69 | 11:45 | 1.09 | 0.95 | 03:50                     | 0.099 | 13:10 | 0.395 | 0.276 | 0.276 |           |
| 12/31/2019 | 05:25      | 3.44 | 10:25 | 7.90  | 6.03 | 04:00           | 0.59 | 10:05 | 1.07 | 0.91 | 05:25                     | 0.091 | 17:35 | 0.404 | 0.279 | 0.279 |           |

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 01/01/2020 | 05:15      | 3.66 | 14:05 | 8.32  | 6.32 | 04:50           | 0.71 | 01:00 | 1.11 | 0.92 | 04:50                     | 0.113 | 13:25 | 0.443 | 0.295 | 0.295 |           |
| 01/02/2020 | 04:10      | 3.69 | 19:50 | 7.90  | 6.20 | 03:20           | 0.71 | 07:50 | 1.13 | 0.93 | 04:05                     | 0.111 | 22:40 | 0.405 | 0.291 | 0.291 |           |
| 01/03/2020 | 05:30      | 3.78 | 20:10 | 8.44  | 6.42 | 03:35           | 0.73 | 23:55 | 1.04 | 0.88 | 03:35                     | 0.131 | 20:30 | 0.405 | 0.288 | 0.288 |           |
| 01/04/2020 | 05:15      | 3.92 | 13:50 | 8.35  | 6.36 | 03:45           | 0.72 | 17:55 | 1.06 | 0.92 | 03:45                     | 0.122 | 14:00 | 0.434 | 0.301 | 0.301 |           |
| 01/05/2020 | 06:10      | 3.85 | 13:40 | 8.29  | 6.53 | 03:45           | 0.72 | 10:15 | 1.08 | 0.91 | 06:00                     | 0.119 | 10:30 | 0.457 | 0.309 | 0.309 |           |
| 01/06/2020 | 03:50      | 3.65 | 21:45 | 8.05  | 6.02 | 04:05           | 0.67 | 07:25 | 1.10 | 0.91 | 03:25                     | 0.103 | 19:30 | 0.433 | 0.277 | 0.277 |           |
| 01/07/2020 | 04:05      | 3.75 | 22:35 | 8.03  | 6.21 | 02:45           | 0.70 | 10:20 | 1.08 | 0.93 | 03:55                     | 0.116 | 10:20 | 0.394 | 0.291 | 0.291 |           |
| 01/08/2020 | 05:20      | 3.62 | 22:25 | 8.27  | 6.07 | 03:20           | 0.71 | 07:20 | 1.08 | 0.91 | 03:25                     | 0.112 | 19:00 | 0.409 | 0.277 | 0.277 | 0.02      |
| 01/09/2020 | 05:20      | 3.74 | 22:30 | 8.30  | 6.15 | 02:05           | 0.70 | 15:35 | 1.15 | 0.94 | 05:15                     | 0.113 | 22:05 | 0.448 | 0.292 | 0.292 | 0.18      |
| 01/10/2020 | 05:35      | 3.96 | 19:15 | 8.00  | 6.23 | 04:55           | 0.76 | 06:50 | 1.15 | 0.94 | 03:15                     | 0.136 | 09:00 | 0.422 | 0.296 | 0.296 | 0.02      |
| 01/11/2020 | 04:55      | 3.86 | 11:05 | 8.41  | 6.35 | 04:55           | 0.70 | 19:05 | 1.06 | 0.92 | 04:55                     | 0.114 | 11:30 | 0.458 | 0.302 | 0.302 | 0.01      |
| 01/12/2020 | 05:20      | 3.86 | 14:25 | 8.71  | 6.51 | 04:05           | 0.69 | 11:40 | 1.10 | 0.91 | 04:05                     | 0.113 | 11:50 | 0.457 | 0.309 | 0.309 |           |
| 01/13/2020 | 03:20      | 3.85 | 21:05 | 8.08  | 6.17 | 04:00           | 0.73 | 18:15 | 1.13 | 0.93 | 04:00                     | 0.125 | 20:20 | 0.425 | 0.290 | 0.290 | 0.02      |
| 01/14/2020 | 03:00      | 3.81 | 08:40 | 7.99  | 5.78 | 03:10           | 0.70 | 07:30 | 1.12 | 0.95 | 03:10                     | 0.112 | 08:35 | 0.410 | 0.273 | 0.273 | 0.11      |
| 01/15/2020 | 05:10      | 2.74 | 21:10 | 7.23  | 5.28 | 04:15           | 0.70 | 07:40 | 1.25 | 0.99 | 03:30                     | 0.085 | 20:35 | 0.374 | 0.251 | 0.251 | 0.07      |
| 01/16/2020 | 03:30      | 2.82 | 19:35 | 8.52  | 5.88 | 04:05           | 0.73 | 07:05 | 1.20 | 0.99 | 03:20                     | 0.095 | 19:25 | 0.458 | 0.287 | 0.287 | 0.66      |
| 01/17/2020 | 03:25      | 3.55 | 08:55 | 8.25  | 5.93 | 03:30           | 0.73 | 07:00 | 1.21 | 1.00 | 03:30                     | 0.126 | 20:40 | 0.395 | 0.292 | 0.292 |           |
| 01/18/2020 | 05:20      | 3.05 | 11:40 | 8.04  | 6.00 | 21:10           | 0.77 | 00:10 | 1.19 | 0.97 | 05:25                     | 0.118 | 11:15 | 0.441 | 0.287 | 0.287 |           |
| 01/19/2020 | 05:35      | 3.12 | 21:50 | 8.80  | 6.19 | 04:05           | 0.75 | 05:45 | 1.15 | 0.98 | 05:15                     | 0.117 | 21:50 | 0.451 | 0.304 | 0.304 |           |
| 01/20/2020 | 05:30      | 4.11 | 13:40 | 9.28  | 6.70 | 16:00           | 0.76 | 06:35 | 1.21 | 1.00 | 05:30                     | 0.157 | 13:30 | 0.459 | 0.339 | 0.339 |           |
| 01/21/2020 | 05:10      | 3.31 | 21:35 | 7.91  | 5.69 | 03:50           | 0.75 | 07:45 | 1.15 | 0.95 | 03:45                     | 0.110 | 21:50 | 0.399 | 0.265 | 0.265 |           |
| 01/22/2020 | 03:25      | 3.21 | 22:40 | 8.31  | 5.88 | 03:15           | 0.71 | 07:40 | 1.13 | 0.95 | 03:25                     | 0.095 | 22:15 | 0.419 | 0.276 | 0.276 | 0.03      |
| 01/23/2020 | 03:35      | 3.43 | 21:55 | 8.83  | 6.29 | 11:55           | 0.73 | 07:15 | 1.14 | 0.93 | 03:40                     | 0.116 | 13:25 | 0.400 | 0.294 | 0.294 |           |
| 01/24/2020 | 05:10      | 3.85 | 22:20 | 8.39  | 6.52 | 22:20           | 0.86 | 07:45 | 1.00 | 0.95 | 05:10                     | 0.148 | 22:20 | 0.393 | 0.312 | 0.312 |           |
| 01/25/2020 | 05:35      | 3.13 | 19:25 | 8.13  | 6.06 | 05:35           | 0.83 | 00:25 | 1.00 | 0.94 | 05:35                     | 0.100 | 19:25 | 0.388 | 0.287 | 0.287 |           |
| 01/26/2020 | 05:30      | 2.96 | 11:10 | 8.51  | 6.24 | 05:30           | 0.81 | 00:30 | 1.00 | 0.92 | 05:30                     | 0.089 | 11:10 | 0.394 | 0.291 | 0.291 | 0.16      |
| 01/27/2020 | 03:35      | 3.19 | 21:25 | 8.09  | 5.82 | 03:35           | 0.84 | 00:00 | 1.00 | 0.96 | 03:35                     | 0.104 | 21:25 | 0.387 | 0.276 | 0.276 |           |
| 01/28/2020 | 05:10      | 3.08 | 20:00 | 8.74  | 5.85 | 20:00           | 0.83 | 15:25 | 1.00 | 0.95 | 05:10                     | 0.097 | 20:00 | 0.396 | 0.276 | 0.276 | 0.01      |
| 01/29/2020 | 03:25      | 3.18 | 21:30 | 8.17  | 5.84 | 03:25           | 0.84 | 18:05 | 1.00 | 0.96 | 03:25                     | 0.103 | 21:30 | 0.389 | 0.278 | 0.278 |           |
| 01/30/2020 | 03:20      | 3.43 | 22:25 | 7.77  | 5.66 | 03:20           | 0.87 | 23:50 | 1.00 | 0.97 | 03:20                     | 0.119 | 22:25 | 0.379 | 0.269 | 0.269 |           |
| 01/31/2020 | 05:05      | 3.20 | 19:30 | 7.81  | 5.71 | 05:05           | 0.84 | 23:35 | 1.00 | 0.96 | 05:05                     | 0.105 | 19:30 | 0.380 | 0.271 | 0.271 |           |
| 02/01/2020 | 03:25      | 3.10 | 10:00 | 7.71  | 5.75 | 03:25           | 0.83 | 23:40 | 1.00 | 0.95 | 03:25                     | 0.098 | 10:00 | 0.377 | 0.272 | 0.272 |           |
| 02/02/2020 | 03:40      | 3.31 | 12:30 | 8.50  | 6.00 | 12:30           | 0.85 | 08:30 | 1.00 | 0.94 | 03:40                     | 0.112 | 12:30 | 0.394 | 0.282 | 0.282 |           |
| 02/03/2020 | 03:30      | 3.48 | 21:30 | 7.92  | 5.75 | 03:30           | 0.88 | 07:30 | 1.00 | 0.96 | 03:30                     | 0.123 | 21:30 | 0.383 | 0.273 | 0.273 |           |
| 02/04/2020 | 03:15      | 3.53 | 08:50 | 7.21  | 5.32 | 03:15           | 0.89 | 17:00 | 1.00 | 0.98 | 03:15                     | 0.126 | 08:50 | 0.360 | 0.249 | 0.249 |           |
| 02/05/2020 | 02:55      | 2.93 | 21:45 | 6.87  | 5.14 | 06:25           | 0.80 | 07:40 | 1.25 | 1.02 | 02:55                     | 0.087 | 11:25 | 0.400 | 0.253 | 0.253 |           |
| 02/06/2020 | 03:40      | 2.80 | 19:10 | 7.96  | 5.29 | 03:15           | 0.74 | 07:40 | 1.23 | 1.00 | 03:40                     | 0.080 | 19:15 | 0.385 | 0.254 | 0.254 |           |
| 02/07/2020 | 03:55      | 2.91 | 21:20 | 7.10  | 5.29 | 03:00           | 0.72 | 11:55 | 1.19 | 1.02 | 03:00                     | 0.083 | 08:55 | 0.379 | 0.260 | 0.260 |           |
| 02/08/2020 | 05:30      | 3.06 | 15:15 | 25.11 | 5.77 | 15:25           | 0.16 | 23:40 | 1.11 | 0.92 | 03:30                     | 0.094 | 16:20 | 0.407 | 0.241 | 0.241 |           |
| 02/09/2020 | 05:30      | 3.30 | 11:15 | 8.27  | 6.03 | 11:20           | 0.73 | 00:00 | 1.17 | 0.96 | 05:55                     | 0.101 | 11:15 | 0.470 | 0.291 | 0.291 |           |
| 02/10/2020 | 03:35      | 3.12 | 21:00 | 7.73  | 5.70 | 05:15           | 0.74 | 07:30 | 1.23 | 0.97 | 03:40                     | 0.091 | 19:50 | 0.418 | 0.273 | 0.273 |           |
| 02/11/2020 | 04:50      | 3.17 | 22:25 | 8.30  | 6.09 | 22:05           | 0.71 | 07:25 | 1.15 | 0.90 | 03:05                     | 0.091 | 09:05 | 0.394 | 0.275 | 0.275 |           |
| 02/12/2020 | 03:10      | 2.94 | 19:25 | 7.95  | 5.79 | 19:55           | 0.74 | 07:20 | 1.26 | 0.98 | 02:50                     | 0.093 | 19:10 | 0.408 | 0.279 | 0.279 |           |
| 02/13/2020 | 03:25      | 2.94 | 19:55 | 7.12  | 5.34 | 04:00           | 0.77 | 07:35 | 1.24 | 1.05 | 03:35                     | 0.089 | 21:50 | 0.415 | 0.270 | 0.270 |           |
| 02/14/2020 | 03:30      | 3.03 | 08:45 | 7.87  | 5.43 | 03:35           | 0.77 | 07:25 | 1.27 | 1.05 | 03:35                     | 0.088 | 20:05 | 0.424 | 0.274 | 0.274 |           |
| 02/15/2020 | 05:15      | 3.12 | 10:45 | 8.15  | 5.71 | 04:35           | 0.73 | 00:05 | 1.18 | 1.00 | 04:35                     | 0.093 | 10:40 | 0.436 | 0.282 | 0.282 |           |
| 02/16/2020 | 05:35      | 2.89 | 12:30 | 7.85  | 5.72 | 04:00           | 0.78 | 00:50 | 1.18 | 0.97 | 06:00                     | 0.091 | 11:25 | 0.460 | 0.270 | 0.270 |           |
| 02/17/2020 | 05:00      | 3.07 | 20:15 | 7.73  | 5.73 | 04:35           | 0.72 | 23:40 | 1.13 | 0.93 | 04:40                     | 0.091 | 20:05 | 0.425 | 0.265 | 0.265 |           |
| 02/18/2020 | 03:20      | 2.98 | 19:45 | 7.61  | 5.52 | 02:35           | 0.75 | 00:00 | 1.18 | 1.00 | 04:50                     | 0.095 | 18:50 | 0.389 | 0.268 | 0.268 |           |
| 02/19/2020 | 03:35      | 3.04 | 21:40 | 8.09  | 5.55 | 22:00           | 0.74 | 10:30 | 1.26 | 1.00 | 03:25                     | 0.094 | 19:45 | 0.404 | 0.271 | 0.271 |           |
| 02/20/2020 | 03:40      | 3.06 | 21:05 | 11.07 | 6.09 | 22:30           | 0.51 | 07:25 | 1.20 | 0.95 | 03:05                     | 0.104 | 23:05 | 0.444 | 0.272 | 0.272 |           |
| 02/21/2020 | 03:10      | 3.58 | 08:15 | 9.33  | 6.13 | 08:15           | 0.65 | 23:30 | 1.11 | 0.95 | 02:45                     | 0.110 | 18:55 | 0.393 | 0.290 | 0.290 |           |
| 02/22/2020 | 06:00      | 3.24 | 10:30 | 8.20  | 6.00 | 10:50           | 0.72 | 08:10 | 1.19 | 0.96 | 06:05                     | 0.111 | 10:35 | 0.443 | 0.287 | 0.287 |           |
| 02/23/2020 | 05:35      | 2.93 | 10:50 | 8.46  | 6.10 | 05:25           | 0.76 | 18:10 | 1.14 | 0.94 | 05:25                     | 0.084 | 12:40 | 0.437 | 0.288 | 0.288 |           |
| 02/24/2020 | 04:55      | 3.37 | 20:45 | 7.93  | 5.75 | 04:50           | 0.75 | 07:30 | 1.15 | 0.95 | 04:10                     | 0.103 | 19:25 | 0.414 | 0.270 | 0.270 |           |



| Date       | Depth (in) |      |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 03:35      | 3.02 | 22:25 | 7.81  | 5.65  | 04:15           | 0.75 | 07:20 | 1.24 | 0.97 | 03:15                     | 0.102 | 21:25 | 0.403 | 0.270 | 0.270 |           |
| 02/26/2020 | 03:15      | 3.11 | 19:35 | 9.23  | 6.17  | 19:25           | 0.67 | 07:30 | 1.18 | 0.93 | 03:30                     | 0.092 | 20:30 | 0.419 | 0.282 | 0.282 |           |
| 02/27/2020 | 04:20      | 3.28 | 17:30 | 19.17 | 6.12  | 17:30           | 0.16 | 09:35 | 1.13 | 0.89 | 04:30                     | 0.100 | 09:00 | 0.545 | 0.262 | 0.262 |           |
| 02/28/2020 | 05:05      | 3.30 | 08:55 | 7.51  | 5.69  | 03:55           | 0.77 | 06:55 | 1.14 | 0.97 | 02:55                     | 0.107 | 08:35 | 0.414 | 0.269 | 0.269 |           |
| 02/29/2020 | 05:50      | 3.23 | 13:15 | 23.46 | 5.72  | 13:20           | 0.16 | 18:15 | 1.22 | 0.96 | 04:30                     | 0.094 | 14:20 | 0.502 | 0.257 | 0.257 |           |
| 03/01/2020 | 05:45      | 2.74 | 21:25 | 7.88  | 5.70  | 04:25           | 0.78 | 18:25 | 1.22 | 1.00 | 04:25                     | 0.084 | 11:45 | 0.433 | 0.283 | 0.283 |           |
| 03/02/2020 | 05:05      | 2.90 | 20:10 | 7.69  | 5.28  | 02:40           | 0.80 | 18:20 | 1.20 | 1.03 | 03:30                     | 0.091 | 19:20 | 0.422 | 0.264 | 0.264 |           |
| 03/03/2020 | 05:00      | 2.90 | 21:50 | 7.93  | 5.37  | 03:25           | 0.83 | 07:25 | 1.24 | 1.07 | 03:25                     | 0.099 | 21:25 | 0.429 | 0.277 | 0.277 |           |
| 03/04/2020 | 05:00      | 2.99 | 20:25 | 7.84  | 5.43  | 02:35           | 0.89 | 07:45 | 1.23 | 1.05 | 02:35                     | 0.102 | 21:15 | 0.418 | 0.276 | 0.276 |           |
| 03/05/2020 | 03:15      | 2.84 | 20:00 | 7.32  | 5.44  | 04:15           | 0.80 | 06:55 | 1.23 | 1.05 | 03:25                     | 0.089 | 19:50 | 0.415 | 0.278 | 0.278 |           |
| 03/06/2020 | 03:05      | 2.95 | 21:00 | 7.50  | 5.53  | 03:15           | 0.86 | 07:25 | 1.22 | 1.05 | 03:15                     | 0.096 | 21:10 | 0.399 | 0.283 | 0.283 |           |
| 03/07/2020 | 03:35      | 2.92 | 20:05 | 7.83  | 5.79  | 13:45           | 0.89 | 19:00 | 1.20 | 1.05 | 03:45                     | 0.107 | 12:35 | 0.454 | 0.300 | 0.300 |           |
| 03/08/2020 | 04:00      | 3.28 | 14:15 | 34.98 | 16.56 | 11:00           | 0.26 | 14:15 | 1.78 | 0.71 | 05:10                     | 0.110 | 14:15 | 1.416 | 0.316 | 0.316 |           |
| 03/09/2020 | 23:55      | 4.57 | 06:40 | 25.25 | 11.60 | 03:20           | 0.16 | 11:30 | 1.20 | 0.81 | 03:20                     | 0.125 | 07:05 | 0.472 | 0.300 | 0.300 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 30.779                    | 4.90      |
| Avg   | 6.17       | 0.94            | 0.283                     |           |

## Site Commentary

### Site Information

| MIL_1043        |       |
|-----------------|-------|
| Pipe Dimensions | 20.75 |
| Silt Level      | 0.00" |

### Overview

Site MIL\_1043 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited a small response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed downstream of MIL\_1193. A review of balancing of combined flows MIL\_1043 and MIL\_2840 shows a net flow of 0.663 MGD.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                     |                   |
|--------------------------|-------------------|---------------------|-------------------|
| Item                     | Depth (in)        | Velocity (ft/s)     | Quantity (MGD)    |
| Average                  | 5.25              | 4.00                | 1.263             |
| Minimum                  | 3.29              | 1.93                | 0.306             |
| Maximum                  | 7.55              | 4.98                | 2.432             |
| Time of Minimum          | 2/26/2020 3:35 AM | 3/2/2020 4:00 AM    | 3/2/2020 4:00 AM  |
| Time of Maximum          | 12/7/2019 6:15 PM | 11/28/2019 12:30 PM | 12/7/2019 6:15 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_1043**

Site Address /Location: Ayer St and Park Hill Dr, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.436384°

Longitude:

-121.887700°

Pipe Size (H x W)

20.75"x20.75"

Pipe Shape

Circular

Manhole #

1043

System Characteristics

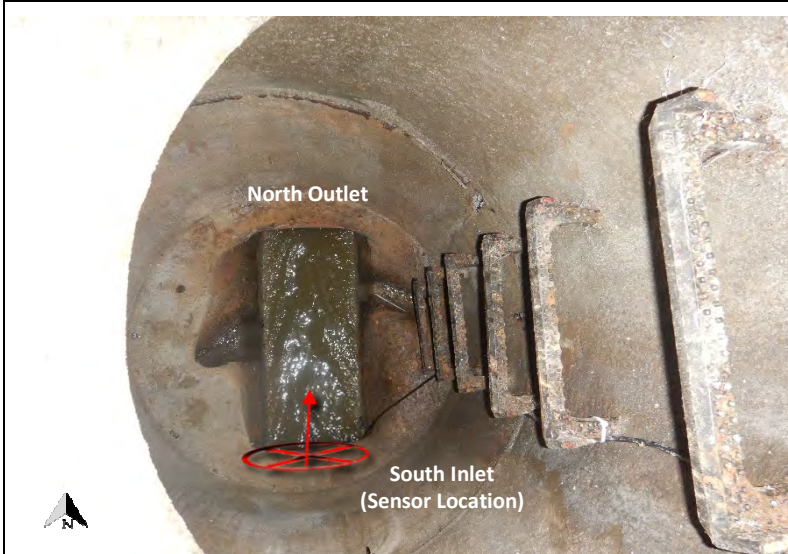
Residential/Commercial

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Thursday, November 14, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

6:52:00 AM

Pipe Size (HxW)

20.75"x20.75"

Depth of Flow (Wet DOF) (in)

6.38"

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

4.50'

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Medium depth with fast velocity and small waves

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

10'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

847

ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325

# SCATTERGRAPH REPORT

MIL\_1043

Flow Monitor

**MIL\_1043**

Pipe Height  
20.75 in

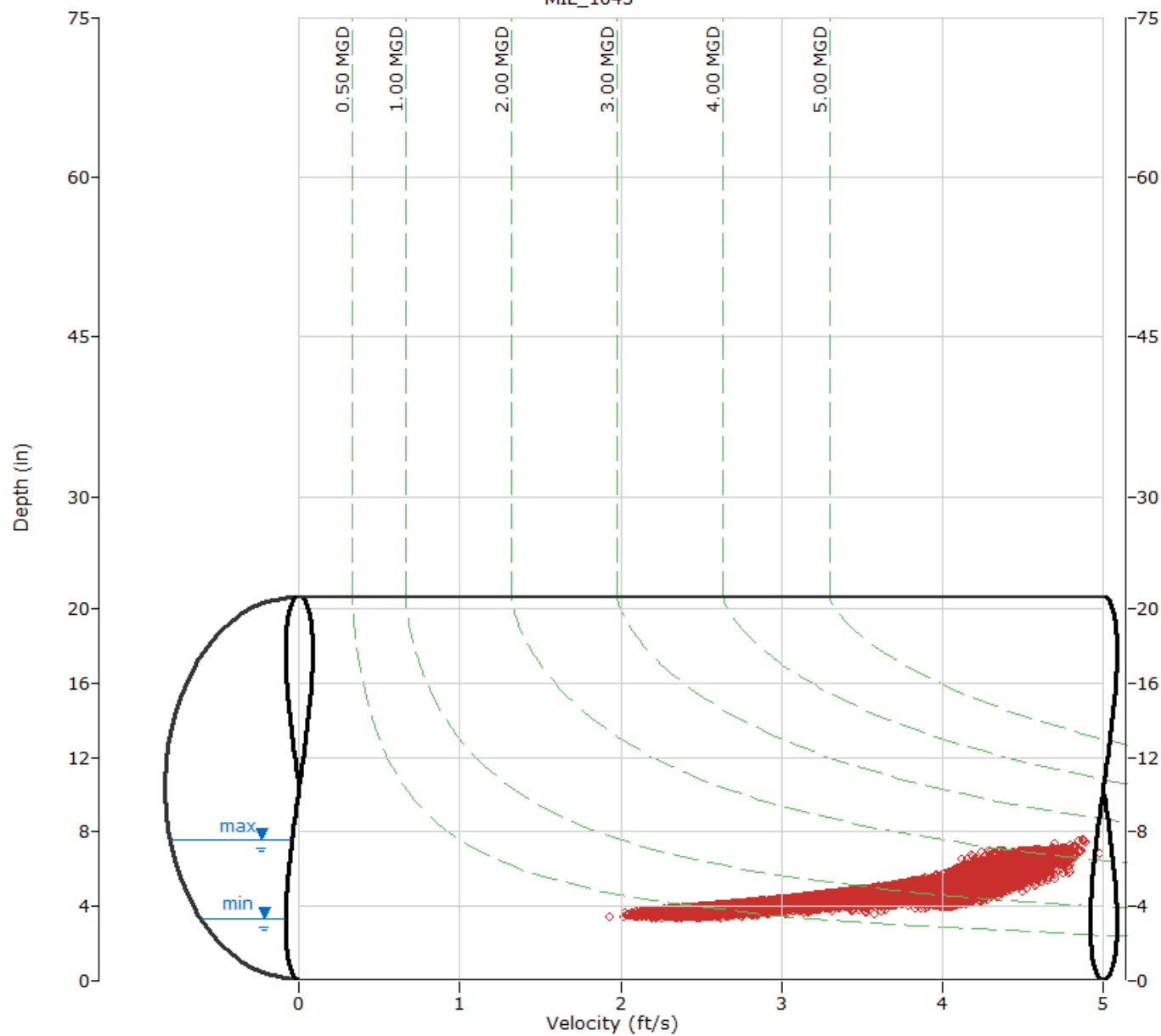
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES

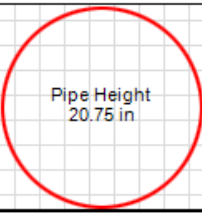




# HYDROGRAPH REPORT

MIL\_1043

Flow Monitor  
**MIL\_1043**

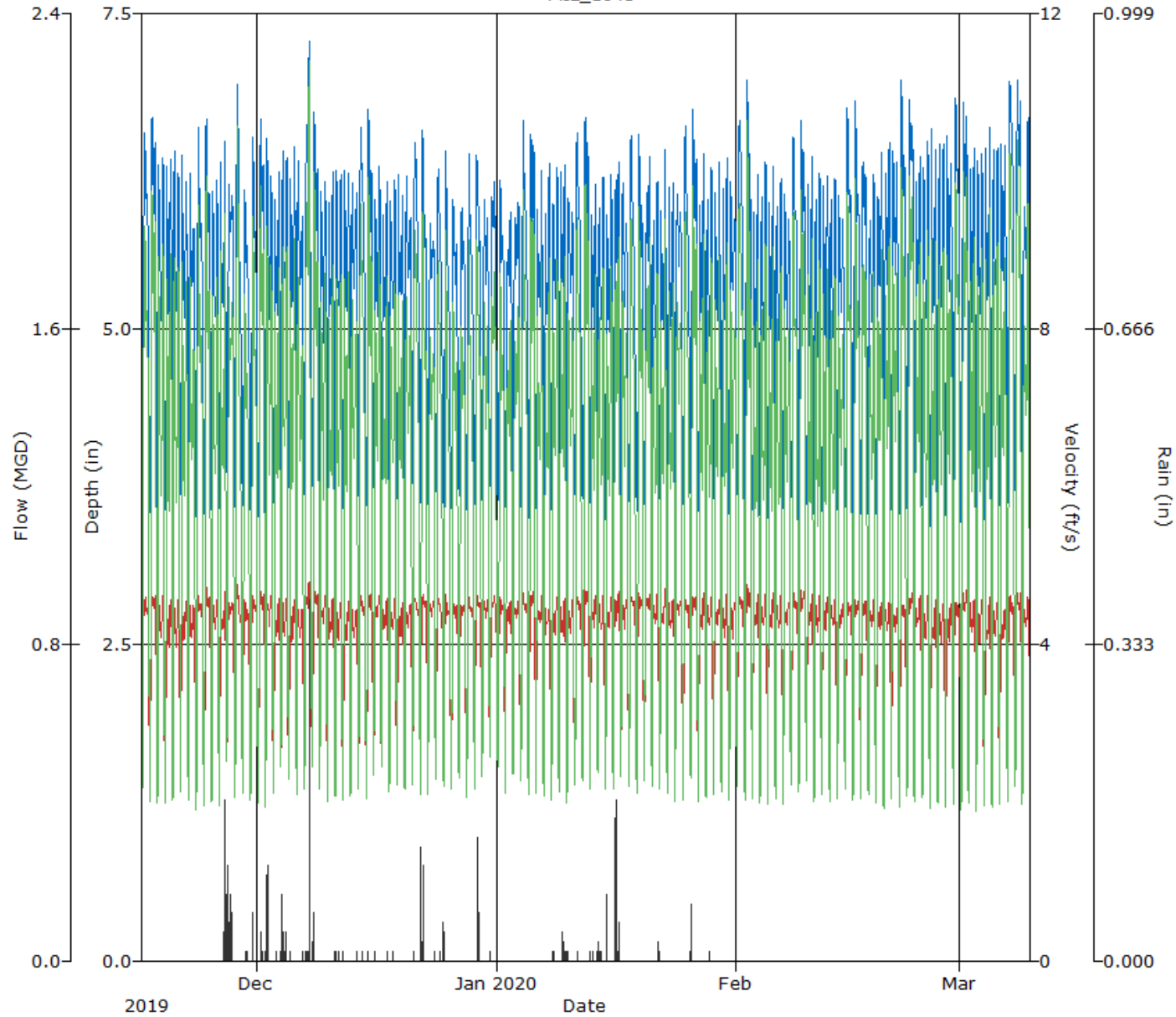


Pipe Height  
20.75 in

Report Period  
11/16/2019  
To  
3/9/2020

Legend  

- Depth
- Velocity
- Quantity
- Rain



# Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_1043, Pipe Height: 20.75 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 03:25      | 3.55 | 10:30 | 6.60 | 5.43 | 04:55           | 2.20 | 13:25 | 4.68 | 3.94 | 04:55                     | 0.387 | 10:25 | 1.915 | 1.316 | 1.316 |           |
| 11/17/2019 | 04:45      | 3.48 | 10:40 | 6.86 | 5.50 | 04:30           | 2.20 | 21:10 | 4.74 | 3.99 | 04:30                     | 0.373 | 10:50 | 2.066 | 1.366 | 1.366 |           |
| 11/18/2019 | 03:25      | 3.47 | 07:55 | 6.71 | 5.27 | 02:20           | 2.15 | 20:15 | 4.73 | 3.94 | 04:20                     | 0.372 | 07:55 | 2.002 | 1.251 | 1.251 |           |
| 11/19/2019 | 04:35      | 3.51 | 08:05 | 6.55 | 5.27 | 02:55           | 2.17 | 07:35 | 4.63 | 3.90 | 04:20                     | 0.381 | 08:05 | 1.888 | 1.238 | 1.238 |           |
| 11/20/2019 | 04:25      | 3.59 | 08:10 | 6.63 | 5.26 | 03:30           | 2.11 | 07:55 | 4.70 | 3.91 | 03:30                     | 0.377 | 08:00 | 1.938 | 1.235 | 1.235 |           |
| 11/21/2019 | 04:25      | 3.59 | 07:55 | 6.68 | 5.27 | 03:35           | 2.20 | 18:15 | 4.70 | 3.93 | 03:35                     | 0.400 | 07:55 | 1.961 | 1.242 | 1.242 |           |
| 11/22/2019 | 03:35      | 3.58 | 08:05 | 6.49 | 5.26 | 04:25           | 2.14 | 08:05 | 4.62 | 3.94 | 04:25                     | 0.382 | 08:05 | 1.873 | 1.240 | 1.240 |           |
| 11/23/2019 | 04:30      | 3.47 | 11:00 | 6.70 | 5.31 | 04:00           | 2.13 | 11:20 | 4.71 | 3.94 | 04:30                     | 0.361 | 11:25 | 1.978 | 1.276 | 1.276 |           |
| 11/24/2019 | 04:40      | 3.49 | 11:10 | 6.75 | 5.35 | 04:45           | 2.07 | 11:35 | 4.82 | 4.00 | 04:45                     | 0.350 | 11:10 | 2.035 | 1.314 | 1.314 |           |
| 11/25/2019 | 04:10      | 3.45 | 08:05 | 6.32 | 5.12 | 03:20           | 2.21 | 21:55 | 4.65 | 3.95 | 04:10                     | 0.371 | 08:10 | 1.811 | 1.203 | 1.203 |           |
| 11/26/2019 | 04:10      | 3.51 | 08:00 | 6.68 | 5.18 | 03:45           | 2.13 | 07:55 | 4.82 | 3.94 | 03:45                     | 0.373 | 08:00 | 2.033 | 1.223 | 1.223 | 0.36      |
| 11/27/2019 | 03:10      | 3.66 | 10:10 | 6.24 | 5.40 | 02:35           | 2.38 | 21:15 | 4.64 | 4.07 | 03:10                     | 0.439 | 10:25 | 1.771 | 1.324 | 1.324 | 0.63      |
| 11/28/2019 | 05:00      | 3.43 | 12:10 | 7.05 | 5.30 | 05:00           | 2.28 | 12:30 | 4.98 | 3.98 | 05:00                     | 0.375 | 12:30 | 2.164 | 1.288 | 1.288 |           |
| 11/29/2019 | 04:05      | 3.40 | 11:15 | 6.18 | 5.05 | 04:20           | 2.25 | 11:50 | 4.70 | 3.95 | 04:05                     | 0.390 | 11:15 | 1.731 | 1.177 | 1.177 | 0.02      |
| 11/30/2019 | 03:45      | 3.41 | 13:15 | 6.57 | 5.17 | 04:10           | 2.13 | 11:50 | 4.69 | 3.97 | 05:00                     | 0.357 | 11:50 | 1.931 | 1.237 | 1.237 | 0.10      |
| 12/01/2019 | 04:55      | 3.42 | 12:45 | 6.70 | 5.38 | 04:15           | 2.23 | 18:20 | 4.74 | 4.03 | 04:55                     | 0.366 | 12:40 | 2.007 | 1.334 | 1.334 | 0.06      |
| 12/02/2019 | 04:05      | 3.40 | 08:15 | 6.81 | 5.23 | 03:05           | 2.10 | 08:10 | 4.75 | 4.03 | 03:05                     | 0.348 | 08:05 | 2.038 | 1.267 | 1.267 | 0.30      |
| 12/03/2019 | 03:25      | 3.41 | 07:55 | 6.43 | 5.21 | 04:25           | 2.14 | 20:25 | 4.64 | 3.96 | 04:25                     | 0.375 | 08:00 | 1.848 | 1.232 | 1.232 | 0.01      |
| 12/04/2019 | 03:25      | 3.52 | 08:05 | 6.61 | 5.39 | 03:25           | 2.25 | 08:05 | 4.77 | 4.02 | 03:25                     | 0.383 | 08:05 | 1.984 | 1.303 | 1.303 | 0.39      |
| 12/05/2019 | 04:35      | 3.53 | 21:35 | 6.46 | 5.29 | 04:10           | 2.17 | 07:55 | 4.66 | 3.94 | 04:35                     | 0.392 | 07:55 | 1.859 | 1.251 | 1.251 | 0.01      |
| 12/06/2019 | 03:30      | 3.58 | 08:15 | 6.57 | 5.31 | 04:45           | 2.24 | 17:25 | 4.62 | 3.94 | 03:35                     | 0.402 | 08:15 | 1.812 | 1.253 | 1.253 | 0.01      |
| 12/07/2019 | 03:25      | 3.55 | 18:15 | 7.55 | 5.61 | 04:25           | 2.22 | 18:05 | 4.90 | 4.04 | 04:35                     | 0.392 | 18:15 | 2.432 | 1.417 | 1.417 | 0.67      |
| 12/08/2019 | 05:05      | 3.60 | 10:55 | 6.83 | 5.53 | 03:35           | 2.44 | 20:20 | 4.75 | 4.14 | 05:05                     | 0.436 | 10:50 | 2.054 | 1.404 | 1.404 | 0.20      |
| 12/09/2019 | 04:25      | 3.52 | 08:05 | 6.43 | 5.18 | 02:40           | 2.03 | 20:30 | 4.71 | 4.01 | 02:40                     | 0.364 | 08:10 | 1.859 | 1.233 | 1.233 |           |
| 12/10/2019 | 03:50      | 3.45 | 20:50 | 6.38 | 5.17 | 03:45           | 2.11 | 20:55 | 4.68 | 3.95 | 03:45                     | 0.356 | 20:55 | 1.845 | 1.212 | 1.212 |           |
| 12/11/2019 | 04:40      | 3.56 | 08:10 | 6.39 | 5.27 | 03:30           | 2.17 | 20:40 | 4.62 | 3.92 | 04:30                     | 0.387 | 08:15 | 1.813 | 1.240 | 1.240 | 0.03      |
| 12/12/2019 | 04:00      | 3.48 | 08:00 | 6.35 | 5.23 | 04:05           | 2.10 | 08:00 | 4.60 | 3.89 | 04:05                     | 0.356 | 08:00 | 1.811 | 1.220 | 1.220 | 0.01      |
| 12/13/2019 | 04:15      | 3.58 | 07:55 | 6.35 | 5.28 | 03:15           | 2.15 | 07:40 | 4.63 | 3.91 | 03:15                     | 0.386 | 07:55 | 1.776 | 1.237 | 1.237 | 0.01      |
| 12/14/2019 | 04:35      | 3.57 | 11:05 | 6.65 | 5.42 | 03:25           | 2.20 | 14:05 | 4.68 | 3.99 | 03:35                     | 0.397 | 11:05 | 1.941 | 1.322 | 1.322 | 0.01      |
| 12/15/2019 | 04:35      | 3.40 | 10:50 | 6.87 | 5.42 | 04:15           | 2.20 | 10:30 | 4.71 | 4.03 | 04:30                     | 0.380 | 11:05 | 2.051 | 1.347 | 1.347 | 0.01      |
| 12/16/2019 | 04:30      | 3.60 | 21:20 | 6.36 | 5.20 | 02:40           | 2.30 | 21:50 | 4.66 | 4.06 | 03:20                     | 0.422 | 21:15 | 1.834 | 1.256 | 1.256 | 0.01      |
| 12/17/2019 | 04:40      | 3.67 | 21:55 | 6.25 | 5.17 | 04:25           | 2.49 | 21:00 | 4.67 | 4.04 | 04:25                     | 0.460 | 21:55 | 1.774 | 1.229 | 1.229 | 0.01      |
| 12/18/2019 | 02:50      | 3.51 | 07:50 | 6.31 | 5.19 | 02:55           | 2.23 | 22:05 | 4.68 | 3.99 | 02:55                     | 0.390 | 22:10 | 1.802 | 1.232 | 1.232 | 0.01      |
| 12/19/2019 | 03:05      | 3.54 | 08:25 | 6.38 | 5.25 | 03:20           | 2.23 | 07:45 | 4.71 | 3.98 | 03:20                     | 0.399 | 07:45 | 1.813 | 1.246 | 1.246 |           |
| 12/20/2019 | 04:25      | 3.57 | 08:05 | 6.32 | 5.30 | 04:40           | 2.18 | 18:50 | 4.68 | 3.97 | 04:40                     | 0.399 | 08:05 | 1.764 | 1.259 | 1.259 |           |
| 12/21/2019 | 03:40      | 3.66 | 11:55 | 6.52 | 5.36 | 03:30           | 2.26 | 14:00 | 4.67 | 4.00 | 04:50                     | 0.418 | 12:00 | 1.888 | 1.302 | 1.302 | 0.01      |
| 12/22/2019 | 04:25      | 3.43 | 11:00 | 6.61 | 5.31 | 04:15           | 2.19 | 19:35 | 4.75 | 4.05 | 04:15                     | 0.379 | 11:30 | 1.930 | 1.304 | 1.304 | 0.41      |
| 12/23/2019 | 04:30      | 3.45 | 11:00 | 5.94 | 5.12 | 04:25           | 2.20 | 12:40 | 4.62 | 4.06 | 04:25                     | 0.373 | 11:00 | 1.640 | 1.224 | 1.224 |           |
| 12/24/2019 | 03:55      | 3.63 | 11:50 | 6.41 | 5.19 | 03:30           | 2.26 | 12:55 | 4.78 | 4.06 | 03:30                     | 0.414 | 11:50 | 1.833 | 1.252 | 1.252 | 0.02      |
| 12/25/2019 | 05:15      | 3.42 | 11:15 | 6.51 | 5.03 | 05:25           | 2.23 | 11:15 | 4.72 | 4.04 | 05:25                     | 0.387 | 11:15 | 1.924 | 1.190 | 1.190 | 0.08      |
| 12/26/2019 | 04:25      | 3.47 | 10:10 | 6.37 | 5.05 | 05:00           | 2.35 | 10:05 | 4.67 | 3.99 | 04:25                     | 0.406 | 10:10 | 1.830 | 1.188 | 1.188 |           |
| 12/27/2019 | 03:50      | 3.48 | 11:45 | 6.05 | 5.10 | 04:30           | 2.30 | 22:05 | 4.61 | 4.02 | 04:25                     | 0.393 | 12:15 | 1.655 | 1.207 | 1.207 |           |
| 12/28/2019 | 04:25      | 3.43 | 12:05 | 6.46 | 5.14 | 04:45           | 2.13 | 12:10 | 4.64 | 3.97 | 04:45                     | 0.373 | 12:05 | 1.865 | 1.220 | 1.220 |           |
| 12/29/2019 | 03:55      | 3.47 | 11:55 | 6.51 | 5.16 | 04:35           | 2.16 | 10:45 | 4.73 | 4.01 | 04:35                     | 0.381 | 11:50 | 1.894 | 1.242 | 1.242 | 0.22      |
| 12/30/2019 | 04:30      | 3.55 | 11:30 | 6.10 | 5.11 | 03:30           | 2.27 | 12:45 | 4.79 | 4.06 | 03:30                     | 0.396 | 12:45 | 1.717 | 1.226 | 1.226 |           |
| 12/31/2019 | 04:25      | 3.70 | 18:20 | 6.24 | 5.21 | 04:20           | 2.55 | 19:10 | 4.68 | 4.13 | 04:20                     | 0.469 | 18:20 | 1.787 | 1.275 | 1.275 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:40      | 3.47 | 12:10 | 6.24 | 5.04 | 05:20           | 2.63 | 12:00 | 4.67 | 4.08 | 05:40                     | 0.463 | 12:10 | 1.796 | 1.205 | 1.205 |       |           |
| 01/02/2020 | 03:45      | 3.46 | 21:10 | 6.01 | 5.08 | 03:35           | 2.27 | 21:50 | 4.59 | 4.05 | 03:50                     | 0.392 | 20:30 | 1.657 | 1.208 | 1.208 |       |           |
| 01/03/2020 | 03:00      | 3.59 | 19:45 | 6.07 | 5.21 | 03:10           | 2.28 | 20:50 | 4.58 | 4.04 | 04:15                     | 0.419 | 19:45 | 1.682 | 1.248 | 1.248 |       |           |
| 01/04/2020 | 03:30      | 3.45 | 12:45 | 6.72 | 5.30 | 04:55           | 2.41 | 12:10 | 4.72 | 4.03 | 04:55                     | 0.408 | 12:10 | 1.988 | 1.299 | 1.299 |       |           |
| 01/05/2020 | 04:25      | 3.38 | 10:25 | 6.66 | 5.37 | 04:20           | 2.27 | 20:30 | 4.76 | 4.08 | 04:20                     | 0.382 | 20:30 | 1.966 | 1.341 | 1.341 |       |           |
| 01/06/2020 | 04:00      | 3.46 | 20:35 | 6.33 | 5.15 | 03:40           | 2.12 | 19:45 | 4.73 | 4.04 | 04:15                     | 0.376 | 20:35 | 1.813 | 1.235 | 1.235 |       |           |
| 01/07/2020 | 03:25      | 3.53 | 21:00 | 6.38 | 5.16 | 04:50           | 2.25 | 21:00 | 4.66 | 3.96 | 03:30                     | 0.400 | 21:00 | 1.848 | 1.216 | 1.216 |       |           |
| 01/08/2020 | 03:55      | 3.50 | 09:50 | 6.39 | 5.25 | 03:45           | 2.18 | 20:45 | 4.63 | 3.94 | 03:45                     | 0.375 | 21:00 | 1.820 | 1.242 | 1.242 |       | 0.02      |
| 01/09/2020 | 04:10      | 3.49 | 08:00 | 6.57 | 5.28 | 04:10           | 2.25 | 21:05 | 4.62 | 3.97 | 04:10                     | 0.379 | 08:00 | 1.894 | 1.262 | 1.262 | 0.18  |           |
| 01/10/2020 | 03:10      | 3.51 | 08:05 | 6.34 | 5.23 | 03:50           | 2.12 | 08:05 | 4.61 | 3.96 | 03:55                     | 0.364 | 08:05 | 1.808 | 1.238 | 1.238 | 0.02  |           |
| 01/11/2020 | 04:05      | 3.58 | 11:35 | 6.58 | 5.31 | 04:35           | 2.26 | 10:30 | 4.77 | 4.01 | 04:35                     | 0.416 | 11:45 | 1.934 | 1.292 | 1.292 | 0.01  |           |
| 01/12/2020 | 04:10      | 3.46 | 12:20 | 6.82 | 5.38 | 03:55           | 2.24 | 10:15 | 4.76 | 4.09 | 03:55                     | 0.385 | 12:15 | 2.034 | 1.349 | 1.349 |       |           |
| 01/13/2020 | 03:45      | 3.50 | 07:55 | 6.35 | 5.08 | 02:25           | 2.25 | 08:00 | 4.68 | 4.04 | 03:20                     | 0.396 | 08:00 | 1.839 | 1.212 | 1.212 |       | 0.02      |
| 01/14/2020 | 02:30      | 3.65 | 08:00 | 6.31 | 5.11 | 02:10           | 2.42 | 21:45 | 4.74 | 4.01 | 02:35                     | 0.451 | 21:45 | 1.839 | 1.209 | 1.209 | 0.11  |           |
| 01/15/2020 | 04:30      | 3.33 | 20:40 | 6.32 | 5.07 | 04:35           | 2.47 | 21:35 | 4.66 | 4.03 | 04:35                     | 0.391 | 20:40 | 1.805 | 1.202 | 1.202 | 0.07  |           |
| 01/16/2020 | 03:25      | 3.54 | 20:35 | 6.43 | 5.32 | 03:20           | 2.27 | 13:05 | 4.79 | 4.08 | 03:30                     | 0.393 | 20:25 | 1.902 | 1.311 | 1.311 | 0.66  |           |
| 01/17/2020 | 03:40      | 3.54 | 09:00 | 6.89 | 5.19 | 04:30           | 2.32 | 08:15 | 4.66 | 4.07 | 04:30                     | 0.409 | 09:00 | 2.050 | 1.251 | 1.251 |       |           |
| 01/18/2020 | 04:00      | 3.48 | 11:15 | 6.56 | 5.21 | 04:05           | 2.28 | 12:15 | 4.72 | 4.07 | 04:05                     | 0.385 | 11:15 | 1.916 | 1.274 | 1.274 |       |           |
| 01/19/2020 | 05:00      | 3.38 | 11:00 | 6.68 | 5.19 | 04:40           | 2.31 | 10:55 | 4.73 | 4.07 | 04:40                     | 0.376 | 11:00 | 1.993 | 1.271 | 1.271 |       |           |
| 01/20/2020 | 04:05      | 3.48 | 21:10 | 6.45 | 5.22 | 04:05           | 2.39 | 14:45 | 4.80 | 4.11 | 04:05                     | 0.402 | 21:10 | 1.886 | 1.284 | 1.284 |       |           |
| 01/21/2020 | 03:45      | 3.56 | 21:55 | 6.25 | 5.05 | 04:35           | 2.24 | 20:45 | 4.78 | 4.05 | 04:35                     | 0.401 | 21:50 | 1.795 | 1.197 | 1.197 |       |           |
| 01/22/2020 | 03:00      | 3.54 | 21:35 | 6.48 | 5.12 | 04:05           | 2.17 | 19:20 | 4.75 | 4.06 | 04:05                     | 0.382 | 20:55 | 1.905 | 1.228 | 1.228 |       | 0.03      |
| 01/23/2020 | 04:35      | 3.50 | 08:05 | 6.41 | 5.15 | 03:30           | 2.13 | 07:20 | 4.67 | 4.03 | 03:30                     | 0.369 | 08:00 | 1.835 | 1.228 | 1.228 |       |           |
| 01/24/2020 | 03:15      | 3.53 | 10:35 | 6.15 | 5.26 | 04:20           | 2.15 | 19:40 | 4.60 | 4.04 | 03:45                     | 0.374 | 10:35 | 1.697 | 1.275 | 1.275 |       |           |
| 01/25/2020 | 05:20      | 3.52 | 11:35 | 6.75 | 5.30 | 04:20           | 2.18 | 11:25 | 4.69 | 4.01 | 04:20                     | 0.382 | 11:35 | 1.967 | 1.286 | 1.286 |       |           |
| 01/26/2020 | 04:10      | 3.54 | 12:15 | 6.80 | 5.42 | 03:40           | 2.33 | 19:40 | 4.68 | 4.09 | 04:10                     | 0.415 | 11:30 | 2.006 | 1.352 | 1.352 |       | 0.16      |
| 01/27/2020 | 03:40      | 3.39 | 20:55 | 6.46 | 5.17 | 04:15           | 2.16 | 20:05 | 4.70 | 4.02 | 03:40                     | 0.370 | 20:50 | 1.889 | 1.240 | 1.240 |       |           |
| 01/28/2020 | 04:15      | 3.51 | 20:30 | 6.46 | 5.11 | 03:55           | 2.17 | 20:30 | 4.71 | 3.98 | 03:35                     | 0.378 | 20:30 | 1.898 | 1.208 | 1.208 |       | 0.01      |
| 01/29/2020 | 04:20      | 3.46 | 21:05 | 6.37 | 5.15 | 03:50           | 2.09 | 22:15 | 4.66 | 3.99 | 03:50                     | 0.369 | 19:50 | 1.819 | 1.220 | 1.220 |       |           |
| 01/30/2020 | 03:45      | 3.58 | 21:55 | 6.44 | 5.21 | 04:30           | 2.14 | 20:50 | 4.78 | 3.98 | 02:50                     | 0.392 | 20:50 | 1.917 | 1.237 | 1.237 |       |           |
| 01/31/2020 | 04:00      | 3.40 | 08:05 | 6.34 | 5.18 | 02:55           | 2.12 | 18:35 | 4.69 | 3.98 | 04:00                     | 0.361 | 08:10 | 1.782 | 1.228 | 1.228 |       |           |
| 02/01/2020 | 04:15      | 3.53 | 10:45 | 6.85 | 5.42 | 04:15           | 2.34 | 10:05 | 4.76 | 4.06 | 04:15                     | 0.401 | 10:45 | 2.032 | 1.344 | 1.344 |       |           |
| 02/02/2020 | 04:50      | 3.38 | 11:35 | 7.06 | 5.34 | 03:50           | 2.18 | 12:00 | 4.87 | 4.09 | 03:50                     | 0.370 | 12:00 | 2.186 | 1.340 | 1.340 |       |           |
| 02/03/2020 | 03:50      | 3.43 | 21:10 | 6.29 | 5.02 | 03:40           | 2.25 | 19:25 | 4.72 | 4.05 | 03:40                     | 0.380 | 21:10 | 1.832 | 1.194 | 1.194 |       |           |
| 02/04/2020 | 04:15      | 3.40 | 20:45 | 6.49 | 5.05 | 04:10           | 2.22 | 20:55 | 4.72 | 4.04 | 04:10                     | 0.363 | 20:45 | 1.911 | 1.203 | 1.203 |       |           |
| 02/05/2020 | 03:10      | 3.42 | 20:45 | 6.34 | 5.05 | 03:00           | 2.20 | 21:05 | 4.71 | 4.02 | 03:00                     | 0.369 | 21:00 | 1.849 | 1.197 | 1.197 |       |           |
| 02/06/2020 | 04:10      | 3.37 | 21:25 | 6.28 | 5.06 | 03:40           | 2.13 | 20:45 | 4.68 | 4.02 | 04:10                     | 0.358 | 21:25 | 1.801 | 1.198 | 1.198 |       |           |
| 02/07/2020 | 03:25      | 3.49 | 08:05 | 6.37 | 5.09 | 03:30           | 2.12 | 07:50 | 4.64 | 4.00 | 03:20                     | 0.367 | 08:05 | 1.806 | 1.200 | 1.200 |       |           |
| 02/08/2020 | 03:55      | 3.49 | 11:45 | 6.62 | 5.31 | 03:55           | 2.14 | 12:10 | 4.70 | 4.08 | 03:55                     | 0.360 | 11:50 | 1.952 | 1.310 | 1.310 |       |           |
| 02/09/2020 | 04:25      | 3.38 | 10:45 | 6.81 | 5.32 | 03:40           | 2.22 | 10:50 | 4.80 | 4.09 | 03:40                     | 0.370 | 10:50 | 2.066 | 1.331 | 1.331 |       |           |
| 02/10/2020 | 04:15      | 3.47 | 08:00 | 6.61 | 5.08 | 02:50           | 2.28 | 20:50 | 4.77 | 4.08 | 04:10                     | 0.386 | 08:00 | 1.958 | 1.223 | 1.223 |       |           |
| 02/11/2020 | 04:40      | 3.47 | 08:05 | 6.35 | 5.01 | 03:15           | 2.18 | 20:00 | 4.67 | 4.00 | 03:15                     | 0.365 | 20:45 | 1.806 | 1.176 | 1.176 |       |           |
| 02/12/2020 | 04:10      | 3.35 | 08:05 | 6.35 | 5.07 | 04:15           | 2.16 | 08:15 | 4.67 | 4.02 | 04:15                     | 0.345 | 08:15 | 1.828 | 1.204 | 1.204 |       |           |
| 02/13/2020 | 04:10      | 3.32 | 07:55 | 6.36 | 5.07 | 03:30           | 2.19 | 07:55 | 4.70 | 4.00 | 04:10                     | 0.349 | 07:55 | 1.852 | 1.198 | 1.198 |       |           |
| 02/14/2020 | 04:00      | 3.40 | 08:05 | 6.19 | 5.14 | 04:55           | 2.19 | 18:10 | 4.60 | 4.00 | 04:00                     | 0.360 | 07:55 | 1.735 | 1.215 | 1.215 |       |           |
| 02/15/2020 | 04:25      | 3.41 | 10:45 | 6.81 | 5.38 | 04:40           | 2.24 | 11:05 | 4.66 | 4.03 | 04:25                     | 0.388 | 11:05 | 1.992 | 1.323 | 1.323 |       |           |
| 02/16/2020 | 03:40      | 3.34 | 11:15 | 6.86 | 5.34 | 03:30           | 2.18 | 10:30 | 4.67 | 3.98 | 03:45                     | 0.367 | 11:10 | 2.015 | 1.308 | 1.308 |       |           |
| 02/17/2020 | 04:25      | 3.43 | 10:45 | 6.50 | 5.28 | 04:05           | 2.14 | 10:55 | 4.62 | 3.99 | 03:50                     | 0.380 | 10:55 | 1.868 | 1.277 | 1.277 |       |           |
| 02/18/2020 | 04:25      | 3.30 | 20:20 | 6.30 | 5.10 | 03:20           | 2.24 | 20:10 | 4.62 | 4.01 | 04:20                     | 0.368 | 20:20 | 1.798 | 1.208 | 1.208 |       |           |
| 02/19/2020 | 03:00      | 3.45 | 22:00 | 6.53 | 5.22 | 03:25           | 2.20 | 18:35 | 4.58 | 3.95 | 03:00                     | 0.372 | 22:00 | 1.855 | 1.238 | 1.238 |       |           |
| 02/20/2020 | 03:30      | 3.38 | 21:10 | 6.55 | 5.32 | 04:45           | 2.12 | 20:55 | 4.80 | 3.93 | 04:35                     | 0.357 | 20:55 | 1.911 | 1.265 | 1.265 |       |           |
| 02/21/2020 | 04:15      | 3.53 | 09:10 | 6.47 | 5.36 | 04:55           | 2.16 | 09:10 | 4.57 | 3.91 | 03:35                     | 0.381 | 09:10 | 1.845 | 1.273 | 1.273 |       |           |
| 02/22/2020 | 04:25      | 3.42 | 11:25 | 7.00 | 5.53 | 04:25           | 2.07 | 09:20 | 4.67 | 3.93 | 04:25                     | 0.340 | 11:25 | 2.061 | 1.355 | 1.355 |       |           |
| 02/23/2020 | 04:40      | 3.39 | 11:05 | 6.89 | 5.59 | 03:45           | 2.17 | 12:50 | 4.70 | 4.02 | 04:40                     | 0.370 | 10:55 | 2.051 | 1.410 | 1.410 |       |           |
| 02/24/2020 | 04:05      | 3.43 | 21:45 | 6.49 | 5.24 | 04:30           | 2.15 | 20:10 | 4.71 | 3.98 | 04:30                     | 0.365 | 21:40 | 1.863 | 1.255 | 1.255 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total |           |
| 02/25/2020 | 03:20      | 3.52 | 21:50 | 6.55 | 5.24 | 03:50           | 2.11 | 20:40 | 4.66 | 3.93 | 03:50                     | 0.374 | 20:45 | 1.907 | 1.239 | 1.239 |           |
| 02/26/2020 | 03:35      | 3.29 | 08:05 | 6.65 | 5.27 | 04:15           | 2.06 | 21:30 | 4.65 | 3.89 | 04:15                     | 0.337 | 08:05 | 1.927 | 1.241 | 1.241 |           |
| 02/27/2020 | 04:05      | 3.36 | 07:55 | 6.60 | 5.31 | 04:30           | 2.04 | 20:10 | 4.56 | 3.90 | 03:20                     | 0.341 | 08:00 | 1.868 | 1.250 | 1.250 |           |
| 02/28/2020 | 02:55      | 3.41 | 08:35 | 6.63 | 5.35 | 04:05           | 2.12 | 20:10 | 4.55 | 3.90 | 04:05                     | 0.355 | 08:35 | 1.870 | 1.264 | 1.264 |           |
| 02/29/2020 | 04:10      | 3.42 | 11:30 | 6.93 | 5.55 | 04:20           | 2.04 | 18:05 | 4.64 | 3.95 | 04:20                     | 0.340 | 11:30 | 2.053 | 1.364 | 1.364 |           |
| 03/01/2020 | 04:55      | 3.36 | 11:05 | 6.91 | 5.51 | 04:20           | 2.09 | 10:40 | 4.83 | 4.00 | 04:20                     | 0.342 | 10:40 | 2.097 | 1.380 | 1.380 |           |
| 03/02/2020 | 04:00      | 3.34 | 07:50 | 6.60 | 5.23 | 04:00           | 1.93 | 07:35 | 4.69 | 3.94 | 04:00                     | 0.306 | 07:50 | 1.945 | 1.239 | 1.239 |           |
| 03/03/2020 | 04:00      | 3.29 | 08:00 | 6.50 | 5.23 | 04:10           | 2.04 | 19:50 | 4.63 | 3.88 | 04:35                     | 0.336 | 08:05 | 1.856 | 1.226 | 1.226 |           |
| 03/04/2020 | 03:30      | 3.40 | 07:55 | 6.73 | 5.31 | 04:05           | 2.14 | 07:55 | 4.83 | 3.91 | 04:05                     | 0.353 | 07:55 | 2.059 | 1.256 | 1.256 |           |
| 03/05/2020 | 04:50      | 3.42 | 20:15 | 6.57 | 5.32 | 04:25           | 2.15 | 20:15 | 4.63 | 3.92 | 04:00                     | 0.362 | 20:15 | 1.912 | 1.264 | 1.264 |           |
| 03/06/2020 | 04:10      | 3.53 | 08:00 | 6.59 | 5.43 | 03:55           | 2.06 | 07:50 | 4.56 | 3.89 | 03:55                     | 0.354 | 07:55 | 1.887 | 1.286 | 1.286 |           |
| 03/07/2020 | 04:45      | 3.52 | 11:35 | 7.03 | 5.66 | 03:35           | 2.14 | 12:30 | 4.70 | 3.96 | 04:45                     | 0.376 | 12:30 | 2.101 | 1.410 | 1.410 |           |
| 03/08/2020 | 05:15      | 3.65 | 11:40 | 7.12 | 5.65 | 03:50           | 2.10 | 09:50 | 4.77 | 4.02 | 03:50                     | 0.378 | 11:40 | 2.161 | 1.427 | 1.427 |           |
| 03/09/2020 | 02:35      | 3.46 | 20:35 | 6.75 | 5.39 | 02:35           | 2.06 | 20:10 | 4.72 | 3.95 | 02:35                     | 0.343 | 20:10 | 1.980 | 1.296 | 1.295 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 145.284                   | 4.90      |
| Avg   | 5.25       | 4.00            | 1.263                     |           |



## Site Commentary

### Site Information

| MIL_1193        |       |
|-----------------|-------|
| Pipe Dimensions | 21    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_1193 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited a small response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Due to a meter malfunction, data confidence is less than typical during December 16, 2019 through December 20, 2019. A data gap occurs during December 20, 2020 at 10:00 pm through December 27, 2020 at 6:00 am.

This location was installed upstream of sites MIL\_1043 and MIL\_2840. (See MIL\_1043 and MIL\_2840 Site Commentary for More Details)

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                  |                   |
|--------------------------|--------------------|------------------|-------------------|
| Item                     | Depth (in)         | Velocity (ft/s)  | Quantity (MGD)    |
| Average                  | 4.15               | 2.59             | 0.600             |
| Minimum                  | 2.34               | 1.36             | 0.136             |
| Maximum                  | 6.11               | 3.72             | 1.368             |
| Time of Minimum          | 11/19/2019 4:20 AM | 3/4/2020 3:15 AM | 2/18/2020 3:50 AM |
| Time of Maximum          | 1/8/2020 9:25 AM   | 2/2/2020 1:10 PM | 1/8/2020 9:25 AM  |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |    |
|-----------------|----|
| Depth (in)      | 95 |
| Velocity (ft/s) | 95 |
| Quantity (MGD)  | 95 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_1193**

Site Address /Location: Yosemite Dr and Dempsey Rd, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.426666°

Longitude:

-121.883676°

Pipe Size (H x W)

21.00"x21.00"

Pipe Shape

Circular

Manhole #

1193

System Characteristics

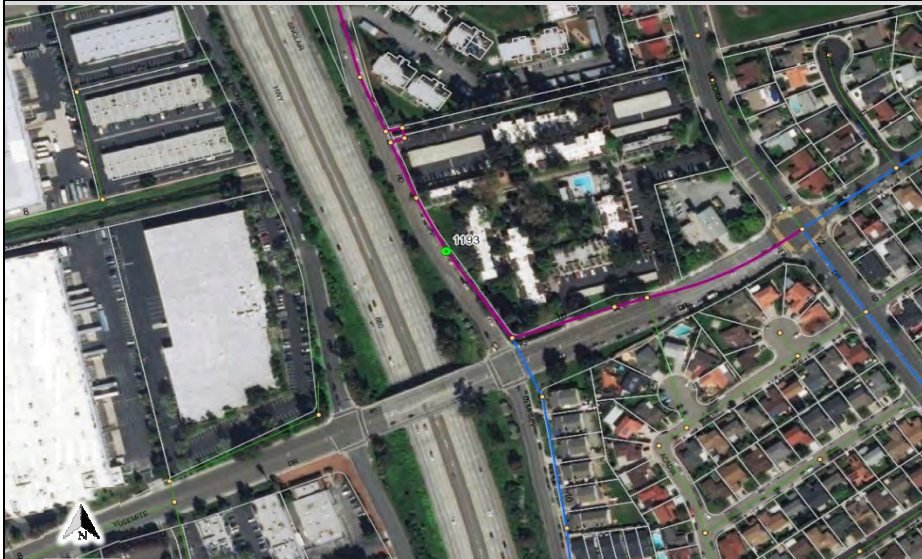
Residential/Commercial

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Thursday, November 14, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

8:09:00 AM

Pipe Size (HxW)

21.00"x21.00"

Depth of Flow (Wet DOF) (in)

5.13"

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

3.50'

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Smooth flow with medium depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

15'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

854

ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325

# SCATTERGRAPH REPORT

MIL\_1193

Flow Monitor

**MIL\_1193**

Pipe Height  
21.00 in

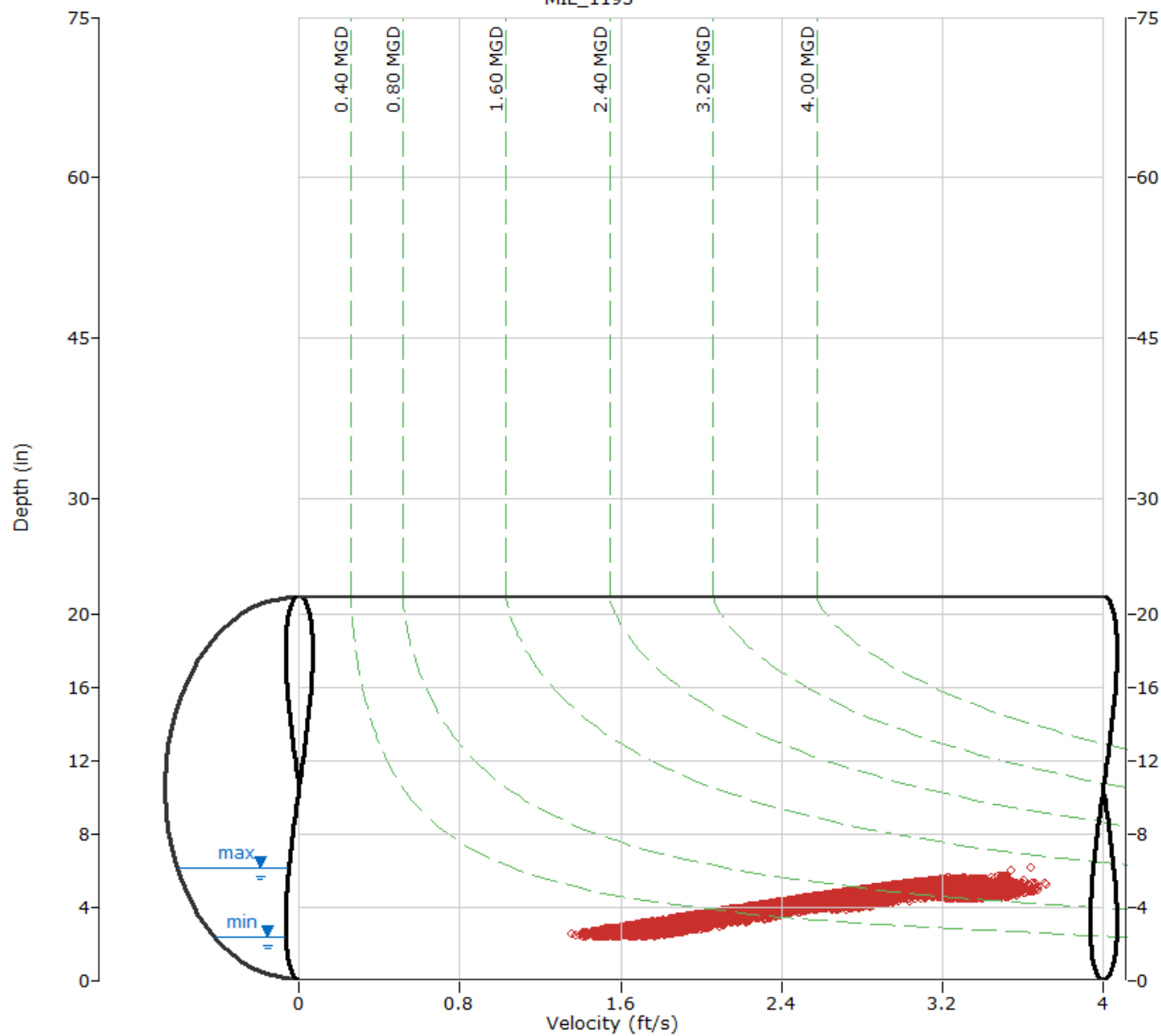
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_1193

Flow Monitor

**MIL\_1193**

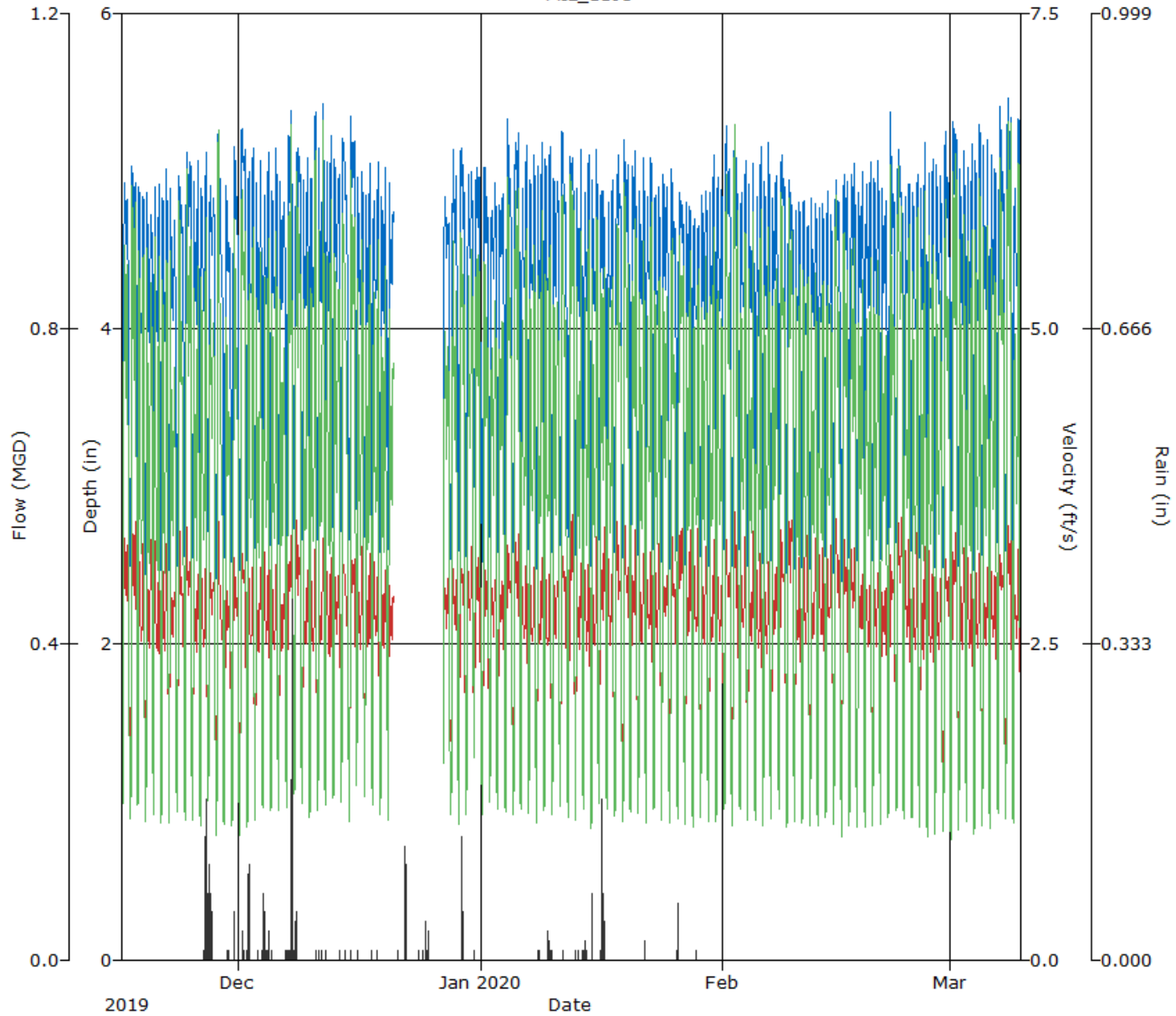
Pipe Height  
21.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_1193, Pipe Height: 21.00 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 04:20      | 2.45 | 10:35 | 4.97 | 4.10 | 05:00           | 1.62 | 12:00 | 3.42 | 2.66 | 04:20                     | 0.176 | 10:35 | 0.938 | 0.607 | 0.607 |           |
| 11/17/2019 | 05:25      | 2.41 | 10:20 | 5.31 | 4.16 | 04:00           | 1.60 | 10:20 | 3.60 | 2.76 | 05:25                     | 0.161 | 10:20 | 1.111 | 0.653 | 0.653 |           |
| 11/18/2019 | 03:15      | 2.54 | 07:45 | 5.11 | 4.01 | 04:40           | 1.67 | 07:50 | 3.54 | 2.62 | 04:40                     | 0.186 | 07:50 | 1.027 | 0.572 | 0.572 |           |
| 11/19/2019 | 04:20      | 2.34 | 07:50 | 5.05 | 3.92 | 04:45           | 1.62 | 21:40 | 3.44 | 2.61 | 04:15                     | 0.161 | 07:50 | 0.981 | 0.555 | 0.555 |           |
| 11/20/2019 | 04:20      | 2.37 | 07:50 | 5.24 | 3.99 | 04:15           | 1.53 | 07:45 | 3.48 | 2.57 | 04:15                     | 0.150 | 07:50 | 1.053 | 0.558 | 0.558 |           |
| 11/21/2019 | 03:55      | 2.39 | 07:45 | 5.11 | 4.01 | 03:45           | 1.52 | 22:00 | 3.50 | 2.59 | 03:55                     | 0.149 | 07:45 | 0.993 | 0.568 | 0.568 |           |
| 11/22/2019 | 03:55      | 2.37 | 07:50 | 5.13 | 4.02 | 03:40           | 1.60 | 07:45 | 3.50 | 2.56 | 03:40                     | 0.156 | 07:50 | 1.024 | 0.560 | 0.560 |           |
| 11/23/2019 | 05:30      | 2.36 | 09:00 | 5.14 | 4.12 | 05:25           | 1.52 | 12:00 | 3.58 | 2.68 | 05:25                     | 0.149 | 10:40 | 1.038 | 0.617 | 0.617 |           |
| 11/24/2019 | 04:20      | 2.41 | 11:05 | 5.21 | 4.23 | 04:10           | 1.54 | 10:50 | 3.62 | 2.67 | 04:10                     | 0.154 | 10:50 | 1.080 | 0.643 | 0.643 |           |
| 11/25/2019 | 04:20      | 2.44 | 21:45 | 5.13 | 4.08 | 02:35           | 1.54 | 07:45 | 3.51 | 2.51 | 04:00                     | 0.164 | 07:45 | 0.991 | 0.566 | 0.566 |           |
| 11/26/2019 | 04:10      | 2.42 | 20:40 | 5.20 | 4.09 | 04:10           | 1.49 | 07:40 | 3.55 | 2.51 | 04:10                     | 0.148 | 07:40 | 1.050 | 0.570 | 0.570 | 0.36      |
| 11/27/2019 | 03:10      | 2.64 | 09:30 | 5.03 | 4.20 | 04:20           | 1.57 | 10:45 | 3.25 | 2.59 | 03:10                     | 0.189 | 10:55 | 0.908 | 0.604 | 0.604 | 0.63      |
| 11/28/2019 | 04:45      | 2.37 | 10:55 | 5.34 | 4.12 | 04:35           | 1.47 | 13:10 | 3.60 | 2.57 | 04:35                     | 0.143 | 11:50 | 1.082 | 0.598 | 0.598 |           |
| 11/29/2019 | 03:55      | 2.43 | 10:55 | 5.14 | 4.02 | 04:35           | 1.47 | 10:50 | 3.16 | 2.45 | 04:35                     | 0.154 | 10:50 | 0.933 | 0.542 | 0.542 | 0.02      |
| 11/30/2019 | 04:55      | 2.46 | 12:45 | 5.23 | 4.20 | 04:05           | 1.47 | 13:35 | 3.30 | 2.53 | 04:45                     | 0.152 | 13:35 | 0.968 | 0.603 | 0.603 | 0.10      |
| 12/01/2019 | 04:10      | 2.43 | 11:50 | 5.43 | 4.32 | 04:30           | 1.43 | 21:05 | 3.39 | 2.60 | 04:30                     | 0.143 | 11:45 | 1.051 | 0.651 | 0.651 | 0.06      |
| 12/02/2019 | 03:10      | 2.51 | 21:30 | 5.46 | 4.18 | 03:35           | 1.43 | 08:00 | 3.38 | 2.51 | 03:35                     | 0.151 | 21:30 | 1.067 | 0.588 | 0.588 | 0.30      |
| 12/03/2019 | 04:20      | 2.52 | 07:45 | 5.36 | 4.09 | 02:40           | 1.52 | 07:45 | 3.30 | 2.49 | 04:20                     | 0.166 | 07:45 | 1.032 | 0.562 | 0.562 | 0.01      |
| 12/04/2019 | 03:05      | 2.53 | 21:40 | 5.18 | 4.13 | 02:55           | 1.54 | 07:45 | 3.55 | 2.54 | 02:55                     | 0.167 | 07:15 | 0.999 | 0.578 | 0.578 | 0.39      |
| 12/05/2019 | 04:00      | 2.48 | 20:45 | 5.23 | 4.13 | 04:00           | 1.41 | 07:35 | 3.39 | 2.51 | 04:00                     | 0.145 | 21:35 | 0.967 | 0.573 | 0.573 | 0.01      |
| 12/06/2019 | 04:05      | 2.59 | 07:55 | 5.18 | 4.14 | 04:00           | 1.56 | 07:55 | 3.18 | 2.49 | 04:00                     | 0.173 | 07:55 | 0.949 | 0.567 | 0.567 | 0.01      |
| 12/07/2019 | 04:00      | 2.60 | 18:00 | 5.68 | 4.33 | 04:15           | 1.64 | 18:20 | 3.54 | 2.65 | 04:15                     | 0.184 | 18:00 | 1.195 | 0.656 | 0.656 | 0.67      |
| 12/08/2019 | 04:35      | 2.68 | 19:10 | 5.37 | 4.34 | 04:25           | 1.67 | 10:50 | 3.61 | 2.73 | 04:25                     | 0.194 | 13:05 | 1.058 | 0.676 | 0.676 | 0.20      |
| 12/09/2019 | 04:15      | 2.60 | 07:35 | 5.25 | 4.16 | 03:20           | 1.56 | 07:55 | 3.42 | 2.53 | 03:20                     | 0.178 | 07:45 | 1.007 | 0.582 | 0.582 |           |
| 12/10/2019 | 03:20      | 2.50 | 20:30 | 5.44 | 4.17 | 03:00           | 1.49 | 20:30 | 3.36 | 2.52 | 03:00                     | 0.159 | 20:30 | 1.073 | 0.586 | 0.586 |           |
| 12/11/2019 | 04:10      | 2.56 | 21:40 | 5.63 | 4.24 | 04:20           | 1.42 | 21:40 | 3.48 | 2.56 | 04:20                     | 0.157 | 21:40 | 1.167 | 0.609 | 0.609 | 0.03      |
| 12/12/2019 | 03:45      | 2.61 | 08:00 | 5.53 | 4.22 | 02:45           | 1.52 | 08:00 | 3.41 | 2.55 | 02:45                     | 0.182 | 08:00 | 1.116 | 0.599 | 0.599 | 0.01      |
| 12/13/2019 | 03:15      | 2.66 | 21:35 | 5.49 | 4.27 | 04:40           | 1.54 | 21:35 | 3.39 | 2.59 | 04:40                     | 0.184 | 21:35 | 1.096 | 0.616 | 0.616 | 0.01      |
| 12/14/2019 | 04:25      | 2.68 | 09:00 | 5.35 | 4.33 | 04:10           | 1.51 | 09:00 | 3.29 | 2.61 | 04:10                     | 0.180 | 09:00 | 1.027 | 0.638 | 0.638 | 0.01      |
| 12/15/2019 | 05:25      | 2.56 | 10:25 | 5.50 | 4.42 | 04:30           | 1.43 | 10:35 | 3.34 | 2.66 | 04:30                     | 0.155 | 10:35 | 1.069 | 0.682 | 0.682 | 0.01      |
| 12/16/2019 | 04:15      | 2.75 | 07:35 | 5.13 | 4.18 | 03:45           | 1.54 | 21:25 | 3.51 | 2.60 | 03:45                     | 0.189 | 07:40 | 0.985 | 0.598 | 0.598 | 0.01      |
| 12/17/2019 | 04:35      | 2.63 | 20:25 | 5.30 | 4.10 | 03:55           | 1.68 | 21:20 | 3.51 | 2.57 | 04:30                     | 0.196 | 20:55 | 1.018 | 0.578 | 0.578 | 0.01      |
| 12/18/2019 | 03:30      | 2.63 | 21:30 | 5.12 | 4.10 | 03:10           | 1.58 | 21:35 | 3.52 | 2.56 | 03:10                     | 0.183 | 21:35 | 0.959 | 0.578 | 0.578 | 0.01      |
| 12/19/2019 | 04:00      | 2.53 | 07:40 | 5.23 | 4.03 | 04:50           | 1.51 | 07:45 | 3.32 | 2.50 | 04:50                     | 0.164 | 19:55 | 0.941 | 0.551 | 0.551 |           |
| 12/20/2019 | 04:50      | 2.56 | 08:05 | 5.23 | 4.14 | 04:20           | 1.53 | 08:10 | 3.17 | 2.50 | 04:20                     | 0.167 | 08:10 | 0.941 | 0.572 | 0.467 |           |
| 12/21/2019 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       | 0.01      |
| 12/22/2019 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       | 0.41      |
| 12/23/2019 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 12/24/2019 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       | 0.02      |
| 12/25/2019 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       | 0.08      |
| 12/26/2019 | 00:00      |      | 00:00 |      |      | 00:00           |      | 00:00 |      |      | 00:00                     |       | 00:00 |       |       |       |           |
| 12/27/2019 | 05:50      | 2.90 | 21:50 | 5.20 | 4.47 | 06:15           | 1.82 | 21:35 | 3.54 | 2.72 | 05:50                     | 0.246 | 21:50 | 1.001 | 0.669 | 0.506 |           |
| 12/28/2019 | 04:55      | 2.49 | 19:50 | 5.39 | 4.16 | 02:50           | 1.60 | 19:50 | 3.32 | 2.53 | 05:35                     | 0.171 | 19:50 | 1.048 | 0.591 | 0.591 |           |
| 12/29/2019 | 05:20      | 2.49 | 13:20 | 5.33 | 4.25 | 05:10           | 1.43 | 10:30 | 3.33 | 2.57 | 05:10                     | 0.150 | 13:20 | 1.019 | 0.622 | 0.622 | 0.22      |
| 12/30/2019 | 04:30      | 2.52 | 22:00 | 5.16 | 4.18 | 04:30           | 1.59 | 21:05 | 3.56 | 2.59 | 04:30                     | 0.168 | 21:05 | 0.977 | 0.605 | 0.605 |           |
| 12/31/2019 | 03:55      | 2.95 | 18:45 | 5.17 | 4.26 | 03:20           | 1.72 | 10:55 | 3.61 | 2.64 | 03:20                     | 0.233 | 10:55 | 1.013 | 0.623 | 0.623 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:15      | 2.39 | 11:45 | 5.15 | 4.10 | 05:20           | 1.57 | 10:50 | 3.47 | 2.56 | 05:15                     | 0.162 | 12:00 | 0.966 | 0.581 | 0.581 |       |           |
| 01/02/2020 | 03:25      | 2.60 | 22:00 | 5.08 | 4.14 | 03:25           | 1.59 | 22:00 | 3.29 | 2.54 | 03:25                     | 0.177 | 22:00 | 0.956 | 0.577 | 0.577 |       |           |
| 01/03/2020 | 03:45      | 2.44 | 18:00 | 4.98 | 4.16 | 03:50           | 1.57 | 18:00 | 3.20 | 2.56 | 03:50                     | 0.166 | 18:00 | 0.903 | 0.587 | 0.587 |       |           |
| 01/04/2020 | 03:35      | 2.46 | 12:25 | 5.60 | 4.24 | 03:35           | 1.56 | 12:25 | 3.46 | 2.62 | 03:35                     | 0.159 | 12:25 | 1.152 | 0.630 | 0.630 |       |           |
| 01/05/2020 | 04:40      | 2.54 | 19:05 | 5.53 | 4.30 | 03:25           | 1.52 | 21:30 | 3.68 | 2.66 | 04:30                     | 0.174 | 19:05 | 1.117 | 0.657 | 0.657 |       |           |
| 01/06/2020 | 03:55      | 2.54 | 19:20 | 5.25 | 4.22 | 04:10           | 1.54 | 19:20 | 3.37 | 2.55 | 04:10                     | 0.172 | 19:20 | 1.025 | 0.599 | 0.599 |       |           |
| 01/07/2020 | 04:15      | 2.51 | 19:45 | 5.19 | 4.19 | 04:05           | 1.48 | 19:40 | 3.23 | 2.52 | 04:05                     | 0.161 | 19:45 | 0.962 | 0.589 | 0.589 |       |           |
| 01/08/2020 | 03:25      | 2.37 | 09:25 | 6.11 | 4.17 | 03:35           | 1.50 | 09:25 | 3.64 | 2.53 | 03:35                     | 0.146 | 09:25 | 1.368 | 0.590 | 0.590 |       | 0.02      |
| 01/09/2020 | 03:20      | 2.58 | 07:50 | 5.26 | 4.19 | 04:00           | 1.63 | 21:25 | 3.17 | 2.51 | 04:00                     | 0.181 | 07:45 | 0.958 | 0.587 | 0.587 | 0.18  |           |
| 01/10/2020 | 04:05      | 2.45 | 07:45 | 5.30 | 4.18 | 03:50           | 1.57 | 21:50 | 3.24 | 2.53 | 03:50                     | 0.162 | 07:50 | 0.975 | 0.586 | 0.586 | 0.02  |           |
| 01/11/2020 | 04:35      | 2.59 | 10:00 | 5.33 | 4.27 | 04:25           | 1.60 | 10:10 | 3.36 | 2.64 | 04:25                     | 0.177 | 10:10 | 1.002 | 0.641 | 0.641 | 0.01  |           |
| 01/12/2020 | 04:25      | 2.60 | 17:45 | 5.36 | 4.31 | 03:35           | 1.53 | 20:55 | 3.68 | 2.73 | 04:25                     | 0.171 | 10:40 | 1.056 | 0.676 | 0.676 |       |           |
| 01/13/2020 | 03:55      | 2.51 | 20:30 | 5.25 | 4.14 | 03:35           | 1.55 | 07:45 | 3.49 | 2.55 | 03:50                     | 0.166 | 07:45 | 1.015 | 0.584 | 0.584 |       | 0.02      |
| 01/14/2020 | 04:05      | 2.57 | 20:45 | 5.29 | 4.15 | 02:55           | 1.62 | 08:00 | 3.53 | 2.55 | 04:20                     | 0.181 | 21:25 | 1.010 | 0.588 | 0.588 |       | 0.11      |
| 01/15/2020 | 03:15      | 2.44 | 07:40 | 5.26 | 4.10 | 03:55           | 1.47 | 21:35 | 3.65 | 2.55 | 03:55                     | 0.150 | 07:40 | 1.037 | 0.582 | 0.582 |       | 0.07      |
| 01/16/2020 | 04:10      | 2.57 | 07:30 | 5.12 | 4.15 | 05:05           | 1.58 | 07:45 | 3.57 | 2.71 | 04:15                     | 0.180 | 09:20 | 0.994 | 0.623 | 0.623 | 0.66  |           |
| 01/17/2020 | 04:10      | 2.52 | 09:00 | 5.10 | 4.13 | 03:50           | 1.54 | 07:50 | 3.55 | 2.59 | 04:25                     | 0.165 | 07:50 | 0.955 | 0.590 | 0.590 |       |           |
| 01/18/2020 | 03:35      | 2.53 | 12:45 | 5.43 | 4.18 | 03:55           | 1.55 | 11:00 | 3.59 | 2.66 | 03:35                     | 0.174 | 12:45 | 1.028 | 0.629 | 0.629 |       |           |
| 01/19/2020 | 04:30      | 2.48 | 09:55 | 5.32 | 4.23 | 04:20           | 1.49 | 12:00 | 3.65 | 2.65 | 04:20                     | 0.161 | 10:40 | 1.063 | 0.638 | 0.638 |       |           |
| 01/20/2020 | 03:45      | 2.54 | 19:20 | 5.33 | 4.24 | 04:55           | 1.57 | 21:05 | 3.64 | 2.62 | 04:20                     | 0.173 | 19:05 | 1.016 | 0.627 | 0.627 |       |           |
| 01/21/2020 | 04:20      | 2.48 | 07:35 | 5.29 | 4.12 | 03:15           | 1.59 | 21:30 | 3.53 | 2.55 | 03:15                     | 0.172 | 21:30 | 1.001 | 0.580 | 0.580 |       |           |
| 01/22/2020 | 03:40      | 2.43 | 19:45 | 5.18 | 4.15 | 04:05           | 1.54 | 21:35 | 3.63 | 2.61 | 04:05                     | 0.161 | 21:35 | 1.044 | 0.601 | 0.601 |       | 0.03      |
| 01/23/2020 | 04:15      | 2.48 | 07:45 | 5.07 | 4.07 | 04:25           | 1.52 | 21:35 | 3.49 | 2.58 | 04:25                     | 0.159 | 07:45 | 1.001 | 0.577 | 0.577 |       |           |
| 01/24/2020 | 04:10      | 2.41 | 09:15 | 5.16 | 4.16 | 04:00           | 1.59 | 08:30 | 3.20 | 2.61 | 04:00                     | 0.158 | 21:45 | 0.906 | 0.602 | 0.602 |       |           |
| 01/25/2020 | 03:50      | 2.45 | 12:55 | 5.15 | 4.09 | 04:20           | 1.61 | 10:55 | 3.57 | 2.63 | 04:20                     | 0.166 | 10:55 | 1.024 | 0.600 | 0.600 |       |           |
| 01/26/2020 | 04:50      | 2.40 | 17:30 | 5.02 | 4.10 | 04:50           | 1.62 | 12:05 | 3.57 | 2.77 | 04:50                     | 0.159 | 11:35 | 0.980 | 0.635 | 0.635 |       | 0.16      |
| 01/27/2020 | 04:20      | 2.39 | 18:30 | 5.05 | 4.01 | 04:30           | 1.53 | 21:20 | 3.64 | 2.63 | 04:20                     | 0.150 | 21:05 | 0.975 | 0.578 | 0.578 |       |           |
| 01/28/2020 | 03:50      | 2.36 | 08:00 | 5.34 | 3.95 | 04:25           | 1.54 | 21:40 | 3.61 | 2.63 | 03:50                     | 0.152 | 08:00 | 1.085 | 0.564 | 0.564 |       | 0.01      |
| 01/29/2020 | 03:55      | 2.49 | 08:15 | 5.17 | 4.05 | 04:25           | 1.56 | 19:25 | 3.46 | 2.58 | 04:25                     | 0.171 | 21:05 | 0.963 | 0.574 | 0.574 |       |           |
| 01/30/2020 | 03:40      | 2.46 | 21:50 | 5.27 | 4.10 | 03:05           | 1.60 | 20:30 | 3.46 | 2.56 | 03:50                     | 0.167 | 21:35 | 0.988 | 0.581 | 0.581 |       |           |
| 01/31/2020 | 04:10      | 2.48 | 08:15 | 5.19 | 4.10 | 03:10           | 1.59 | 07:50 | 3.46 | 2.55 | 03:55                     | 0.166 | 07:35 | 0.969 | 0.574 | 0.574 |       |           |
| 02/01/2020 | 04:35      | 2.56 | 10:25 | 5.55 | 4.29 | 04:35           | 1.60 | 10:35 | 3.48 | 2.64 | 04:35                     | 0.172 | 10:25 | 1.134 | 0.644 | 0.644 |       |           |
| 02/02/2020 | 04:25      | 2.41 | 11:50 | 5.28 | 4.23 | 04:35           | 1.59 | 13:10 | 3.72 | 2.72 | 04:25                     | 0.159 | 11:50 | 1.137 | 0.660 | 0.660 |       |           |
| 02/03/2020 | 04:10      | 2.43 | 20:05 | 5.25 | 4.09 | 04:05           | 1.50 | 21:05 | 3.50 | 2.61 | 04:05                     | 0.150 | 20:00 | 0.981 | 0.589 | 0.589 |       |           |
| 02/04/2020 | 04:00      | 2.43 | 19:50 | 5.22 | 4.07 | 04:10           | 1.60 | 20:30 | 3.49 | 2.59 | 04:00                     | 0.162 | 07:35 | 1.013 | 0.581 | 0.581 |       |           |
| 02/05/2020 | 03:05      | 2.47 | 21:15 | 5.43 | 4.08 | 03:45           | 1.63 | 20:20 | 3.51 | 2.55 | 03:05                     | 0.171 | 21:15 | 1.066 | 0.575 | 0.575 |       |           |
| 02/06/2020 | 04:15      | 2.46 | 21:10 | 5.27 | 4.13 | 04:30           | 1.54 | 08:00 | 3.46 | 2.52 | 04:15                     | 0.161 | 08:00 | 1.009 | 0.578 | 0.578 |       |           |
| 02/07/2020 | 03:50      | 2.46 | 19:20 | 5.09 | 4.15 | 03:25           | 1.64 | 07:35 | 3.36 | 2.56 | 03:50                     | 0.171 | 19:20 | 0.964 | 0.589 | 0.589 |       |           |
| 02/08/2020 | 03:45      | 2.52 | 09:00 | 5.25 | 4.25 | 04:50           | 1.65 | 10:10 | 3.58 | 2.71 | 04:50                     | 0.179 | 12:25 | 1.010 | 0.654 | 0.654 |       |           |
| 02/09/2020 | 04:50      | 2.40 | 14:25 | 5.04 | 4.08 | 04:40           | 1.53 | 20:15 | 3.64 | 2.80 | 04:40                     | 0.152 | 10:45 | 1.024 | 0.644 | 0.644 |       |           |
| 02/10/2020 | 04:20      | 2.46 | 22:10 | 5.05 | 3.97 | 03:20           | 1.62 | 21:40 | 3.49 | 2.64 | 03:50                     | 0.167 | 07:45 | 0.992 | 0.572 | 0.572 |       |           |
| 02/11/2020 | 04:20      | 2.42 | 07:45 | 5.00 | 3.95 | 03:00           | 1.52 | 07:40 | 3.59 | 2.62 | 03:00                     | 0.155 | 07:40 | 1.005 | 0.563 | 0.563 |       |           |
| 02/12/2020 | 04:05      | 2.39 | 18:55 | 5.04 | 3.99 | 03:50           | 1.49 | 20:05 | 3.46 | 2.60 | 03:50                     | 0.150 | 07:50 | 0.946 | 0.566 | 0.566 |       |           |
| 02/13/2020 | 03:50      | 2.37 | 19:10 | 5.07 | 3.98 | 02:30           | 1.64 | 19:50 | 3.49 | 2.61 | 03:50                     | 0.159 | 19:50 | 0.983 | 0.567 | 0.567 |       |           |
| 02/14/2020 | 04:15      | 2.40 | 08:55 | 4.98 | 4.00 | 03:35           | 1.52 | 21:50 | 3.46 | 2.66 | 03:35                     | 0.160 | 07:25 | 0.907 | 0.580 | 0.580 |       |           |
| 02/15/2020 | 04:40      | 2.38 | 11:00 | 5.12 | 4.08 | 04:30           | 1.54 | 11:00 | 3.66 | 2.73 | 04:30                     | 0.150 | 11:00 | 1.075 | 0.623 | 0.623 |       |           |
| 02/16/2020 | 04:20      | 2.35 | 13:40 | 5.13 | 4.11 | 04:40           | 1.48 | 18:55 | 3.60 | 2.67 | 04:40                     | 0.143 | 18:55 | 0.994 | 0.618 | 0.618 |       |           |
| 02/17/2020 | 04:00      | 2.49 | 12:40 | 5.15 | 4.17 | 04:30           | 1.41 | 10:15 | 3.49 | 2.61 | 04:30                     | 0.151 | 11:45 | 0.969 | 0.614 | 0.614 |       |           |
| 02/18/2020 | 04:00      | 2.36 | 19:55 | 5.24 | 4.10 | 03:50           | 1.41 | 20:00 | 3.45 | 2.51 | 03:50                     | 0.136 | 20:00 | 0.966 | 0.571 | 0.571 |       |           |
| 02/19/2020 | 03:40      | 2.47 | 21:35 | 5.18 | 4.09 | 04:10           | 1.49 | 21:25 | 3.31 | 2.47 | 04:10                     | 0.157 | 21:40 | 0.979 | 0.558 | 0.558 |       |           |
| 02/20/2020 | 03:40      | 2.48 | 21:40 | 5.25 | 4.12 | 03:35           | 1.49 | 21:15 | 3.18 | 2.51 | 03:35                     | 0.158 | 21:40 | 0.960 | 0.573 | 0.573 |       |           |
| 02/21/2020 | 04:00      | 2.47 | 08:50 | 5.03 | 4.10 | 04:15           | 1.52 | 20:45 | 3.09 | 2.50 | 04:15                     | 0.159 | 08:50 | 0.878 | 0.565 | 0.565 |       |           |
| 02/22/2020 | 03:20      | 2.58 | 11:00 | 5.51 | 4.23 | 04:20           | 1.48 | 10:35 | 3.37 | 2.59 | 04:25                     | 0.169 | 10:45 | 1.081 | 0.621 | 0.621 |       |           |
| 02/23/2020 | 05:10      | 2.60 | 11:05 | 5.23 | 4.25 | 03:45           | 1.55 | 20:55 | 3.66 | 2.76 | 04:15                     | 0.176 | 12:25 | 1.035 | 0.671 | 0.671 |       |           |
| 02/24/2020 | 04:20      | 2.44 | 20:45 | 5.13 | 4.08 | 02:10           | 1.50 | 21:25 | 3.50 | 2.61 | 04:20                     | 0.162 | 19:45 | 0.975 | 0.589 | 0.589 |       |           |
|            |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 04:15      | 2.51 | 21:15 | 5.13 | 4.05 | 04:30           | 1.54 | 20:25 | 3.58 | 2.57 | 04:00                     | 0.163 | 20:25 | 1.004 | 0.574 | 0.574 |           |
| 02/26/2020 | 04:15      | 2.39 | 21:00 | 5.36 | 4.11 | 03:55           | 1.45 | 21:05 | 3.50 | 2.53 | 04:15                     | 0.144 | 21:40 | 1.058 | 0.579 | 0.579 |           |
| 02/27/2020 | 04:20      | 2.42 | 07:40 | 5.31 | 4.14 | 04:00           | 1.38 | 07:35 | 3.56 | 2.51 | 04:00                     | 0.140 | 07:40 | 1.097 | 0.580 | 0.580 |           |
| 02/28/2020 | 03:15      | 2.43 | 07:30 | 5.41 | 4.16 | 04:15           | 1.49 | 07:45 | 3.46 | 2.49 | 03:20                     | 0.152 | 07:40 | 1.029 | 0.577 | 0.577 |           |
| 02/29/2020 | 03:45      | 2.39 | 11:10 | 5.42 | 4.27 | 05:25           | 1.42 | 11:10 | 3.26 | 2.59 | 05:25                     | 0.148 | 11:10 | 1.037 | 0.635 | 0.635 |           |
| 03/01/2020 | 05:00      | 2.40 | 19:00 | 5.40 | 4.33 | 04:35           | 1.40 | 20:05 | 3.57 | 2.65 | 04:35                     | 0.137 | 22:15 | 1.089 | 0.671 | 0.671 |           |
| 03/02/2020 | 04:00      | 2.39 | 07:50 | 5.24 | 4.11 | 03:50           | 1.43 | 07:20 | 3.56 | 2.53 | 03:55                     | 0.143 | 07:35 | 1.031 | 0.582 | 0.582 |           |
| 03/03/2020 | 04:05      | 2.43 | 07:20 | 5.26 | 4.13 | 02:45           | 1.46 | 07:45 | 3.41 | 2.53 | 04:05                     | 0.157 | 21:15 | 0.997 | 0.584 | 0.584 |           |
| 03/04/2020 | 04:10      | 2.40 | 20:25 | 5.49 | 4.13 | 03:15           | 1.36 | 07:30 | 3.54 | 2.53 | 03:15                     | 0.139 | 20:25 | 1.099 | 0.585 | 0.585 |           |
| 03/05/2020 | 04:20      | 2.38 | 21:15 | 5.45 | 4.19 | 04:15           | 1.42 | 07:35 | 3.33 | 2.53 | 04:15                     | 0.139 | 07:35 | 1.053 | 0.595 | 0.595 |           |
| 03/06/2020 | 04:05      | 2.45 | 07:30 | 5.37 | 4.18 | 03:50           | 1.43 | 07:35 | 3.33 | 2.53 | 03:50                     | 0.146 | 07:45 | 1.036 | 0.591 | 0.591 |           |
| 03/07/2020 | 04:30      | 2.55 | 10:30 | 5.47 | 4.32 | 05:00           | 1.58 | 10:10 | 3.36 | 2.64 | 04:15                     | 0.174 | 10:10 | 1.079 | 0.655 | 0.655 |           |
| 03/08/2020 | 04:30      | 2.57 | 11:35 | 5.58 | 4.40 | 03:05           | 1.52 | 20:35 | 3.60 | 2.69 | 04:30                     | 0.170 | 12:00 | 1.135 | 0.689 | 0.689 |           |
| 03/09/2020 | 03:15      | 2.47 | 19:55 | 5.60 | 4.21 | 03:15           | 1.41 | 19:40 | 3.48 | 2.55 | 03:15                     | 0.144 | 19:55 | 1.100 | 0.602 | 0.602 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 65.190                    | 4.90      |
| Avg   | 4.15       | 2.59            | 0.600                     |           |

## Site Commentary

### Site Information

| MIL_1564        |       |
|-----------------|-------|
| Pipe Dimensions | 8     |
| Silt Level      | 0.00" |

### Overview

Site MIL\_1564 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Surge conditions were experienced at this location. Review of the scattergraph shows that both free flow and backwater flows were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                   |                   |
|--------------------------|-------------------|-------------------|-------------------|
| Item                     | Depth (in)        | Velocity (ft/s)   | Quantity (MGD)    |
| Average                  | 1.60              | 2.40              | 0.078             |
| Minimum                  | 1.17              | 0.49              | 0.011             |
| Maximum                  | 21.57             | 4.82              | 0.785             |
| Time of Minimum          | 2/10/2020 4:45 AM | 2/16/2020 4:10 AM | 2/16/2020 4:10 AM |
| Time of Maximum          | 1/29/2020 6:30 PM | 1/24/2020 9:45 PM | 1/29/2020 6:20 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_1564

Site Address /Location: Country Club Dr and Park Victoria Dr, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.449480°

Longitude:

-121.887946°

Pipe Size (H x W)

8.00"x8.00"

Pipe Shape

Circular

Manhole #

1564

System Characteristics

Residential/Commercial

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Thursday, November 14, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

4:25:00 AM

Pipe Size (HxW)

8.00"x8.00"

Depth of Flow (Wet DOF) (in)

0.63"

Range (Air DOF) (in)

0 - 5"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.69

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Shallow depth with moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

4'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

861



ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325

# SCATTERGRAPH REPORT

MIL\_1564

Flow Monitor

**MIL\_1564**

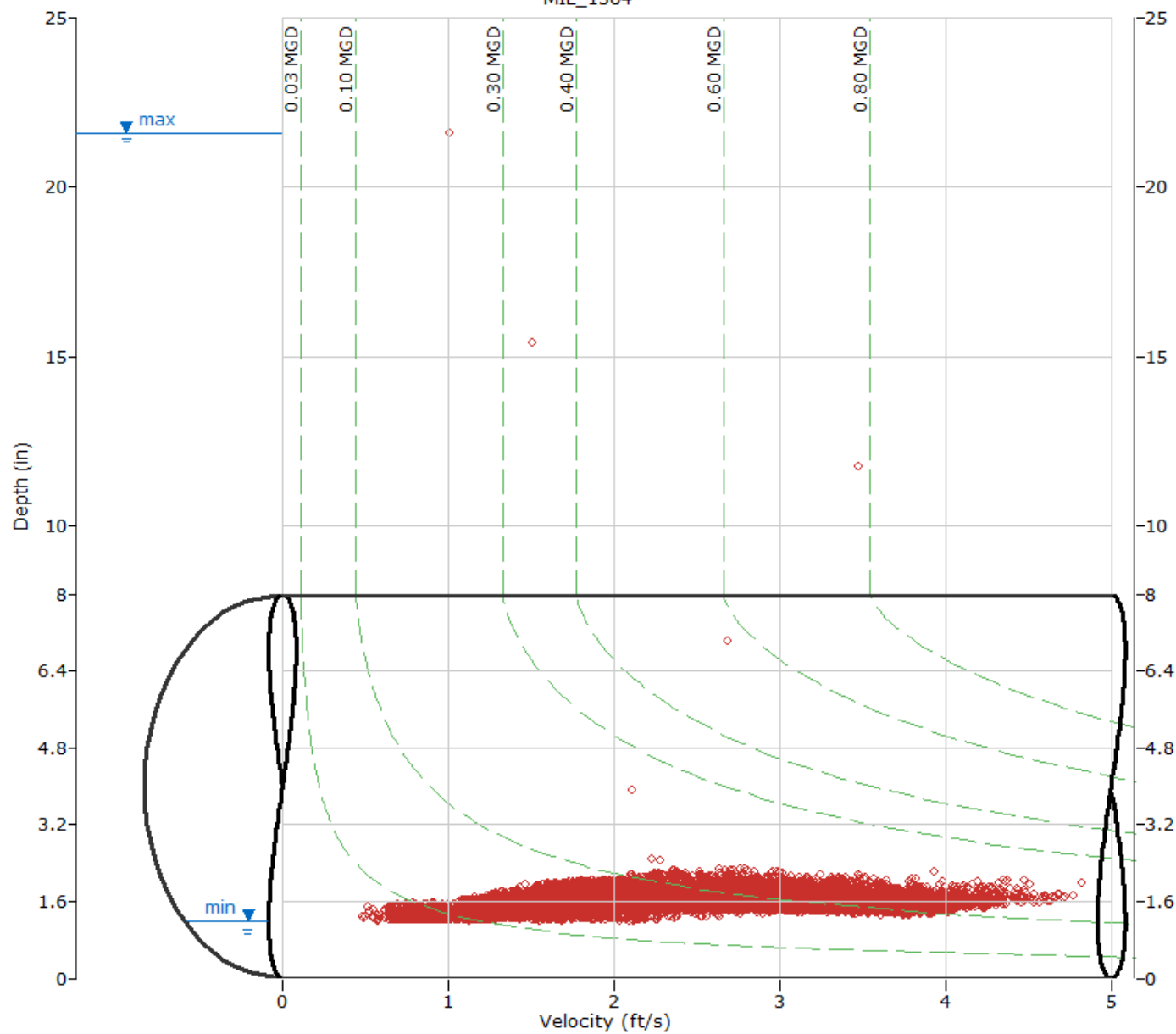
Pipe Height  
8.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

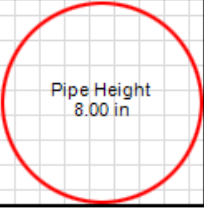


ADS ENVIRONMENTAL  
SERVICES

# HYDROGRAPH REPORT

MIL\_1564

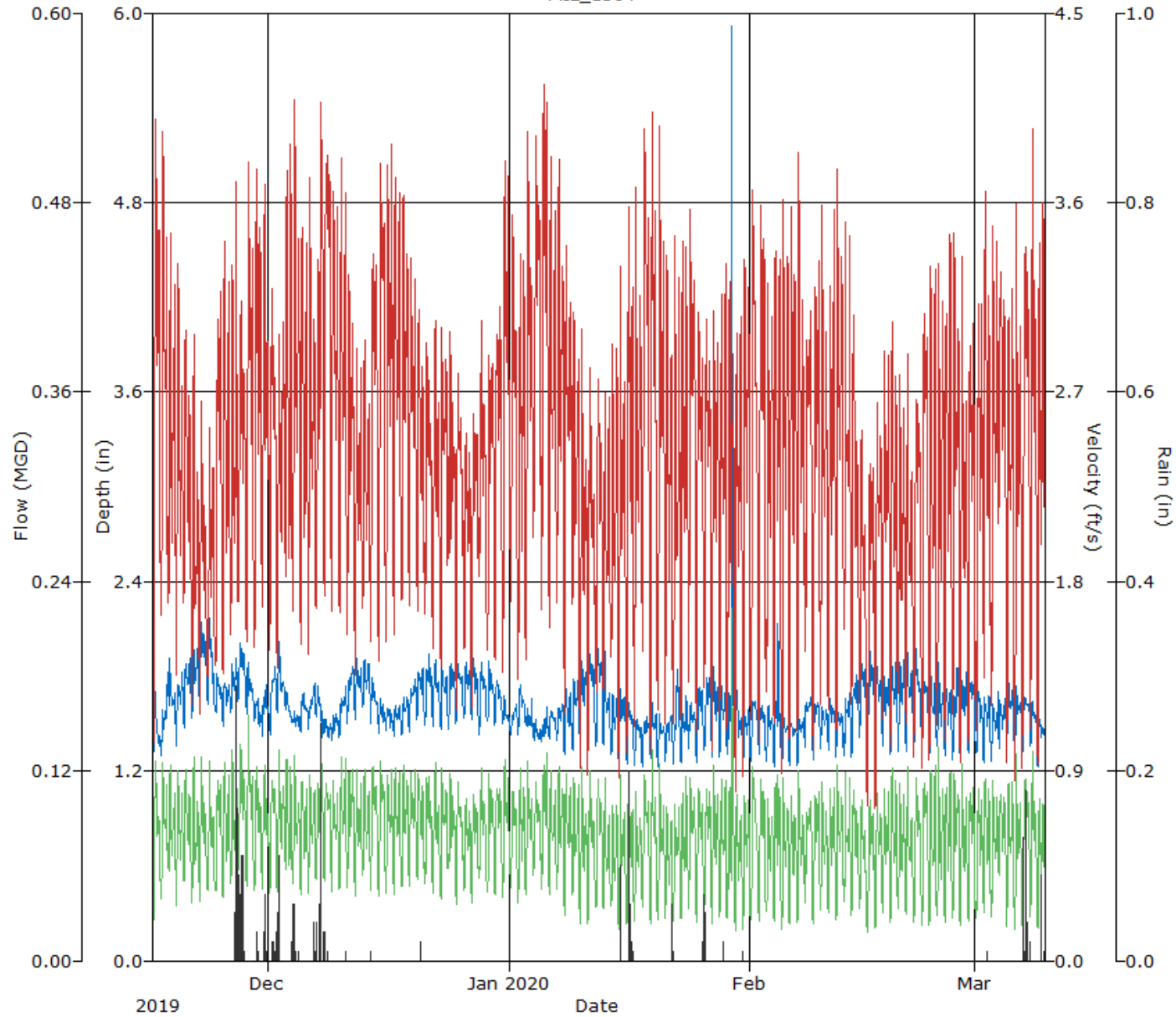
Flow Monitor  
**MIL\_1564**



Pipe Height  
8.00 in

Report Period  
11/16/2019  
To  
3/9/2020

**Legend**  
— Depth  
— Velocity  
— Quantity  
— Rain



ADS ENVIRONMENTAL SERVICES



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_1564, Pipe Height: 8.00 in, Silt: 0.00 in

# Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 05:00      | 1.30 | 08:25 | 1.81 | 1.47 | 04:40           | 0.86 | 09:30 | 4.23 | 2.63 | 04:40                     | 0.021 | 09:30 | 0.149 | 0.076 | 0.076 |           |
| 11/17/2019 | 03:45      | 1.28 | 23:55 | 1.80 | 1.49 | 06:40           | 1.25 | 08:50 | 4.53 | 2.74 | 06:40                     | 0.030 | 08:50 | 0.143 | 0.081 | 0.081 |           |
| 11/18/2019 | 16:10      | 1.46 | 07:10 | 2.48 | 1.70 | 05:20           | 1.07 | 10:15 | 4.44 | 2.45 | 05:20                     | 0.034 | 10:15 | 0.174 | 0.086 | 0.086 |           |
| 11/19/2019 | 03:35      | 1.34 | 22:15 | 1.94 | 1.64 | 04:55           | 0.92 | 09:30 | 4.01 | 2.31 | 04:55                     | 0.023 | 09:30 | 0.146 | 0.079 | 0.079 |           |
| 11/20/2019 | 04:35      | 1.46 | 21:20 | 2.10 | 1.74 | 05:35           | 1.42 | 12:40 | 3.62 | 2.30 | 05:35                     | 0.040 | 21:25 | 0.152 | 0.085 | 0.085 |           |
| 11/21/2019 | 03:45      | 1.52 | 08:25 | 2.08 | 1.81 | 03:35           | 1.04 | 10:25 | 3.44 | 1.96 | 03:35                     | 0.031 | 10:25 | 0.152 | 0.077 | 0.077 |           |
| 11/22/2019 | 04:40      | 1.58 | 09:35 | 2.22 | 1.91 | 04:35           | 1.08 | 10:25 | 3.01 | 1.86 | 04:35                     | 0.035 | 08:40 | 0.152 | 0.079 | 0.079 |           |
| 11/23/2019 | 04:35      | 1.61 | 09:55 | 2.28 | 1.88 | 04:35           | 1.15 | 21:10 | 3.21 | 1.91 | 04:35                     | 0.037 | 09:50 | 0.147 | 0.079 | 0.079 |           |
| 11/24/2019 | 07:10      | 1.54 | 00:40 | 1.88 | 1.69 | 02:55           | 1.20 | 21:50 | 3.80 | 2.33 | 02:55                     | 0.037 | 10:20 | 0.133 | 0.082 | 0.082 |           |
| 11/25/2019 | 04:30      | 1.46 | 11:50 | 1.89 | 1.65 | 05:40           | 1.17 | 08:25 | 4.05 | 2.35 | 05:40                     | 0.034 | 08:25 | 0.164 | 0.081 | 0.081 |           |
| 11/26/2019 | 04:15      | 1.56 | 20:20 | 2.05 | 1.75 | 03:40           | 1.42 | 20:20 | 4.47 | 2.40 | 03:40                     | 0.044 | 20:20 | 0.204 | 0.089 | 0.089 | 0.63      |
| 11/27/2019 | 01:55      | 1.61 | 10:25 | 2.08 | 1.85 | 03:55           | 1.45 | 11:25 | 3.80 | 2.46 | 01:55                     | 0.047 | 08:45 | 0.166 | 0.099 | 0.099 | 0.77      |
| 11/28/2019 | 04:50      | 1.55 | 11:45 | 2.01 | 1.73 | 04:50           | 1.39 | 11:50 | 4.51 | 2.66 | 04:50                     | 0.043 | 11:50 | 0.191 | 0.097 | 0.097 |           |
| 11/29/2019 | 22:55      | 1.42 | 00:40 | 1.88 | 1.59 | 03:45           | 1.36 | 11:15 | 4.28 | 2.70 | 06:20                     | 0.040 | 11:20 | 0.159 | 0.086 | 0.086 |           |
| 11/30/2019 | 05:50      | 1.39 | 13:45 | 1.82 | 1.60 | 05:25           | 1.34 | 12:15 | 3.97 | 2.68 | 05:25                     | 0.036 | 12:15 | 0.147 | 0.087 | 0.087 | 0.05      |
| 12/01/2019 | 05:35      | 1.40 | 21:15 | 1.98 | 1.68 | 04:15           | 1.20 | 17:55 | 3.81 | 2.44 | 04:15                     | 0.035 | 12:15 | 0.149 | 0.086 | 0.086 | 0.14      |
| 12/02/2019 | 03:00      | 1.51 | 08:10 | 2.16 | 1.76 | 05:00           | 0.97 | 23:10 | 3.86 | 2.23 | 05:00                     | 0.029 | 08:15 | 0.177 | 0.084 | 0.084 | 0.06      |
| 12/03/2019 | 22:45      | 1.46 | 10:15 | 1.88 | 1.61 | 17:00           | 1.32 | 21:15 | 4.72 | 2.67 | 17:00                     | 0.042 | 10:15 | 0.171 | 0.087 | 0.087 | 0.36      |
| 12/04/2019 | 11:30      | 1.40 | 07:55 | 1.75 | 1.53 | 04:40           | 1.40 | 10:40 | 4.59 | 2.85 | 04:40                     | 0.041 | 10:40 | 0.157 | 0.086 | 0.086 | 0.44      |
| 12/05/2019 | 04:20      | 1.43 | 13:55 | 1.76 | 1.59 | 04:30           | 1.36 | 22:05 | 4.29 | 2.57 | 04:30                     | 0.037 | 22:05 | 0.134 | 0.083 | 0.083 |           |
| 12/06/2019 | 04:20      | 1.44 | 23:05 | 1.80 | 1.62 | 04:15           | 1.22 | 10:10 | 3.99 | 2.56 | 04:15                     | 0.034 | 10:10 | 0.147 | 0.084 | 0.084 |           |
| 12/07/2019 | 21:05      | 1.36 | 10:05 | 1.97 | 1.60 | 04:10           | 1.39 | 19:05 | 4.67 | 2.81 | 04:10                     | 0.041 | 10:05 | 0.186 | 0.090 | 0.090 | 0.06      |
| 12/08/2019 | 13:00      | 1.35 | 20:55 | 1.72 | 1.48 | 13:10           | 1.51 | 11:50 | 4.66 | 3.18 | 13:10                     | 0.039 | 11:50 | 0.159 | 0.091 | 0.091 | 0.84      |
| 12/09/2019 | 04:20      | 1.37 | 09:55 | 1.66 | 1.49 | 03:25           | 1.50 | 09:35 | 4.20 | 2.83 | 03:25                     | 0.039 | 09:00 | 0.138 | 0.082 | 0.082 | 0.10      |
| 12/10/2019 | 03:20      | 1.40 | 22:05 | 1.90 | 1.59 | 04:35           | 1.43 | 22:05 | 4.26 | 2.75 | 04:35                     | 0.039 | 22:05 | 0.175 | 0.089 | 0.089 |           |
| 12/11/2019 | 04:25      | 1.47 | 21:10 | 1.96 | 1.73 | 04:20           | 1.27 | 10:20 | 3.80 | 2.49 | 04:20                     | 0.036 | 21:30 | 0.146 | 0.091 | 0.091 | 0.01      |
| 12/12/2019 | 04:25      | 1.50 | 05:35 | 2.06 | 1.75 | 04:20           | 1.21 | 09:00 | 3.66 | 2.20 | 04:20                     | 0.036 | 05:35 | 0.154 | 0.082 | 0.082 | 0.00      |
| 12/13/2019 | 04:00      | 1.55 | 01:20 | 2.04 | 1.77 | 03:55           | 1.41 | 09:25 | 3.48 | 2.26 | 03:55                     | 0.043 | 09:25 | 0.154 | 0.085 | 0.085 |           |
| 12/14/2019 | 04:25      | 1.49 | 00:10 | 1.93 | 1.68 | 04:35           | 1.21 | 08:25 | 4.21 | 2.69 | 04:35                     | 0.036 | 08:25 | 0.160 | 0.093 | 0.093 |           |
| 12/15/2019 | 18:20      | 1.37 | 12:10 | 1.85 | 1.56 | 04:10           | 1.21 | 11:55 | 4.69 | 2.87 | 04:10                     | 0.035 | 12:10 | 0.173 | 0.090 | 0.090 | 0.01      |
| 12/16/2019 | 04:20      | 1.39 | 04:55 | 1.75 | 1.54 | 03:50           | 1.31 | 21:10 | 4.43 | 2.82 | 03:50                     | 0.037 | 07:35 | 0.151 | 0.086 | 0.086 |           |
| 12/17/2019 | 03:10      | 1.40 | 21:45 | 1.88 | 1.53 | 03:50           | 1.40 | 08:05 | 4.22 | 2.84 | 03:55                     | 0.038 | 21:45 | 0.171 | 0.086 | 0.086 |           |
| 12/18/2019 | 03:45      | 1.41 | 12:15 | 1.79 | 1.57 | 03:25           | 1.47 | 09:15 | 4.31 | 2.72 | 05:50                     | 0.040 | 09:20 | 0.159 | 0.086 | 0.086 |           |
| 12/19/2019 | 03:40      | 1.42 | 21:45 | 1.89 | 1.66 | 03:40           | 1.41 | 08:10 | 3.99 | 2.61 | 03:40                     | 0.038 | 08:10 | 0.150 | 0.090 | 0.090 |           |
| 12/20/2019 | 02:10      | 1.48 | 23:50 | 1.94 | 1.72 | 05:35           | 1.28 | 11:00 | 3.75 | 2.35 | 05:35                     | 0.038 | 08:55 | 0.148 | 0.085 | 0.085 | 0.02      |
| 12/21/2019 | 04:25      | 1.46 | 17:20 | 2.04 | 1.74 | 05:40           | 1.43 | 11:50 | 3.59 | 2.36 | 05:40                     | 0.042 | 11:50 | 0.150 | 0.087 | 0.087 |           |
| 12/22/2019 | 06:10      | 1.45 | 13:25 | 2.07 | 1.71 | 05:45           | 1.24 | 13:25 | 3.80 | 2.28 | 05:45                     | 0.035 | 13:25 | 0.175 | 0.083 | 0.083 |           |
| 12/23/2019 | 05:30      | 1.45 | 09:00 | 2.22 | 1.69 | 05:20           | 1.23 | 09:00 | 3.94 | 2.31 | 05:20                     | 0.034 | 09:00 | 0.201 | 0.082 | 0.082 |           |
| 12/24/2019 | 04:10      | 1.44 | 09:20 | 1.93 | 1.72 | 03:20           | 1.23 | 10:55 | 3.80 | 2.36 | 03:20                     | 0.038 | 10:55 | 0.158 | 0.085 | 0.085 |           |
| 12/25/2019 | 03:40      | 1.48 | 09:10 | 1.96 | 1.73 | 05:05           | 1.06 | 00:35 | 3.36 | 2.17 | 05:10                     | 0.031 | 10:45 | 0.138 | 0.079 | 0.079 |           |
| 12/26/2019 | 04:50      | 1.52 | 21:20 | 1.97 | 1.74 | 04:45           | 1.28 | 09:30 | 2.97 | 2.09 | 04:45                     | 0.038 | 09:30 | 0.125 | 0.077 | 0.077 |           |
| 12/27/2019 | 04:45      | 1.52 | 08:45 | 1.99 | 1.74 | 04:15           | 1.13 | 21:00 | 2.89 | 2.10 | 04:15                     | 0.034 | 08:45 | 0.124 | 0.077 | 0.077 |           |
| 12/28/2019 | 04:25      | 1.41 | 11:35 | 2.01 | 1.68 | 01:40           | 1.70 | 11:30 | 3.60 | 2.37 | 04:30                     | 0.049 | 10:30 | 0.146 | 0.083 | 0.083 |           |
| 12/29/2019 | 02:35      | 1.50 | 11:35 | 2.07 | 1.69 | 06:20           | 1.30 | 11:25 | 3.65 | 2.31 | 06:20                     | 0.038 | 11:25 | 0.166 | 0.082 | 0.082 |           |
| 12/30/2019 | 04:00      | 1.48 | 10:00 | 1.87 | 1.66 | 03:30           | 1.26 | 08:55 | 3.85 | 2.45 | 04:30                     | 0.038 | 08:55 | 0.140 | 0.084 | 0.084 |           |
| 12/31/2019 | 19:35      | 1.46 | 09:15 | 1.73 | 1.57 | 03:55           | 1.23 | 20:10 | 4.47 | 2.72 | 03:55                     | 0.036 | 20:10 | 0.153 | 0.086 | 0.086 |           |



| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:35      | 1.41 | 23:45 | 1.67  | 1.53 | 06:35           | 1.59 | 10:20 | 4.49 | 2.71 | 06:35                     | 0.044 | 10:20 | 0.146 | 0.083 | 0.083 | 0.10  |           |
| 01/02/2020 | 05:10      | 1.42 | 10:55 | 1.82  | 1.61 | 05:10           | 1.20 | 23:00 | 4.02 | 2.36 | 05:10                     | 0.032 | 10:55 | 0.141 | 0.078 | 0.078 |       |           |
| 01/03/2020 | 14:15      | 1.38 | 09:50 | 1.90  | 1.54 | 03:25           | 1.25 | 12:00 | 4.35 | 2.78 | 03:25                     | 0.036 | 09:50 | 0.169 | 0.084 | 0.084 |       |           |
| 01/04/2020 | 14:05      | 1.29 | 13:40 | 1.82  | 1.44 | 14:05           | 1.25 | 20:35 | 4.51 | 3.06 | 14:05                     | 0.030 | 13:40 | 0.164 | 0.085 | 0.085 |       |           |
| 01/05/2020 | 10:40      | 1.34 | 12:10 | 1.68  | 1.46 | 05:55           | 1.43 | 11:20 | 4.72 | 3.14 | 05:55                     | 0.037 | 12:10 | 0.158 | 0.089 | 0.089 |       |           |
| 01/06/2020 | 03:40      | 1.36 | 08:25 | 1.70  | 1.51 | 05:10           | 1.42 | 08:20 | 4.44 | 2.72 | 05:10                     | 0.037 | 08:25 | 0.145 | 0.081 | 0.081 |       |           |
| 01/07/2020 | 04:00      | 1.37 | 09:50 | 1.88  | 1.53 | 03:20           | 1.56 | 08:15 | 4.77 | 2.73 | 04:00                     | 0.041 | 08:15 | 0.169 | 0.084 | 0.084 |       |           |
| 01/08/2020 | 03:30      | 1.27 | 09:30 | 1.83  | 1.54 | 05:45           | 0.81 | 10:10 | 3.97 | 2.47 | 05:45                     | 0.019 | 09:30 | 0.139 | 0.078 | 0.078 |       |           |
| 01/09/2020 | 05:30      | 1.29 | 07:55 | 2.00  | 1.63 | 05:00           | 0.65 | 07:55 | 3.99 | 2.43 | 05:00                     | 0.015 | 07:55 | 0.176 | 0.081 | 0.081 |       |           |
| 01/10/2020 | 04:55      | 1.34 | 09:45 | 1.99  | 1.69 | 05:00           | 0.71 | 09:50 | 3.68 | 1.98 | 05:00                     | 0.018 | 09:55 | 0.148 | 0.071 | 0.071 |       |           |
| 01/11/2020 | 04:30      | 1.28 | 08:35 | 2.11  | 1.71 | 04:20           | 0.63 | 10:25 | 3.59 | 1.91 | 04:20                     | 0.015 | 10:20 | 0.160 | 0.071 | 0.071 | 0.66  |           |
| 01/12/2020 | 04:50      | 1.33 | 10:50 | 2.12  | 1.72 | 04:20           | 0.67 | 18:00 | 3.52 | 2.07 | 04:20                     | 0.017 | 18:00 | 0.167 | 0.076 | 0.076 |       |           |
| 01/13/2020 | 05:00      | 1.32 | 08:40 | 2.13  | 1.61 | 04:55           | 0.73 | 20:55 | 3.09 | 1.96 | 04:55                     | 0.018 | 08:40 | 0.148 | 0.065 | 0.065 |       |           |
| 01/14/2020 | 04:55      | 1.28 | 21:50 | 1.89  | 1.53 | 06:15           | 0.76 | 20:50 | 3.87 | 2.13 | 06:15                     | 0.019 | 20:50 | 0.148 | 0.066 | 0.066 |       |           |
| 01/15/2020 | 05:15      | 1.19 | 08:20 | 1.93  | 1.52 | 05:35           | 0.58 | 08:10 | 4.48 | 2.08 | 05:35                     | 0.012 | 08:10 | 0.173 | 0.065 | 0.065 |       |           |
| 01/16/2020 | 05:35      | 1.21 | 10:40 | 1.89  | 1.50 | 05:10           | 0.77 | 10:40 | 4.06 | 2.36 | 05:40                     | 0.017 | 10:40 | 0.165 | 0.071 | 0.071 |       |           |
| 01/17/2020 | 20:05      | 1.19 | 07:25 | 1.59  | 1.43 | 04:05           | 0.75 | 22:00 | 4.28 | 2.40 | 04:05                     | 0.017 | 09:50 | 0.133 | 0.067 | 0.067 |       |           |
| 01/18/2020 | 04:40      | 1.21 | 14:35 | 1.69  | 1.44 | 06:50           | 1.05 | 11:30 | 4.62 | 2.92 | 04:45                     | 0.023 | 14:35 | 0.150 | 0.082 | 0.082 |       |           |
| 01/19/2020 | 05:40      | 1.26 | 11:50 | 1.85  | 1.47 | 05:30           | 0.78 | 11:15 | 4.38 | 2.62 | 05:30                     | 0.018 | 11:50 | 0.166 | 0.076 | 0.076 |       |           |
| 01/20/2020 | 04:40      | 1.22 | 10:35 | 1.80  | 1.44 | 04:25           | 0.96 | 11:20 | 4.52 | 2.64 | 04:25                     | 0.021 | 08:45 | 0.160 | 0.074 | 0.074 |       | 0.01      |
| 01/21/2020 | 03:00      | 1.23 | 22:50 | 1.63  | 1.44 | 05:35           | 0.95 | 08:05 | 3.80 | 2.36 | 03:00                     | 0.021 | 08:05 | 0.114 | 0.067 | 0.067 |       |           |
| 01/22/2020 | 04:25      | 1.21 | 17:15 | 1.97  | 1.52 | 02:10           | 0.92 | 22:40 | 3.85 | 2.27 | 05:10                     | 0.021 | 21:25 | 0.112 | 0.069 | 0.069 |       |           |
| 01/23/2020 | 04:15      | 1.22 | 23:10 | 1.79  | 1.48 | 02:35           | 0.89 | 08:15 | 3.81 | 2.32 | 02:35                     | 0.020 | 20:20 | 0.131 | 0.069 | 0.069 |       |           |
| 01/24/2020 | 02:55      | 1.28 | 21:45 | 1.97  | 1.51 | 04:10           | 0.92 | 21:45 | 4.82 | 2.62 | 04:10                     | 0.023 | 21:45 | 0.208 | 0.079 | 0.079 |       |           |
| 01/25/2020 | 04:50      | 1.22 | 22:55 | 1.91  | 1.56 | 04:00           | 0.85 | 09:55 | 3.80 | 2.44 | 04:00                     | 0.019 | 23:00 | 0.140 | 0.078 | 0.078 |       |           |
| 01/26/2020 | 03:15      | 1.31 | 18:00 | 1.92  | 1.61 | 03:10           | 1.14 | 11:15 | 3.64 | 2.32 | 03:10                     | 0.027 | 22:25 | 0.137 | 0.077 | 0.077 |       |           |
| 01/27/2020 | 04:05      | 1.27 | 08:10 | 1.94  | 1.60 | 03:50           | 0.83 | 10:10 | 3.66 | 2.24 | 03:50                     | 0.019 | 08:20 | 0.147 | 0.076 | 0.076 |       |           |
| 01/28/2020 | 04:05      | 1.27 | 07:30 | 1.81  | 1.55 | 04:00           | 0.87 | 21:25 | 4.07 | 2.26 | 04:00                     | 0.020 | 21:20 | 0.149 | 0.072 | 0.072 |       |           |
| 01/29/2020 | 02:15      | 1.20 | 18:30 | 21.57 | 1.72 | 01:25           | 0.68 | 08:20 | 3.89 | 2.16 | 01:25                     | 0.017 | 18:20 | 0.785 | 0.074 | 0.074 | 0.16  |           |
| 01/30/2020 | 04:00      | 1.22 | 07:40 | 1.81  | 1.49 | 03:45           | 0.58 | 11:35 | 3.80 | 2.16 | 03:45                     | 0.013 | 11:35 | 0.135 | 0.065 | 0.065 |       |           |
| 01/31/2020 | 04:10      | 1.21 | 20:55 | 1.66  | 1.46 | 04:10           | 0.70 | 07:40 | 4.05 | 2.45 | 04:10                     | 0.015 | 07:40 | 0.133 | 0.072 | 0.072 |       |           |
| 02/01/2020 | 03:45      | 1.21 | 05:20 | 1.84  | 1.53 | 02:55           | 0.79 | 10:10 | 4.19 | 2.52 | 02:55                     | 0.018 | 10:10 | 0.154 | 0.078 | 0.078 |       |           |
| 02/02/2020 | 05:25      | 1.28 | 07:50 | 1.78  | 1.51 | 04:35           | 0.76 | 12:15 | 3.90 | 2.50 | 04:35                     | 0.018 | 12:15 | 0.127 | 0.076 | 0.076 |       |           |
| 02/03/2020 | 02:50      | 1.23 | 08:10 | 1.68  | 1.48 | 05:00           | 1.02 | 07:45 | 3.65 | 2.32 | 05:00                     | 0.024 | 07:50 | 0.117 | 0.068 | 0.068 |       |           |
| 02/04/2020 | 03:30      | 1.22 | 14:40 | 2.24  | 1.54 | 03:30           | 0.85 | 07:45 | 4.24 | 2.39 | 03:30                     | 0.019 | 07:45 | 0.148 | 0.075 | 0.075 |       |           |
| 02/05/2020 | 04:40      | 1.22 | 08:20 | 1.69  | 1.44 | 05:50           | 0.58 | 08:20 | 4.00 | 2.40 | 05:50                     | 0.013 | 08:20 | 0.139 | 0.068 | 0.068 |       |           |
| 02/06/2020 | 04:05      | 1.21 | 07:50 | 1.56  | 1.43 | 03:50           | 0.84 | 08:15 | 4.09 | 2.39 | 03:50                     | 0.018 | 07:50 | 0.122 | 0.067 | 0.067 |       |           |
| 02/07/2020 | 05:25      | 1.22 | 08:40 | 1.77  | 1.44 | 03:55           | 0.93 | 08:20 | 4.43 | 2.44 | 03:55                     | 0.020 | 08:40 | 0.148 | 0.069 | 0.069 |       | 0.02      |
| 02/08/2020 | 02:50      | 1.27 | 04:30 | 1.97  | 1.59 | 02:55           | 1.15 | 08:35 | 4.21 | 2.47 | 02:50                     | 0.027 | 08:35 | 0.133 | 0.079 | 0.079 |       |           |
| 02/09/2020 | 05:20      | 1.26 | 12:15 | 1.79  | 1.53 | 05:50           | 0.84 | 12:05 | 3.95 | 2.36 | 05:50                     | 0.019 | 09:10 | 0.129 | 0.074 | 0.074 |       |           |
| 02/10/2020 | 04:45      | 1.17 | 08:30 | 1.89  | 1.51 | 04:10           | 0.99 | 08:30 | 4.08 | 2.40 | 04:10                     | 0.026 | 08:30 | 0.166 | 0.072 | 0.072 |       |           |
| 02/11/2020 | 03:30      | 1.28 | 09:00 | 1.88  | 1.53 | 01:15           | 0.95 | 20:15 | 3.84 | 2.40 | 04:50                     | 0.023 | 09:00 | 0.154 | 0.074 | 0.074 |       |           |
| 02/12/2020 | 04:00      | 1.25 | 08:25 | 1.82  | 1.49 | 04:00           | 0.76 | 08:25 | 4.34 | 2.48 | 04:00                     | 0.017 | 08:25 | 0.168 | 0.074 | 0.074 |       |           |
| 02/13/2020 | 01:35      | 1.23 | 09:40 | 1.86  | 1.54 | 02:50           | 1.23 | 09:40 | 4.28 | 2.45 | 04:35                     | 0.030 | 09:40 | 0.170 | 0.076 | 0.076 |       |           |
| 02/14/2020 | 03:25      | 1.27 | 18:45 | 1.95  | 1.61 | 05:35           | 1.04 | 08:25 | 3.50 | 2.16 | 05:35                     | 0.024 | 09:25 | 0.139 | 0.072 | 0.072 |       |           |
| 02/15/2020 | 04:25      | 1.38 | 20:20 | 2.12  | 1.69 | 05:30           | 1.06 | 10:05 | 2.85 | 1.80 | 05:30                     | 0.028 | 12:00 | 0.126 | 0.065 | 0.065 |       |           |
| 02/16/2020 | 04:25      | 1.26 | 12:15 | 2.19  | 1.69 | 04:10           | 0.49 | 09:50 | 3.35 | 1.70 | 04:10                     | 0.011 | 09:50 | 0.149 | 0.062 | 0.062 | 0.01  |           |
| 02/17/2020 | 06:10      | 1.44 | 11:55 | 1.96  | 1.69 | 03:45           | 0.52 | 09:20 | 3.53 | 1.92 | 03:45                     | 0.015 | 09:20 | 0.146 | 0.069 | 0.069 |       |           |
| 02/18/2020 | 05:05      | 1.32 | 08:00 | 1.89  | 1.62 | 04:10           | 0.89 | 09:35 | 3.40 | 2.13 | 04:10                     | 0.023 | 08:00 | 0.130 | 0.072 | 0.072 |       |           |
| 02/19/2020 | 04:05      | 1.28 | 08:35 | 2.09  | 1.67 | 03:55           | 0.88 | 07:40 | 3.61 | 2.12 | 03:55                     | 0.021 | 08:40 | 0.160 | 0.076 | 0.076 |       |           |
| 02/20/2020 | 04:00      | 1.29 | 22:00 | 2.09  | 1.68 | 04:30           | 0.70 | 22:00 | 3.12 | 2.04 | 04:30                     | 0.019 | 22:00 | 0.146 | 0.073 | 0.073 |       |           |
| 02/21/2020 | 03:35      | 1.28 | 19:25 | 2.10  | 1.71 | 03:20           | 0.76 | 08:40 | 3.43 | 1.94 | 03:20                     | 0.018 | 08:40 | 0.153 | 0.070 | 0.070 |       |           |
| 02/22/2020 | 04:05      | 1.31 | 11:10 | 2.06  | 1.69 | 03:45           | 0.83 | 23:55 | 3.33 | 2.05 | 03:45                     | 0.020 | 23:55 | 0.140 | 0.074 | 0.074 |       |           |
| 02/23/2020 | 07:05      | 1.26 | 12:05 | 1.93  | 1.62 | 07:05           | 0.49 | 11:35 | 3.79 | 2.25 | 07:05                     | 0.011 | 11:35 | 0.145 | 0.077 | 0.077 |       |           |
| 02/24/2020 | 05:35      | 1.26 | 21:50 | 1.88  | 1.59 | 05:35           | 0.84 | 20:15 | 3.88 | 2.16 | 05:35                     | 0.019 | 20:15 | 0.143 | 0.072 | 0.072 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 02/25/2020 | 02:40      | 1.32 | 08:30 | 2.00 | 1.60 | 05:05           | 0.88 | 19:50 | 4.28 | 2.21 | 05:05                     | 0.021 | 19:50 | 0.153 | 0.074 | 0.074 |       |           |
| 02/26/2020 | 04:50      | 1.26 | 20:50 | 1.85 | 1.57 | 04:40           | 0.87 | 20:50 | 4.22 | 2.29 | 04:40                     | 0.020 | 20:50 | 0.167 | 0.074 | 0.074 |       |           |
| 02/27/2020 | 04:50      | 1.25 | 17:45 | 1.91 | 1.59 | 04:20           | 0.88 | 14:30 | 4.09 | 2.42 | 04:20                     | 0.020 | 14:30 | 0.150 | 0.079 | 0.079 |       |           |
| 02/28/2020 | 04:10      | 1.23 | 22:45 | 1.90 | 1.61 | 04:10           | 0.72 | 08:40 | 3.85 | 2.08 | 04:10                     | 0.016 | 08:40 | 0.146 | 0.071 | 0.071 |       |           |
| 02/29/2020 | 04:30      | 1.29 | 20:35 | 1.93 | 1.63 | 04:25           | 0.88 | 20:45 | 3.99 | 2.21 | 04:30                     | 0.021 | 20:40 | 0.147 | 0.075 | 0.075 |       |           |
| 03/01/2020 | 06:15      | 1.27 | 15:55 | 2.03 | 1.55 | 06:15           | 0.73 | 15:55 | 4.35 | 2.23 | 06:15                     | 0.017 | 15:55 | 0.196 | 0.070 | 0.070 |       |           |
| 03/02/2020 | 05:30      | 1.20 | 07:40 | 2.04 | 1.51 | 04:15           | 0.93 | 07:40 | 4.37 | 2.50 | 04:45                     | 0.020 | 07:40 | 0.198 | 0.076 | 0.076 | 0.01  |           |
| 03/03/2020 | 02:00      | 1.24 | 22:50 | 1.71 | 1.49 | 05:55           | 0.92 | 22:50 | 4.36 | 2.48 | 05:55                     | 0.021 | 22:50 | 0.154 | 0.074 | 0.074 |       |           |
| 03/04/2020 | 04:15      | 1.19 | 01:35 | 2.27 | 1.55 | 01:00           | 1.67 | 07:40 | 4.32 | 2.72 | 01:00                     | 0.041 | 07:40 | 0.145 | 0.084 | 0.084 |       |           |
| 03/05/2020 | 03:40      | 1.22 | 09:15 | 1.94 | 1.59 | 02:55           | 0.82 | 21:00 | 3.98 | 2.26 | 03:40                     | 0.018 | 09:15 | 0.148 | 0.075 | 0.075 |       |           |
| 03/06/2020 | 04:00      | 1.25 | 08:45 | 1.93 | 1.56 | 03:50           | 0.71 | 08:25 | 4.11 | 2.24 | 03:50                     | 0.016 | 08:25 | 0.172 | 0.072 | 0.072 |       |           |
| 03/07/2020 | 03:40      | 1.23 | 01:15 | 1.79 | 1.57 | 04:10           | 0.68 | 10:30 | 3.98 | 2.55 | 03:40                     | 0.018 | 10:35 | 0.136 | 0.082 | 0.082 | 0.58  |           |
| 03/08/2020 | 05:55      | 1.30 | 11:35 | 1.88 | 1.53 | 04:15           | 0.92 | 11:00 | 4.60 | 2.51 | 04:15                     | 0.023 | 11:35 | 0.173 | 0.077 | 0.077 | 0.02  |           |
| 03/09/2020 | 03:40      | 1.22 | 20:10 | 1.69 | 1.43 | 03:40           | 0.81 | 20:10 | 4.20 | 2.45 | 03:40                     | 0.018 | 20:10 | 0.146 | 0.069 | 0.069 | 0.11  |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 9.014                     | 5.26      |
| Avg   | 1.60       | 2.40            | 0.078                     |           |

## Site Commentary

### Site Information

| MIL_1790        |       |
|-----------------|-------|
| Pipe Dimensions | 28    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_1790 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed downstream of sites MIL\_0190, MIL\_0649 and MIL\_1795. A check of balancing shows a net flow of 0.837 MGD between the sites.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                     |                     |                     |
|--------------------------|---------------------|---------------------|---------------------|
| Item                     | Depth (in)          | Velocity (ft/s)     | Quantity (MGD)      |
| Average                  | 10.91               | 1.97                | 2.006               |
| Minimum                  | 7.93                | 1.32                | 0.852               |
| Maximum                  | 13.37               | 2.51                | 3.219               |
| Time of Minimum          | 3/1/2020 5:45 AM    | 3/1/2020 5:40 AM    | 3/1/2020 5:40 AM    |
| Time of Maximum          | 12/23/2019 12:05 PM | 11/27/2019 10:55 AM | 12/23/2019 12:05 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_1790**

Site Address /Location: 490 N McCarthy Blvd, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.435578°

Longitude:

-121.919933°

Pipe Size (H x W)

28.00"x28.00"

Pipe Shape

Circular

Manhole #

1790

System Characteristics

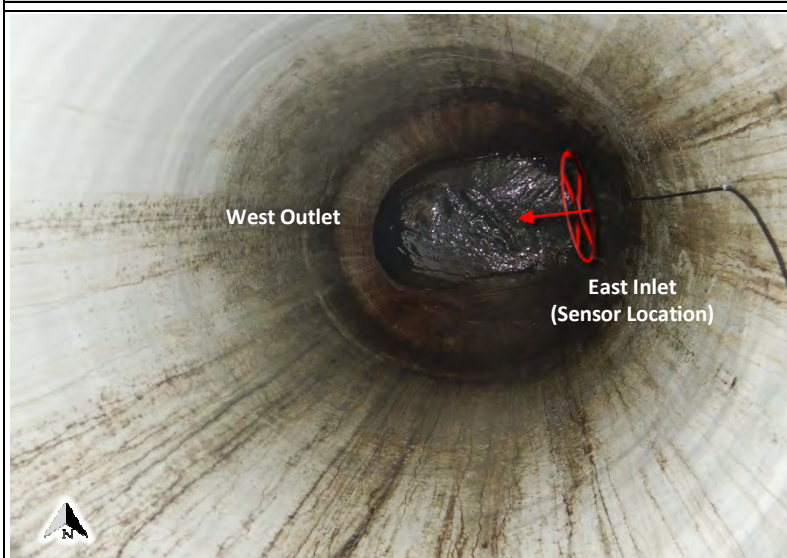
Residential/Commercial

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Friday, November 15, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

4:26:00 AM

Pipe Size (HxW)

28.00"x28.00"

Depth of Flow (Wet DOF) (in)

9.00"

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.82'

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Smooth flow with deep depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

12'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

868

ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325



# SCATTERGRAPH REPORT

MIL\_1790

Flow Monitor

**MIL\_1790**

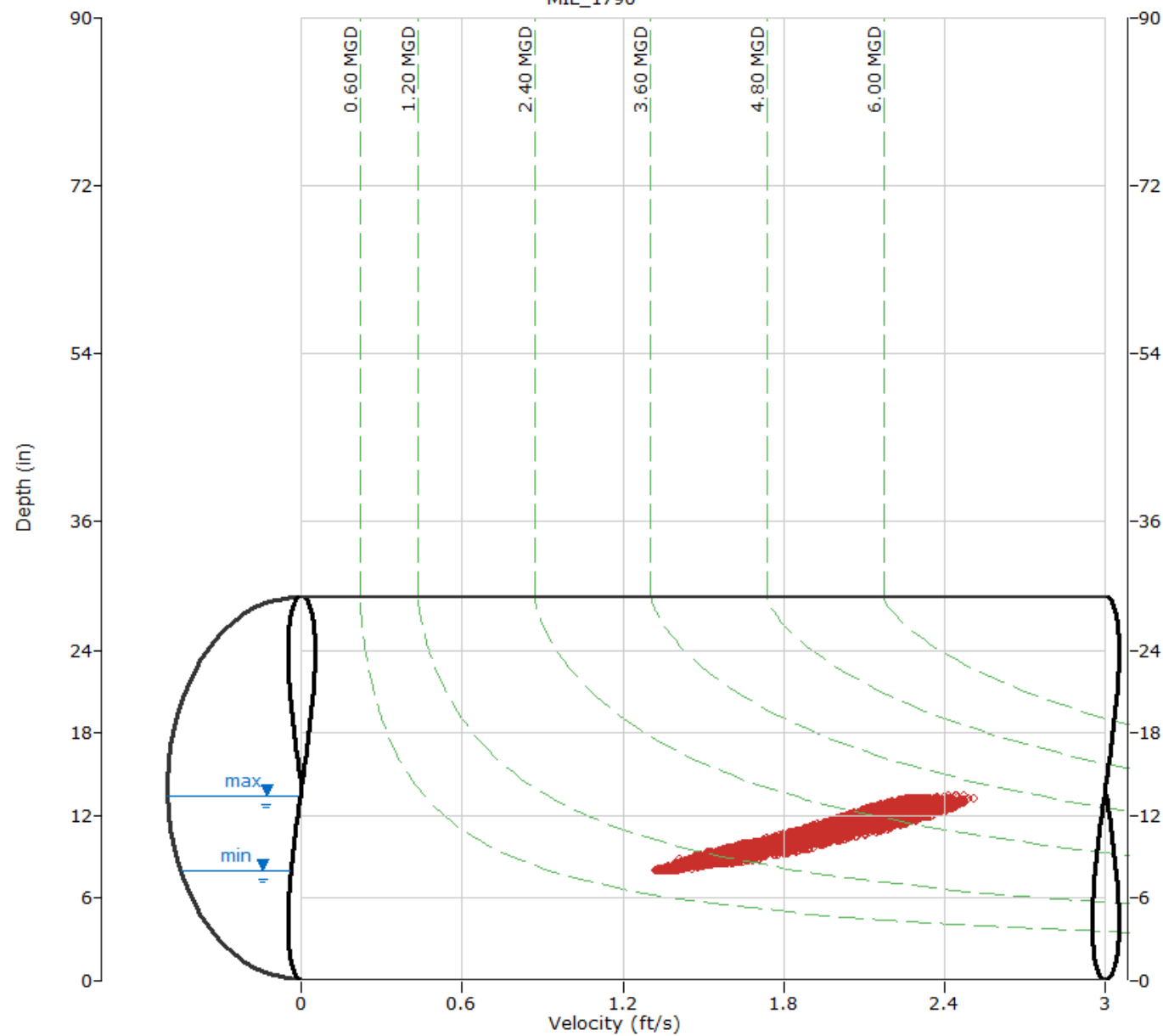
Pipe Height  
28.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



ADS ENVIRONMENTAL  
SERVICES

# HYDROGRAPH REPORT

MIL\_1790

Flow Monitor

**MIL\_1790**

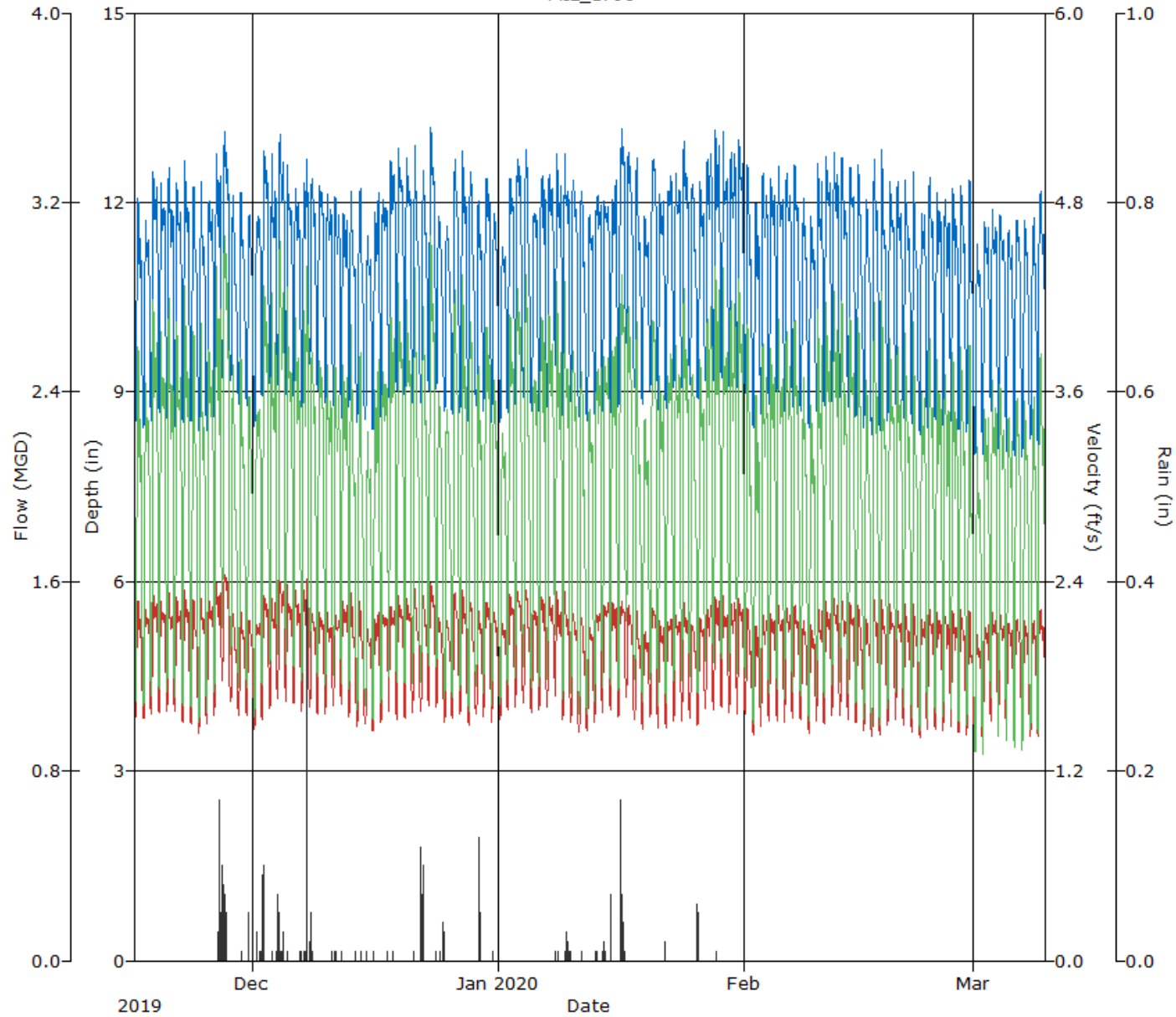
Pipe Height  
28.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth
- Velocity
- Quantity
- Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_1790, Pipe Height: 28.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 04:50      | 8.41 | 13:00 | 12.14 | 10.48 | 04:50           | 1.49 | 13:05 | 2.35 | 1.96 | 04:50                     | 1.042 | 13:05 | 2.693 | 1.892 | 1.892 |           |
| 11/17/2019 | 05:10      | 8.36 | 11:25 | 11.76 | 10.38 | 05:00           | 1.50 | 11:30 | 2.26 | 1.96 | 05:00                     | 1.043 | 11:15 | 2.492 | 1.863 | 1.863 |           |
| 11/18/2019 | 03:55      | 8.47 | 10:55 | 12.74 | 11.03 | 04:05           | 1.54 | 10:40 | 2.41 | 2.05 | 04:05                     | 1.085 | 10:45 | 2.934 | 2.124 | 2.124 |           |
| 11/19/2019 | 04:30      | 8.64 | 10:30 | 12.37 | 11.03 | 04:35           | 1.56 | 09:20 | 2.31 | 2.04 | 04:30                     | 1.130 | 10:30 | 2.717 | 2.101 | 2.101 |           |
| 11/20/2019 | 04:20      | 8.59 | 10:20 | 12.63 | 10.92 | 03:55           | 1.56 | 10:40 | 2.36 | 2.02 | 03:55                     | 1.124 | 10:40 | 2.840 | 2.058 | 2.058 |           |
| 11/21/2019 | 04:45      | 8.43 | 09:55 | 12.75 | 10.93 | 04:35           | 1.56 | 10:00 | 2.36 | 2.04 | 04:35                     | 1.095 | 09:55 | 2.893 | 2.079 | 2.079 |           |
| 11/22/2019 | 04:05      | 8.48 | 10:30 | 12.74 | 11.03 | 05:05           | 1.49 | 10:40 | 2.39 | 2.03 | 03:55                     | 1.059 | 10:40 | 2.911 | 2.105 | 2.105 |           |
| 11/23/2019 | 05:30      | 8.52 | 13:00 | 12.43 | 10.62 | 05:00           | 1.49 | 11:25 | 2.33 | 1.96 | 04:55                     | 1.057 | 11:25 | 2.735 | 1.929 | 1.929 |           |
| 11/24/2019 | 04:50      | 8.32 | 11:50 | 12.42 | 10.50 | 04:35           | 1.42 | 11:00 | 2.33 | 1.95 | 04:50                     | 0.980 | 11:55 | 2.752 | 1.897 | 1.897 |           |
| 11/25/2019 | 04:10      | 8.35 | 13:00 | 12.08 | 10.80 | 03:55           | 1.49 | 12:15 | 2.31 | 2.03 | 03:55                     | 1.031 | 12:15 | 2.618 | 2.041 | 2.041 |           |
| 11/26/2019 | 03:45      | 8.54 | 10:00 | 12.85 | 11.16 | 03:40           | 1.49 | 10:00 | 2.46 | 2.10 | 03:40                     | 1.064 | 10:00 | 3.038 | 2.202 | 2.202 | 0.36      |
| 11/27/2019 | 03:30      | 9.16 | 10:35 | 13.21 | 11.60 | 03:30           | 1.64 | 10:55 | 2.51 | 2.20 | 03:30                     | 1.285 | 10:55 | 3.198 | 2.420 | 2.420 | 0.63      |
| 11/28/2019 | 05:55      | 9.13 | 12:15 | 12.16 | 10.64 | 05:55           | 1.63 | 10:45 | 2.29 | 1.95 | 05:55                     | 1.274 | 12:15 | 2.542 | 1.896 | 1.896 |           |
| 11/29/2019 | 05:05      | 8.72 | 14:45 | 12.30 | 10.67 | 05:05           | 1.53 | 18:15 | 2.24 | 1.94 | 05:05                     | 1.123 | 14:45 | 2.601 | 1.910 | 1.910 | 0.02      |
| 11/30/2019 | 06:50      | 8.72 | 13:05 | 11.84 | 10.52 | 06:50           | 1.53 | 13:05 | 2.16 | 1.91 | 06:50                     | 1.126 | 13:05 | 2.400 | 1.843 | 1.843 | 0.10      |
| 12/01/2019 | 06:55      | 8.39 | 16:00 | 11.80 | 10.50 | 06:55           | 1.45 | 22:05 | 2.16 | 1.89 | 06:55                     | 1.010 | 22:10 | 2.376 | 1.833 | 1.833 | 0.06      |
| 12/02/2019 | 04:40      | 8.91 | 09:20 | 12.88 | 11.47 | 04:20           | 1.52 | 10:50 | 2.35 | 2.06 | 04:25                     | 1.151 | 09:30 | 2.909 | 2.240 | 2.240 | 0.30      |
| 12/03/2019 | 04:25      | 9.10 | 10:15 | 12.85 | 11.19 | 04:55           | 1.57 | 21:30 | 2.35 | 2.04 | 04:55                     | 1.227 | 10:30 | 2.880 | 2.133 | 2.133 | 0.01      |
| 12/04/2019 | 04:25      | 8.62 | 10:05 | 13.23 | 11.53 | 04:25           | 1.51 | 09:45 | 2.44 | 2.14 | 04:25                     | 1.090 | 10:00 | 3.092 | 2.336 | 2.336 | 0.39      |
| 12/05/2019 | 04:35      | 8.92 | 09:40 | 12.68 | 11.22 | 04:30           | 1.62 | 10:55 | 2.42 | 2.09 | 04:30                     | 1.228 | 09:40 | 2.931 | 2.197 | 2.197 | 0.01      |
| 12/06/2019 | 04:25      | 8.85 | 09:45 | 12.34 | 10.95 | 03:00           | 1.52 | 09:45 | 2.39 | 2.05 | 03:00                     | 1.162 | 09:45 | 2.800 | 2.090 | 2.090 | 0.01      |
| 12/07/2019 | 04:00      | 8.72 | 19:55 | 12.74 | 10.99 | 03:25           | 1.55 | 20:15 | 2.44 | 2.07 | 04:50                     | 1.150 | 19:55 | 2.988 | 2.135 | 2.135 | 0.67      |
| 12/08/2019 | 06:20      | 9.41 | 11:30 | 12.40 | 11.14 | 06:30           | 1.56 | 13:40 | 2.23 | 1.97 | 06:30                     | 1.273 | 10:50 | 2.621 | 2.046 | 2.046 | 0.20      |
| 12/09/2019 | 04:45      | 8.99 | 09:50 | 12.37 | 11.20 | 03:55           | 1.51 | 09:30 | 2.27 | 1.99 | 03:55                     | 1.172 | 09:45 | 2.644 | 2.088 | 2.088 |           |
| 12/10/2019 | 04:30      | 8.80 | 10:05 | 12.20 | 10.96 | 04:15           | 1.49 | 09:20 | 2.25 | 1.97 | 04:15                     | 1.119 | 09:25 | 2.587 | 2.004 | 2.004 |           |
| 12/11/2019 | 03:50      | 8.74 | 11:20 | 12.19 | 10.87 | 04:05           | 1.55 | 09:05 | 2.27 | 2.00 | 04:05                     | 1.148 | 11:20 | 2.570 | 2.010 | 2.010 | 0.03      |
| 12/12/2019 | 04:35      | 8.56 | 09:55 | 11.95 | 10.77 | 03:05           | 1.57 | 11:35 | 2.32 | 2.05 | 04:20                     | 1.161 | 11:35 | 2.574 | 2.040 | 2.040 | 0.01      |
| 12/13/2019 | 03:55      | 8.75 | 10:10 | 12.54 | 10.61 | 03:55           | 1.54 | 10:15 | 2.37 | 1.96 | 03:55                     | 1.137 | 10:10 | 2.832 | 1.916 | 1.916 | 0.01      |
| 12/14/2019 | 04:45      | 8.48 | 14:40 | 12.24 | 10.45 | 04:45           | 1.47 | 12:00 | 2.34 | 1.90 | 04:45                     | 1.040 | 12:00 | 2.658 | 1.827 | 1.827 | 0.01      |
| 12/15/2019 | 03:45      | 8.49 | 12:15 | 11.66 | 10.25 | 03:45           | 1.47 | 12:15 | 2.13 | 1.86 | 03:45                     | 1.043 | 12:15 | 2.322 | 1.732 | 1.732 | 0.01      |
| 12/16/2019 | 03:50      | 8.27 | 21:35 | 12.25 | 10.76 | 03:50           | 1.42 | 22:10 | 2.32 | 1.95 | 03:50                     | 0.971 | 22:10 | 2.668 | 1.951 | 1.951 | 0.01      |
| 12/17/2019 | 04:15      | 8.56 | 10:55 | 12.12 | 10.94 | 04:15           | 1.49 | 10:55 | 2.20 | 1.99 | 04:15                     | 1.068 | 10:55 | 2.523 | 2.024 | 2.024 | 0.01      |
| 12/18/2019 | 04:50      | 8.81 | 11:10 | 12.72 | 11.41 | 04:50           | 1.55 | 10:15 | 2.28 | 2.04 | 04:50                     | 1.159 | 11:10 | 2.775 | 2.192 | 2.192 | 0.01      |
| 12/19/2019 | 04:15      | 8.96 | 10:40 | 12.98 | 11.54 | 04:00           | 1.51 | 11:05 | 2.36 | 2.04 | 04:20                     | 1.155 | 10:40 | 2.908 | 2.238 | 2.238 |           |
| 12/20/2019 | 05:35      | 8.91 | 10:55 | 12.85 | 11.40 | 05:00           | 1.51 | 10:45 | 2.37 | 2.04 | 05:00                     | 1.145 | 10:50 | 2.925 | 2.195 | 2.195 |           |
| 12/21/2019 | 04:50      | 8.76 | 11:10 | 12.98 | 10.98 | 04:45           | 1.54 | 12:00 | 2.38 | 2.00 | 04:45                     | 1.139 | 11:25 | 2.970 | 2.048 | 2.048 | 0.01      |
| 12/22/2019 | 04:30      | 8.77 | 14:25 | 12.58 | 10.86 | 04:25           | 1.55 | 15:00 | 2.36 | 1.99 | 04:25                     | 1.152 | 15:00 | 2.816 | 2.014 | 2.014 | 0.41      |
| 12/23/2019 | 04:20      | 8.98 | 12:05 | 13.37 | 11.47 | 04:30           | 1.60 | 12:05 | 2.47 | 2.09 | 04:30                     | 1.226 | 12:05 | 3.219 | 2.280 | 2.280 |           |
| 12/24/2019 | 04:55      | 9.01 | 11:45 | 11.85 | 10.67 | 04:55           | 1.58 | 12:55 | 2.19 | 1.95 | 04:55                     | 1.212 | 11:45 | 2.436 | 1.910 | 1.910 | 0.02      |
| 12/25/2019 | 07:20      | 8.64 | 11:55 | 11.72 | 10.39 | 06:15           | 1.41 | 11:55 | 2.18 | 1.90 | 06:15                     | 1.037 | 11:55 | 2.385 | 1.805 | 1.805 | 0.08      |
| 12/26/2019 | 04:10      | 8.56 | 13:45 | 12.77 | 11.05 | 04:15           | 1.49 | 12:50 | 2.39 | 2.02 | 04:10                     | 1.071 | 13:20 | 2.889 | 2.101 | 2.101 |           |
| 12/27/2019 | 04:35      | 8.59 | 11:25 | 12.92 | 11.09 | 05:35           | 1.55 | 11:20 | 2.39 | 2.02 | 04:30                     | 1.117 | 11:25 | 2.969 | 2.107 | 2.107 |           |
| 12/28/2019 | 06:15      | 8.43 | 11:30 | 12.54 | 10.69 | 05:00           | 1.45 | 14:55 | 2.29 | 1.94 | 05:00                     | 1.036 | 11:30 | 2.729 | 1.926 | 1.926 |           |
| 12/29/2019 | 03:55      | 8.63 | 13:00 | 12.08 | 10.52 | 03:45           | 1.53 | 11:50 | 2.26 | 1.93 | 03:55                     | 1.117 | 11:50 | 2.567 | 1.865 | 1.865 | 0.22      |
| 12/30/2019 | 05:00      | 8.63 | 12:05 | 12.49 | 11.06 | 04:10           | 1.52 | 12:10 | 2.30 | 2.03 | 04:50                     | 1.112 | 12:10 | 2.745 | 2.100 | 2.100 |           |
| 12/31/2019 | 04:55      | 8.48 | 12:10 | 11.96 | 10.57 | 04:00           | 1.49 | 12:00 | 2.25 | 1.95 | 04:55                     | 1.056 | 12:00 | 2.512 | 1.897 | 1.897 |           |

| Date       | Depth (in) |      |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 06:40      | 8.45 | 11:15 | 11.44 | 10.24 | 06:05           | 1.50 | 13:00 | 2.15 | 1.90 | 06:50                     | 1.062 | 13:40 | 2.250 | 1.769 | 1.769 |       |           |
| 01/02/2020 | 04:55      | 8.64 | 14:00 | 12.47 | 11.10 | 04:45           | 1.57 | 14:05 | 2.36 | 2.06 | 05:00                     | 1.141 | 14:05 | 2.803 | 2.140 | 2.140 |       |           |
| 01/03/2020 | 04:15      | 8.73 | 12:50 | 12.84 | 11.17 | 04:10           | 1.57 | 12:40 | 2.42 | 2.04 | 04:10                     | 1.158 | 12:40 | 2.975 | 2.147 | 2.147 |       |           |
| 01/04/2020 | 04:40      | 8.87 | 11:50 | 13.21 | 10.98 | 04:35           | 1.61 | 11:50 | 2.42 | 2.03 | 04:50                     | 1.213 | 11:50 | 3.104 | 2.078 | 2.078 |       |           |
| 01/05/2020 | 04:15      | 8.67 | 12:00 | 11.86 | 10.68 | 04:05           | 1.55 | 12:15 | 2.32 | 1.98 | 04:15                     | 1.134 | 12:15 | 2.581 | 1.951 | 1.951 |       |           |
| 01/06/2020 | 05:00      | 8.63 | 13:45 | 12.51 | 11.13 | 04:50           | 1.55 | 10:45 | 2.35 | 2.05 | 04:50                     | 1.128 | 10:45 | 2.804 | 2.142 | 2.142 |       |           |
| 01/07/2020 | 04:25      | 8.73 | 09:55 | 12.56 | 11.21 | 04:25           | 1.59 | 09:30 | 2.39 | 2.06 | 04:25                     | 1.166 | 09:30 | 2.848 | 2.173 | 2.173 |       |           |
| 01/08/2020 | 05:00      | 9.14 | 10:50 | 12.92 | 11.34 | 04:50           | 1.60 | 10:40 | 2.45 | 2.07 | 04:50                     | 1.261 | 10:40 | 3.044 | 2.202 | 2.202 |       |           |
| 01/09/2020 | 04:20      | 8.55 | 11:15 | 13.09 | 11.17 | 03:40           | 1.51 | 10:45 | 2.39 | 2.01 | 04:20                     | 1.080 | 11:05 | 3.005 | 2.110 | 2.110 |       |           |
| 01/10/2020 | 04:30      | 8.79 | 10:20 | 12.42 | 11.06 | 04:00           | 1.49 | 10:05 | 2.22 | 1.94 | 04:20                     | 1.113 | 10:40 | 2.629 | 2.007 | 2.007 | 0.02  |           |
| 01/11/2020 | 04:00      | 8.51 | 12:55 | 12.28 | 10.62 | 04:00           | 1.42 | 12:50 | 2.23 | 1.85 | 04:00                     | 1.006 | 12:50 | 2.596 | 1.823 | 1.823 | 0.18  |           |
| 01/12/2020 | 04:10      | 8.51 | 11:50 | 11.85 | 10.50 | 06:15           | 1.44 | 11:50 | 2.16 | 1.86 | 04:10                     | 1.023 | 11:50 | 2.406 | 1.797 | 1.797 | 0.02  |           |
| 01/13/2020 | 04:20      | 8.58 | 13:55 | 12.28 | 10.93 | 04:25           | 1.48 | 22:35 | 2.28 | 1.98 | 04:25                     | 1.066 | 13:55 | 2.606 | 2.016 | 2.016 | 0.01  |           |
| 01/14/2020 | 04:00      | 8.64 | 09:50 | 12.09 | 10.94 | 02:15           | 1.52 | 10:35 | 2.34 | 2.03 | 04:00                     | 1.125 | 10:35 | 2.645 | 2.077 | 2.077 | 0.02  |           |
| 01/15/2020 | 04:25      | 8.64 | 20:10 | 12.45 | 11.09 | 04:25           | 1.56 | 11:10 | 2.36 | 2.06 | 04:25                     | 1.128 | 11:10 | 2.687 | 2.129 | 2.129 | 0.11  |           |
| 01/16/2020 | 04:50      | 8.69 | 14:25 | 13.23 | 11.54 | 04:50           | 1.52 | 12:45 | 2.32 | 2.04 | 04:50                     | 1.114 | 14:00 | 2.970 | 2.243 | 2.243 | 0.07  |           |
| 01/17/2020 | 04:10      | 9.72 | 10:35 | 12.87 | 11.64 | 04:55           | 1.64 | 09:40 | 2.28 | 2.03 | 04:05                     | 1.407 | 09:40 | 2.809 | 2.226 | 2.226 | 0.66  |           |
| 01/18/2020 | 04:40      | 9.03 | 12:55 | 12.88 | 10.93 | 04:40           | 1.52 | 10:50 | 2.26 | 1.89 | 04:40                     | 1.168 | 12:45 | 2.801 | 1.929 | 1.929 |       |           |
| 01/19/2020 | 06:00      | 8.73 | 11:45 | 11.92 | 10.57 | 04:15           | 1.45 | 14:35 | 2.11 | 1.84 | 04:15                     | 1.076 | 11:45 | 2.359 | 1.794 | 1.794 |       |           |
| 01/20/2020 | 03:45      | 8.99 | 15:25 | 12.78 | 11.27 | 04:10           | 1.51 | 12:55 | 2.25 | 1.97 | 03:45                     | 1.170 | 15:15 | 2.750 | 2.096 | 2.096 |       |           |
| 01/21/2020 | 04:55      | 8.63 | 10:15 | 12.24 | 11.02 | 04:45           | 1.44 | 10:15 | 2.18 | 1.93 | 04:45                     | 1.043 | 10:15 | 2.529 | 1.977 | 1.977 |       |           |
| 01/22/2020 | 04:20      | 8.72 | 20:10 | 12.46 | 11.16 | 04:20           | 1.46 | 19:55 | 2.22 | 1.94 | 04:20                     | 1.072 | 20:00 | 2.633 | 2.037 | 2.037 |       |           |
| 01/23/2020 | 04:35      | 9.06 | 09:50 | 12.69 | 11.30 | 04:50           | 1.49 | 09:25 | 2.23 | 1.97 | 04:50                     | 1.152 | 09:50 | 2.687 | 2.093 | 2.093 |       |           |
| 01/24/2020 | 04:45      | 9.02 | 11:30 | 13.07 | 11.46 | 04:45           | 1.50 | 12:00 | 2.29 | 1.99 | 04:45                     | 1.158 | 11:30 | 2.891 | 2.159 | 2.159 |       |           |
| 01/25/2020 | 04:35      | 9.03 | 15:15 | 12.37 | 10.91 | 04:35           | 1.51 | 12:15 | 2.18 | 1.88 | 04:35                     | 1.166 | 11:30 | 2.537 | 1.907 | 1.907 |       |           |
| 01/26/2020 | 05:35      | 8.87 | 11:30 | 12.42 | 10.90 | 04:55           | 1.47 | 13:40 | 2.20 | 1.91 | 04:55                     | 1.112 | 11:40 | 2.599 | 1.940 | 1.940 |       |           |
| 01/27/2020 | 04:20      | 9.13 | 20:40 | 12.82 | 11.47 | 03:20           | 1.59 | 09:40 | 2.33 | 2.02 | 04:35                     | 1.252 | 09:40 | 2.855 | 2.193 | 2.193 | 0.16  |           |
| 01/28/2020 | 04:05      | 9.12 | 10:30 | 13.20 | 11.57 | 04:00           | 1.56 | 11:00 | 2.34 | 2.04 | 04:00                     | 1.217 | 10:55 | 2.986 | 2.245 | 2.245 | 0.01  |           |
| 01/29/2020 | 04:20      | 9.14 | 10:15 | 13.19 | 11.53 | 02:55           | 1.58 | 09:40 | 2.37 | 2.03 | 04:20                     | 1.246 | 09:40 | 3.013 | 2.212 | 2.212 |       |           |
| 01/30/2020 | 04:30      | 9.07 | 21:30 | 12.86 | 11.45 | 03:20           | 1.56 | 10:55 | 2.31 | 2.02 | 04:30                     | 1.213 | 10:55 | 2.855 | 2.190 | 2.190 |       |           |
| 01/31/2020 | 04:45      | 9.04 | 09:35 | 13.05 | 11.54 | 04:45           | 1.55 | 09:55 | 2.38 | 2.03 | 04:45                     | 1.193 | 09:55 | 2.995 | 2.227 | 2.227 |       |           |
| 02/01/2020 | 04:30      | 8.93 | 11:50 | 12.66 | 10.87 | 04:35           | 1.54 | 10:35 | 2.28 | 1.92 | 04:35                     | 1.173 | 10:40 | 2.756 | 1.936 | 1.936 |       |           |
| 02/02/2020 | 05:50      | 8.37 | 13:20 | 12.05 | 10.42 | 05:40           | 1.39 | 13:50 | 2.14 | 1.83 | 05:40                     | 0.966 | 12:30 | 2.413 | 1.754 | 1.754 |       |           |
| 02/03/2020 | 04:15      | 8.60 | 10:50 | 12.57 | 11.06 | 04:30           | 1.45 | 11:10 | 2.26 | 1.95 | 04:00                     | 1.052 | 11:10 | 2.703 | 2.019 | 2.019 |       |           |
| 02/04/2020 | 03:45      | 8.73 | 09:50 | 12.47 | 11.14 | 03:50           | 1.50 | 09:20 | 2.25 | 1.96 | 03:50                     | 1.102 | 09:25 | 2.660 | 2.050 | 2.050 |       |           |
| 02/05/2020 | 04:15      | 8.88 | 10:40 | 12.68 | 11.19 | 04:10           | 1.50 | 10:35 | 2.26 | 1.99 | 04:15                     | 1.131 | 10:40 | 2.740 | 2.084 | 2.084 |       |           |
| 02/06/2020 | 04:30      | 8.67 | 10:05 | 12.55 | 11.15 | 04:30           | 1.50 | 09:50 | 2.25 | 1.99 | 04:30                     | 1.091 | 10:05 | 2.693 | 2.082 | 2.082 |       |           |
| 02/07/2020 | 04:20      | 8.71 | 10:50 | 12.66 | 11.16 | 04:05           | 1.52 | 11:25 | 2.28 | 1.99 | 04:25                     | 1.120 | 11:25 | 2.761 | 2.083 | 2.083 |       |           |
| 02/08/2020 | 04:35      | 8.67 | 16:10 | 12.60 | 10.62 | 03:45           | 1.51 | 16:10 | 2.26 | 1.90 | 04:35                     | 1.105 | 16:10 | 2.726 | 1.858 | 1.858 |       |           |
| 02/09/2020 | 05:10      | 8.41 | 11:40 | 11.84 | 10.41 | 06:15           | 1.42 | 12:05 | 2.15 | 1.86 | 05:10                     | 0.997 | 12:05 | 2.372 | 1.774 | 1.774 |       |           |
| 02/10/2020 | 04:30      | 8.66 | 09:45 | 12.79 | 11.02 | 04:25           | 1.50 | 10:10 | 2.34 | 1.97 | 04:25                     | 1.090 | 10:10 | 2.866 | 2.025 | 2.025 |       |           |
| 02/11/2020 | 05:00      | 8.73 | 09:35 | 12.83 | 11.31 | 04:55           | 1.49 | 09:45 | 2.32 | 1.99 | 05:00                     | 1.094 | 09:45 | 2.850 | 2.128 | 2.128 |       |           |
| 02/12/2020 | 05:00      | 8.79 | 10:40 | 12.82 | 11.40 | 04:45           | 1.52 | 10:00 | 2.32 | 2.03 | 04:55                     | 1.136 | 10:40 | 2.859 | 2.187 | 2.187 |       |           |
| 02/13/2020 | 04:40      | 8.81 | 09:35 | 12.81 | 11.16 | 05:20           | 1.52 | 09:20 | 2.33 | 2.00 | 05:15                     | 1.142 | 09:25 | 2.868 | 2.089 | 2.089 |       |           |
| 02/14/2020 | 04:40      | 8.71 | 11:05 | 12.67 | 11.19 | 04:35           | 1.52 | 11:05 | 2.30 | 2.00 | 04:35                     | 1.116 | 11:05 | 2.791 | 2.102 | 2.102 |       |           |
| 02/15/2020 | 04:00      | 8.50 | 12:15 | 12.72 | 10.65 | 04:00           | 1.47 | 12:20 | 2.31 | 1.91 | 04:00                     | 1.042 | 12:15 | 2.818 | 1.881 | 1.881 |       |           |
| 02/16/2020 | 04:50      | 8.31 | 13:10 | 12.24 | 10.40 | 04:40           | 1.41 | 13:05 | 2.18 | 1.86 | 04:45                     | 0.969 | 13:05 | 2.531 | 1.774 | 1.774 |       |           |
| 02/17/2020 | 05:15      | 8.29 | 11:30 | 12.82 | 10.70 | 06:00           | 1.40 | 11:35 | 2.33 | 1.90 | 06:00                     | 0.959 | 11:35 | 2.864 | 1.908 | 1.908 |       |           |
| 02/18/2020 | 04:30      | 8.31 | 10:45 | 12.93 | 10.89 | 04:25           | 1.41 | 10:15 | 2.32 | 1.96 | 04:25                     | 0.969 | 10:50 | 2.855 | 1.984 | 1.984 |       |           |
| 02/19/2020 | 04:35      | 8.51 | 10:45 | 12.39 | 10.85 | 03:05           | 1.46 | 10:35 | 2.29 | 1.96 | 03:40                     | 1.045 | 10:45 | 2.701 | 1.987 | 1.987 |       |           |
| 02/20/2020 | 05:00      | 8.69 | 11:30 | 12.43 | 10.95 | 04:55           | 1.50 | 11:30 | 2.25 | 1.97 | 04:55                     | 1.097 | 11:30 | 2.667 | 2.000 | 2.000 |       |           |
| 02/21/2020 | 04:40      | 8.56 | 10:55 | 12.63 | 10.77 | 03:55           | 1.46 | 10:50 | 2.33 | 1.93 | 03:55                     | 1.046 | 10:50 | 2.795 | 1.926 | 1.926 |       |           |
| 02/22/2020 | 06:35      | 8.46 | 11:30 | 12.56 | 10.54 | 06:50           | 1.44 | 11:15 | 2.29 | 1.89 | 06:20                     | 1.016 | 11:15 | 2.737 | 1.836 | 1.836 |       |           |
| 02/23/2020 | 06:45      | 8.26 | 20:50 | 11.96 | 10.49 | 06:00           | 1.39 | 11:40 | 2.19 | 1.88 | 06:40                     | 0.952 | 11:30 | 2.444 | 1.826 | 1.826 |       |           |
| 02/24/2020 | 03:55      | 8.42 | 11:30 | 12.52 | 10.87 | 05:00           | 1.43 | 11:30 | 2.27 | 1.96 | 05:00                     | 1.003 | 11:30 | 2.718 | 1.984 | 1.984 |       |           |



| Date       | Depth (in) |      |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 05:15      | 8.41 | 10:15 | 12.22 | 10.84 | 05:00           | 1.41 | 10:20 | 2.24 | 1.95 | 05:05                     | 0.995 | 10:20 | 2.584 | 1.967 | 1.967 |           |
| 02/26/2020 | 05:00      | 8.35 | 10:55 | 12.23 | 10.78 | 04:50           | 1.43 | 10:55 | 2.22 | 1.95 | 05:00                     | 0.993 | 10:55 | 2.581 | 1.942 | 1.942 |           |
| 02/27/2020 | 05:20      | 8.44 | 09:55 | 12.33 | 10.84 | 04:30           | 1.46 | 10:10 | 2.24 | 1.95 | 05:20                     | 1.034 | 09:55 | 2.618 | 1.959 | 1.959 |           |
| 02/28/2020 | 04:20      | 8.37 | 11:05 | 12.44 | 10.75 | 03:50           | 1.43 | 09:55 | 2.26 | 1.92 | 04:35                     | 0.994 | 11:05 | 2.664 | 1.924 | 1.924 |           |
| 02/29/2020 | 04:05      | 8.25 | 14:10 | 12.89 | 10.38 | 03:50           | 1.40 | 14:00 | 2.33 | 1.85 | 03:50                     | 0.957 | 14:10 | 2.893 | 1.760 | 1.760 |           |
| 03/01/2020 | 05:45      | 7.93 | 12:35 | 11.38 | 10.01 | 05:40           | 1.32 | 12:10 | 2.08 | 1.77 | 05:40                     | 0.852 | 12:10 | 2.189 | 1.611 | 1.611 |           |
| 03/02/2020 | 04:35      | 7.99 | 09:45 | 12.02 | 10.50 | 04:35           | 1.33 | 20:50 | 2.21 | 1.88 | 04:35                     | 0.864 | 20:50 | 2.488 | 1.827 | 1.827 |           |
| 03/03/2020 | 05:55      | 8.52 | 11:00 | 12.07 | 10.65 | 04:50           | 1.46 | 11:00 | 2.27 | 1.95 | 05:50                     | 1.050 | 11:00 | 2.588 | 1.914 | 1.914 |           |
| 03/04/2020 | 03:45      | 8.00 | 09:40 | 12.22 | 10.51 | 03:45           | 1.40 | 09:35 | 2.26 | 1.93 | 03:45                     | 0.911 | 09:35 | 2.607 | 1.868 | 1.868 |           |
| 03/05/2020 | 04:15      | 7.99 | 10:55 | 11.62 | 10.43 | 04:25           | 1.36 | 11:00 | 2.20 | 1.91 | 04:25                     | 0.888 | 11:00 | 2.379 | 1.831 | 1.831 |           |
| 03/06/2020 | 04:20      | 7.96 | 12:35 | 11.81 | 10.44 | 04:10           | 1.35 | 12:30 | 2.21 | 1.90 | 04:10                     | 0.877 | 12:35 | 2.447 | 1.827 | 1.827 |           |
| 03/07/2020 | 04:30      | 7.94 | 12:10 | 11.94 | 10.24 | 03:40           | 1.34 | 10:20 | 2.21 | 1.86 | 03:40                     | 0.872 | 12:05 | 2.474 | 1.745 | 1.745 |           |
| 03/08/2020 | 05:30      | 8.22 | 15:05 | 12.34 | 10.08 | 04:25           | 1.39 | 15:00 | 2.26 | 1.83 | 04:25                     | 0.947 | 15:05 | 2.655 | 1.678 | 1.678 |           |
| 03/09/2020 | 03:25      | 8.15 | 12:20 | 12.27 | 10.71 | 03:15           | 1.41 | 12:10 | 2.25 | 1.94 | 03:25                     | 0.942 | 12:20 | 2.618 | 1.930 | 1.928 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 230.723                   | 4.90      |
| Avg   | 10.91      | 1.97            | 2.006                     |           |

## Site Commentary

### Site Information

| MIL_1795        |       |
|-----------------|-------|
| Pipe Dimensions | 27    |
| Silt Level      | 1.50" |

### Overview

Site MIL\_1795 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Sediment and slow flow conditions render data of lower confidence than typical.

This location was installed upstream of site MIL\_1790. (See MIL\_1790 Site Commentary for More Details)

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                    |                     |
|--------------------------|-------------------|--------------------|---------------------|
| Item                     | Depth (in)        | Velocity (ft/s)    | Quantity (MGD)      |
| Average                  | 9.47              | 0.40               | 0.299               |
| Minimum                  | 6.32              | 0.17               | 0.087               |
| Maximum                  | 12.80             | 0.54               | 0.503               |
| Time of Minimum          | 2/7/2020 3:55 AM  | 11/22/2019 4:40 AM | 2/7/2020 3:55 AM    |
| Time of Maximum          | 1/9/2020 11:40 AM | 3/8/2020 1:35 PM   | 12/30/2019 12:35 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_1795**

Site Address /Location: Marylinn Dr and Penitencia St, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.435797°

Longitude:

-121.911864°

Pipe Size (H x W)

27.00"x27.00"

Pipe Shape

Circular

Manhole #

1795

System Characteristics

Residential/Commercial

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Friday, November 15, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

6:23:00 AM

Pipe Size (HxW)

27.00"x27.00"

Depth of Flow (Wet DOF) (in)

9.75"

Range (Air DOF) (in)

NA

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

0.34'

Velocity Sensor Offset (in)

0"

Silt (in)

3.0"

Silt Type

Soft / Loose

### Hydraulic Comments:

Smooth flow with deep depth and slow velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

8'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

875



ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325

# SCATTERGRAPH REPORT

MIL\_1795

Flow Monitor

**MIL\_1795**

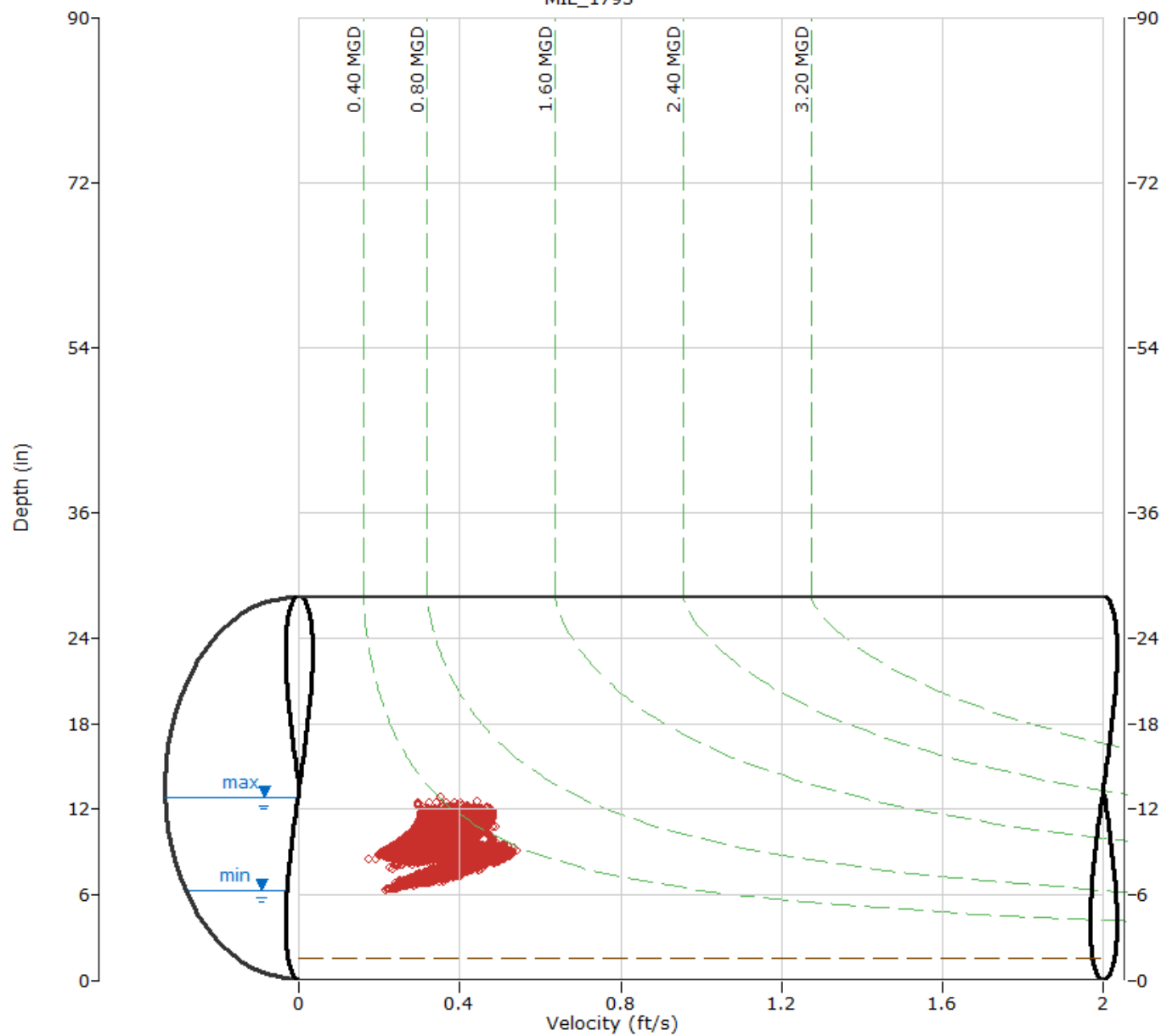
Pipe Height  
27.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_1795

Flow Monitor

**MIL\_1795**

Pipe Height

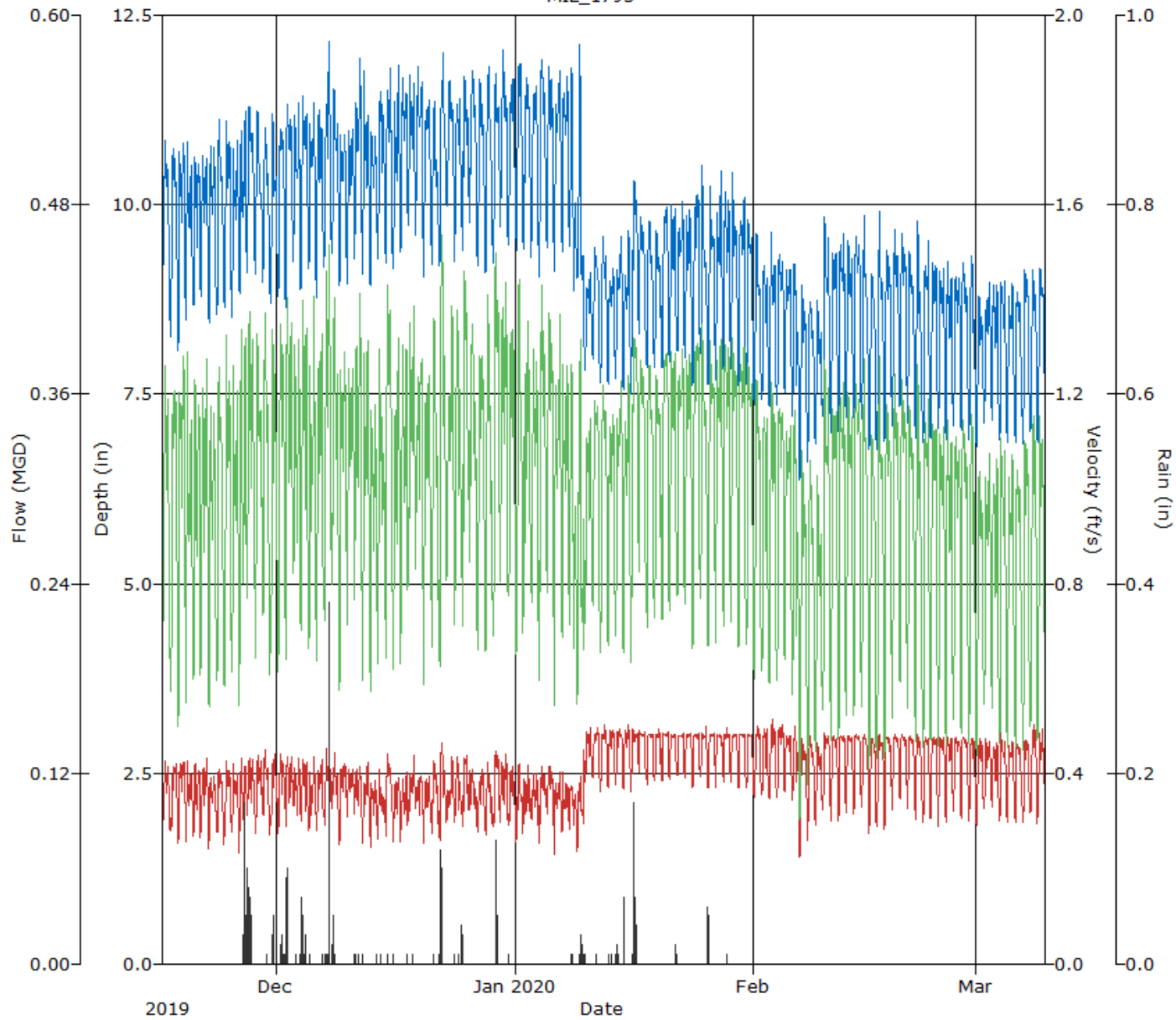
27.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_1795, Pipe Height: 27.00 in, Silt: 1.50 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 04:40      | 8.99 | 11:20 | 10.88 | 10.01 | 04:15           | 0.22 | 13:40 | 0.46 | 0.36 | 04:15                     | 0.156 | 13:40 | 0.412 | 0.297 | 0.297 |           |
| 11/17/2019 | 05:20      | 8.24 | 13:15 | 10.80 | 9.77  | 05:50           | 0.24 | 11:15 | 0.46 | 0.36 | 05:50                     | 0.148 | 11:15 | 0.409 | 0.287 | 0.287 |           |
| 11/18/2019 | 04:20      | 8.06 | 08:10 | 10.91 | 9.74  | 04:05           | 0.24 | 21:55 | 0.47 | 0.37 | 04:05                     | 0.140 | 21:55 | 0.427 | 0.292 | 0.292 |           |
| 11/19/2019 | 03:30      | 8.46 | 07:55 | 10.99 | 9.73  | 04:35           | 0.22 | 08:50 | 0.46 | 0.35 | 04:35                     | 0.142 | 08:45 | 0.408 | 0.278 | 0.278 |           |
| 11/20/2019 | 02:40      | 8.63 | 17:40 | 10.85 | 9.82  | 04:10           | 0.21 | 07:30 | 0.46 | 0.36 | 04:10                     | 0.140 | 09:05 | 0.398 | 0.286 | 0.286 |           |
| 11/21/2019 | 02:40      | 8.76 | 20:40 | 10.77 | 9.93  | 02:20           | 0.24 | 20:45 | 0.46 | 0.36 | 02:20                     | 0.158 | 20:45 | 0.409 | 0.295 | 0.295 |           |
| 11/22/2019 | 04:15      | 8.41 | 17:05 | 11.12 | 9.87  | 04:40           | 0.17 | 21:50 | 0.47 | 0.34 | 04:40                     | 0.110 | 21:50 | 0.410 | 0.275 | 0.275 |           |
| 11/23/2019 | 03:55      | 8.51 | 13:20 | 11.32 | 9.92  | 05:25           | 0.23 | 13:05 | 0.47 | 0.35 | 05:25                     | 0.147 | 13:05 | 0.448 | 0.287 | 0.287 |           |
| 11/24/2019 | 04:45      | 8.62 | 12:00 | 11.14 | 10.10 | 02:50           | 0.21 | 09:05 | 0.47 | 0.36 | 02:50                     | 0.142 | 10:45 | 0.432 | 0.299 | 0.299 |           |
| 11/25/2019 | 03:30      | 8.47 | 20:20 | 10.88 | 9.94  | 04:45           | 0.20 | 19:40 | 0.45 | 0.36 | 04:45                     | 0.132 | 19:40 | 0.405 | 0.290 | 0.290 |           |
| 11/26/2019 | 04:15      | 8.80 | 21:05 | 11.28 | 10.08 | 04:10           | 0.20 | 07:45 | 0.47 | 0.35 | 04:10                     | 0.135 | 07:45 | 0.439 | 0.292 | 0.292 | 0.36      |
| 11/27/2019 | 03:20      | 9.00 | 09:50 | 11.41 | 10.48 | 05:05           | 0.29 | 12:00 | 0.48 | 0.39 | 03:20                     | 0.208 | 10:35 | 0.459 | 0.337 | 0.337 | 0.63      |
| 11/28/2019 | 05:25      | 9.04 | 11:05 | 11.32 | 10.25 | 05:30           | 0.22 | 14:50 | 0.47 | 0.37 | 05:30                     | 0.155 | 12:30 | 0.437 | 0.313 | 0.313 |           |
| 11/29/2019 | 04:05      | 8.87 | 10:55 | 11.05 | 10.09 | 04:20           | 0.23 | 10:40 | 0.47 | 0.38 | 04:20                     | 0.160 | 10:40 | 0.436 | 0.311 | 0.311 | 0.02      |
| 11/30/2019 | 06:00      | 8.66 | 11:35 | 11.32 | 9.98  | 03:15           | 0.21 | 11:30 | 0.48 | 0.36 | 03:15                     | 0.142 | 11:30 | 0.458 | 0.299 | 0.299 | 0.10      |
| 12/01/2019 | 05:50      | 8.76 | 15:10 | 11.11 | 10.17 | 06:40           | 0.21 | 12:50 | 0.48 | 0.37 | 06:40                     | 0.150 | 12:50 | 0.444 | 0.313 | 0.313 | 0.06      |
| 12/02/2019 | 03:35      | 8.62 | 08:50 | 11.52 | 10.37 | 04:45           | 0.24 | 16:00 | 0.48 | 0.38 | 04:45                     | 0.157 | 08:20 | 0.458 | 0.326 | 0.326 | 0.30      |
| 12/03/2019 | 03:10      | 9.15 | 19:15 | 11.56 | 10.43 | 04:35           | 0.27 | 22:10 | 0.47 | 0.38 | 04:35                     | 0.207 | 20:10 | 0.451 | 0.325 | 0.325 | 0.01      |
| 12/04/2019 | 03:10      | 8.77 | 08:45 | 11.59 | 10.53 | 03:25           | 0.26 | 20:55 | 0.47 | 0.38 | 03:25                     | 0.176 | 10:35 | 0.461 | 0.332 | 0.332 | 0.39      |
| 12/05/2019 | 04:00      | 9.10 | 21:25 | 11.42 | 10.43 | 05:00           | 0.23 | 21:55 | 0.48 | 0.36 | 05:00                     | 0.166 | 21:55 | 0.455 | 0.310 | 0.310 | 0.01      |
| 12/06/2019 | 04:10      | 8.72 | 07:50 | 11.41 | 10.33 | 03:55           | 0.21 | 12:10 | 0.47 | 0.37 | 03:55                     | 0.137 | 12:10 | 0.443 | 0.316 | 0.316 | 0.01      |
| 12/07/2019 | 02:50      | 9.15 | 18:35 | 12.16 | 10.63 | 05:55           | 0.26 | 12:00 | 0.48 | 0.38 | 05:55                     | 0.193 | 17:45 | 0.501 | 0.339 | 0.339 | 0.67      |
| 12/08/2019 | 05:50      | 9.33 | 10:20 | 11.56 | 10.56 | 23:55           | 0.28 | 11:35 | 0.48 | 0.38 | 23:55                     | 0.230 | 11:35 | 0.476 | 0.335 | 0.335 | 0.20      |
| 12/09/2019 | 04:10      | 8.91 | 06:50 | 11.26 | 10.25 | 04:05           | 0.21 | 19:40 | 0.47 | 0.37 | 04:05                     | 0.142 | 19:40 | 0.437 | 0.311 | 0.311 |           |
| 12/10/2019 | 04:20      | 8.95 | 08:40 | 11.04 | 10.30 | 04:40           | 0.27 | 20:25 | 0.47 | 0.38 | 04:40                     | 0.184 | 20:25 | 0.432 | 0.321 | 0.321 |           |
| 12/11/2019 | 04:10      | 9.24 | 20:25 | 12.06 | 10.70 | 04:50           | 0.25 | 20:00 | 0.46 | 0.37 | 04:50                     | 0.181 | 20:00 | 0.474 | 0.334 | 0.334 | 0.03      |
| 12/12/2019 | 04:55      | 9.03 | 08:20 | 11.94 | 10.45 | 04:05           | 0.23 | 22:00 | 0.47 | 0.35 | 04:05                     | 0.164 | 22:00 | 0.443 | 0.305 | 0.305 | 0.01      |
| 12/13/2019 | 04:05      | 8.91 | 07:00 | 11.11 | 10.26 | 04:20           | 0.21 | 07:05 | 0.45 | 0.34 | 04:20                     | 0.142 | 07:05 | 0.417 | 0.290 | 0.290 | 0.01      |
| 12/14/2019 | 03:35      | 9.23 | 19:35 | 11.88 | 10.53 | 04:30           | 0.24 | 14:55 | 0.46 | 0.33 | 04:30                     | 0.175 | 14:55 | 0.433 | 0.291 | 0.291 | 0.01      |
| 12/15/2019 | 05:30      | 9.22 | 19:20 | 11.90 | 10.67 | 06:10           | 0.24 | 11:55 | 0.48 | 0.38 | 05:15                     | 0.175 | 11:55 | 0.471 | 0.337 | 0.337 | 0.01      |
| 12/16/2019 | 03:25      | 9.04 | 19:15 | 12.04 | 10.56 | 04:30           | 0.23 | 20:55 | 0.47 | 0.35 | 04:30                     | 0.168 | 20:55 | 0.475 | 0.306 | 0.306 | 0.01      |
| 12/17/2019 | 03:00      | 9.35 | 11:25 | 11.82 | 10.81 | 03:20           | 0.23 | 21:00 | 0.47 | 0.34 | 03:20                     | 0.171 | 21:00 | 0.460 | 0.310 | 0.310 | 0.01      |
| 12/18/2019 | 03:20      | 9.69 | 09:05 | 11.84 | 10.90 | 03:30           | 0.25 | 08:55 | 0.48 | 0.37 | 03:30                     | 0.198 | 08:55 | 0.488 | 0.340 | 0.340 | 0.01      |
| 12/19/2019 | 03:10      | 9.40 | 21:45 | 11.97 | 10.96 | 05:30           | 0.27 | 16:10 | 0.47 | 0.36 | 05:30                     | 0.216 | 17:55 | 0.449 | 0.335 | 0.335 |           |
| 12/20/2019 | 04:00      | 8.98 | 19:15 | 11.49 | 10.60 | 04:10           | 0.23 | 21:35 | 0.45 | 0.34 | 04:10                     | 0.157 | 18:55 | 0.421 | 0.306 | 0.306 |           |
| 12/21/2019 | 05:05      | 9.18 | 14:15 | 11.67 | 10.37 | 05:55           | 0.23 | 12:45 | 0.48 | 0.36 | 05:40                     | 0.164 | 14:30 | 0.462 | 0.309 | 0.309 | 0.01      |
| 12/22/2019 | 06:00      | 9.09 | 15:05 | 12.18 | 10.70 | 05:50           | 0.22 | 12:45 | 0.48 | 0.37 | 05:50                     | 0.158 | 12:40 | 0.474 | 0.333 | 0.333 | 0.41      |
| 12/23/2019 | 05:10      | 9.93 | 10:40 | 11.67 | 10.90 | 02:45           | 0.28 | 20:25 | 0.48 | 0.36 | 01:20                     | 0.228 | 20:45 | 0.457 | 0.329 | 0.329 |           |
| 12/24/2019 | 04:50      | 9.20 | 19:15 | 11.56 | 10.58 | 04:55           | 0.28 | 13:45 | 0.48 | 0.36 | 04:55                     | 0.199 | 13:45 | 0.450 | 0.319 | 0.319 | 0.02      |
| 12/25/2019 | 05:10      | 9.37 | 11:55 | 11.70 | 10.65 | 04:20           | 0.25 | 19:10 | 0.47 | 0.37 | 04:20                     | 0.187 | 12:00 | 0.465 | 0.333 | 0.333 | 0.08      |
| 12/26/2019 | 02:45      | 9.69 | 12:55 | 11.93 | 10.97 | 02:50           | 0.27 | 14:10 | 0.48 | 0.37 | 02:50                     | 0.212 | 14:10 | 0.480 | 0.339 | 0.339 |           |
| 12/27/2019 | 04:55      | 9.18 | 11:35 | 11.70 | 10.65 | 04:45           | 0.24 | 16:25 | 0.47 | 0.35 | 04:45                     | 0.172 | 12:25 | 0.439 | 0.318 | 0.318 |           |
| 12/28/2019 | 05:05      | 9.03 | 14:20 | 11.92 | 10.57 | 05:30           | 0.24 | 13:50 | 0.48 | 0.34 | 05:30                     | 0.171 | 13:50 | 0.470 | 0.305 | 0.305 |           |
| 12/29/2019 | 05:05      | 9.20 | 13:25 | 11.80 | 10.72 | 06:55           | 0.27 | 13:40 | 0.48 | 0.37 | 05:40                     | 0.196 | 09:45 | 0.488 | 0.337 | 0.337 | 0.22      |
| 12/30/2019 | 03:55      | 9.62 | 12:50 | 12.09 | 11.03 | 03:10           | 0.26 | 15:55 | 0.48 | 0.38 | 03:35                     | 0.203 | 12:35 | 0.503 | 0.357 | 0.357 |           |
| 12/31/2019 | 04:10      | 9.43 | 19:50 | 11.96 | 10.81 | 06:00           | 0.26 | 19:00 | 0.48 | 0.36 | 06:00                     | 0.207 | 19:00 | 0.459 | 0.328 | 0.328 |           |

| Date       | Depth (in) |      |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 06:20      | 9.37 | 18:45 | 12.51 | 10.90 | 05:00           | 0.24 | 20:00 | 0.47 | 0.34 | 05:00                     | 0.185 | 18:45 | 0.491 | 0.318 | 0.318 |       |           |
| 01/02/2020 | 03:35      | 9.39 | 13:40 | 11.71 | 10.83 | 02:25           | 0.25 | 19:10 | 0.47 | 0.34 | 04:30                     | 0.188 | 19:10 | 0.467 | 0.314 | 0.314 |       |           |
| 01/03/2020 | 03:00      | 9.16 | 19:35 | 11.60 | 10.72 | 05:20           | 0.24 | 20:50 | 0.47 | 0.35 | 05:20                     | 0.182 | 20:50 | 0.459 | 0.316 | 0.316 |       |           |
| 01/04/2020 | 04:15      | 9.03 | 13:25 | 11.96 | 10.76 | 04:15           | 0.21 | 13:05 | 0.45 | 0.35 | 04:15                     | 0.149 | 13:05 | 0.464 | 0.320 | 0.320 |       |           |
| 01/05/2020 | 04:45      | 9.38 | 12:20 | 11.88 | 10.84 | 05:15           | 0.24 | 09:20 | 0.47 | 0.37 | 05:15                     | 0.178 | 09:20 | 0.456 | 0.341 | 0.341 |       |           |
| 01/06/2020 | 04:00      | 9.02 | 21:40 | 11.80 | 10.72 | 04:05           | 0.22 | 21:20 | 0.48 | 0.34 | 04:00                     | 0.151 | 21:20 | 0.490 | 0.310 | 0.310 |       |           |
| 01/07/2020 | 04:50      | 9.35 | 20:05 | 11.71 | 10.90 | 04:50           | 0.26 | 06:15 | 0.47 | 0.34 | 04:50                     | 0.190 | 06:20 | 0.435 | 0.311 | 0.311 |       |           |
| 01/08/2020 | 15:20      | 7.76 | 10:15 | 11.81 | 10.31 | 15:25           | 0.23 | 14:35 | 0.47 | 0.34 | 15:25                     | 0.129 | 14:35 | 0.434 | 0.292 | 0.292 |       |           |
| 01/09/2020 | 23:55      | 8.58 | 11:40 | 12.80 | 9.84  | 03:00           | 0.22 | 10:40 | 0.45 | 0.32 | 04:25                     | 0.150 | 11:45 | 0.465 | 0.258 | 0.258 |       |           |
| 01/10/2020 | 03:50      | 7.77 | 19:20 | 9.17  | 8.61  | 03:35           | 0.38 | 19:00 | 0.52 | 0.45 | 03:35                     | 0.212 | 19:00 | 0.364 | 0.296 | 0.296 | 0.02  |           |
| 01/11/2020 | 05:10      | 7.93 | 11:00 | 9.52  | 8.81  | 05:10           | 0.39 | 12:30 | 0.52 | 0.45 | 05:10                     | 0.223 | 12:30 | 0.380 | 0.308 | 0.308 | 0.18  |           |
| 01/12/2020 | 05:00      | 7.61 | 11:00 | 9.82  | 8.72  | 04:50           | 0.34 | 15:55 | 0.52 | 0.45 | 04:50                     | 0.181 | 11:00 | 0.380 | 0.299 | 0.299 | 0.02  |           |
| 01/13/2020 | 04:15      | 7.61 | 19:40 | 9.24  | 8.59  | 04:15           | 0.37 | 21:15 | 0.52 | 0.45 | 04:15                     | 0.199 | 21:15 | 0.367 | 0.291 | 0.291 | 0.11  |           |
| 01/14/2020 | 02:15      | 7.68 | 20:30 | 9.62  | 8.74  | 03:35           | 0.35 | 08:15 | 0.52 | 0.45 | 03:35                     | 0.194 | 20:30 | 0.370 | 0.304 | 0.304 | 0.07  |           |
| 01/15/2020 | 04:55      | 7.52 | 20:30 | 9.69  | 8.65  | 04:20           | 0.36 | 19:00 | 0.52 | 0.45 | 04:20                     | 0.194 | 21:20 | 0.380 | 0.298 | 0.298 | 0.66  |           |
| 01/16/2020 | 04:00      | 7.44 | 13:15 | 10.33 | 9.21  | 04:00           | 0.36 | 10:05 | 0.52 | 0.45 | 04:00                     | 0.186 | 13:15 | 0.395 | 0.330 | 0.330 |       |           |
| 01/17/2020 | 04:50      | 8.28 | 09:50 | 9.95  | 9.22  | 04:50           | 0.40 | 07:20 | 0.52 | 0.47 | 04:50                     | 0.247 | 09:50 | 0.386 | 0.339 | 0.339 |       |           |
| 01/18/2020 | 05:40      | 7.83 | 14:15 | 9.85  | 8.91  | 05:55           | 0.35 | 22:25 | 0.52 | 0.45 | 05:55                     | 0.200 | 14:15 | 0.382 | 0.312 | 0.312 |       |           |
| 01/19/2020 | 04:55      | 7.85 | 11:55 | 9.74  | 8.86  | 04:55           | 0.38 | 22:50 | 0.52 | 0.45 | 04:55                     | 0.217 | 11:55 | 0.376 | 0.310 | 0.310 |       |           |
| 01/20/2020 | 04:40      | 7.84 | 15:20 | 10.01 | 9.16  | 04:40           | 0.38 | 23:35 | 0.52 | 0.46 | 04:40                     | 0.216 | 15:20 | 0.388 | 0.329 | 0.329 |       |           |
| 01/21/2020 | 03:55      | 7.87 | 11:45 | 10.30 | 9.14  | 03:55           | 0.39 | 07:25 | 0.52 | 0.46 | 03:55                     | 0.219 | 11:45 | 0.395 | 0.329 | 0.329 |       |           |
| 01/22/2020 | 05:00      | 8.01 | 21:15 | 10.12 | 9.17  | 05:00           | 0.39 | 07:35 | 0.52 | 0.46 | 05:00                     | 0.229 | 21:15 | 0.391 | 0.331 | 0.331 | 0.03  |           |
| 01/23/2020 | 04:35      | 7.98 | 19:45 | 10.10 | 9.12  | 04:35           | 0.39 | 23:30 | 0.52 | 0.46 | 04:35                     | 0.227 | 19:45 | 0.391 | 0.328 | 0.328 |       |           |
| 01/24/2020 | 04:50      | 7.59 | 17:45 | 10.20 | 9.19  | 04:55           | 0.36 | 08:35 | 0.51 | 0.45 | 04:55                     | 0.194 | 17:45 | 0.393 | 0.327 | 0.327 |       |           |
| 01/25/2020 | 05:05      | 8.00 | 10:35 | 10.74 | 9.09  | 05:05           | 0.39 | 21:20 | 0.52 | 0.46 | 05:05                     | 0.228 | 10:35 | 0.438 | 0.327 | 0.327 |       |           |
| 01/26/2020 | 05:05      | 7.59 | 11:15 | 10.31 | 9.05  | 05:10           | 0.37 | 09:00 | 0.52 | 0.45 | 05:05                     | 0.197 | 11:15 | 0.395 | 0.319 | 0.319 | 0.16  |           |
| 01/27/2020 | 05:20      | 7.67 | 21:20 | 10.68 | 9.17  | 05:05           | 0.34 | 08:10 | 0.48 | 0.46 | 05:05                     | 0.184 | 21:05 | 0.396 | 0.328 | 0.328 |       |           |
| 01/28/2020 | 04:30      | 7.76 | 10:45 | 10.40 | 9.18  | 04:30           | 0.38 | 14:35 | 0.52 | 0.46 | 04:30                     | 0.211 | 10:45 | 0.396 | 0.332 | 0.332 |       |           |
| 01/29/2020 | 04:05      | 7.76 | 10:05 | 10.69 | 9.20  | 04:05           | 0.38 | 00:00 | 0.52 | 0.46 | 04:05                     | 0.211 | 10:20 | 0.396 | 0.331 | 0.331 |       |           |
| 01/30/2020 | 04:05      | 7.59 | 22:25 | 10.33 | 9.14  | 04:05           | 0.37 | 07:35 | 0.51 | 0.46 | 04:05                     | 0.198 | 22:25 | 0.395 | 0.328 | 0.328 |       |           |
| 01/31/2020 | 04:55      | 7.62 | 10:40 | 9.84  | 8.99  | 04:55           | 0.37 | 22:50 | 0.51 | 0.45 | 04:55                     | 0.200 | 10:40 | 0.381 | 0.318 | 0.318 |       |           |
| 02/01/2020 | 04:40      | 7.32 | 11:30 | 9.64  | 8.60  | 04:40           | 0.35 | 09:50 | 0.52 | 0.44 | 04:40                     | 0.176 | 11:30 | 0.371 | 0.290 | 0.290 |       |           |
| 02/02/2020 | 04:55      | 7.41 | 10:45 | 9.24  | 8.40  | 04:55           | 0.35 | 21:30 | 0.52 | 0.43 | 04:55                     | 0.183 | 21:30 | 0.366 | 0.271 | 0.271 |       |           |
| 02/03/2020 | 04:05      | 7.32 | 08:55 | 10.48 | 8.57  | 04:05           | 0.35 | 13:30 | 0.52 | 0.44 | 04:05                     | 0.176 | 09:00 | 0.396 | 0.289 | 0.289 |       |           |
| 02/04/2020 | 04:35      | 7.34 | 13:50 | 9.45  | 8.62  | 06:10           | 0.34 | 08:20 | 0.52 | 0.45 | 04:35                     | 0.177 | 08:20 | 0.364 | 0.295 | 0.295 |       |           |
| 02/05/2020 | 05:30      | 7.48 | 20:55 | 9.34  | 8.56  | 03:50           | 0.33 | 19:15 | 0.52 | 0.44 | 03:50                     | 0.176 | 09:15 | 0.368 | 0.286 | 0.286 |       |           |
| 02/06/2020 | 15:00      | 6.59 | 14:50 | 9.92  | 8.19  | 15:00           | 0.26 | 11:40 | 0.52 | 0.42 | 15:00                     | 0.114 | 14:50 | 0.385 | 0.258 | 0.258 |       |           |
| 02/07/2020 | 03:55      | 6.32 | 11:20 | 8.99  | 7.91  | 03:55           | 0.22 | 20:10 | 0.50 | 0.39 | 03:55                     | 0.087 | 11:20 | 0.328 | 0.231 | 0.231 |       |           |
| 02/08/2020 | 04:00      | 6.57 | 12:00 | 8.81  | 7.88  | 04:45           | 0.24 | 11:00 | 0.50 | 0.40 | 04:00                     | 0.107 | 12:10 | 0.337 | 0.233 | 0.233 |       |           |
| 02/09/2020 | 03:50      | 6.83 | 11:20 | 8.82  | 7.82  | 04:35           | 0.25 | 21:55 | 0.48 | 0.39 | 04:35                     | 0.117 | 11:20 | 0.316 | 0.224 | 0.224 |       |           |
| 02/10/2020 | 03:20      | 7.20 | 09:25 | 9.88  | 8.65  | 01:45           | 0.29 | 15:55 | 0.50 | 0.43 | 01:45                     | 0.144 | 09:25 | 0.383 | 0.289 | 0.289 |       |           |
| 02/11/2020 | 03:40      | 6.95 | 21:05 | 9.40  | 8.58  | 04:50           | 0.29 | 10:05 | 0.48 | 0.43 | 04:50                     | 0.138 | 09:10 | 0.353 | 0.285 | 0.285 |       |           |
| 02/12/2020 | 04:05      | 7.00 | 20:10 | 9.76  | 8.68  | 04:15           | 0.27 | 16:25 | 0.51 | 0.44 | 04:15                     | 0.127 | 20:10 | 0.377 | 0.294 | 0.294 |       |           |
| 02/13/2020 | 04:00      | 7.13 | 11:55 | 9.57  | 8.65  | 03:35           | 0.29 | 21:00 | 0.51 | 0.44 | 03:35                     | 0.142 | 21:00 | 0.376 | 0.293 | 0.293 |       |           |
| 02/14/2020 | 04:00      | 7.12 | 11:25 | 9.65  | 8.74  | 03:50           | 0.28 | 22:55 | 0.51 | 0.44 | 03:50                     | 0.138 | 19:20 | 0.372 | 0.299 | 0.299 |       |           |
| 02/15/2020 | 05:30      | 7.13 | 12:20 | 9.92  | 8.50  | 06:15           | 0.30 | 13:55 | 0.48 | 0.43 | 06:15                     | 0.150 | 12:20 | 0.385 | 0.280 | 0.280 |       |           |
| 02/16/2020 | 04:45      | 6.74 | 13:10 | 9.27  | 8.18  | 04:45           | 0.24 | 19:55 | 0.49 | 0.41 | 04:45                     | 0.107 | 13:10 | 0.344 | 0.255 | 0.255 |       |           |
| 02/17/2020 | 04:50      | 6.75 | 13:25 | 9.99  | 8.37  | 03:00           | 0.27 | 10:45 | 0.51 | 0.41 | 04:50                     | 0.122 | 13:25 | 0.387 | 0.267 | 0.267 |       |           |
| 02/18/2020 | 03:50      | 6.85 | 11:00 | 9.50  | 8.45  | 04:55           | 0.27 | 08:30 | 0.50 | 0.43 | 05:25                     | 0.123 | 11:00 | 0.358 | 0.277 | 0.277 |       |           |
| 02/19/2020 | 04:30      | 7.06 | 12:10 | 9.75  | 8.61  | 04:30           | 0.31 | 13:25 | 0.51 | 0.44 | 04:30                     | 0.150 | 13:25 | 0.383 | 0.289 | 0.289 |       |           |
| 02/20/2020 | 03:30      | 7.30 | 11:20 | 9.64  | 8.72  | 04:20           | 0.31 | 21:45 | 0.51 | 0.45 | 04:20                     | 0.160 | 11:20 | 0.371 | 0.299 | 0.299 |       |           |
| 02/21/2020 | 04:20      | 7.10 | 11:00 | 9.56  | 8.48  | 03:50           | 0.29 | 11:00 | 0.48 | 0.44 | 03:50                     | 0.145 | 11:00 | 0.367 | 0.281 | 0.281 |       |           |
| 02/22/2020 | 05:40      | 6.88 | 12:05 | 9.91  | 8.34  | 03:40           | 0.28 | 12:35 | 0.48 | 0.42 | 05:45                     | 0.135 | 12:05 | 0.384 | 0.267 | 0.267 |       |           |
| 02/23/2020 | 05:35      | 6.85 | 20:20 | 9.71  | 8.32  | 03:00           | 0.28 | 17:55 | 0.50 | 0.42 | 05:15                     | 0.129 | 20:20 | 0.375 | 0.265 | 0.265 |       |           |
| 02/24/2020 | 04:30      | 6.91 | 11:40 | 9.34  | 8.37  | 01:50           | 0.29 | 14:50 | 0.51 | 0.42 | 03:50                     | 0.137 | 14:50 | 0.360 | 0.271 | 0.271 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 02/25/2020 | 05:10      | 7.00 | 20:45 | 9.19 | 8.44 | 03:55           | 0.28 | 10:55 | 0.50 | 0.43 | 03:55                     | 0.133 | 10:55 | 0.351 | 0.277 | 0.277 |       |           |
| 02/26/2020 | 04:15      | 6.90 | 08:30 | 9.34 | 8.33 | 05:15           | 0.27 | 08:50 | 0.48 | 0.43 | 05:15                     | 0.127 | 08:30 | 0.348 | 0.268 | 0.268 |       |           |
| 02/27/2020 | 04:10      | 7.06 | 12:30 | 9.10 | 8.41 | 04:05           | 0.29 | 07:50 | 0.50 | 0.43 | 04:05                     | 0.139 | 07:50 | 0.336 | 0.276 | 0.276 |       |           |
| 02/28/2020 | 04:05      | 7.00 | 11:00 | 9.33 | 8.41 | 04:55           | 0.29 | 12:25 | 0.50 | 0.43 | 04:55                     | 0.140 | 11:00 | 0.350 | 0.276 | 0.276 |       |           |
| 02/29/2020 | 03:55      | 6.85 | 13:55 | 9.42 | 8.13 | 03:45           | 0.26 | 12:10 | 0.50 | 0.41 | 03:45                     | 0.118 | 12:10 | 0.363 | 0.250 | 0.250 |       |           |
| 03/01/2020 | 05:30      | 6.79 | 12:55 | 8.88 | 7.97 | 03:10           | 0.25 | 20:40 | 0.51 | 0.41 | 03:15                     | 0.116 | 14:25 | 0.328 | 0.239 | 0.239 |       |           |
| 03/02/2020 | 04:25      | 7.12 | 20:55 | 9.06 | 8.22 | 01:50           | 0.29 | 08:55 | 0.52 | 0.42 | 04:00                     | 0.146 | 08:40 | 0.336 | 0.256 | 0.256 |       |           |
| 03/03/2020 | 04:40      | 7.14 | 20:20 | 9.01 | 8.18 | 04:40           | 0.33 | 07:55 | 0.52 | 0.41 | 04:40                     | 0.160 | 07:55 | 0.353 | 0.247 | 0.247 |       |           |
| 03/04/2020 | 03:50      | 6.87 | 09:40 | 9.11 | 8.21 | 03:50           | 0.30 | 11:45 | 0.53 | 0.42 | 03:50                     | 0.137 | 11:45 | 0.361 | 0.258 | 0.258 |       |           |
| 03/05/2020 | 03:35      | 6.84 | 20:45 | 9.08 | 8.16 | 04:30           | 0.29 | 09:40 | 0.48 | 0.41 | 04:30                     | 0.133 | 20:45 | 0.331 | 0.251 | 0.251 |       |           |
| 03/06/2020 | 05:35      | 6.83 | 10:35 | 8.98 | 8.16 | 05:35           | 0.29 | 10:35 | 0.47 | 0.41 | 05:35                     | 0.134 | 10:35 | 0.323 | 0.252 | 0.252 |       |           |
| 03/07/2020 | 05:15      | 6.78 | 11:05 | 9.25 | 8.19 | 04:55           | 0.28 | 20:40 | 0.52 | 0.40 | 04:55                     | 0.126 | 20:40 | 0.348 | 0.248 | 0.248 |       |           |
| 03/08/2020 | 04:50      | 6.98 | 11:30 | 9.18 | 8.17 | 04:50           | 0.31 | 13:35 | 0.54 | 0.42 | 04:50                     | 0.146 | 13:35 | 0.379 | 0.257 | 0.257 |       |           |
| 03/09/2020 | 03:30      | 6.86 | 10:25 | 9.21 | 8.25 | 01:40           | 0.27 | 10:20 | 0.53 | 0.41 | 02:40                     | 0.130 | 10:20 | 0.383 | 0.257 | 0.257 |       |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 34.416                    | 4.90      |
| Avg   | 9.47       | 0.40            | 0.299                     |           |



## Site Commentary

### Site Information

| MIL_2300        |       |
|-----------------|-------|
| Pipe Dimensions | 10.25 |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2300 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited a small response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                     |                     |                     |
|--------------------------|---------------------|---------------------|---------------------|
| Item                     | Depth (in)          | Velocity (ft/s)     | Quantity (MGD)      |
| Average                  | 1.65                | 1.40                | 0.056               |
| Minimum                  | 0.93                | 0.33                | 0.006               |
| Maximum                  | 2.44                | 2.89                | 0.177               |
| Time of Minimum          | 1/13/2020 4:15 AM   | 2/27/2020 3:50 AM   | 1/13/2020 3:55 AM   |
| Time of Maximum          | 11/28/2019 12:45 PM | 12/13/2019 11:10 AM | 11/28/2019 12:50 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_2300

Site Address /Location: Washington Dr and Fontainebleu Avenue, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: In between lanes w/buses

Latitude:

37.452734

Longitude:

-121.909412

Pipe Size (H x W)

10.25" x 10.25"

Pipe Shape

Circular

Manhole #

2300

System Characteristics

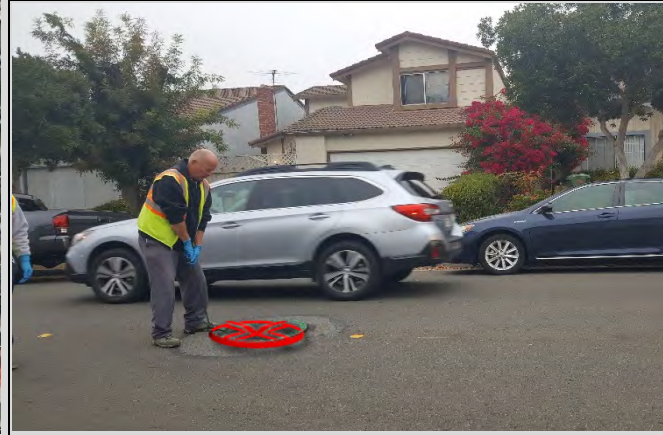
Residential

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

3:03:34 AM

Pipe Size (HxW)

10.25" x 10.25"

Depth of Flow (Wet DOF) (in)

1.13"

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.2

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

### Hydraulic Comments:

Good flow shallow depth, moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

6'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

882

ADS Project Name: Milpitas.WWTFM.CA19-20

105

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_2300

Flow Monitor

**MIL\_2300**

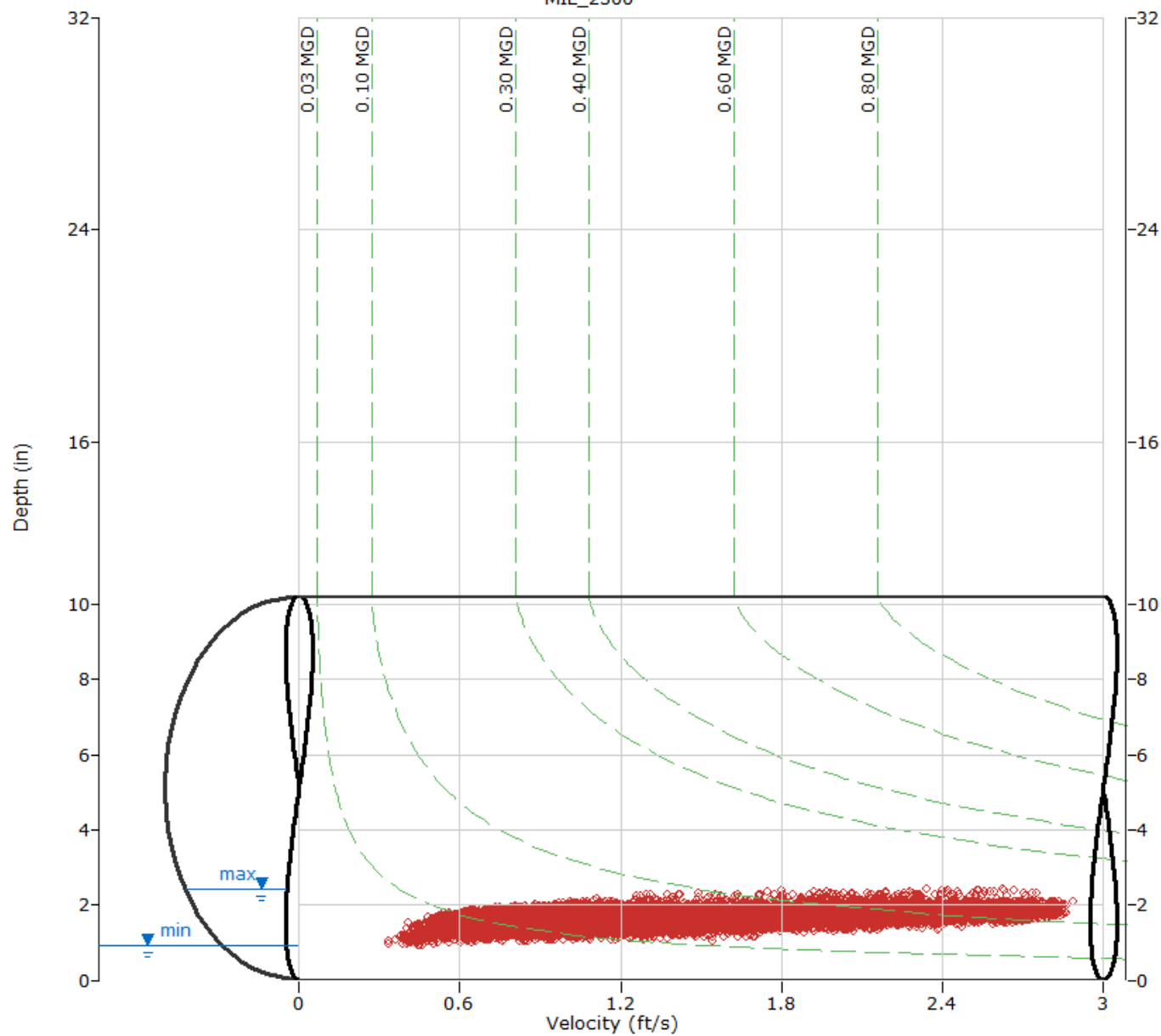
Pipe Height  
10.25 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

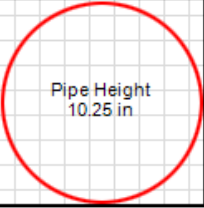


ADS ENVIRONMENTAL  
SERVICES

# HYDROGRAPH REPORT

MIL\_2300

Flow Monitor  
**MIL\_2300**

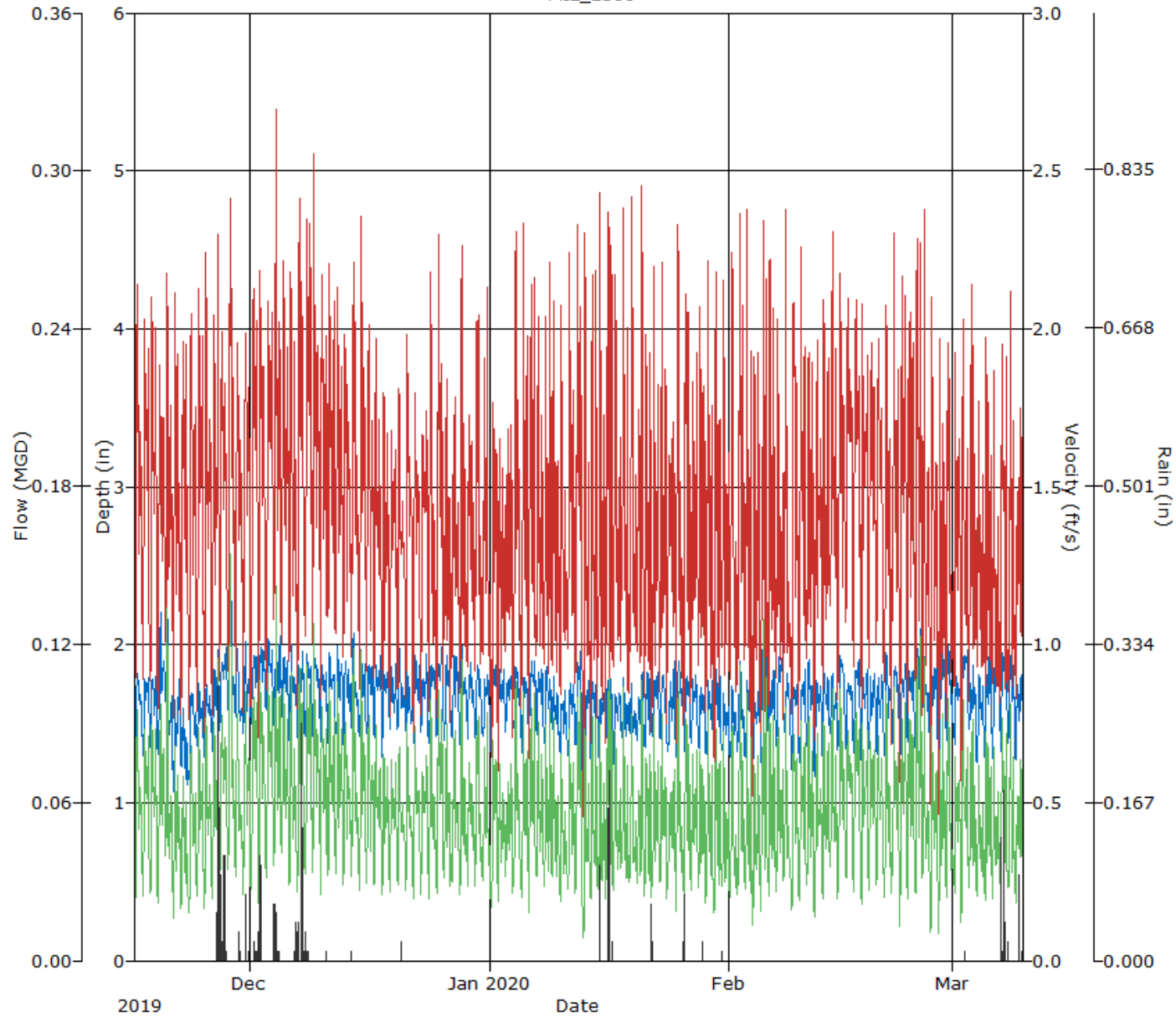


Pipe Height  
10.25 in.

Report Period  
11/16/2019  
To  
3/9/2020

Legend  

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2300, Pipe Height: 10.25 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 11/16/2019 | 05:45      | 1.20 | 11:55 | 1.86 | 1.60 | 04:05           | 0.54 | 11:55 | 2.71 | 1.45 | 04:05                     | 0.014 | 11:55 | 0.125 | 0.055 | 0.055 |       |           |
| 11/17/2019 | 05:25      | 1.27 | 20:00 | 2.02 | 1.61 | 05:25           | 0.65 | 20:00 | 2.83 | 1.47 | 05:25                     | 0.017 | 20:00 | 0.146 | 0.057 | 0.057 |       |           |
| 11/18/2019 | 01:55      | 1.30 | 19:25 | 1.93 | 1.63 | 00:35           | 0.65 | 18:50 | 2.58 | 1.49 | 04:25                     | 0.020 | 18:50 | 0.118 | 0.058 | 0.058 |       |           |
| 11/19/2019 | 03:05      | 1.22 | 11:15 | 2.33 | 1.74 | 23:50           | 0.54 | 07:50 | 2.59 | 1.40 | 02:25                     | 0.015 | 11:20 | 0.143 | 0.061 | 0.061 |       |           |
| 11/20/2019 | 23:40      | 1.32 | 07:35 | 2.40 | 1.67 | 02:40           | 0.65 | 07:40 | 2.63 | 1.43 | 23:25                     | 0.021 | 07:40 | 0.172 | 0.058 | 0.058 |       |           |
| 11/21/2019 | 04:15      | 0.99 | 14:00 | 2.04 | 1.43 | 03:40           | 0.36 | 14:10 | 2.66 | 1.37 | 03:40                     | 0.008 | 14:00 | 0.133 | 0.045 | 0.045 |       |           |
| 11/22/2019 | 23:50      | 1.05 | 07:55 | 1.71 | 1.34 | 02:30           | 0.49 | 10:10 | 2.67 | 1.43 | 02:35                     | 0.013 | 14:20 | 0.100 | 0.042 | 0.042 |       |           |
| 11/23/2019 | 00:15      | 1.04 | 13:40 | 2.05 | 1.46 | 03:20           | 0.54 | 12:25 | 2.82 | 1.48 | 03:15                     | 0.012 | 12:25 | 0.115 | 0.050 | 0.050 |       |           |
| 11/24/2019 | 03:50      | 1.31 | 09:50 | 1.95 | 1.54 | 05:15           | 0.50 | 09:50 | 2.82 | 1.46 | 05:15                     | 0.014 | 09:50 | 0.138 | 0.052 | 0.052 |       |           |
| 11/25/2019 | 02:40      | 1.24 | 11:15 | 1.88 | 1.56 | 03:15           | 0.46 | 11:25 | 2.76 | 1.45 | 03:15                     | 0.012 | 11:25 | 0.127 | 0.053 | 0.053 |       |           |
| 11/26/2019 | 03:40      | 1.29 | 23:55 | 2.22 | 1.69 | 04:00           | 0.50 | 21:50 | 2.74 | 1.47 | 04:00                     | 0.014 | 20:50 | 0.143 | 0.061 | 0.061 | 0.63  |           |
| 11/27/2019 | 03:30      | 1.43 | 22:05 | 2.09 | 1.78 | 03:55           | 0.45 | 22:05 | 2.67 | 1.53 | 03:55                     | 0.015 | 22:05 | 0.144 | 0.067 | 0.067 | 0.77  |           |
| 11/28/2019 | 04:15      | 1.55 | 12:45 | 2.44 | 1.89 | 04:10           | 0.61 | 11:45 | 2.75 | 1.58 | 04:10                     | 0.021 | 12:50 | 0.177 | 0.078 | 0.078 |       |           |
| 11/29/2019 | 18:05      | 1.43 | 08:55 | 2.08 | 1.66 | 05:20           | 0.56 | 10:25 | 2.44 | 1.43 | 05:20                     | 0.019 | 10:25 | 0.118 | 0.057 | 0.057 |       |           |
| 11/30/2019 | 04:10      | 1.42 | 10:25 | 2.14 | 1.70 | 02:40           | 0.53 | 19:15 | 2.73 | 1.51 | 02:40                     | 0.017 | 19:15 | 0.143 | 0.063 | 0.063 | 0.14  |           |
| 12/01/2019 | 03:40      | 1.47 | 14:30 | 2.07 | 1.77 | 05:05           | 0.41 | 12:10 | 2.70 | 1.58 | 05:05                     | 0.014 | 14:30 | 0.144 | 0.070 | 0.070 | 0.06  |           |
| 12/02/2019 | 04:50      | 1.35 | 14:50 | 2.17 | 1.79 | 05:05           | 0.49 | 14:30 | 2.76 | 1.57 | 04:25                     | 0.017 | 14:50 | 0.148 | 0.071 | 0.071 | 0.36  |           |
| 12/03/2019 | 04:35      | 1.45 | 09:55 | 2.18 | 1.84 | 03:20           | 0.58 | 08:05 | 2.73 | 1.59 | 03:20                     | 0.020 | 08:05 | 0.147 | 0.074 | 0.074 |       |           |
| 12/04/2019 | 03:10      | 1.45 | 22:00 | 2.12 | 1.80 | 04:05           | 0.80 | 09:50 | 2.84 | 1.70 | 04:05                     | 0.027 | 09:50 | 0.154 | 0.077 | 0.077 |       |           |
| 12/05/2019 | 23:55      | 1.51 | 09:40 | 2.01 | 1.78 | 04:30           | 0.61 | 07:30 | 2.80 | 1.58 | 04:30                     | 0.027 | 07:30 | 0.136 | 0.069 | 0.069 |       |           |
| 12/06/2019 | 05:20      | 1.32 | 09:00 | 2.15 | 1.68 | 02:00           | 0.62 | 11:10 | 2.75 | 1.49 | 02:00                     | 0.019 | 09:20 | 0.147 | 0.061 | 0.061 |       |           |
| 12/07/2019 | 03:30      | 1.37 | 20:15 | 2.04 | 1.72 | 04:20           | 0.50 | 17:45 | 2.84 | 1.66 | 04:50                     | 0.015 | 19:45 | 0.138 | 0.070 | 0.070 | 0.84  |           |
| 12/08/2019 | 01:25      | 1.34 | 10:25 | 2.00 | 1.72 | 04:45           | 0.55 | 19:20 | 2.82 | 1.73 | 04:45                     | 0.018 | 12:00 | 0.132 | 0.073 | 0.073 | 0.10  |           |
| 12/09/2019 | 04:05      | 1.28 | 07:40 | 2.04 | 1.75 | 04:10           | 0.58 | 07:15 | 2.84 | 1.66 | 04:10                     | 0.016 | 07:20 | 0.147 | 0.072 | 0.072 |       |           |
| 12/10/2019 | 03:30      | 1.29 | 09:15 | 2.03 | 1.70 | 02:55           | 0.61 | 10:10 | 2.74 | 1.57 | 03:30                     | 0.018 | 10:25 | 0.132 | 0.065 | 0.065 |       |           |
| 12/11/2019 | 03:05      | 1.35 | 08:30 | 2.08 | 1.71 | 00:55           | 0.47 | 21:00 | 2.78 | 1.58 | 00:55                     | 0.015 | 08:30 | 0.135 | 0.066 | 0.066 | 0.00  |           |
| 12/12/2019 | 05:10      | 1.36 | 07:35 | 2.07 | 1.73 | 01:45           | 0.68 | 15:30 | 2.75 | 1.53 | 01:45                     | 0.022 | 08:05 | 0.142 | 0.065 | 0.065 |       |           |
| 12/13/2019 | 02:50      | 1.29 | 11:20 | 2.12 | 1.69 | 05:05           | 0.57 | 11:10 | 2.89 | 1.48 | 03:05                     | 0.017 | 11:10 | 0.157 | 0.061 | 0.061 |       |           |
| 12/14/2019 | 03:00      | 1.27 | 13:30 | 2.21 | 1.71 | 03:55           | 0.49 | 08:40 | 2.79 | 1.51 | 03:55                     | 0.016 | 08:40 | 0.145 | 0.063 | 0.063 | 0.01  |           |
| 12/15/2019 | 05:35      | 1.35 | 09:20 | 2.12 | 1.68 | 07:25           | 0.65 | 18:45 | 2.73 | 1.53 | 03:20                     | 0.020 | 11:05 | 0.141 | 0.063 | 0.063 |       |           |
| 12/16/2019 | 05:05      | 1.39 | 12:15 | 2.13 | 1.71 | 02:40           | 0.61 | 08:30 | 2.74 | 1.46 | 02:40                     | 0.020 | 08:30 | 0.135 | 0.061 | 0.061 |       |           |
| 12/17/2019 | 02:55      | 1.37 | 09:15 | 2.16 | 1.72 | 02:50           | 0.59 | 07:35 | 2.72 | 1.38 | 02:50                     | 0.018 | 07:35 | 0.139 | 0.058 | 0.058 |       |           |
| 12/18/2019 | 01:50      | 1.18 | 07:00 | 2.03 | 1.67 | 03:45           | 0.60 | 09:10 | 2.41 | 1.34 | 03:45                     | 0.018 | 11:25 | 0.109 | 0.054 | 0.054 |       |           |
| 12/19/2019 | 02:55      | 1.41 | 08:50 | 2.01 | 1.69 | 03:05           | 0.63 | 11:30 | 2.39 | 1.34 | 03:05                     | 0.020 | 21:25 | 0.112 | 0.054 | 0.054 |       |           |
| 12/20/2019 | 04:40      | 1.41 | 10:35 | 2.08 | 1.66 | 02:40           | 0.66 | 08:25 | 2.45 | 1.31 | 02:40                     | 0.023 | 08:25 | 0.118 | 0.052 | 0.052 |       |           |
| 12/21/2019 | 05:35      | 1.42 | 09:35 | 1.97 | 1.62 | 05:05           | 0.69 | 09:35 | 2.51 | 1.39 | 05:05                     | 0.022 | 09:35 | 0.125 | 0.053 | 0.053 |       |           |
| 12/22/2019 | 04:35      | 1.33 | 11:30 | 2.26 | 1.70 | 03:50           | 0.57 | 10:50 | 2.40 | 1.33 | 03:50                     | 0.017 | 10:50 | 0.134 | 0.055 | 0.055 |       |           |
| 12/23/2019 | 02:40      | 1.39 | 20:30 | 2.00 | 1.70 | 23:35           | 0.66 | 22:45 | 2.70 | 1.37 | 02:30                     | 0.022 | 22:45 | 0.128 | 0.056 | 0.056 |       |           |
| 12/24/2019 | 04:20      | 1.31 | 09:55 | 2.01 | 1.70 | 00:25           | 0.56 | 13:55 | 2.71 | 1.35 | 03:20                     | 0.019 | 09:50 | 0.132 | 0.055 | 0.055 |       |           |
| 12/25/2019 | 06:40      | 1.36 | 20:40 | 2.06 | 1.74 | 23:55           | 0.56 | 11:50 | 2.75 | 1.44 | 05:45                     | 0.019 | 09:45 | 0.139 | 0.062 | 0.062 |       |           |
| 12/26/2019 | 04:50      | 1.33 | 11:05 | 2.08 | 1.69 | 23:25           | 0.54 | 11:05 | 2.77 | 1.23 | 04:50                     | 0.018 | 11:05 | 0.149 | 0.050 | 0.050 |       |           |
| 12/27/2019 | 04:20      | 1.32 | 21:15 | 2.07 | 1.70 | 00:15           | 0.55 | 11:40 | 2.59 | 1.33 | 00:15                     | 0.019 | 09:10 | 0.133 | 0.055 | 0.055 |       |           |
| 12/28/2019 | 03:55      | 1.26 | 10:35 | 2.05 | 1.68 | 05:00           | 0.45 | 10:35 | 2.77 | 1.33 | 05:00                     | 0.014 | 10:35 | 0.146 | 0.055 | 0.055 |       |           |
| 12/29/2019 | 05:45      | 1.38 | 13:45 | 1.97 | 1.67 | 17:35           | 0.54 | 10:35 | 2.65 | 1.30 | 05:50                     | 0.017 | 08:25 | 0.122 | 0.052 | 0.052 |       |           |
| 12/30/2019 | 04:50      | 1.32 | 11:35 | 1.97 | 1.68 | 23:15           | 0.60 | 11:35 | 2.65 | 1.38 | 03:00                     | 0.021 | 11:35 | 0.132 | 0.056 | 0.056 |       |           |
| 12/31/2019 | 03:05      | 1.33 | 22:00 | 1.88 | 1.64 | 15:40           | 0.63 | 16:20 | 2.80 | 1.34 | 03:15                     | 0.019 | 17:30 | 0.124 | 0.052 | 0.052 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total     |
| 01/01/2020 | 05:10      | 1.24 | 11:00 | 2.00 | 1.68 | 05:05           | 0.41 | 11:00 | 2.73 | 1.20 | 05:05                     | 0.011 | 11:00 | 0.138 | 0.050 | 0.10      |
| 01/02/2020 | 05:05      | 1.47 | 09:10 | 1.96 | 1.71 | 02:25           | 0.48 | 08:35 | 2.69 | 1.21 | 03:20                     | 0.018 | 09:05 | 0.130 | 0.050 |           |
| 01/03/2020 | 01:30      | 1.40 | 09:05 | 1.90 | 1.67 | 06:55           | 0.50 | 19:10 | 2.69 | 1.31 | 06:55                     | 0.016 | 19:10 | 0.126 | 0.052 |           |
| 01/04/2020 | 04:10      | 1.40 | 10:10 | 1.96 | 1.67 | 03:25           | 0.47 | 09:50 | 2.83 | 1.39 | 03:25                     | 0.016 | 11:30 | 0.135 | 0.056 |           |
| 01/05/2020 | 04:30      | 1.27 | 09:30 | 1.94 | 1.64 | 01:00           | 0.50 | 11:20 | 2.82 | 1.36 | 05:15                     | 0.018 | 11:20 | 0.129 | 0.054 |           |
| 01/06/2020 | 03:15      | 1.29 | 12:00 | 2.02 | 1.71 | 04:05           | 0.40 | 09:50 | 2.78 | 1.41 | 04:05                     | 0.012 | 09:50 | 0.134 | 0.059 |           |
| 01/07/2020 | 03:05      | 1.33 | 08:40 | 1.97 | 1.69 | 23:50           | 0.55 | 19:25 | 2.76 | 1.34 | 23:50                     | 0.021 | 07:35 | 0.131 | 0.054 |           |
| 01/08/2020 | 02:45      | 1.32 | 08:00 | 1.94 | 1.65 | 14:25           | 0.51 | 21:30 | 2.79 | 1.32 | 02:30                     | 0.017 | 11:10 | 0.131 | 0.052 |           |
| 01/09/2020 | 10:40      | 1.32 | 09:45 | 1.86 | 1.59 | 23:35           | 0.57 | 10:10 | 2.76 | 1.32 | 23:35                     | 0.017 | 07:15 | 0.124 | 0.050 |           |
| 01/10/2020 | 04:35      | 1.12 | 20:20 | 1.75 | 1.53 | 01:00           | 0.58 | 09:30 | 2.71 | 1.30 | 04:30                     | 0.015 | 08:20 | 0.107 | 0.046 |           |
| 01/11/2020 | 03:45      | 1.21 | 23:10 | 1.94 | 1.57 | 07:10           | 0.54 | 13:50 | 2.80 | 1.45 | 05:25                     | 0.017 | 11:05 | 0.116 | 0.053 |           |
| 01/12/2020 | 23:50      | 1.14 | 19:50 | 2.02 | 1.64 | 01:05           | 0.47 | 10:40 | 2.86 | 1.52 | 01:05                     | 0.014 | 19:10 | 0.144 | 0.061 |           |
| 01/13/2020 | 04:15      | 0.93 | 17:35 | 2.03 | 1.47 | 03:55           | 0.33 | 20:50 | 2.74 | 1.15 | 03:55                     | 0.006 | 12:00 | 0.127 | 0.041 |           |
| 01/14/2020 | 04:35      | 1.26 | 21:00 | 1.87 | 1.59 | 06:35           | 0.47 | 20:25 | 2.84 | 1.22 | 03:20                     | 0.015 | 21:00 | 0.129 | 0.046 |           |
| 01/15/2020 | 04:40      | 1.20 | 20:00 | 1.78 | 1.55 | 23:50           | 0.53 | 21:30 | 2.71 | 1.27 | 23:50                     | 0.018 | 21:30 | 0.116 | 0.046 |           |
| 01/16/2020 | 23:45      | 1.34 | 12:50 | 1.93 | 1.62 | 00:45           | 0.49 | 19:50 | 2.77 | 1.50 | 00:45                     | 0.016 | 07:25 | 0.131 | 0.059 |           |
| 01/17/2020 | 01:20      | 1.22 | 14:50 | 1.98 | 1.55 | 01:00           | 0.52 | 12:20 | 2.79 | 1.39 | 01:00                     | 0.014 | 07:55 | 0.121 | 0.050 |           |
| 01/18/2020 | 22:45      | 1.33 | 10:25 | 1.86 | 1.55 | 01:10           | 0.50 | 10:15 | 2.79 | 1.39 | 01:10                     | 0.017 | 10:25 | 0.124 | 0.050 |           |
| 01/19/2020 | 05:30      | 1.38 | 09:45 | 1.81 | 1.55 | 01:30           | 0.58 | 14:50 | 2.85 | 1.42 | 03:50                     | 0.020 | 14:50 | 0.120 | 0.051 |           |
| 01/20/2020 | 23:55      | 1.35 | 19:15 | 1.97 | 1.57 | 01:10           | 0.61 | 18:10 | 2.86 | 1.40 | 01:10                     | 0.020 | 18:50 | 0.135 | 0.052 |           |
| 01/21/2020 | 04:25      | 1.24 | 20:35 | 2.05 | 1.59 | 00:20           | 0.55 | 12:30 | 2.80 | 1.34 | 00:20                     | 0.016 | 20:35 | 0.137 | 0.050 |           |
| 01/22/2020 | 00:35      | 1.34 | 17:45 | 1.89 | 1.65 | 01:10           | 0.51 | 13:25 | 2.71 | 1.30 | 00:55                     | 0.018 | 17:45 | 0.125 | 0.051 |           |
| 01/23/2020 | 23:50      | 1.33 | 17:10 | 1.93 | 1.62 | 00:10           | 0.55 | 19:45 | 2.71 | 1.36 | 23:50                     | 0.017 | 07:25 | 0.124 | 0.052 |           |
| 01/24/2020 | 12:10      | 1.19 | 10:55 | 2.05 | 1.57 | 00:10           | 0.68 | 13:05 | 2.68 | 1.35 | 00:10                     | 0.017 | 22:20 | 0.114 | 0.049 |           |
| 01/25/2020 | 03:20      | 1.19 | 13:10 | 1.98 | 1.64 | 01:05           | 0.54 | 09:30 | 2.82 | 1.36 | 05:00                     | 0.014 | 13:10 | 0.137 | 0.054 |           |
| 01/26/2020 | 18:30      | 1.13 | 21:55 | 1.88 | 1.62 | 04:50           | 0.52 | 11:10 | 2.83 | 1.45 | 04:50                     | 0.014 | 11:10 | 0.130 | 0.056 | 0.16      |
| 01/27/2020 | 01:15      | 1.18 | 19:00 | 1.87 | 1.61 | 23:50           | 0.45 | 19:50 | 2.74 | 1.31 | 23:50                     | 0.013 | 19:00 | 0.123 | 0.050 |           |
| 01/28/2020 | 18:10      | 1.18 | 15:05 | 1.83 | 1.55 | 00:35           | 0.46 | 21:25 | 2.79 | 1.32 | 00:35                     | 0.014 | 15:05 | 0.121 | 0.047 | 0.02      |
| 01/29/2020 | 00:55      | 1.05 | 08:40 | 1.98 | 1.56 | 01:35           | 0.52 | 19:20 | 2.81 | 1.36 | 00:55                     | 0.013 | 19:20 | 0.134 | 0.050 |           |
| 01/30/2020 | 00:05      | 1.23 | 10:35 | 2.17 | 1.60 | 01:10           | 0.43 | 10:00 | 2.73 | 1.30 | 01:10                     | 0.013 | 19:45 | 0.133 | 0.050 | 0.01      |
| 01/31/2020 | 17:35      | 1.20 | 16:05 | 1.78 | 1.49 | 15:40           | 0.57 | 16:10 | 2.82 | 1.31 | 17:35                     | 0.015 | 16:10 | 0.121 | 0.045 |           |
| 02/01/2020 | 03:05      | 1.15 | 10:05 | 1.86 | 1.49 | 07:45           | 0.58 | 11:05 | 2.73 | 1.37 | 07:45                     | 0.018 | 13:10 | 0.114 | 0.047 | 0.01      |
| 02/02/2020 | 01:55      | 1.20 | 11:45 | 2.04 | 1.57 | 23:10           | 0.57 | 14:10 | 2.74 | 1.48 | 23:10                     | 0.016 | 11:45 | 0.127 | 0.056 |           |
| 02/03/2020 | 05:10      | 1.12 | 21:05 | 1.95 | 1.59 | 00:10           | 0.49 | 07:10 | 2.81 | 1.33 | 00:10                     | 0.014 | 21:05 | 0.122 | 0.050 |           |
| 02/04/2020 | 00:40      | 1.15 | 20:30 | 1.88 | 1.53 | 03:35           | 0.39 | 22:25 | 2.79 | 1.26 | 03:35                     | 0.009 | 22:25 | 0.118 | 0.045 |           |
| 02/05/2020 | 03:50      | 1.21 | 12:05 | 2.40 | 1.75 | 04:40           | 0.47 | 20:25 | 2.81 | 1.26 | 04:40                     | 0.013 | 12:05 | 0.168 | 0.056 |           |
| 02/06/2020 | 03:20      | 1.34 | 13:45 | 1.98 | 1.65 | 03:25           | 0.52 | 20:20 | 2.75 | 1.40 | 03:25                     | 0.015 | 20:20 | 0.130 | 0.056 |           |
| 02/07/2020 | 05:00      | 1.28 | 11:15 | 2.13 | 1.73 | 15:55           | 0.64 | 14:15 | 2.81 | 1.29 | 04:25                     | 0.019 | 14:15 | 0.147 | 0.054 |           |
| 02/08/2020 | 06:50      | 1.39 | 19:25 | 1.95 | 1.63 | 22:45           | 0.57 | 10:00 | 2.75 | 1.23 | 22:45                     | 0.019 | 14:00 | 0.121 | 0.047 |           |
| 02/09/2020 | 04:50      | 1.10 | 08:25 | 1.87 | 1.53 | 23:30           | 0.44 | 19:45 | 2.82 | 1.37 | 23:30                     | 0.014 | 08:30 | 0.121 | 0.050 |           |
| 02/10/2020 | 04:10      | 1.16 | 11:30 | 2.00 | 1.60 | 00:20           | 0.58 | 19:55 | 2.84 | 1.45 | 04:40                     | 0.018 | 13:25 | 0.128 | 0.056 |           |
| 02/11/2020 | 02:15      | 1.34 | 08:30 | 1.98 | 1.65 | 13:25           | 0.67 | 07:30 | 2.81 | 1.34 | 16:25                     | 0.023 | 07:30 | 0.137 | 0.053 |           |
| 02/12/2020 | 02:05      | 1.08 | 10:15 | 2.02 | 1.59 | 06:10           | 0.50 | 10:05 | 2.86 | 1.37 | 02:00                     | 0.012 | 10:15 | 0.146 | 0.052 |           |
| 02/13/2020 | 02:00      | 1.25 | 09:50 | 1.90 | 1.61 | 14:05           | 0.58 | 13:20 | 2.83 | 1.41 | 04:35                     | 0.019 | 07:55 | 0.127 | 0.054 |           |
| 02/14/2020 | 04:00      | 1.40 | 13:00 | 2.01 | 1.62 | 15:30           | 0.63 | 10:05 | 2.83 | 1.55 | 15:30                     | 0.021 | 13:00 | 0.140 | 0.060 |           |
| 02/15/2020 | 02:20      | 1.27 | 09:30 | 2.04 | 1.70 | 03:00           | 0.60 | 09:05 | 2.75 | 1.51 | 03:00                     | 0.016 | 09:30 | 0.141 | 0.064 |           |
| 02/16/2020 | 05:35      | 1.26 | 16:20 | 1.85 | 1.61 | 00:25           | 0.53 | 16:30 | 2.69 | 1.61 | 00:25                     | 0.018 | 16:20 | 0.112 | 0.061 |           |
| 02/17/2020 | 04:15      | 1.26 | 20:50 | 1.94 | 1.67 | 04:15           | 0.58 | 17:40 | 2.51 | 1.57 | 04:15                     | 0.015 | 14:45 | 0.121 | 0.064 |           |
| 02/18/2020 | 04:20      | 1.20 | 18:55 | 1.94 | 1.62 | 04:35           | 0.55 | 18:55 | 2.83 | 1.52 | 04:35                     | 0.013 | 18:55 | 0.138 | 0.059 |           |
| 02/19/2020 | 04:35      | 1.30 | 08:05 | 1.96 | 1.62 | 23:55           | 0.60 | 20:25 | 2.53 | 1.53 | 04:20                     | 0.017 | 08:10 | 0.122 | 0.059 |           |
| 02/20/2020 | 04:20      | 1.24 | 10:20 | 1.92 | 1.60 | 00:00           | 0.55 | 09:25 | 2.44 | 1.47 | 00:00                     | 0.018 | 09:25 | 0.109 | 0.056 |           |
| 02/21/2020 | 03:30      | 1.25 | 09:15 | 2.10 | 1.63 | 02:20           | 0.43 | 09:15 | 2.73 | 1.38 | 02:20                     | 0.013 | 09:15 | 0.149 | 0.054 |           |
| 02/22/2020 | 03:45      | 1.30 | 14:10 | 1.95 | 1.68 | 00:35           | 0.50 | 09:35 | 2.83 | 1.52 | 00:35                     | 0.018 | 09:35 | 0.130 | 0.061 |           |
| 02/23/2020 | 04:05      | 1.10 | 19:50 | 2.00 | 1.63 | 04:25           | 0.38 | 18:05 | 2.74 | 1.46 | 04:10                     | 0.009 | 18:05 | 0.131 | 0.058 |           |
| 02/24/2020 | 03:25      | 1.33 | 11:30 | 2.06 | 1.67 | 23:40           | 0.50 | 11:30 | 2.81 | 1.47 | 03:05                     | 0.015 | 11:30 | 0.149 | 0.059 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 04:05      | 1.27 | 13:40 | 2.25 | 1.79 | 03:50           | 0.75 | 21:35 | 2.86 | 1.57 | 03:55                     | 0.020 | 20:45 | 0.151 | 0.071 | 0.071 | 0.01      |
| 02/26/2020 | 23:50      | 1.44 | 00:00 | 2.04 | 1.71 | 02:40           | 0.50 | 10:00 | 2.84 | 1.32 | 23:05                     | 0.017 | 10:00 | 0.143 | 0.055 | 0.055 |           |
| 02/27/2020 | 04:10      | 0.99 | 12:30 | 1.95 | 1.62 | 03:50           | 0.33 | 07:35 | 2.68 | 1.22 | 03:50                     | 0.006 | 18:00 | 0.120 | 0.049 | 0.049 |           |
| 02/28/2020 | 03:55      | 1.03 | 14:35 | 2.40 | 1.64 | 03:50           | 0.41 | 14:35 | 2.67 | 1.15 | 03:50                     | 0.009 | 14:35 | 0.176 | 0.047 | 0.047 |           |
| 02/29/2020 | 05:15      | 1.33 | 11:25 | 2.07 | 1.71 | 05:00           | 0.49 | 11:40 | 2.57 | 1.23 | 05:00                     | 0.014 | 11:40 | 0.132 | 0.051 | 0.051 |           |
| 03/01/2020 | 05:40      | 1.29 | 16:40 | 1.95 | 1.62 | 00:05           | 0.55 | 21:05 | 2.50 | 1.32 | 00:05                     | 0.020 | 21:05 | 0.120 | 0.051 | 0.051 |           |
| 03/02/2020 | 01:50      | 1.20 | 12:50 | 2.10 | 1.75 | 02:30           | 0.47 | 07:30 | 2.70 | 1.27 | 02:30                     | 0.012 | 07:30 | 0.138 | 0.056 | 0.056 |           |
| 03/03/2020 | 04:25      | 1.35 | 14:00 | 1.99 | 1.63 | 23:15           | 0.53 | 14:05 | 2.85 | 1.29 | 04:25                     | 0.016 | 14:00 | 0.144 | 0.050 | 0.050 |           |
| 03/04/2020 | 04:25      | 1.18 | 12:50 | 1.97 | 1.56 | 03:25           | 0.45 | 10:25 | 2.72 | 1.23 | 03:25                     | 0.011 | 12:50 | 0.123 | 0.045 | 0.045 |           |
| 03/05/2020 | 04:00      | 1.21 | 13:35 | 2.25 | 1.66 | 04:00           | 0.53 | 10:10 | 2.74 | 1.30 | 04:00                     | 0.013 | 13:55 | 0.144 | 0.052 | 0.052 |           |
| 03/06/2020 | 03:20      | 1.17 | 21:10 | 1.99 | 1.69 | 11:25           | 0.60 | 20:45 | 2.46 | 1.12 | 03:20                     | 0.019 | 20:45 | 0.116 | 0.045 | 0.045 | 0.58      |
| 03/07/2020 | 04:55      | 1.24 | 14:05 | 2.04 | 1.72 | 03:15           | 0.47 | 14:00 | 2.74 | 1.30 | 03:15                     | 0.014 | 14:00 | 0.142 | 0.055 | 0.055 |           |
| 03/08/2020 | 04:35      | 1.34 | 09:45 | 2.03 | 1.68 | 03:35           | 0.51 | 21:50 | 2.72 | 1.25 | 03:35                     | 0.016 | 09:45 | 0.125 | 0.051 | 0.051 | 0.02      |
| 03/09/2020 | 04:20      | 1.22 | 22:00 | 1.90 | 1.59 | 04:25           | 0.50 | 07:10 | 2.60 | 1.27 | 04:25                     | 0.013 | 19:45 | 0.108 | 0.047 | 0.047 | 0.11      |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 6.402                     | 5.26      |
| Avg   | 1.65       | 1.40            | 0.056                     |           |

## Site Commentary

### Site Information

| MIL_2334        |       |
|-----------------|-------|
| Pipe Dimensions | 12.5  |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2334 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited little to no response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                   |                   |
|--------------------------|--------------------|-------------------|-------------------|
| Item                     | Depth (in)         | Velocity (ft/s)   | Quantity (MGD)    |
| Average                  | 2.12               | 2.77              | 0.175             |
| Minimum                  | 1.55               | 1.24              | 0.052             |
| Maximum                  | 3.31               | 3.62              | 0.352             |
| Time of Minimum          | 11/25/2019 3:50 AM | 2/28/2020 3:55 AM | 2/28/2020 3:55 AM |
| Time of Maximum          | 12/8/2019 2:25 PM  | 3/6/2020 9:45 AM  | 12/8/2019 2:25 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

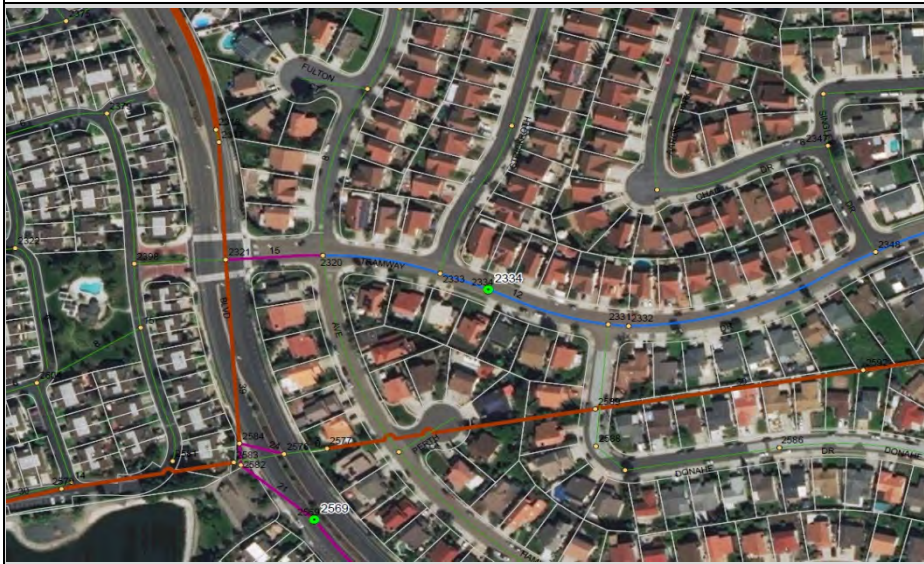
## Flow Monitoring Site Report



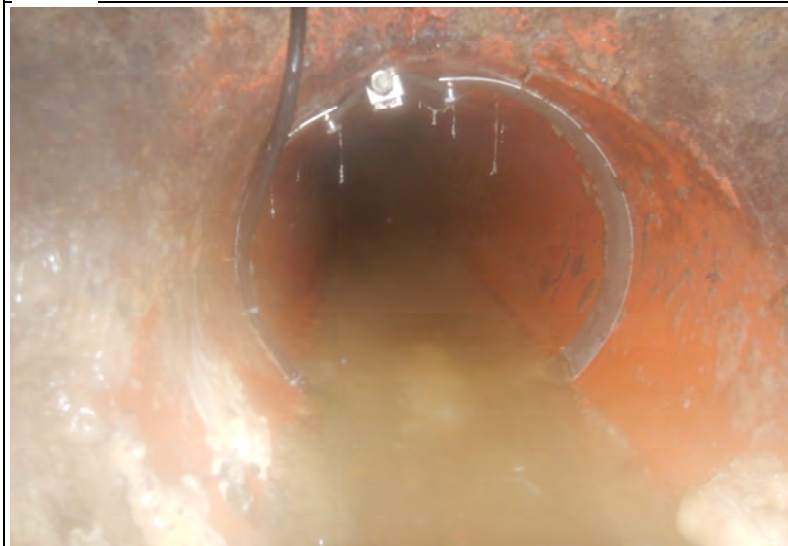
Site Name

**MIL\_2334**

|                         |                              |            |                |                   |               |           |
|-------------------------|------------------------------|------------|----------------|-------------------|---------------|-----------|
| Site Address /Location: | Tramway Dr and Strickroth Dr |            | Monitor Series | TRITON+           | Location Type | Temporary |
| Site Access Details:    | Drive                        | Latitude:  | 37.44209       | Pipe Size (H x W) | Pipe Shape    |           |
|                         |                              | Longitude: | -121.903338    | 12.5" x 12.5"     | Circular      |           |



|           |       |                        |             |
|-----------|-------|------------------------|-------------|
| Manhole # | 2334  | System Characteristics | Residential |
| Access    | Drive | Traffic                | Light       |



### Installation Information

|                                |                           |                             |                                 |
|--------------------------------|---------------------------|-----------------------------|---------------------------------|
| Installation Date:             | Friday, November 15, 2019 | Installation Type:          | Doppler Standard Ring and Crank |
| Monitoring Location (Sensors): | Upstream 0-5 FT           | Monitor Location:           | Manhole                         |
| Sensors / Devices:             | Peak Combo (CS4)          | Pressure Sensor Range (psi) | 0 - 5 psi                       |

### Installation Confirmation:

|                                 |            |                             |               |
|---------------------------------|------------|-----------------------------|---------------|
| Confirmation Time:              | 7:47:00 AM | Pipe Size (HxW)             | 12.5" x 12.5" |
| Depth of Flow (Wet DOF) (in)    | 2.25"      | Range (Air DOF) (in)        | 0.00"         |
| Downlooker Physical Offset (in) | NA         | Measurement Confidence (in) | 0.25"         |
| Peak Velocity (fps)             | 3.52       | Velocity Sensor Offset (in) | 0"            |
| Silt (in)                       | 0"         | Silt Type                   |               |

### Hydraulic Comments:

good flow, shallow and moderate velocity

### Manhole / Pipe Information:

|                               |                     |                             |        |
|-------------------------------|---------------------|-----------------------------|--------|
| Manhole Depth (Approx. FT):   | 12'                 | Manhole Configuration       | Single |
| Manhole Material:             | Concrete            | Manhole Condition:          | Good   |
| Manhole Opening Diameter (in) | 26"                 | Manhole Diameter (Approx.): | 54"    |
| Manhole Cover                 | Unbolted            | Manhole Frame               | Normal |
| Active Drop Connections       | No                  | Air Quality:                | Normal |
| Pipe Material                 | Vitrified Clay Pipe | Pipe Condition:             | Good   |

### Communication Information:

|                    |          |                  |                          |
|--------------------|----------|------------------|--------------------------|
| Communication Type | Wireless | Antenna Location | Manhole Pick / Vent Hole |
|--------------------|----------|------------------|--------------------------|

### Additional Site Info. / Comments:

889

|                     |                        |     |
|---------------------|------------------------|-----|
| ADS Project Name:   | Milpitas.WWTFM.CA19-20 | 1.2 |
| ADS Project Number: | 22431                  |     |

# SCATTERGRAPH REPORT

MIL\_2334

Flow Monitor

**MIL\_2334**

Pipe Height  
12.50 in

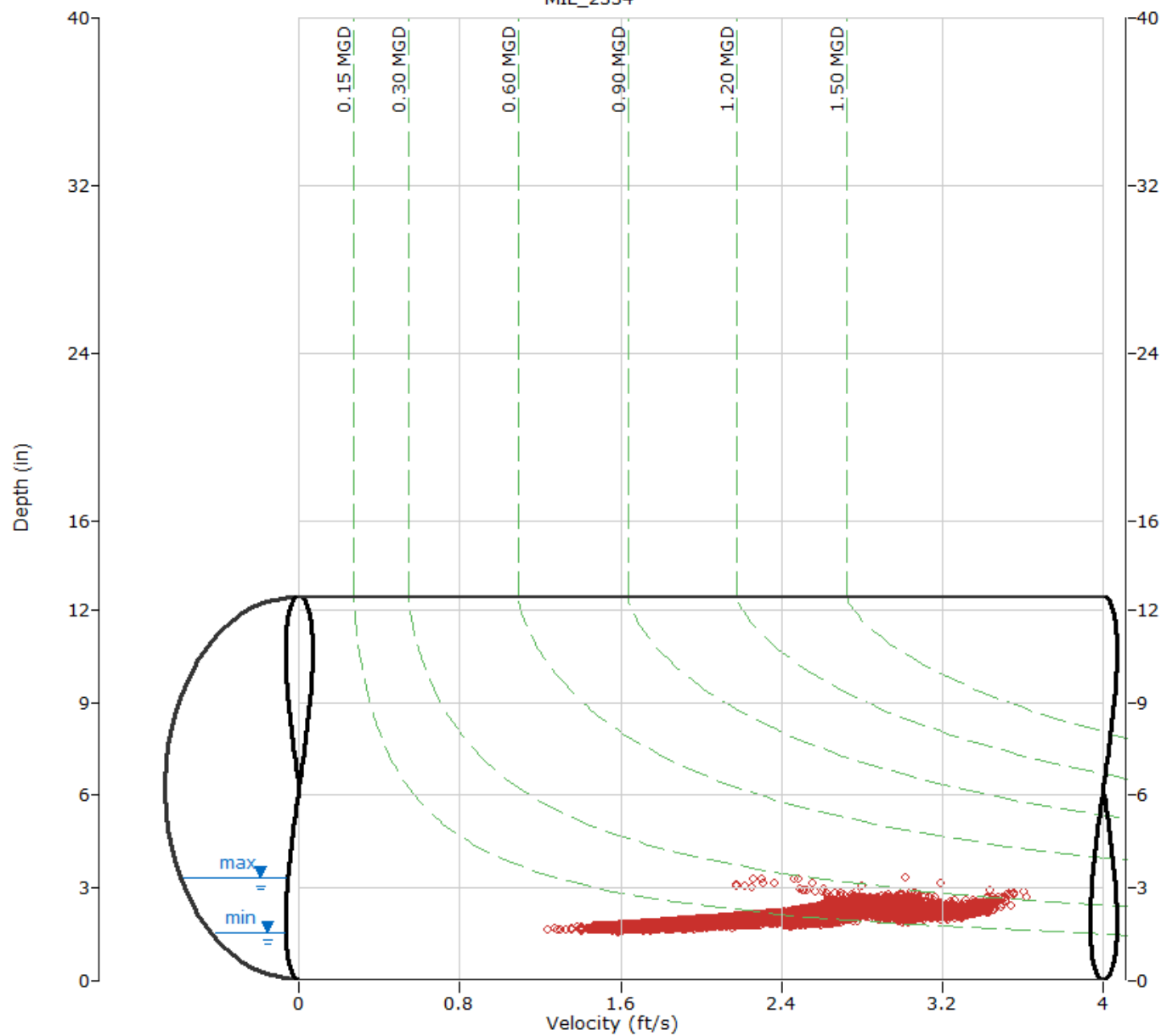
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_2334

Flow Monitor

**MIL\_2334**

Pipe Height

12.50 in

Report Period

11/16/2019  
To  
3/9/2020

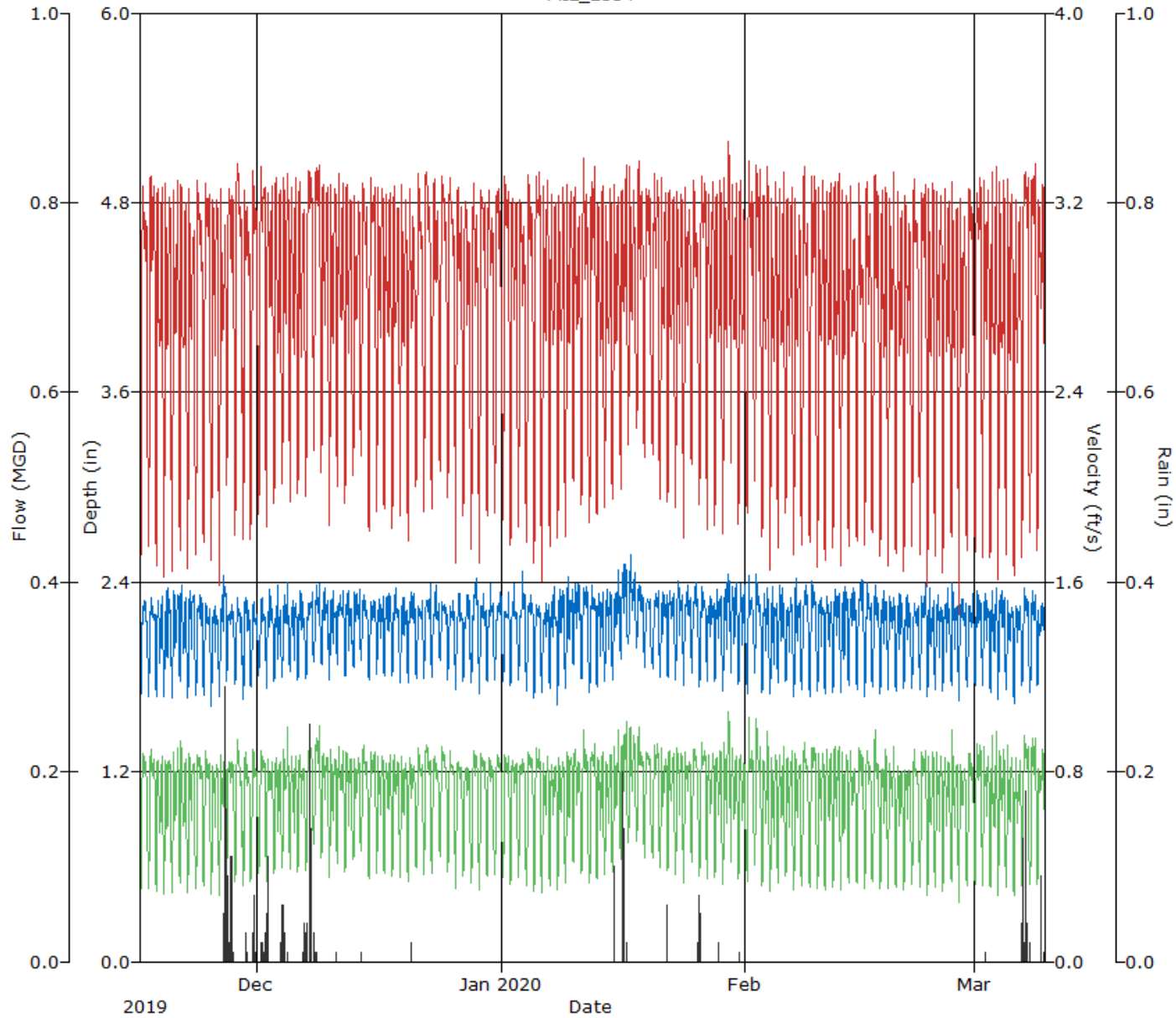
Legend

Depth

Velocity

Quantity

Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2334, Pipe Height: 12.50 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 03:55      | 1.64 | 18:45 | 2.65 | 2.08 | 04:10           | 1.41 | 12:05 | 3.37 | 2.74 | 04:10                     | 0.062 | 17:40 | 0.252 | 0.170 | 0.170 |           |
| 11/17/2019 | 04:05      | 1.63 | 12:25 | 2.68 | 2.09 | 03:45           | 1.50 | 11:15 | 3.41 | 2.81 | 03:50                     | 0.067 | 14:30 | 0.254 | 0.175 | 0.175 |           |
| 11/18/2019 | 04:00      | 1.63 | 17:25 | 2.50 | 2.07 | 03:55           | 1.47 | 08:15 | 3.35 | 2.70 | 03:55                     | 0.062 | 07:50 | 0.239 | 0.165 | 0.165 |           |
| 11/19/2019 | 03:10      | 1.66 | 19:15 | 2.58 | 2.09 | 03:10           | 1.36 | 20:20 | 3.38 | 2.71 | 03:10                     | 0.059 | 11:15 | 0.237 | 0.168 | 0.168 |           |
| 11/20/2019 | 03:50      | 1.64 | 07:10 | 2.65 | 2.10 | 03:50           | 1.46 | 20:25 | 3.38 | 2.67 | 03:50                     | 0.062 | 07:10 | 0.245 | 0.168 | 0.168 |           |
| 11/21/2019 | 03:55      | 1.72 | 23:00 | 2.48 | 2.10 | 04:00           | 1.51 | 07:35 | 3.41 | 2.65 | 04:00                     | 0.070 | 07:35 | 0.256 | 0.166 | 0.166 |           |
| 11/22/2019 | 03:55      | 1.59 | 09:15 | 2.52 | 2.10 | 03:40           | 1.51 | 07:55 | 3.38 | 2.66 | 03:40                     | 0.063 | 07:40 | 0.242 | 0.167 | 0.167 |           |
| 11/23/2019 | 04:05      | 1.63 | 16:55 | 2.87 | 2.10 | 04:15           | 1.33 | 10:45 | 3.35 | 2.78 | 04:15                     | 0.057 | 16:55 | 0.290 | 0.174 | 0.174 |           |
| 11/24/2019 | 05:30      | 1.67 | 10:55 | 2.75 | 2.08 | 04:35           | 1.53 | 10:25 | 3.39 | 2.82 | 04:35                     | 0.071 | 10:55 | 0.276 | 0.173 | 0.173 |           |
| 11/25/2019 | 03:50      | 1.55 | 11:40 | 2.50 | 2.05 | 04:10           | 1.41 | 21:20 | 3.34 | 2.73 | 04:10                     | 0.057 | 11:45 | 0.225 | 0.165 | 0.165 |           |
| 11/26/2019 | 04:00      | 1.63 | 19:05 | 2.59 | 2.13 | 03:55           | 1.29 | 08:40 | 3.34 | 2.66 | 03:55                     | 0.054 | 20:35 | 0.238 | 0.170 | 0.170 | 0.63      |
| 11/27/2019 | 03:00      | 1.76 | 14:45 | 2.46 | 2.10 | 01:40           | 1.78 | 11:40 | 3.38 | 2.89 | 01:40                     | 0.089 | 17:45 | 0.220 | 0.179 | 0.179 | 0.77      |
| 11/28/2019 | 03:55      | 1.72 | 11:50 | 2.50 | 2.10 | 03:40           | 1.56 | 11:50 | 3.47 | 2.91 | 03:40                     | 0.073 | 11:50 | 0.271 | 0.180 | 0.180 |           |
| 11/29/2019 | 04:40      | 1.60 | 16:35 | 2.69 | 2.08 | 05:30           | 1.56 | 09:35 | 3.33 | 2.80 | 05:30                     | 0.067 | 16:40 | 0.260 | 0.171 | 0.171 |           |
| 11/30/2019 | 03:30      | 1.70 | 12:00 | 2.96 | 2.06 | 03:35           | 1.52 | 11:20 | 3.37 | 2.83 | 03:35                     | 0.068 | 12:00 | 0.248 | 0.172 | 0.172 | 0.14      |
| 12/01/2019 | 04:30      | 1.79 | 13:55 | 3.12 | 2.09 | 04:05           | 1.79 | 10:45 | 3.39 | 2.89 | 04:05                     | 0.088 | 13:55 | 0.254 | 0.178 | 0.178 | 0.06      |
| 12/02/2019 | 03:15      | 1.69 | 13:05 | 2.45 | 2.10 | 02:35           | 1.65 | 07:45 | 3.36 | 2.80 | 03:10                     | 0.077 | 08:00 | 0.244 | 0.174 | 0.174 | 0.36      |
| 12/03/2019 | 03:45      | 1.76 | 12:15 | 2.47 | 2.07 | 03:40           | 1.70 | 08:30 | 3.35 | 2.78 | 03:40                     | 0.081 | 08:05 | 0.223 | 0.169 | 0.169 |           |
| 12/04/2019 | 02:15      | 1.77 | 19:15 | 2.88 | 2.13 | 02:10           | 1.86 | 19:15 | 3.61 | 2.85 | 03:10                     | 0.089 | 19:15 | 0.346 | 0.180 | 0.180 |           |
| 12/05/2019 | 03:35      | 1.80 | 07:30 | 2.46 | 2.11 | 02:25           | 1.75 | 20:45 | 3.34 | 2.81 | 02:25                     | 0.086 | 07:35 | 0.234 | 0.174 | 0.174 |           |
| 12/06/2019 | 03:45      | 1.75 | 10:20 | 2.50 | 2.13 | 03:35           | 1.80 | 08:05 | 3.35 | 2.77 | 03:35                     | 0.086 | 08:05 | 0.240 | 0.174 | 0.174 |           |
| 12/07/2019 | 04:20      | 1.75 | 00:00 | 2.52 | 2.13 | 04:10           | 1.76 | 20:55 | 3.39 | 2.92 | 04:10                     | 0.084 | 20:55 | 0.234 | 0.185 | 0.185 | 0.84      |
| 12/08/2019 | 02:35      | 1.86 | 14:25 | 3.31 | 2.18 | 04:40           | 1.86 | 19:40 | 3.56 | 3.00 | 04:45                     | 0.098 | 14:25 | 0.352 | 0.195 | 0.195 | 0.10      |
| 12/09/2019 | 03:50      | 1.79 | 09:50 | 2.52 | 2.16 | 03:05           | 1.80 | 08:10 | 3.38 | 2.84 | 03:05                     | 0.091 | 07:55 | 0.244 | 0.183 | 0.183 |           |
| 12/10/2019 | 03:20      | 1.77 | 16:20 | 2.58 | 2.13 | 03:30           | 1.62 | 07:35 | 3.39 | 2.79 | 03:30                     | 0.077 | 07:35 | 0.250 | 0.176 | 0.176 |           |
| 12/11/2019 | 01:20      | 1.83 | 23:45 | 2.47 | 2.18 | 03:45           | 1.93 | 07:55 | 3.41 | 2.83 | 03:25                     | 0.099 | 07:55 | 0.252 | 0.184 | 0.184 | 0.00      |
| 12/12/2019 | 03:45      | 1.78 | 10:30 | 2.54 | 2.12 | 04:35           | 1.84 | 22:15 | 3.39 | 2.78 | 03:50                     | 0.090 | 07:30 | 0.251 | 0.175 | 0.175 |           |
| 12/13/2019 | 05:20      | 1.78 | 09:05 | 2.52 | 2.16 | 03:00           | 1.78 | 08:05 | 3.34 | 2.77 | 03:00                     | 0.088 | 09:05 | 0.233 | 0.179 | 0.179 |           |
| 12/14/2019 | 05:55      | 1.86 | 17:25 | 2.60 | 2.16 | 03:50           | 1.90 | 11:10 | 3.31 | 2.91 | 03:50                     | 0.101 | 17:25 | 0.243 | 0.187 | 0.187 | 0.01      |
| 12/15/2019 | 04:05      | 1.75 | 18:15 | 3.13 | 2.11 | 04:10           | 1.63 | 21:05 | 3.39 | 2.85 | 04:10                     | 0.077 | 18:15 | 0.249 | 0.179 | 0.179 |           |
| 12/16/2019 | 03:40      | 1.79 | 09:10 | 2.83 | 2.14 | 04:00           | 1.75 | 08:05 | 3.35 | 2.80 | 04:00                     | 0.086 | 07:50 | 0.248 | 0.177 | 0.177 |           |
| 12/17/2019 | 03:35      | 1.80 | 10:45 | 2.58 | 2.13 | 02:30           | 1.75 | 07:35 | 3.36 | 2.77 | 02:30                     | 0.087 | 11:40 | 0.231 | 0.175 | 0.175 |           |
| 12/18/2019 | 03:05      | 1.79 | 13:45 | 2.47 | 2.14 | 03:55           | 1.67 | 08:10 | 3.42 | 2.76 | 03:55                     | 0.083 | 08:10 | 0.241 | 0.175 | 0.175 |           |
| 12/19/2019 | 03:20      | 1.73 | 09:05 | 2.58 | 2.10 | 03:20           | 1.73 | 07:45 | 3.34 | 2.75 | 03:20                     | 0.079 | 07:40 | 0.242 | 0.171 | 0.171 |           |
| 12/20/2019 | 03:50      | 1.74 | 11:45 | 2.53 | 2.14 | 03:15           | 1.59 | 07:35 | 3.38 | 2.74 | 03:15                     | 0.075 | 07:35 | 0.232 | 0.175 | 0.175 |           |
| 12/21/2019 | 06:35      | 1.75 | 23:25 | 2.50 | 2.11 | 04:10           | 1.80 | 12:25 | 3.37 | 2.85 | 04:10                     | 0.086 | 23:15 | 0.236 | 0.178 | 0.178 |           |
| 12/22/2019 | 04:20      | 1.76 | 18:55 | 2.67 | 2.13 | 04:20           | 1.65 | 17:10 | 3.50 | 2.87 | 04:20                     | 0.078 | 17:10 | 0.267 | 0.183 | 0.183 |           |
| 12/23/2019 | 04:50      | 1.77 | 13:30 | 2.52 | 2.13 | 04:55           | 1.63 | 09:50 | 3.42 | 2.84 | 04:55                     | 0.078 | 13:20 | 0.236 | 0.179 | 0.179 |           |
| 12/24/2019 | 03:55      | 1.84 | 21:00 | 2.49 | 2.14 | 03:40           | 1.84 | 17:20 | 3.43 | 2.90 | 03:40                     | 0.097 | 17:20 | 0.234 | 0.184 | 0.184 |           |
| 12/25/2019 | 05:30      | 1.77 | 18:45 | 2.65 | 2.12 | 04:40           | 1.78 | 11:00 | 3.37 | 2.87 | 04:40                     | 0.086 | 18:45 | 0.250 | 0.180 | 0.180 |           |
| 12/26/2019 | 05:05      | 1.67 | 16:40 | 2.57 | 2.09 | 04:40           | 1.58 | 11:50 | 3.43 | 2.79 | 04:40                     | 0.072 | 15:30 | 0.237 | 0.173 | 0.173 |           |
| 12/27/2019 | 03:40      | 1.72 | 14:15 | 2.64 | 2.13 | 03:50           | 1.64 | 12:45 | 3.32 | 2.75 | 03:50                     | 0.075 | 14:15 | 0.236 | 0.173 | 0.173 |           |
| 12/28/2019 | 03:30      | 1.73 | 14:30 | 2.65 | 2.15 | 04:35           | 1.57 | 12:40 | 3.36 | 2.74 | 04:35                     | 0.073 | 21:55 | 0.257 | 0.177 | 0.177 |           |
| 12/29/2019 | 05:25      | 1.66 | 18:25 | 2.53 | 2.09 | 03:50           | 1.50 | 20:50 | 3.35 | 2.80 | 05:10                     | 0.068 | 10:45 | 0.244 | 0.174 | 0.174 |           |
| 12/30/2019 | 04:00      | 1.74 | 17:05 | 2.63 | 2.12 | 04:00           | 1.55 | 11:15 | 3.31 | 2.79 | 04:00                     | 0.072 | 14:50 | 0.243 | 0.176 | 0.176 |           |
| 12/31/2019 | 04:45      | 1.76 | 17:05 | 2.67 | 2.13 | 03:10           | 1.61 | 18:15 | 3.36 | 2.81 | 03:10                     | 0.078 | 17:05 | 0.254 | 0.178 | 0.178 |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:20      | 1.76 | 22:55 | 2.55 | 2.11 | 05:55           | 1.78 | 10:25 | 3.38 | 2.84 | 05:55                     | 0.085 | 22:55 | 0.235 | 0.177 | 0.177 | 0.10  |           |
| 01/02/2020 | 03:55      | 1.72 | 14:45 | 2.46 | 2.12 | 03:05           | 1.59 | 11:55 | 3.35 | 2.77 | 03:55                     | 0.074 | 11:55 | 0.223 | 0.175 | 0.175 |       |           |
| 01/03/2020 | 04:40      | 1.76 | 21:50 | 2.59 | 2.15 | 04:45           | 1.66 | 07:45 | 3.26 | 2.74 | 04:45                     | 0.079 | 17:50 | 0.241 | 0.176 | 0.176 |       |           |
| 01/04/2020 | 05:40      | 1.67 | 20:40 | 2.64 | 2.11 | 03:35           | 1.57 | 10:35 | 3.38 | 2.78 | 03:35                     | 0.073 | 20:40 | 0.253 | 0.175 | 0.175 |       |           |
| 01/05/2020 | 04:20      | 1.64 | 11:35 | 2.33 | 2.09 | 04:20           | 1.48 | 14:05 | 3.39 | 2.83 | 04:20                     | 0.063 | 11:40 | 0.236 | 0.176 | 0.176 |       |           |
| 01/06/2020 | 03:35      | 1.68 | 09:20 | 2.55 | 2.08 | 03:10           | 1.38 | 08:20 | 3.38 | 2.73 | 03:10                     | 0.062 | 09:20 | 0.232 | 0.169 | 0.169 |       |           |
| 01/07/2020 | 03:40      | 1.69 | 06:40 | 2.51 | 2.11 | 03:45           | 1.56 | 21:30 | 3.38 | 2.73 | 03:45                     | 0.069 | 17:50 | 0.225 | 0.171 | 0.171 |       |           |
| 01/08/2020 | 04:00      | 1.61 | 09:00 | 2.60 | 2.12 | 03:45           | 1.67 | 08:00 | 3.32 | 2.71 | 03:45                     | 0.069 | 09:00 | 0.245 | 0.172 | 0.172 |       |           |
| 01/09/2020 | 03:20      | 1.68 | 23:05 | 2.55 | 2.13 | 04:25           | 1.59 | 08:05 | 3.36 | 2.71 | 03:20                     | 0.072 | 07:50 | 0.252 | 0.173 | 0.173 |       |           |
| 01/10/2020 | 01:10      | 1.85 | 08:10 | 2.60 | 2.18 | 03:40           | 1.81 | 07:35 | 3.41 | 2.77 | 03:40                     | 0.094 | 08:10 | 0.271 | 0.181 | 0.181 |       |           |
| 01/11/2020 | 05:15      | 1.76 | 17:50 | 2.64 | 2.16 | 05:10           | 1.77 | 11:00 | 3.49 | 2.80 | 05:10                     | 0.084 | 11:00 | 0.252 | 0.181 | 0.181 |       |           |
| 01/12/2020 | 04:10      | 1.67 | 10:45 | 3.06 | 2.12 | 02:50           | 1.61 | 21:20 | 3.40 | 2.82 | 05:10                     | 0.076 | 14:50 | 0.270 | 0.179 | 0.179 |       |           |
| 01/13/2020 | 03:50      | 1.70 | 09:50 | 2.56 | 2.13 | 02:10           | 1.74 | 07:40 | 3.35 | 2.74 | 03:45                     | 0.079 | 09:50 | 0.250 | 0.174 | 0.174 |       |           |
| 01/14/2020 | 02:40      | 1.72 | 06:45 | 2.62 | 2.13 | 02:20           | 1.71 | 22:15 | 3.33 | 2.72 | 02:40                     | 0.082 | 14:25 | 0.247 | 0.173 | 0.173 |       |           |
| 01/15/2020 | 04:15      | 1.76 | 22:15 | 2.81 | 2.16 | 02:40           | 1.75 | 07:45 | 3.40 | 2.71 | 04:30                     | 0.085 | 22:15 | 0.285 | 0.176 | 0.176 |       |           |
| 01/16/2020 | 03:40      | 1.88 | 17:45 | 2.76 | 2.27 | 03:40           | 1.83 | 21:20 | 3.42 | 2.81 | 03:40                     | 0.096 | 12:35 | 0.276 | 0.195 | 0.195 |       |           |
| 01/17/2020 | 01:25      | 1.90 | 21:40 | 2.80 | 2.28 | 03:05           | 2.03 | 08:00 | 3.45 | 2.83 | 03:05                     | 0.114 | 21:40 | 0.282 | 0.197 | 0.197 |       |           |
| 01/18/2020 | 03:40      | 1.93 | 00:55 | 2.69 | 2.24 | 05:10           | 2.00 | 11:15 | 3.42 | 2.92 | 05:10                     | 0.112 | 00:55 | 0.263 | 0.197 | 0.197 |       |           |
| 01/19/2020 | 03:15      | 1.81 | 18:50 | 2.75 | 2.17 | 02:15           | 1.83 | 19:25 | 3.46 | 2.90 | 02:15                     | 0.095 | 18:50 | 0.243 | 0.188 | 0.188 |       |           |
| 01/20/2020 | 05:40      | 1.84 | 13:45 | 2.69 | 2.15 | 05:00           | 1.99 | 17:50 | 3.37 | 2.88 | 05:00                     | 0.102 | 13:50 | 0.245 | 0.184 | 0.184 |       |           |
| 01/21/2020 | 03:50      | 1.76 | 17:35 | 2.50 | 2.15 | 02:40           | 1.78 | 23:50 | 3.40 | 2.77 | 03:45                     | 0.088 | 23:50 | 0.252 | 0.178 | 0.178 |       |           |
| 01/22/2020 | 05:05      | 1.78 | 10:00 | 2.54 | 2.16 | 04:05           | 1.71 | 22:00 | 3.41 | 2.73 | 04:05                     | 0.083 | 22:05 | 0.238 | 0.177 | 0.177 |       |           |
| 01/23/2020 | 03:50      | 1.74 | 09:50 | 2.56 | 2.17 | 03:55           | 1.72 | 07:45 | 3.35 | 2.75 | 03:55                     | 0.080 | 12:15 | 0.244 | 0.180 | 0.180 |       |           |
| 01/24/2020 | 03:55      | 1.71 | 22:35 | 2.61 | 2.17 | 03:20           | 1.58 | 09:00 | 3.37 | 2.79 | 03:20                     | 0.073 | 22:35 | 0.245 | 0.181 | 0.181 |       |           |
| 01/25/2020 | 04:10      | 1.77 | 19:20 | 2.59 | 2.17 | 04:00           | 1.84 | 13:00 | 3.33 | 2.81 | 04:00                     | 0.088 | 23:45 | 0.239 | 0.183 | 0.183 |       |           |
| 01/26/2020 | 04:10      | 1.67 | 11:05 | 2.97 | 2.13 | 04:00           | 1.64 | 12:25 | 3.37 | 2.85 | 04:00                     | 0.073 | 11:05 | 0.262 | 0.182 | 0.182 |       |           |
| 01/27/2020 | 03:40      | 1.73 | 06:30 | 2.64 | 2.12 | 03:55           | 1.62 | 07:45 | 3.40 | 2.76 | 03:55                     | 0.078 | 06:30 | 0.243 | 0.174 | 0.174 |       |           |
| 01/28/2020 | 04:05      | 1.75 | 17:15 | 2.55 | 2.13 | 03:30           | 1.63 | 20:10 | 3.37 | 2.75 | 03:30                     | 0.077 | 06:45 | 0.236 | 0.174 | 0.174 |       |           |
| 01/29/2020 | 03:40      | 1.68 | 12:55 | 2.59 | 2.17 | 03:45           | 1.74 | 20:00 | 3.54 | 2.79 | 03:45                     | 0.078 | 20:15 | 0.276 | 0.184 | 0.184 |       |           |
| 01/30/2020 | 04:15      | 1.79 | 18:25 | 2.56 | 2.18 | 04:15           | 1.92 | 20:35 | 3.37 | 2.82 | 04:15                     | 0.093 | 07:50 | 0.251 | 0.183 | 0.183 |       |           |
| 01/31/2020 | 03:40      | 1.73 | 22:10 | 2.55 | 2.13 | 02:40           | 1.60 | 08:25 | 3.36 | 2.70 | 03:45                     | 0.074 | 07:50 | 0.238 | 0.172 | 0.172 |       |           |
| 02/01/2020 | 05:10      | 1.65 | 10:45 | 2.68 | 2.13 | 03:30           | 1.69 | 10:40 | 3.51 | 2.84 | 05:35                     | 0.076 | 10:40 | 0.304 | 0.181 | 0.181 |       |           |
| 02/02/2020 | 03:35      | 1.80 | 12:00 | 3.28 | 2.16 | 05:05           | 1.86 | 10:15 | 3.47 | 2.86 | 03:45                     | 0.094 | 10:15 | 0.292 | 0.185 | 0.185 |       |           |
| 02/03/2020 | 03:50      | 1.68 | 01:20 | 2.55 | 2.11 | 04:10           | 1.61 | 20:10 | 3.52 | 2.72 | 04:10                     | 0.073 | 20:10 | 0.281 | 0.171 | 0.171 |       |           |
| 02/04/2020 | 03:40      | 1.66 | 08:45 | 2.53 | 2.09 | 03:50           | 1.46 | 08:00 | 3.36 | 2.69 | 03:50                     | 0.064 | 10:00 | 0.242 | 0.166 | 0.166 |       |           |
| 02/05/2020 | 03:50      | 1.73 | 09:30 | 2.57 | 2.11 | 03:35           | 1.57 | 21:40 | 3.40 | 2.69 | 03:50                     | 0.074 | 07:55 | 0.238 | 0.169 | 0.169 |       |           |
| 02/06/2020 | 02:25      | 1.74 | 09:05 | 2.70 | 2.10 | 02:20           | 1.64 | 07:30 | 3.34 | 2.72 | 02:20                     | 0.077 | 09:05 | 0.259 | 0.170 | 0.170 |       |           |
| 02/07/2020 | 04:00      | 1.65 | 18:10 | 2.57 | 2.12 | 03:35           | 1.61 | 09:20 | 3.37 | 2.66 | 03:35                     | 0.071 | 10:20 | 0.237 | 0.169 | 0.169 |       |           |
| 02/08/2020 | 04:50      | 1.68 | 21:25 | 2.62 | 2.15 | 03:30           | 1.52 | 11:15 | 3.37 | 2.73 | 03:30                     | 0.070 | 14:40 | 0.244 | 0.177 | 0.177 |       |           |
| 02/09/2020 | 05:10      | 1.66 | 11:55 | 3.29 | 2.13 | 04:55           | 1.61 | 12:05 | 3.38 | 2.78 | 05:00                     | 0.071 | 11:55 | 0.262 | 0.178 | 0.178 |       |           |
| 02/10/2020 | 02:40      | 1.67 | 09:20 | 2.52 | 2.11 | 03:50           | 1.52 | 07:30 | 3.41 | 2.67 | 02:45                     | 0.068 | 07:35 | 0.233 | 0.168 | 0.168 |       |           |
| 02/11/2020 | 03:40      | 1.65 | 10:45 | 2.56 | 2.09 | 03:30           | 1.49 | 08:05 | 3.35 | 2.69 | 04:10                     | 0.066 | 10:45 | 0.245 | 0.167 | 0.167 |       |           |
| 02/12/2020 | 03:55      | 1.68 | 23:25 | 2.58 | 2.13 | 02:45           | 1.63 | 08:00 | 3.41 | 2.70 | 03:50                     | 0.073 | 08:00 | 0.253 | 0.172 | 0.172 |       |           |
| 02/13/2020 | 04:15      | 1.68 | 20:45 | 2.91 | 2.10 | 04:25           | 1.49 | 07:35 | 3.41 | 2.65 | 04:25                     | 0.068 | 20:45 | 0.246 | 0.165 | 0.165 |       |           |
| 02/14/2020 | 03:50      | 1.65 | 09:20 | 2.65 | 2.13 | 03:55           | 1.54 | 07:50 | 3.39 | 2.67 | 03:55                     | 0.067 | 07:50 | 0.252 | 0.170 | 0.170 |       |           |
| 02/15/2020 | 05:10      | 1.67 | 17:35 | 2.60 | 2.16 | 04:20           | 1.50 | 11:20 | 3.41 | 2.70 | 04:20                     | 0.070 | 11:35 | 0.251 | 0.176 | 0.176 |       |           |
| 02/16/2020 | 05:25      | 1.64 | 14:25 | 2.69 | 2.12 | 04:10           | 1.50 | 12:05 | 3.39 | 2.76 | 04:10                     | 0.067 | 14:25 | 0.256 | 0.174 | 0.174 |       |           |
| 02/17/2020 | 04:00      | 1.68 | 10:55 | 2.93 | 2.11 | 04:00           | 1.55 | 11:00 | 3.55 | 2.77 | 04:00                     | 0.069 | 10:55 | 0.338 | 0.174 | 0.174 |       |           |
| 02/18/2020 | 03:30      | 1.67 | 10:15 | 2.73 | 2.10 | 03:30           | 1.51 | 20:25 | 3.43 | 2.68 | 03:30                     | 0.066 | 20:20 | 0.265 | 0.167 | 0.167 |       |           |
| 02/19/2020 | 03:10      | 1.68 | 22:35 | 2.58 | 2.12 | 03:10           | 1.49 | 21:00 | 3.41 | 2.72 | 03:10                     | 0.066 | 22:35 | 0.245 | 0.172 | 0.172 |       |           |
| 02/20/2020 | 03:50      | 1.67 | 18:50 | 2.59 | 2.09 | 03:55           | 1.50 | 08:00 | 3.29 | 2.64 | 03:55                     | 0.066 | 18:50 | 0.232 | 0.163 | 0.163 |       |           |
| 02/21/2020 | 03:40      | 1.68 | 17:55 | 2.58 | 2.09 | 02:45           | 1.53 | 09:45 | 3.35 | 2.67 | 03:50                     | 0.070 | 20:45 | 0.236 | 0.165 | 0.165 |       |           |
| 02/22/2020 | 04:20      | 1.68 | 13:25 | 2.55 | 2.08 | 03:30           | 1.54 | 10:05 | 3.41 | 2.75 | 04:20                     | 0.071 | 11:35 | 0.228 | 0.169 | 0.169 |       |           |
| 02/23/2020 | 04:40      | 1.66 | 10:05 | 3.26 | 2.12 | 04:15           | 1.56 | 21:45 | 3.40 | 2.81 | 04:20                     | 0.069 | 10:05 | 0.263 | 0.178 | 0.178 |       |           |
| 02/24/2020 | 03:30      | 1.65 | 06:35 | 2.55 | 2.08 | 03:25           | 1.27 | 07:30 | 3.39 | 2.66 | 03:25                     | 0.055 | 07:55 | 0.235 | 0.164 |       |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 04:00      | 1.65 | 13:55 | 2.53 | 2.10 | 02:25           | 1.50 | 07:30 | 3.39 | 2.68 | 02:25                     | 0.066 | 07:50 | 0.233 | 0.167 | 0.167 | 0.01      |
| 02/26/2020 | 02:55      | 1.62 | 18:30 | 2.58 | 2.11 | 03:00           | 1.40 | 07:35 | 3.39 | 2.66 | 03:00                     | 0.060 | 07:50 | 0.248 | 0.167 | 0.167 |           |
| 02/27/2020 | 04:30      | 1.72 | 07:50 | 2.87 | 2.10 | 03:45           | 1.46 | 07:50 | 3.55 | 2.68 | 03:45                     | 0.067 | 07:50 | 0.339 | 0.168 | 0.168 |           |
| 02/28/2020 | 03:50      | 1.61 | 23:00 | 2.56 | 2.10 | 03:55           | 1.24 | 08:10 | 3.34 | 2.65 | 03:55                     | 0.052 | 07:50 | 0.234 | 0.166 | 0.166 |           |
| 02/29/2020 | 04:05      | 1.68 | 23:25 | 2.54 | 2.09 | 05:30           | 1.48 | 12:05 | 3.35 | 2.79 | 05:30                     | 0.069 | 22:45 | 0.237 | 0.173 | 0.173 |           |
| 03/01/2020 | 05:30      | 1.69 | 10:25 | 3.29 | 2.10 | 05:25           | 1.52 | 10:20 | 3.39 | 2.80 | 05:25                     | 0.068 | 10:25 | 0.285 | 0.176 | 0.176 |           |
| 03/02/2020 | 03:40      | 1.72 | 13:20 | 2.49 | 2.11 | 02:50           | 1.48 | 08:10 | 3.41 | 2.72 | 03:55                     | 0.068 | 07:50 | 0.260 | 0.171 | 0.171 |           |
| 03/03/2020 | 02:50      | 1.66 | 06:40 | 2.58 | 2.08 | 03:00           | 1.46 | 21:20 | 3.47 | 2.66 | 03:00                     | 0.064 | 21:20 | 0.279 | 0.164 | 0.164 |           |
| 03/04/2020 | 03:35      | 1.61 | 09:55 | 2.50 | 2.13 | 03:35           | 1.42 | 08:05 | 3.39 | 2.68 | 03:35                     | 0.059 | 07:55 | 0.238 | 0.171 | 0.171 |           |
| 03/05/2020 | 03:30      | 1.69 | 17:45 | 2.73 | 2.08 | 03:15           | 1.50 | 07:55 | 3.36 | 2.70 | 03:30                     | 0.068 | 17:45 | 0.246 | 0.166 | 0.166 |           |
| 03/06/2020 | 03:35      | 1.62 | 09:45 | 2.70 | 2.08 | 04:05           | 1.49 | 09:45 | 3.62 | 2.70 | 04:05                     | 0.064 | 09:45 | 0.317 | 0.167 | 0.167 | 0.58      |
| 03/07/2020 | 03:05      | 1.67 | 12:50 | 2.74 | 2.12 | 05:05           | 1.46 | 12:05 | 3.42 | 2.86 | 05:05                     | 0.065 | 12:50 | 0.259 | 0.182 | 0.182 |           |
| 03/08/2020 | 04:05      | 1.65 | 10:30 | 3.13 | 2.11 | 04:45           | 1.68 | 09:50 | 3.43 | 2.86 | 04:45                     | 0.075 | 10:30 | 0.345 | 0.181 | 0.181 | 0.02      |
| 03/09/2020 | 02:50      | 1.70 | 12:05 | 2.58 | 2.09 | 02:30           | 1.56 | 21:15 | 3.37 | 2.78 | 02:30                     | 0.073 | 19:45 | 0.235 | 0.172 | 0.172 | 0.11      |

#### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 20.139                    | 5.26      |
| Avg   | 2.12       | 2.77            | 0.175                     |           |

## Site Commentary

### Site Information

| MIL_2491        |       |
|-----------------|-------|
| Pipe Dimensions | 15    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2491 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Due to a meter malfunction, data confidence is less than typical from January 28, 2020 through February 22, 2020. A data gap also occurs February 23, 2020 through March 2, 2020.

This location was installed upstream of site MIL\_2569 and downstream of the combined flows of sites MIL\_0386 and MIL\_2840. A review of balancing with the combined flows of MIL\_0386 and MIL\_2840 into MIL\_0649 and MIL\_2491 shows a net flow between the sites of 0.426 MGD.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                    |                    |
|--------------------------|-------------------|--------------------|--------------------|
| Item                     | Depth (in)        | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 2.34              | 2.36               | 0.216              |
| Minimum                  | 1.07              | 0.37               | 0.010              |
| Maximum                  | 4.18              | 3.84               | 0.682              |
| Time of Minimum          | 1/3/2020 9:55 PM  | 3/8/2020 3:05 AM   | 3/8/2020 3:05 AM   |
| Time of Maximum          | 1/17/2020 1:15 PM | 11/21/2019 9:30 AM | 11/21/2019 9:30 AM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |    |
|-----------------|----|
| Depth (in)      | 91 |
| Velocity (ft/s) | 91 |
| Quantity (MGD)  | 91 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_2491

Site Address /Location: N Milpitas Blvd and E Calaveras Blvd, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: Drive

Latitude:

37.433991

Longitude:

-121.900388

Pipe Size (H x W)

15.0" x 15.0"

Pipe Shape

Circular

Manhole #

2491

System Characteristics

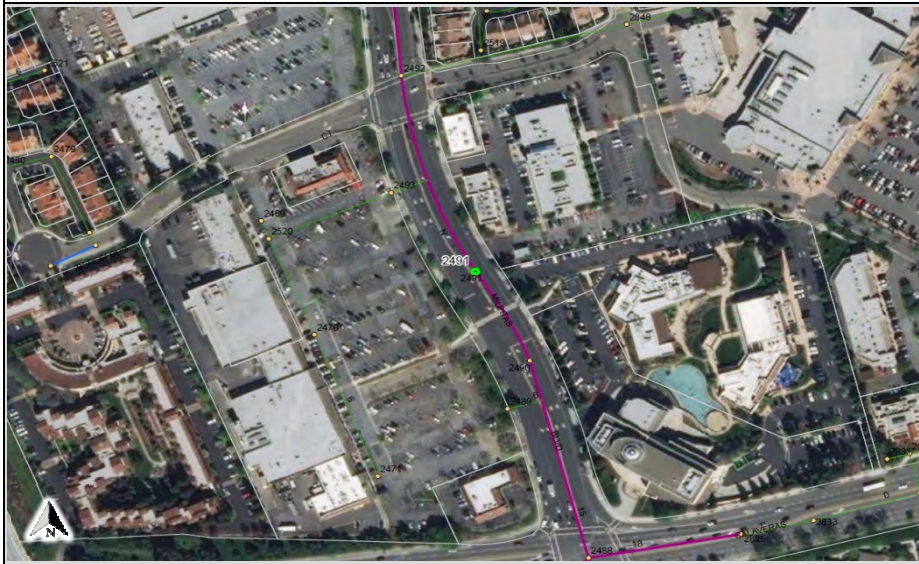
Residential/Commercial

Access

Traffic

Drive

Heavy



### Installation Information

Installation Date:

Wednesday, November 13, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

9:04:37 AM

Pipe Size (HxW)

15.0" x 15.0"

Depth of Flow (Wet DOF) (in)

3.25"

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

3.74

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

Hydraulic Comments:

Good flow, Moderate depth and velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

10'

Manhole Configuration

Single

Manhole Material:

Vitrified Clay Pipe

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

896



ADS Project Name: Milpitas.WWTFM.CA19-20

119

ADS Project Number: 22431



# SCATTERGRAPH REPORT

MIL\_2491

Flow Monitor

**MIL\_2491**

Pipe Height  
15.00 in

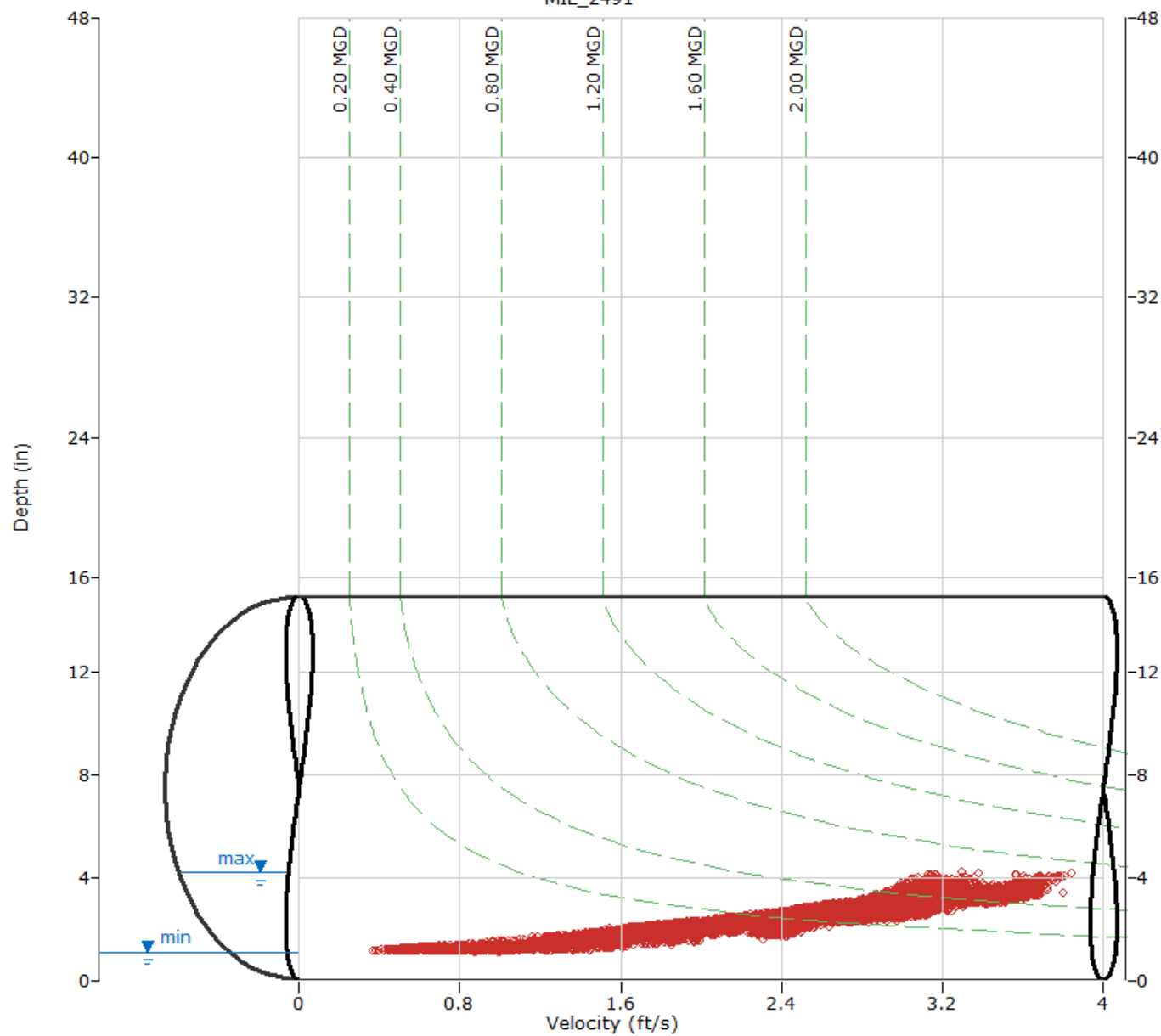
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_2491

Flow Monitor

**MIL\_2491**

Pipe Height

15.00 in

Report Period

11/16/2019  
To  
3/9/2020

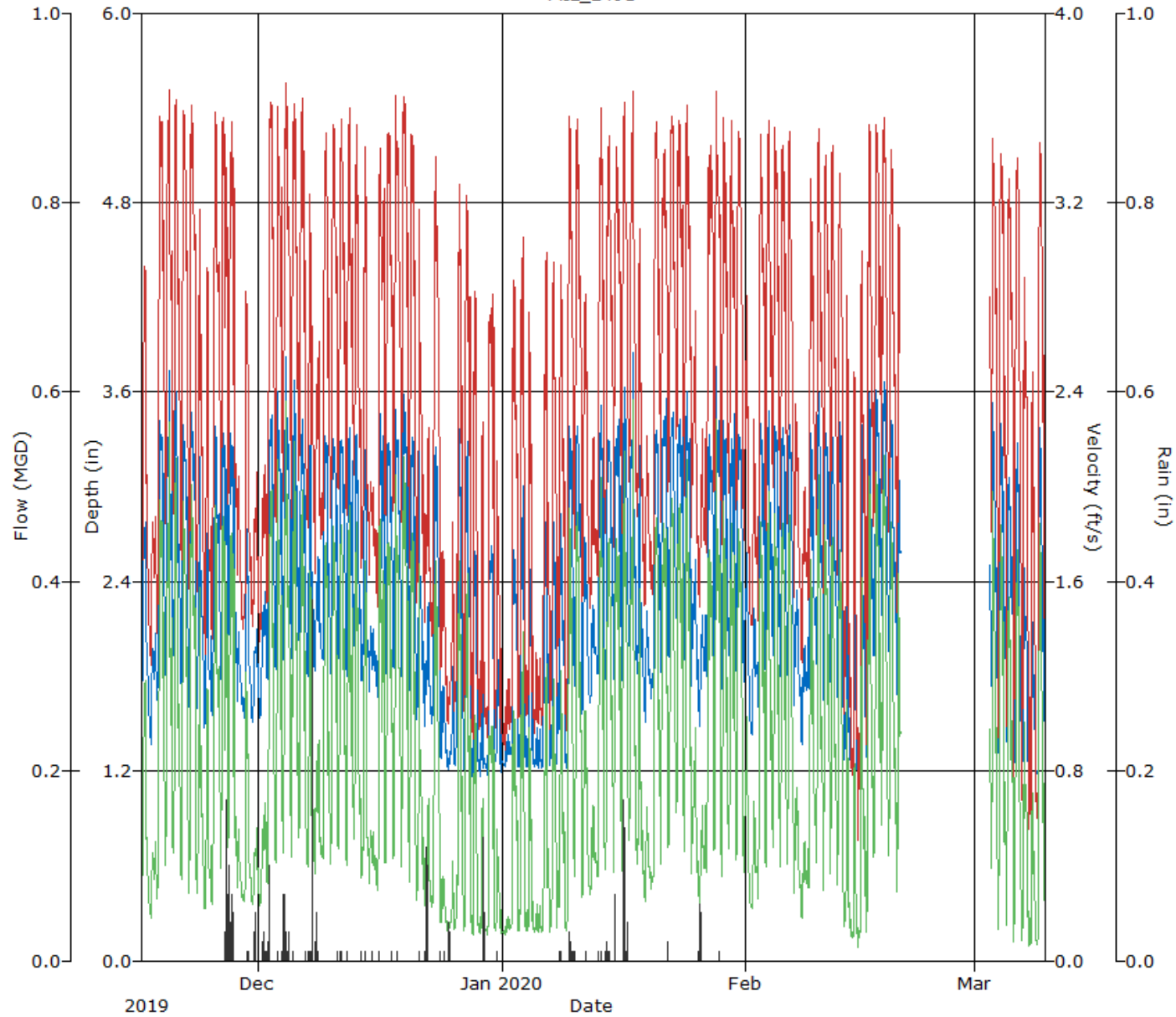
Legend

Depth

Velocity

Quantity

Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2491, Pipe Height: 15.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 23:25      | 1.71 | 12:20 | 3.63 | 2.11 | 22:35           | 1.41 | 12:20 | 3.30 | 2.11 | 22:35                     | 0.071 | 12:20 | 0.488 | 0.153 | 0.153 |           |
| 11/17/2019 | 06:30      | 1.33 | 19:25 | 2.32 | 1.75 | 07:55           | 1.17 | 19:30 | 2.22 | 1.60 | 06:20                     | 0.042 | 19:25 | 0.171 | 0.085 | 0.085 |           |
| 11/18/2019 | 00:45      | 1.57 | 14:50 | 3.97 | 2.72 | 01:00           | 1.25 | 13:25 | 3.72 | 2.77 | 00:45                     | 0.056 | 13:25 | 0.582 | 0.300 | 0.300 |           |
| 11/19/2019 | 04:45      | 1.76 | 15:30 | 3.93 | 2.76 | 04:55           | 1.72 | 15:45 | 3.72 | 2.88 | 04:55                     | 0.092 | 15:30 | 0.615 | 0.308 | 0.308 |           |
| 11/20/2019 | 03:25      | 1.82 | 12:20 | 3.94 | 2.66 | 03:05           | 1.81 | 12:20 | 3.72 | 2.75 | 03:25                     | 0.100 | 12:20 | 0.618 | 0.280 | 0.280 |           |
| 11/21/2019 | 04:10      | 1.68 | 09:30 | 4.13 | 2.70 | 03:00           | 1.60 | 09:30 | 3.84 | 2.81 | 04:15                     | 0.080 | 09:30 | 0.682 | 0.295 | 0.295 |           |
| 11/22/2019 | 04:30      | 1.58 | 11:30 | 3.91 | 2.79 | 04:20           | 1.52 | 11:30 | 3.69 | 2.88 | 04:20                     | 0.069 | 11:30 | 0.607 | 0.315 | 0.315 |           |
| 11/23/2019 | 05:00      | 1.55 | 12:05 | 3.76 | 2.14 | 04:55           | 1.47 | 12:00 | 3.41 | 2.15 | 04:55                     | 0.064 | 12:05 | 0.504 | 0.159 | 0.159 |           |
| 11/24/2019 | 03:20      | 1.44 | 09:30 | 3.57 | 1.98 | 05:30           | 1.05 | 11:15 | 3.21 | 1.89 | 05:30                     | 0.044 | 09:30 | 0.452 | 0.128 | 0.128 |           |
| 11/25/2019 | 02:00      | 1.51 | 16:45 | 3.74 | 2.58 | 02:20           | 1.12 | 12:40 | 3.63 | 2.65 | 02:05                     | 0.047 | 12:25 | 0.519 | 0.268 | 0.268 |           |
| 11/26/2019 | 04:10      | 1.75 | 13:35 | 3.61 | 2.75 | 05:10           | 1.58 | 13:10 | 3.68 | 2.89 | 05:10                     | 0.085 | 13:35 | 0.493 | 0.306 | 0.306 | 0.36      |
| 11/27/2019 | 03:10      | 1.92 | 10:20 | 3.75 | 2.79 | 02:55           | 1.76 | 13:55 | 3.60 | 2.86 | 02:00                     | 0.107 | 21:05 | 0.502 | 0.307 | 0.307 | 0.63      |
| 11/28/2019 | 20:05      | 1.59 | 02:50 | 2.32 | 1.86 | 22:45           | 1.22 | 00:00 | 2.34 | 1.77 | 20:00                     | 0.058 | 09:20 | 0.177 | 0.102 | 0.102 |           |
| 11/29/2019 | 04:15      | 1.50 | 09:10 | 3.87 | 2.01 | 05:55           | 1.28 | 14:05 | 3.35 | 1.98 | 04:25                     | 0.057 | 09:10 | 0.524 | 0.137 | 0.137 | 0.02      |
| 11/30/2019 | 06:20      | 1.46 | 17:25 | 2.26 | 1.79 | 06:25           | 1.30 | 17:35 | 2.35 | 1.68 | 06:25                     | 0.052 | 17:25 | 0.172 | 0.091 | 0.091 | 0.10      |
| 12/01/2019 | 06:00      | 1.49 | 21:25 | 2.54 | 1.94 | 04:15           | 1.25 | 21:40 | 2.62 | 1.73 | 04:15                     | 0.054 | 21:40 | 0.223 | 0.107 | 0.107 | 0.06      |
| 12/02/2019 | 04:10      | 1.74 | 08:30 | 3.62 | 2.77 | 04:10           | 1.39 | 15:20 | 3.68 | 2.79 | 04:10                     | 0.071 | 13:20 | 0.513 | 0.308 | 0.308 | 0.30      |
| 12/03/2019 | 04:05      | 1.79 | 10:00 | 4.05 | 2.75 | 04:10           | 1.82 | 09:55 | 3.69 | 2.80 | 04:05                     | 0.097 | 10:00 | 0.636 | 0.298 | 0.298 | 0.01      |
| 12/04/2019 | 01:45      | 1.87 | 12:05 | 4.04 | 2.92 | 03:20           | 1.84 | 12:05 | 3.81 | 2.97 | 02:00                     | 0.109 | 12:05 | 0.656 | 0.341 | 0.341 | 0.39      |
| 12/05/2019 | 03:25      | 1.88 | 14:30 | 4.04 | 2.82 | 03:10           | 1.72 | 13:25 | 3.80 | 2.92 | 03:10                     | 0.102 | 14:30 | 0.643 | 0.318 | 0.318 | 0.01      |
| 12/06/2019 | 05:00      | 1.87 | 14:45 | 3.76 | 2.73 | 01:15           | 1.90 | 12:30 | 3.69 | 2.84 | 05:00                     | 0.111 | 14:45 | 0.524 | 0.295 | 0.295 | 0.01      |
| 12/07/2019 | 06:00      | 1.76 | 11:35 | 3.72 | 2.35 | 05:45           | 1.74 | 12:15 | 3.51 | 2.39 | 05:45                     | 0.091 | 11:35 | 0.508 | 0.200 | 0.200 | 0.67      |
| 12/08/2019 | 03:50      | 1.82 | 07:40 | 3.31 | 2.11 | 05:30           | 1.48 | 07:35 | 3.16 | 2.05 | 05:30                     | 0.082 | 07:40 | 0.410 | 0.143 | 0.143 | 0.20      |
| 12/09/2019 | 04:20      | 1.82 | 17:05 | 3.83 | 2.69 | 01:10           | 1.53 | 13:30 | 3.58 | 2.79 | 04:15                     | 0.086 | 17:05 | 0.507 | 0.288 | 0.288 |           |
| 12/10/2019 | 04:55      | 1.78 | 09:20 | 3.94 | 2.70 | 05:10           | 1.80 | 14:40 | 3.63 | 2.81 | 05:10                     | 0.096 | 09:20 | 0.540 | 0.291 | 0.291 |           |
| 12/11/2019 | 04:15      | 1.87 | 09:40 | 3.85 | 2.74 | 02:40           | 1.88 | 13:10 | 3.63 | 2.85 | 03:55                     | 0.109 | 14:20 | 0.532 | 0.298 | 0.298 | 0.03      |
| 12/12/2019 | 04:20      | 1.77 | 17:05 | 3.81 | 2.72 | 04:10           | 1.84 | 12:30 | 3.65 | 2.85 | 04:20                     | 0.097 | 17:05 | 0.518 | 0.295 | 0.295 | 0.01      |
| 12/13/2019 | 01:40      | 1.92 | 12:55 | 3.75 | 2.57 | 23:50           | 1.89 | 12:25 | 3.57 | 2.66 | 01:40                     | 0.119 | 12:55 | 0.515 | 0.254 | 0.254 | 0.01      |
| 12/14/2019 | 03:05      | 1.74 | 15:20 | 3.69 | 2.30 | 02:05           | 1.49 | 14:05 | 3.51 | 2.31 | 02:05                     | 0.079 | 15:20 | 0.510 | 0.194 | 0.194 | 0.01      |
| 12/15/2019 | 06:15      | 1.61 | 11:30 | 2.25 | 1.93 | 23:45           | 1.46 | 06:35 | 2.29 | 1.85 | 03:10                     | 0.071 | 11:35 | 0.160 | 0.111 | 0.111 | 0.01      |
| 12/16/2019 | 03:40      | 1.64 | 14:00 | 4.10 | 2.75 | 04:05           | 1.32 | 10:05 | 3.58 | 2.69 | 04:05                     | 0.065 | 14:00 | 0.556 | 0.294 | 0.294 | 0.01      |
| 12/17/2019 | 05:10      | 1.75 | 09:40 | 3.65 | 2.74 | 05:10           | 1.78 | 15:35 | 3.59 | 2.86 | 05:10                     | 0.092 | 16:45 | 0.470 | 0.303 | 0.303 | 0.01      |
| 12/18/2019 | 04:05      | 1.68 | 09:05 | 3.72 | 2.82 | 03:40           | 1.66 | 11:15 | 3.71 | 2.96 | 04:05                     | 0.084 | 11:15 | 0.551 | 0.323 | 0.323 | 0.01      |
| 12/19/2019 | 03:35      | 1.77 | 18:35 | 3.79 | 2.84 | 04:25           | 1.78 | 10:15 | 3.70 | 2.96 | 04:25                     | 0.094 | 13:10 | 0.561 | 0.328 | 0.328 |           |
| 12/20/2019 | 04:55      | 1.63 | 15:50 | 3.84 | 2.69 | 04:30           | 1.60 | 10:20 | 3.58 | 2.80 | 05:00                     | 0.076 | 15:50 | 0.538 | 0.287 | 0.287 |           |
| 12/21/2019 | 04:20      | 1.50 | 11:15 | 3.82 | 2.15 | 04:25           | 1.44 | 11:20 | 3.32 | 2.16 | 04:25                     | 0.060 | 11:15 | 0.514 | 0.166 | 0.166 | 0.01      |
| 12/22/2019 | 03:15      | 1.44 | 14:30 | 2.50 | 1.77 | 03:05           | 1.35 | 14:30 | 2.49 | 1.72 | 03:30                     | 0.053 | 14:30 | 0.217 | 0.093 | 0.093 | 0.41      |
| 12/23/2019 | 01:05      | 1.40 | 16:20 | 3.71 | 2.47 | 01:20           | 1.23 | 09:50 | 3.52 | 2.50 | 01:20                     | 0.046 | 16:20 | 0.493 | 0.238 | 0.238 |           |
| 12/24/2019 | 22:40      | 1.25 | 00:00 | 2.57 | 1.49 | 20:20           | 1.03 | 00:00 | 2.53 | 1.43 | 23:50                     | 0.033 | 00:00 | 0.229 | 0.061 | 0.061 | 0.02      |
| 12/25/2019 | 01:30      | 1.18 | 16:00 | 1.98 | 1.36 | 01:25           | 0.90 | 15:45 | 1.99 | 1.23 | 01:30                     | 0.027 | 16:00 | 0.123 | 0.046 | 0.046 | 0.08      |
| 12/26/2019 | 02:05      | 1.17 | 15:20 | 3.72 | 2.27 | 03:40           | 1.01 | 13:15 | 3.39 | 2.24 | 02:15                     | 0.031 | 14:40 | 0.486 | 0.199 | 0.199 |           |
| 12/27/2019 | 02:50      | 1.16 | 09:50 | 3.66 | 2.23 | 02:50           | 1.03 | 10:55 | 3.53 | 2.29 | 02:50                     | 0.029 | 13:50 | 0.494 | 0.197 | 0.197 |           |
| 12/28/2019 | 03:55      | 1.10 | 12:05 | 2.92 | 1.73 | 06:35           | 0.82 | 13:00 | 3.05 | 1.73 | 06:35                     | 0.022 | 13:00 | 0.318 | 0.109 | 0.109 |           |
| 12/29/2019 | 03:20      | 1.10 | 11:40 | 2.73 | 1.41 | 01:45           | 0.78 | 09:15 | 2.79 | 1.29 | 01:45                     | 0.022 | 11:40 | 0.252 | 0.056 | 0.056 | 0.22      |
| 12/30/2019 | 01:00      | 1.08 | 08:30 | 2.93 | 2.03 | 00:55           | 0.80 | 17:40 | 3.05 | 2.06 | 00:55                     | 0.021 | 17:40 | 0.328 | 0.152 | 0.152 |           |
| 12/31/2019 | 21:30      | 1.11 | 08:40 | 2.26 | 1.48 | 18:05           | 0.82 | 08:45 | 2.32 | 1.35 | 18:05                     | 0.023 | 08:45 | 0.170 | 0.059 | 0.059 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 01/01/2020 | 14:05      | 1.14 | 16:35 | 1.68 | 1.30 | 07:05           | 0.86 | 16:35 | 1.55 | 1.03 | 14:05                     | 0.026 | 16:35 | 0.076 | 0.035 | 0.035 |           |
| 01/02/2020 | 23:30      | 1.23 | 07:30 | 3.51 | 2.01 | 23:35           | 0.95 | 07:30 | 3.29 | 2.01 | 23:35                     | 0.030 | 07:30 | 0.465 | 0.146 | 0.146 |           |
| 01/03/2020 | 21:55      | 1.07 | 15:10 | 3.39 | 1.92 | 00:30           | 0.89 | 15:10 | 3.16 | 1.90 | 21:55                     | 0.025 | 15:10 | 0.425 | 0.139 | 0.139 |           |
| 01/04/2020 | 19:50      | 1.14 | 12:35 | 2.84 | 1.64 | 05:55           | 0.83 | 11:00 | 2.94 | 1.55 | 05:55                     | 0.025 | 12:35 | 0.282 | 0.087 | 0.087 |           |
| 01/05/2020 | 11:50      | 1.11 | 17:35 | 2.14 | 1.29 | 11:55           | 0.75 | 17:35 | 2.21 | 1.07 | 11:50                     | 0.020 | 17:35 | 0.153 | 0.037 | 0.037 |           |
| 01/06/2020 | 00:05      | 1.22 | 13:05 | 3.31 | 1.93 | 00:00           | 0.89 | 13:05 | 3.14 | 1.90 | 00:00                     | 0.027 | 13:05 | 0.408 | 0.134 | 0.134 |           |
| 01/07/2020 | 23:45      | 1.13 | 14:30 | 2.99 | 1.92 | 01:05           | 0.87 | 12:30 | 3.02 | 1.92 | 01:05                     | 0.027 | 12:35 | 0.323 | 0.133 | 0.133 |           |
| 01/08/2020 | 04:25      | 1.12 | 08:35 | 3.04 | 2.01 | 04:30           | 0.98 | 08:35 | 3.16 | 2.04 | 04:30                     | 0.026 | 08:35 | 0.364 | 0.143 | 0.143 | 0.02      |
| 01/09/2020 | 02:05      | 1.09 | 10:45 | 4.03 | 2.41 | 05:05           | 0.86 | 10:45 | 3.69 | 2.42 | 02:05                     | 0.023 | 10:45 | 0.633 | 0.245 | 0.245 | 0.18      |
| 01/10/2020 | 05:05      | 1.72 | 16:00 | 3.89 | 2.68 | 02:30           | 1.66 | 14:05 | 3.62 | 2.76 | 05:05                     | 0.085 | 16:00 | 0.538 | 0.287 | 0.287 | 0.02      |
| 01/11/2020 | 06:05      | 1.53 | 13:50 | 3.23 | 2.09 | 06:05           | 1.43 | 17:45 | 2.96 | 2.12 | 06:05                     | 0.061 | 13:50 | 0.371 | 0.151 | 0.151 | 0.01      |
| 01/12/2020 | 03:40      | 1.62 | 14:05 | 2.39 | 1.94 | 03:30           | 1.16 | 14:15 | 2.38 | 1.80 | 03:30                     | 0.055 | 14:05 | 0.193 | 0.110 | 0.110 |           |
| 01/13/2020 | 04:30      | 1.72 | 14:50 | 3.86 | 2.68 | 03:10           | 1.50 | 12:55 | 3.66 | 2.71 | 04:25                     | 0.079 | 13:05 | 0.535 | 0.282 | 0.282 | 0.02      |
| 01/14/2020 | 04:50      | 1.74 | 08:25 | 3.94 | 2.70 | 04:50           | 1.68 | 12:50 | 3.55 | 2.75 | 04:50                     | 0.086 | 08:25 | 0.555 | 0.287 | 0.287 | 0.11      |
| 01/15/2020 | 04:15      | 1.73 | 10:30 | 4.01 | 2.80 | 03:45           | 1.67 | 12:10 | 3.54 | 2.84 | 04:20                     | 0.087 | 10:30 | 0.542 | 0.306 | 0.306 | 0.07      |
| 01/16/2020 | 04:20      | 1.75 | 14:00 | 4.00 | 2.84 | 04:05           | 1.78 | 14:00 | 3.75 | 2.93 | 04:20                     | 0.093 | 14:00 | 0.637 | 0.323 | 0.323 | 0.66      |
| 01/17/2020 | 04:40      | 1.89 | 13:15 | 4.18 | 2.77 | 05:00           | 1.92 | 15:00 | 3.74 | 2.84 | 04:45                     | 0.113 | 15:00 | 0.629 | 0.301 | 0.301 |           |
| 01/18/2020 | 07:25      | 1.68 | 12:40 | 3.38 | 2.18 | 22:15           | 1.53 | 12:40 | 3.17 | 2.23 | 22:15                     | 0.083 | 12:40 | 0.425 | 0.169 | 0.169 |           |
| 01/19/2020 | 04:50      | 1.46 | 08:55 | 2.39 | 1.81 | 19:55           | 1.43 | 08:55 | 2.42 | 1.78 | 04:50                     | 0.057 | 08:55 | 0.197 | 0.099 | 0.099 |           |
| 01/20/2020 | 00:40      | 1.63 | 11:00 | 3.70 | 2.64 | 03:15           | 1.37 | 14:55 | 3.58 | 2.68 | 00:55                     | 0.068 | 12:30 | 0.495 | 0.279 | 0.279 |           |
| 01/21/2020 | 04:00      | 1.75 | 17:20 | 3.99 | 2.91 | 04:00           | 1.78 | 12:40 | 3.60 | 2.89 | 04:00                     | 0.092 | 17:20 | 0.562 | 0.327 | 0.327 |           |
| 01/22/2020 | 04:15      | 1.84 | 09:25 | 3.87 | 2.87 | 04:05           | 1.92 | 12:50 | 3.62 | 2.93 | 04:15                     | 0.108 | 09:25 | 0.516 | 0.327 | 0.327 | 0.03      |
| 01/23/2020 | 04:10      | 1.94 | 13:15 | 3.75 | 2.92 | 04:10           | 1.92 | 08:55 | 3.61 | 2.96 | 04:10                     | 0.116 | 15:05 | 0.503 | 0.333 | 0.333 |           |
| 01/24/2020 | 04:50      | 1.88 | 19:00 | 4.11 | 2.81 | 02:45           | 1.90 | 11:05 | 3.72 | 2.87 | 04:45                     | 0.112 | 11:05 | 0.594 | 0.313 | 0.313 |           |
| 01/25/2020 | 23:15      | 1.66 | 14:00 | 2.76 | 2.07 | 23:15           | 1.50 | 11:10 | 2.95 | 2.12 | 23:15                     | 0.072 | 11:10 | 0.287 | 0.145 | 0.145 |           |
| 01/26/2020 | 03:20      | 1.42 | 19:10 | 2.70 | 1.88 | 02:30           | 1.32 | 08:15 | 2.91 | 1.84 | 03:20                     | 0.054 | 08:15 | 0.270 | 0.108 | 0.108 | 0.16      |
| 01/27/2020 | 22:35      | 1.84 | 08:50 | 3.78 | 2.76 | 01:25           | 1.81 | 14:40 | 3.55 | 2.89 | 01:15                     | 0.105 | 08:50 | 0.495 | 0.305 | 0.305 |           |
| 01/28/2020 | 22:55      | 1.70 | 05:15 | 3.83 | 2.81 | 23:35           | 1.69 | 05:10 | 3.76 | 2.85 | 22:55                     | 0.086 | 05:10 | 0.599 | 0.315 | 0.315 | 0.01      |
| 01/29/2020 | 21:05      | 1.84 | 10:25 | 3.82 | 2.69 | 21:10           | 1.88 | 03:25 | 3.61 | 2.80 | 21:05                     | 0.105 | 03:25 | 0.505 | 0.285 | 0.285 |           |
| 01/30/2020 | 18:25      | 1.78 | 05:50 | 3.87 | 2.76 | 18:00           | 1.82 | 03:20 | 3.69 | 2.84 | 18:25                     | 0.097 | 05:50 | 0.529 | 0.299 | 0.299 |           |
| 01/31/2020 | 17:50      | 1.67 | 02:45 | 3.90 | 2.67 | 17:40           | 1.68 | 03:05 | 3.59 | 2.72 | 17:50                     | 0.082 | 02:45 | 0.528 | 0.280 | 0.280 |           |
| 02/01/2020 | 14:55      | 1.39 | 03:30 | 2.78 | 1.84 | 15:00           | 1.35 | 03:30 | 2.96 | 1.85 | 15:00                     | 0.050 | 03:30 | 0.300 | 0.111 | 0.111 |           |
| 02/02/2020 | 13:00      | 1.58 | 19:45 | 3.71 | 2.24 | 12:55           | 1.21 | 23:15 | 3.53 | 2.20 | 12:55                     | 0.055 | 19:45 | 0.490 | 0.189 | 0.189 |           |
| 02/03/2020 | 13:05      | 1.73 | 20:15 | 3.73 | 2.77 | 12:55           | 1.73 | 21:15 | 3.62 | 2.82 | 13:00                     | 0.089 | 21:45 | 0.524 | 0.302 | 0.302 |           |
| 02/04/2020 | 11:10      | 1.85 | 21:40 | 3.65 | 2.80 | 11:05           | 1.88 | 16:10 | 3.58 | 2.88 | 11:10                     | 0.106 | 21:40 | 0.490 | 0.307 | 0.307 |           |
| 02/05/2020 | 09:25      | 1.75 | 17:00 | 3.82 | 2.75 | 09:25           | 1.73 | 17:35 | 3.68 | 2.83 | 09:25                     | 0.089 | 17:35 | 0.584 | 0.297 | 0.297 |           |
| 02/06/2020 | 04:50      | 1.73 | 14:50 | 3.81 | 2.76 | 04:25           | 1.73 | 13:10 | 3.57 | 2.79 | 04:50                     | 0.088 | 14:50 | 0.505 | 0.295 | 0.295 |           |
| 02/07/2020 | 03:25      | 1.55 | 11:00 | 2.68 | 1.94 | 22:55           | 1.23 | 10:40 | 2.47 | 1.88 | 22:55                     | 0.053 | 10:55 | 0.234 | 0.117 | 0.117 |           |
| 02/08/2020 | 01:15      | 1.34 | 11:15 | 2.26 | 1.75 | 02:40           | 1.16 | 11:15 | 2.26 | 1.65 | 03:55                     | 0.041 | 11:15 | 0.170 | 0.087 | 0.087 |           |
| 02/09/2020 | 01:55      | 1.65 | 10:10 | 3.64 | 2.50 | 00:15           | 1.46 | 04:30 | 3.36 | 2.45 | 01:55                     | 0.069 | 10:10 | 0.456 | 0.230 | 0.230 |           |
| 02/10/2020 | 20:35      | 1.62 | 08:05 | 4.14 | 2.71 | 20:55           | 1.44 | 06:30 | 3.58 | 2.70 | 21:00                     | 0.067 | 08:05 | 0.603 | 0.284 | 0.284 |           |
| 02/11/2020 | 16:45      | 1.70 | 02:50 | 4.00 | 2.80 | 15:55           | 1.56 | 02:00 | 3.54 | 2.78 | 16:45                     | 0.085 | 02:50 | 0.537 | 0.304 | 0.304 |           |
| 02/12/2020 | 16:20      | 1.57 | 22:00 | 4.10 | 2.62 | 16:15           | 1.53 | 00:10 | 3.50 | 2.62 | 16:25                     | 0.068 | 22:00 | 0.553 | 0.262 | 0.262 |           |
| 02/13/2020 | 12:25      | 1.15 | 01:50 | 3.91 | 2.17 | 13:10           | 0.81 | 00:00 | 3.39 | 2.13 | 12:45                     | 0.026 | 01:50 | 0.522 | 0.180 | 0.180 |           |
| 02/14/2020 | 16:20      | 1.13 | 21:40 | 2.89 | 1.67 | 16:15           | 0.43 | 19:25 | 2.77 | 1.48 | 16:15                     | 0.012 | 21:40 | 0.280 | 0.088 | 0.088 |           |
| 02/15/2020 | 06:00      | 1.12 | 18:00 | 4.07 | 1.79 | 06:00           | 0.39 | 16:35 | 3.16 | 1.56 | 06:00                     | 0.010 | 18:00 | 0.544 | 0.110 | 0.110 |           |
| 02/16/2020 | 04:35      | 1.20 | 16:25 | 4.09 | 2.40 | 04:35           | 0.51 | 16:35 | 3.61 | 2.32 | 04:35                     | 0.015 | 16:35 | 0.625 | 0.231 | 0.231 |           |
| 02/17/2020 | 08:15      | 1.83 | 12:40 | 3.85 | 2.79 | 06:30           | 1.64 | 14:00 | 3.57 | 2.74 | 08:05                     | 0.098 | 14:05 | 0.546 | 0.301 | 0.301 |           |
| 02/18/2020 | 06:55      | 1.93 | 19:20 | 4.01 | 2.96 | 06:55           | 1.69 | 14:35 | 3.60 | 2.90 | 06:55                     | 0.101 | 14:30 | 0.563 | 0.336 | 0.336 |           |
| 02/19/2020 | 02:05      | 1.89 | 13:00 | 3.83 | 2.69 | 01:50           | 1.62 | 11:00 | 3.52 | 2.62 | 01:50                     | 0.100 | 16:55 | 0.514 | 0.271 | 0.271 |           |
| 02/20/2020 | 06:05      | 1.60 | 10:40 | 3.78 | 2.43 | 04:35           | 1.19 | 12:40 | 3.43 | 2.35 | 04:35                     | 0.057 | 12:40 | 0.498 | 0.214 | 0.137 |           |
| 02/21/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 02/22/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 02/23/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 02/24/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 02/26/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 02/27/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 02/28/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 02/29/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/01/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/02/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/03/2020 | 23:50      | 1.45 | 10:00 | 3.65 | 2.56 | 05:05           | 1.01 | 10:00 | 3.56 | 2.80 | 23:50                     | 0.040 | 10:00 | 0.530 | 0.270 | 0.238 |           |
| 03/04/2020 | 04:35      | 1.16 | 09:00 | 3.60 | 2.44 | 04:35           | 0.50 | 11:50 | 3.52 | 2.56 | 04:35                     | 0.014 | 09:00 | 0.511 | 0.247 | 0.247 |           |
| 03/05/2020 | 04:35      | 1.32 | 08:30 | 3.42 | 2.40 | 04:40           | 0.72 | 08:40 | 3.49 | 2.63 | 04:40                     | 0.025 | 08:30 | 0.474 | 0.234 | 0.234 |           |
| 03/06/2020 | 04:15      | 1.11 | 15:35 | 3.39 | 2.23 | 03:40           | 0.50 | 15:20 | 3.43 | 2.43 | 03:40                     | 0.015 | 15:35 | 0.461 | 0.212 | 0.212 |           |
| 03/07/2020 | 03:35      | 1.10 | 11:25 | 2.98 | 1.68 | 03:55           | 0.48 | 11:25 | 3.31 | 1.81 | 01:05                     | 0.013 | 11:25 | 0.370 | 0.105 | 0.105 |           |
| 03/08/2020 | 05:15      | 1.11 | 11:45 | 2.77 | 1.50 | 03:05           | 0.37 | 13:40 | 3.09 | 1.40 | 03:05                     | 0.010 | 11:45 | 0.303 | 0.072 | 0.072 |           |
| 03/09/2020 | 03:50      | 1.17 | 12:00 | 3.55 | 2.19 | 02:30           | 0.45 | 13:25 | 3.53 | 2.30 | 02:30                     | 0.013 | 12:00 | 0.503 | 0.205 | 0.205 |           |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 22.365                    | 4.90      |
| Avg   | 2.34       | 2.36            | 0.216                     |           |

## Site Commentary

### Site Information

| MIL_2569        |       |
|-----------------|-------|
| Pipe Dimensions | 21    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2569 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited a small response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed downstream of site MIL\_2491. A check of balancing shows a net flow of 0.225 MGD between the sites.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                    |                    |
|--------------------------|--------------------|--------------------|--------------------|
| Item                     | Depth (in)         | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 6.43               | 1.05               | 0.441              |
| Minimum                  | 4.32               | 0.45               | 0.121              |
| Maximum                  | 9.03               | 1.68               | 0.966              |
| Time of Minimum          | 11/16/2019 5:00 AM | 2/18/2020 3:50 AM  | 2/18/2020 3:50 AM  |
| Time of Maximum          | 12/23/2019 3:10 PM | 12/4/2019 12:25 PM | 12/23/2019 3:10 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_2569**

Site Address /Location:

Milpitas Blvd and Tramway Dr

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details:

Drive

Latitude:

37.440801

Longitude:

-121.9044

Pipe Size (H x W)

21.0" x 21.0"

Pipe Shape

Circular

Manhole #

2569

System Characteristics

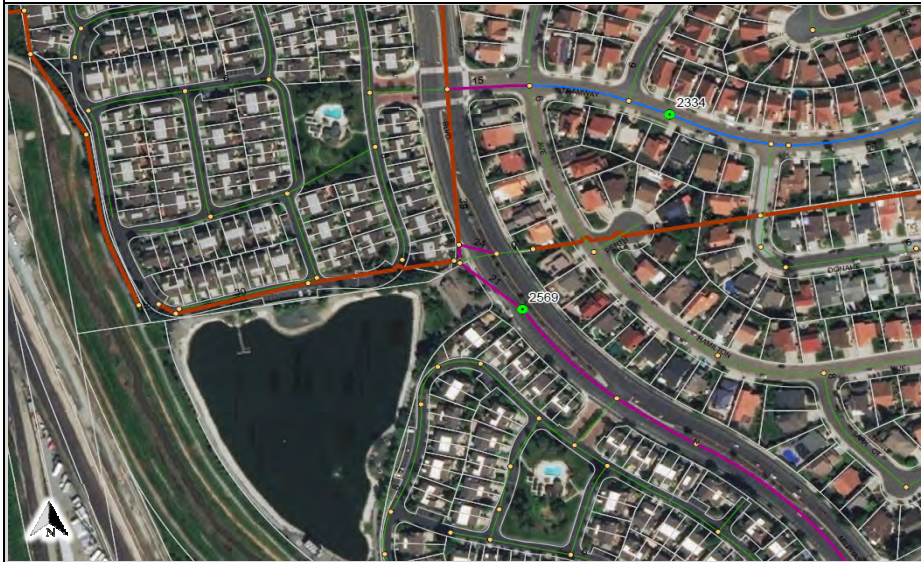
Residential/Commercial

Access

Traffic

Drive

Medium



### Installation Information

Installation Date:

Wednesday, November 13, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

8:15:00 AM

Pipe Size (HxW)

21.0" x 21.0"

Depth of Flow (Wet DOF) (in)

7.5"

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.26

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

### Hydraulic Comments:

Smooth good flow, Medium depth and velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

10'

Manhole Configuration

Single

Manhole Material:

Vitrified Clay Pipe

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

903



ADS Project Name: Milpitas.WWTFM.CA19-20

126

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_2569

Flow Monitor

**MIL\_2569**

Pipe Height  
21.00 in

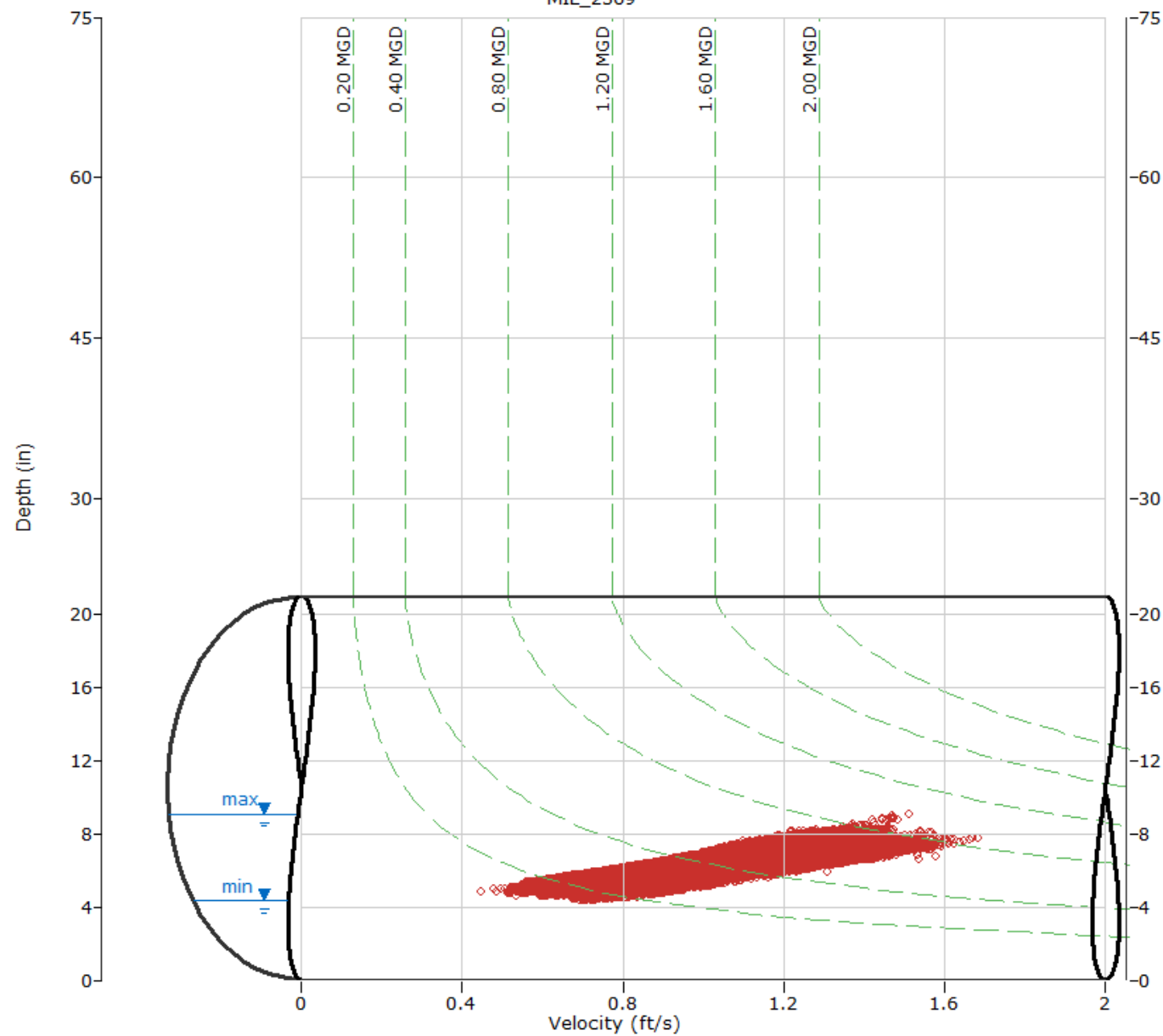
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES

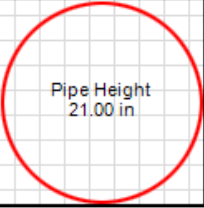




# HYDROGRAPH REPORT

MIL\_2569

Flow Monitor  
**MIL\_2569**

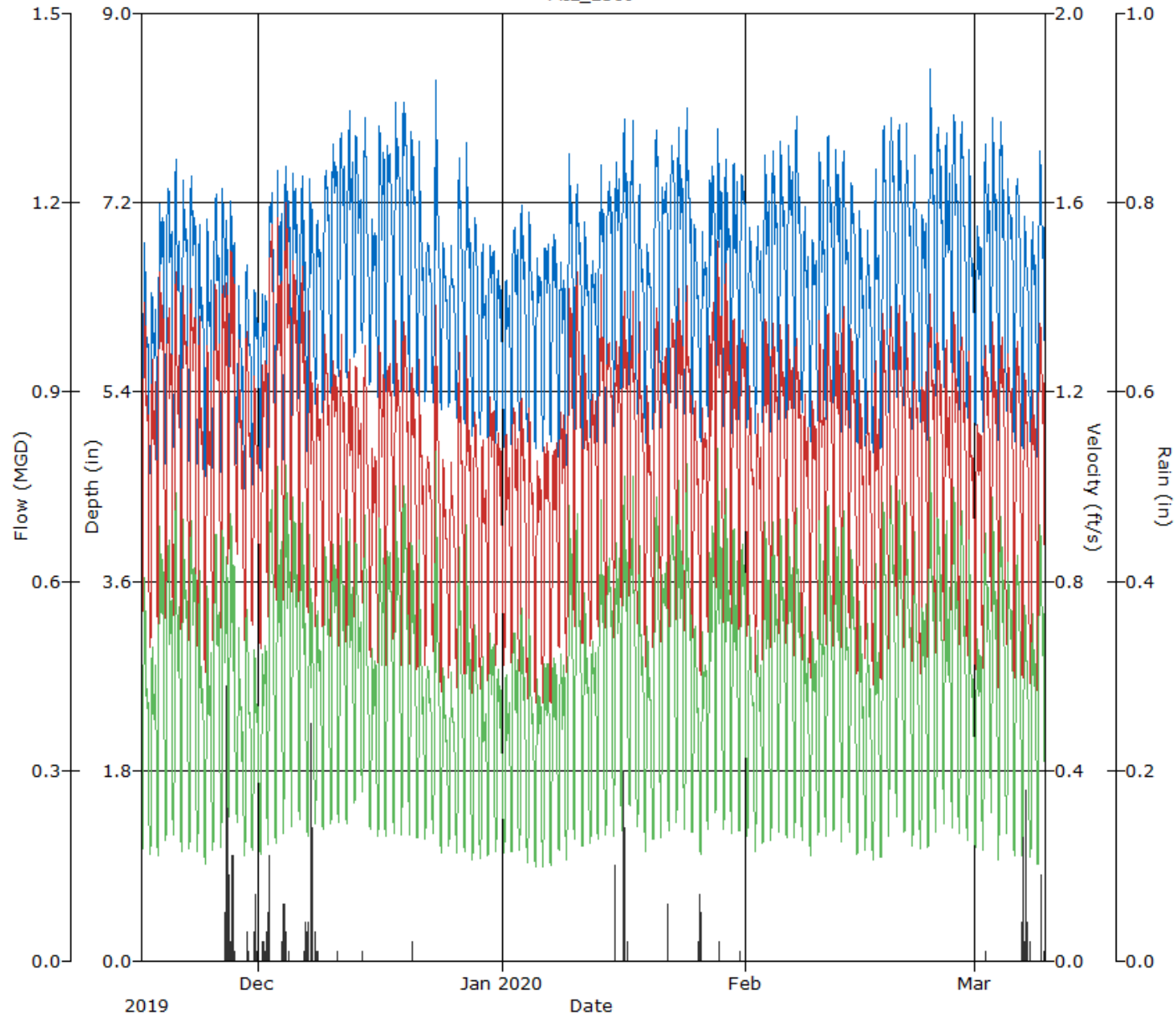


Pipe Height  
21.00 in

Report Period  
11/16/2019  
To  
3/9/2020

Legend  

- Depth
- Velocity
- Quantity
- Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2569, Pipe Height: 21.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 05:00      | 4.32 | 11:20 | 6.92 | 5.69 | 04:50           | 0.70 | 11:10 | 1.42 | 1.10 | 05:00                     | 0.161 | 11:20 | 0.631 | 0.389 | 0.389 |           |
| 11/17/2019 | 03:40      | 4.61 | 09:30 | 6.49 | 5.63 | 03:20           | 0.61 | 10:50 | 1.29 | 1.02 | 03:20                     | 0.153 | 10:50 | 0.507 | 0.352 | 0.352 |           |
| 11/18/2019 | 03:55      | 4.38 | 10:30 | 7.50 | 6.21 | 02:55           | 0.67 | 10:35 | 1.55 | 1.18 | 03:15                     | 0.163 | 10:30 | 0.773 | 0.475 | 0.475 |           |
| 11/19/2019 | 05:20      | 4.71 | 16:05 | 7.66 | 6.46 | 03:50           | 0.69 | 16:00 | 1.50 | 1.15 | 03:50                     | 0.183 | 16:00 | 0.771 | 0.488 | 0.488 |           |
| 11/20/2019 | 04:45      | 4.82 | 10:05 | 7.76 | 6.34 | 03:45           | 0.71 | 12:35 | 1.49 | 1.13 | 03:45                     | 0.194 | 10:05 | 0.780 | 0.465 | 0.465 |           |
| 11/21/2019 | 04:50      | 4.70 | 09:50 | 7.82 | 6.35 | 04:15           | 0.64 | 09:50 | 1.52 | 1.15 | 04:15                     | 0.167 | 09:50 | 0.801 | 0.475 | 0.475 |           |
| 11/22/2019 | 05:00      | 4.71 | 20:45 | 7.96 | 6.47 | 04:05           | 0.67 | 20:50 | 1.57 | 1.17 | 04:00                     | 0.175 | 20:50 | 0.845 | 0.499 | 0.499 |           |
| 11/23/2019 | 05:10      | 4.67 | 12:25 | 7.10 | 5.94 | 05:25           | 0.64 | 12:50 | 1.41 | 1.04 | 05:25                     | 0.166 | 12:50 | 0.654 | 0.388 | 0.388 |           |
| 11/24/2019 | 05:15      | 4.57 | 10:00 | 7.10 | 5.89 | 05:15           | 0.60 | 09:55 | 1.34 | 1.00 | 05:15                     | 0.149 | 09:55 | 0.619 | 0.372 | 0.372 |           |
| 11/25/2019 | 04:15      | 4.66 | 12:45 | 7.48 | 6.21 | 04:55           | 0.66 | 12:45 | 1.51 | 1.13 | 04:55                     | 0.171 | 12:45 | 0.749 | 0.454 | 0.454 |           |
| 11/26/2019 | 05:25      | 4.60 | 09:55 | 7.59 | 6.31 | 04:15           | 0.67 | 09:40 | 1.54 | 1.19 | 05:30                     | 0.174 | 09:45 | 0.772 | 0.486 | 0.486 | 0.63      |
| 11/27/2019 | 03:30      | 4.60 | 09:15 | 7.38 | 6.17 | 03:20           | 0.81 | 10:10 | 1.57 | 1.26 | 03:20                     | 0.205 | 10:15 | 0.759 | 0.497 | 0.497 | 0.77      |
| 11/28/2019 | 05:45      | 4.53 | 12:00 | 6.44 | 5.53 | 05:40           | 0.83 | 11:40 | 1.33 | 1.07 | 05:40                     | 0.206 | 12:40 | 0.535 | 0.357 | 0.357 |           |
| 11/29/2019 | 04:50      | 4.40 | 14:25 | 6.80 | 5.65 | 03:50           | 0.54 | 14:25 | 1.38 | 1.05 | 03:50                     | 0.133 | 14:25 | 0.602 | 0.365 | 0.365 |           |
| 11/30/2019 | 04:55      | 4.48 | 12:00 | 6.43 | 5.60 | 03:50           | 0.68 | 11:40 | 1.26 | 1.00 | 03:50                     | 0.166 | 11:40 | 0.506 | 0.341 | 0.341 | 0.14      |
| 12/01/2019 | 05:55      | 4.61 | 21:55 | 6.45 | 5.70 | 05:40           | 0.63 | 22:05 | 1.32 | 1.04 | 05:45                     | 0.159 | 22:00 | 0.533 | 0.366 | 0.366 | 0.06      |
| 12/02/2019 | 04:50      | 4.50 | 17:20 | 7.33 | 6.29 | 02:00           | 0.67 | 17:00 | 1.59 | 1.27 | 02:00                     | 0.178 | 17:05 | 0.763 | 0.521 | 0.521 | 0.36      |
| 12/03/2019 | 04:40      | 4.46 | 10:15 | 7.67 | 6.20 | 04:40           | 0.73 | 10:05 | 1.62 | 1.23 | 04:40                     | 0.177 | 10:05 | 0.833 | 0.494 | 0.494 |           |
| 12/04/2019 | 03:05      | 4.74 | 12:25 | 7.74 | 6.49 | 03:05           | 0.74 | 12:25 | 1.68 | 1.27 | 03:05                     | 0.195 | 12:25 | 0.875 | 0.541 | 0.541 |           |
| 12/05/2019 | 04:30      | 4.83 | 14:55 | 7.78 | 6.51 | 04:25           | 0.76 | 14:50 | 1.56 | 1.23 | 04:25                     | 0.205 | 14:50 | 0.814 | 0.521 | 0.521 |           |
| 12/06/2019 | 05:35      | 4.97 | 12:55 | 7.57 | 6.44 | 03:00           | 0.69 | 12:55 | 1.52 | 1.18 | 05:35                     | 0.209 | 12:55 | 0.765 | 0.493 | 0.493 |           |
| 12/07/2019 | 05:00      | 4.77 | 12:45 | 7.47 | 6.32 | 05:10           | 0.73 | 12:15 | 1.39 | 1.07 | 05:05                     | 0.193 | 12:05 | 0.689 | 0.437 | 0.437 | 0.84      |
| 12/08/2019 | 05:15      | 5.27 | 11:30 | 7.07 | 6.33 | 06:00           | 0.66 | 11:10 | 1.23 | 1.01 | 06:00                     | 0.202 | 11:10 | 0.562 | 0.410 | 0.410 | 0.10      |
| 12/09/2019 | 05:00      | 5.12 | 09:35 | 7.65 | 6.72 | 04:55           | 0.68 | 09:30 | 1.42 | 1.09 | 04:55                     | 0.200 | 09:35 | 0.715 | 0.484 | 0.484 |           |
| 12/10/2019 | 05:10      | 5.36 | 12:25 | 7.85 | 6.92 | 04:25           | 0.67 | 14:50 | 1.32 | 1.07 | 04:30                     | 0.210 | 12:20 | 0.696 | 0.493 | 0.493 |           |
| 12/11/2019 | 03:30      | 5.52 | 11:10 | 7.96 | 7.00 | 03:15           | 0.65 | 13:35 | 1.33 | 1.06 | 03:15                     | 0.213 | 13:35 | 0.715 | 0.495 | 0.495 |           |
| 12/12/2019 | 04:55      | 5.50 | 12:55 | 8.11 | 7.06 | 05:10           | 0.64 | 12:55 | 1.33 | 1.05 | 05:10                     | 0.209 | 12:55 | 0.735 | 0.496 | 0.496 |           |
| 12/13/2019 | 05:10      | 5.63 | 12:40 | 7.99 | 6.96 | 05:10           | 0.67 | 12:40 | 1.33 | 1.05 | 05:10                     | 0.226 | 12:40 | 0.720 | 0.482 | 0.482 |           |
| 12/14/2019 | 05:25      | 5.84 | 13:35 | 8.06 | 6.87 | 04:30           | 0.73 | 11:05 | 1.34 | 1.03 | 04:30                     | 0.260 | 13:40 | 0.728 | 0.464 | 0.464 |           |
| 12/15/2019 | 03:40      | 5.41 | 11:10 | 7.12 | 6.43 | 03:40           | 0.62 | 23:00 | 1.12 | 0.92 | 03:40                     | 0.196 | 11:15 | 0.520 | 0.377 | 0.377 |           |
| 12/16/2019 | 03:45      | 5.31 | 08:40 | 8.39 | 6.92 | 03:35           | 0.58 | 08:35 | 1.40 | 1.04 | 03:35                     | 0.179 | 08:35 | 0.813 | 0.485 | 0.485 |           |
| 12/17/2019 | 04:55      | 5.37 | 08:25 | 7.95 | 6.97 | 03:35           | 0.59 | 17:05 | 1.32 | 1.07 | 03:35                     | 0.184 | 08:25 | 0.713 | 0.499 | 0.499 |           |
| 12/18/2019 | 04:45      | 5.30 | 11:35 | 8.30 | 7.09 | 04:50           | 0.63 | 10:20 | 1.38 | 1.08 | 04:50                     | 0.194 | 11:40 | 0.782 | 0.518 | 0.518 |           |
| 12/19/2019 | 05:05      | 5.36 | 10:55 | 8.32 | 7.13 | 05:10           | 0.58 | 13:35 | 1.38 | 1.09 | 05:10                     | 0.182 | 10:55 | 0.790 | 0.527 | 0.527 |           |
| 12/20/2019 | 05:00      | 5.32 | 09:00 | 8.01 | 6.98 | 05:30           | 0.60 | 14:45 | 1.33 | 1.05 | 05:05                     | 0.187 | 14:45 | 0.712 | 0.487 | 0.487 |           |
| 12/21/2019 | 03:45      | 5.31 | 10:00 | 7.85 | 6.51 | 03:50           | 0.57 | 11:35 | 1.29 | 0.95 | 03:50                     | 0.175 | 10:05 | 0.685 | 0.403 | 0.403 |           |
| 12/22/2019 | 04:30      | 5.28 | 11:05 | 6.97 | 6.26 | 04:45           | 0.61 | 11:05 | 1.12 | 0.91 | 04:45                     | 0.189 | 11:05 | 0.503 | 0.360 | 0.360 |           |
| 12/23/2019 | 05:20      | 5.29 | 15:10 | 9.03 | 6.68 | 05:55           | 0.64 | 15:10 | 1.51 | 1.00 | 05:55                     | 0.196 | 15:10 | 0.966 | 0.446 | 0.446 |           |
| 12/24/2019 | 05:05      | 5.20 | 12:10 | 6.85 | 6.18 | 05:00           | 0.55 | 12:50 | 1.17 | 0.86 | 05:00                     | 0.165 | 12:50 | 0.514 | 0.334 | 0.334 |           |
| 12/25/2019 | 05:00      | 5.23 | 12:15 | 6.85 | 6.09 | 04:45           | 0.55 | 11:25 | 1.09 | 0.85 | 04:45                     | 0.169 | 11:25 | 0.475 | 0.324 | 0.324 |           |
| 12/26/2019 | 03:50      | 5.12 | 13:40 | 7.71 | 6.51 | 03:40           | 0.55 | 13:35 | 1.33 | 0.97 | 03:40                     | 0.162 | 13:35 | 0.685 | 0.416 | 0.416 |           |
| 12/27/2019 | 04:55      | 5.06 | 11:15 | 7.87 | 6.45 | 05:00           | 0.57 | 11:15 | 1.35 | 0.97 | 05:00                     | 0.164 | 11:15 | 0.720 | 0.411 | 0.411 |           |
| 12/28/2019 | 05:20      | 4.97 | 11:10 | 7.25 | 6.18 | 04:50           | 0.55 | 11:35 | 1.30 | 0.91 | 04:50                     | 0.156 | 11:35 | 0.584 | 0.361 | 0.361 |           |
| 12/29/2019 | 05:20      | 4.96 | 11:35 | 6.86 | 5.94 | 05:15           | 0.56 | 09:50 | 1.12 | 0.87 | 05:15                     | 0.156 | 11:05 | 0.490 | 0.321 | 0.321 |           |
| 12/30/2019 | 03:40      | 4.93 | 19:10 | 6.92 | 6.13 | 03:25           | 0.57 | 19:05 | 1.26 | 0.97 | 03:25                     | 0.160 | 19:05 | 0.561 | 0.381 | 0.381 |           |
| 12/31/2019 | 05:25      | 4.91 | 11:00 | 6.59 | 5.90 | 04:50           | 0.60 | 10:55 | 1.13 | 0.92 | 05:15                     | 0.168 | 11:00 | 0.473 | 0.337 | 0.337 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 01/01/2020 | 05:25      | 4.85 | 12:15 | 6.51 | 5.83 | 05:55           | 0.60 | 12:15 | 1.14 | 0.91 | 05:55                     | 0.163 | 12:15 | 0.467 | 0.328 | 0.328 | 0.10      |
| 01/02/2020 | 04:45      | 4.83 | 10:40 | 7.01 | 6.17 | 03:45           | 0.60 | 10:35 | 1.21 | 0.96 | 03:45                     | 0.165 | 10:35 | 0.549 | 0.380 | 0.380 |           |
| 01/03/2020 | 04:45      | 4.99 | 12:40 | 7.24 | 6.21 | 02:50           | 0.58 | 12:40 | 1.24 | 0.94 | 02:50                     | 0.169 | 12:40 | 0.587 | 0.375 | 0.375 |           |
| 01/04/2020 | 05:05      | 4.88 | 11:50 | 7.28 | 6.06 | 05:20           | 0.52 | 11:50 | 1.21 | 0.88 | 05:20                     | 0.143 | 11:50 | 0.579 | 0.339 | 0.339 |           |
| 01/05/2020 | 05:25      | 4.84 | 11:05 | 6.79 | 6.00 | 05:15           | 0.52 | 12:00 | 1.08 | 0.86 | 05:15                     | 0.142 | 11:05 | 0.468 | 0.325 | 0.325 |           |
| 01/06/2020 | 04:50      | 4.79 | 12:40 | 7.01 | 6.15 | 04:00           | 0.49 | 10:35 | 1.16 | 0.91 | 04:00                     | 0.131 | 12:45 | 0.522 | 0.357 | 0.357 |           |
| 01/07/2020 | 03:20      | 4.90 | 12:55 | 7.03 | 6.17 | 05:25           | 0.51 | 12:55 | 1.13 | 0.90 | 05:25                     | 0.143 | 12:55 | 0.518 | 0.356 | 0.356 |           |
| 01/08/2020 | 04:45      | 4.67 | 10:55 | 6.68 | 5.90 | 04:45           | 0.63 | 12:50 | 1.20 | 0.98 | 04:45                     | 0.163 | 10:55 | 0.508 | 0.361 | 0.361 |           |
| 01/09/2020 | 04:40      | 4.67 | 11:10 | 7.79 | 6.39 | 03:45           | 0.59 | 11:10 | 1.49 | 1.10 | 03:45                     | 0.153 | 11:10 | 0.783 | 0.467 | 0.467 |           |
| 01/10/2020 | 04:40      | 4.82 | 13:10 | 7.44 | 6.39 | 03:20           | 0.68 | 13:15 | 1.48 | 1.15 | 03:20                     | 0.185 | 13:15 | 0.728 | 0.479 | 0.479 |           |
| 01/11/2020 | 05:20      | 4.76 | 11:15 | 7.15 | 6.08 | 03:50           | 0.64 | 11:15 | 1.36 | 1.02 | 05:30                     | 0.172 | 11:15 | 0.635 | 0.393 | 0.393 | 0.66      |
| 01/12/2020 | 05:30      | 4.94 | 11:35 | 6.70 | 5.99 | 05:10           | 0.65 | 11:30 | 1.22 | 1.00 | 05:35                     | 0.181 | 11:35 | 0.518 | 0.374 | 0.374 |           |
| 01/13/2020 | 03:30      | 4.84 | 13:25 | 7.66 | 6.42 | 03:20           | 0.68 | 13:35 | 1.49 | 1.13 | 03:25                     | 0.185 | 13:35 | 0.760 | 0.474 | 0.474 |           |
| 01/14/2020 | 04:40      | 4.87 | 13:25 | 7.50 | 6.52 | 02:15           | 0.68 | 08:55 | 1.36 | 1.10 | 04:40                     | 0.189 | 13:20 | 0.670 | 0.470 | 0.470 |           |
| 01/15/2020 | 04:40      | 5.06 | 12:15 | 7.69 | 6.74 | 04:15           | 0.67 | 12:25 | 1.35 | 1.10 | 04:15                     | 0.194 | 12:25 | 0.691 | 0.489 | 0.489 |           |
| 01/16/2020 | 04:45      | 5.08 | 14:15 | 8.22 | 6.88 | 04:40           | 0.68 | 14:10 | 1.47 | 1.14 | 04:40                     | 0.198 | 14:10 | 0.825 | 0.524 | 0.524 |           |
| 01/17/2020 | 05:10      | 5.35 | 15:20 | 8.19 | 6.79 | 05:10           | 0.74 | 15:25 | 1.45 | 1.12 | 05:10                     | 0.231 | 15:20 | 0.815 | 0.499 | 0.499 |           |
| 01/18/2020 | 04:35      | 5.14 | 13:00 | 7.56 | 6.34 | 03:35           | 0.69 | 13:00 | 1.44 | 1.04 | 04:35                     | 0.204 | 13:00 | 0.725 | 0.424 | 0.424 |           |
| 01/19/2020 | 05:20      | 4.89 | 10:30 | 6.86 | 6.07 | 05:20           | 0.60 | 10:25 | 1.25 | 0.95 | 05:20                     | 0.166 | 10:25 | 0.551 | 0.366 | 0.366 |           |
| 01/20/2020 | 05:20      | 5.01 | 12:45 | 8.10 | 6.72 | 03:45           | 0.60 | 15:00 | 1.40 | 1.09 | 03:45                     | 0.172 | 12:45 | 0.770 | 0.491 | 0.491 |           |
| 01/21/2020 | 04:15      | 5.06 | 21:55 | 7.60 | 6.73 | 04:05           | 0.66 | 21:45 | 1.36 | 1.11 | 04:05                     | 0.190 | 21:55 | 0.690 | 0.492 | 0.492 | 0.01      |
| 01/22/2020 | 04:40      | 5.18 | 12:55 | 7.81 | 6.85 | 04:35           | 0.67 | 17:15 | 1.39 | 1.14 | 04:35                     | 0.199 | 13:05 | 0.721 | 0.521 | 0.521 | 0.09      |
| 01/23/2020 | 04:40      | 5.16 | 09:15 | 8.02 | 6.84 | 04:40           | 0.70 | 19:25 | 1.47 | 1.15 | 04:40                     | 0.207 | 09:15 | 0.797 | 0.522 | 0.522 | 0.16      |
| 01/24/2020 | 04:45      | 5.14 | 11:20 | 8.24 | 6.83 | 05:05           | 0.68 | 11:10 | 1.47 | 1.13 | 05:05                     | 0.201 | 11:20 | 0.829 | 0.515 | 0.515 |           |
| 01/25/2020 | 03:40      | 5.15 | 11:55 | 7.03 | 6.21 | 03:45           | 0.66 | 12:40 | 1.20 | 0.97 | 03:45                     | 0.194 | 11:50 | 0.543 | 0.383 | 0.383 |           |
| 01/26/2020 | 05:35      | 4.90 | 11:05 | 7.06 | 6.11 | 05:30           | 0.59 | 10:45 | 1.28 | 0.95 | 05:30                     | 0.161 | 11:05 | 0.584 | 0.369 | 0.369 |           |
| 01/27/2020 | 03:00      | 5.12 | 18:35 | 7.84 | 6.67 | 02:10           | 0.66 | 18:40 | 1.46 | 1.13 | 02:55                     | 0.202 | 18:35 | 0.758 | 0.500 | 0.500 |           |
| 01/28/2020 | 04:05      | 5.19 | 10:15 | 8.02 | 6.70 | 03:50           | 0.77 | 10:30 | 1.58 | 1.20 | 03:55                     | 0.230 | 10:15 | 0.856 | 0.531 | 0.531 | 0.02      |
| 01/29/2020 | 04:55      | 5.04 | 10:00 | 7.69 | 6.52 | 04:35           | 0.71 | 10:00 | 1.51 | 1.16 | 04:50                     | 0.203 | 10:00 | 0.780 | 0.493 | 0.493 |           |
| 01/30/2020 | 04:45      | 4.95 | 11:30 | 7.66 | 6.59 | 02:45           | 0.66 | 10:30 | 1.38 | 1.12 | 02:45                     | 0.190 | 10:30 | 0.700 | 0.483 | 0.483 |           |
| 01/31/2020 | 03:30      | 5.12 | 12:50 | 7.71 | 6.69 | 03:30           | 0.68 | 12:40 | 1.41 | 1.13 | 03:30                     | 0.200 | 12:45 | 0.730 | 0.497 | 0.497 | 0.01      |
| 02/01/2020 | 04:10      | 5.04 | 11:40 | 7.11 | 6.22 | 03:45           | 0.66 | 11:35 | 1.30 | 0.99 | 03:45                     | 0.191 | 11:35 | 0.600 | 0.390 | 0.390 | 0.01      |
| 02/02/2020 | 05:20      | 4.98 | 12:50 | 7.10 | 6.15 | 05:15           | 0.59 | 12:35 | 1.19 | 0.93 | 05:15                     | 0.167 | 12:50 | 0.550 | 0.364 | 0.364 |           |
| 02/03/2020 | 04:45      | 5.09 | 10:35 | 7.73 | 6.60 | 03:35           | 0.62 | 11:20 | 1.43 | 1.09 | 03:35                     | 0.181 | 10:40 | 0.715 | 0.476 | 0.476 |           |
| 02/04/2020 | 04:50      | 5.00 | 13:30 | 7.77 | 6.64 | 03:15           | 0.62 | 13:20 | 1.39 | 1.09 | 03:15                     | 0.177 | 13:25 | 0.724 | 0.478 | 0.478 |           |
| 02/05/2020 | 04:45      | 5.10 | 09:50 | 7.91 | 6.75 | 04:45           | 0.67 | 10:00 | 1.38 | 1.11 | 04:45                     | 0.196 | 10:00 | 0.737 | 0.495 | 0.495 |           |
| 02/06/2020 | 04:40      | 5.09 | 11:30 | 8.02 | 6.79 | 05:20           | 0.65 | 11:25 | 1.45 | 1.09 | 04:40                     | 0.188 | 11:30 | 0.784 | 0.493 | 0.493 |           |
| 02/07/2020 | 03:30      | 5.20 | 11:15 | 8.10 | 6.83 | 03:10           | 0.62 | 08:45 | 1.37 | 1.08 | 03:10                     | 0.187 | 11:10 | 0.757 | 0.490 | 0.490 |           |
| 02/08/2020 | 03:45      | 5.18 | 11:35 | 7.37 | 6.24 | 04:25           | 0.58 | 11:35 | 1.26 | 0.97 | 04:25                     | 0.174 | 11:35 | 0.612 | 0.382 | 0.382 |           |
| 02/09/2020 | 05:40      | 4.90 | 11:05 | 6.87 | 6.12 | 05:45           | 0.58 | 13:55 | 1.20 | 0.97 | 05:45                     | 0.161 | 11:25 | 0.526 | 0.376 | 0.376 |           |
| 02/10/2020 | 03:55      | 5.10 | 08:20 | 7.98 | 6.52 | 03:05           | 0.63 | 08:20 | 1.47 | 1.06 | 03:05                     | 0.193 | 08:20 | 0.796 | 0.453 | 0.453 |           |
| 02/11/2020 | 05:00      | 5.07 | 13:20 | 7.97 | 6.78 | 04:45           | 0.64 | 13:15 | 1.44 | 1.11 | 04:55                     | 0.184 | 13:15 | 0.776 | 0.502 | 0.502 | 0.01      |
| 02/12/2020 | 04:40      | 5.26 | 09:05 | 7.86 | 6.82 | 03:25           | 0.56 | 12:15 | 1.35 | 1.12 | 03:25                     | 0.170 | 09:05 | 0.715 | 0.505 | 0.505 |           |
| 02/13/2020 | 04:40      | 5.00 | 11:15 | 7.82 | 6.53 | 03:10           | 0.63 | 11:15 | 1.44 | 1.09 | 03:10                     | 0.182 | 11:15 | 0.759 | 0.469 | 0.469 |           |
| 02/14/2020 | 03:55      | 5.04 | 10:50 | 7.50 | 6.52 | 03:40           | 0.68 | 10:20 | 1.36 | 1.09 | 03:40                     | 0.195 | 10:45 | 0.667 | 0.463 | 0.463 |           |
| 02/15/2020 | 03:50      | 4.87 | 12:10 | 7.48 | 6.10 | 03:20           | 0.55 | 12:05 | 1.31 | 0.95 | 03:20                     | 0.153 | 12:05 | 0.650 | 0.371 | 0.371 |           |
| 02/16/2020 | 05:10      | 4.86 | 11:10 | 7.04 | 6.00 | 05:10           | 0.63 | 12:45 | 1.26 | 0.95 | 05:10                     | 0.171 | 12:45 | 0.572 | 0.358 | 0.358 |           |
| 02/17/2020 | 05:10      | 4.78 | 12:45 | 7.56 | 6.16 | 05:55           | 0.48 | 11:05 | 1.33 | 0.96 | 05:55                     | 0.135 | 11:05 | 0.667 | 0.381 | 0.381 |           |
| 02/18/2020 | 03:45      | 4.83 | 12:25 | 8.16 | 6.56 | 03:50           | 0.45 | 12:15 | 1.54 | 1.05 | 03:50                     | 0.121 | 12:20 | 0.856 | 0.458 | 0.458 |           |
| 02/19/2020 | 05:00      | 5.16 | 12:55 | 8.14 | 6.88 | 03:10           | 0.56 | 11:25 | 1.45 | 1.11 | 03:10                     | 0.167 | 11:25 | 0.796 | 0.515 | 0.515 |           |
| 02/20/2020 | 04:55      | 5.24 | 11:25 | 8.09 | 6.93 | 04:55           | 0.70 | 11:15 | 1.44 | 1.13 | 04:55                     | 0.212 | 11:15 | 0.793 | 0.522 | 0.522 |           |
| 02/21/2020 | 04:40      | 5.21 | 10:15 | 7.98 | 6.71 | 03:20           | 0.59 | 10:20 | 1.38 | 1.07 | 03:20                     | 0.181 | 10:20 | 0.747 | 0.475 | 0.475 | 0.01      |
| 02/22/2020 | 05:10      | 5.01 | 11:35 | 7.71 | 6.42 | 05:05           | 0.61 | 11:40 | 1.39 | 1.03 | 05:05                     | 0.174 | 11:40 | 0.718 | 0.428 | 0.428 |           |
| 02/23/2020 | 05:55      | 5.06 | 10:00 | 7.14 | 6.31 | 06:05           | 0.56 | 20:40 | 1.27 | 1.00 | 06:05                     | 0.162 | 20:40 | 0.585 | 0.407 | 0.407 |           |
| 02/24/2020 | 03:45      | 4.89 | 11:05 | 8.78 | 6.87 | 03:55           | 0.60 | 11:20 | 1.48 | 1.11 | 03:55                     | 0.166 | 11:05 | 0.905 | 0.513 | 0.513 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total |           |
| 02/25/2020 | 05:00      | 5.30 | 12:40 | 8.03 | 6.93 | 05:10           | 0.62 | 12:50 | 1.38 | 1.07 | 05:10                     | 0.190 | 12:50 | 0.750 | 0.498 | 0.498 | 0.01      |
| 02/26/2020 | 04:55      | 5.34 | 10:35 | 7.98 | 6.92 | 05:00           | 0.63 | 12:55 | 1.48 | 1.07 | 05:00                     | 0.197 | 12:55 | 0.784 | 0.492 | 0.492 |           |
| 02/27/2020 | 04:55      | 5.32 | 12:55 | 8.12 | 6.98 | 04:50           | 0.61 | 12:50 | 1.41 | 1.10 | 04:50                     | 0.190 | 12:50 | 0.781 | 0.513 | 0.513 |           |
| 02/28/2020 | 03:35      | 5.21 | 10:40 | 8.05 | 6.79 | 02:45           | 0.64 | 12:05 | 1.37 | 1.07 | 03:35                     | 0.194 | 10:55 | 0.740 | 0.486 | 0.486 |           |
| 02/29/2020 | 03:30      | 5.14 | 11:10 | 8.12 | 6.39 | 03:05           | 0.62 | 11:15 | 1.37 | 0.98 | 03:05                     | 0.183 | 11:15 | 0.760 | 0.405 | 0.405 |           |
| 03/01/2020 | 05:50      | 5.08 | 12:35 | 7.05 | 6.23 | 05:20           | 0.55 | 11:30 | 1.18 | 0.94 | 05:20                     | 0.161 | 12:35 | 0.536 | 0.376 | 0.376 |           |
| 03/02/2020 | 03:35      | 5.00 | 10:40 | 7.86 | 6.69 | 03:55           | 0.60 | 10:55 | 1.36 | 1.06 | 03:45                     | 0.170 | 10:55 | 0.715 | 0.473 | 0.473 |           |
| 03/03/2020 | 05:40      | 5.30 | 10:20 | 8.14 | 6.81 | 05:35           | 0.70 | 10:05 | 1.40 | 1.08 | 05:35                     | 0.215 | 10:15 | 0.773 | 0.485 | 0.485 |           |
| 03/04/2020 | 03:45      | 4.89 | 09:20 | 8.20 | 6.71 | 03:30           | 0.55 | 09:25 | 1.37 | 1.06 | 03:30                     | 0.152 | 09:25 | 0.771 | 0.476 | 0.476 |           |
| 03/05/2020 | 04:55      | 5.07 | 08:50 | 7.82 | 6.61 | 04:55           | 0.59 | 08:55 | 1.38 | 1.07 | 04:55                     | 0.170 | 08:50 | 0.724 | 0.461 | 0.461 |           |
| 03/06/2020 | 05:10      | 4.88 | 15:55 | 7.57 | 6.48 | 03:05           | 0.49 | 15:45 | 1.36 | 1.04 | 03:05                     | 0.139 | 15:45 | 0.675 | 0.446 | 0.446 | 0.58      |
| 03/07/2020 | 05:05      | 4.79 | 11:55 | 7.44 | 6.16 | 05:25           | 0.56 | 11:55 | 1.47 | 0.99 | 05:25                     | 0.151 | 11:55 | 0.723 | 0.390 | 0.390 |           |
| 03/08/2020 | 04:55      | 4.90 | 11:00 | 7.14 | 6.11 | 05:20           | 0.50 | 10:55 | 1.24 | 0.95 | 05:20                     | 0.139 | 11:00 | 0.577 | 0.370 | 0.370 | 0.02      |
| 03/09/2020 | 03:20      | 4.74 | 12:10 | 7.84 | 6.44 | 03:20           | 0.52 | 12:15 | 1.42 | 1.05 | 03:20                     | 0.135 | 12:10 | 0.753 | 0.449 | 0.449 | 0.11      |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 50.750                    | 5.26      |
| Avg   | 6.43       | 1.05            | 0.441                     |           |



## Site Commentary

### Site Information

| MIL_2666        |       |
|-----------------|-------|
| Pipe Dimensions | 17.88 |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2666 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited a moderate response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Surge conditions were experienced at this site. Review of the scattergraph shows that both free flow and backwater conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                   |                   |
|--------------------------|--------------------|-------------------|-------------------|
| Item                     | Depth (in)         | Velocity (ft/s)   | Quantity (MGD)    |
| Average                  | 8.74               | 1.74              | 0.949             |
| Minimum                  | 5.81               | 0.77              | 0.363             |
| Maximum                  | 21.77              | 2.28              | 1.470             |
| Time of Minimum          | 2/14/2020 2:55 AM  | 3/3/2020 7:40 AM  | 2/25/2020 3:25 AM |
| Time of Maximum          | 1/26/2020 11:35 AM | 2/25/2020 7:30 AM | 1/13/2020 8:00 AM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_2666

Site Address /Location: California Cir and Cadillac Court, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: Drive

Latitude:

37.449182°

Longitude:

-121.919254°

Pipe Size (H x W)

17.88" x 17.88"

Pipe Shape

Circular

Manhole #

2666

System Characteristics

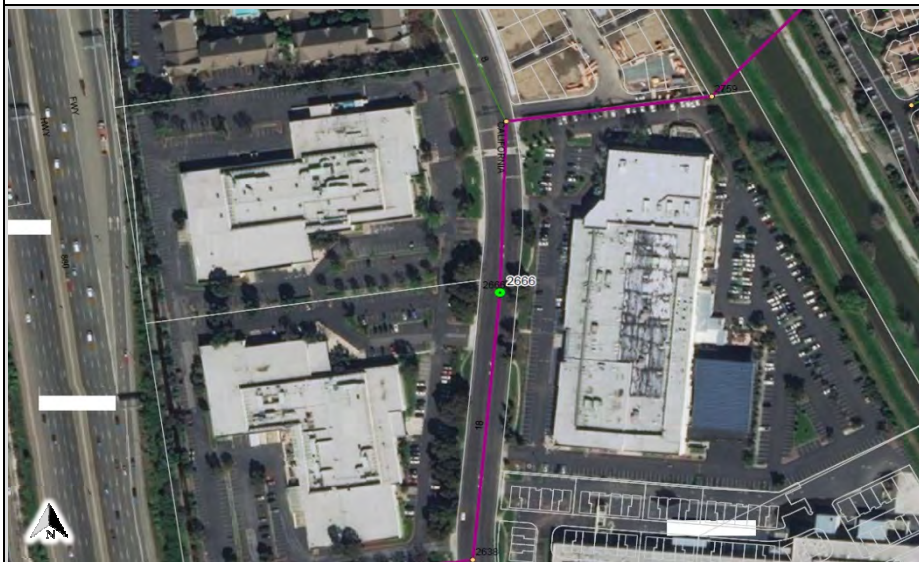
Residential/Commercial

Access

Drive

Traffic

Medium



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

4:33:04 AM

Pipe Size (HxW)

17.88" x 17.88"

Depth of Flow (Wet DOF) (in)

6.25"

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.58

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

### Hydraulic Comments:

good flow, medium depth and velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

9'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

910

ADS Project Name: Milpitas.WWTFM.CA19-20

133

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_2666

Flow Monitor

**MIL\_2666**

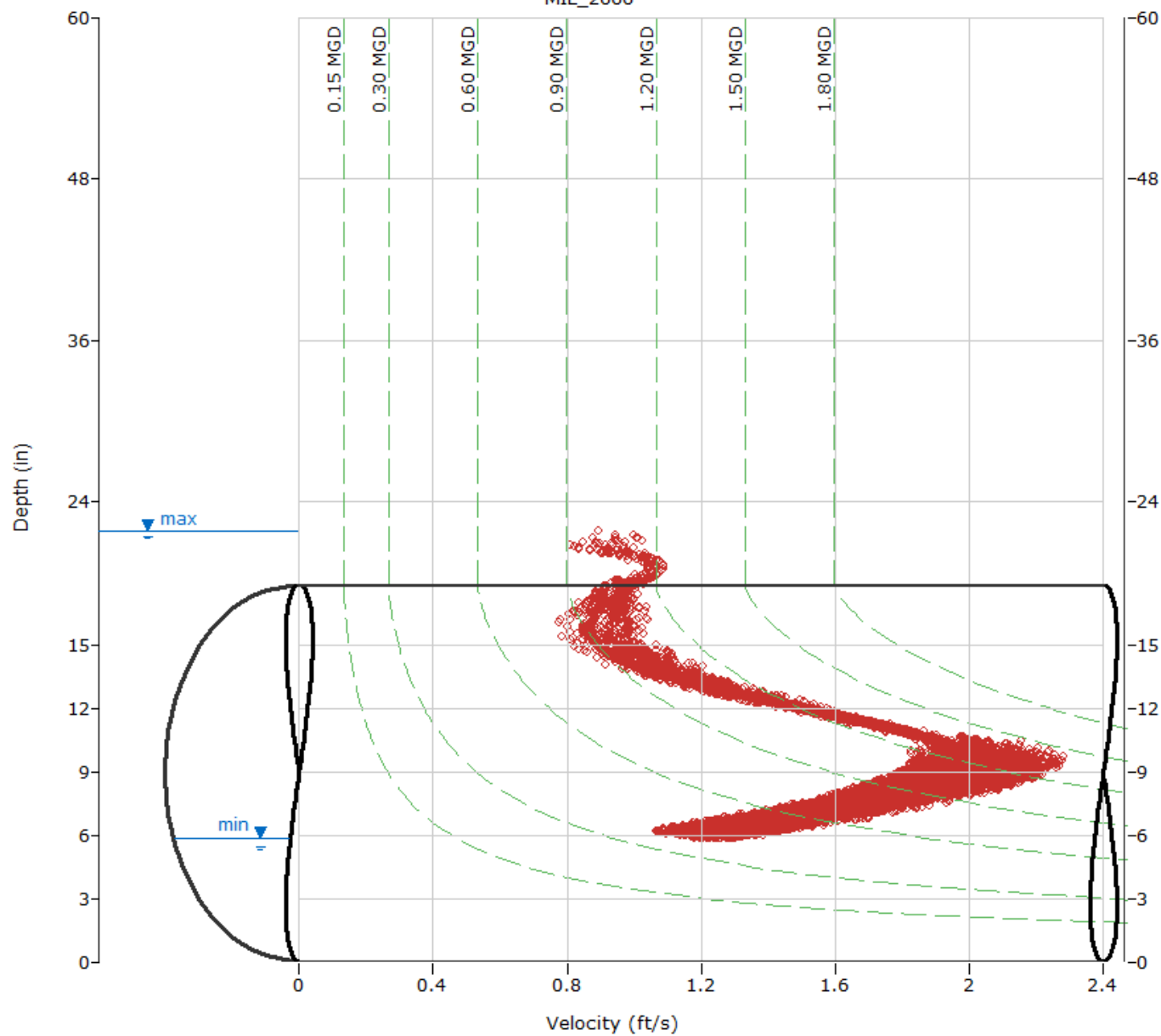
Pipe Height  
17.88 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

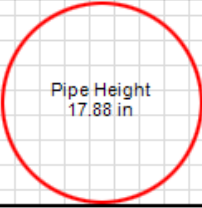


ADS ENVIRONMENTAL  
SERVICES

# HYDROGRAPH REPORT

MIL\_2666

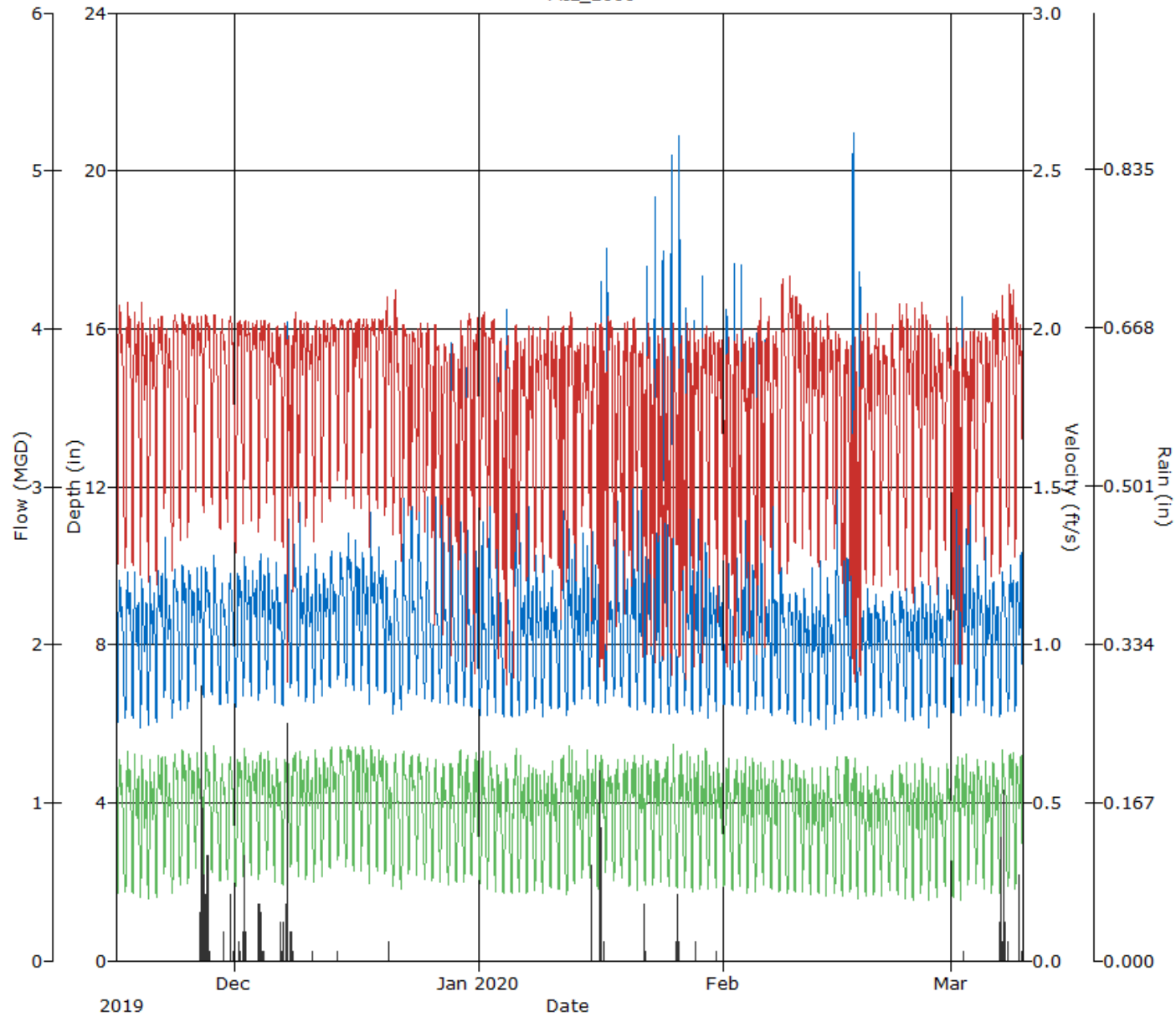
Flow Monitor  
**MIL\_2666**



Report Period  
11/16/2019  
To  
3/9/2020

Legend  

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2666, Pipe Height: 17.88 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |      |      |      |      |  |  |      |  |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|------|------|------|------|--|--|------|--|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |      |      |      |      |  |  |      |  |
| 11/16/2019 | 04:30      | 5.94 | 11:15 | 9.75  | 8.10 | 04:10           | 1.19 | 10:35 | 2.15 | 1.78 | 04:10                     | 0.393 | 12:50 | 1.313 | 0.912 | 0.912 |           |      |      |      |      |  |  |      |  |
| 11/17/2019 | 04:10      | 6.11 | 10:45 | 10.15 | 8.25 | 03:35           | 1.20 | 20:00 | 2.14 | 1.78 | 05:05                     | 0.413 | 11:15 | 1.385 | 0.935 | 0.935 |           |      |      |      |      |  |  |      |  |
| 11/18/2019 | 03:25      | 6.10 | 07:35 | 10.12 | 8.22 | 02:55           | 1.19 | 19:55 | 2.14 | 1.79 | 02:55                     | 0.412 | 07:40 | 1.391 | 0.931 | 0.931 |           |      |      |      |      |  |  |      |  |
| 11/19/2019 | 03:40      | 5.87 | 07:45 | 10.35 | 8.08 | 02:20           | 1.14 | 08:05 | 2.19 | 1.78 | 04:10                     | 0.381 | 07:35 | 1.437 | 0.905 | 0.905 |           |      |      |      |      |  |  |      |  |
| 11/20/2019 | 03:45      | 5.91 | 07:35 | 10.48 | 8.17 | 03:45           | 1.18 | 19:20 | 2.06 | 1.78 | 03:45                     | 0.383 | 07:35 | 1.389 | 0.915 | 0.915 |           |      |      |      |      |  |  |      |  |
| 11/21/2019 | 03:45      | 6.02 | 08:10 | 10.54 | 8.58 | 03:35           | 1.13 | 08:00 | 2.09 | 1.84 | 03:35                     | 0.379 | 08:10 | 1.396 | 1.012 | 1.012 |           |      |      |      |      |  |  |      |  |
| 11/22/2019 | 03:45      | 6.64 | 07:40 | 11.30 | 8.47 | 03:45           | 1.42 | 09:20 | 2.16 | 1.84 | 03:45                     | 0.540 | 08:10 | 1.372 | 0.975 | 0.975 |           |      |      |      |      |  |  |      |  |
| 11/23/2019 | 04:10      | 6.09 | 11:05 | 10.26 | 8.34 | 03:50           | 1.18 | 12:35 | 2.06 | 1.79 | 03:50                     | 0.405 | 11:05 | 1.363 | 0.954 | 0.954 |           |      |      |      |      |  |  |      |  |
| 11/24/2019 | 05:05      | 6.33 | 12:35 | 10.23 | 8.53 | 05:05           | 1.32 | 11:00 | 2.07 | 1.83 | 05:05                     | 0.471 | 11:45 | 1.363 | 0.995 | 0.995 |           |      |      |      |      |  |  |      |  |
| 11/25/2019 | 03:55      | 6.35 | 07:50 | 10.47 | 8.59 | 03:55           | 1.32 | 07:40 | 2.07 | 1.86 | 03:55                     | 0.475 | 07:45 | 1.409 | 1.017 | 1.017 |           |      |      |      |      |  |  |      |  |
| 11/26/2019 | 03:45      | 6.80 | 07:45 | 10.52 | 8.68 | 03:45           | 1.47 | 20:40 | 2.04 | 1.88 | 03:45                     | 0.578 | 07:45 | 1.394 | 1.037 | 1.037 | 0.63      |      |      |      |      |  |  |      |  |
| 11/27/2019 | 03:30      | 6.63 | 08:40 | 10.23 | 8.82 | 03:25           | 1.37 | 09:40 | 2.04 | 1.90 | 03:25                     | 0.520 | 08:40 | 1.359 | 1.069 | 1.069 | 0.77      |      |      |      |      |  |  |      |  |
| 11/28/2019 | 04:40      | 6.68 | 11:30 | 10.47 | 8.48 | 04:40           | 1.43 | 10:55 | 2.04 | 1.84 | 04:40                     | 0.551 | 11:30 | 1.389 | 0.985 | 0.985 |           |      |      |      |      |  |  |      |  |
| 11/29/2019 | 05:05      | 6.46 | 10:55 | 9.77  | 8.21 | 05:05           | 1.36 | 10:55 | 2.04 | 1.80 | 05:05                     | 0.499 | 10:55 | 1.285 | 0.927 | 0.927 |           | 0.05 |      |      |      |  |  |      |  |
| 11/30/2019 | 05:25      | 6.50 | 12:05 | 10.15 | 8.34 | 05:25           | 1.38 | 11:55 | 2.04 | 1.82 | 05:25                     | 0.509 | 12:05 | 1.348 | 0.957 | 0.957 |           | 0.14 |      |      |      |  |  |      |  |
| 12/01/2019 | 05:15      | 6.41 | 11:15 | 10.05 | 8.49 | 05:15           | 1.29 | 11:55 | 2.09 | 1.80 | 05:15                     | 0.467 | 11:15 | 1.320 | 0.976 | 0.976 |           | 0.06 |      |      |      |  |  |      |  |
| 12/02/2019 | 03:35      | 6.68 | 07:55 | 10.76 | 8.77 | 03:35           | 1.38 | 08:00 | 2.06 | 1.86 | 03:35                     | 0.529 | 08:00 | 1.398 | 1.044 | 1.044 |           | 0.36 |      |      |      |  |  |      |  |
| 12/03/2019 | 03:50      | 6.67 | 07:35 | 10.41 | 8.65 | 03:50           | 1.38 | 20:00 | 2.03 | 1.86 | 03:50                     | 0.528 | 07:40 | 1.361 | 1.021 | 1.021 |           |      |      |      |      |  |  |      |  |
| 12/04/2019 | 03:15      | 6.56 | 08:20 | 11.02 | 8.79 | 03:15           | 1.34 | 20:40 | 2.03 | 1.87 | 03:15                     | 0.501 | 07:35 | 1.378 | 1.049 | 1.049 |           |      | 0.44 |      |      |  |  |      |  |
| 12/05/2019 | 03:40      | 6.84 | 08:20 | 10.59 | 8.62 | 03:40           | 1.43 | 19:00 | 2.12 | 1.84 | 03:40                     | 0.568 | 08:20 | 1.377 | 1.003 | 1.003 |           |      |      |      |      |  |  |      |  |
| 12/06/2019 | 03:40      | 6.48 | 07:55 | 10.81 | 8.50 | 03:40           | 1.31 | 09:20 | 2.08 | 1.83 | 03:40                     | 0.483 | 08:15 | 1.339 | 0.980 | 0.980 |           |      |      | 0.06 |      |  |  |      |  |
| 12/07/2019 | 04:55      | 6.41 | 18:05 | 16.58 | 9.36 | 19:55           | 0.87 | 17:15 | 2.18 | 1.67 | 04:35                     | 0.462 | 17:15 | 1.414 | 0.959 | 0.959 |           |      |      | 0.84 |      |  |  |      |  |
| 12/08/2019 | 03:55      | 6.90 | 11:55 | 13.35 | 9.32 | 12:00           | 1.12 | 15:50 | 2.16 | 1.77 | 05:00                     | 0.567 | 17:55 | 1.412 | 1.044 | 1.044 | 0.10      |      |      |      |      |  |  |      |  |
| 12/09/2019 | 03:15      | 6.68 | 07:50 | 12.68 | 8.79 | 07:55           | 1.29 | 10:00 | 2.03 | 1.83 | 03:15                     | 0.530 | 08:45 | 1.356 | 1.019 | 1.019 |           |      |      |      |      |  |  |      |  |
| 12/10/2019 | 03:25      | 6.51 | 08:15 | 10.66 | 8.46 | 02:45           | 1.31 | 20:45 | 2.05 | 1.83 | 02:45                     | 0.491 | 08:20 | 1.368 | 0.974 | 0.974 |           |      |      | 0.01 |      |  |  |      |  |
| 12/11/2019 | 03:25      | 6.51 | 08:30 | 10.68 | 8.55 | 03:30           | 1.29 | 14:05 | 2.07 | 1.82 | 03:30                     | 0.477 | 08:15 | 1.384 | 0.988 | 0.988 |           |      |      | 0.00 |      |  |  |      |  |
| 12/12/2019 | 03:45      | 6.66 | 07:40 | 10.43 | 8.65 | 03:45           | 1.37 | 10:10 | 2.03 | 1.86 | 03:45                     | 0.525 | 07:40 | 1.364 | 1.023 | 1.023 |           |      |      |      |      |  |  |      |  |
| 12/13/2019 | 03:00      | 6.88 | 08:15 | 10.59 | 8.88 | 03:00           | 1.44 | 08:50 | 2.03 | 1.90 | 03:00                     | 0.577 | 08:15 | 1.377 | 1.074 | 1.074 |           |      |      |      |      |  |  |      |  |
| 12/14/2019 | 04:20      | 7.04 | 10:40 | 10.60 | 8.98 | 04:20           | 1.49 | 15:30 | 2.03 | 1.89 | 04:20                     | 0.616 | 10:40 | 1.377 | 1.087 | 1.087 |           |      |      |      | 0.01 |  |  |      |  |
| 12/15/2019 | 04:40      | 6.93 | 11:05 | 10.95 | 9.10 | 04:40           | 1.46 | 14:25 | 2.03 | 1.87 | 04:40                     | 0.590 | 10:50 | 1.383 | 1.096 | 1.096 |           |      |      |      |      |  |  |      |  |
| 12/16/2019 | 03:45      | 6.77 | 08:25 | 10.78 | 9.05 | 03:45           | 1.41 | 20:50 | 2.03 | 1.89 | 03:45                     | 0.552 | 08:40 | 1.377 | 1.095 | 1.095 |           |      |      |      |      |  |  |      |  |
| 12/17/2019 | 03:35      | 6.81 | 07:40 | 10.73 | 8.87 | 03:35           | 1.42 | 11:10 | 2.03 | 1.89 | 03:35                     | 0.559 | 07:35 | 1.376 | 1.067 | 1.067 |           |      |      |      |      |  |  |      |  |
| 12/18/2019 | 03:45      | 6.43 | 08:20 | 11.98 | 8.99 | 04:10           | 1.26 | 21:05 | 2.03 | 1.86 | 04:10                     | 0.464 | 08:50 | 1.383 | 1.073 | 1.073 |           |      |      |      |      |  |  |      |  |
| 12/19/2019 | 03:35      | 6.82 | 08:00 | 10.95 | 9.02 | 03:35           | 1.42 | 19:15 | 2.03 | 1.89 | 03:35                     | 0.562 | 07:40 | 1.380 | 1.093 | 1.093 |           |      |      |      |      |  |  |      |  |
| 12/20/2019 | 05:05      | 6.59 | 08:25 | 10.05 | 8.25 | 05:10           | 1.38 | 09:30 | 2.26 | 1.86 | 05:10                     | 0.523 | 07:40 | 1.408 | 0.961 | 0.961 |           |      |      |      |      |  |  | 0.02 |  |
| 12/21/2019 | 05:00      | 6.21 | 11:00 | 10.40 | 8.15 | 04:25           | 1.32 | 10:05 | 2.28 | 1.80 | 04:25                     | 0.464 | 11:00 | 1.395 | 0.921 | 0.921 |           |      |      |      |      |  |  |      |  |
| 12/22/2019 | 04:45      | 6.32 | 12:15 | 12.19 | 8.67 | 04:30           | 1.24 | 10:05 | 2.09 | 1.75 | 04:30                     | 0.444 | 14:25 | 1.370 | 0.968 | 0.968 |           |      |      |      |      |  |  |      |  |
| 12/23/2019 | 03:25      | 6.72 | 12:15 | 13.17 | 8.97 | 12:20           | 1.18 | 08:50 | 2.03 | 1.79 | 03:25                     | 0.538 | 13:40 | 1.377 | 1.019 | 1.019 |           |      |      |      |      |  |  |      |  |
| 12/24/2019 | 04:05      | 6.63 | 11:15 | 12.60 | 8.92 | 04:05           | 1.36 | 14:05 | 2.03 | 1.78 | 04:05                     | 0.518 | 13:40 | 1.374 | 1.004 | 1.004 |           |      |      |      |      |  |  |      |  |
| 12/25/2019 | 05:20      | 6.61 | 13:10 | 12.38 | 8.45 | 05:20           | 1.35 | 11:20 | 2.11 | 1.76 | 05:20                     | 0.512 | 13:55 | 1.376 | 0.936 | 0.936 |           |      |      |      |      |  |  |      |  |
| 12/26/2019 | 04:10      | 6.51 | 11:55 | 14.17 | 8.82 | 11:35           | 0.97 | 18:10 | 2.10 | 1.72 | 04:10                     | 0.490 | 14:00 | 1.374 | 0.943 | 0.943 |           |      |      |      |      |  |  |      |  |
| 12/27/2019 | 04:15      | 6.46 | 11:55 | 14.12 | 9.00 | 11:55           | 0.98 | 14:30 | 2.03 | 1.67 | 03:35                     | 0.480 | 14:05 | 1.374 | 0.930 | 0.930 |           |      |      |      |      |  |  |      |  |
| 12/28/2019 | 05:00      | 6.46 | 12:25 | 16.08 | 9.04 | 11:35           | 0.86 | 09:50 | 2.09 | 1.62 | 05:00                     | 0.470 | 15:10 | 1.375 | 0.900 | 0.900 |           |      |      |      |      |  |  |      |  |
| 12/29/2019 | 05:05      | 6.52 | 11:15 | 13.33 | 9.13 | 11:10           | 1.15 | 20:30 | 2.03 | 1.66 | 06:00                     | 0.484 | 17:25 | 1.380 | 0.966 | 0.966 |           |      |      |      |      |  |  |      |  |
| 12/30/2019 | 04:05      | 6.41 | 11:45 | 15.44 | 9.14 | 12:05           | 0.83 | 18:00 | 2.20 | 1.68 | 03:30                     | 0.484 | 09:15 | 1.374 | 0.937 | 0.937 |           |      |      |      |      |  |  |      |  |
| 12/31/2019 | 03:25      | 6.28 | 11:45 | 15.22 | 9.04 | 11:45           | 0.87 | 14:50 | 2.14 | 1.72 | 03:30                     | 0.480 | 09:55 | 1.380 | 0.950 | 0.950 |           |      |      |      |      |  |  |      |  |



| Date       | Depth (in) |      |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 05:35      | 6.16 | 12:20 | 11.50 | 8.08  | 04:10           | 1.35 | 16:50 | 2.19 | 1.81 | 05:30                     | 0.474 | 13:25 | 1.381 | 0.913 | 0.913 | 0.10  |           |
| 01/02/2020 | 03:20      | 6.21 | 12:10 | 12.67 | 8.65  | 05:05           | 1.24 | 18:25 | 2.13 | 1.79 | 03:45                     | 0.437 | 13:10 | 1.383 | 0.973 | 0.973 |       |           |
| 01/03/2020 | 04:10      | 6.18 | 12:05 | 15.89 | 9.08  | 12:15           | 0.86 | 08:00 | 2.04 | 1.63 | 04:10                     | 0.417 | 09:55 | 1.381 | 0.909 | 0.909 |       |           |
| 01/04/2020 | 04:50      | 6.18 | 12:55 | 16.78 | 9.08  | 12:25           | 0.80 | 15:05 | 2.02 | 1.57 | 04:45                     | 0.377 | 14:45 | 1.366 | 0.862 | 0.862 |       |           |
| 01/05/2020 | 05:05      | 6.11 | 11:00 | 15.63 | 9.47  | 10:55           | 0.82 | 22:45 | 2.07 | 1.56 | 05:05                     | 0.395 | 19:10 | 1.371 | 0.924 | 0.924 |       |           |
| 01/06/2020 | 04:05      | 6.17 | 08:15 | 11.25 | 8.25  | 03:15           | 1.21 | 10:35 | 2.07 | 1.74 | 03:15                     | 0.420 | 08:00 | 1.370 | 0.905 | 0.905 |       |           |
| 01/07/2020 | 03:55      | 6.26 | 08:10 | 13.58 | 8.37  | 08:10           | 1.04 | 07:25 | 2.11 | 1.72 | 03:35                     | 0.417 | 08:30 | 1.378 | 0.906 | 0.906 |       |           |
| 01/08/2020 | 04:00      | 6.36 | 08:05 | 11.90 | 8.26  | 03:40           | 1.16 | 07:25 | 2.09 | 1.75 | 03:40                     | 0.419 | 07:45 | 1.380 | 0.908 | 0.908 |       |           |
| 01/09/2020 | 03:40      | 6.12 | 08:10 | 11.96 | 8.23  | 05:00           | 1.14 | 21:40 | 2.11 | 1.75 | 03:40                     | 0.403 | 07:40 | 1.383 | 0.910 | 0.910 |       |           |
| 01/10/2020 | 03:40      | 6.35 | 08:35 | 10.00 | 8.26  | 03:10           | 1.21 | 18:55 | 2.13 | 1.76 | 03:10                     | 0.436 | 08:30 | 1.312 | 0.912 | 0.912 |       |           |
| 01/11/2020 | 04:40      | 6.29 | 12:35 | 14.83 | 9.30  | 12:45           | 0.91 | 09:40 | 2.10 | 1.62 | 04:25                     | 0.425 | 20:35 | 1.382 | 0.957 | 0.957 |       |           |
| 01/12/2020 | 05:35      | 6.18 | 11:05 | 12.10 | 8.41  | 05:10           | 1.15 | 19:35 | 2.17 | 1.74 | 05:10                     | 0.397 | 11:25 | 1.383 | 0.939 | 0.939 |       |           |
| 01/13/2020 | 03:40      | 6.47 | 08:35 | 14.71 | 8.47  | 08:40           | 0.95 | 08:00 | 2.15 | 1.73 | 03:40                     | 0.483 | 08:00 | 1.470 | 0.915 | 0.915 |       |           |
| 01/14/2020 | 03:10      | 6.62 | 08:00 | 14.30 | 8.54  | 08:00           | 0.95 | 09:50 | 2.03 | 1.77 | 04:50                     | 0.492 | 20:45 | 1.381 | 0.954 | 0.954 |       |           |
| 01/15/2020 | 03:45      | 6.60 | 08:00 | 15.26 | 8.81  | 08:00           | 0.87 | 10:10 | 2.02 | 1.73 | 03:45                     | 0.514 | 10:00 | 1.382 | 0.949 | 0.949 |       |           |
| 01/16/2020 | 04:15      | 6.44 | 13:20 | 17.95 | 10.81 | 08:00           | 0.80 | 15:35 | 2.02 | 1.45 | 03:35                     | 0.445 | 11:05 | 1.381 | 0.954 | 0.954 |       |           |
| 01/17/2020 | 03:55      | 6.42 | 08:50 | 20.36 | 9.07  | 09:30           | 0.87 | 11:35 | 2.19 | 1.79 | 04:15                     | 0.523 | 09:55 | 1.373 | 0.979 | 0.979 |       |           |
| 01/18/2020 | 05:00      | 6.68 | 11:05 | 14.00 | 9.04  | 11:05           | 1.00 | 15:50 | 2.10 | 1.66 | 04:55                     | 0.492 | 10:05 | 1.383 | 0.935 | 0.935 |       |           |
| 01/19/2020 | 05:35      | 6.64 | 11:45 | 13.98 | 8.94  | 11:50           | 1.00 | 18:35 | 2.12 | 1.70 | 05:50                     | 0.484 | 13:55 | 1.369 | 0.945 | 0.945 |       |           |
| 01/20/2020 | 03:45      | 6.39 | 11:40 | 13.75 | 8.87  | 11:50           | 1.06 | 18:30 | 2.16 | 1.71 | 04:00                     | 0.439 | 13:50 | 1.371 | 0.953 | 0.953 |       |           |
| 01/21/2020 | 03:15      | 6.32 | 20:45 | 15.12 | 9.19  | 20:55           | 0.89 | 14:10 | 2.08 | 1.62 | 03:10                     | 0.425 | 17:40 | 1.379 | 0.918 | 0.918 |       |           |
| 01/22/2020 | 03:55      | 6.45 | 08:20 | 18.11 | 9.90  | 09:05           | 0.87 | 07:15 | 2.11 | 1.62 | 04:10                     | 0.472 | 10:25 | 1.383 | 0.978 | 0.978 |       |           |
| 01/23/2020 | 03:35      | 6.25 | 08:50 | 20.32 | 10.37 | 10:45           | 0.87 | 06:55 | 2.12 | 1.58 | 03:25                     | 0.466 | 19:00 | 1.383 | 0.967 | 0.967 |       |           |
| 01/24/2020 | 03:55      | 6.24 | 10:10 | 18.25 | 11.02 | 12:40           | 0.87 | 07:05 | 2.07 | 1.49 | 03:55                     | 0.483 | 07:55 | 1.373 | 0.985 | 0.985 |       |           |
| 01/25/2020 | 05:00      | 6.19 | 12:00 | 20.73 | 10.31 | 12:05           | 0.82 | 22:25 | 2.05 | 1.57 | 05:25                     | 0.395 | 19:15 | 1.383 | 0.935 | 0.935 |       |           |
| 01/26/2020 | 05:00      | 6.25 | 11:35 | 21.77 | 10.90 | 10:15           | 0.83 | 16:45 | 2.02 | 1.46 | 04:55                     | 0.450 | 17:45 | 1.381 | 0.943 | 0.943 |       |           |
| 01/27/2020 | 03:55      | 6.45 | 08:15 | 16.90 | 9.44  | 08:00           | 0.78 | 07:15 | 2.14 | 1.63 | 03:45                     | 0.448 | 11:15 | 1.383 | 0.949 | 0.949 |       |           |
| 01/28/2020 | 03:45      | 6.20 | 08:10 | 17.31 | 9.02  | 08:40           | 0.87 | 07:25 | 2.06 | 1.68 | 03:50                     | 0.428 | 09:40 | 1.379 | 0.944 | 0.944 |       |           |
| 01/29/2020 | 03:45      | 6.27 | 08:20 | 17.83 | 9.14  | 09:10           | 0.87 | 11:40 | 2.06 | 1.70 | 04:10                     | 0.440 | 20:10 | 1.380 | 0.954 | 0.954 |       |           |
| 01/30/2020 | 03:45      | 6.10 | 08:20 | 14.39 | 8.47  | 08:20           | 0.94 | 19:30 | 2.12 | 1.77 | 03:30                     | 0.437 | 09:05 | 1.364 | 0.935 | 0.935 |       |           |
| 01/31/2020 | 02:55      | 6.27 | 08:15 | 14.81 | 8.66  | 08:15           | 0.90 | 07:30 | 2.19 | 1.72 | 03:30                     | 0.448 | 07:30 | 1.380 | 0.927 | 0.927 |       |           |
| 02/01/2020 | 03:35      | 6.45 | 12:10 | 16.80 | 9.52  | 11:05           | 0.87 | 08:50 | 2.05 | 1.57 | 03:40                     | 0.433 | 15:10 | 1.304 | 0.915 | 0.915 |       |           |
| 02/02/2020 | 05:05      | 6.41 | 12:10 | 18.12 | 9.75  | 10:55           | 0.87 | 16:40 | 2.07 | 1.53 | 04:25                     | 0.437 | 09:55 | 1.312 | 0.902 | 0.902 |       |           |
| 02/03/2020 | 03:50      | 6.43 | 08:15 | 18.18 | 9.21  | 08:55           | 0.83 | 07:15 | 2.18 | 1.66 | 03:30                     | 0.440 | 07:15 | 1.388 | 0.940 | 0.940 |       |           |
| 02/04/2020 | 03:35      | 6.23 | 07:55 | 15.84 | 8.73  | 07:45           | 0.85 | 07:20 | 2.08 | 1.69 | 03:30                     | 0.407 | 10:00 | 1.304 | 0.918 | 0.918 |       |           |
| 02/05/2020 | 04:10      | 6.30 | 08:15 | 17.09 | 9.05  | 08:10           | 0.86 | 18:55 | 2.19 | 1.67 | 04:10                     | 0.420 | 07:25 | 1.361 | 0.935 | 0.935 |       |           |
| 02/06/2020 | 03:40      | 6.35 | 08:10 | 17.37 | 8.70  | 08:25           | 0.82 | 11:25 | 2.17 | 1.73 | 03:20                     | 0.467 | 09:50 | 1.303 | 0.925 | 0.925 |       |           |
| 02/07/2020 | 03:45      | 6.19 | 08:05 | 14.72 | 8.40  | 08:00           | 0.85 | 18:40 | 2.08 | 1.75 | 02:25                     | 0.441 | 08:40 | 1.303 | 0.917 | 0.917 |       |           |
| 02/08/2020 | 05:10      | 6.28 | 08:30 | 15.11 | 8.18  | 08:30           | 0.87 | 13:15 | 2.27 | 1.77 | 05:00                     | 0.414 | 11:50 | 1.345 | 0.909 | 0.909 |       |           |
| 02/09/2020 | 05:30      | 6.17 | 10:40 | 9.52  | 8.05  | 05:30           | 1.17 | 12:05 | 2.26 | 1.81 | 05:30                     | 0.404 | 10:40 | 1.357 | 0.920 | 0.920 |       |           |
| 02/10/2020 | 03:40      | 5.93 | 07:55 | 10.11 | 7.99  | 03:40           | 1.29 | 07:30 | 2.23 | 1.85 | 03:40                     | 0.422 | 07:55 | 1.449 | 0.923 | 0.923 |       |           |
| 02/11/2020 | 03:50      | 5.99 | 07:55 | 10.11 | 7.93  | 02:30           | 1.28 | 07:45 | 2.25 | 1.80 | 02:50                     | 0.428 | 07:45 | 1.388 | 0.888 | 0.888 |       |           |
| 02/12/2020 | 03:25      | 5.96 | 08:10 | 11.00 | 7.92  | 02:25           | 1.24 | 07:40 | 2.21 | 1.79 | 03:35                     | 0.409 | 07:40 | 1.393 | 0.883 | 0.883 |       |           |
| 02/13/2020 | 03:20      | 6.06 | 07:55 | 11.30 | 7.96  | 03:05           | 1.22 | 09:40 | 2.18 | 1.77 | 03:00                     | 0.412 | 07:35 | 1.354 | 0.879 | 0.879 |       |           |
| 02/14/2020 | 02:55      | 5.81 | 08:30 | 10.12 | 7.85  | 03:45           | 1.22 | 07:25 | 2.17 | 1.80 | 03:45                     | 0.391 | 08:30 | 1.300 | 0.878 | 0.878 |       |           |
| 02/15/2020 | 04:40      | 5.96 | 12:20 | 12.23 | 8.30  | 04:40           | 1.14 | 18:55 | 2.14 | 1.72 | 04:40                     | 0.374 | 13:15 | 1.304 | 0.900 | 0.900 |       |           |
| 02/16/2020 | 04:00      | 6.08 | 11:30 | 14.05 | 8.73  | 11:30           | 0.99 | 17:25 | 2.12 | 1.62 | 05:10                     | 0.389 | 13:30 | 1.311 | 0.895 | 0.895 |       |           |
| 02/17/2020 | 04:15      | 6.31 | 13:10 | 21.29 | 11.84 | 13:30           | 0.81 | 08:25 | 2.03 | 1.33 | 04:10                     | 0.414 | 18:05 | 1.304 | 0.913 | 0.913 |       |           |
| 02/18/2020 | 03:00      | 6.05 | 09:15 | 17.91 | 9.05  | 08:20           | 0.78 | 12:20 | 2.15 | 1.63 | 03:20                     | 0.368 | 07:45 | 1.304 | 0.881 | 0.881 |       |           |
| 02/19/2020 | 03:15      | 6.09 | 08:10 | 9.70  | 8.05  | 03:20           | 1.14 | 08:40 | 2.21 | 1.74 | 03:20                     | 0.386 | 08:05 | 1.312 | 0.878 | 0.878 |       |           |
| 02/20/2020 | 03:55      | 6.15 | 09:00 | 9.50  | 8.05  | 03:50           | 1.17 | 10:50 | 2.16 | 1.74 | 03:50                     | 0.401 | 10:10 | 1.252 | 0.874 | 0.874 |       |           |
| 02/21/2020 | 04:10      | 6.02 | 08:20 | 9.30  | 8.03  | 04:00           | 1.13 | 14:00 | 2.06 | 1.72 | 04:00                     | 0.377 | 12:10 | 1.169 | 0.865 | 0.865 |       |           |
| 02/22/2020 | 04:35      | 6.34 | 12:15 | 9.46  | 8.10  | 04:40           | 1.15 | 11:55 | 2.09 | 1.71 | 04:40                     | 0.411 | 11:55 | 1.234 | 0.869 | 0.869 |       |           |
| 02/23/2020 | 04:50      | 6.26 | 11:10 | 9.60  | 8.11  | 05:35           | 1.11 | 11:45 | 2.25 | 1.75 | 05:35                     | 0.391 | 11:45 | 1.343 | 0.899 | 0.899 |       |           |
| 02/24/2020 | 03:35      | 6.01 | 07:25 | 9.90  | 8.01  | 02:55           | 1.16 | 07:35 | 2.25 | 1.77 | 03:35                     | 0.389 | 07:35 | 1.388 | 0.887 | 0.887 |       |           |

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total |           |
| 02/25/2020 | 03:15      | 6.07 | 07:40 | 10.11 | 8.00 | 03:25           | 1.07 | 07:30 | 2.28 | 1.74 | 03:25                     | 0.363 | 08:00 | 1.448 | 0.872 | 0.872 | 0.01      |
| 02/26/2020 | 03:10      | 6.17 | 07:25 | 10.20 | 8.15 | 03:15           | 1.18 | 07:20 | 2.16 | 1.77 | 03:15                     | 0.408 | 07:25 | 1.411 | 0.903 | 0.903 |           |
| 02/27/2020 | 03:40      | 5.85 | 07:35 | 10.02 | 7.99 | 04:00           | 1.14 | 08:25 | 2.21 | 1.73 | 04:00                     | 0.373 | 08:25 | 1.381 | 0.866 | 0.866 |           |
| 02/28/2020 | 03:25      | 6.14 | 07:50 | 10.19 | 8.08 | 03:25           | 1.08 | 07:30 | 2.01 | 1.73 | 03:25                     | 0.371 | 07:30 | 1.313 | 0.876 | 0.876 |           |
| 02/29/2020 | 04:30      | 6.32 | 11:20 | 9.65  | 8.16 | 04:30           | 1.27 | 11:25 | 2.16 | 1.75 | 04:30                     | 0.451 | 11:25 | 1.338 | 0.899 | 0.899 |           |
| 03/01/2020 | 05:05      | 6.23 | 12:00 | 15.82 | 9.83 | 11:40           | 0.83 | 15:25 | 2.02 | 1.46 | 05:10                     | 0.391 | 18:45 | 1.316 | 0.890 | 0.890 |           |
| 03/02/2020 | 03:40      | 6.18 | 08:00 | 18.41 | 9.10 | 08:40           | 0.85 | 11:20 | 2.02 | 1.65 | 03:35                     | 0.368 | 19:55 | 1.316 | 0.930 | 0.930 |           |
| 03/03/2020 | 03:30      | 6.42 | 08:05 | 17.17 | 8.71 | 07:40           | 0.77 | 20:25 | 2.06 | 1.75 | 03:30                     | 0.477 | 08:25 | 1.309 | 0.949 | 0.949 |           |
| 03/04/2020 | 04:05      | 6.40 | 07:50 | 10.38 | 8.52 | 04:05           | 1.30 | 09:10 | 2.16 | 1.81 | 04:05                     | 0.471 | 07:35 | 1.343 | 0.978 | 0.978 |           |
| 03/05/2020 | 03:10      | 6.25 | 07:40 | 11.68 | 8.31 | 02:30           | 1.12 | 07:10 | 2.22 | 1.76 | 02:30                     | 0.400 | 07:10 | 1.326 | 0.919 | 0.919 |           |
| 03/06/2020 | 04:10      | 6.15 | 08:15 | 9.97  | 8.23 | 02:55           | 1.13 | 20:15 | 2.21 | 1.82 | 02:55                     | 0.399 | 07:55 | 1.359 | 0.941 | 0.941 | 0.58      |
| 03/07/2020 | 04:45      | 6.14 | 12:20 | 10.36 | 8.35 | 04:35           | 1.08 | 12:45 | 2.21 | 1.77 | 04:35                     | 0.369 | 12:45 | 1.402 | 0.943 | 0.943 |           |
| 03/08/2020 | 05:05      | 6.31 | 11:20 | 10.38 | 8.42 | 02:45           | 1.22 | 20:55 | 2.25 | 1.83 | 04:20                     | 0.439 | 20:10 | 1.428 | 0.981 | 0.981 | 0.02      |
| 03/09/2020 | 03:00      | 6.28 | 20:10 | 10.66 | 8.50 | 02:20           | 1.24 | 07:40 | 2.16 | 1.81 | 02:20                     | 0.440 | 06:40 | 1.374 | 0.978 | 0.977 | 0.11      |

### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 109.178                   | 5.26      |
| Avg   | 8.74       | 1.74            | 0.949                     |           |

## Site Commentary

### Site Information

| MIL_2721        |       |
|-----------------|-------|
| Pipe Dimensions | 8     |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2721 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited a moderate response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location. Due to the high flows at the creek, crews could not access the meter and data stops on March 02, 2020 for this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                   |                   |
|--------------------------|-------------------|-------------------|-------------------|
| Item                     | Depth (in)        | Velocity (ft/s)   | Quantity (MGD)    |
| Average                  | 6.23              | 1.05              | 0.198             |
| Minimum                  | 3.86              | 0.53              | 0.080             |
| Maximum                  | 9.28              | 1.61              | 0.363             |
| Time of Minimum          | 3/2/2020 3:05 AM  | 2/2/2020 5:45 AM  | 2/2/2020 5:45 AM  |
| Time of Maximum          | 1/17/2020 8:05 AM | 1/17/2020 8:10 AM | 1/17/2020 8:10 AM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 2, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_2721

Site Address /Location: 1545 N Milpitas Blvd

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: Gate access. Need hip waders to cross stream.

Latitude:  
Longitude:

37.452946°  
-121.914112°

Pipe Size (H x W)  
8.0" x 8.0"

Pipe Shape  
Circular



Manhole #

2721

System Characteristics

Residential

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Friday, November 15, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

9:56:00 AM

Pipe Size (HxW)

8.0" x 8.0"

Depth of Flow (Wet DOF) (in)

5.50"

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.7

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

Hydraulic Comments:

Good flow medium depth and velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

6'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

917

ADS Project Name: Milpitas.WWTFM.CA19-20

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_2721

Flow Monitor

**MIL\_2721**

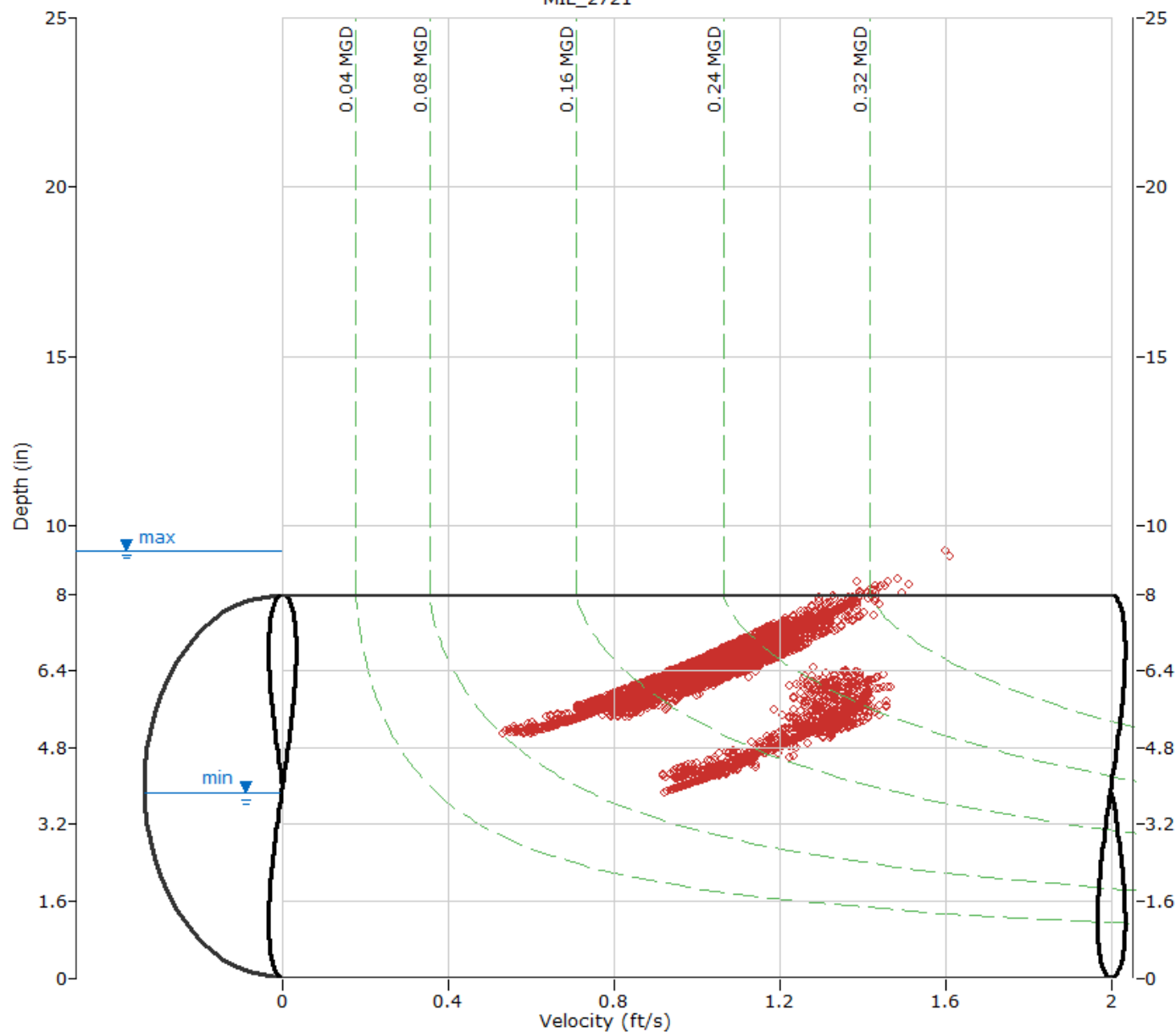
Pipe Height  
8.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



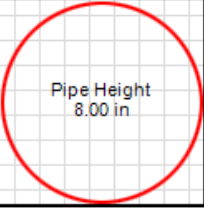
ADS ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_2721

Flow Monitor  
**MIL\_2721**

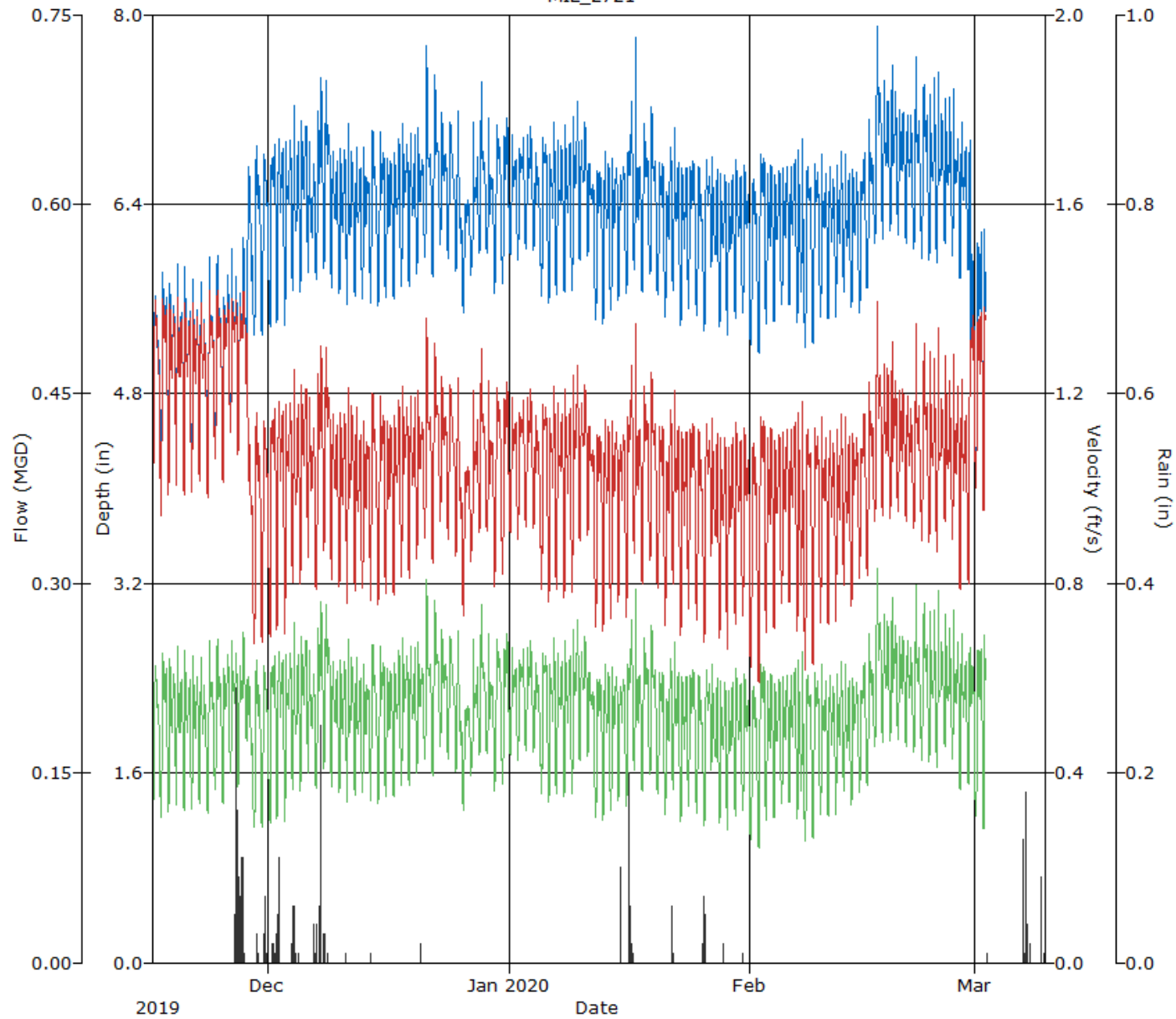


Pipe Height  
8.00 in

Report Period  
11/16/2019  
To  
3/9/2020

**Legend**  

- Depth
- Velocity
- Quantity
- Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2721, Pipe Height: 8.00 in, Silt: 0.00 in

## Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 03:25      | 4.20 | 10:20 | 5.97 | 5.03 | 04:30           | 1.01 | 09:55 | 1.46 | 1.24 | 04:30                     | 0.123 | 10:20 | 0.255 | 0.188 | 0.188 |           |
| 11/17/2019 | 03:35      | 4.18 | 09:20 | 6.03 | 5.11 | 05:15           | 0.92 | 09:25 | 1.42 | 1.24 | 05:20                     | 0.110 | 09:25 | 0.257 | 0.191 | 0.191 |           |
| 11/18/2019 | 02:55      | 4.16 | 07:50 | 5.95 | 5.08 | 02:55           | 0.95 | 07:50 | 1.41 | 1.25 | 02:55                     | 0.113 | 07:50 | 0.254 | 0.191 | 0.191 |           |
| 11/19/2019 | 03:35      | 4.28 | 07:50 | 6.27 | 5.07 | 03:35           | 1.00 | 07:20 | 1.43 | 1.25 | 03:35                     | 0.123 | 07:20 | 0.261 | 0.190 | 0.190 |           |
| 11/20/2019 | 03:00      | 4.19 | 07:45 | 6.37 | 5.04 | 03:00           | 0.97 | 07:55 | 1.41 | 1.24 | 03:00                     | 0.116 | 07:45 | 0.261 | 0.187 | 0.187 |           |
| 11/21/2019 | 03:10      | 4.20 | 07:50 | 6.12 | 5.03 | 03:10           | 0.97 | 07:55 | 1.46 | 1.24 | 03:10                     | 0.116 | 07:55 | 0.267 | 0.187 | 0.187 |           |
| 11/22/2019 | 02:20      | 4.28 | 07:40 | 6.00 | 5.03 | 02:20           | 1.00 | 07:40 | 1.42 | 1.24 | 02:20                     | 0.123 | 07:40 | 0.257 | 0.186 | 0.186 |           |
| 11/23/2019 | 04:30      | 4.15 | 10:20 | 6.12 | 5.09 | 04:30           | 0.95 | 10:15 | 1.47 | 1.25 | 04:30                     | 0.112 | 10:15 | 0.269 | 0.191 | 0.191 |           |
| 11/24/2019 | 04:40      | 4.41 | 09:45 | 6.26 | 5.19 | 04:40           | 1.05 | 10:35 | 1.45 | 1.27 | 04:40                     | 0.134 | 09:45 | 0.272 | 0.199 | 0.199 |           |
| 11/25/2019 | 03:50      | 4.22 | 19:15 | 6.14 | 5.19 | 03:50           | 0.98 | 19:10 | 1.41 | 1.27 | 03:50                     | 0.118 | 19:15 | 0.256 | 0.199 | 0.199 |           |
| 11/26/2019 | 01:30      | 4.57 | 07:40 | 6.34 | 5.29 | 01:30           | 1.11 | 07:25 | 1.45 | 1.30 | 01:30                     | 0.148 | 07:50 | 0.271 | 0.207 | 0.207 | 0.63      |
| 11/27/2019 | 04:20      | 4.42 | 18:30 | 6.33 | 5.34 | 04:20           | 1.05 | 21:25 | 1.47 | 1.30 | 04:20                     | 0.135 | 18:25 | 0.277 | 0.210 | 0.210 | 0.77      |
| 11/28/2019 | 04:30      | 4.82 | 11:10 | 6.82 | 5.85 | 23:55           | 0.85 | 08:20 | 1.40 | 1.11 | 23:55                     | 0.150 | 08:20 | 0.247 | 0.194 | 0.194 | 0.05      |
| 11/29/2019 | 04:40      | 5.27 | 10:45 | 7.15 | 6.21 | 04:40           | 0.67 | 10:45 | 1.22 | 0.96 | 04:40                     | 0.105 | 10:45 | 0.260 | 0.183 | 0.183 |           |
| 11/30/2019 | 04:40      | 5.23 | 13:30 | 7.09 | 6.19 | 04:40           | 0.65 | 13:30 | 1.21 | 0.96 | 04:40                     | 0.102 | 13:30 | 0.256 | 0.181 | 0.181 | 0.14      |
| 12/01/2019 | 05:35      | 5.34 | 19:25 | 7.32 | 6.31 | 05:35           | 0.68 | 19:25 | 1.27 | 1.00 | 05:35                     | 0.108 | 19:25 | 0.275 | 0.192 | 0.192 | 0.06      |
| 12/02/2019 | 02:45      | 5.31 | 07:50 | 7.41 | 6.35 | 02:45           | 0.67 | 07:50 | 1.29 | 1.01 | 02:45                     | 0.106 | 07:50 | 0.282 | 0.196 | 0.196 | 0.36      |
| 12/03/2019 | 03:30      | 5.32 | 07:25 | 7.08 | 6.34 | 03:30           | 0.67 | 07:25 | 1.22 | 1.01 | 03:30                     | 0.107 | 07:25 | 0.257 | 0.195 | 0.195 | 0.44      |
| 12/04/2019 | 02:15      | 5.65 | 07:40 | 7.51 | 6.39 | 02:15           | 0.79 | 07:40 | 1.31 | 1.03 | 02:15                     | 0.135 | 07:40 | 0.289 | 0.199 | 0.199 |           |
| 12/05/2019 | 02:20      | 5.63 | 19:30 | 7.37 | 6.52 | 02:20           | 0.79 | 19:30 | 1.28 | 1.06 | 02:20                     | 0.133 | 19:30 | 0.279 | 0.210 | 0.210 | 0.06      |
| 12/06/2019 | 03:25      | 5.77 | 07:50 | 7.16 | 6.37 | 03:25           | 0.84 | 07:55 | 1.29 | 1.03 | 03:25                     | 0.146 | 07:55 | 0.274 | 0.200 | 0.200 |           |
| 12/07/2019 | 04:05      | 5.72 | 17:40 | 7.81 | 6.66 | 02:50           | 0.75 | 17:40 | 1.37 | 1.08 | 02:50                     | 0.129 | 17:40 | 0.308 | 0.218 | 0.218 | 0.84      |
| 12/08/2019 | 04:55      | 5.79 | 10:50 | 7.74 | 6.68 | 04:55           | 0.84 | 10:50 | 1.36 | 1.11 | 04:55                     | 0.147 | 10:50 | 0.304 | 0.223 | 0.223 | 0.10      |
| 12/09/2019 | 04:15      | 5.62 | 07:45 | 7.11 | 6.38 | 04:15           | 0.78 | 07:45 | 1.22 | 1.02 | 04:15                     | 0.133 | 07:45 | 0.259 | 0.198 | 0.198 | 0.01      |
| 12/10/2019 | 02:35      | 5.59 | 07:40 | 7.16 | 6.33 | 02:35           | 0.77 | 07:40 | 1.23 | 1.01 | 02:35                     | 0.130 | 07:40 | 0.263 | 0.194 | 0.194 |           |
| 12/11/2019 | 02:55      | 5.51 | 07:45 | 7.40 | 6.30 | 02:55           | 0.74 | 07:45 | 1.29 | 1.02 | 02:55                     | 0.123 | 07:45 | 0.281 | 0.195 | 0.195 | 0.00      |
| 12/12/2019 | 04:15      | 5.55 | 07:20 | 7.11 | 6.30 | 04:15           | 0.76 | 07:55 | 1.26 | 0.99 | 04:15                     | 0.127 | 07:55 | 0.261 | 0.190 | 0.190 | 0.01      |
| 12/13/2019 | 03:00      | 5.57 | 07:45 | 7.03 | 6.31 | 04:10           | 0.75 | 08:00 | 1.19 | 0.99 | 04:10                     | 0.126 | 08:00 | 0.249 | 0.190 | 0.190 |           |
| 12/14/2019 | 03:55      | 5.51 | 10:05 | 7.35 | 6.40 | 03:55           | 0.74 | 10:05 | 1.28 | 1.03 | 03:55                     | 0.123 | 10:05 | 0.277 | 0.200 | 0.200 | 0.02      |
| 12/15/2019 | 03:45      | 5.49 | 11:00 | 7.46 | 6.39 | 03:45           | 0.73 | 11:00 | 1.30 | 1.02 | 03:45                     | 0.121 | 11:00 | 0.285 | 0.199 | 0.199 |           |
| 12/16/2019 | 02:50      | 5.57 | 07:45 | 7.10 | 6.33 | 02:50           | 0.76 | 07:45 | 1.22 | 1.01 | 02:50                     | 0.128 | 07:45 | 0.258 | 0.194 | 0.194 | 0.02      |
| 12/17/2019 | 01:25      | 5.57 | 20:35 | 7.07 | 6.39 | 01:25           | 0.76 | 20:35 | 1.21 | 1.03 | 01:25                     | 0.128 | 20:35 | 0.256 | 0.199 | 0.199 |           |
| 12/18/2019 | 03:15      | 5.65 | 07:25 | 7.29 | 6.46 | 03:15           | 0.79 | 07:25 | 1.26 | 1.05 | 03:15                     | 0.135 | 07:25 | 0.273 | 0.206 | 0.206 | 0.02      |
| 12/19/2019 | 03:15      | 5.63 | 07:40 | 7.44 | 6.42 | 03:15           | 0.79 | 07:40 | 1.30 | 1.03 | 03:15                     | 0.133 | 07:40 | 0.284 | 0.202 | 0.202 |           |
| 12/20/2019 | 03:05      | 5.71 | 07:30 | 7.35 | 6.50 | 03:05           | 0.82 | 07:30 | 1.28 | 1.06 | 03:05                     | 0.140 | 07:30 | 0.277 | 0.208 | 0.208 | 0.02      |
| 12/21/2019 | 04:40      | 5.89 | 09:50 | 7.90 | 6.65 | 04:40           | 0.88 | 09:50 | 1.39 | 1.10 | 04:40                     | 0.156 | 09:50 | 0.313 | 0.221 | 0.221 |           |
| 12/22/2019 | 04:25      | 5.75 | 13:25 | 7.91 | 6.70 | 04:25           | 0.83 | 13:25 | 1.39 | 1.11 | 04:25                     | 0.144 | 13:25 | 0.313 | 0.224 | 0.224 | 0.02      |
| 12/23/2019 | 04:20      | 6.01 | 09:40 | 7.43 | 6.61 | 04:20           | 0.92 | 09:40 | 1.30 | 1.09 | 04:20                     | 0.167 | 09:40 | 0.283 | 0.218 | 0.218 |           |
| 12/24/2019 | 04:20      | 5.92 | 09:40 | 7.32 | 6.59 | 04:20           | 0.89 | 09:40 | 1.27 | 1.08 | 04:20                     | 0.159 | 09:40 | 0.275 | 0.216 | 0.216 | 0.02      |
| 12/25/2019 | 23:25      | 5.75 | 11:35 | 8.01 | 6.31 | 23:25           | 0.83 | 11:35 | 1.41 | 1.00 | 23:25                     | 0.144 | 11:35 | 0.318 | 0.192 | 0.192 |           |
| 12/26/2019 | 04:20      | 5.42 | 08:25 | 6.60 | 6.14 | 04:20           | 0.71 | 08:25 | 1.09 | 0.95 | 04:20                     | 0.115 | 08:25 | 0.218 | 0.178 | 0.178 | 0.02      |
| 12/27/2019 | 03:45      | 5.76 | 09:35 | 7.60 | 6.33 | 03:45           | 0.83 | 09:25 | 1.43 | 1.01 | 03:45                     | 0.145 | 09:25 | 0.315 | 0.194 | 0.194 |           |
| 12/28/2019 | 06:20      | 5.92 | 12:45 | 7.79 | 6.60 | 06:20           | 0.89 | 12:45 | 1.37 | 1.09 | 06:20                     | 0.159 | 12:45 | 0.307 | 0.217 | 0.217 | 0.02      |
| 12/29/2019 | 02:55      | 5.95 | 10:35 | 7.52 | 6.44 | 02:55           | 0.84 | 10:35 | 1.31 | 1.04 | 02:55                     | 0.151 | 10:35 | 0.289 | 0.204 | 0.204 |           |
| 12/30/2019 | 02:50      | 5.60 | 17:35 | 7.32 | 6.47 | 02:50           | 0.78 | 17:35 | 1.27 | 1.05 | 02:50                     | 0.131 | 17:35 | 0.275 | 0.205 | 0.205 | 0.02      |
| 12/31/2019 | 04:15      | 5.67 | 19:05 | 7.45 | 6.52 | 04:15           | 0.80 | 19:05 | 1.30 | 1.06 | 04:15                     | 0.137 | 19:05 | 0.284 | 0.210 | 0.210 |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 03:55      | 5.94 | 10:10 | 7.26 | 6.52 | 03:55           | 0.89 | 10:10 | 1.26 | 1.07 | 03:55                     | 0.161 | 10:10 | 0.271 | 0.211 | 0.211 | 0.10  |           |
| 01/02/2020 | 04:25      | 5.87 | 09:15 | 7.18 | 6.52 | 04:25           | 0.87 | 09:15 | 1.24 | 1.07 | 04:25                     | 0.154 | 09:15 | 0.264 | 0.210 | 0.210 |       |           |
| 01/03/2020 | 04:15      | 5.93 | 17:35 | 7.45 | 6.61 | 04:15           | 0.89 | 17:35 | 1.30 | 1.09 | 04:15                     | 0.160 | 17:35 | 0.284 | 0.218 | 0.218 |       |           |
| 01/04/2020 | 04:00      | 5.91 | 11:25 | 6.98 | 6.45 | 04:00           | 0.88 | 11:25 | 1.19 | 1.05 | 04:00                     | 0.158 | 11:25 | 0.249 | 0.205 | 0.205 |       |           |
| 01/05/2020 | 05:40      | 5.60 | 20:55 | 7.20 | 6.44 | 05:40           | 0.78 | 20:55 | 1.24 | 1.04 | 05:40                     | 0.131 | 20:55 | 0.266 | 0.203 | 0.203 |       |           |
| 01/06/2020 | 02:25      | 5.53 | 18:55 | 7.42 | 6.38 | 04:20           | 0.71 | 18:55 | 1.29 | 1.02 | 04:20                     | 0.120 | 18:55 | 0.282 | 0.199 | 0.199 |       |           |
| 01/07/2020 | 02:25      | 5.59 | 20:15 | 7.17 | 6.40 | 02:25           | 0.77 | 20:15 | 1.24 | 1.03 | 02:25                     | 0.130 | 20:15 | 0.264 | 0.200 | 0.200 |       |           |
| 01/08/2020 | 03:20      | 5.64 | 07:45 | 7.45 | 6.44 | 02:15           | 0.75 | 07:50 | 1.32 | 1.03 | 02:25                     | 0.127 | 07:50 | 0.288 | 0.201 | 0.201 |       |           |
| 01/09/2020 | 02:50      | 5.59 | 19:55 | 7.54 | 6.56 | 03:55           | 0.71 | 07:45 | 1.35 | 1.06 | 03:55                     | 0.121 | 07:45 | 0.292 | 0.211 | 0.211 |       |           |
| 01/10/2020 | 01:30      | 5.83 | 07:00 | 7.22 | 6.62 | 01:30           | 0.86 | 07:00 | 1.25 | 1.09 | 01:30                     | 0.151 | 07:00 | 0.267 | 0.219 | 0.219 |       |           |
| 01/11/2020 | 04:15      | 5.74 | 09:00 | 7.10 | 6.42 | 04:15           | 0.83 | 09:00 | 1.22 | 1.04 | 04:15                     | 0.143 | 09:00 | 0.258 | 0.202 | 0.202 | 0.66  |           |
| 01/12/2020 | 03:30      | 5.39 | 17:15 | 6.87 | 6.21 | 03:30           | 0.70 | 17:15 | 1.16 | 0.97 | 03:30                     | 0.113 | 17:15 | 0.240 | 0.184 | 0.184 |       |           |
| 01/13/2020 | 03:40      | 5.30 | 08:00 | 7.49 | 6.20 | 03:40           | 0.66 | 08:10 | 1.31 | 0.97 | 03:40                     | 0.105 | 08:00 | 0.285 | 0.183 | 0.183 |       |           |
| 01/14/2020 | 01:45      | 5.44 | 07:35 | 6.97 | 6.26 | 01:55           | 0.64 | 07:35 | 1.19 | 0.98 | 01:55                     | 0.105 | 07:35 | 0.248 | 0.187 | 0.187 |       |           |
| 01/15/2020 | 02:35      | 5.55 | 09:05 | 6.95 | 6.32 | 01:10           | 0.71 | 09:15 | 1.22 | 0.99 | 02:55                     | 0.120 | 09:15 | 0.250 | 0.191 | 0.191 |       |           |
| 01/16/2020 | 02:40      | 5.58 | 18:50 | 7.48 | 6.57 | 02:40           | 0.71 | 18:50 | 1.31 | 1.06 | 02:40                     | 0.119 | 18:50 | 0.287 | 0.211 | 0.211 |       |           |
| 01/17/2020 | 03:35      | 5.82 | 08:05 | 9.28 | 6.45 | 03:35           | 0.85 | 08:10 | 1.61 | 1.04 | 03:35                     | 0.150 | 08:10 | 0.363 | 0.203 | 0.203 |       |           |
| 01/18/2020 | 03:10      | 5.61 | 09:40 | 7.41 | 6.46 | 03:10           | 0.78 | 09:40 | 1.29 | 1.04 | 03:10                     | 0.132 | 09:40 | 0.282 | 0.205 | 0.205 |       |           |
| 01/19/2020 | 05:10      | 5.77 | 09:45 | 7.80 | 6.48 | 05:10           | 0.84 | 09:45 | 1.37 | 1.05 | 05:10                     | 0.146 | 09:45 | 0.308 | 0.207 | 0.207 |       |           |
| 01/20/2020 | 03:30      | 5.61 | 20:05 | 6.90 | 6.31 | 03:30           | 0.78 | 20:05 | 1.17 | 1.00 | 03:30                     | 0.132 | 20:05 | 0.242 | 0.192 | 0.192 |       |           |
| 01/21/2020 | 03:00      | 5.38 | 21:35 | 7.07 | 6.18 | 04:40           | 0.65 | 21:35 | 1.21 | 0.96 | 04:40                     | 0.107 | 21:35 | 0.256 | 0.181 | 0.181 | 0.01  |           |
| 01/22/2020 | 02:35      | 5.62 | 08:00 | 7.17 | 6.34 | 02:35           | 0.78 | 08:00 | 1.24 | 1.01 | 02:35                     | 0.133 | 08:00 | 0.264 | 0.195 | 0.195 | 0.09  |           |
| 01/23/2020 | 03:15      | 5.30 | 19:40 | 6.92 | 6.19 | 03:15           | 0.66 | 19:40 | 1.18 | 0.97 | 03:15                     | 0.105 | 19:40 | 0.244 | 0.182 | 0.182 | 0.16  |           |
| 01/24/2020 | 03:05      | 5.45 | 09:40 | 7.00 | 6.32 | 03:05           | 0.72 | 09:40 | 1.20 | 1.01 | 03:05                     | 0.118 | 09:40 | 0.250 | 0.193 | 0.193 |       |           |
| 01/25/2020 | 03:10      | 5.43 | 12:10 | 6.92 | 6.17 | 03:10           | 0.71 | 12:10 | 1.18 | 0.96 | 03:10                     | 0.116 | 12:10 | 0.244 | 0.181 | 0.181 |       |           |
| 01/26/2020 | 04:40      | 5.26 | 11:15 | 6.98 | 6.20 | 04:40           | 0.65 | 11:15 | 1.19 | 0.96 | 04:40                     | 0.101 | 11:15 | 0.249 | 0.183 | 0.183 |       |           |
| 01/27/2020 | 05:55      | 5.59 | 05:25 | 7.24 | 6.23 | 00:05           | 0.78 | 05:25 | 1.25 | 0.98 | 06:00                     | 0.135 | 05:25 | 0.269 | 0.185 | 0.185 |       |           |
| 01/28/2020 | 02:35      | 5.33 | 07:40 | 6.83 | 6.08 | 02:35           | 0.67 | 07:40 | 1.15 | 0.93 | 02:35                     | 0.107 | 07:40 | 0.237 | 0.173 | 0.173 | 0.02  |           |
| 01/29/2020 | 03:20      | 5.27 | 19:10 | 6.82 | 6.11 | 03:20           | 0.65 | 19:10 | 1.15 | 0.94 | 03:20                     | 0.102 | 19:10 | 0.236 | 0.176 | 0.176 | 0.01  |           |
| 01/30/2020 | 03:05      | 5.38 | 07:55 | 6.95 | 6.21 | 03:05           | 0.69 | 07:55 | 1.18 | 0.97 | 03:05                     | 0.112 | 07:55 | 0.246 | 0.184 | 0.184 |       |           |
| 01/31/2020 | 02:55      | 5.43 | 08:15 | 6.88 | 6.18 | 02:55           | 0.71 | 08:15 | 1.17 | 0.96 | 02:55                     | 0.116 | 08:15 | 0.241 | 0.181 | 0.181 |       |           |
| 02/01/2020 | 02:55      | 5.15 | 08:00 | 7.09 | 6.04 | 04:30           | 0.56 | 08:00 | 1.19 | 0.92 | 04:30                     | 0.087 | 08:00 | 0.251 | 0.169 | 0.169 |       |           |
| 02/02/2020 | 06:05      | 5.08 | 21:20 | 7.08 | 6.15 | 05:45           | 0.53 | 21:20 | 1.22 | 0.94 | 05:45                     | 0.080 | 21:20 | 0.257 | 0.178 | 0.178 |       |           |
| 02/03/2020 | 03:35      | 5.36 | 07:45 | 6.92 | 6.18 | 03:35           | 0.68 | 07:45 | 1.18 | 0.96 | 03:35                     | 0.110 | 07:45 | 0.244 | 0.181 | 0.181 |       |           |
| 02/04/2020 | 02:15      | 5.36 | 18:45 | 6.91 | 6.19 | 02:15           | 0.68 | 18:45 | 1.17 | 0.97 | 02:15                     | 0.110 | 18:45 | 0.243 | 0.182 | 0.182 |       |           |
| 02/05/2020 | 04:05      | 5.50 | 07:25 | 6.89 | 6.21 | 04:05           | 0.74 | 07:25 | 1.17 | 0.97 | 04:05                     | 0.122 | 07:25 | 0.242 | 0.184 | 0.184 |       |           |
| 02/06/2020 | 02:25      | 5.50 | 21:05 | 7.16 | 6.25 | 02:25           | 0.74 | 21:05 | 1.23 | 0.99 | 02:25                     | 0.122 | 21:05 | 0.263 | 0.187 | 0.187 |       |           |
| 02/07/2020 | 03:10      | 5.30 | 18:10 | 7.26 | 6.07 | 03:10           | 0.66 | 18:10 | 1.26 | 0.93 | 03:10                     | 0.105 | 18:10 | 0.271 | 0.172 | 0.172 |       |           |
| 02/08/2020 | 04:20      | 5.16 | 09:35 | 6.93 | 6.12 | 04:20           | 0.60 | 09:35 | 1.18 | 0.94 | 04:20                     | 0.093 | 09:35 | 0.245 | 0.176 | 0.176 |       |           |
| 02/09/2020 | 05:00      | 5.13 | 12:35 | 7.04 | 6.15 | 05:00           | 0.59 | 12:35 | 1.21 | 0.95 | 05:00                     | 0.090 | 12:35 | 0.254 | 0.179 | 0.179 |       |           |
| 02/10/2020 | 03:30      | 5.38 | 07:45 | 7.14 | 6.21 | 03:30           | 0.69 | 07:45 | 1.23 | 0.97 | 03:30                     | 0.112 | 07:45 | 0.261 | 0.184 | 0.184 |       |           |
| 02/11/2020 | 03:45      | 5.37 | 07:50 | 6.94 | 6.19 | 03:45           | 0.69 | 07:50 | 1.18 | 0.96 | 03:45                     | 0.111 | 07:50 | 0.246 | 0.182 | 0.182 |       |           |
| 02/12/2020 | 02:05      | 5.41 | 07:45 | 7.02 | 6.23 | 02:05           | 0.70 | 07:45 | 1.20 | 0.98 | 02:05                     | 0.114 | 07:45 | 0.252 | 0.186 | 0.186 |       |           |
| 02/13/2020 | 04:05      | 5.56 | 07:30 | 6.96 | 6.22 | 04:05           | 0.76 | 07:30 | 1.19 | 0.98 | 04:05                     | 0.127 | 07:30 | 0.247 | 0.185 | 0.185 |       |           |
| 02/14/2020 | 03:30      | 5.50 | 07:45 | 6.84 | 6.22 | 03:30           | 0.74 | 18:40 | 1.17 | 0.99 | 03:30                     | 0.122 | 07:45 | 0.237 | 0.187 | 0.187 |       |           |
| 02/15/2020 | 05:10      | 5.44 | 15:55 | 7.03 | 6.27 | 03:05           | 0.79 | 15:55 | 1.24 | 1.02 | 03:10                     | 0.130 | 15:55 | 0.261 | 0.194 | 0.194 |       |           |
| 02/16/2020 | 02:20      | 5.66 | 10:15 | 7.49 | 6.44 | 04:15           | 0.79 | 10:00 | 1.31 | 1.05 | 04:15                     | 0.135 | 10:15 | 0.286 | 0.205 | 0.205 |       |           |
| 02/17/2020 | 04:20      | 5.98 | 10:00 | 8.34 | 6.92 | 04:20           | 0.90 | 10:05 | 1.51 | 1.14 | 04:20                     | 0.163 | 10:05 | 0.341 | 0.235 | 0.235 |       |           |
| 02/18/2020 | 03:05      | 6.06 | 09:30 | 7.95 | 6.85 | 03:05           | 0.93 | 09:30 | 1.39 | 1.12 | 03:05                     | 0.170 | 09:30 | 0.314 | 0.230 | 0.230 |       |           |
| 02/19/2020 | 02:45      | 6.01 | 08:35 | 7.78 | 6.84 | 02:45           | 0.91 | 08:45 | 1.37 | 1.11 | 02:45                     | 0.166 | 08:35 | 0.304 | 0.229 | 0.229 |       |           |
| 02/20/2020 | 04:20      | 6.05 | 09:00 | 7.73 | 6.77 | 04:20           | 0.92 | 09:05 | 1.34 | 1.10 | 04:20                     | 0.169 | 09:05 | 0.300 | 0.223 | 0.223 |       |           |
| 02/21/2020 | 03:40      | 6.01 | 18:45 | 7.58 | 6.69 | 03:40           | 0.91 | 18:45 | 1.32 | 1.07 | 03:40                     | 0.166 | 18:45 | 0.292 | 0.217 | 0.217 |       |           |
| 02/22/2020 | 05:00      | 5.89 | 10:20 | 8.07 | 6.77 | 05:00           | 0.87 | 10:20 | 1.39 | 1.10 | 05:00                     | 0.156 | 10:20 | 0.315 | 0.224 | 0.224 |       |           |
| 02/23/2020 | 05:15      | 5.89 | 11:05 | 7.88 | 6.74 | 05:15           | 0.87 | 11:00 | 1.39 | 1.10 | 05:15                     | 0.156 | 11:05 | 0.310 | 0.223 | 0.223 |       |           |
| 02/24/2020 | 03:15      | 5.87 | 19:50 | 8.34 | 6.69 | 03:15           | 0.87 | 19:50 | 1.46 | 1.08 | 03:15                     | 0.154 | 19:50 | 0.330 | 0.217 | 0.217 |       |           |

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 02:30      | 5.85 | 07:40 | 7.89 | 6.64 | 02:30           | 0.79 | 07:45 | 1.43 | 1.07 | 02:30                     | 0.140 | 07:45 | 0.322 | 0.215 | 0.215 | 0.01      |
| 02/26/2020 | 04:10      | 6.02 | 07:40 | 7.55 | 6.65 | 04:10           | 0.91 | 07:35 | 1.38 | 1.07 | 04:10                     | 0.167 | 07:35 | 0.301 | 0.214 | 0.214 |           |
| 02/27/2020 | 02:50      | 5.90 | 07:10 | 7.61 | 6.59 | 02:50           | 0.88 | 07:10 | 1.40 | 1.07 | 02:50                     | 0.156 | 07:10 | 0.311 | 0.213 | 0.213 |           |
| 02/28/2020 | 03:10      | 5.71 | 07:35 | 7.69 | 6.49 | 02:55           | 0.74 | 07:35 | 1.35 | 1.03 | 03:00                     | 0.128 | 07:35 | 0.300 | 0.203 | 0.203 | 0.58      |
| 02/29/2020 | 23:50      | 4.83 | 11:05 | 7.31 | 5.91 | 03:30           | 0.79 | 14:30 | 1.43 | 1.15 | 03:30                     | 0.139 | 11:05 | 0.273 | 0.204 | 0.204 |           |
| 03/01/2020 | 04:35      | 4.05 | 20:55 | 6.58 | 5.30 | 04:35           | 0.99 | 12:35 | 1.42 | 1.24 | 04:35                     | 0.113 | 19:40 | 0.265 | 0.199 | 0.199 |           |
| 03/02/2020 | 03:05      | 3.86 | 07:35 | 6.38 | 4.60 | 03:05           | 0.92 | 07:00 | 1.41 | 1.12 | 03:05                     | 0.100 | 07:30 | 0.267 | 0.153 | 0.055 | 0.02      |
| 03/03/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/04/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/05/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       | 0.11      |
| 03/06/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/07/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |
| 03/08/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       | 0.11      |
| 03/09/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |           |

#### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 21.255                    | 5.26      |
| Avg   | 6.23       | 1.05            | 0.198                     |           |



## Site Commentary

### Site Information

| MIL_2724        |       |
|-----------------|-------|
| Pipe Dimensions | 39.88 |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2724 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019 and December 7, 2019 - December 8, 2019. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                   |                    |                    |
|--------------------------|-------------------|--------------------|--------------------|
| Item                     | Depth (in)        | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 18.34             | 0.78               | 2.042              |
| Minimum                  | 13.49             | 0.43               | 0.744              |
| Maximum                  | 22.23             | 1.11               | 3.446              |
| Time of Minimum          | 3/4/2020 5:30 AM  | 3/4/2020 4:40 AM   | 3/4/2020 4:40 AM   |
| Time of Maximum          | 12/7/2019 7:45 PM | 12/2/2019 10:10 AM | 12/4/2019 10:25 PM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_2724**

Site Address /Location: California Cir and Cadillac Court, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: Drive

Latitude:

37.446644°

Longitude:

-121.918485°

Pipe Size (H x W)

39.88" x 40.50"

Pipe Shape

Circular

Manhole #

2724

System Characteristics

Residential/Commercial

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Tuesday, November 12, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

5:37:34 AM

Pipe Size (HxW)

39.88" x 40.50"

Depth of Flow (Wet DOF) (in)

14.00"

Range (Air DOF) (in)

0.00"

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

0.89

Velocity Sensor Offset (in)

0"

Silt (in)

0"

Silt Type

Hydraulic Comments:

Ok flow, Deep and slow

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

20'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

PVC

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Manhole Pick / Vent Hole

### Additional Site Info. / Comments:

924



ADS Project Name: Milpitas.WWTFM.CA19-20

147

ADS Project Number: 22431

# SCATTERGRAPH REPORT

MIL\_2724

Flow Monitor

**MIL\_2724**

Pipe Height  
39.88 in

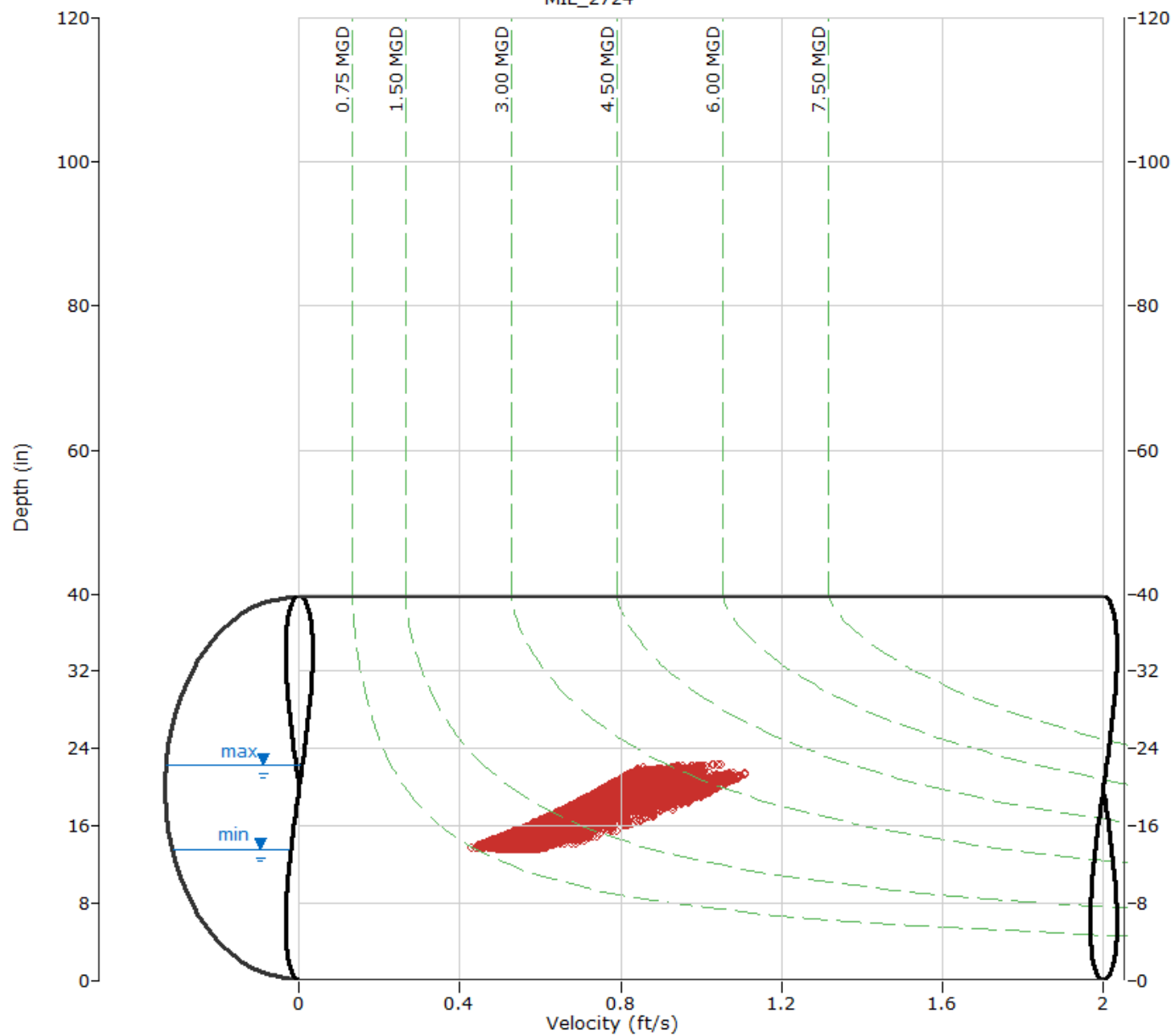
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

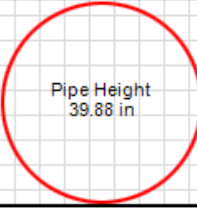
**ADS** ENVIRONMENTAL  
SERVICES



# HYDROGRAPH REPORT

MIL\_2724

Flow Monitor  
**MIL\_2724**

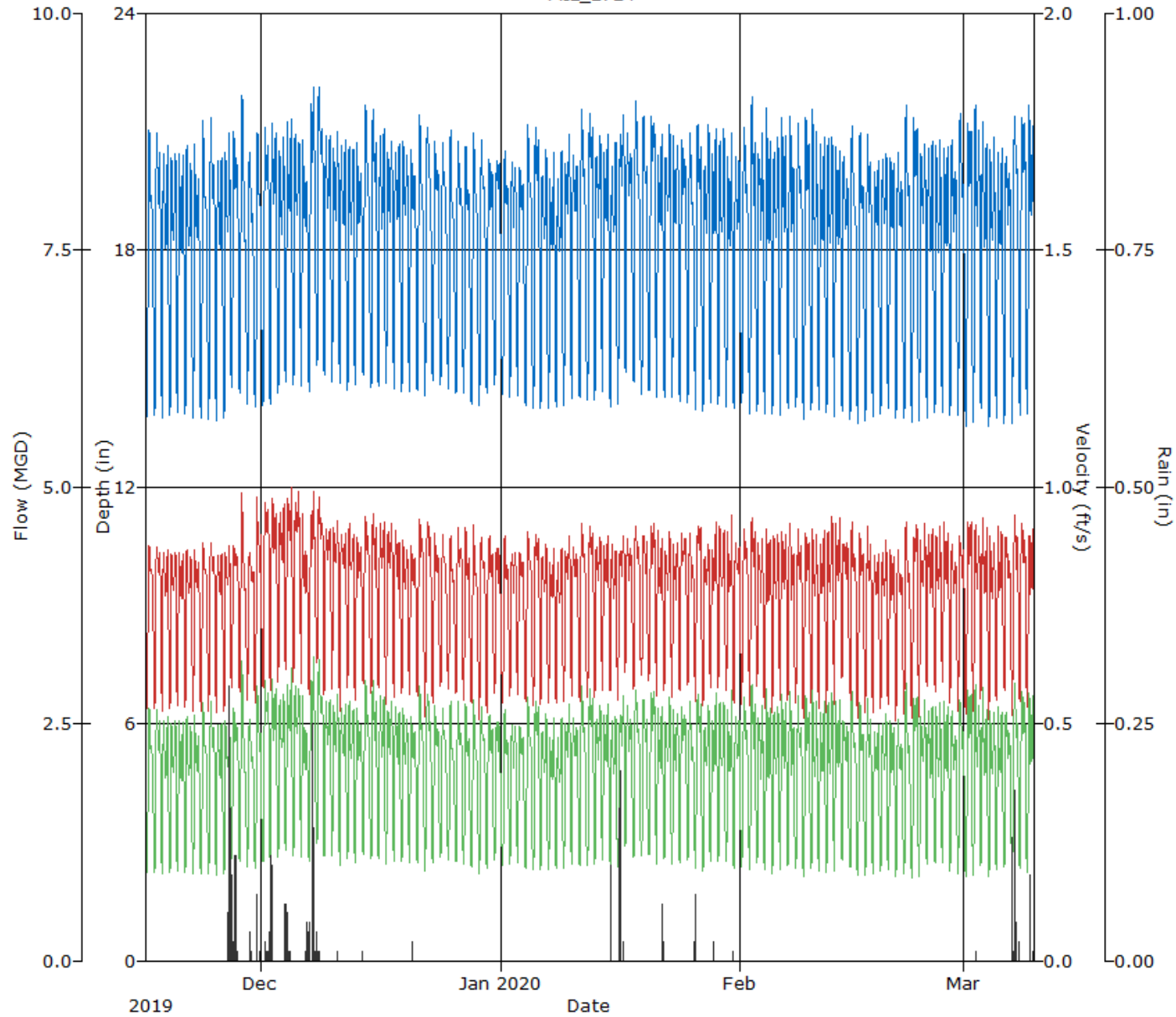


Pipe Height  
39.88 in

Report Period  
11/16/2019  
To  
3/9/2020

Legend  

- Depth
- Velocity
- Quantity
- Rain





Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2724, Pipe Height: 39.88 in, Silt: 0.00 in

# Daily Tabular Report

| Date       | Depth (in) |       |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|-------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min   | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 06:05      | 13.74 | 12:15 | 21.05 | 18.02 | 06:05           | 0.53 | 12:15 | 0.88 | 0.75 | 06:05                     | 0.917 | 12:15 | 2.670 | 1.935 | 1.935 |           |
| 11/17/2019 | 06:05      | 13.78 | 12:45 | 20.99 | 18.15 | 06:05           | 0.53 | 12:45 | 0.87 | 0.76 | 06:05                     | 0.925 | 12:45 | 2.656 | 1.968 | 1.968 |           |
| 11/18/2019 | 05:30      | 13.71 | 22:10 | 20.69 | 18.05 | 05:30           | 0.53 | 22:10 | 0.87 | 0.76 | 05:30                     | 0.910 | 22:10 | 2.587 | 1.942 | 1.942 |           |
| 11/19/2019 | 05:35      | 13.80 | 09:50 | 20.54 | 18.07 | 05:35           | 0.53 | 09:50 | 0.86 | 0.76 | 05:35                     | 0.931 | 09:50 | 2.551 | 1.949 | 1.949 |           |
| 11/20/2019 | 05:25      | 13.88 | 09:50 | 20.59 | 18.03 | 05:25           | 0.54 | 09:50 | 0.86 | 0.76 | 05:25                     | 0.946 | 09:50 | 2.564 | 1.938 | 1.938 |           |
| 11/21/2019 | 05:40      | 13.81 | 10:10 | 20.70 | 18.02 | 05:40           | 0.53 | 10:10 | 0.87 | 0.76 | 05:40                     | 0.932 | 10:10 | 2.589 | 1.937 | 1.937 |           |
| 11/22/2019 | 05:30      | 13.71 | 10:05 | 20.76 | 18.09 | 05:30           | 0.53 | 10:05 | 0.87 | 0.76 | 05:30                     | 0.912 | 10:05 | 2.603 | 1.953 | 1.953 |           |
| 11/23/2019 | 06:05      | 13.69 | 12:45 | 21.31 | 18.08 | 06:05           | 0.52 | 12:45 | 0.88 | 0.76 | 06:05                     | 0.906 | 12:45 | 2.729 | 1.951 | 1.951 |           |
| 11/24/2019 | 06:25      | 13.67 | 12:30 | 21.38 | 18.19 | 06:25           | 0.52 | 12:30 | 0.88 | 0.76 | 06:25                     | 0.902 | 12:30 | 2.746 | 1.977 | 1.977 |           |
| 11/25/2019 | 05:35      | 13.64 | 09:55 | 20.41 | 17.97 | 05:35           | 0.52 | 09:55 | 0.86 | 0.75 | 05:35                     | 0.897 | 09:55 | 2.520 | 1.925 | 1.925 |           |
| 11/26/2019 | 05:35      | 13.71 | 22:15 | 21.05 | 18.15 | 05:35           | 0.53 | 22:15 | 0.88 | 0.76 | 05:35                     | 0.911 | 22:15 | 2.671 | 1.968 | 1.968 | 0.63      |
| 11/27/2019 | 04:50      | 14.44 | 11:30 | 21.02 | 18.67 | 04:50           | 0.57 | 11:30 | 0.88 | 0.78 | 04:50                     | 1.065 | 11:30 | 2.664 | 2.093 | 2.093 | 0.77      |
| 11/28/2019 | 06:40      | 14.33 | 13:45 | 21.91 | 18.41 | 06:40           | 0.57 | 13:45 | 1.00 | 0.77 | 06:40                     | 1.043 | 13:45 | 3.198 | 2.040 | 2.040 |           |
| 11/29/2019 | 06:20      | 14.05 | 12:50 | 20.54 | 17.82 | 06:20           | 0.55 | 12:50 | 0.86 | 0.75 | 06:20                     | 0.981 | 12:50 | 2.552 | 1.884 | 1.884 | 0.05      |
| 11/30/2019 | 06:00      | 13.99 | 13:50 | 21.00 | 17.98 | 05:40           | 0.51 | 11:55 | 1.06 | 0.79 | 05:40                     | 0.914 | 13:35 | 3.216 | 2.021 | 2.021 | 0.14      |
| 12/01/2019 | 06:35      | 14.06 | 13:45 | 21.12 | 18.38 | 05:15           | 0.53 | 12:35 | 1.09 | 0.83 | 06:35                     | 0.950 | 13:15 | 3.333 | 2.196 | 2.196 | 0.06      |
| 12/02/2019 | 05:35      | 14.07 | 10:05 | 21.27 | 18.67 | 05:45           | 0.51 | 10:10 | 1.11 | 0.84 | 05:45                     | 0.916 | 10:10 | 3.427 | 2.251 | 2.251 | 0.36      |
| 12/03/2019 | 05:35      | 14.37 | 22:15 | 20.89 | 18.45 | 05:25           | 0.57 | 21:35 | 1.08 | 0.84 | 05:25                     | 1.051 | 23:10 | 3.240 | 2.193 | 2.193 |           |
| 12/04/2019 | 04:55      | 14.58 | 22:25 | 21.36 | 18.87 | 04:50           | 0.58 | 22:25 | 1.11 | 0.87 | 04:50                     | 1.091 | 22:25 | 3.446 | 2.348 | 2.348 | 0.44      |
| 12/05/2019 | 05:30      | 14.58 | 10:05 | 21.01 | 18.69 | 05:45           | 0.55 | 10:30 | 1.07 | 0.86 | 05:45                     | 1.039 | 10:30 | 3.235 | 2.303 | 2.303 |           |
| 12/06/2019 | 05:30      | 14.54 | 10:15 | 20.84 | 18.47 | 05:00           | 0.55 | 09:10 | 1.06 | 0.80 | 05:15                     | 1.034 | 09:10 | 3.106 | 2.087 | 2.087 | 0.06      |
| 12/07/2019 | 06:10      | 14.37 | 19:45 | 22.23 | 18.99 | 06:40           | 0.51 | 19:45 | 1.05 | 0.81 | 06:40                     | 0.953 | 19:45 | 3.419 | 2.231 | 2.231 | 0.84      |
| 12/08/2019 | 06:30      | 15.07 | 12:25 | 22.18 | 19.31 | 04:35           | 0.58 | 12:25 | 1.00 | 0.84 | 06:00                     | 1.140 | 12:25 | 3.264 | 2.341 | 2.341 | 0.10      |
| 12/09/2019 | 05:35      | 14.80 | 09:50 | 21.02 | 18.87 | 05:05           | 0.51 | 21:20 | 0.97 | 0.82 | 05:05                     | 0.991 | 22:45 | 2.940 | 2.204 | 2.204 |           |
| 12/10/2019 | 05:35      | 14.64 | 22:50 | 21.07 | 18.60 | 06:00           | 0.52 | 22:30 | 0.98 | 0.81 | 06:00                     | 0.993 | 22:30 | 2.988 | 2.153 | 2.153 | 0.01      |
| 12/11/2019 | 05:25      | 14.61 | 22:55 | 20.85 | 18.60 | 05:05           | 0.50 | 10:25 | 0.96 | 0.80 | 05:20                     | 0.935 | 23:15 | 2.887 | 2.115 | 2.115 | 0.00      |
| 12/12/2019 | 05:35      | 14.43 | 10:00 | 20.73 | 18.44 | 04:45           | 0.50 | 09:20 | 0.96 | 0.80 | 04:45                     | 0.932 | 10:20 | 2.871 | 2.097 | 2.097 |           |
| 12/13/2019 | 05:45      | 14.57 | 09:50 | 20.80 | 18.46 | 04:50           | 0.50 | 10:50 | 0.94 | 0.79 | 05:45                     | 0.932 | 10:50 | 2.815 | 2.078 | 2.078 |           |
| 12/14/2019 | 06:20      | 14.81 | 12:30 | 21.71 | 18.85 | 06:35           | 0.52 | 13:20 | 1.01 | 0.80 | 06:35                     | 1.006 | 13:20 | 3.176 | 2.176 | 2.176 | 0.01      |
| 12/15/2019 | 06:35      | 14.51 | 12:30 | 21.60 | 18.72 | 05:20           | 0.51 | 12:00 | 1.00 | 0.79 | 06:25                     | 0.978 | 12:40 | 3.116 | 2.141 | 2.141 |           |
| 12/16/2019 | 05:35      | 14.52 | 22:40 | 21.09 | 18.64 | 05:35           | 0.58 | 10:15 | 0.98 | 0.81 | 05:35                     | 1.078 | 23:05 | 2.982 | 2.152 | 2.152 |           |
| 12/17/2019 | 05:40      | 14.60 | 22:55 | 20.78 | 18.58 | 05:35           | 0.50 | 09:40 | 0.96 | 0.80 | 05:35                     | 0.935 | 23:20 | 2.876 | 2.127 | 2.127 |           |
| 12/18/2019 | 05:25      | 14.46 | 22:30 | 20.69 | 18.58 | 04:55           | 0.50 | 10:25 | 0.96 | 0.79 | 04:55                     | 0.947 | 10:25 | 2.836 | 2.100 | 2.100 |           |
| 12/19/2019 | 05:35      | 14.39 | 10:00 | 20.84 | 18.55 | 05:55           | 0.50 | 09:40 | 0.94 | 0.78 | 05:55                     | 0.935 | 09:40 | 2.804 | 2.051 | 2.051 |           |
| 12/20/2019 | 05:40      | 14.38 | 10:10 | 20.54 | 18.50 | 05:50           | 0.49 | 10:30 | 0.93 | 0.78 | 05:50                     | 0.899 | 10:30 | 2.739 | 2.039 | 2.039 | 0.02      |
| 12/21/2019 | 06:15      | 14.41 | 12:50 | 21.47 | 18.43 | 06:40           | 0.49 | 11:30 | 0.99 | 0.79 | 06:40                     | 0.906 | 13:20 | 3.084 | 2.093 | 2.093 |           |
| 12/22/2019 | 06:25      | 14.30 | 13:20 | 21.12 | 18.49 | 06:05           | 0.48 | 13:40 | 0.99 | 0.79 | 06:15                     | 0.876 | 13:40 | 3.029 | 2.093 | 2.093 |           |
| 12/23/2019 | 06:00      | 14.63 | 12:50 | 20.84 | 18.53 | 05:35           | 0.50 | 11:25 | 0.96 | 0.78 | 05:40                     | 0.939 | 12:35 | 2.866 | 2.071 | 2.071 |           |
| 12/24/2019 | 06:00      | 14.53 | 13:20 | 20.76 | 18.30 | 07:00           | 0.50 | 12:25 | 0.95 | 0.77 | 07:00                     | 0.941 | 14:05 | 2.826 | 2.004 | 2.004 |           |
| 12/25/2019 | 07:05      | 14.40 | 13:15 | 21.12 | 18.00 | 07:05           | 0.57 | 13:10 | 0.95 | 0.76 | 07:05                     | 1.051 | 13:10 | 2.921 | 1.927 | 1.927 |           |
| 12/26/2019 | 05:55      | 14.29 | 13:00 | 20.76 | 18.16 | 05:55           | 0.56 | 12:25 | 0.97 | 0.77 | 05:55                     | 1.029 | 13:05 | 2.912 | 1.998 | 1.998 |           |
| 12/27/2019 | 05:55      | 14.31 | 12:15 | 20.62 | 18.16 | 04:50           | 0.49 | 12:15 | 0.96 | 0.77 | 05:55                     | 0.893 | 12:15 | 2.860 | 1.998 | 1.998 |           |
| 12/28/2019 | 06:35      | 14.09 | 13:35 | 20.99 | 18.06 | 07:10           | 0.49 | 12:20 | 0.96 | 0.75 | 07:10                     | 0.880 | 12:35 | 2.881 | 1.928 | 1.928 |           |
| 12/29/2019 | 06:30      | 14.06 | 13:20 | 20.82 | 18.02 | 06:25           | 0.46 | 13:40 | 0.96 | 0.75 | 06:25                     | 0.823 | 13:40 | 2.890 | 1.933 | 1.933 |           |
| 12/30/2019 | 05:55      | 14.35 | 12:55 | 20.33 | 18.20 | 05:15           | 0.50 | 12:10 | 0.95 | 0.77 | 05:55                     | 0.913 | 12:10 | 2.767 | 1.991 | 1.991 |           |
| 12/31/2019 | 06:05      | 14.53 | 13:00 | 20.30 | 18.28 | 04:55           | 0.50 | 19:40 | 0.94 | 0.76 | 06:40                     | 0.951 | 19:40 | 2.733 | 1.974 | 1.974 |           |



| Date       | Depth (in) |       |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|-------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min   | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 01/01/2020 | 07:20      | 14.33 | 13:45 | 20.53 | 17.98 | 06:05           | 0.50 | 12:50 | 0.96 | 0.75 | 06:25                     | 0.922 | 13:55 | 2.842 | 1.912 | 1.912 |           |
| 01/02/2020 | 05:50      | 14.22 | 11:50 | 20.44 | 18.11 | 05:40           | 0.50 | 11:45 | 0.94 | 0.76 | 05:40                     | 0.919 | 11:50 | 2.750 | 1.948 | 1.948 |           |
| 01/03/2020 | 05:50      | 14.26 | 12:35 | 20.09 | 18.12 | 05:50           | 0.56 | 12:35 | 0.86 | 0.76 | 05:50                     | 1.023 | 12:35 | 2.472 | 1.960 | 1.960 |           |
| 01/04/2020 | 06:30      | 14.06 | 13:30 | 21.19 | 18.21 | 06:30           | 0.55 | 13:30 | 0.91 | 0.77 | 06:30                     | 0.980 | 13:30 | 2.786 | 1.993 | 1.993 |           |
| 01/05/2020 | 06:45      | 13.97 | 13:15 | 21.14 | 18.39 | 06:20           | 0.46 | 12:45 | 0.91 | 0.77 | 06:20                     | 0.819 | 12:45 | 2.775 | 2.038 | 2.038 |           |
| 01/06/2020 | 05:35      | 13.96 | 22:20 | 20.57 | 18.05 | 05:35           | 0.54 | 22:20 | 0.88 | 0.76 | 05:35                     | 0.960 | 22:20 | 2.607 | 1.945 | 1.945 |           |
| 01/07/2020 | 05:35      | 13.98 | 22:10 | 20.49 | 17.96 | 05:35           | 0.54 | 22:10 | 0.88 | 0.75 | 05:35                     | 0.965 | 22:10 | 2.585 | 1.914 | 1.914 |           |
| 01/08/2020 | 05:50      | 13.98 | 22:20 | 20.50 | 17.98 | 05:50           | 0.54 | 21:55 | 0.92 | 0.75 | 05:50                     | 0.965 | 21:55 | 2.703 | 1.908 | 1.908 |           |
| 01/09/2020 | 05:35      | 14.03 | 22:00 | 20.97 | 18.39 | 05:35           | 0.54 | 21:10 | 0.94 | 0.77 | 05:35                     | 0.974 | 21:20 | 2.859 | 2.032 | 2.032 |           |
| 01/10/2020 | 05:40      | 14.23 | 10:00 | 20.40 | 18.44 | 05:40           | 0.56 | 23:05 | 0.88 | 0.78 | 05:40                     | 1.016 | 10:00 | 2.560 | 2.042 | 2.042 |           |
| 01/11/2020 | 06:20      | 14.26 | 13:30 | 21.59 | 18.52 | 06:30           | 0.49 | 13:30 | 0.92 | 0.78 | 06:30                     | 0.890 | 13:30 | 2.902 | 2.069 | 2.069 |           |
| 01/12/2020 | 06:20      | 14.18 | 12:55 | 21.48 | 18.67 | 06:20           | 0.55 | 13:10 | 0.92 | 0.78 | 06:20                     | 1.006 | 13:10 | 2.869 | 2.111 | 2.111 |           |
| 01/13/2020 | 05:25      | 14.19 | 22:50 | 20.89 | 18.48 | 05:25           | 0.56 | 22:50 | 0.89 | 0.78 | 05:25                     | 1.008 | 22:50 | 2.698 | 2.057 | 2.057 |           |
| 01/14/2020 | 05:45      | 14.42 | 22:20 | 20.92 | 18.42 | 05:45           | 0.57 | 22:20 | 0.89 | 0.78 | 05:45                     | 1.057 | 22:20 | 2.707 | 2.042 | 2.042 |           |
| 01/15/2020 | 05:30      | 13.93 | 22:00 | 20.77 | 18.28 | 05:30           | 0.54 | 19:55 | 0.95 | 0.77 | 05:30                     | 0.956 | 19:55 | 2.723 | 1.998 | 1.998 | 0.10      |
| 01/16/2020 | 05:30      | 14.07 | 22:10 | 21.46 | 18.85 | 03:40           | 0.51 | 20:30 | 0.98 | 0.79 | 05:35                     | 0.934 | 20:30 | 2.975 | 2.130 | 2.130 | 0.66      |
| 01/17/2020 | 05:30      | 14.90 | 10:00 | 21.03 | 18.91 | 03:40           | 0.55 | 10:05 | 0.95 | 0.79 | 04:50                     | 1.115 | 10:05 | 2.890 | 2.145 | 2.145 |           |
| 01/18/2020 | 06:15      | 14.62 | 13:40 | 21.78 | 18.71 | 06:35           | 0.51 | 11:10 | 0.98 | 0.79 | 06:35                     | 0.963 | 11:20 | 2.982 | 2.116 | 2.116 |           |
| 01/19/2020 | 06:30      | 14.32 | 13:00 | 21.43 | 18.49 | 05:25           | 0.49 | 14:20 | 0.98 | 0.78 | 05:25                     | 0.918 | 14:20 | 2.980 | 2.074 | 2.074 |           |
| 01/20/2020 | 06:00      | 14.37 | 13:45 | 21.42 | 18.85 | 04:05           | 0.52 | 22:00 | 0.99 | 0.80 | 04:10                     | 1.017 | 22:00 | 3.042 | 2.167 | 2.167 |           |
| 01/21/2020 | 05:35      | 14.26 | 22:45 | 20.98 | 18.47 | 05:30           | 0.47 | 09:35 | 0.96 | 0.78 | 05:30                     | 0.863 | 21:50 | 2.846 | 2.050 | 2.050 | 0.01      |
| 01/22/2020 | 05:45      | 14.24 | 22:30 | 21.20 | 18.58 | 04:55           | 0.49 | 21:20 | 0.97 | 0.78 | 06:00                     | 0.905 | 21:20 | 2.956 | 2.071 | 2.071 | 0.09      |
| 01/23/2020 | 05:40      | 14.23 | 10:00 | 21.02 | 18.50 | 05:45           | 0.48 | 22:45 | 0.97 | 0.78 | 05:45                     | 0.879 | 22:45 | 2.893 | 2.049 | 2.049 |           |
| 01/24/2020 | 05:50      | 14.12 | 12:00 | 20.91 | 18.63 | 05:10           | 0.49 | 10:45 | 0.96 | 0.80 | 05:10                     | 0.884 | 10:45 | 2.847 | 2.122 | 2.122 |           |
| 01/25/2020 | 06:15      | 14.09 | 13:15 | 21.03 | 18.17 | 07:20           | 0.52 | 12:55 | 0.97 | 0.78 | 07:20                     | 0.970 | 12:55 | 2.935 | 2.003 | 2.003 |           |
| 01/26/2020 | 06:15      | 13.91 | 13:30 | 21.20 | 18.32 | 05:15           | 0.47 | 13:45 | 0.99 | 0.79 | 05:15                     | 0.846 | 13:45 | 3.036 | 2.075 | 2.075 | 0.16      |
| 01/27/2020 | 05:40      | 13.88 | 21:55 | 21.17 | 18.27 | 05:40           | 0.54 | 22:45 | 0.97 | 0.77 | 05:40                     | 0.946 | 22:45 | 2.982 | 1.996 | 1.996 |           |
| 01/28/2020 | 05:20      | 14.11 | 21:50 | 21.09 | 18.40 | 04:15           | 0.52 | 22:15 | 0.98 | 0.79 | 05:20                     | 0.952 | 22:15 | 2.987 | 2.061 | 2.061 | 0.02      |
| 01/29/2020 | 05:30      | 14.06 | 22:20 | 21.11 | 18.38 | 05:15           | 0.57 | 21:35 | 0.98 | 0.79 | 05:15                     | 1.015 | 21:35 | 2.975 | 2.074 | 2.074 |           |
| 01/30/2020 | 05:35      | 14.00 | 22:15 | 21.00 | 18.27 | 05:20           | 0.54 | 23:00 | 0.98 | 0.79 | 05:20                     | 0.968 | 23:00 | 2.946 | 2.050 | 2.050 |           |
| 01/31/2020 | 05:35      | 13.96 | 10:05 | 20.42 | 18.29 | 04:35           | 0.49 | 09:40 | 0.95 | 0.78 | 05:30                     | 0.885 | 09:40 | 2.757 | 2.035 | 2.035 | 0.01      |
| 02/01/2020 | 06:15      | 14.11 | 12:05 | 21.13 | 18.31 | 05:40           | 0.50 | 14:35 | 0.98 | 0.78 | 05:40                     | 0.903 | 12:30 | 2.973 | 2.051 | 2.051 |           |
| 02/02/2020 | 06:30      | 13.83 | 13:30 | 21.92 | 18.34 | 05:50           | 0.48 | 15:05 | 0.99 | 0.78 | 05:50                     | 0.845 | 14:10 | 3.084 | 2.068 | 2.068 |           |
| 02/03/2020 | 05:30      | 13.88 | 22:25 | 20.98 | 18.34 | 04:45           | 0.48 | 09:50 | 0.95 | 0.78 | 04:45                     | 0.852 | 22:35 | 2.819 | 2.031 | 2.031 |           |
| 02/04/2020 | 05:45      | 13.83 | 10:10 | 21.72 | 18.50 | 04:10           | 0.47 | 10:35 | 0.99 | 0.78 | 05:40                     | 0.839 | 10:05 | 3.098 | 2.061 | 2.061 |           |
| 02/05/2020 | 05:30      | 13.84 | 22:15 | 20.86 | 18.19 | 05:50           | 0.45 | 09:45 | 0.96 | 0.77 | 05:50                     | 0.797 | 09:45 | 2.820 | 1.988 | 1.988 |           |
| 02/06/2020 | 05:35      | 13.79 | 10:25 | 21.37 | 18.51 | 06:05           | 0.50 | 10:00 | 0.96 | 0.78 | 06:05                     | 0.880 | 10:00 | 2.988 | 2.075 | 2.075 |           |
| 02/07/2020 | 05:35      | 13.97 | 12:10 | 21.45 | 18.56 | 04:25           | 0.48 | 11:25 | 0.98 | 0.79 | 04:25                     | 0.873 | 11:25 | 3.000 | 2.101 | 2.101 |           |
| 02/08/2020 | 06:05      | 13.98 | 12:50 | 21.28 | 18.29 | 05:20           | 0.48 | 12:20 | 0.97 | 0.77 | 05:20                     | 0.862 | 12:50 | 3.008 | 2.003 | 2.003 |           |
| 02/09/2020 | 06:30      | 13.68 | 12:50 | 21.39 | 18.35 | 05:30           | 0.48 | 12:55 | 0.97 | 0.77 | 05:30                     | 0.849 | 12:55 | 3.015 | 2.027 | 2.027 |           |
| 02/10/2020 | 05:45      | 13.91 | 10:35 | 21.64 | 18.34 | 04:50           | 0.47 | 09:30 | 0.98 | 0.77 | 04:50                     | 0.846 | 10:55 | 3.022 | 2.024 | 2.024 |           |
| 02/11/2020 | 05:40      | 13.93 | 22:20 | 20.89 | 18.30 | 05:45           | 0.46 | 22:45 | 0.96 | 0.78 | 05:45                     | 0.815 | 22:45 | 2.874 | 2.030 | 2.030 |           |
| 02/12/2020 | 05:20      | 13.87 | 22:25 | 20.89 | 18.28 | 04:10           | 0.48 | 22:45 | 0.98 | 0.78 | 04:10                     | 0.875 | 22:45 | 2.948 | 2.044 | 2.044 |           |
| 02/13/2020 | 05:45      | 13.77 | 10:00 | 20.68 | 18.17 | 05:10           | 0.44 | 10:15 | 0.97 | 0.79 | 05:10                     | 0.777 | 10:15 | 2.874 | 2.048 | 2.048 |           |
| 02/14/2020 | 05:40      | 13.90 | 10:15 | 20.40 | 18.17 | 04:55           | 0.56 | 09:55 | 0.95 | 0.80 | 04:55                     | 0.994 | 09:55 | 2.789 | 2.052 | 2.052 |           |
| 02/15/2020 | 06:20      | 13.69 | 12:55 | 21.28 | 17.98 | 05:20           | 0.48 | 12:20 | 0.98 | 0.77 | 05:20                     | 0.842 | 13:05 | 3.009 | 1.979 | 1.979 |           |
| 02/16/2020 | 06:50      | 13.59 | 13:00 | 21.00 | 17.91 | 05:55           | 0.46 | 12:10 | 0.96 | 0.76 | 05:55                     | 0.799 | 13:10 | 2.910 | 1.933 | 1.933 |           |
| 02/17/2020 | 05:50      | 13.62 | 13:05 | 20.97 | 17.99 | 06:10           | 0.47 | 13:30 | 0.95 | 0.75 | 06:10                     | 0.812 | 13:30 | 2.883 | 1.931 | 1.931 |           |
| 02/18/2020 | 05:35      | 13.73 | 22:05 | 20.32 | 18.02 | 05:30           | 0.46 | 11:05 | 0.92 | 0.75 | 05:30                     | 0.803 | 11:05 | 2.610 | 1.915 | 1.915 |           |
| 02/19/2020 | 05:45      | 13.82 | 23:05 | 20.49 | 18.19 | 06:10           | 0.47 | 22:50 | 0.94 | 0.75 | 06:10                     | 0.842 | 22:50 | 2.761 | 1.954 | 1.954 |           |
| 02/20/2020 | 05:35      | 13.96 | 11:40 | 20.35 | 18.22 | 04:55           | 0.46 | 09:55 | 0.93 | 0.76 | 04:55                     | 0.831 | 21:00 | 2.643 | 1.960 | 1.960 |           |
| 02/21/2020 | 05:25      | 13.73 | 11:25 | 20.49 | 18.03 | 04:50           | 0.45 | 19:35 | 0.90 | 0.74 | 05:45                     | 0.790 | 12:15 | 2.604 | 1.900 | 1.900 |           |
| 02/22/2020 | 06:25      | 13.70 | 12:30 | 21.74 | 18.19 | 05:35           | 0.46 | 12:10 | 1.00 | 0.75 | 05:35                     | 0.807 | 12:10 | 3.175 | 1.960 | 1.960 |           |
| 02/23/2020 | 06:45      | 13.60 | 12:35 | 21.39 | 18.40 | 07:10           | 0.44 | 22:35 | 0.97 | 0.77 | 07:10                     | 0.761 | 22:35 | 2.966 | 2.056 | 2.056 |           |
| 02/24/2020 | 05:40      | 13.65 | 22:10 | 20.68 | 18.25 | 05:15           | 0.45 | 22:20 | 0.97 | 0.77 | 05:15                     | 0.772 | 22:20 | 2.887 | 2.006 | 2.006 |           |

| Date       | Depth (in) |       |       |       |       | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|-------|-------|-------|-------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min   | Time  | Max   | Avg   | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 05:25      | 13.72 | 22:30 | 20.76 | 18.16 | 06:10           | 0.53 | 22:20 | 0.98 | 0.78 | 06:10                     | 0.935 | 22:20 | 2.919 | 2.022 | 2.022 | 0.01      |
| 02/26/2020 | 05:45      | 13.85 | 09:50 | 20.90 | 18.24 | 05:55           | 0.54 | 23:15 | 0.97 | 0.79 | 05:55                     | 0.944 | 23:15 | 2.918 | 2.059 | 2.059 |           |
| 02/27/2020 | 06:05      | 13.77 | 09:45 | 20.68 | 18.24 | 06:35           | 0.55 | 09:50 | 0.97 | 0.80 | 06:35                     | 0.986 | 09:50 | 2.898 | 2.065 | 2.065 |           |
| 02/28/2020 | 05:25      | 13.79 | 10:05 | 20.86 | 18.29 | 04:10           | 0.48 | 20:20 | 0.93 | 0.76 | 04:10                     | 0.857 | 09:25 | 2.706 | 1.985 | 1.985 |           |
| 02/29/2020 | 06:40      | 13.81 | 12:30 | 21.47 | 18.32 | 06:45           | 0.45 | 11:55 | 0.99 | 0.76 | 06:45                     | 0.781 | 11:55 | 3.083 | 2.008 | 2.008 |           |
| 03/01/2020 | 06:35      | 13.50 | 13:05 | 21.27 | 18.34 | 05:40           | 0.46 | 13:05 | 0.99 | 0.78 | 05:40                     | 0.787 | 13:05 | 3.052 | 2.064 | 2.064 |           |
| 03/02/2020 | 05:35      | 13.63 | 11:30 | 21.72 | 18.55 | 05:05           | 0.45 | 23:10 | 0.98 | 0.78 | 05:05                     | 0.772 | 11:05 | 3.028 | 2.081 | 2.081 |           |
| 03/03/2020 | 05:40      | 13.94 | 10:10 | 21.48 | 18.22 | 05:05           | 0.51 | 09:45 | 1.00 | 0.78 | 05:05                     | 0.906 | 10:05 | 3.126 | 2.016 | 2.016 |           |
| 03/04/2020 | 05:30      | 13.49 | 22:20 | 20.92 | 18.10 | 04:40           | 0.43 | 10:05 | 0.97 | 0.77 | 04:40                     | 0.744 | 10:05 | 2.906 | 1.981 | 1.981 |           |
| 03/05/2020 | 05:50      | 13.72 | 09:45 | 20.67 | 18.04 | 06:10           | 0.46 | 09:50 | 0.97 | 0.78 | 06:10                     | 0.799 | 09:50 | 2.897 | 2.003 | 2.003 |           |
| 03/06/2020 | 05:40      | 13.56 | 14:05 | 20.51 | 18.19 | 06:30           | 0.53 | 14:15 | 0.96 | 0.78 | 06:30                     | 0.939 | 14:15 | 2.840 | 2.017 | 2.017 | 0.58      |
| 03/07/2020 | 05:45      | 13.50 | 13:10 | 21.42 | 18.27 | 03:50           | 0.48 | 13:20 | 1.00 | 0.77 | 05:45                     | 0.868 | 13:20 | 3.120 | 2.037 | 2.037 |           |
| 03/08/2020 | 06:05      | 13.77 | 13:20 | 21.37 | 18.58 | 07:00           | 0.51 | 14:45 | 0.98 | 0.79 | 07:00                     | 0.913 | 13:40 | 3.000 | 2.113 | 2.113 | 0.02      |
| 03/09/2020 | 04:10      | 13.82 | 10:55 | 21.69 | 18.65 | 04:10           | 0.53 | 20:45 | 0.98 | 0.78 | 04:10                     | 0.934 | 20:45 | 2.985 | 2.091 | 2.090 | 0.11      |

#### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 234.802                   | 5.26      |
| Avg   | 18.34      | 0.78            | 2.042                     |           |

## Site Commentary

### Site Information

| MIL_2808        |       |
|-----------------|-------|
| Pipe Dimensions | 36    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2808 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020 . This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that free flow conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed downstream of sites MIL\_0229 and MIL\_0715. A review of balancing shows a net flow of 0.938 MGD between the sites.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020 , along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                   |                  |
|--------------------------|--------------------|-------------------|------------------|
| Item                     | Depth (in)         | Velocity (ft/s)   | Quantity (MGD)   |
| Average                  | 8.74               | 2.26              | 2.009            |
| Minimum                  | 5.84               | 1.16              | 0.567            |
| Maximum                  | 11.20              | 3.09              | 3.591            |
| Time of Minimum          | 1/5/2020 6:30 AM   | 1/4/2020 6:30 AM  | 1/4/2020 6:30 AM |
| Time of Maximum          | 12/23/2019 2:10 PM | 1/23/2020 9:45 AM | 3/4/2020 9:55 AM |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_2808

Site Address /Location: N McCarthy Blvd and Ranch Dr, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.433534°

Longitude:

-121.922138°

Pipe Size (H x W)

36.00"x36.00"

Pipe Shape

Circular

Manhole #

2808

System Characteristics

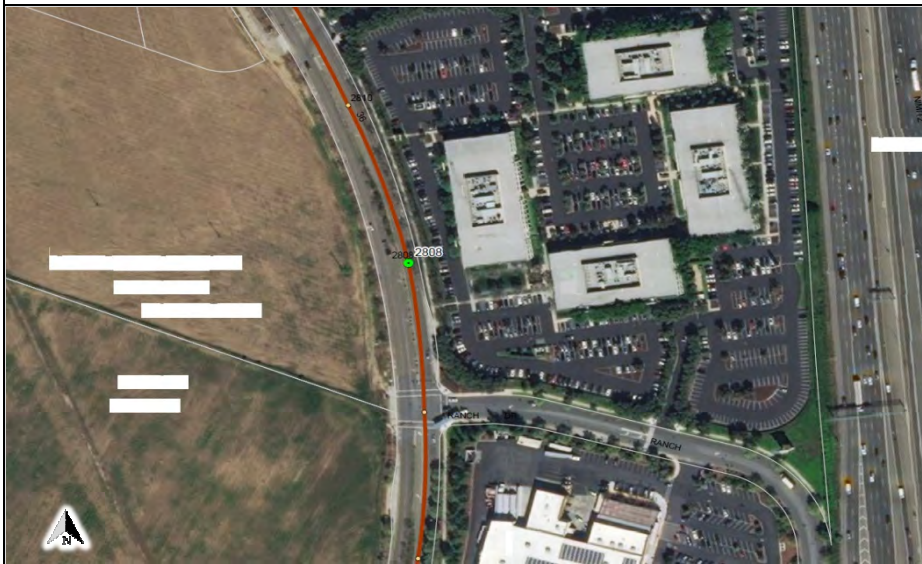
Residential/Commercial

Access

Traffic

Drive

Heavy



### Installation Information

Installation Date:

Wednesday, November 13, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

12:08:00 AM

Pipe Size (HxW)

36.00"x36.00"

Depth of Flow (Wet DOF) (in)

11.25"

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

2.45'

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Smooth flow with deep depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

12'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

931

ADS Project Name: Milpitas.WWTFM.CA2019-2020

ADS Project Number: 22431.11.325

# SCATTERGRAPH REPORT

MIL\_2808

Flow Monitor

**MIL\_2808**

Pipe Height  
36.00 in

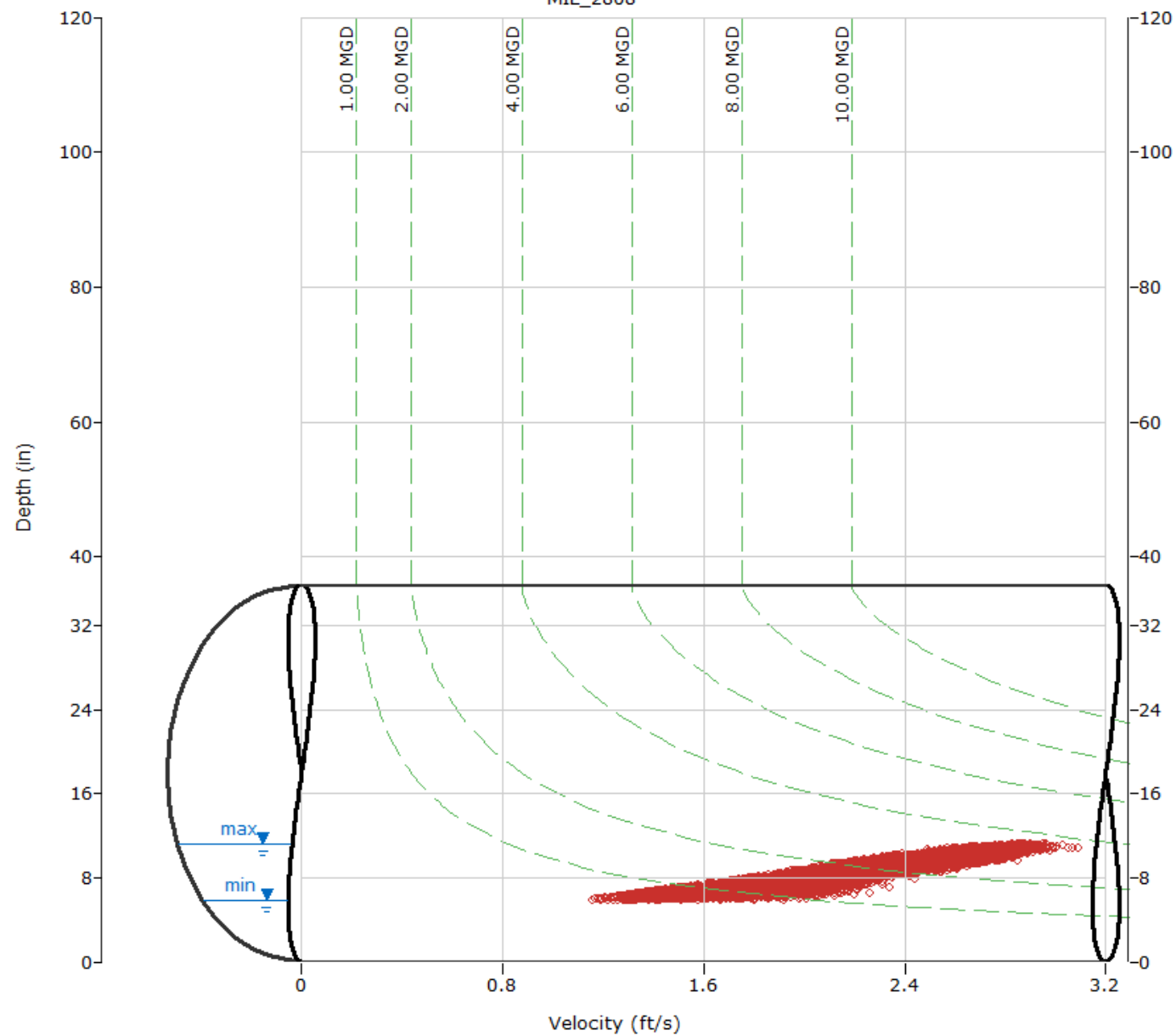
Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth

**ADS** ENVIRONMENTAL  
SERVICES

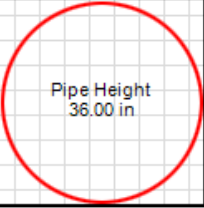




# HYDROGRAPH REPORT

MIL\_2808

Flow Monitor  
**MIL\_2808**

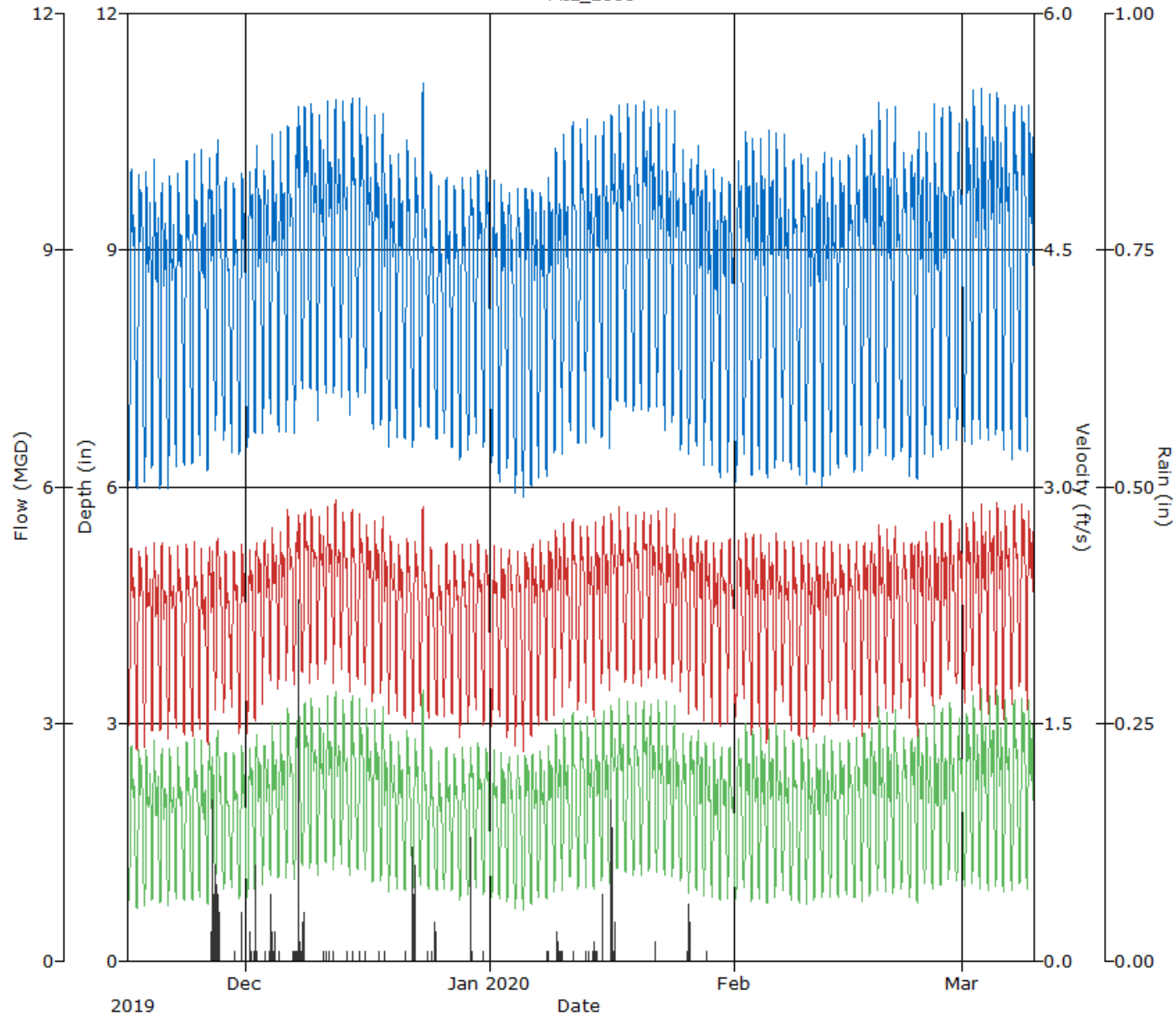


Pipe Height  
36.00 in

Report Period  
11/16/2019  
To  
3/9/2020

Legend  

- Depth
- Velocity
- Quantity
- Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2808, Pipe Height: 36.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |      |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |      |
| 11/16/2019 | 06:00      | 6.05 | 13:00 | 10.14 | 8.37 | 05:20           | 1.25 | 13:30 | 2.73 | 2.15 | 06:00                     | 0.638 | 13:30 | 2.852 | 1.816 | 1.816 |           |      |
| 11/17/2019 | 06:25      | 5.94 | 12:50 | 10.15 | 8.39 | 06:10           | 1.19 | 20:00 | 2.70 | 2.12 | 06:10                     | 0.593 | 12:55 | 2.766 | 1.812 | 1.812 |           |      |
| 11/18/2019 | 05:25      | 6.04 | 10:05 | 10.08 | 8.43 | 04:45           | 1.23 | 09:20 | 2.74 | 2.14 | 04:45                     | 0.632 | 09:55 | 2.810 | 1.819 | 1.819 |           |      |
| 11/19/2019 | 04:40      | 6.18 | 09:55 | 10.21 | 8.48 | 04:35           | 1.31 | 10:55 | 2.84 | 2.17 | 04:35                     | 0.686 | 10:55 | 2.954 | 1.848 | 1.848 |           |      |
| 11/20/2019 | 06:00      | 5.93 | 10:10 | 9.95  | 8.35 | 06:10           | 1.27 | 11:00 | 2.75 | 2.15 | 06:10                     | 0.625 | 11:00 | 2.777 | 1.794 | 1.794 |           |      |
| 11/21/2019 | 06:05      | 5.93 | 10:25 | 10.00 | 8.40 | 05:50           | 1.17 | 09:25 | 2.67 | 2.15 | 05:55                     | 0.580 | 10:25 | 2.715 | 1.814 | 1.814 |           |      |
| 11/22/2019 | 05:35      | 6.19 | 12:05 | 10.05 | 8.47 | 05:30           | 1.26 | 10:10 | 2.76 | 2.17 | 05:30                     | 0.660 | 10:10 | 2.863 | 1.845 | 1.845 |           |      |
| 11/23/2019 | 06:05      | 6.26 | 13:10 | 10.24 | 8.52 | 07:20           | 1.31 | 12:35 | 2.75 | 2.14 | 07:20                     | 0.705 | 12:35 | 2.910 | 1.846 | 1.846 |           |      |
| 11/24/2019 | 07:00      | 6.23 | 13:10 | 10.38 | 8.54 | 07:05           | 1.31 | 11:45 | 2.78 | 2.12 | 07:05                     | 0.694 | 13:00 | 2.939 | 1.843 | 1.843 |           |      |
| 11/25/2019 | 06:40      | 6.37 | 10:45 | 10.35 | 8.57 | 05:35           | 1.33 | 10:45 | 2.69 | 2.10 | 05:35                     | 0.738 | 10:45 | 2.921 | 1.818 | 1.818 |           |      |
| 11/26/2019 | 05:50      | 6.17 | 11:05 | 10.22 | 8.58 | 06:25           | 1.26 | 21:50 | 2.71 | 2.14 | 06:25                     | 0.664 | 10:55 | 2.869 | 1.870 | 1.870 | 0.36      |      |
| 11/27/2019 | 05:40      | 6.69 | 11:15 | 10.47 | 8.78 | 05:00           | 1.45 | 12:10 | 2.76 | 2.25 | 05:10                     | 0.855 | 11:15 | 2.981 | 2.001 | 2.001 | 0.63      |      |
| 11/28/2019 | 07:25      | 6.55 | 13:50 | 9.99  | 8.33 | 07:00           | 1.43 | 12:55 | 2.66 | 2.12 | 07:00                     | 0.818 | 13:00 | 2.723 | 1.745 | 1.745 |           |      |
| 11/29/2019 | 07:00      | 6.39 | 12:30 | 9.90  | 8.35 | 05:45           | 1.35 | 12:35 | 2.72 | 2.17 | 05:45                     | 0.763 | 12:35 | 2.746 | 1.795 | 1.795 |           | 0.02 |
| 11/30/2019 | 06:35      | 6.39 | 13:55 | 10.16 | 8.43 | 07:30           | 1.34 | 14:30 | 2.74 | 2.14 | 07:30                     | 0.747 | 13:50 | 2.859 | 1.811 | 1.811 |           | 0.10 |
| 12/01/2019 | 07:50      | 6.47 | 13:55 | 10.08 | 8.53 | 07:25           | 1.34 | 15:25 | 2.75 | 2.14 | 07:25                     | 0.754 | 15:25 | 2.854 | 1.843 | 1.843 |           | 0.06 |
| 12/02/2019 | 06:25      | 6.62 | 10:35 | 10.40 | 8.73 | 06:10           | 1.40 | 11:25 | 2.72 | 2.23 | 06:10                     | 0.814 | 10:35 | 2.955 | 1.973 | 1.973 |           | 0.30 |
| 12/03/2019 | 05:30      | 6.66 | 10:50 | 10.05 | 8.77 | 05:15           | 1.42 | 22:20 | 2.80 | 2.29 | 05:15                     | 0.827 | 11:55 | 2.782 | 2.031 | 2.031 |           | 0.01 |
| 12/04/2019 | 05:00      | 6.81 | 10:25 | 10.54 | 8.95 | 05:00           | 1.54 | 09:55 | 2.83 | 2.35 | 05:00                     | 0.926 | 10:25 | 3.108 | 2.137 | 2.137 |           | 0.39 |
| 12/05/2019 | 05:20      | 6.68 | 10:35 | 10.54 | 8.92 | 04:45           | 1.53 | 09:40 | 2.89 | 2.35 | 04:45                     | 0.901 | 09:40 | 3.117 | 2.130 | 2.130 |           | 0.01 |
| 12/06/2019 | 05:30      | 6.65 | 10:40 | 10.64 | 8.98 | 05:25           | 1.45 | 10:20 | 2.98 | 2.39 | 05:25                     | 0.844 | 10:20 | 3.330 | 2.188 | 2.188 |           | 0.01 |
| 12/07/2019 | 05:55      | 6.66 | 20:00 | 10.89 | 9.09 | 06:10           | 1.48 | 19:15 | 2.94 | 2.38 | 06:10                     | 0.863 | 20:10 | 3.399 | 2.241 | 2.241 |           | 0.67 |
| 12/08/2019 | 06:45      | 7.19 | 12:10 | 10.89 | 9.28 | 06:55           | 1.61 | 14:25 | 3.00 | 2.39 | 06:55                     | 1.049 | 14:25 | 3.449 | 2.299 | 2.299 | 0.20      |      |
| 12/09/2019 | 06:20      | 7.20 | 10:20 | 10.91 | 9.23 | 04:40           | 1.58 | 10:15 | 2.95 | 2.40 | 04:50                     | 1.040 | 10:15 | 3.444 | 2.274 | 2.274 |           |      |
| 12/10/2019 | 05:25      | 6.83 | 11:00 | 10.76 | 9.18 | 04:35           | 1.47 | 10:40 | 2.92 | 2.43 | 04:35                     | 0.907 | 10:40 | 3.336 | 2.287 | 2.287 |           |      |
| 12/11/2019 | 06:10      | 7.14 | 09:55 | 10.95 | 9.28 | 04:35           | 1.68 | 10:30 | 2.99 | 2.44 | 05:10                     | 1.106 | 10:30 | 3.491 | 2.323 | 2.323 |           | 0.03 |
| 12/12/2019 | 04:55      | 7.14 | 09:50 | 10.96 | 9.32 | 04:00           | 1.63 | 09:25 | 3.07 | 2.44 | 04:55                     | 1.093 | 09:25 | 3.534 | 2.341 | 2.341 |           | 0.01 |
| 12/13/2019 | 05:50      | 7.09 | 10:20 | 10.97 | 9.25 | 05:05           | 1.65 | 10:10 | 2.93 | 2.42 | 05:05                     | 1.073 | 10:10 | 3.421 | 2.297 | 2.297 |           | 0.01 |
| 12/14/2019 | 06:40      | 6.86 | 13:35 | 10.99 | 9.18 | 05:55           | 1.49 | 13:20 | 2.98 | 2.36 | 05:55                     | 0.923 | 13:20 | 3.493 | 2.240 | 2.240 |           | 0.01 |
| 12/15/2019 | 07:05      | 7.08 | 13:05 | 11.02 | 9.25 | 07:20           | 1.55 | 13:25 | 2.96 | 2.37 | 07:20                     | 0.990 | 13:25 | 3.491 | 2.269 | 2.269 |           | 0.01 |
| 12/16/2019 | 06:00      | 7.11 | 10:50 | 10.97 | 9.20 | 05:55           | 1.57 | 10:10 | 2.90 | 2.36 | 05:55                     | 1.005 | 10:10 | 3.321 | 2.228 | 2.228 |           | 0.01 |
| 12/17/2019 | 04:55      | 6.71 | 10:45 | 10.78 | 9.08 | 04:50           | 1.49 | 10:15 | 2.93 | 2.35 | 04:50                     | 0.880 | 10:15 | 3.330 | 2.192 | 2.192 |           | 0.01 |
| 12/18/2019 | 05:30      | 6.76 | 10:30 | 10.78 | 9.00 | 04:50           | 1.44 | 10:45 | 2.91 | 2.33 | 04:50                     | 0.870 | 09:55 | 3.303 | 2.141 | 2.141 |           | 0.01 |
| 12/19/2019 | 05:00      | 6.48 | 10:20 | 10.41 | 8.76 | 05:45           | 1.35 | 10:10 | 2.80 | 2.27 | 05:45                     | 0.762 | 10:25 | 3.041 | 2.015 | 2.015 |           |      |
| 12/20/2019 | 06:25      | 6.60 | 11:00 | 10.32 | 8.75 | 06:50           | 1.39 | 10:05 | 2.79 | 2.23 | 06:50                     | 0.802 | 10:05 | 2.873 | 1.980 | 1.980 |           |      |
| 12/21/2019 | 07:05      | 6.57 | 13:30 | 10.48 | 8.66 | 05:30           | 1.42 | 13:25 | 2.72 | 2.23 | 05:30                     | 0.815 | 13:30 | 3.007 | 1.954 | 1.954 |           | 0.01 |
| 12/22/2019 | 06:30      | 6.47 | 14:50 | 10.27 | 8.67 | 07:15           | 1.39 | 14:45 | 2.78 | 2.22 | 07:15                     | 0.803 | 14:45 | 2.968 | 1.955 | 1.955 |           | 0.41 |
| 12/23/2019 | 06:25      | 6.74 | 14:10 | 11.20 | 8.83 | 06:00           | 1.43 | 12:55 | 2.97 | 2.25 | 06:15                     | 0.850 | 14:15 | 3.580 | 2.042 | 2.042 |           |      |
| 12/24/2019 | 06:45      | 6.73 | 12:50 | 10.04 | 8.48 | 06:00           | 1.45 | 13:40 | 2.70 | 2.16 | 06:00                     | 0.858 | 14:00 | 2.787 | 1.825 | 1.825 |           | 0.02 |
| 12/25/2019 | 06:35      | 6.58 | 13:35 | 9.84  | 8.22 | 05:25           | 1.39 | 13:15 | 2.65 | 2.07 | 06:25                     | 0.798 | 13:20 | 2.665 | 1.674 | 1.674 |           | 0.08 |
| 12/26/2019 | 06:10      | 6.67 | 13:40 | 9.99  | 8.46 | 05:50           | 1.47 | 13:00 | 2.71 | 2.17 | 05:50                     | 0.866 | 13:50 | 2.773 | 1.834 | 1.834 |           |      |
| 12/27/2019 | 05:40      | 6.46 | 13:30 | 9.86  | 8.40 | 04:50           | 1.38 | 12:45 | 2.79 | 2.16 | 06:20                     | 0.772 | 12:45 | 2.809 | 1.814 | 1.814 |           |      |
| 12/28/2019 | 06:45      | 6.31 | 13:00 | 9.98  | 8.35 | 06:20           | 1.30 | 14:10 | 2.73 | 2.13 | 06:20                     | 0.706 | 14:10 | 2.800 | 1.786 | 1.786 |           |      |
| 12/29/2019 | 06:15      | 6.44 | 13:55 | 10.02 | 8.48 | 06:05           | 1.33 | 13:05 | 2.72 | 2.16 | 06:05                     | 0.744 | 12:50 | 2.775 | 1.849 | 1.849 | 0.22      |      |
| 12/30/2019 | 06:20      | 6.66 | 12:55 | 10.11 | 8.63 | 06:20           | 1.41 | 13:15 | 2.77 | 2.21 | 06:20                     | 0.820 | 13:15 | 2.897 | 1.916 | 1.916 |           |      |
| 12/31/2019 | 06:25      | 6.46 | 13:30 | 10.04 | 8.59 | 06:35           | 1.35 | 14:20 | 2.76 | 2.18 | 06:35                     | 0.753 | 14:20 | 2.838 | 1.892 | 1.892 |           |      |

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 01/01/2020 | 07:55      | 6.27 | 14:00 | 9.92  | 8.26 | 07:10           | 1.33 | 14:50 | 2.71 | 2.12 | 07:10                     | 0.722 | 14:50 | 2.744 | 1.741 | 1.741 |           |
| 01/02/2020 | 05:30      | 6.04 | 11:50 | 9.90  | 8.35 | 05:35           | 1.35 | 11:55 | 2.77 | 2.17 | 05:35                     | 0.686 | 11:55 | 2.825 | 1.812 | 1.812 |           |
| 01/03/2020 | 06:20      | 6.20 | 11:50 | 9.83  | 8.36 | 07:10           | 1.31 | 11:10 | 2.69 | 2.16 | 06:25                     | 0.700 | 13:20 | 2.681 | 1.806 | 1.806 |           |
| 01/04/2020 | 06:30      | 5.90 | 13:35 | 9.84  | 8.18 | 06:30           | 1.16 | 13:50 | 2.71 | 2.10 | 06:30                     | 0.567 | 13:50 | 2.720 | 1.722 | 1.722 |           |
| 01/05/2020 | 06:30      | 5.84 | 14:30 | 9.84  | 8.22 | 07:30           | 1.19 | 13:30 | 2.70 | 2.12 | 07:30                     | 0.578 | 13:30 | 2.699 | 1.753 | 1.753 |           |
| 01/06/2020 | 06:05      | 5.92 | 11:00 | 9.83  | 8.32 | 06:05           | 1.18 | 11:00 | 2.73 | 2.17 | 06:05                     | 0.579 | 11:00 | 2.760 | 1.810 | 1.810 |           |
| 01/07/2020 | 06:05      | 6.01 | 09:45 | 9.79  | 8.40 | 05:15           | 1.29 | 10:25 | 2.73 | 2.22 | 06:20                     | 0.673 | 10:25 | 2.713 | 1.863 | 1.863 |           |
| 01/08/2020 | 06:00      | 6.04 | 10:20 | 9.98  | 8.48 | 06:05           | 1.24 | 10:20 | 2.78 | 2.25 | 06:05                     | 0.628 | 10:20 | 2.871 | 1.923 | 1.923 | 0.02      |
| 01/09/2020 | 06:10      | 6.39 | 09:50 | 10.41 | 8.71 | 04:10           | 1.40 | 09:50 | 2.87 | 2.30 | 04:10                     | 0.795 | 09:50 | 3.143 | 2.028 | 2.028 | 0.18      |
| 01/10/2020 | 05:25      | 6.39 | 10:45 | 10.55 | 8.74 | 04:25           | 1.37 | 10:20 | 2.84 | 2.32 | 04:25                     | 0.785 | 11:15 | 3.111 | 2.049 | 2.049 | 0.02      |
| 01/11/2020 | 05:55      | 6.70 | 13:45 | 10.74 | 8.83 | 04:35           | 1.55 | 13:05 | 2.86 | 2.34 | 05:05                     | 0.911 | 13:25 | 3.222 | 2.096 | 2.096 | 0.01      |
| 01/12/2020 | 06:05      | 6.47 | 14:15 | 10.64 | 8.83 | 05:05           | 1.38 | 12:10 | 2.86 | 2.29 | 05:05                     | 0.794 | 12:10 | 3.162 | 2.077 | 2.077 |           |
| 01/13/2020 | 06:00      | 6.48 | 10:25 | 10.69 | 8.85 | 05:00           | 1.46 | 14:25 | 2.85 | 2.29 | 06:00                     | 0.820 | 10:35 | 3.182 | 2.065 | 2.065 | 0.02      |
| 01/14/2020 | 04:55      | 6.71 | 10:45 | 10.56 | 8.87 | 05:05           | 1.41 | 10:30 | 2.87 | 2.31 | 05:05                     | 0.831 | 10:45 | 3.173 | 2.086 | 2.086 | 0.11      |
| 01/15/2020 | 06:00      | 6.55 | 10:05 | 10.68 | 8.91 | 03:20           | 1.57 | 10:20 | 2.85 | 2.35 | 06:25                     | 0.919 | 10:20 | 3.222 | 2.129 | 2.129 | 0.07      |
| 01/16/2020 | 05:25      | 6.46 | 13:55 | 10.84 | 9.17 | 05:00           | 1.47 | 10:15 | 2.94 | 2.40 | 05:00                     | 0.823 | 10:15 | 3.346 | 2.279 | 2.279 | 0.66      |
| 01/17/2020 | 04:50      | 7.02 | 10:50 | 10.91 | 9.27 | 04:00           | 1.55 | 10:15 | 2.93 | 2.42 | 04:00                     | 1.004 | 10:15 | 3.391 | 2.314 | 2.314 |           |
| 01/18/2020 | 07:10      | 6.95 | 12:55 | 10.94 | 9.08 | 07:15           | 1.62 | 12:30 | 2.95 | 2.35 | 07:15                     | 1.002 | 12:30 | 3.418 | 2.189 | 2.189 |           |
| 01/19/2020 | 06:00      | 6.94 | 12:55 | 10.92 | 9.09 | 06:30           | 1.48 | 12:05 | 2.91 | 2.35 | 06:30                     | 0.913 | 12:05 | 3.380 | 2.194 | 2.194 |           |
| 01/20/2020 | 05:55      | 6.97 | 14:25 | 10.97 | 9.18 | 05:30           | 1.55 | 13:45 | 2.94 | 2.37 | 05:30                     | 0.972 | 14:30 | 3.450 | 2.254 | 2.254 |           |
| 01/21/2020 | 05:55      | 6.94 | 10:30 | 10.83 | 9.19 | 04:30           | 1.61 | 10:55 | 2.90 | 2.39 | 04:30                     | 1.008 | 10:55 | 3.309 | 2.261 | 2.261 |           |
| 01/22/2020 | 05:20      | 6.98 | 10:20 | 10.89 | 9.16 | 04:45           | 1.58 | 10:35 | 2.92 | 2.38 | 04:45                     | 1.012 | 10:30 | 3.389 | 2.236 | 2.236 | 0.03      |
| 01/23/2020 | 05:15      | 6.70 | 09:55 | 10.95 | 9.03 | 04:45           | 1.58 | 09:45 | 3.09 | 2.38 | 05:00                     | 0.931 | 09:45 | 3.580 | 2.200 | 2.200 |           |
| 01/24/2020 | 05:30      | 6.80 | 10:15 | 10.80 | 9.00 | 05:35           | 1.62 | 10:35 | 2.90 | 2.36 | 05:35                     | 0.971 | 11:10 | 3.323 | 2.161 | 2.161 |           |
| 01/25/2020 | 06:15      | 6.45 | 13:15 | 10.43 | 8.62 | 08:20           | 1.39 | 13:05 | 2.74 | 2.26 | 08:20                     | 0.810 | 13:05 | 2.977 | 1.964 | 1.964 |           |
| 01/26/2020 | 06:25      | 6.39 | 13:50 | 10.24 | 8.66 | 05:30           | 1.34 | 13:10 | 2.77 | 2.27 | 05:30                     | 0.751 | 13:40 | 2.918 | 1.994 | 1.994 | 0.16      |
| 01/27/2020 | 05:55      | 6.44 | 10:25 | 10.42 | 8.69 | 04:20           | 1.39 | 10:10 | 2.80 | 2.25 | 04:20                     | 0.796 | 10:10 | 3.026 | 1.982 | 1.982 |           |
| 01/28/2020 | 05:35      | 6.24 | 10:15 | 10.11 | 8.57 | 05:45           | 1.27 | 09:45 | 2.80 | 2.25 | 05:45                     | 0.676 | 09:45 | 2.847 | 1.934 | 1.934 | 0.01      |
| 01/29/2020 | 05:45      | 6.22 | 10:35 | 10.17 | 8.44 | 05:10           | 1.39 | 09:30 | 2.70 | 2.21 | 05:50                     | 0.737 | 10:35 | 2.863 | 1.864 | 1.864 |           |
| 01/30/2020 | 05:25      | 6.09 | 10:20 | 9.98  | 8.41 | 05:50           | 1.28 | 10:35 | 2.79 | 2.22 | 05:50                     | 0.662 | 10:35 | 2.861 | 1.861 | 1.861 |           |
| 01/31/2020 | 05:00      | 6.13 | 10:55 | 9.91  | 8.35 | 05:25           | 1.31 | 11:15 | 2.77 | 2.20 | 05:25                     | 0.684 | 11:15 | 2.810 | 1.826 | 1.826 |           |
| 02/01/2020 | 06:55      | 6.04 | 14:10 | 10.26 | 8.43 | 04:35           | 1.31 | 15:15 | 2.74 | 2.20 | 07:20                     | 0.673 | 14:20 | 2.869 | 1.875 | 1.875 |           |
| 02/02/2020 | 06:30      | 6.39 | 13:20 | 10.57 | 8.62 | 06:00           | 1.36 | 13:15 | 2.80 | 2.23 | 06:00                     | 0.756 | 13:15 | 3.126 | 1.946 | 1.946 |           |
| 02/03/2020 | 06:20      | 6.09 | 10:25 | 10.47 | 8.62 | 05:35           | 1.25 | 11:30 | 2.85 | 2.21 | 05:35                     | 0.645 | 10:35 | 3.072 | 1.938 | 1.938 |           |
| 02/04/2020 | 05:55      | 6.19 | 10:10 | 10.51 | 8.66 | 05:05           | 1.28 | 10:05 | 2.81 | 2.24 | 05:05                     | 0.678 | 10:05 | 3.114 | 1.967 | 1.967 |           |
| 02/05/2020 | 05:30      | 6.09 | 10:00 | 10.69 | 8.67 | 05:50           | 1.23 | 09:45 | 2.80 | 2.22 | 05:50                     | 0.632 | 09:45 | 3.131 | 1.961 | 1.961 |           |
| 02/06/2020 | 05:20      | 6.20 | 09:55 | 10.69 | 8.68 | 05:20           | 1.29 | 10:00 | 2.75 | 2.23 | 05:20                     | 0.677 | 10:00 | 3.113 | 1.958 | 1.958 |           |
| 02/07/2020 | 06:00      | 6.30 | 10:05 | 10.53 | 8.65 | 04:10           | 1.42 | 09:45 | 2.81 | 2.22 | 05:50                     | 0.769 | 09:45 | 3.103 | 1.941 | 1.941 |           |
| 02/08/2020 | 06:10      | 6.18 | 12:55 | 10.32 | 8.48 | 06:05           | 1.26 | 12:00 | 2.72 | 2.17 | 06:05                     | 0.659 | 13:30 | 2.864 | 1.862 | 1.862 |           |
| 02/09/2020 | 06:40      | 6.11 | 13:45 | 10.28 | 8.56 | 06:15           | 1.26 | 13:00 | 2.85 | 2.17 | 06:15                     | 0.656 | 13:00 | 3.012 | 1.893 | 1.893 |           |
| 02/10/2020 | 05:40      | 5.97 | 10:35 | 10.20 | 8.44 | 05:40           | 1.17 | 10:30 | 2.76 | 2.15 | 05:40                     | 0.582 | 10:30 | 2.935 | 1.828 | 1.828 |           |
| 02/11/2020 | 06:30      | 6.14 | 11:50 | 10.05 | 8.50 | 04:05           | 1.23 | 12:15 | 2.80 | 2.19 | 04:05                     | 0.639 | 12:15 | 2.900 | 1.872 | 1.872 |           |
| 02/12/2020 | 05:40      | 5.97 | 10:00 | 10.47 | 8.49 | 04:15           | 1.34 | 10:10 | 2.71 | 2.21 | 06:05                     | 0.682 | 10:05 | 2.943 | 1.882 | 1.882 |           |
| 02/13/2020 | 05:40      | 6.13 | 10:00 | 10.25 | 8.61 | 04:10           | 1.30 | 11:25 | 2.74 | 2.22 | 04:55                     | 0.707 | 11:25 | 2.852 | 1.931 | 1.931 |           |
| 02/14/2020 | 05:05      | 6.21 | 11:15 | 10.22 | 8.66 | 06:10           | 1.33 | 09:45 | 2.73 | 2.22 | 06:10                     | 0.704 | 09:45 | 2.844 | 1.946 | 1.946 |           |
| 02/15/2020 | 06:50      | 6.32 | 13:30 | 10.28 | 8.63 | 07:35           | 1.36 | 12:10 | 2.72 | 2.20 | 07:35                     | 0.740 | 13:30 | 2.897 | 1.924 | 1.924 |           |
| 02/16/2020 | 06:50      | 6.15 | 13:25 | 10.36 | 8.63 | 06:25           | 1.26 | 11:50 | 2.71 | 2.18 | 06:25                     | 0.661 | 13:25 | 2.950 | 1.921 | 1.921 |           |
| 02/17/2020 | 06:15      | 6.17 | 12:05 | 10.60 | 8.78 | 06:50           | 1.35 | 11:30 | 2.77 | 2.20 | 06:50                     | 0.713 | 11:30 | 3.075 | 1.987 | 1.987 |           |
| 02/18/2020 | 05:40      | 6.35 | 10:50 | 10.68 | 8.82 | 05:00           | 1.35 | 10:55 | 2.74 | 2.22 | 05:00                     | 0.753 | 10:55 | 3.093 | 2.006 | 2.006 |           |
| 02/19/2020 | 05:25      | 6.47 | 10:20 | 10.94 | 8.89 | 04:15           | 1.43 | 10:15 | 2.89 | 2.28 | 04:45                     | 0.822 | 10:15 | 3.388 | 2.074 | 2.074 |           |
| 02/20/2020 | 05:20      | 6.33 | 10:25 | 10.89 | 8.88 | 06:20           | 1.36 | 10:15 | 2.85 | 2.28 | 06:20                     | 0.760 | 10:15 | 3.269 | 2.072 | 2.072 |           |
| 02/21/2020 | 05:45      | 6.30 | 11:00 | 10.91 | 8.81 | 05:45           | 1.41 | 10:30 | 2.85 | 2.26 | 05:45                     | 0.759 | 10:30 | 3.320 | 2.031 | 2.031 |           |
| 02/22/2020 | 06:15      | 6.39 | 13:00 | 10.32 | 8.68 | 04:55           | 1.38 | 12:15 | 2.73 | 2.23 | 04:55                     | 0.800 | 12:55 | 2.945 | 1.966 | 1.966 |           |
| 02/23/2020 | 06:20      | 6.10 | 12:55 | 10.29 | 8.63 | 06:20           | 1.36 | 22:00 | 2.75 | 2.21 | 06:20                     | 0.695 | 13:00 | 2.876 | 1.949 | 1.949 |           |
| 02/24/2020 | 04:40      | 6.06 | 10:45 | 10.59 | 8.66 | 04:40           | 1.23 | 10:10 | 2.73 | 2.23 | 04:40                     | 0.624 | 10:45 | 3.004 | 1.972 | 1.972 |           |

| Date       | Depth (in) |      |       |       |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|-------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max   | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 06:10      | 6.34 | 10:05 | 10.55 | 8.70 | 04:35           | 1.36 | 10:05 | 2.84 | 2.29 | 04:35                     | 0.772 | 10:05 | 3.169 | 2.015 | 2.015 |           |
| 02/26/2020 | 05:45      | 6.34 | 10:15 | 10.98 | 8.81 | 04:30           | 1.44 | 10:05 | 2.89 | 2.28 | 06:05                     | 0.800 | 10:05 | 3.371 | 2.048 | 2.048 |           |
| 02/27/2020 | 05:30      | 6.44 | 09:55 | 10.95 | 8.88 | 03:45           | 1.43 | 10:00 | 2.88 | 2.31 | 04:50                     | 0.818 | 10:00 | 3.378 | 2.096 | 2.096 |           |
| 02/28/2020 | 05:45      | 6.42 | 10:50 | 10.96 | 8.90 | 06:25           | 1.34 | 10:30 | 2.91 | 2.33 | 06:25                     | 0.755 | 10:50 | 3.376 | 2.111 | 2.111 |           |
| 02/29/2020 | 06:25      | 6.53 | 14:30 | 10.69 | 8.81 | 05:10           | 1.52 | 13:50 | 2.88 | 2.29 | 05:10                     | 0.888 | 13:05 | 3.203 | 2.055 | 2.055 |           |
| 03/01/2020 | 05:45      | 6.54 | 14:10 | 10.78 | 8.92 | 05:25           | 1.44 | 14:25 | 2.88 | 2.30 | 06:15                     | 0.837 | 14:25 | 3.261 | 2.118 | 2.118 |           |
| 03/02/2020 | 06:00      | 6.42 | 10:40 | 11.12 | 9.05 | 04:45           | 1.39 | 10:30 | 2.92 | 2.35 | 04:45                     | 0.804 | 10:30 | 3.472 | 2.194 | 2.194 |           |
| 03/03/2020 | 06:05      | 6.53 | 10:35 | 11.07 | 9.14 | 06:25           | 1.45 | 10:55 | 2.97 | 2.36 | 06:05                     | 0.836 | 10:55 | 3.540 | 2.240 | 2.240 |           |
| 03/04/2020 | 06:15      | 6.54 | 10:00 | 11.02 | 9.20 | 06:10           | 1.38 | 09:55 | 3.03 | 2.38 | 06:10                     | 0.784 | 09:55 | 3.591 | 2.275 | 2.275 |           |
| 03/05/2020 | 06:00      | 6.61 | 10:05 | 11.06 | 9.23 | 05:00           | 1.40 | 10:45 | 3.01 | 2.38 | 05:00                     | 0.823 | 10:45 | 3.549 | 2.277 | 2.277 |           |
| 03/06/2020 | 06:05      | 6.45 | 10:05 | 10.89 | 9.05 | 06:05           | 1.37 | 10:20 | 2.99 | 2.36 | 06:05                     | 0.760 | 10:20 | 3.482 | 2.209 | 2.209 |           |
| 03/07/2020 | 06:55      | 6.28 | 13:30 | 10.89 | 9.02 | 06:50           | 1.41 | 12:45 | 2.98 | 2.37 | 06:50                     | 0.759 | 14:45 | 3.390 | 2.223 | 2.223 |           |
| 03/08/2020 | 05:55      | 6.43 | 13:55 | 10.86 | 9.12 | 05:30           | 1.38 | 12:45 | 3.05 | 2.41 | 05:35                     | 0.771 | 12:45 | 3.522 | 2.287 | 2.287 |           |
| 03/09/2020 | 05:00      | 6.42 | 10:35 | 10.91 | 9.08 | 04:45           | 1.38 | 10:30 | 2.93 | 2.38 | 04:45                     | 0.766 | 10:30 | 3.412 | 2.239 | 2.238 |           |

#### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 231.008                   | 4.90      |
| Avg   | 8.74       | 2.26            | 2.009                     |           |

## Site Commentary

### Site Information

| MIL_2840        |       |
|-----------------|-------|
| Pipe Dimensions | 15    |
| Silt Level      | 0.00" |

### Overview

Site MIL\_2840 functioned under normal conditions during the period Saturday, November 16, 2019 to Monday, March 9, 2020. This site exhibited an observable response to the wet weather events of November 26, 2019 - November 27, 2019, December 7, 2019 - December 8, 2019, and January 16, 2020 - January 17, 2020. Review of the scattergraph shows that both free flow and backwater flows were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

This location was installed upstream of sites MIL\_0649 and MIL\_2491, and downstream of MIL\_1193. A review of balancing of combined flows MIL\_1043 and MIL\_2840 shows a net flow of 0.663 MGD.

### Observations

Average flow depth, velocity, and quantity data observed during Saturday, November 16, 2019 to Monday, March 9, 2020, along with observed minimum and maximum data, are provided in the following table.

| Observed Flow Conditions |                    |                    |                    |
|--------------------------|--------------------|--------------------|--------------------|
| Item                     | Depth (in)         | Velocity (ft/s)    | Quantity (MGD)     |
| Average                  | 1.99               | 1.38               | 0.087              |
| Minimum                  | 1.80               | 0.99               | 0.055              |
| Maximum                  | 2.26               | 1.82               | 0.131              |
| Time of Minimum          | 11/21/2019 3:35 PM | 11/24/2019 7:15 AM | 11/24/2019 7:15 AM |
| Time of Maximum          | 12/8/2019 6:00 PM  | 12/10/2019 5:35 PM | 12/9/2019 5:25 PM  |

### Data Quality

Data uptime observed during the Saturday, November 16, 2019 to the Monday, March 9, 2020 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

| Percent Uptime  |     |
|-----------------|-----|
| Depth (in)      | 100 |
| Velocity (ft/s) | 100 |
| Quantity (MGD)  | 100 |



# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

**MIL\_2840**

Site Address /Location: S Abel St and Curtis Ave, Milpitas, CA

Monitor Series

TRITON+

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.433982°

Longitude:

-121.891547°

Pipe Size (H x W)

15.00"x15.00"

Pipe Shape

Circular

Manhole #

2840

System Characteristics

Residential/Commercial

Access

Traffic

Drive

Heavy



West Outlet

East Inlet  
(Sensor Location)

### Installation Information

Installation Date:

Wednesday, November 13, 2019

Installation Type:

Doppler Standard Ring and Crank

Monitoring Location (Sensors):

Upstream 0-5 FT

Monitor Location:

Manhole

Sensors / Devices:

Peak Combo (CS4)

Pressure Sensor Range (psi)

0 - 5 psi

### Installation Confirmation:

Confirmation Time:

11:04:00 AM

Pipe Size (HxW)

15.00"x15.00"

Depth of Flow (Wet DOF) (in)

2.00"

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

0.25"

Peak Velocity (fps)

1.28'

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

### Hydraulic Comments:

Smooth flow with shallow depth and moderate velocity

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

10'

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Unbolted

Manhole Frame

Normal

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

Good

### Communication Information:

Communication Type

Wireless

Antenna Location

Drilled Pavement / Concrete

### Additional Site Info. / Comments:

938

ADS Project Name: Milpitas.WWTFM.CA2019-2020

161

ADS Project Number: 22431.11.325

# SCATTERGRAPH REPORT

MIL\_2840

Flow Monitor

**MIL\_2840**

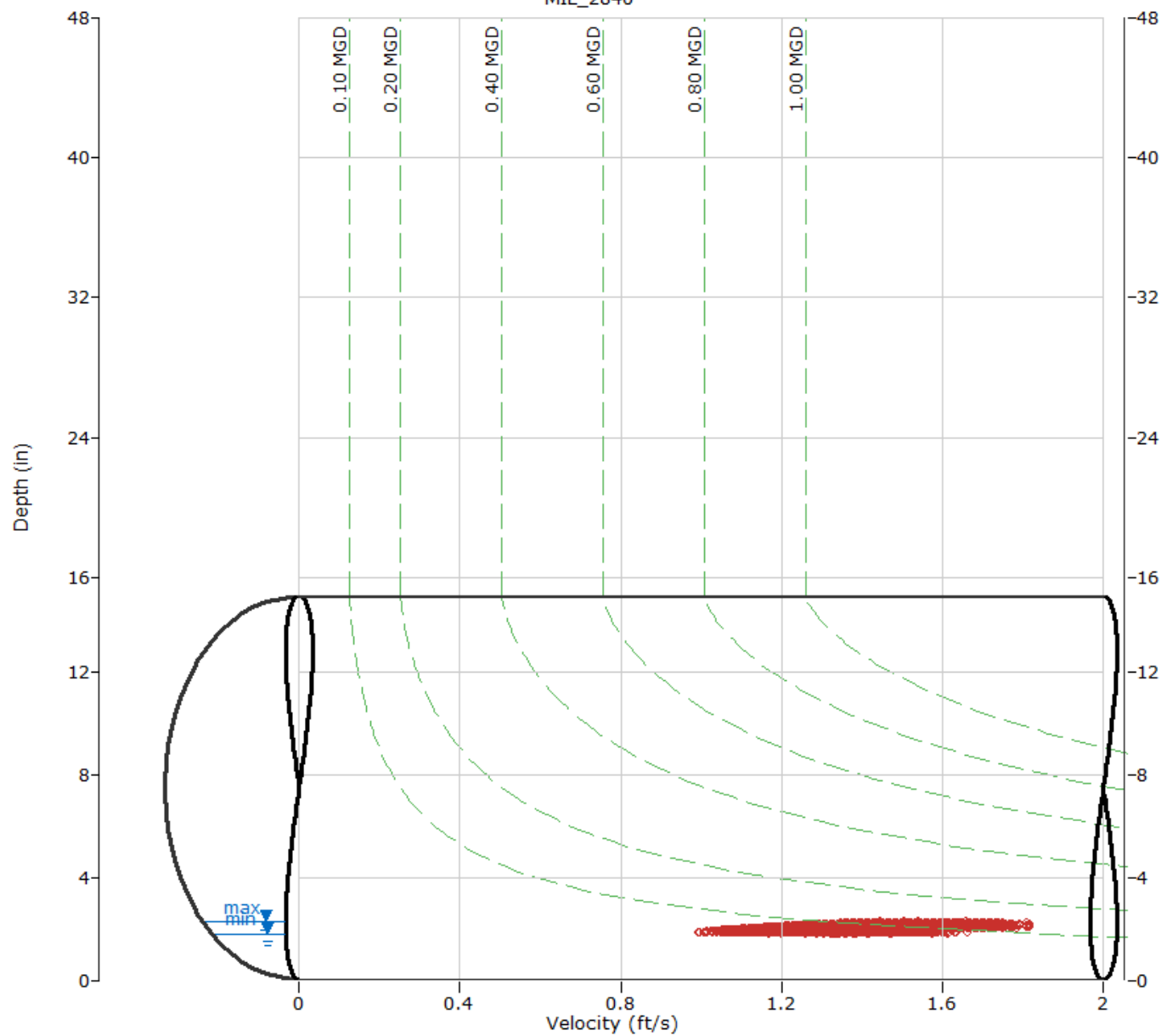
Pipe Height  
15.00 in

Report Period

11/16/2019  
To  
3/9/2020

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- ▼ Min-Max Depth



**ADS** ENVIRONMENTAL  
SERVICES

# HYDROGRAPH REPORT

MIL\_2840

Flow Monitor

**MIL\_2840**

Pipe Height

15.00 in.

Report Period

11/16/2019  
To  
3/9/2020

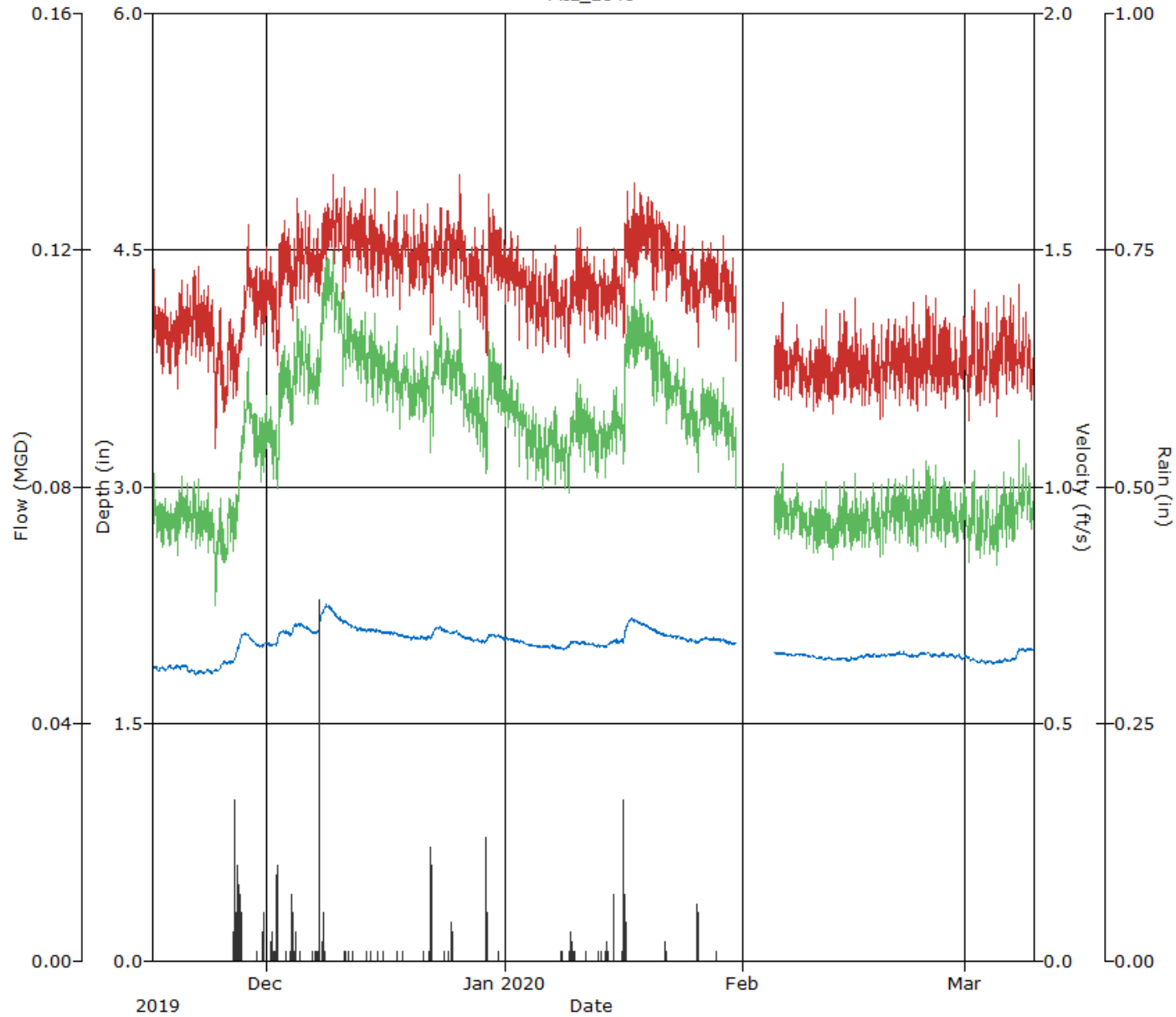
Legend

Depth

Velocity

Quantity

Rain



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_2840, Pipe Height: 15.00 in, Silt: 0.00 in

Daily Tabular Report

| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 11/16/2019 | 21:25      | 1.83 | 13:55 | 1.86 | 1.85 | 23:15           | 1.11 | 02:50 | 1.63 | 1.35 | 23:15                     | 0.062 | 02:50 | 0.091 | 0.076 | 0.076 |           |
| 11/17/2019 | 16:55      | 1.83 | 07:55 | 1.86 | 1.85 | 16:35           | 1.05 | 15:05 | 1.56 | 1.32 | 16:35                     | 0.059 | 15:05 | 0.087 | 0.074 | 0.074 |           |
| 11/18/2019 | 19:25      | 1.84 | 09:30 | 1.87 | 1.85 | 12:05           | 1.06 | 19:50 | 1.66 | 1.31 | 00:30                     | 0.060 | 19:50 | 0.093 | 0.074 | 0.074 |           |
| 11/19/2019 | 16:25      | 1.84 | 22:40 | 1.88 | 1.86 | 08:20           | 1.07 | 21:30 | 1.57 | 1.33 | 08:20                     | 0.060 | 22:25 | 0.090 | 0.075 | 0.075 |           |
| 11/20/2019 | 23:05      | 1.83 | 10:10 | 1.88 | 1.85 | 17:45           | 1.04 | 08:45 | 1.61 | 1.34 | 17:45                     | 0.058 | 08:45 | 0.092 | 0.076 | 0.076 |           |
| 11/21/2019 | 15:35      | 1.80 | 06:00 | 1.85 | 1.83 | 06:35           | 1.10 | 11:30 | 1.62 | 1.35 | 06:35                     | 0.061 | 11:30 | 0.090 | 0.074 | 0.074 |           |
| 11/22/2019 | 00:05      | 1.81 | 06:35 | 1.84 | 1.83 | 19:10           | 1.13 | 10:35 | 1.58 | 1.35 | 19:10                     | 0.062 | 10:35 | 0.087 | 0.074 | 0.074 |           |
| 11/23/2019 | 21:05      | 1.81 | 08:20 | 1.85 | 1.83 | 14:30           | 1.10 | 01:10 | 1.58 | 1.34 | 14:30                     | 0.061 | 01:10 | 0.087 | 0.074 | 0.074 |           |
| 11/24/2019 | 00:05      | 1.82 | 23:50 | 1.87 | 1.84 | 07:15           | 0.99 | 01:00 | 1.55 | 1.25 | 07:15                     | 0.055 | 23:50 | 0.086 | 0.070 | 0.070 |           |
| 11/25/2019 | 00:45      | 1.85 | 14:00 | 1.90 | 1.88 | 18:05           | 1.02 | 00:55 | 1.54 | 1.23 | 18:05                     | 0.058 | 00:55 | 0.087 | 0.071 | 0.071 |           |
| 11/26/2019 | 05:00      | 1.87 | 23:50 | 1.94 | 1.90 | 16:50           | 1.04 | 15:50 | 1.58 | 1.28 | 16:50                     | 0.061 | 15:50 | 0.091 | 0.075 | 0.075 | 0.36      |
| 11/27/2019 | 00:30      | 1.94 | 22:45 | 2.07 | 2.02 | 06:00           | 1.09 | 22:00 | 1.52 | 1.30 | 06:00                     | 0.067 | 22:00 | 0.100 | 0.083 | 0.083 | 0.63      |
| 11/28/2019 | 22:20      | 2.03 | 01:15 | 2.08 | 2.06 | 15:00           | 1.19 | 09:40 | 1.69 | 1.43 | 15:00                     | 0.078 | 09:40 | 0.111 | 0.094 | 0.094 |           |
| 11/29/2019 | 18:55      | 1.99 | 00:50 | 2.04 | 2.01 | 10:50           | 1.14 | 00:40 | 1.72 | 1.40 | 10:50                     | 0.072 | 00:40 | 0.111 | 0.089 | 0.089 |           |
| 11/30/2019 | 08:10      | 1.98 | 22:15 | 2.02 | 2.00 | 05:15           | 1.12 | 04:15 | 1.63 | 1.40 | 05:15                     | 0.070 | 04:15 | 0.102 | 0.088 | 0.088 |           |
| 12/01/2019 | 11:05      | 1.98 | 06:50 | 2.02 | 2.00 | 22:35           | 1.13 | 00:05 | 1.62 | 1.41 | 22:35                     | 0.071 | 00:05 | 0.103 | 0.089 | 0.089 |           |
| 12/02/2019 | 05:20      | 1.99 | 20:10 | 2.10 | 2.04 | 08:45           | 1.14 | 22:35 | 1.70 | 1.39 | 08:45                     | 0.072 | 22:35 | 0.113 | 0.090 | 0.090 |           |
| 12/03/2019 | 22:30      | 2.06 | 03:40 | 2.10 | 2.08 | 05:15           | 1.20 | 09:50 | 1.76 | 1.49 | 05:15                     | 0.080 | 09:50 | 0.116 | 0.099 | 0.099 |           |
| 12/04/2019 | 02:35      | 2.05 | 18:15 | 2.14 | 2.10 | 09:00           | 1.22 | 23:35 | 1.73 | 1.44 | 04:15                     | 0.081 | 23:35 | 0.119 | 0.097 | 0.097 |           |
| 12/05/2019 | 22:45      | 2.10 | 03:30 | 2.14 | 2.12 | 19:50           | 1.23 | 03:00 | 1.71 | 1.49 | 19:50                     | 0.083 | 03:00 | 0.118 | 0.102 | 0.102 |           |
| 12/06/2019 | 22:15      | 2.06 | 05:40 | 2.12 | 2.09 | 08:05           | 1.24 | 01:00 | 1.72 | 1.49 | 19:55                     | 0.083 | 01:00 | 0.116 | 0.100 | 0.100 |           |
| 12/07/2019 | 03:45      | 2.06 | 22:45 | 2.17 | 2.09 | 16:10           | 1.20 | 08:55 | 1.70 | 1.46 | 16:10                     | 0.080 | 08:55 | 0.113 | 0.098 | 0.098 |           |
| 12/08/2019 | 00:00      | 2.17 | 18:00 | 2.26 | 2.22 | 00:50           | 1.31 | 03:05 | 1.73 | 1.52 | 00:50                     | 0.094 | 17:45 | 0.126 | 0.112 | 0.112 |           |
| 12/09/2019 | 23:30      | 2.17 | 00:15 | 2.25 | 2.22 | 19:10           | 1.35 | 17:25 | 1.81 | 1.55 | 18:35                     | 0.097 | 17:25 | 0.131 | 0.113 | 0.113 |           |
| 12/10/2019 | 23:00      | 2.13 | 00:10 | 2.20 | 2.16 | 21:00           | 1.29 | 17:35 | 1.82 | 1.55 | 23:15                     | 0.089 | 02:05 | 0.128 | 0.109 | 0.109 |           |
| 12/11/2019 | 16:20      | 2.11 | 04:55 | 2.16 | 2.14 | 18:15           | 1.27 | 01:50 | 1.77 | 1.53 | 18:15                     | 0.088 | 01:50 | 0.123 | 0.106 | 0.106 |           |
| 12/12/2019 | 16:15      | 2.08 | 00:00 | 2.12 | 2.11 | 16:50           | 1.24 | 08:10 | 1.79 | 1.53 | 16:50                     | 0.085 | 08:10 | 0.122 | 0.104 | 0.104 |           |
| 12/13/2019 | 22:00      | 2.07 | 03:15 | 2.12 | 2.10 | 21:15           | 1.24 | 18:25 | 1.75 | 1.53 | 21:15                     | 0.083 | 20:20 | 0.118 | 0.103 | 0.103 |           |
| 12/14/2019 | 00:00      | 2.08 | 07:35 | 2.11 | 2.09 | 00:30           | 1.21 | 10:55 | 1.73 | 1.51 | 00:30                     | 0.081 | 10:55 | 0.116 | 0.101 | 0.101 |           |
| 12/15/2019 | 03:30      | 2.07 | 00:00 | 2.10 | 2.09 | 12:30           | 1.26 | 02:10 | 1.74 | 1.51 | 12:30                     | 0.084 | 02:10 | 0.117 | 0.101 | 0.101 |           |
| 12/16/2019 | 00:10      | 2.06 | 01:00 | 2.10 | 2.08 | 12:05           | 1.24 | 01:00 | 1.81 | 1.50 | 12:00                     | 0.083 | 01:00 | 0.122 | 0.100 | 0.100 |           |
| 12/17/2019 | 00:05      | 2.06 | 06:15 | 2.09 | 2.07 | 08:35           | 1.26 | 23:55 | 1.82 | 1.50 | 08:35                     | 0.083 | 23:55 | 0.120 | 0.099 | 0.099 |           |
| 12/18/2019 | 17:05      | 2.04 | 00:05 | 2.07 | 2.06 | 08:20           | 1.21 | 00:05 | 1.81 | 1.49 | 08:20                     | 0.079 | 00:05 | 0.120 | 0.098 | 0.098 |           |
| 12/19/2019 | 20:10      | 2.02 | 03:50 | 2.06 | 2.05 | 23:20           | 1.16 | 07:55 | 1.72 | 1.49 | 23:20                     | 0.075 | 03:50 | 0.113 | 0.097 | 0.097 |           |
| 12/20/2019 | 02:05      | 2.03 | 03:10 | 2.06 | 2.04 | 20:20           | 1.22 | 23:35 | 1.72 | 1.48 | 20:20                     | 0.079 | 23:35 | 0.111 | 0.096 | 0.096 |           |
| 12/21/2019 | 17:25      | 2.02 | 06:15 | 2.07 | 2.04 | 14:05           | 1.18 | 21:55 | 1.75 | 1.49 | 14:05                     | 0.077 | 21:55 | 0.113 | 0.097 | 0.097 |           |
| 12/22/2019 | 06:20      | 2.03 | 22:45 | 2.11 | 2.06 | 07:35           | 1.17 | 23:00 | 1.70 | 1.46 | 07:35                     | 0.075 | 23:00 | 0.115 | 0.096 | 0.096 |           |
| 12/23/2019 | 19:00      | 2.08 | 13:00 | 2.13 | 2.10 | 08:40           | 1.29 | 13:50 | 1.82 | 1.51 | 08:40                     | 0.087 | 13:50 | 0.124 | 0.102 | 0.102 |           |
| 12/24/2019 | 14:50      | 2.07 | 00:55 | 2.10 | 2.08 | 02:35           | 1.28 | 18:10 | 1.74 | 1.51 | 02:35                     | 0.086 | 15:30 | 0.115 | 0.101 | 0.101 |           |
| 12/25/2019 | 03:25      | 2.06 | 07:50 | 2.09 | 2.08 | 15:50           | 1.21 | 14:20 | 1.72 | 1.49 | 15:50                     | 0.081 | 14:20 | 0.115 | 0.099 | 0.099 |           |
| 12/26/2019 | 19:20      | 2.03 | 01:35 | 2.08 | 2.05 | 17:45           | 1.24 | 04:25 | 1.74 | 1.50 | 17:45                     | 0.081 | 04:25 | 0.115 | 0.098 | 0.098 |           |
| 12/27/2019 | 20:55      | 2.01 | 01:45 | 2.05 | 2.03 | 08:00           | 1.19 | 14:25 | 1.67 | 1.44 | 08:00                     | 0.077 | 14:25 | 0.108 | 0.093 | 0.093 |           |
| 12/28/2019 | 23:30      | 2.00 | 01:55 | 2.04 | 2.02 | 20:45           | 1.19 | 03:00 | 1.68 | 1.43 | 20:45                     | 0.076 | 03:50 | 0.108 | 0.092 | 0.092 |           |
| 12/29/2019 | 01:10      | 2.01 | 23:40 | 2.07 | 2.03 | 06:10           | 1.17 | 20:25 | 1.72 | 1.41 | 06:10                     | 0.074 | 20:25 | 0.111 | 0.091 | 0.091 | 0.22      |
| 12/30/2019 | 03:45      | 2.04 | 00:15 | 2.07 | 2.06 | 21:55           | 1.22 | 02:30 | 1.74 | 1.51 | 21:55                     | 0.079 | 02:30 | 0.114 | 0.099 | 0.099 |           |
| 12/31/2019 | 14:35      | 2.03 | 01:30 | 2.07 | 2.05 | 06:55           | 1.17 | 03:45 | 1.71 | 1.49 | 06:55                     | 0.077 | 03:45 | 0.111 | 0.097 | 0.097 |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total |           |
| 01/01/2020 | 11:50      | 2.02 | 00:05 | 2.06 | 2.04 | 03:15           | 1.19 | 13:25 | 1.77 | 1.45 | 03:15                     | 0.077 | 13:25 | 0.114 | 0.094 | 0.094 |       |           |
| 01/02/2020 | 03:15      | 2.01 | 00:45 | 2.04 | 2.03 | 22:15           | 1.16 | 18:20 | 1.68 | 1.44 | 22:15                     | 0.074 | 18:20 | 0.107 | 0.092 | 0.092 |       |           |
| 01/03/2020 | 21:15      | 1.99 | 00:20 | 2.03 | 2.01 | 22:50           | 1.19 | 21:50 | 1.78 | 1.43 | 22:50                     | 0.075 | 21:50 | 0.113 | 0.091 | 0.091 |       |           |
| 01/04/2020 | 10:10      | 1.98 | 00:00 | 2.01 | 2.00 | 00:15           | 1.20 | 02:30 | 1.75 | 1.41 | 17:05                     | 0.075 | 02:30 | 0.109 | 0.088 | 0.088 |       |           |
| 01/05/2020 | 10:00      | 1.97 | 01:05 | 2.00 | 1.99 | 15:55           | 1.13 | 00:25 | 1.67 | 1.37 | 15:55                     | 0.071 | 00:25 | 0.104 | 0.085 | 0.085 |       |           |
| 01/06/2020 | 19:40      | 1.97 | 01:20 | 2.00 | 1.99 | 00:30           | 1.13 | 07:45 | 1.60 | 1.38 | 00:30                     | 0.071 | 07:45 | 0.100 | 0.086 | 0.086 |       |           |
| 01/07/2020 | 16:30      | 1.97 | 04:15 | 2.01 | 1.99 | 18:45           | 1.18 | 16:15 | 1.70 | 1.41 | 18:45                     | 0.073 | 16:15 | 0.106 | 0.088 | 0.088 |       |           |
| 01/08/2020 | 07:20      | 1.96 | 00:30 | 1.99 | 1.98 | 07:55           | 1.10 | 00:15 | 1.60 | 1.37 | 07:55                     | 0.067 | 00:15 | 0.099 | 0.085 | 0.085 |       |           |
| 01/09/2020 | 00:00      | 1.97 | 13:45 | 2.02 | 2.00 | 09:40           | 1.12 | 23:10 | 1.70 | 1.38 | 09:40                     | 0.070 | 23:10 | 0.107 | 0.087 | 0.087 |       |           |
| 01/10/2020 | 21:00      | 1.99 | 09:25 | 2.03 | 2.01 | 18:25           | 1.14 | 11:30 | 1.71 | 1.43 | 18:25                     | 0.073 | 11:30 | 0.109 | 0.091 | 0.091 | 0.02  |           |
| 01/11/2020 | 17:30      | 1.99 | 04:35 | 2.03 | 2.01 | 10:45           | 1.13 | 01:45 | 1.64 | 1.42 | 10:45                     | 0.072 | 01:45 | 0.104 | 0.090 | 0.090 | 0.18  |           |
| 01/12/2020 | 21:35      | 1.98 | 01:10 | 2.02 | 2.00 | 20:25           | 1.16 | 18:15 | 1.70 | 1.40 | 20:25                     | 0.072 | 18:15 | 0.106 | 0.088 | 0.088 | 0.02  |           |
| 01/13/2020 | 00:45      | 1.98 | 05:25 | 2.01 | 1.99 | 02:45           | 1.12 | 23:30 | 1.64 | 1.40 | 02:45                     | 0.070 | 23:30 | 0.101 | 0.088 | 0.088 | 0.01  |           |
| 01/14/2020 | 02:50      | 1.97 | 13:25 | 2.02 | 2.00 | 02:40           | 1.16 | 11:05 | 1.64 | 1.40 | 02:40                     | 0.072 | 11:05 | 0.103 | 0.088 | 0.088 | 0.02  |           |
| 01/15/2020 | 01:10      | 2.01 | 12:05 | 2.04 | 2.02 | 15:45           | 1.18 | 06:45 | 1.69 | 1.43 | 15:45                     | 0.075 | 06:45 | 0.107 | 0.091 | 0.091 | 0.11  |           |
| 01/16/2020 | 10:15      | 2.00 | 23:40 | 2.13 | 2.05 | 11:40           | 1.15 | 23:10 | 1.77 | 1.43 | 11:40                     | 0.073 | 23:40 | 0.120 | 0.093 | 0.093 | 0.07  |           |
| 01/17/2020 | 00:00      | 2.12 | 11:55 | 2.17 | 2.15 | 03:15           | 1.30 | 17:05 | 1.77 | 1.52 | 03:15                     | 0.090 | 17:05 | 0.124 | 0.106 | 0.106 | 0.66  |           |
| 01/18/2020 | 20:00      | 2.11 | 00:30 | 2.16 | 2.14 | 02:50           | 1.28 | 21:40 | 1.78 | 1.54 | 04:30                     | 0.089 | 01:20 | 0.123 | 0.107 | 0.107 |       |           |
| 01/19/2020 | 11:20      | 2.10 | 03:20 | 2.14 | 2.12 | 07:20           | 1.30 | 17:55 | 1.78 | 1.54 | 07:20                     | 0.088 | 18:25 | 0.121 | 0.105 | 0.105 |       |           |
| 01/20/2020 | 17:55      | 2.07 | 00:00 | 2.11 | 2.09 | 13:45           | 1.21 | 10:40 | 1.77 | 1.50 | 13:45                     | 0.081 | 10:40 | 0.118 | 0.101 | 0.101 |       |           |
| 01/21/2020 | 16:20      | 2.04 | 00:00 | 2.09 | 2.07 | 18:25           | 1.24 | 03:40 | 1.76 | 1.52 | 18:25                     | 0.082 | 03:40 | 0.116 | 0.100 | 0.100 |       |           |
| 01/22/2020 | 01:50      | 2.04 | 03:55 | 2.07 | 2.05 | 01:10           | 1.21 | 13:00 | 1.71 | 1.48 | 01:10                     | 0.079 | 13:00 | 0.113 | 0.097 | 0.097 |       |           |
| 01/23/2020 | 22:35      | 2.03 | 02:40 | 2.06 | 2.05 | 00:00           | 1.25 | 12:15 | 1.70 | 1.48 | 00:00                     | 0.081 | 12:15 | 0.111 | 0.097 | 0.097 |       |           |
| 01/24/2020 | 04:00      | 2.02 | 06:55 | 2.06 | 2.03 | 18:15           | 1.14 | 09:35 | 1.67 | 1.45 | 18:15                     | 0.073 | 09:35 | 0.108 | 0.093 | 0.093 |       |           |
| 01/25/2020 | 02:05      | 2.01 | 02:45 | 2.05 | 2.03 | 19:25           | 1.15 | 21:55 | 1.69 | 1.43 | 19:25                     | 0.073 | 21:55 | 0.108 | 0.092 | 0.092 |       |           |
| 01/26/2020 | 03:50      | 2.00 | 14:40 | 2.05 | 2.03 | 02:10           | 1.17 | 13:40 | 1.70 | 1.42 | 02:10                     | 0.074 | 13:40 | 0.110 | 0.091 | 0.091 |       |           |
| 01/27/2020 | 10:35      | 2.02 | 03:55 | 2.05 | 2.04 | 09:00           | 1.22 | 20:25 | 1.68 | 1.45 | 09:00                     | 0.078 | 20:25 | 0.109 | 0.094 | 0.094 | 0.16  |           |
| 01/28/2020 | 03:15      | 2.02 | 00:45 | 2.05 | 2.03 | 04:05           | 1.16 | 06:15 | 1.69 | 1.43 | 04:05                     | 0.075 | 06:15 | 0.108 | 0.092 | 0.092 | 0.01  |           |
| 01/29/2020 | 21:55      | 2.00 | 00:10 | 2.04 | 2.02 | 10:55           | 1.17 | 01:15 | 1.64 | 1.43 | 10:55                     | 0.075 | 01:15 | 0.106 | 0.092 | 0.092 |       |           |
| 01/30/2020 | 06:15      | 1.99 | 03:30 | 2.03 | 2.01 | 16:05           | 1.15 | 00:50 | 1.66 | 1.42 | 16:05                     | 0.072 | 00:50 | 0.105 | 0.090 | 0.090 |       |           |
| 01/31/2020 | 01:00      | 1.99 | 00:35 | 2.02 | 2.01 | 00:05           | 1.21 | 00:20 | 1.58 | 1.38 | 00:05                     | 0.076 | 00:20 | 0.100 | 0.087 | 0.015 |       |           |
| 02/01/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |       |           |
| 02/02/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |       |           |
| 02/03/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |       |           |
| 02/04/2020 |            |      |       |      |      |                 |      |       |      |      |                           |       |       |       |       |       |       |           |
| 02/05/2020 | 15:55      | 1.93 | 17:25 | 1.96 | 1.94 | 05:30           | 1.08 | 17:40 | 1.57 | 1.26 | 14:45                     | 0.065 | 17:40 | 0.095 | 0.076 | 0.063 |       |           |
| 02/06/2020 | 22:45      | 1.93 | 04:30 | 1.96 | 1.94 | 15:00           | 1.07 | 06:10 | 1.52 | 1.26 | 15:00                     | 0.064 | 06:10 | 0.092 | 0.076 | 0.076 |       |           |
| 02/07/2020 | 18:30      | 1.92 | 03:10 | 1.95 | 1.94 | 19:45           | 1.06 | 17:45 | 1.48 | 1.25 | 19:45                     | 0.063 | 17:45 | 0.088 | 0.075 | 0.075 |       |           |
| 02/08/2020 | 23:05      | 1.93 | 06:35 | 1.95 | 1.94 | 20:05           | 1.06 | 04:55 | 1.52 | 1.26 | 20:05                     | 0.063 | 04:55 | 0.092 | 0.076 | 0.076 |       |           |
| 02/09/2020 | 23:25      | 1.91 | 04:05 | 1.95 | 1.93 | 16:50           | 1.06 | 19:40 | 1.51 | 1.24 | 20:30                     | 0.062 | 19:40 | 0.090 | 0.074 | 0.074 |       |           |
| 02/10/2020 | 14:00      | 1.91 | 06:25 | 1.94 | 1.92 | 22:40           | 1.06 | 00:10 | 1.50 | 1.24 | 22:40                     | 0.062 | 00:10 | 0.089 | 0.074 | 0.074 |       |           |
| 02/11/2020 | 14:25      | 1.90 | 05:05 | 1.93 | 1.91 | 01:20           | 1.05 | 11:05 | 1.63 | 1.26 | 15:30                     | 0.062 | 11:05 | 0.096 | 0.074 | 0.074 |       |           |
| 02/12/2020 | 21:00      | 1.90 | 07:35 | 1.93 | 1.91 | 21:50           | 1.04 | 08:40 | 1.61 | 1.23 | 21:50                     | 0.061 | 08:40 | 0.095 | 0.072 | 0.072 |       |           |
| 02/13/2020 | 00:10      | 1.89 | 13:30 | 1.92 | 1.91 | 06:15           | 1.04 | 02:00 | 1.49 | 1.25 | 06:15                     | 0.061 | 02:00 | 0.087 | 0.073 | 0.073 |       |           |
| 02/14/2020 | 17:50      | 1.89 | 01:40 | 1.92 | 1.91 | 12:05           | 1.04 | 05:10 | 1.50 | 1.27 | 12:05                     | 0.061 | 05:10 | 0.089 | 0.074 | 0.074 |       |           |
| 02/15/2020 | 01:30      | 1.89 | 05:15 | 1.93 | 1.91 | 06:35           | 1.05 | 19:50 | 1.54 | 1.26 | 11:00                     | 0.062 | 19:55 | 0.091 | 0.074 | 0.074 |       |           |
| 02/16/2020 | 00:45      | 1.90 | 04:25 | 1.93 | 1.92 | 00:50           | 1.05 | 00:40 | 1.51 | 1.24 | 00:50                     | 0.061 | 11:25 | 0.089 | 0.074 | 0.074 |       |           |
| 02/17/2020 | 21:50      | 1.92 | 06:05 | 1.95 | 1.93 | 19:25           | 1.06 | 11:00 | 1.54 | 1.24 | 19:25                     | 0.063 | 11:00 | 0.092 | 0.074 | 0.074 |       |           |
| 02/18/2020 | 23:45      | 1.92 | 04:35 | 1.95 | 1.93 | 23:50           | 1.05 | 20:40 | 1.49 | 1.24 | 23:50                     | 0.062 | 20:40 | 0.089 | 0.074 | 0.074 |       |           |
| 02/19/2020 | 00:00      | 1.92 | 06:50 | 1.94 | 1.93 | 19:30           | 1.05 | 05:00 | 1.55 | 1.24 | 19:30                     | 0.063 | 05:00 | 0.093 | 0.074 | 0.074 |       |           |
| 02/20/2020 | 17:45      | 1.92 | 04:35 | 1.95 | 1.94 | 19:05           | 1.06 | 01:05 | 1.52 | 1.26 | 19:05                     | 0.064 | 01:05 | 0.091 | 0.076 | 0.076 |       |           |
| 02/21/2020 | 00:00      | 1.93 | 14:25 | 1.96 | 1.94 | 16:15           | 1.07 | 04:40 | 1.58 | 1.25 | 21:05                     | 0.064 | 04:40 | 0.096 | 0.076 | 0.076 |       |           |
| 02/22/2020 | 21:35      | 1.91 | 03:45 | 1.96 | 1.93 | 17:50           | 1.05 | 10:00 | 1.52 | 1.26 | 17:50                     | 0.062 | 10:00 | 0.091 | 0.076 | 0.076 |       |           |
| 02/23/2020 | 00:10      | 1.92 | 03:25 | 1.94 | 1.93 | 15:55           | 1.05 | 13:10 | 1.54 | 1.24 | 15:55                     | 0.062 | 13:10 | 0.092 | 0.074 | 0.074 |       |           |
| 02/24/2020 | 01:05      | 1.93 | 12:10 | 1.95 | 1.94 | 21:45           | 1.06 | 09:25 | 1.54 | 1.25 | 21:45                     | 0.064 | 09:25 | 0.093 | 0.075 | 0.075 |       |           |



| Date       | Depth (in) |      |       |      |      | Velocity (ft/s) |      |       |      |      | Quantity (MGD - Total MG) |       |       |       |       |       | Rain (in) |
|------------|------------|------|-------|------|------|-----------------|------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|-----------|
|            | Time       | Min  | Time  | Max  | Avg  | Time            | Min  | Time  | Max  | Avg  | Time                      | Min   | Time  | Max   | Avg   | Total | Total     |
| 02/25/2020 | 22:10      | 1.92 | 05:15 | 1.96 | 1.94 | 20:20           | 1.06 | 01:50 | 1.52 | 1.29 | 20:05                     | 0.063 | 03:05 | 0.092 | 0.077 | 0.077 |           |
| 02/26/2020 | 14:25      | 1.92 | 00:55 | 1.95 | 1.93 | 10:00           | 1.06 | 15:15 | 1.53 | 1.26 | 10:00                     | 0.064 | 15:15 | 0.091 | 0.075 | 0.075 |           |
| 02/27/2020 | 18:45      | 1.92 | 05:50 | 1.96 | 1.93 | 19:40           | 1.06 | 17:20 | 1.48 | 1.27 | 19:40                     | 0.063 | 08:50 | 0.089 | 0.076 | 0.076 |           |
| 02/28/2020 | 20:55      | 1.91 | 02:40 | 1.95 | 1.93 | 17:55           | 1.06 | 03:20 | 1.49 | 1.25 | 16:55                     | 0.063 | 03:20 | 0.090 | 0.074 | 0.074 |           |
| 02/29/2020 | 22:10      | 1.90 | 07:20 | 1.94 | 1.92 | 01:05           | 1.06 | 23:40 | 1.51 | 1.26 | 22:05                     | 0.063 | 23:45 | 0.089 | 0.075 | 0.075 |           |
| 03/01/2020 | 20:20      | 1.89 | 04:15 | 1.93 | 1.92 | 15:10           | 1.05 | 02:55 | 1.51 | 1.25 | 15:10                     | 0.062 | 02:55 | 0.090 | 0.074 | 0.074 |           |
| 03/02/2020 | 18:30      | 1.88 | 05:00 | 1.92 | 1.90 | 12:45           | 1.04 | 08:25 | 1.58 | 1.29 | 12:45                     | 0.061 | 08:25 | 0.093 | 0.075 | 0.075 |           |
| 03/03/2020 | 20:15      | 1.87 | 04:45 | 1.91 | 1.89 | 14:35           | 1.08 | 18:20 | 1.50 | 1.28 | 14:35                     | 0.062 | 01:10 | 0.087 | 0.074 | 0.074 |           |
| 03/04/2020 | 22:00      | 1.87 | 06:15 | 1.90 | 1.89 | 18:45           | 1.03 | 01:50 | 1.52 | 1.26 | 18:45                     | 0.059 | 01:50 | 0.088 | 0.073 | 0.073 |           |
| 03/05/2020 | 11:00      | 1.88 | 14:50 | 1.90 | 1.89 | 07:05           | 1.05 | 02:35 | 1.55 | 1.28 | 07:05                     | 0.061 | 02:35 | 0.090 | 0.074 | 0.074 |           |
| 03/06/2020 | 18:05      | 1.88 | 05:20 | 1.91 | 1.90 | 05:10           | 1.06 | 05:05 | 1.59 | 1.31 | 05:10                     | 0.062 | 05:05 | 0.093 | 0.076 | 0.076 |           |
| 03/07/2020 | 00:35      | 1.88 | 23:25 | 1.96 | 1.92 | 11:00           | 1.05 | 08:05 | 1.53 | 1.29 | 11:00                     | 0.062 | 08:05 | 0.090 | 0.076 | 0.076 |           |
| 03/08/2020 | 01:15      | 1.95 | 15:25 | 1.98 | 1.97 | 01:10           | 1.08 | 16:40 | 1.54 | 1.28 | 01:10                     | 0.065 | 16:40 | 0.094 | 0.079 | 0.079 |           |
| 03/09/2020 | 21:35      | 1.95 | 08:20 | 1.98 | 1.97 | 09:45           | 1.09 | 12:40 | 1.60 | 1.26 | 09:45                     | 0.067 | 12:40 | 0.099 | 0.077 | 0.077 |           |

#### Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59

|       | Depth (in) | Velocity (ft/s) | Quantity (MGD - Total MG) | Rain (in) |
|-------|------------|-----------------|---------------------------|-----------|
| Total |            |                 | 9.571                     | 4.90      |
| Avg   | 1.99       | 1.38            | 0.087                     |           |

## Rainfall data

| MIL_RG01                  |    |
|---------------------------|----|
| Rain Collector Dimensions | 8" |

The rainfall measured at MIL\_RG01 from November 16, 2019 to March 09, 2020 is 4.90 inches.

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_RG01

Site Address /Location: 641 Gibraltar Court, Milpitas, CA

Monitor Series

Location Type

Rain Alert III

Temporary

Pipe Size (H x W)

Pipe Shape

Site Access Details: DRIVE.

Latitude:

37.423469°

Longitude:

-121.898106°

Manhole #

System Characteristics

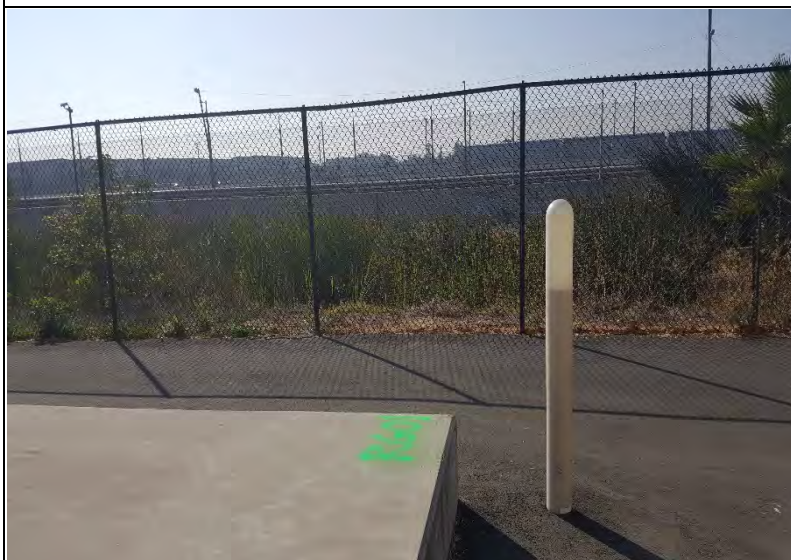
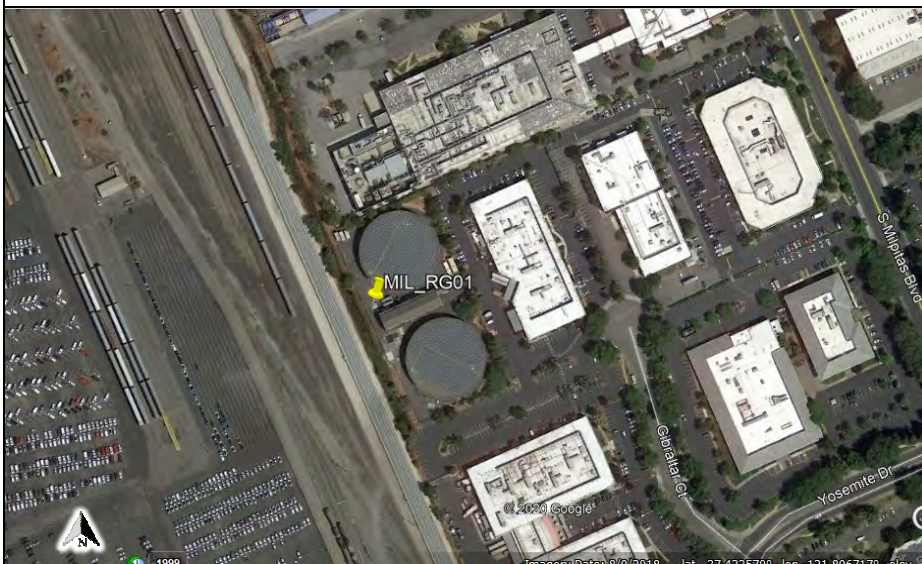
Commercial

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Friday, November 15, 2019

Installation Type:

Rain Gauge

Monitoring Location (Sensors):

Field

Monitor Location:

Building

Sensors / Devices:

Rain Gauge Tipping Bucket

Pressure Sensor Range (psi)

### Installation Confirmation:

Confirmation Time:

Pipe Size (HxW)

Depth of Flow (Wet DOF) (in)

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

Peak Velocity (fps)

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

Hydraulic Comments:

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Manhole Frame

Active Drop Connections

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

### Communication Information:

Communication Type

Wireless

Antenna Location

### Additional Site Info. / Comments:

Need key to access.

945

ADS Project Name: Milpitas.WWTFM.CA2019-2020

168

ADS Project Number: 22431.11.325

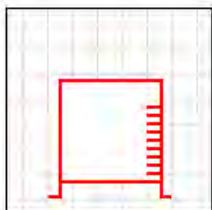


# HYDROGRAPH REPORT

MIL\_RG01

Rain Gauge

**MIL\_RG01**

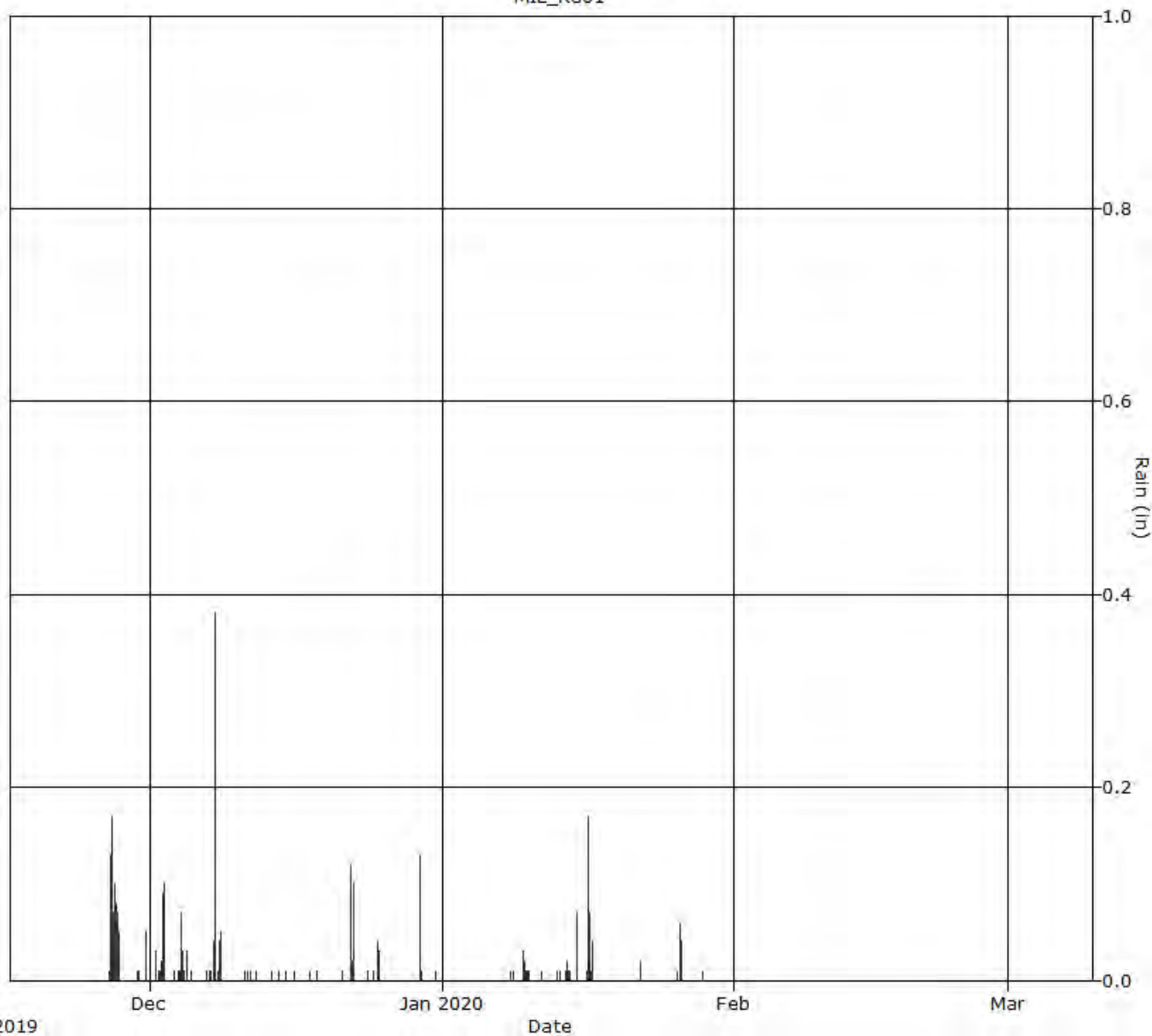


Report Period

11/16/2019  
To  
3/9/2020

Legend

— Rain



**ADS** ENVIRONMENTAL  
SERVICES

Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_RG01 , Silt: --

### Daily Tabular Report

| Date       | Depth (in) |     |      |     |     | Velocity (ft/s) |     |      |     |     | Quantity (MGD - Total MG) |     |      |     |     |       | Rain (in) |
|------------|------------|-----|------|-----|-----|-----------------|-----|------|-----|-----|---------------------------|-----|------|-----|-----|-------|-----------|
|            | Time       | Min | Time | Max | Avg | Time            | Min | Time | Max | Avg | Time                      | Min | Time | Max | Avg | Total | Total     |
| 11/16/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/17/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/18/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/19/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/20/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/21/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/22/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/23/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/24/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/25/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/26/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.36      |
| 11/27/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.63      |
| 11/28/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/29/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.02      |
| 11/30/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.10      |
| 12/01/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.06      |
| 12/02/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.30      |
| 12/03/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/04/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.39      |
| 12/05/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/06/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/07/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.67      |
| 12/08/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.20      |
| 12/09/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/10/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/11/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.03      |
| 12/12/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/13/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/14/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/15/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/16/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/17/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/18/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/19/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/20/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/21/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/22/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.41      |
| 12/23/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/24/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.02      |
| 12/25/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.08      |
| 12/26/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/27/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/28/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/29/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.22      |
| 12/30/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/31/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |



| Date       | Depth (in) |     |      |     |     | Velocity (ft/s) |     |      |     |     | Quantity (MGD - Total MG) |     |      |     |     |       | Rain (in) |
|------------|------------|-----|------|-----|-----|-----------------|-----|------|-----|-----|---------------------------|-----|------|-----|-----|-------|-----------|
|            | Time       | Min | Time | Max | Avg | Time            | Min | Time | Max | Avg | Time                      | Min | Time | Max | Avg | Total | Total     |
| 01/01/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/02/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/03/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/04/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/05/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/06/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/07/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/08/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.02      |
| 01/09/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.18      |
| 01/10/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.02      |
| 01/11/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 01/12/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/13/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.02      |
| 01/14/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.11      |
| 01/15/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.07      |
| 01/16/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.66      |
| 01/17/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/18/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/19/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/20/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/21/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/22/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.03      |
| 01/23/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/24/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/25/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/26/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.16      |
| 01/27/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/28/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 01/29/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/30/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 01/31/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/01/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/02/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/03/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/04/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/05/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/06/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/07/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/08/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/09/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/10/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/11/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/12/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/13/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/14/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/15/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/16/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/17/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/18/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/19/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/20/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/21/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/22/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/23/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/24/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |

| Date       | Depth (in) |     |      |     |     | Velocity (ft/s) |     |      |     |     | Quantity (MGD - Total MG) |     |      |     |     |       | Rain (in) |
|------------|------------|-----|------|-----|-----|-----------------|-----|------|-----|-----|---------------------------|-----|------|-----|-----|-------|-----------|
|            | Time       | Min | Time | Max | Avg | Time            | Min | Time | Max | Avg | Time                      | Min | Time | Max | Avg | Total | Total     |
| 02/25/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/26/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/27/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/28/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/29/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/01/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/02/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/03/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/04/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/05/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/06/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/07/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/08/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/09/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |

**Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59**

|       | Rain (in) |
|-------|-----------|
| Total | 4.90      |
| Avg   |           |

## Rainfall data

| MIL_RG02                  |    |
|---------------------------|----|
| Rain Collector Dimensions | 8" |

The rainfall measured at MIL\_RG02 from November 16, 2019 to March 09, 2020 is 5.26 inches.

# Milpitas Temp Study 2019-20

## Flow Monitoring Site Report



Site Name

MIL\_RG02

Site Address /Location: 1328 Tularcitos Drive, Milpitas, CA

Monitor Series

Rain Alert III

Location Type

Temporary

Site Access Details: DRIVE.

Latitude:

37.455939°

Longitude:

-121.875253°

Pipe Size (H x W)

Pipe Shape

Manhole #

System Characteristics

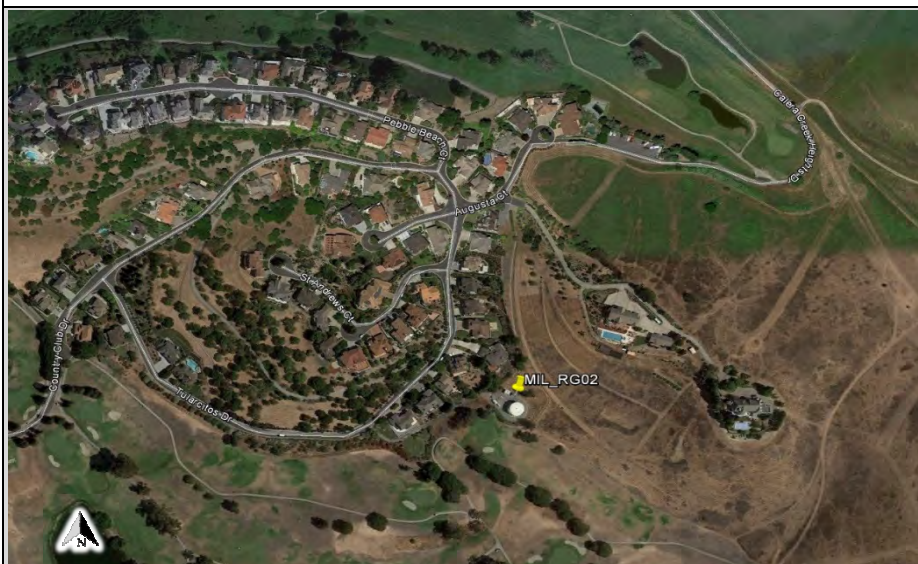
Commercial

Access

Traffic

Drive

Light



### Installation Information

Installation Date:

Friday, November 15, 2019

Installation Type:

Rain Gauge

Monitoring Location (Sensors):

Field

Monitor Location:

Building

Sensors / Devices:

Rain Gauge Tipping Bucket

Pressure Sensor Range (psi)

### Installation Confirmation:

Confirmation Time:

1:30:00 AM

Pipe Size (HxW)

Depth of Flow (Wet DOF) (in)

Range (Air DOF) (in)

Downlooker Physical Offset (in)

NA

Measurement Confidence (in)

Peak Velocity (fps)

Velocity Sensor Offset (in)

0"

Silt (in)

0.0"

Silt Type

Hydraulic Comments:

### Manhole / Pipe Information:

Manhole Depth (Approx. FT):

Manhole Configuration

Single

Manhole Material:

Concrete

Manhole Condition:

Good

Manhole Opening Diameter (in)

26"

Manhole Diameter (Approx.):

54"

Manhole Cover

Manhole Frame

Active Drop Connections

No

Air Quality:

Normal

Pipe Material

Concrete

Pipe Condition:

### Communication Information:

Communication Type

Wireless

Antenna Location

### Additional Site Info. / Comments:

Tularcitos Pump Station. Needs passcode and key.

951

ADS Project Name: Milpitas.WWTFM.CA2019-2020

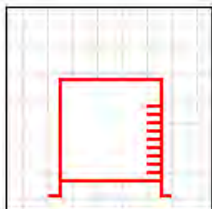
ADS Project Number: 22431.11.325

# HYDROGRAPH REPORT

MIL\_RG02

Rain Gauge

**MIL\_RG02**

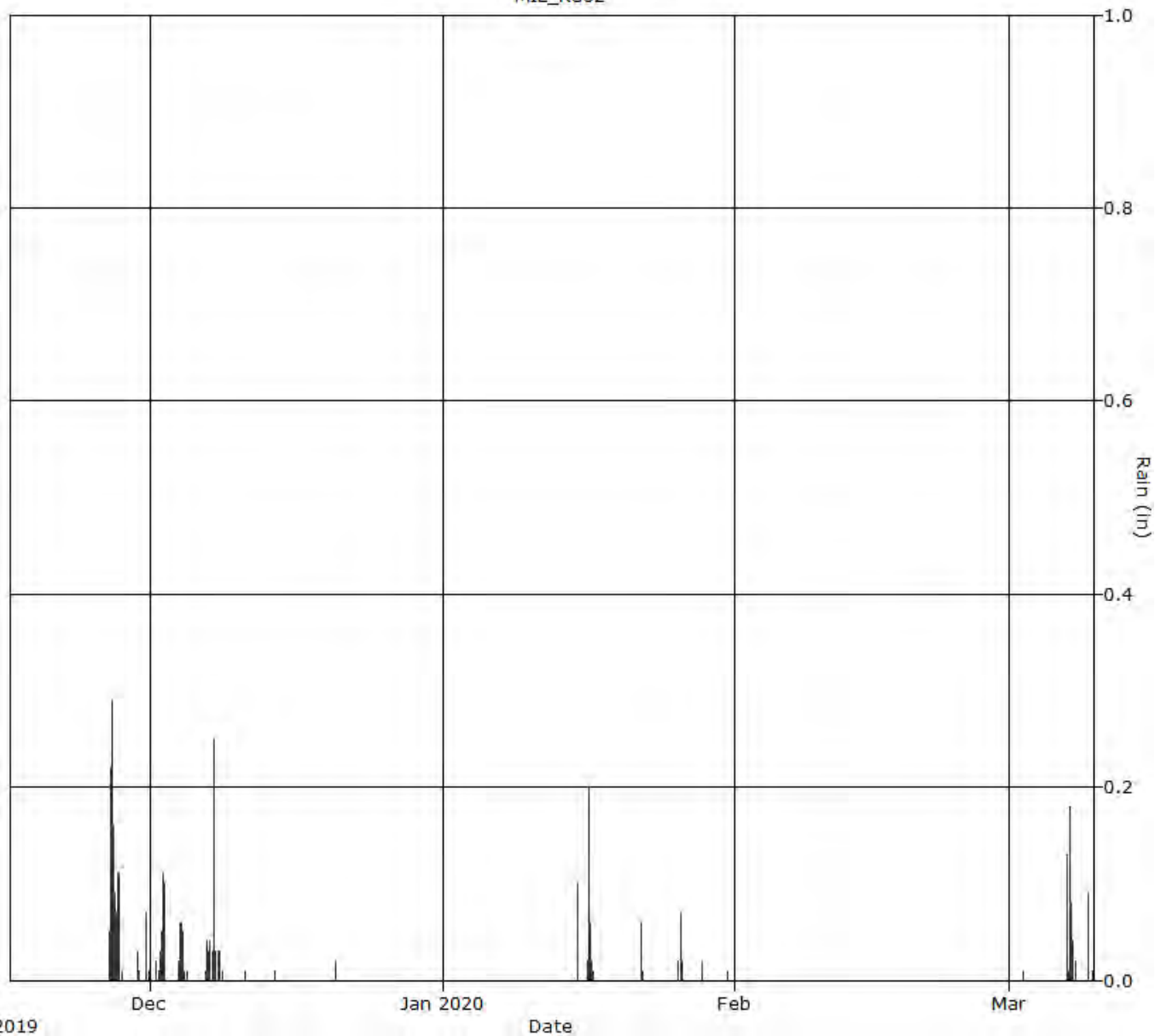


Report Period

11/16/2019  
To  
3/9/2020

Legend

— Rain



ADS ENVIRONMENTAL SERVICES



Daily Tabular Report For The Period 11/16/2019 00:00 - 03/09/2020 23:59

MIL\_RG02 , Silt: --

## Daily Tabular Report

| Date       | Depth (in) |     |      |     |     | Velocity (ft/s) |     |      |     |     | Quantity (MGD - Total MG) |     |      |     |     |       | Rain (in) |
|------------|------------|-----|------|-----|-----|-----------------|-----|------|-----|-----|---------------------------|-----|------|-----|-----|-------|-----------|
|            | Time       | Min | Time | Max | Avg | Time            | Min | Time | Max | Avg | Time                      | Min | Time | Max | Avg | Total | Total     |
| 11/16/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/17/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/18/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/19/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/20/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/21/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/22/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/23/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/24/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/25/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/26/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.63      |
| 11/27/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.77      |
| 11/28/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 11/29/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.05      |
| 11/30/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.14      |
| 12/01/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.06      |
| 12/02/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.36      |
| 12/03/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/04/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.44      |
| 12/05/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/06/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.06      |
| 12/07/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.84      |
| 12/08/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.10      |
| 12/09/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/10/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/11/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.00      |
| 12/12/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/13/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/14/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 12/15/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/16/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/17/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/18/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/19/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/20/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.02      |
| 12/21/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/22/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/23/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/24/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/25/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/26/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/27/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/28/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/29/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/30/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 12/31/2019 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |

| Date       | Depth<br>(in) |     |      |     |     | Velocity<br>(ft/s) |     |      |     |     | Quantity<br>(MGD - Total MG) |     |      |     |     |       | Rain<br>(in) |
|------------|---------------|-----|------|-----|-----|--------------------|-----|------|-----|-----|------------------------------|-----|------|-----|-----|-------|--------------|
|            | Time          | Min | Time | Max | Avg | Time               | Min | Time | Max | Avg | Time                         | Min | Time | Max | Avg | Total | Total        |
| 01/01/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/02/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/03/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/04/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/05/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/06/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/07/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/08/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/09/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/10/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/11/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/12/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/13/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/14/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/15/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       | 0.10         |
| 01/16/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       | 0.66         |
| 01/17/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/18/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/19/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/20/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/21/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       | 0.01         |
| 01/22/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       | 0.09         |
| 01/23/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/24/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/25/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/26/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       | 0.16         |
| 01/27/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/28/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       | 0.02         |
| 01/29/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/30/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 01/31/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       | 0.01         |
| 02/01/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/02/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/03/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/04/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/05/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/06/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/07/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/08/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/09/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/10/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/11/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/12/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/13/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/14/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/15/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/16/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/17/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/18/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/19/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/20/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/21/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/22/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/23/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |
| 02/24/2020 |               |     |      |     |     |                    |     |      |     |     |                              |     |      |     |     |       |              |

| Date       | Depth (in) |     |      |     |     | Velocity (ft/s) |     |      |     |     | Quantity (MGD - Total MG) |     |      |     |     |       | Rain (in) |
|------------|------------|-----|------|-----|-----|-----------------|-----|------|-----|-----|---------------------------|-----|------|-----|-----|-------|-----------|
|            | Time       | Min | Time | Max | Avg | Time            | Min | Time | Max | Avg | Time                      | Min | Time | Max | Avg | Total | Total     |
| 02/25/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/26/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/27/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/28/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 02/29/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/01/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/02/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.01      |
| 03/03/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/04/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/05/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/06/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       |           |
| 03/07/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.58      |
| 03/08/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.02      |
| 03/09/2020 |            |     |      |     |     |                 |     |      |     |     |                           |     |      |     |     |       | 0.11      |

**Report Summary For The Period 11/16/2019 00:00 - 03/09/2020 23:59**

|       | Rain (in) |
|-------|-----------|
| Total | 5.26      |
| Avg   |           |

**APPENDIX C**  
City of Milpitas  
Sewer Master Plan Study  
Summary of GIS Updates

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## GIS Updates

The City provided their most up-to-date records of the wastewater collection system as an ArcGIS geodatabase (GIS) as well as a hard-drive containing most of the record drawings on file. The GIS had not been updated with any recent CIP projects implemented since the last model update in 2009. The City also provided a spreadsheet listing all of the record drawings and designating them as one of the following seven categories:

1. Category 1: Pre-2002, DWG # is not referenced on GIS, plat sheet # has been identified;
2. Category 2: Pre-2002, DWG # is referenced on GIS, plat sheet # has not been identified;
3. Category 3: Pre-2002, DWG # is not referenced on GIS, plat sheet # has not been identified;
4. Category 4: Post-2002, DWG # is referenced on GIS, plat sheet # has not been identified;
5. Category 5: Post-2002, DWG # is referenced on GIS, plat sheet # has been identified;
6. Category 6: Post-2002, DWG # is not referenced on GIS, plat sheet # has been identified, alignment not drawn in GIS; and
7. Category 7: Post-2002, No utility improvements but existing utilities shown on plan for reference.

Based on these categories, the following drawing reviews were completed to update the GIS:

1. All category 1, 4, and 5 record drawings, along with many category 2 record drawings, were reviewed and updates were made where there was missing information;
2. All available category 3 record drawings were reviewed, but none of the available drawings had any sanitary sewer pipe information;
3. All category 6 record drawings were reviewed and new alignments were added;
4. Benchmark and/or datum information found on each reviewed drawing was recorded or it was noted if there was no information.

Based on the review of the abovementioned record drawings, the following information was added to or updated in the GIS:

1. Pipe GIS updates:
  - Material, diameter, upstream and downstream invert elevations, measured length, slope, year built, and drawing number were updated where information was found in the set of available record drawings;
  - The actual length was also calculated using one dimensional horizontal distance calculator in ArcGIS once all updates were complete;
  - Where siphons are located throughout the system, “siphon” was listed in the “slope” field;
  - All existing pipe segments with the material “High Density Polyurethane” were changed to “HDPE” for consistency with the rest of the system;
  - In cases where the pipe material was not specified on the drawing, but it was listed in the notes that all sanitary sewer pipes on this drawing should be, for example, “VCP or ABS or other approved material,” the material was listed as “VCP/ABS”;
  - Where the material was listed as “SS” or “SSP” and no material was listed in the record drawings, these were left as “SS” or “SSP.” When referring to pipe material, these

acronyms often represent stainless steel pipe; however, for a gravity collection system, it is assumed that these are simply to indicate that the pipelines are “sanitary sewer” and are not a representation of the pipe material;

- An attribute column titled “HSE\_NOTES” was added for tracking notes and edits made to the pipeline GIS file. Notes were standardized to the extent possible for streamlined sorting. Notes indicated in that column include the following:
  - If a drawing indicated that a liner was added to an existing pipe or the pipe was rehabilitated, the year built was updated to indicate the year the liner was added or the rehab was completed, and “UPDT\_YR(NEWLINER)” or “UPDT\_YR(REHAB)” was added;
  - Abandoned pipes were labeled “ABANDONED”;
  - New pipes were labeled “ADDED\_SEGMENT”;
  - Pipes that were already in GIS but were indicated as private on record drawings were labeled “PRIVATE”;

2. Manhole GIS updates:

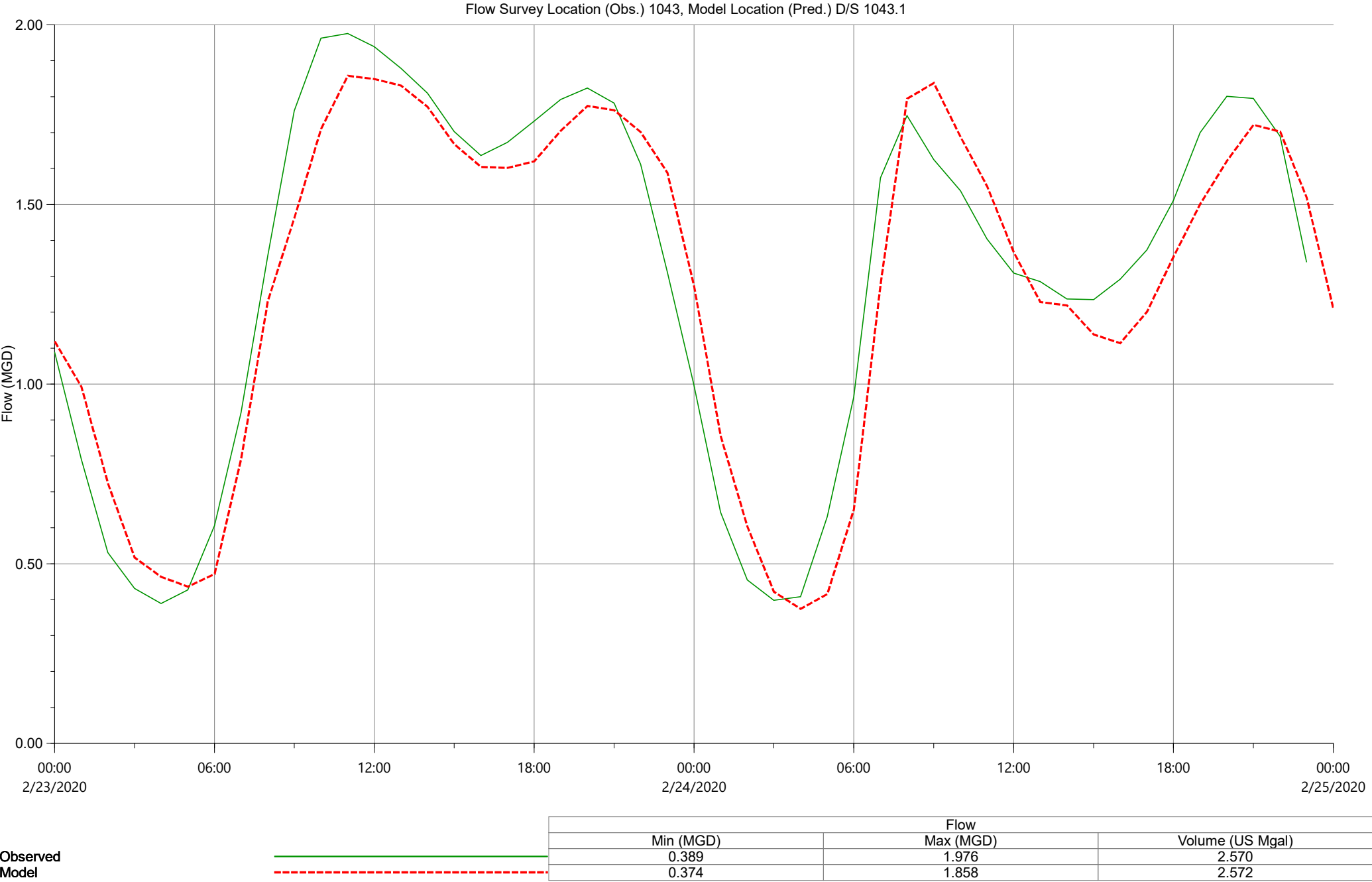
- Rim elevation, year of installation, and drawing number were updated where available;
- Manhole invert elevations were not typically available on record drawings and were not prioritized;
- An attribute column titled “HSE\_NOTES” was also added for tracking notes and edits made to the manhole GIS file. Notes indicated in that column include the following:
  - Abandoned and floating manholes were labeled “ABANDONED” or “DISCONNECTED,” respectively;
  - New manholes were labeled “ADDED\_MH”;

3. Two of the fields included in the attributes table for both the pipeline and manhole GIS files are DRAWINGNO (drawing number) and UPDTSRC (update source). The DRAWINGNO was reserved for the original utility construction drawing. The UPDTSRC field indicated the drawing number for updates made during our review and generally referred to record drawings of new facilities that might show the facility as “existing.”

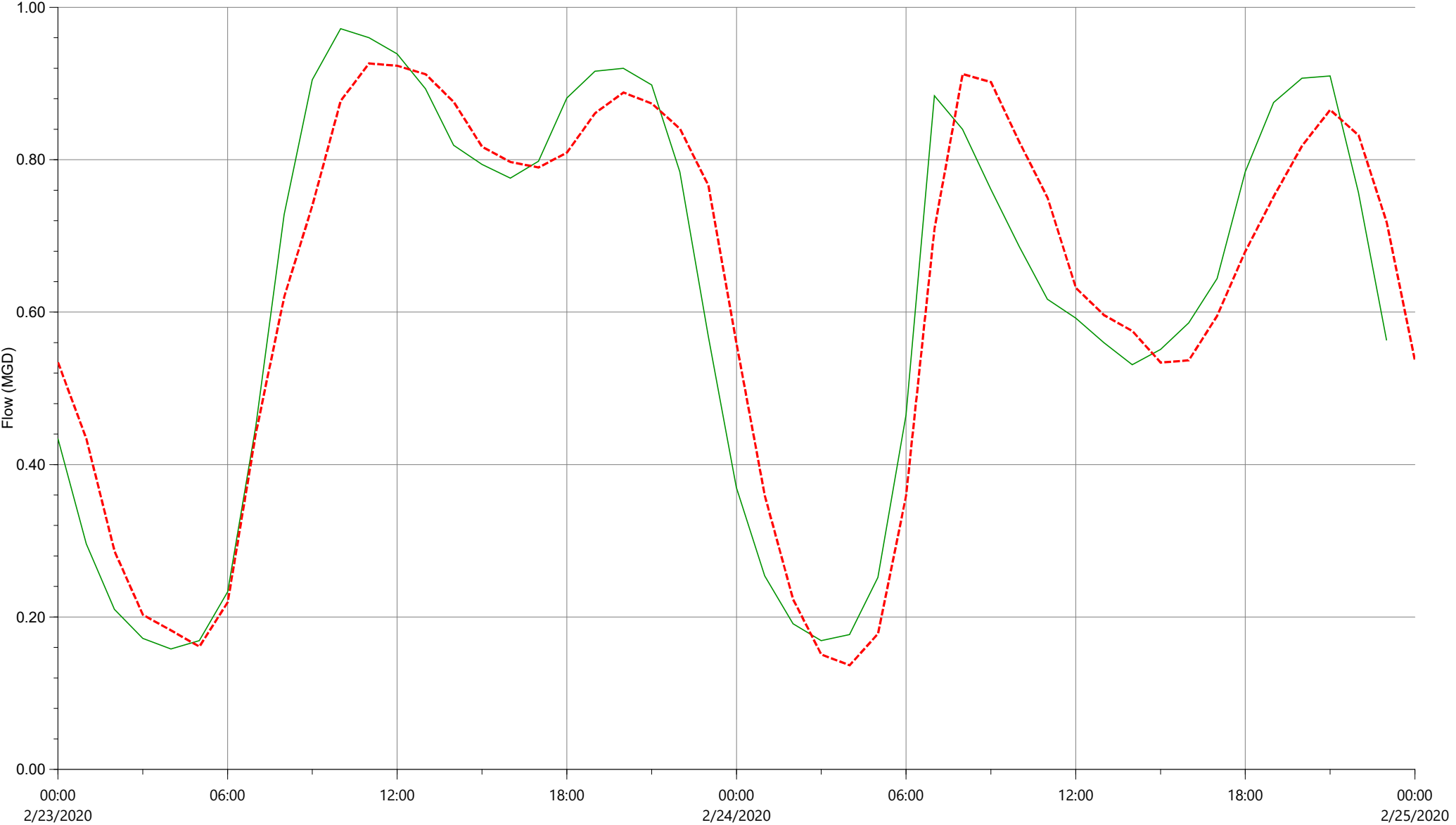
During the GIS update process, the update of model information for areas containing either flow splits or where critical information, such as pipe diameter, material, invert elevations, and year built, was missing was prioritized.

**APPENDIX D**  
City of Milpitas  
Sewer Master Plan Study  
Dry Weather Calibration Charts

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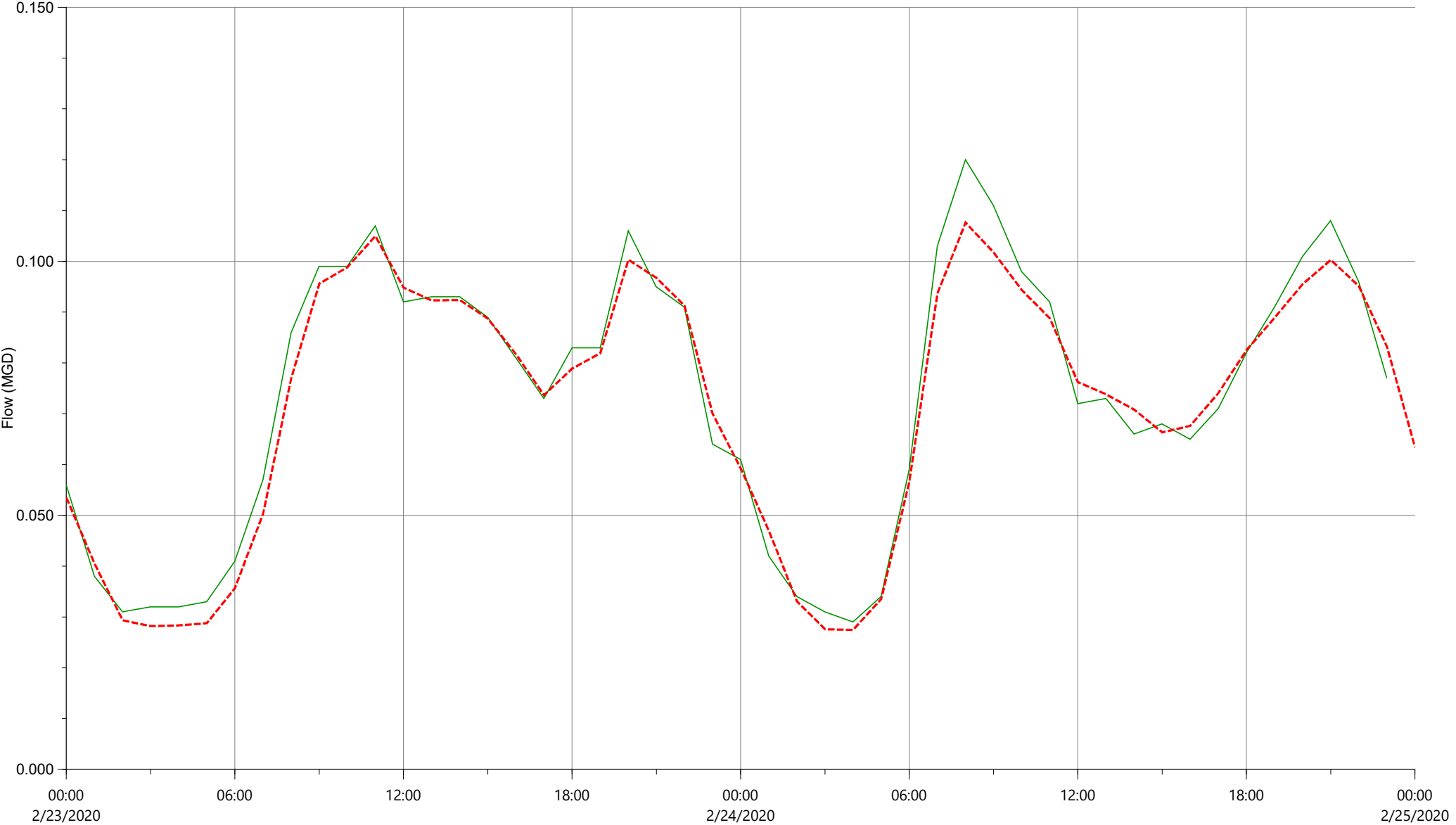


Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.158     | 0.972     | 1.213            |
| 0.137     | 0.926     | 1.249            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

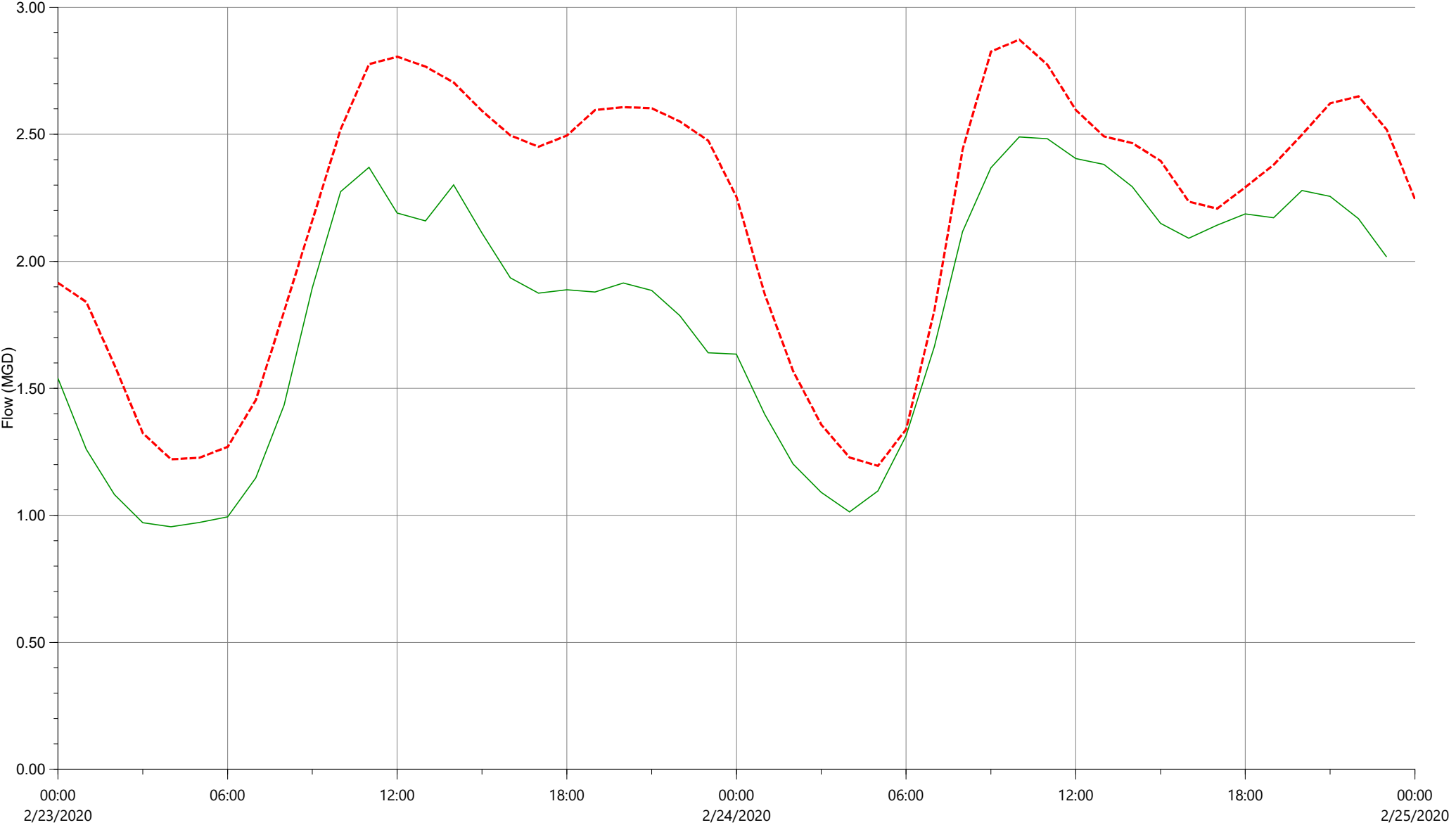


Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.029     | 0.120     | 0.145            |
| 0.027     | 0.108     | 0.144            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

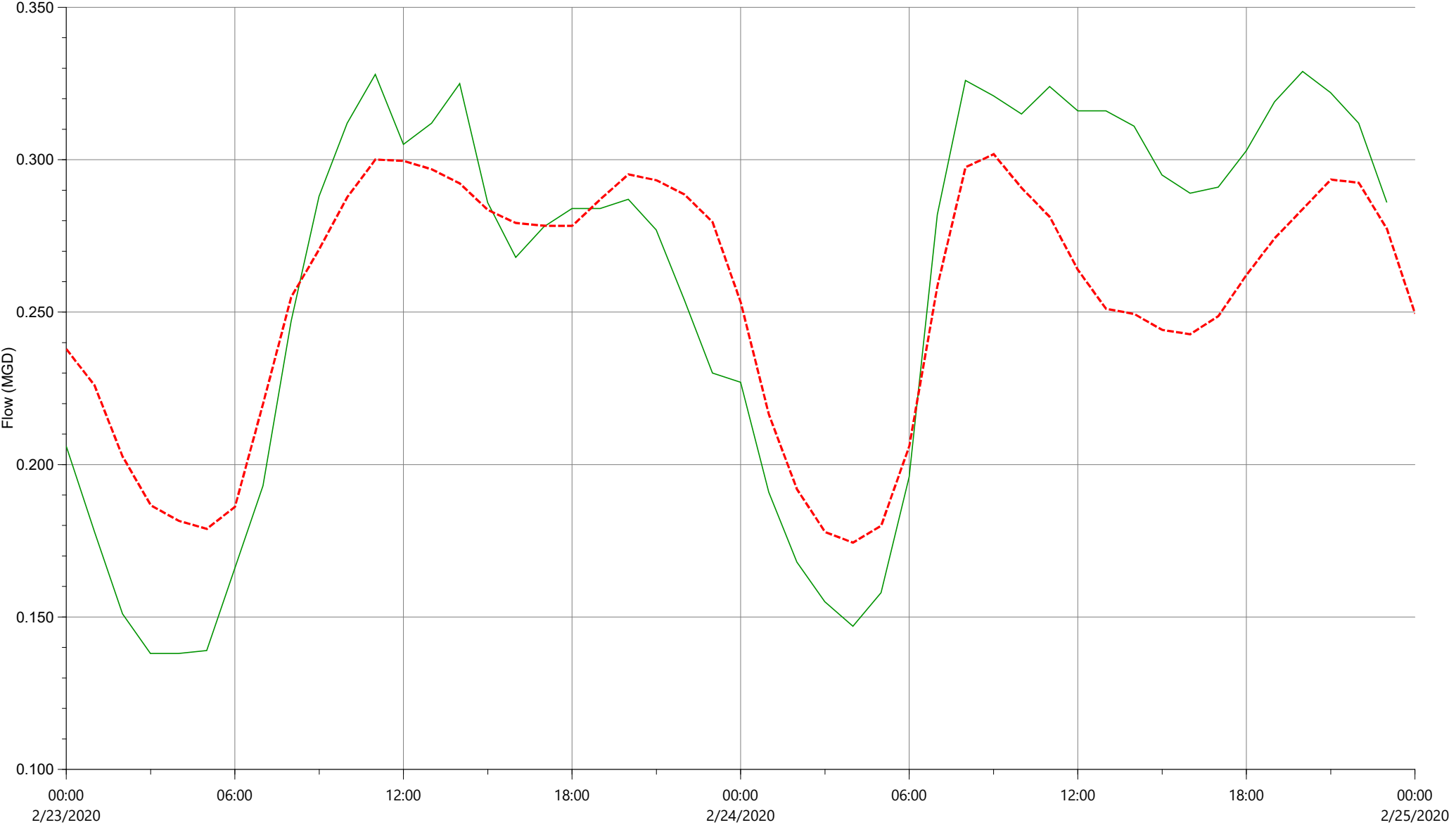


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.955     | 2.490     | 3.546            |
| 1.196     | 2.874     | 4.388            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

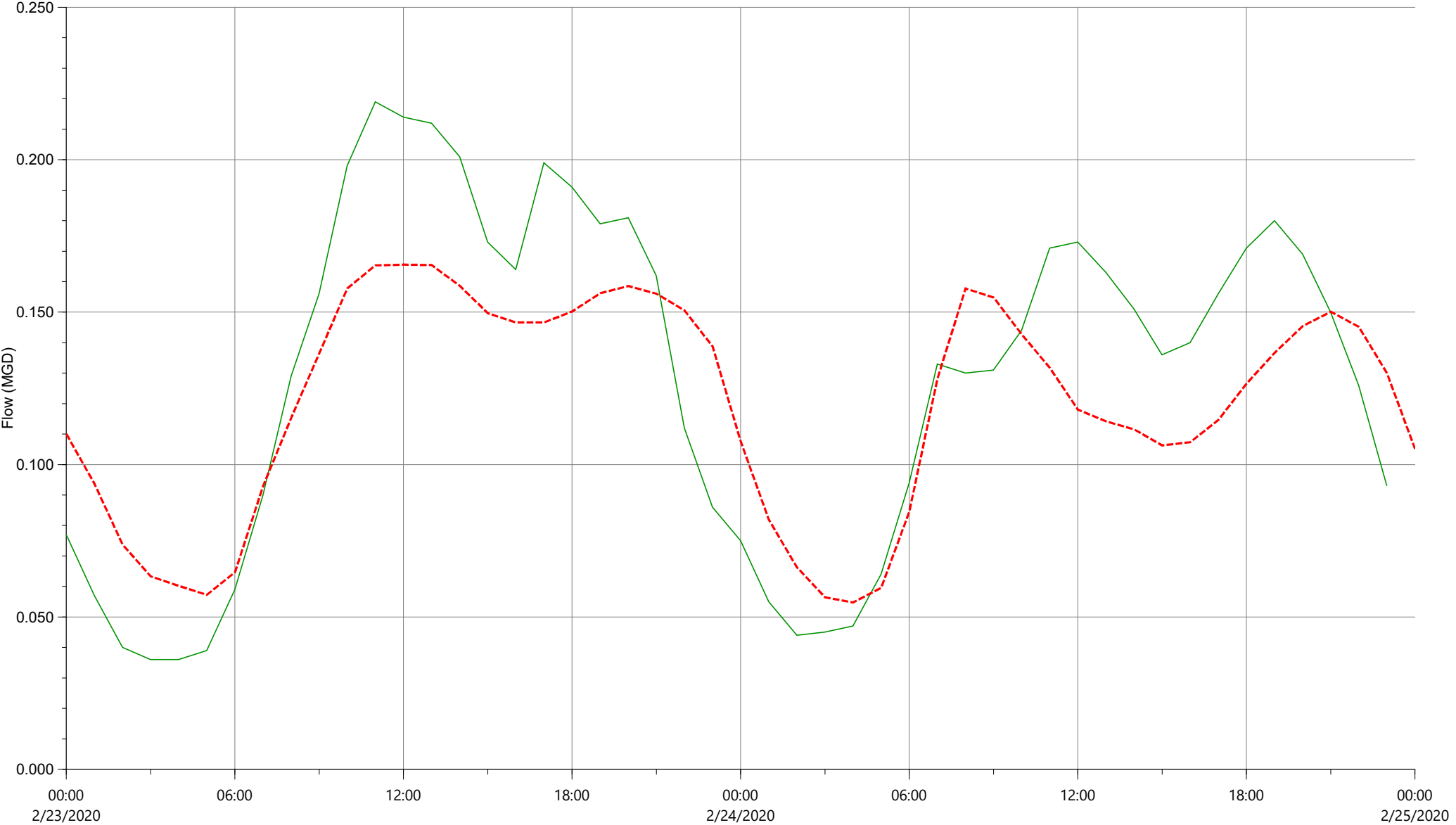


Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.138     | 0.329     | 0.505            |
| 0.174     | 0.302     | 0.509            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



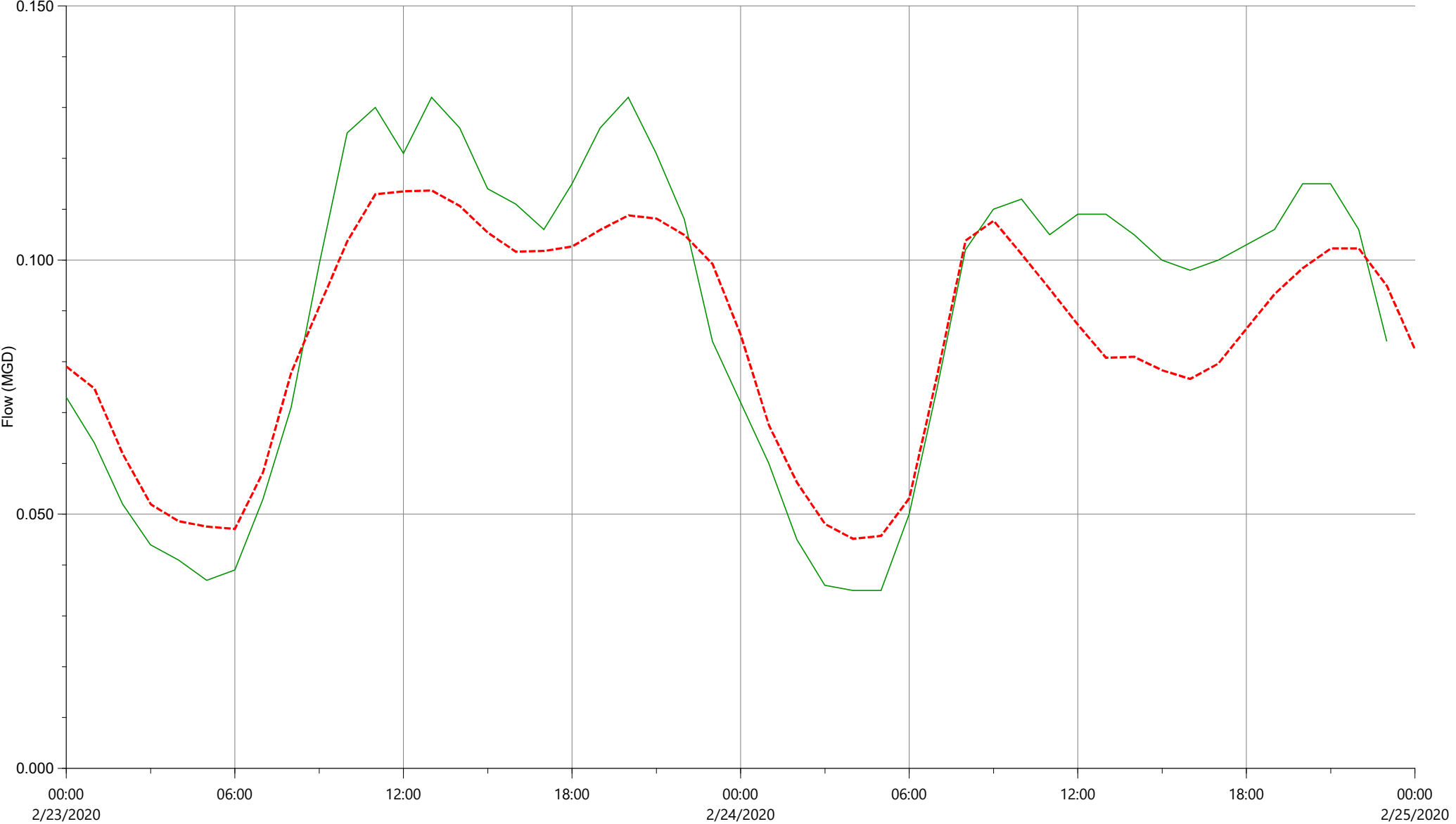
Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.036     | 0.219     | 0.253            |
| 0.055     | 0.166     | 0.240            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



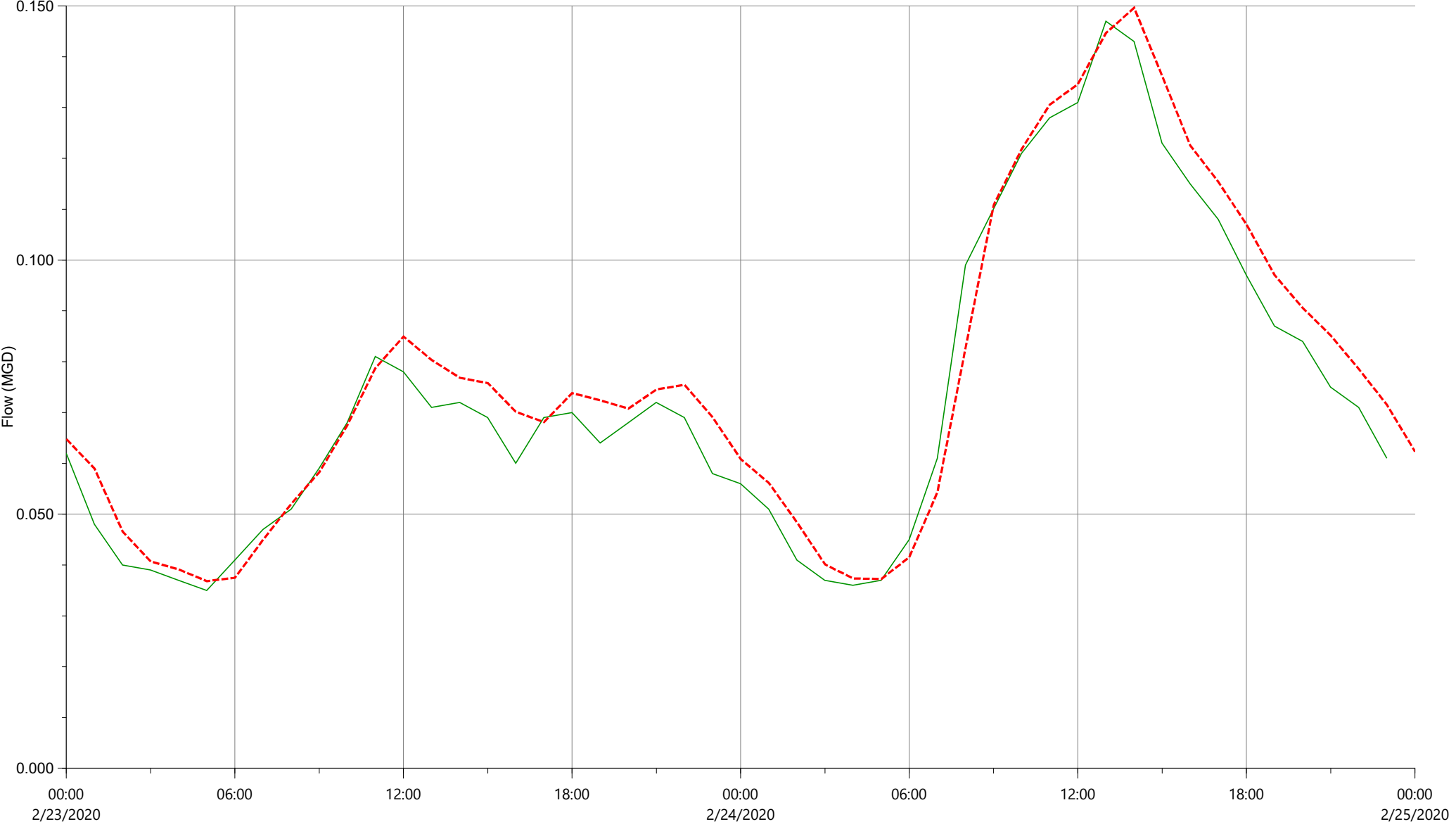


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.035     | 0.132     | 0.176            |
| 0.045     | 0.114     | 0.170            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

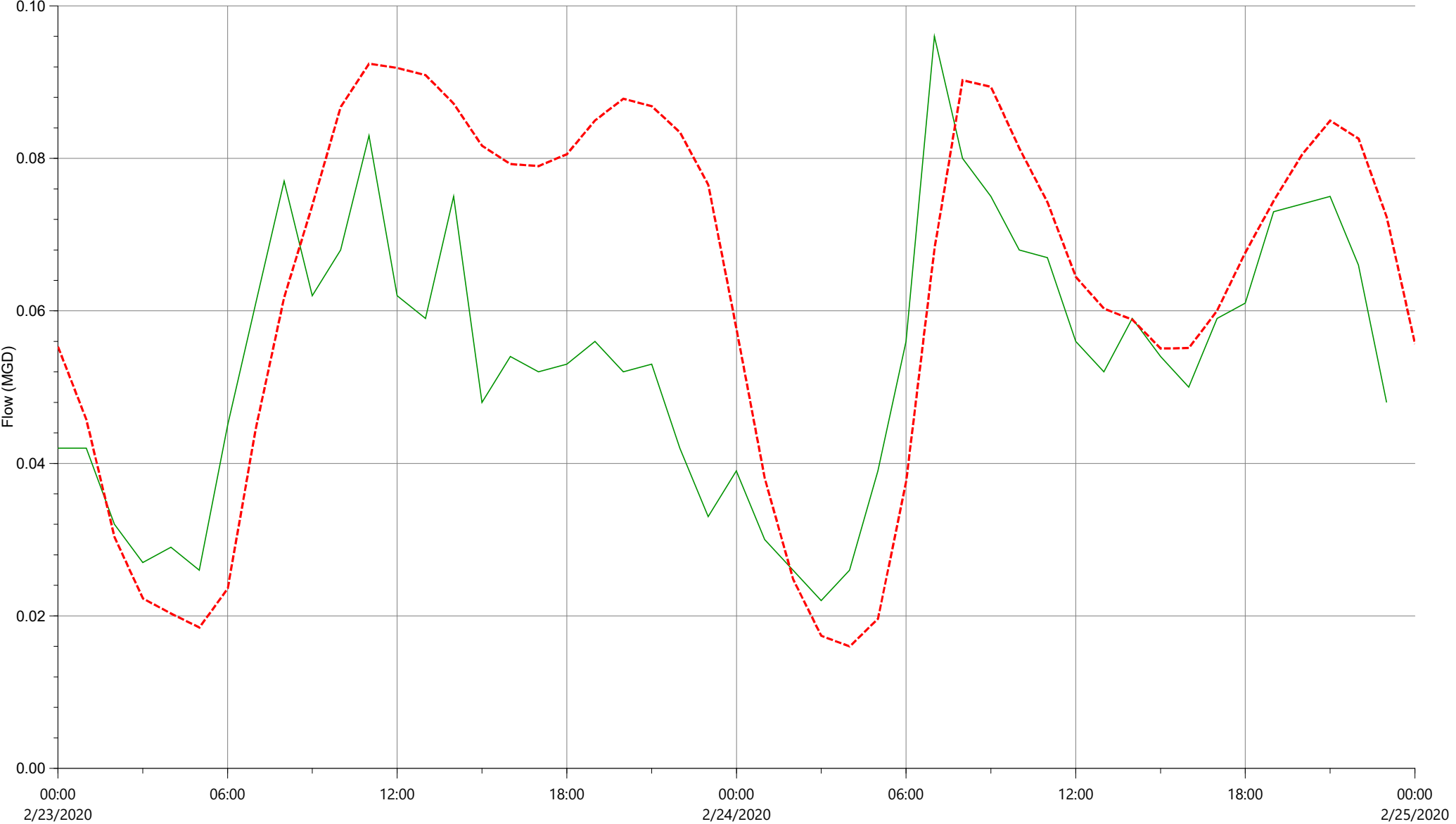


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.035     | 0.147     | 0.143            |
| 0.037     | 0.150     | 0.153            |

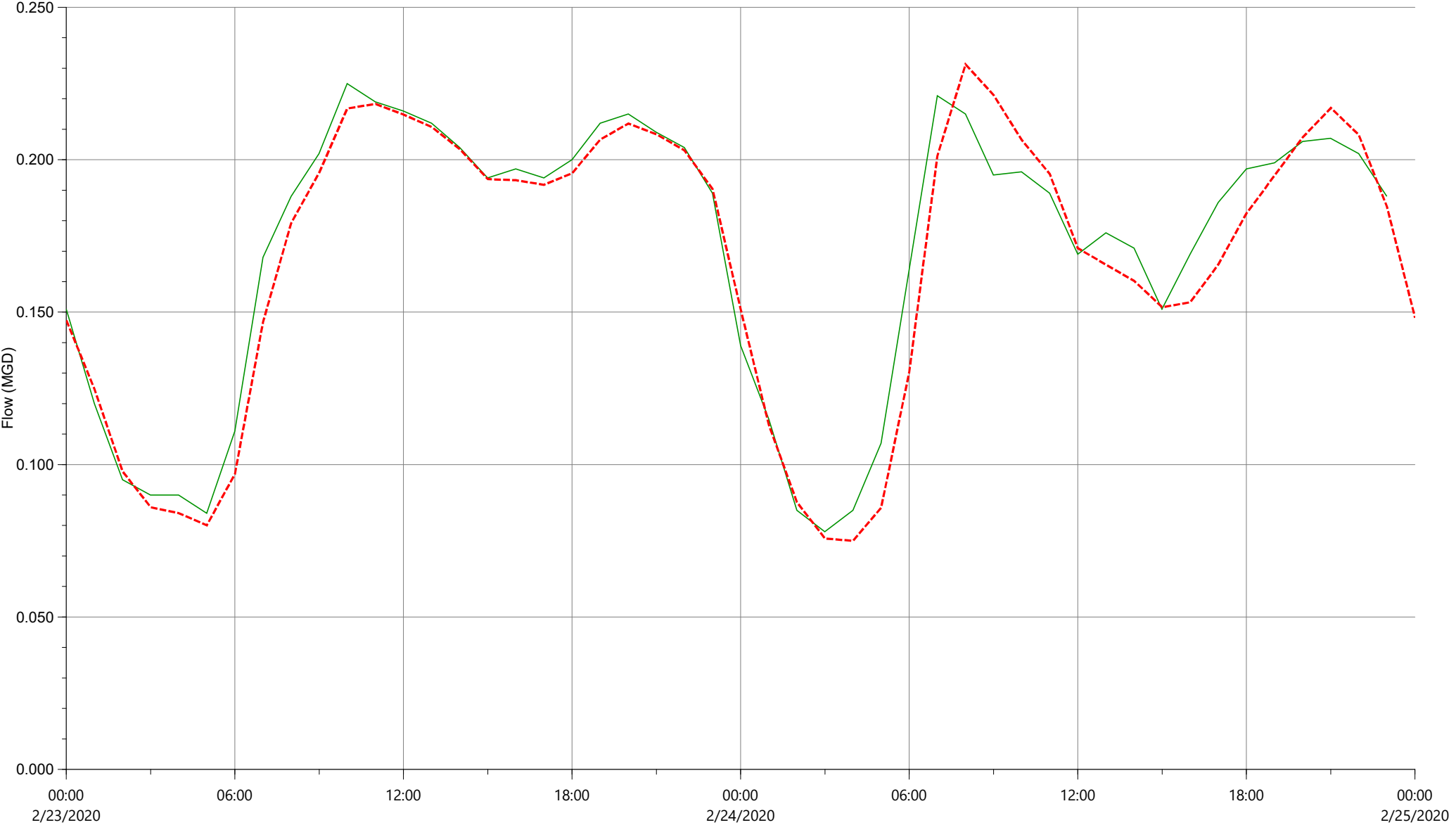
# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



Observed  
Model

| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.022     | 0.096     | 0.106            |
| 0.016     | 0.092     | 0.126            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

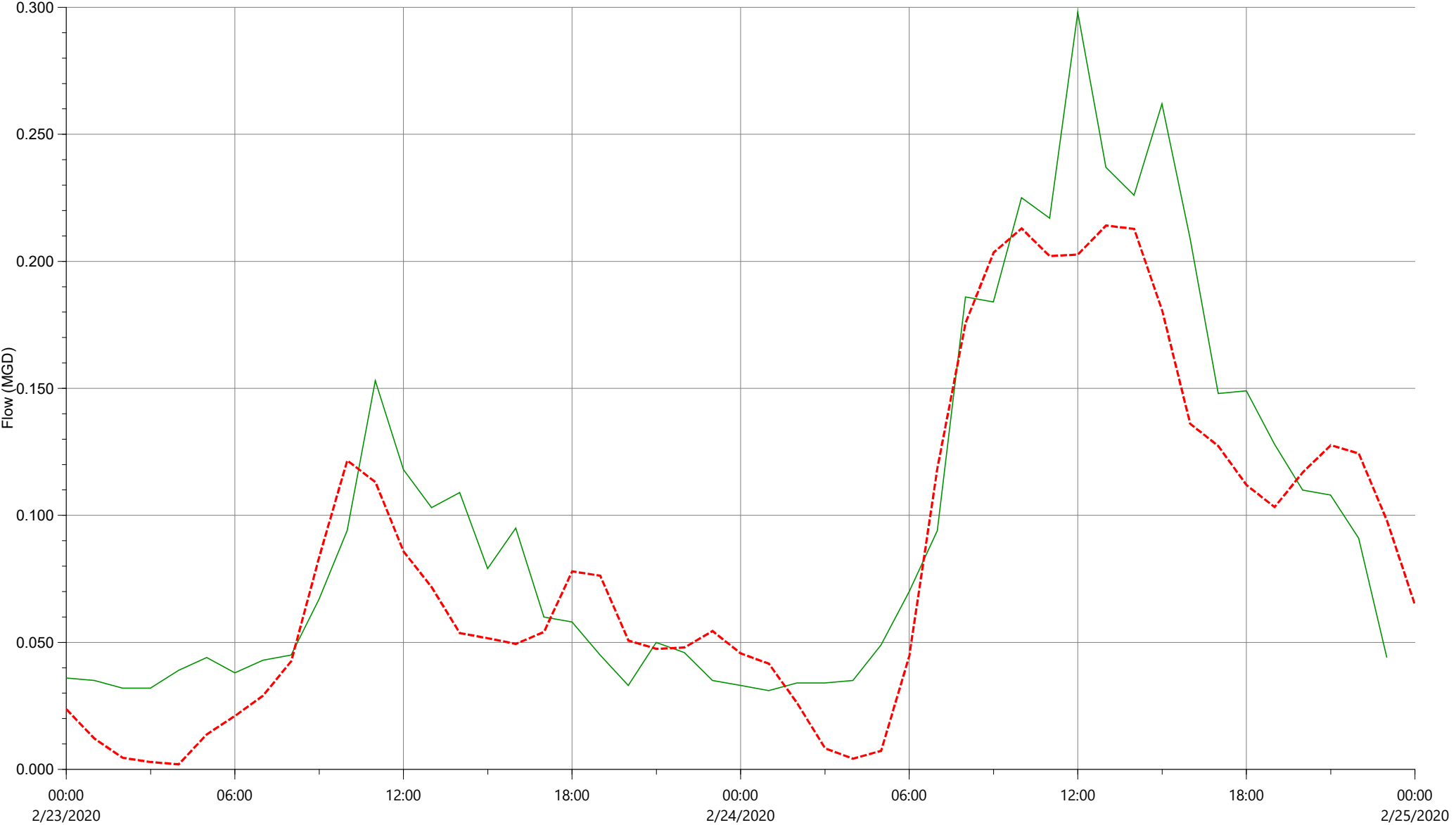


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.078     | 0.225     | 0.335            |
| 0.075     | 0.231     | 0.335            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



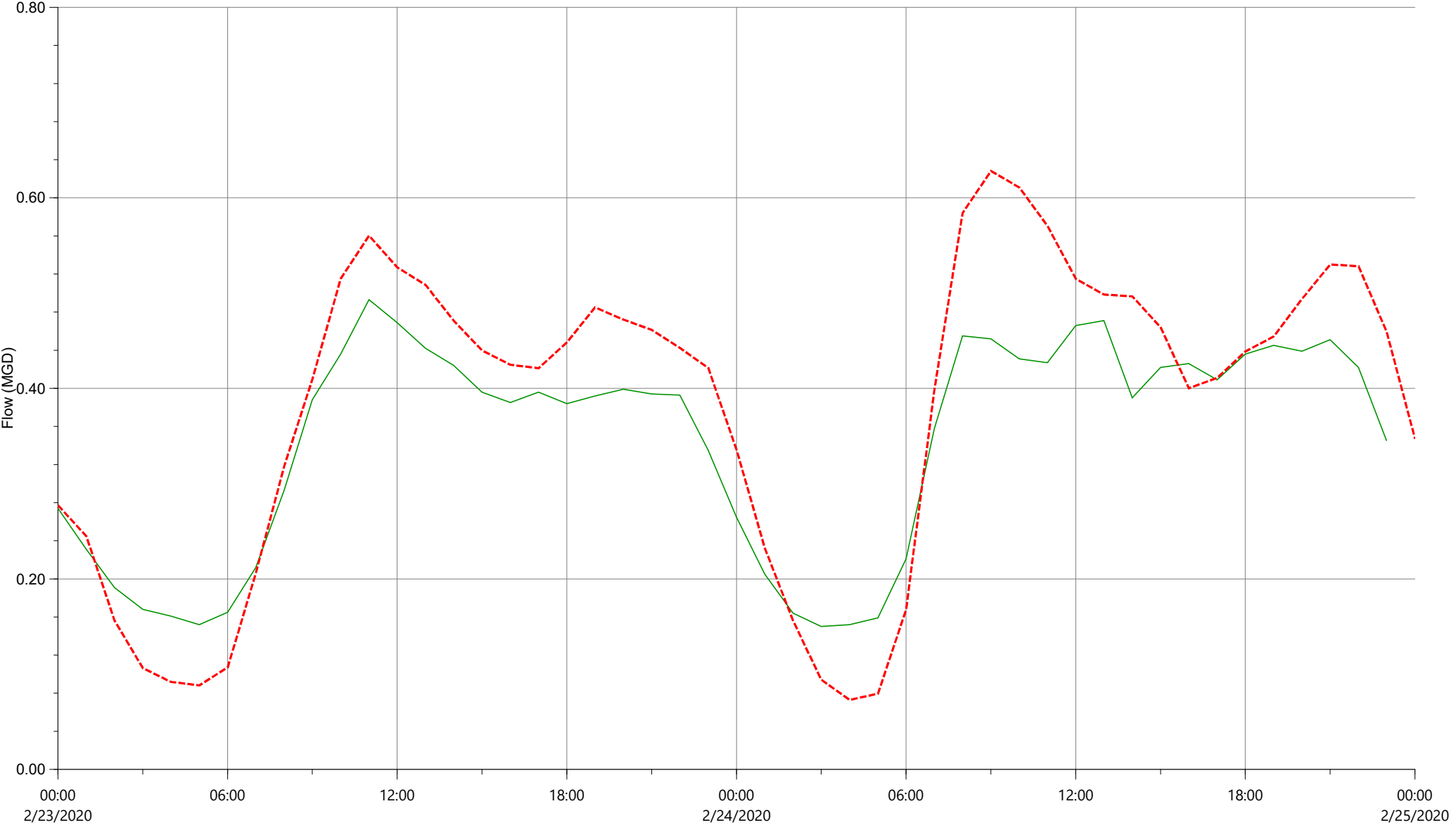
Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.031     | 0.298     | 0.194            |
| 0.002     | 0.214     | 0.169            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



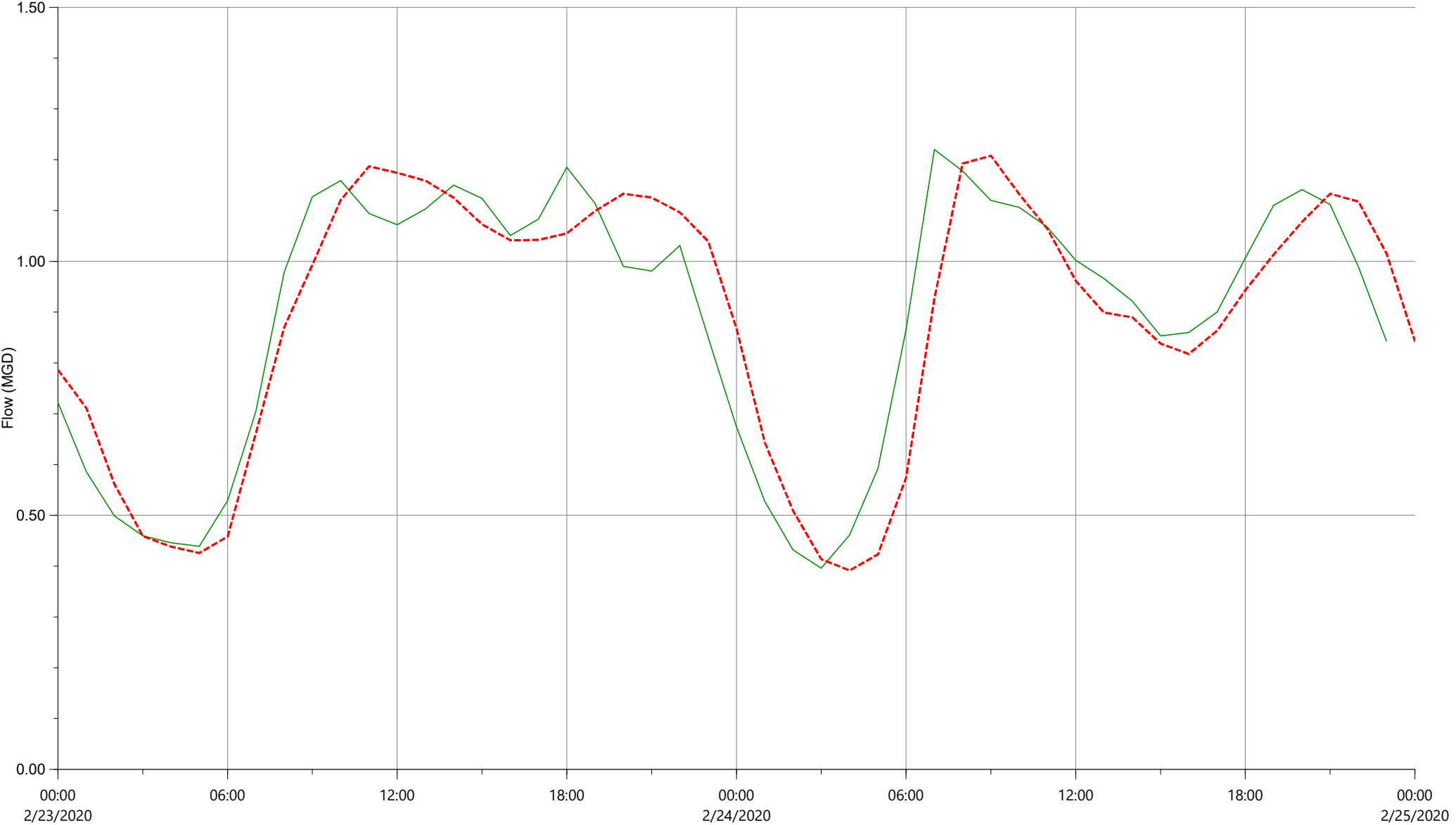


Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.150     | 0.493     | 0.676            |
| 0.073     | 0.628     | 0.761            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

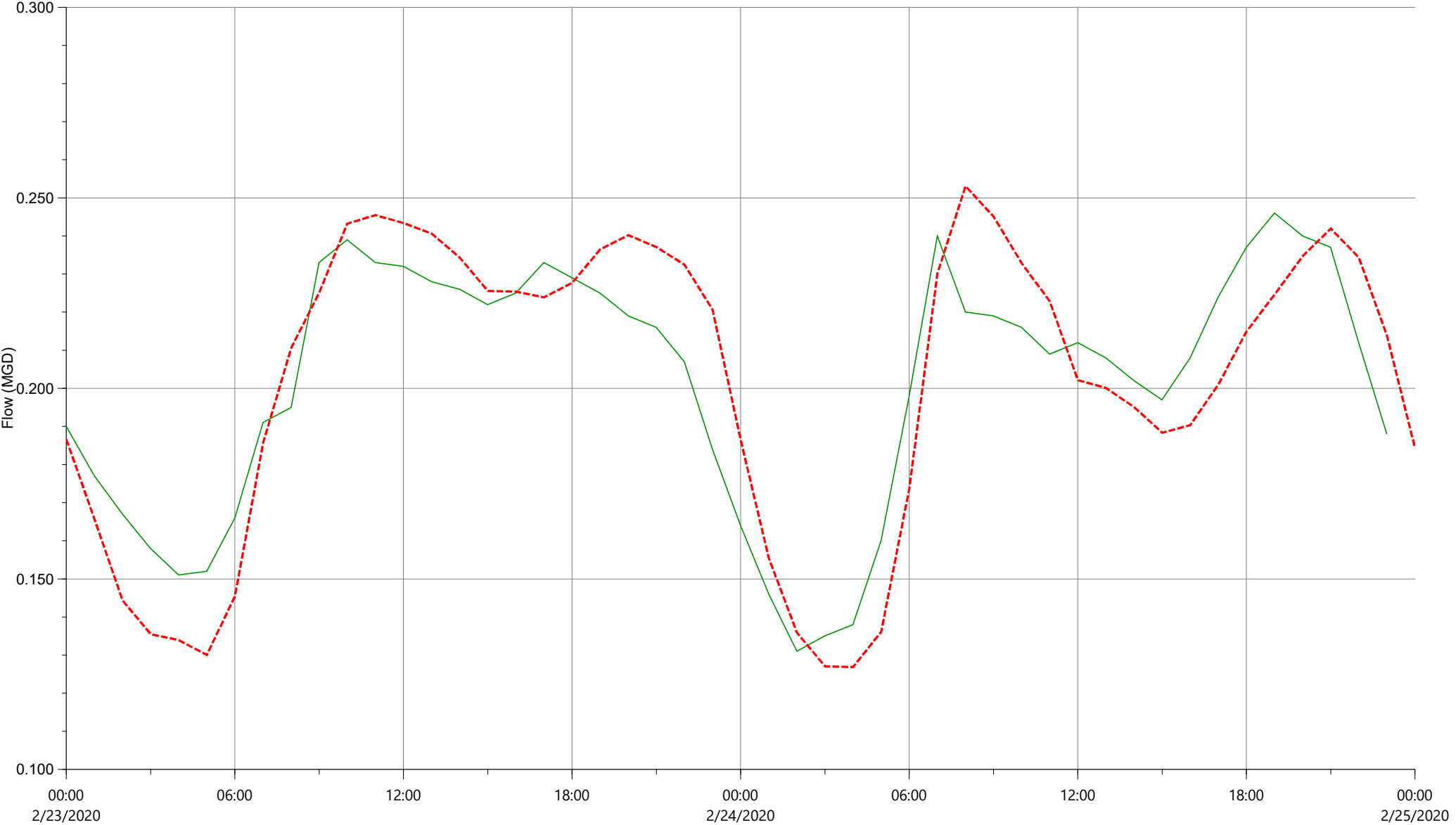


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.396     | 1.220     | 1.752            |
| 0.392     | 1.208     | 1.783            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

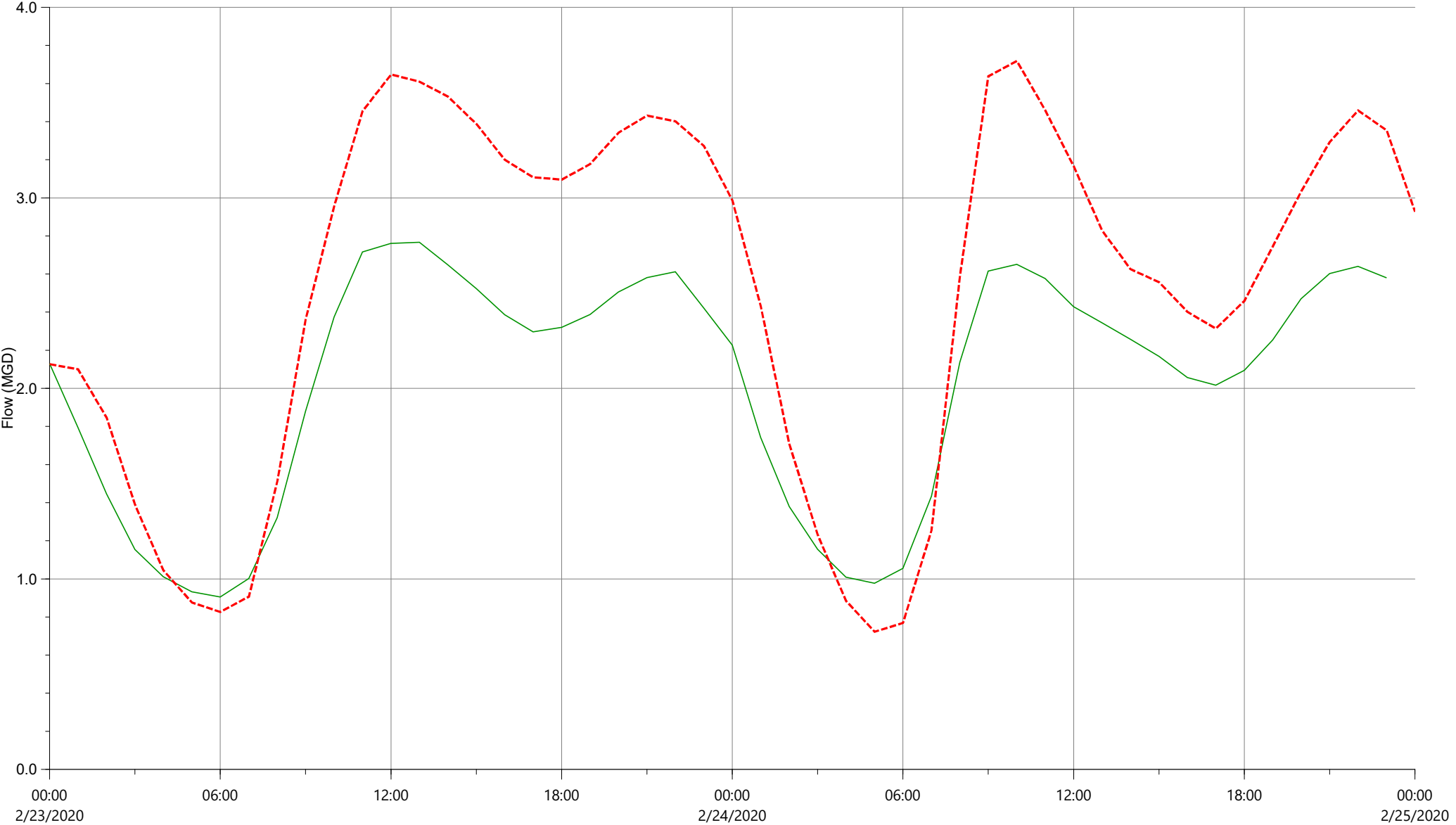


Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.131     | 0.246     | 0.396            |
| 0.127     | 0.253     | 0.404            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

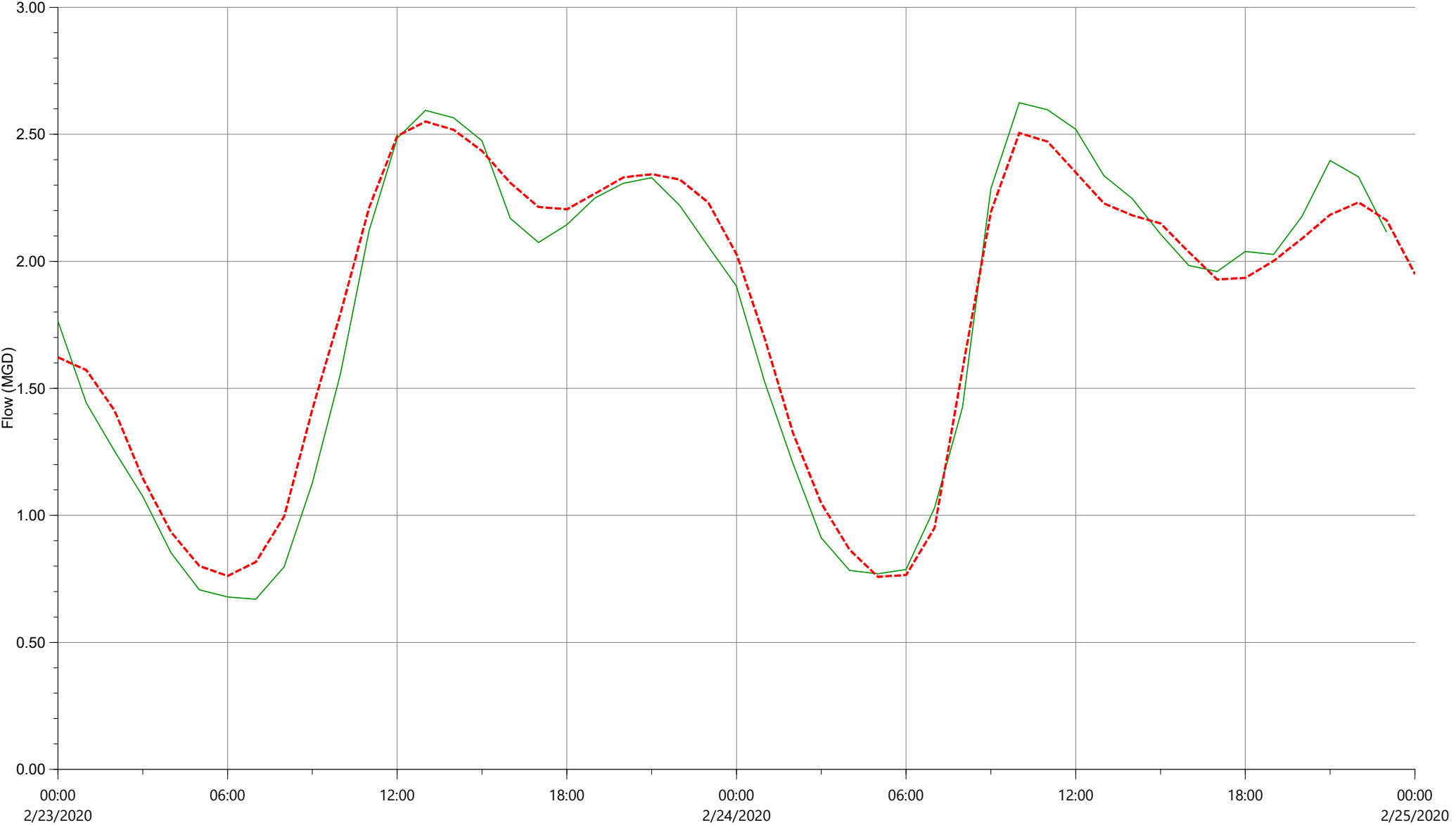


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.905     | 2.767     | 3.975            |
| 0.723     | 3.719     | 5.069            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



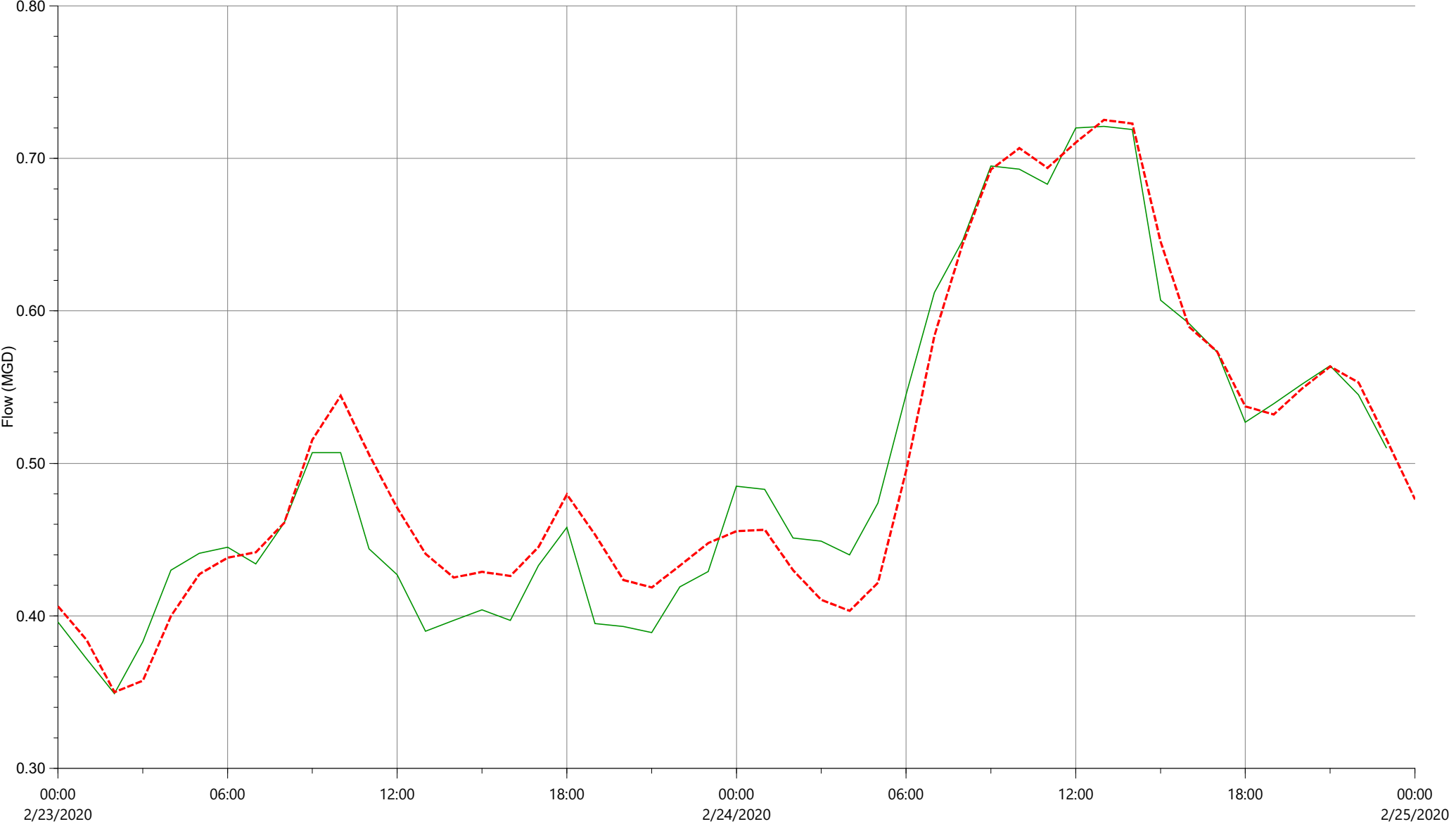
Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.670     | 2.624     | 3.494            |
| 0.758     | 2.551     | 3.648            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



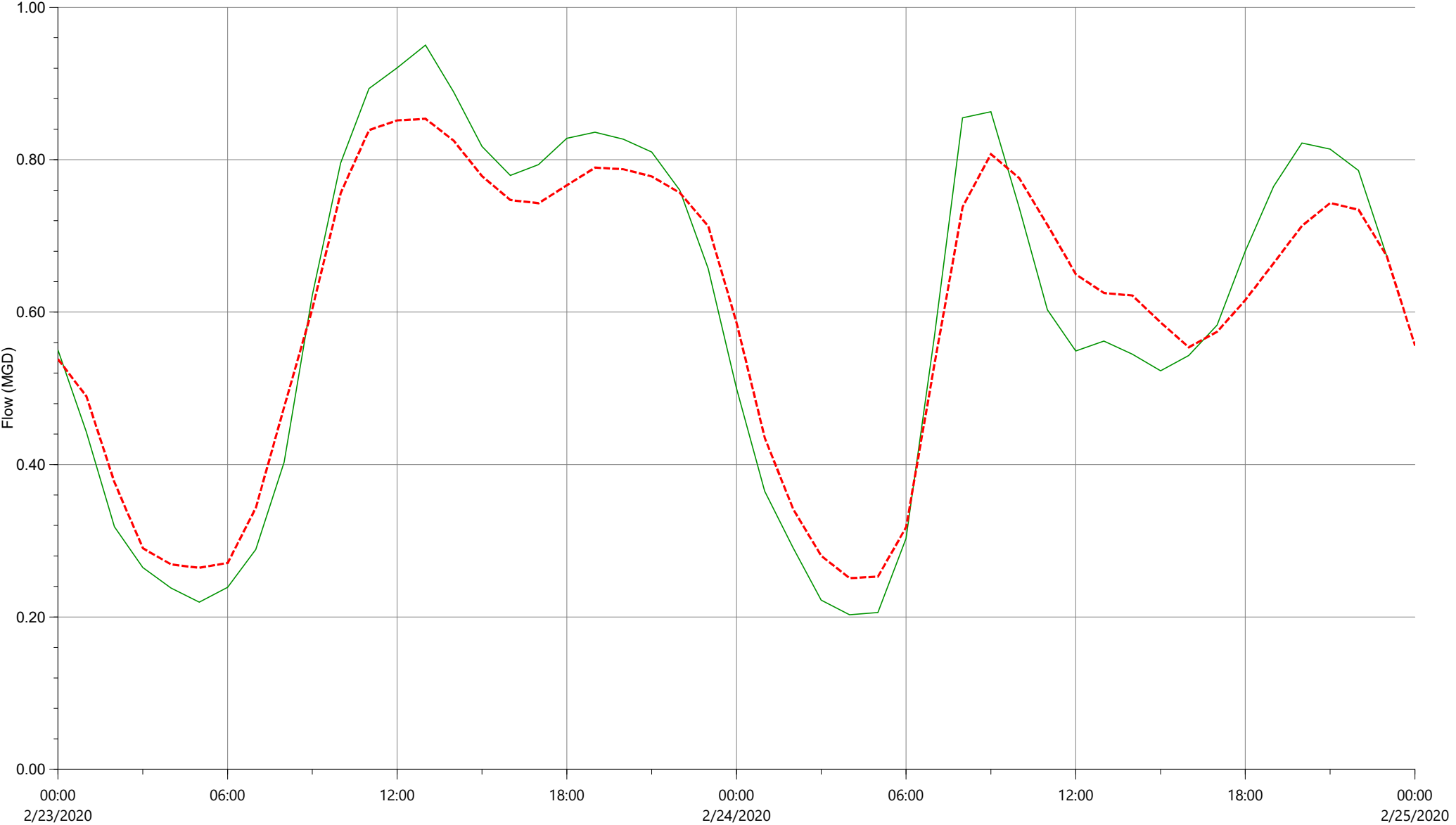


Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.349     | 0.721     | 0.978            |
| 0.350     | 0.725     | 1.007            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

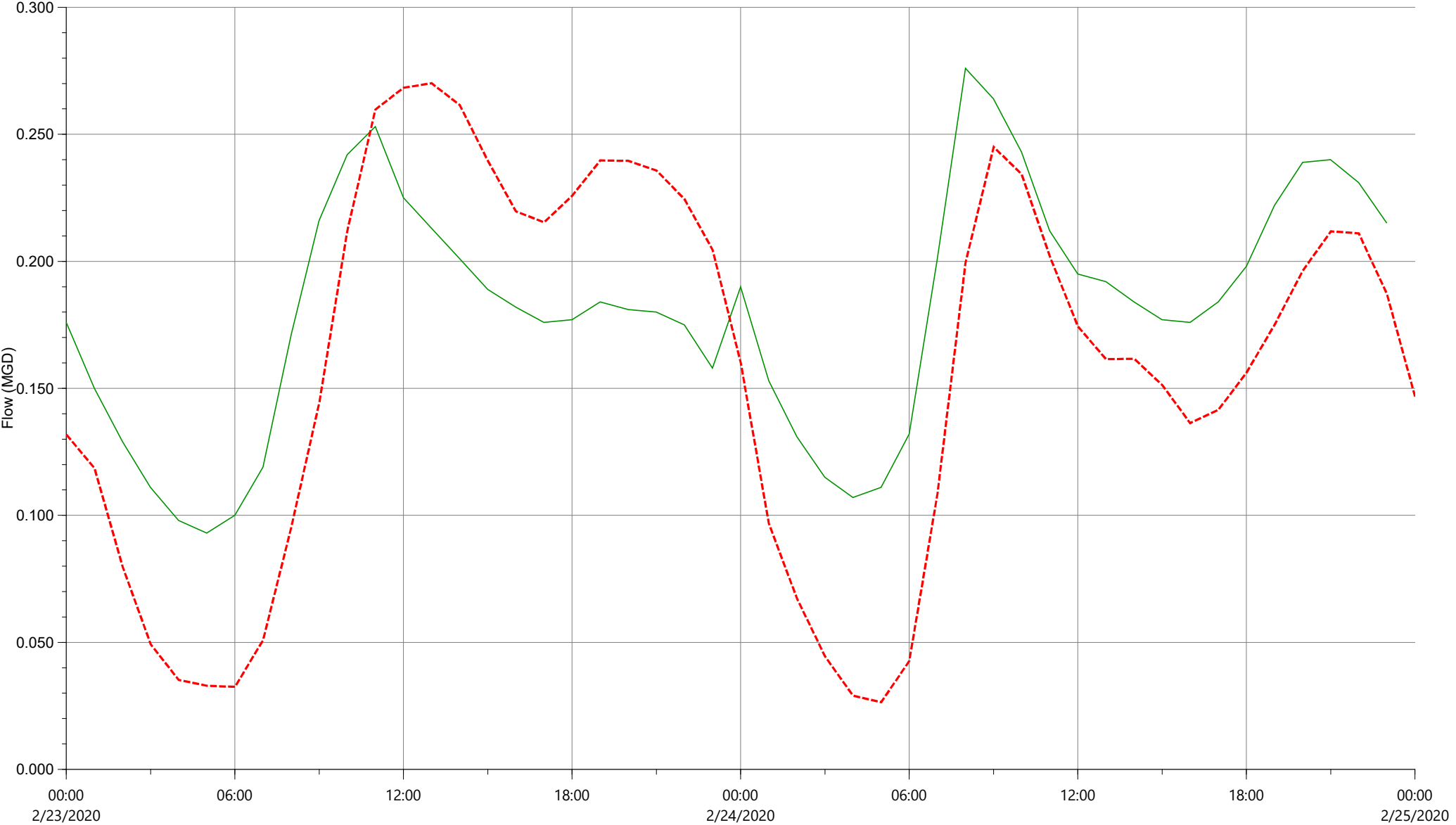


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.203     | 0.951     | 1.171            |
| 0.251     | 0.854     | 1.196            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

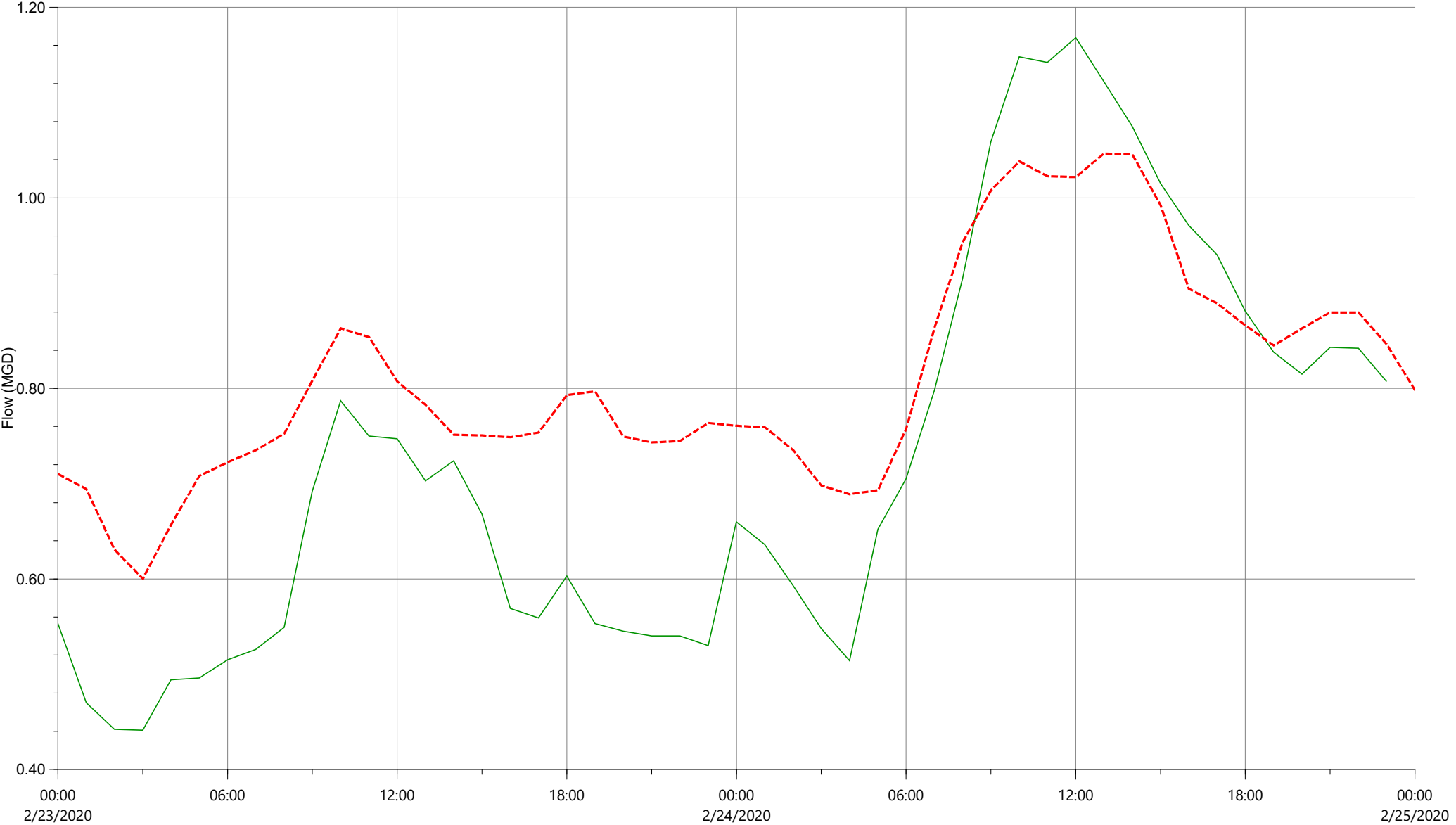


Observed  
Model



| Flow      |           | Volume (US Mgal) |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) |                  |
| 0.093     | 0.276     | 0.354            |
| 0.027     | 0.270     | 0.317            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

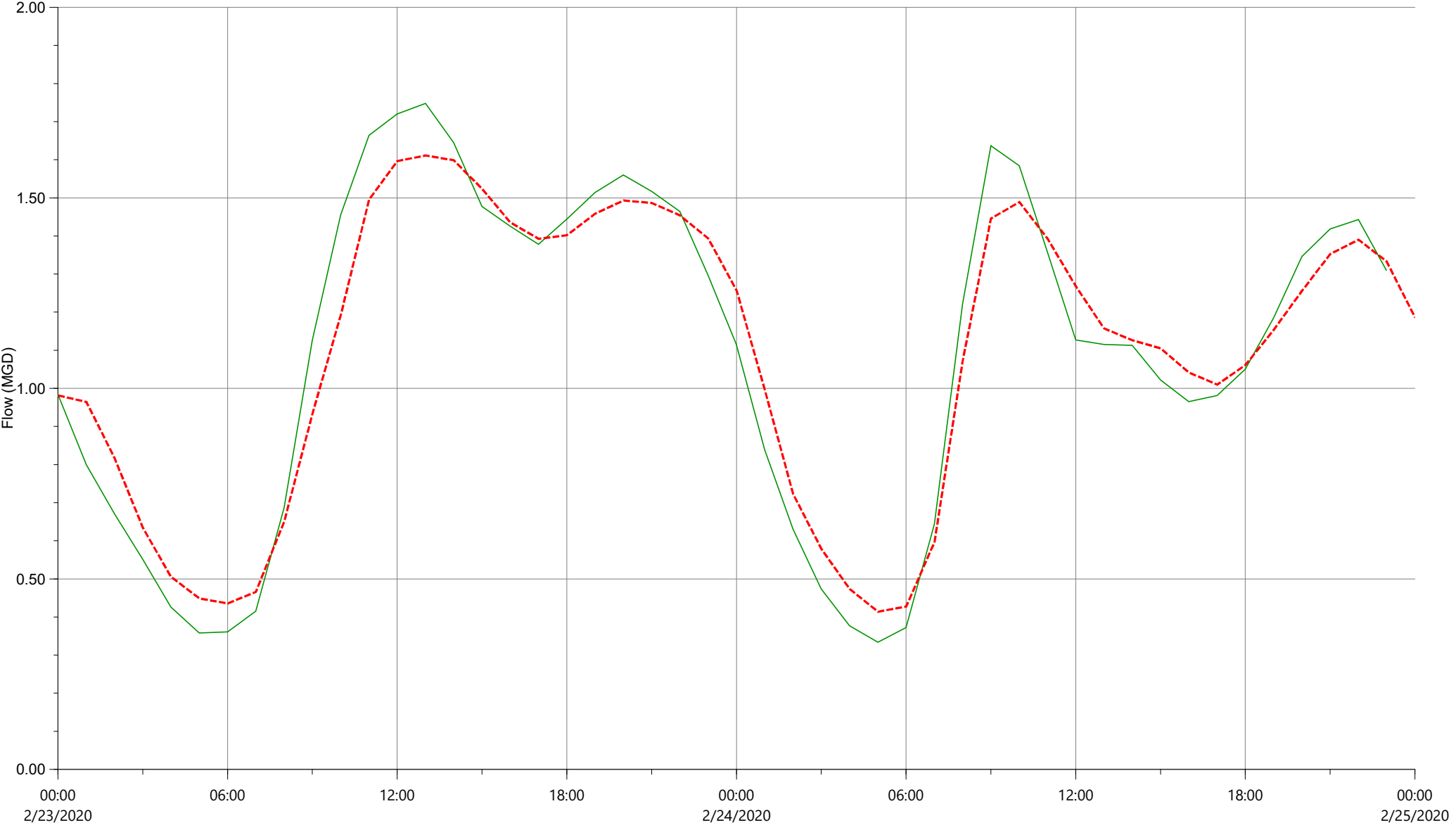


Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.441     | 1.168     | 1.417            |
| 0.600     | 1.047     | 1.626            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



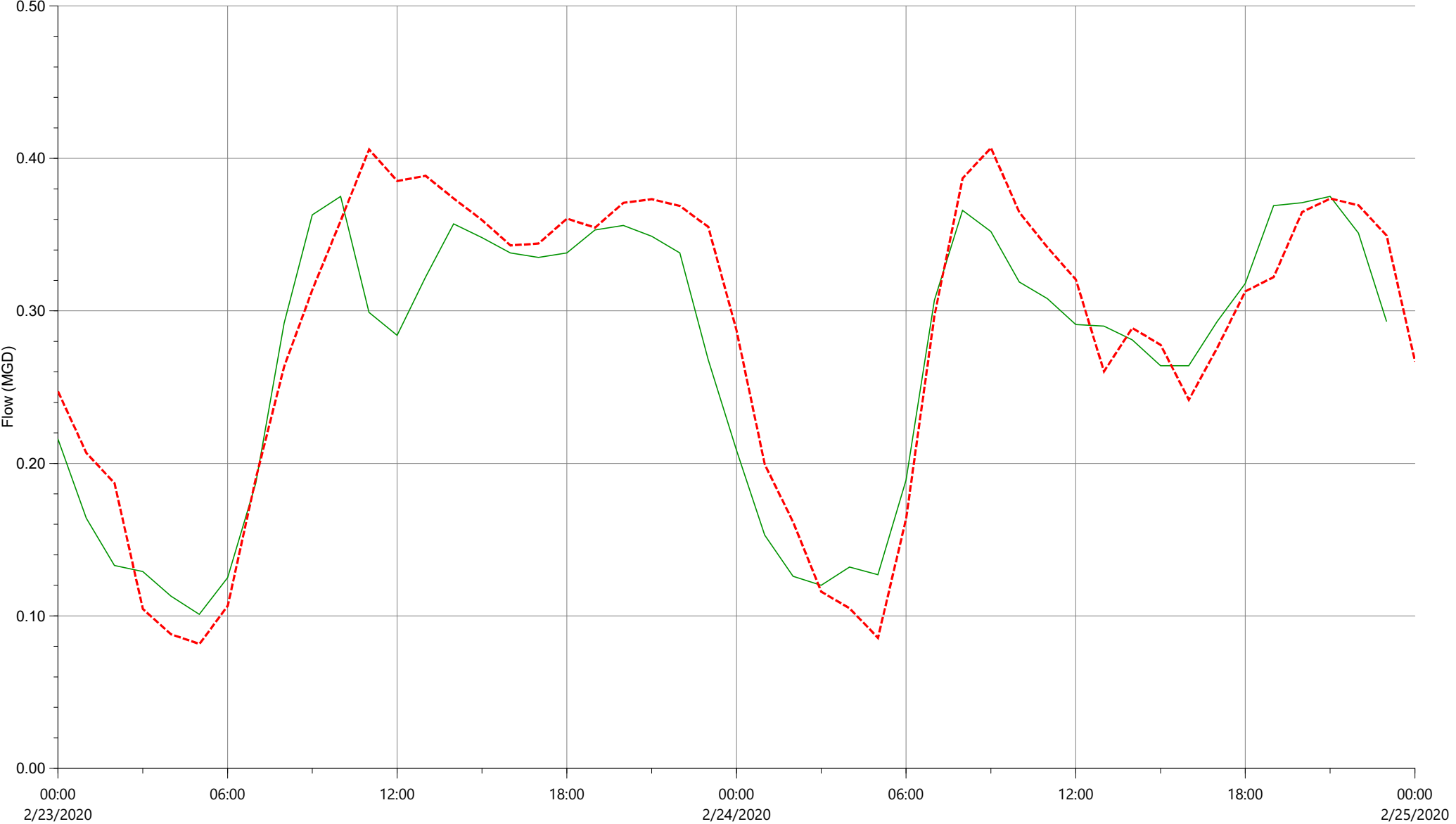
Observed  
Model



| Flow      |           |                  |
|-----------|-----------|------------------|
| Min (MGD) | Max (MGD) | Volume (US Mgal) |
| 0.334     | 1.748     | 2.133            |
| 0.414     | 1.611     | 2.192            |

# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL



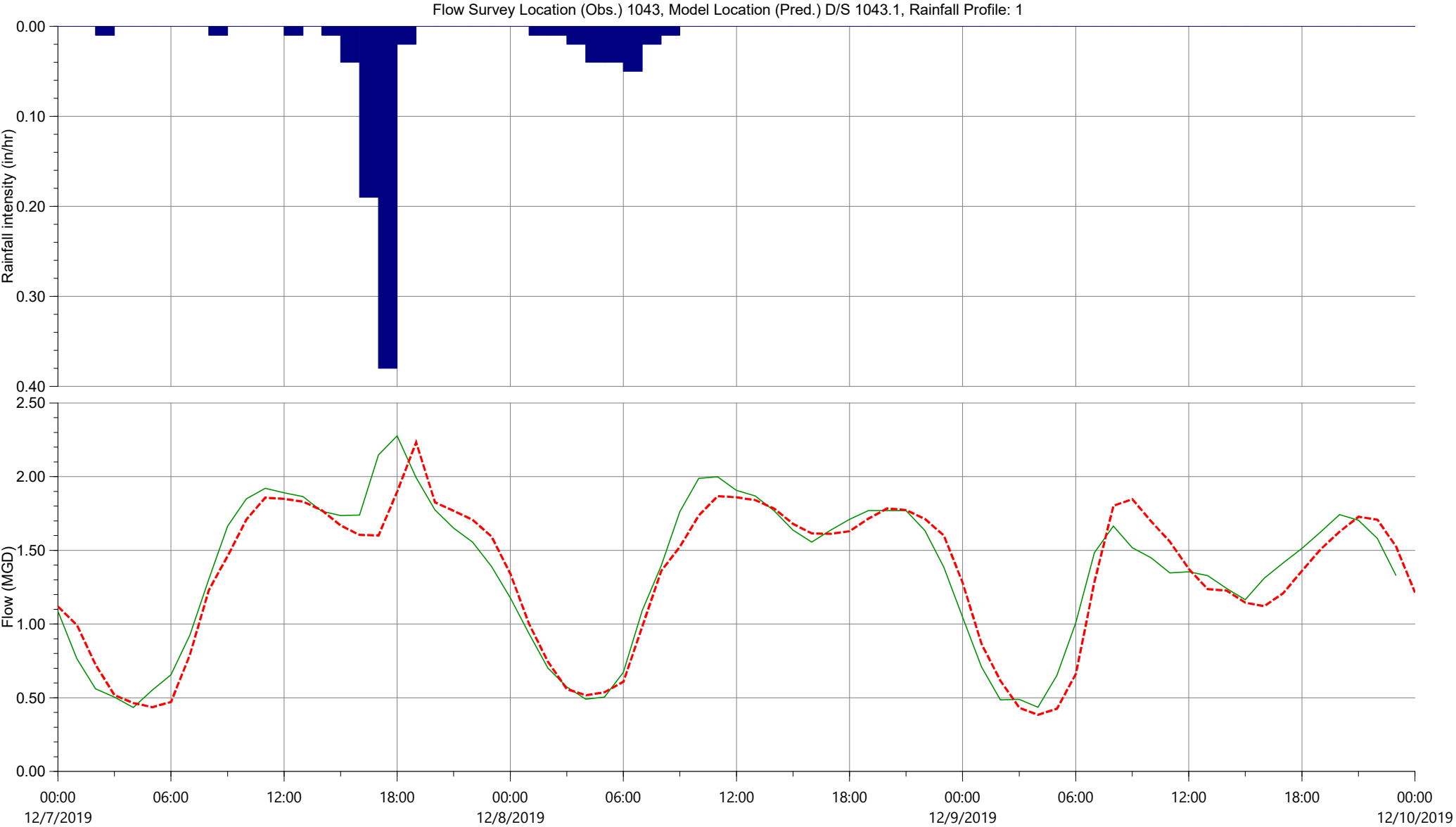


Observed  
Model

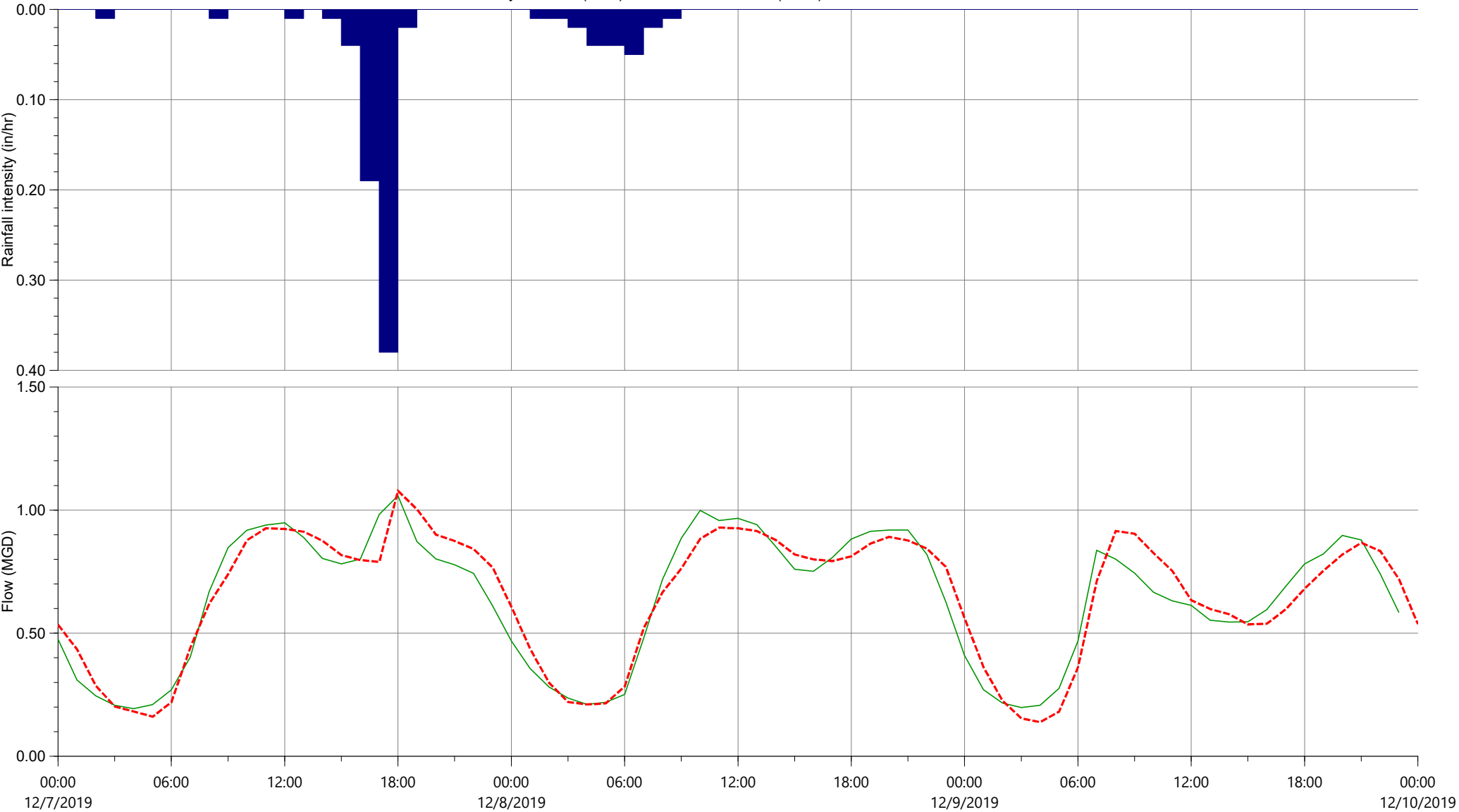
# Observed / Predicted Report (Custom graph) - DWF Calibration FINAL

**APPENDIX E**  
City of Milpitas  
Sewer Master Plan Study  
Wet Weather Calibration Charts

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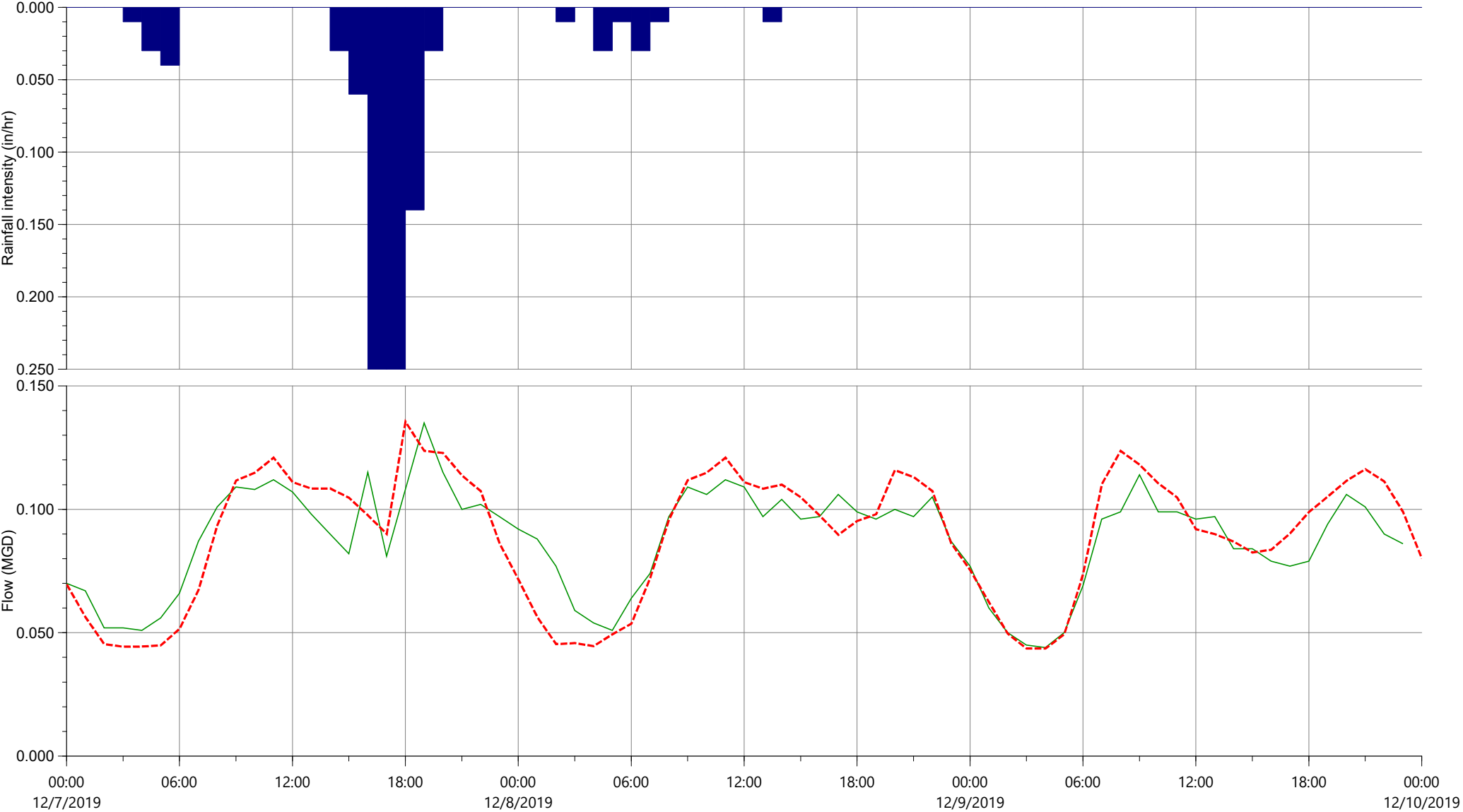


|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.433     | 2.277     | 4.004            |
| Model    |            |              |                 | 0.384     | 2.235     | 4.010            |

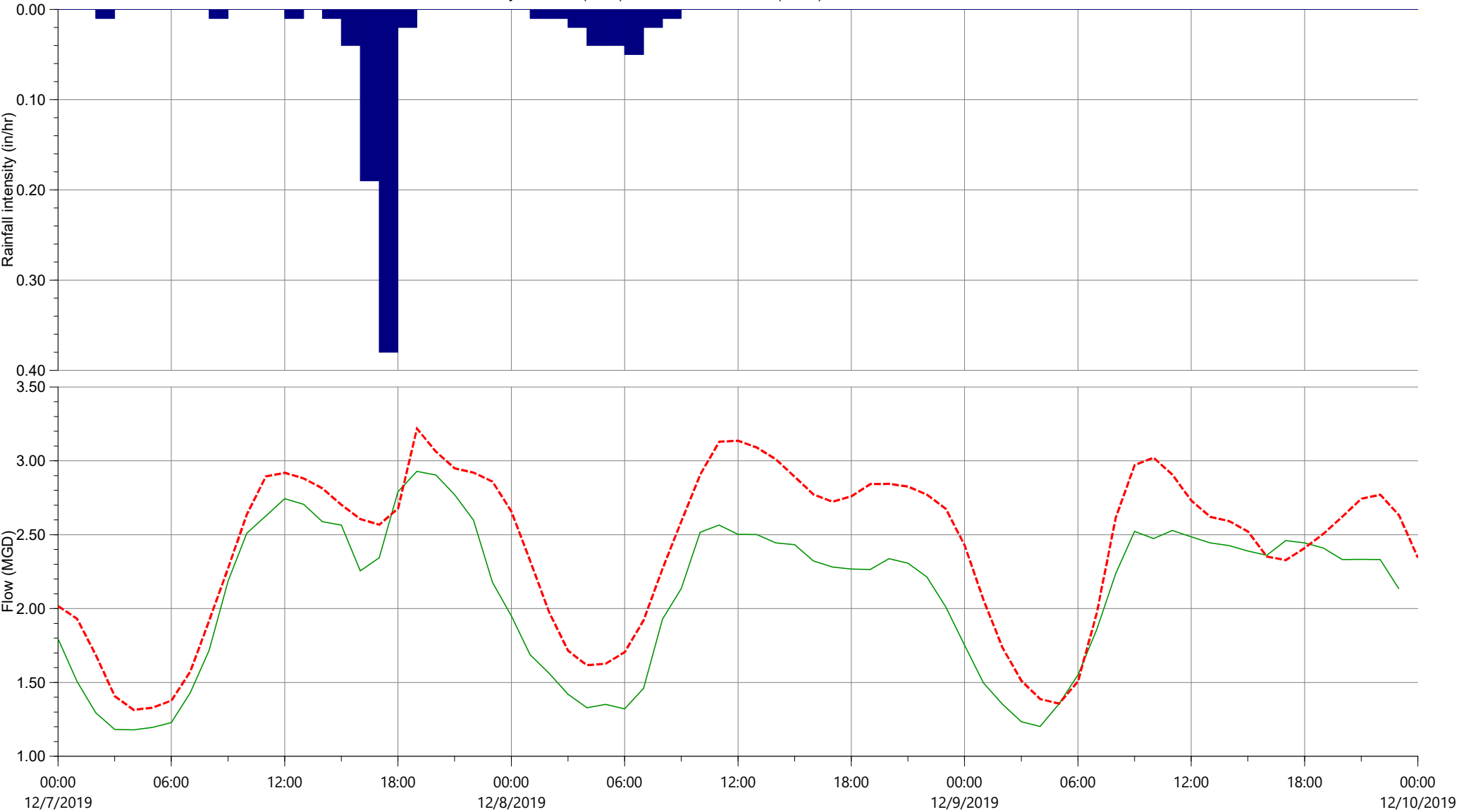


| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
|          | 0.870      | 0.380        | 0.012           | 0.193     | 1.058     | 1.892            |
| Observed |            |              |                 | 0.139     | 1.079     | 1.946            |
| Model    |            |              |                 |           |           |                  |

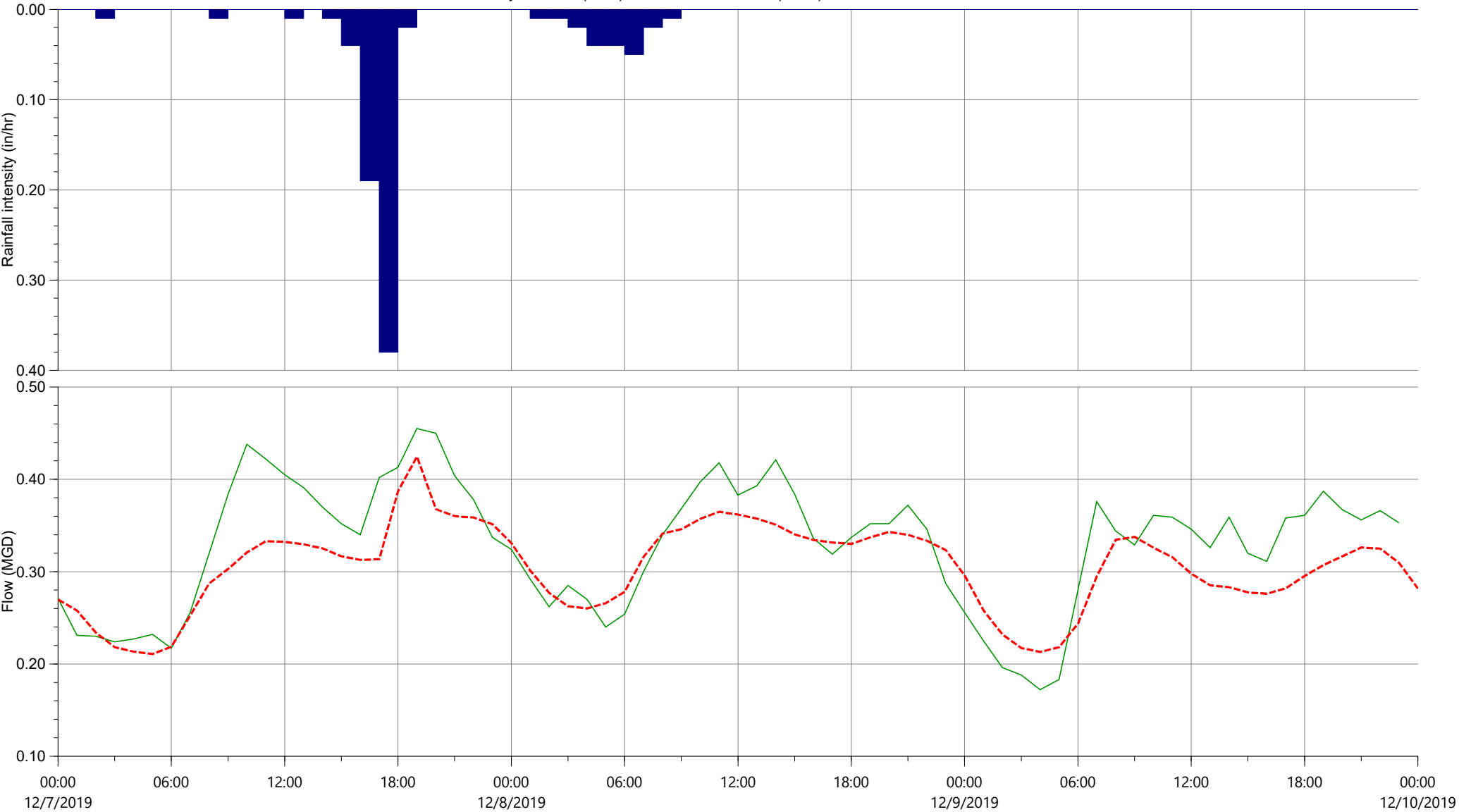




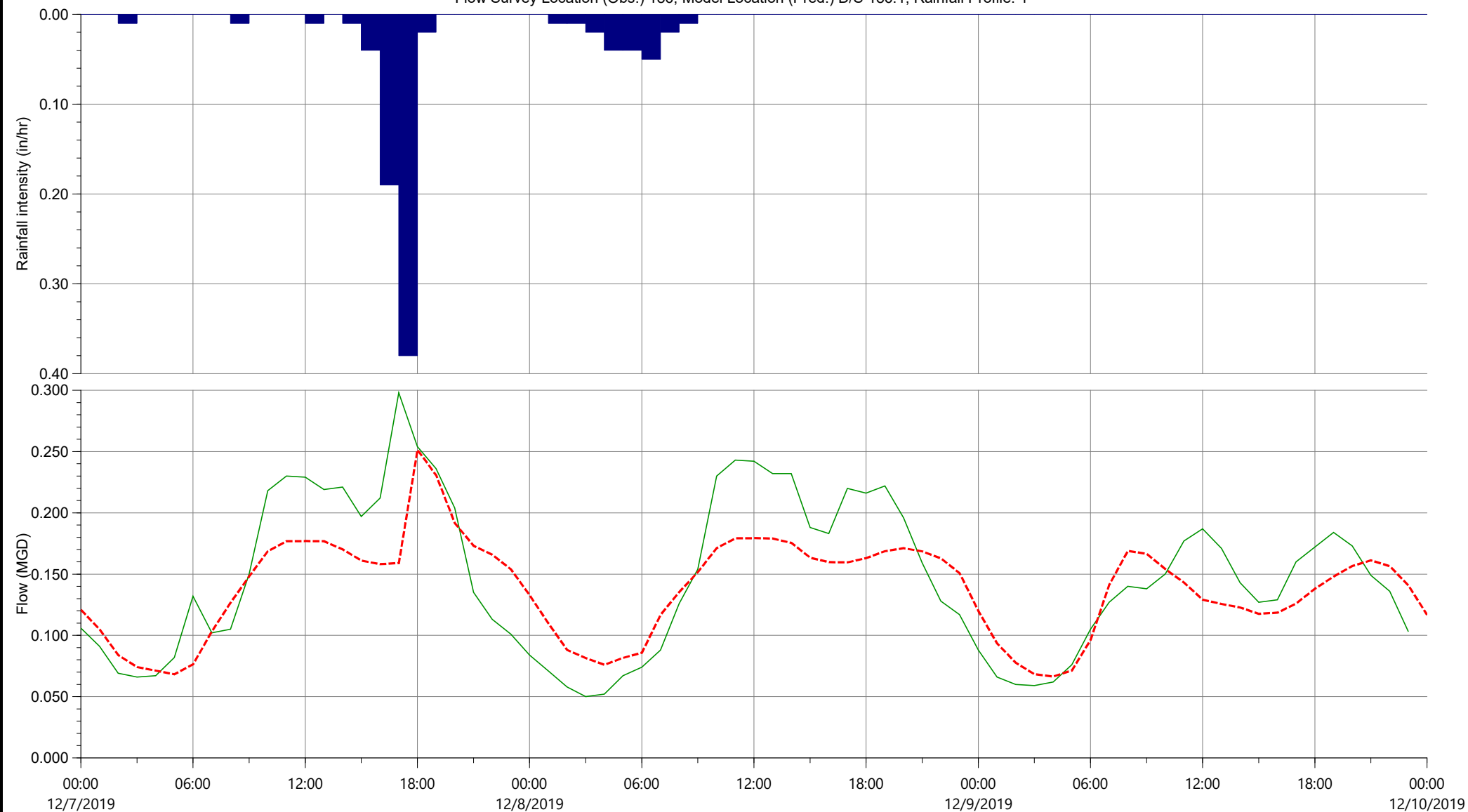
| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Observed | 0.940      | 0.250        | 0.013           | 0.044     | 0.135     | 0.260            |
| Model    |            |              |                 | 0.044     | 0.135     | 0.268            |



|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 1.179     | 2.929     | 6.187            |
| Model    |            |              |                 | 1.314     | 3.219     | 7.243            |

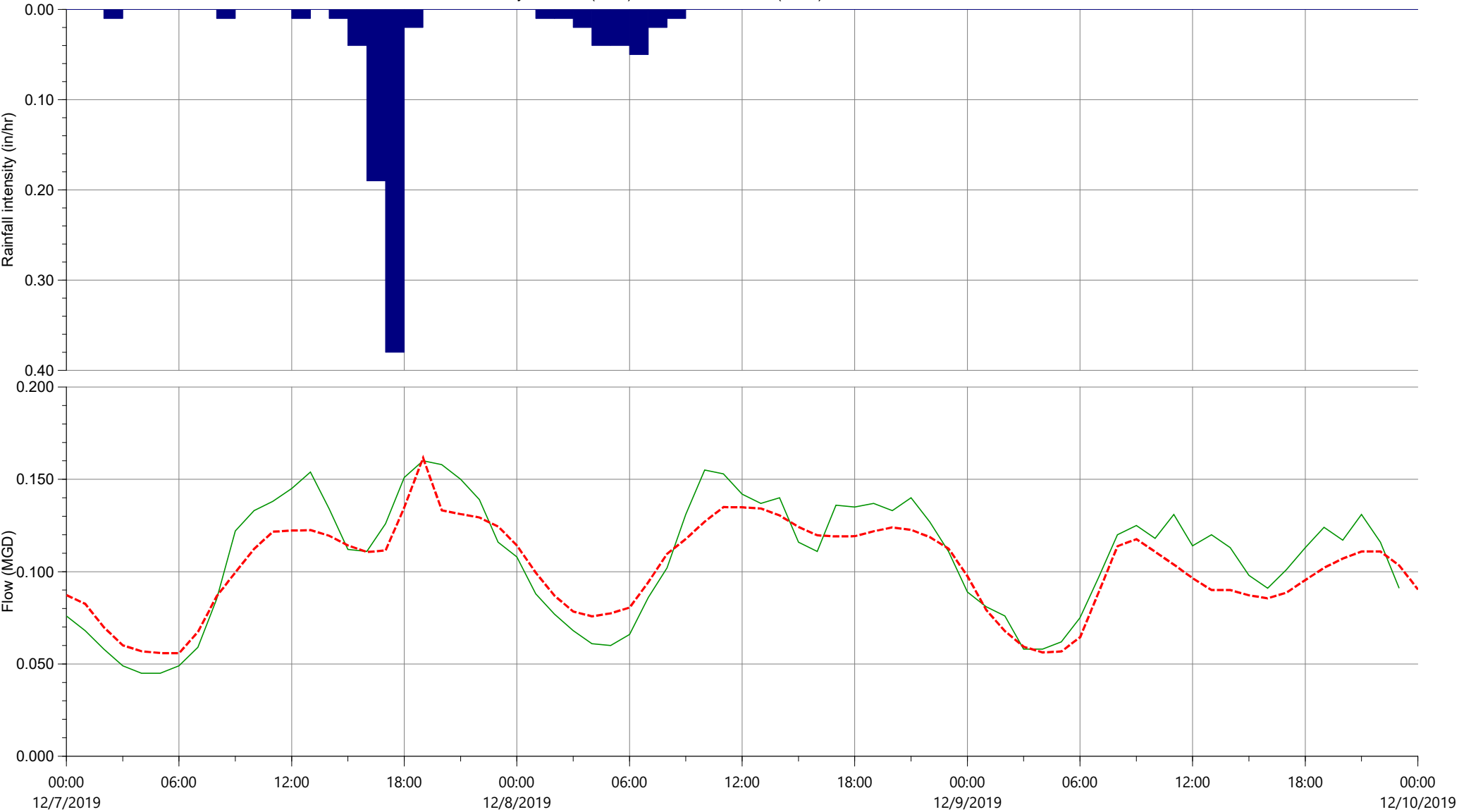


| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Observed | 0.870      | 0.380        | 0.012           | 0.172     | 0.455     | 0.973            |
| Model    |            |              |                 | 0.211     | 0.425     | 0.915            |



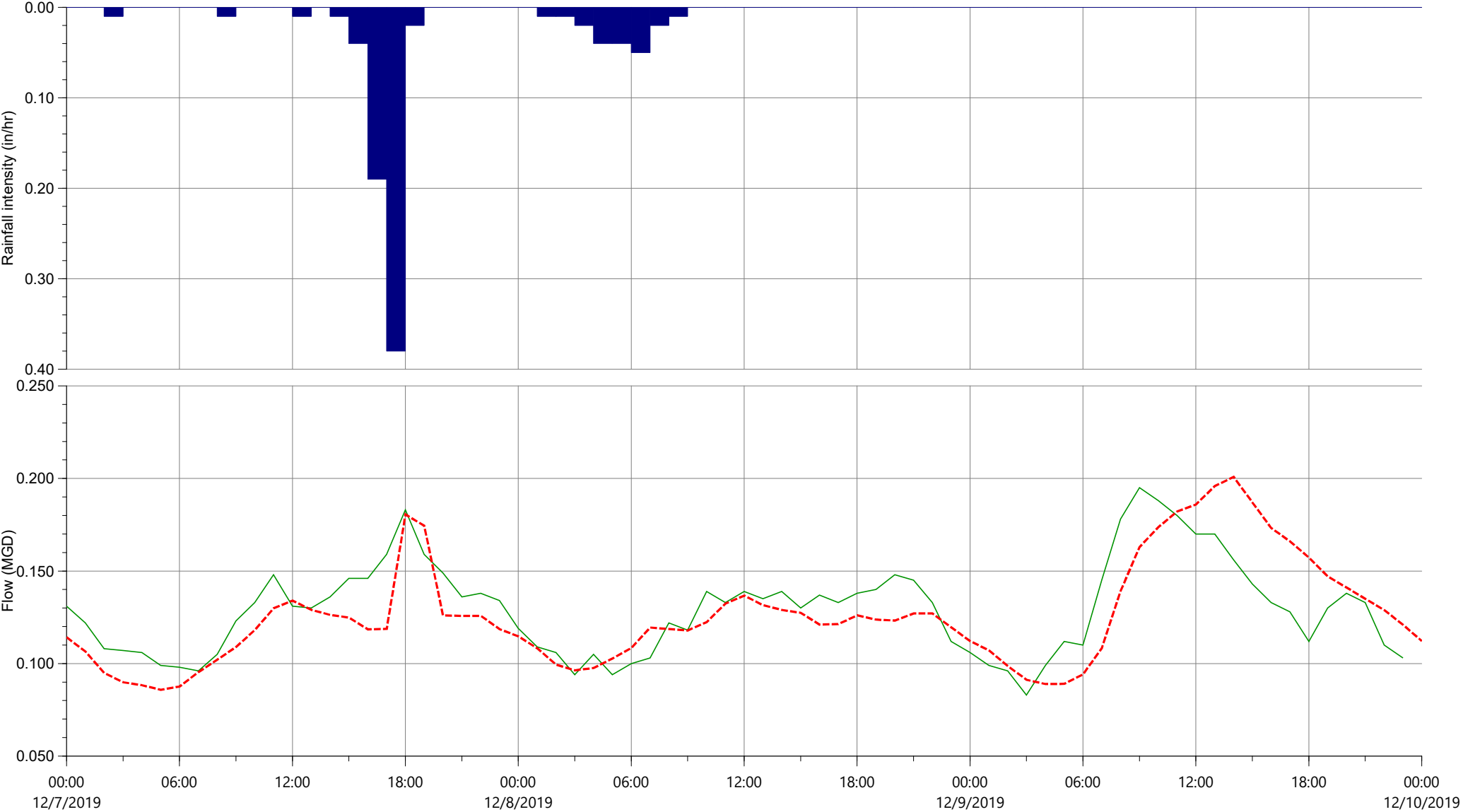
|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.050     | 0.298     | 0.435            |
| Model    |            |              |                 | 0.067     | 0.251     | 0.413            |

Observed / Predicted Report (Custom graph) - Wet Weather Calibration FINAL

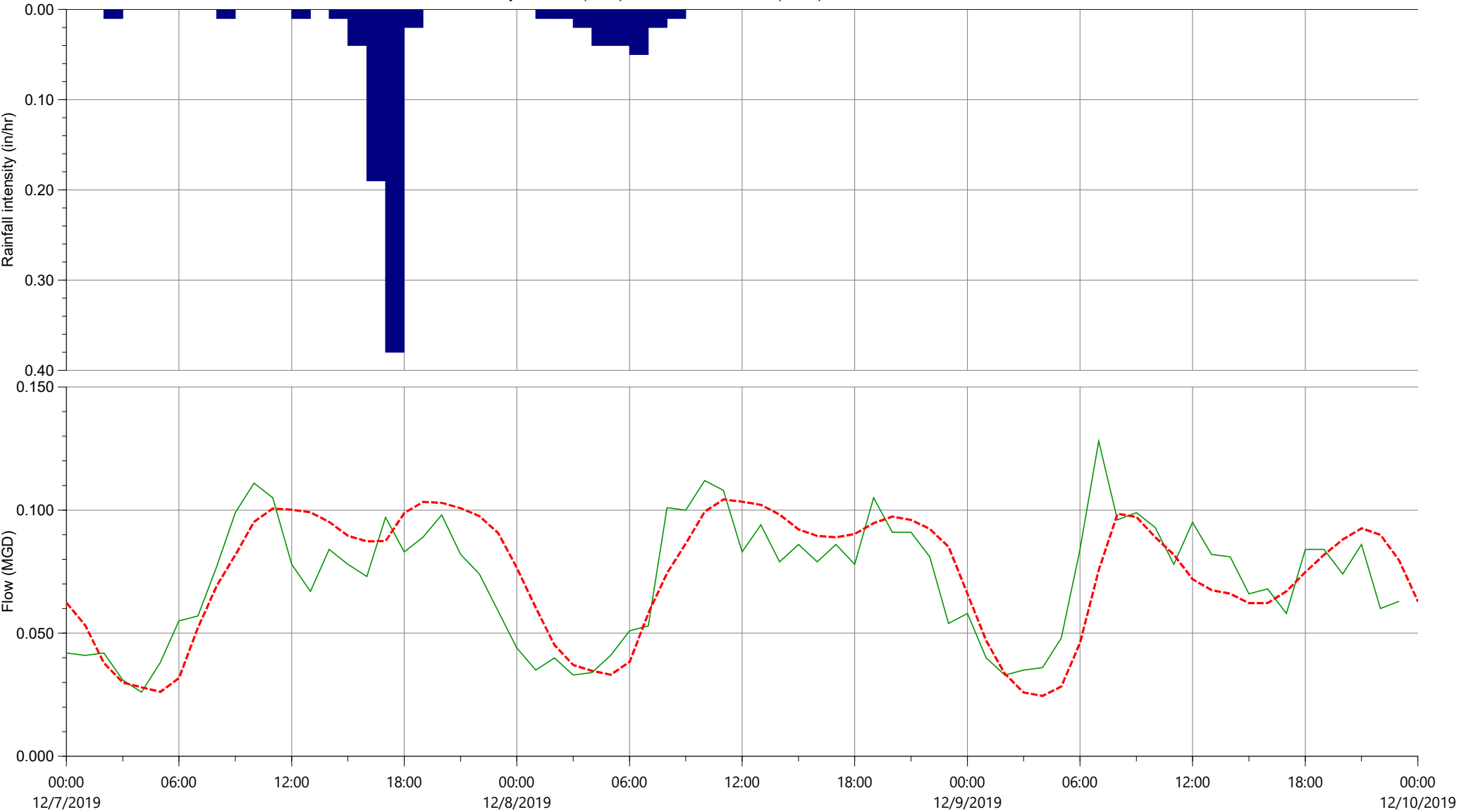


|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.045     | 0.160     | 0.318            |
| Model    |            |              |                 | 0.056     | 0.162     | 0.306            |

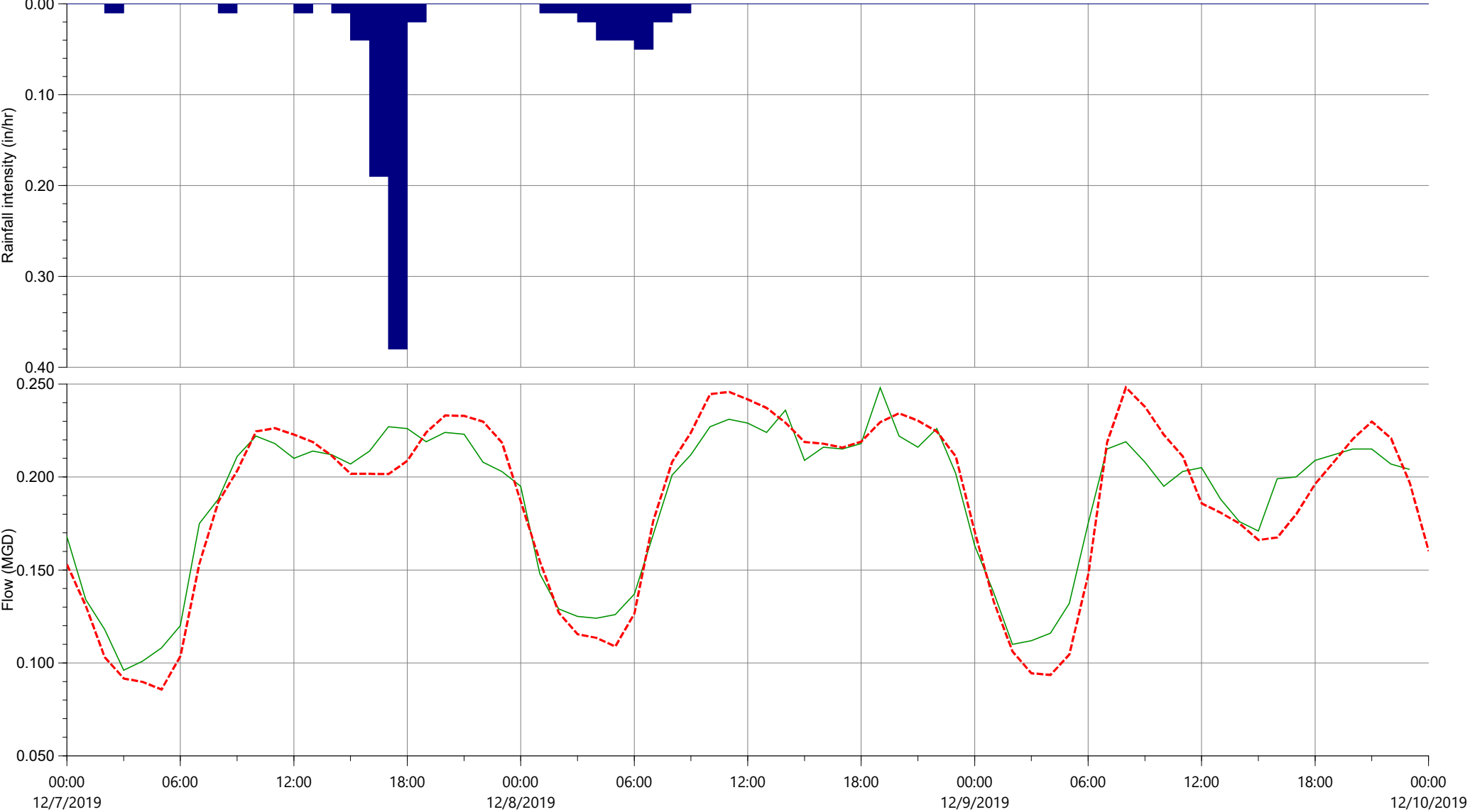




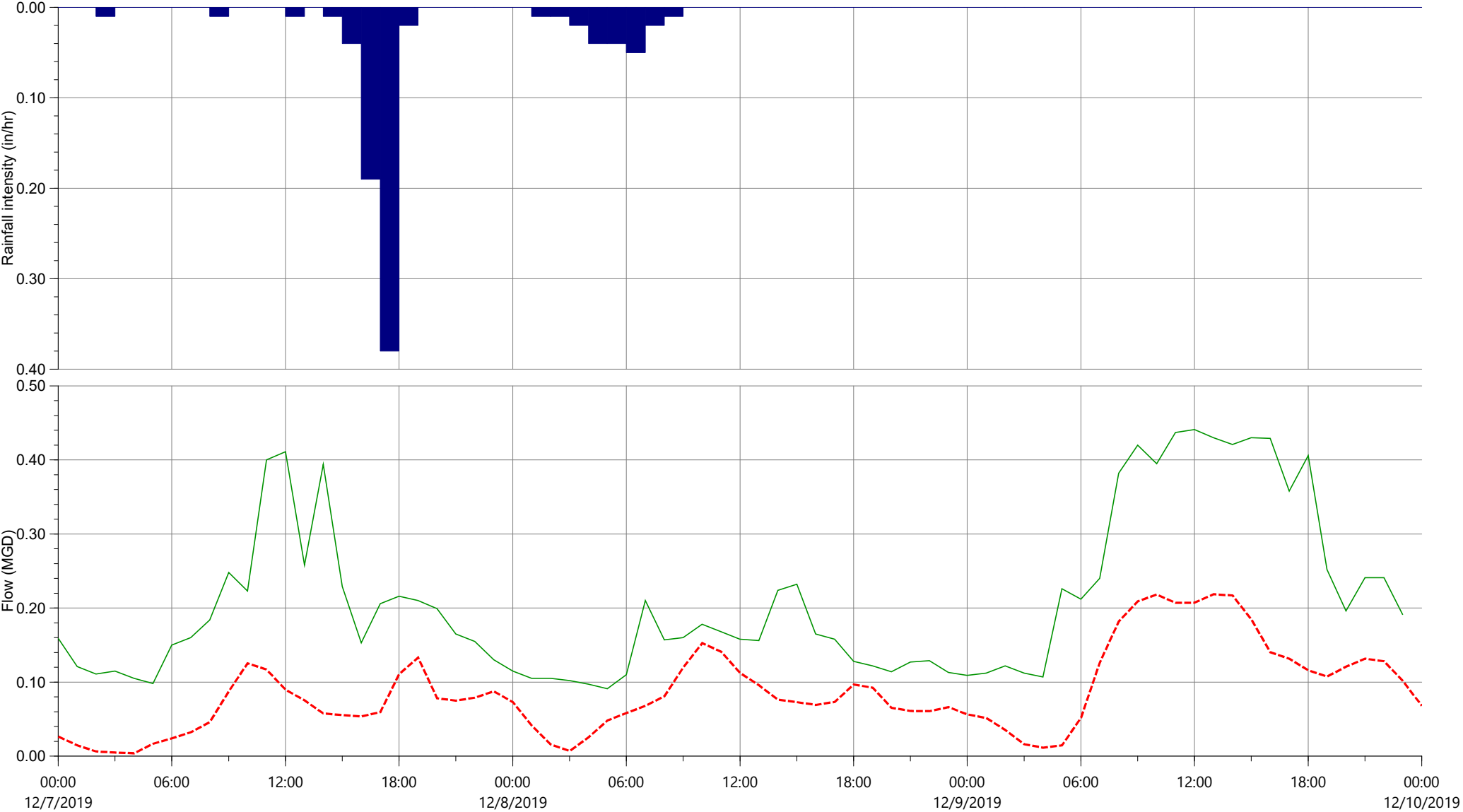
| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Observed | 0.870      | 0.380        | 0.012           | 0.083     | 0.195     | 0.383            |
| Model    |            |              |                 | 0.086     | 0.201     | 0.378            |



|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.026     | 0.128     | 0.213            |
| Model    |            |              |                 | 0.025     | 0.104     | 0.222            |

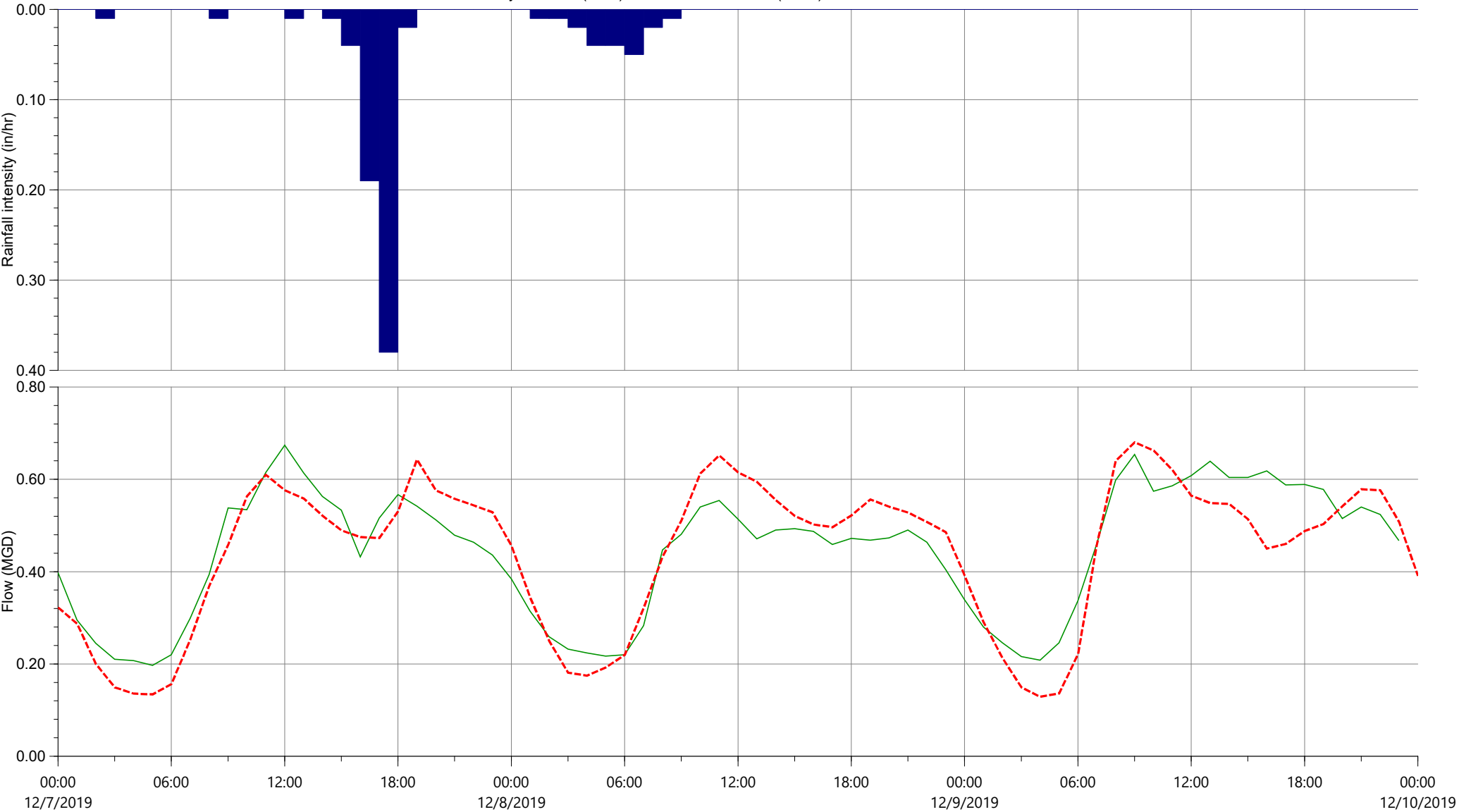


|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.096     | 0.248     | 0.555            |
| Model    |            |              |                 | 0.086     | 0.248     | 0.559            |



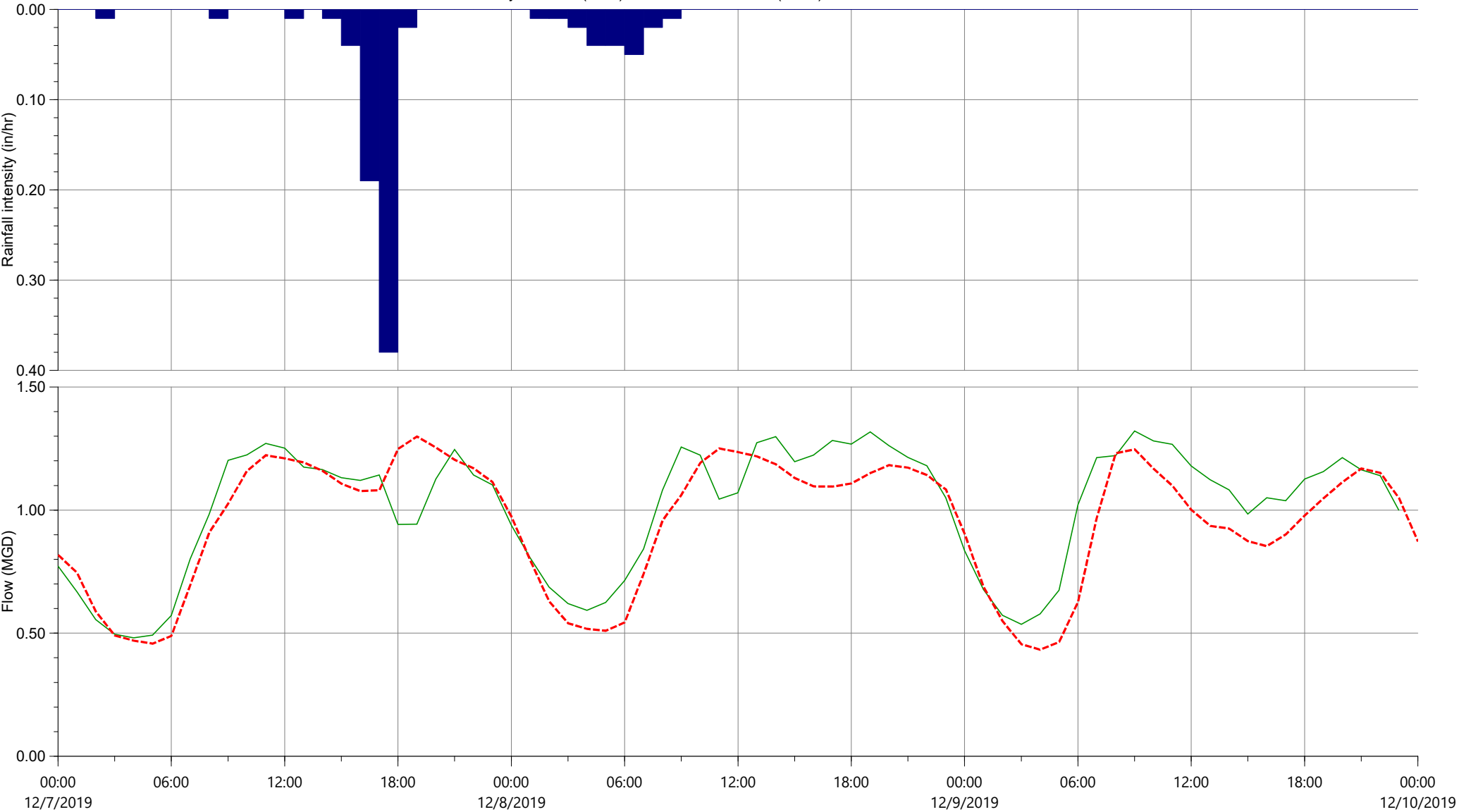
| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Observed | 0.870      | 0.380        | 0.012           | 0.091     | 0.441     | 0.623            |
| Model    |            |              |                 | 0.004     | 0.219     | 0.260            |

Observed / Predicted Report (Custom graph) - Wet Weather Calibration FINAL

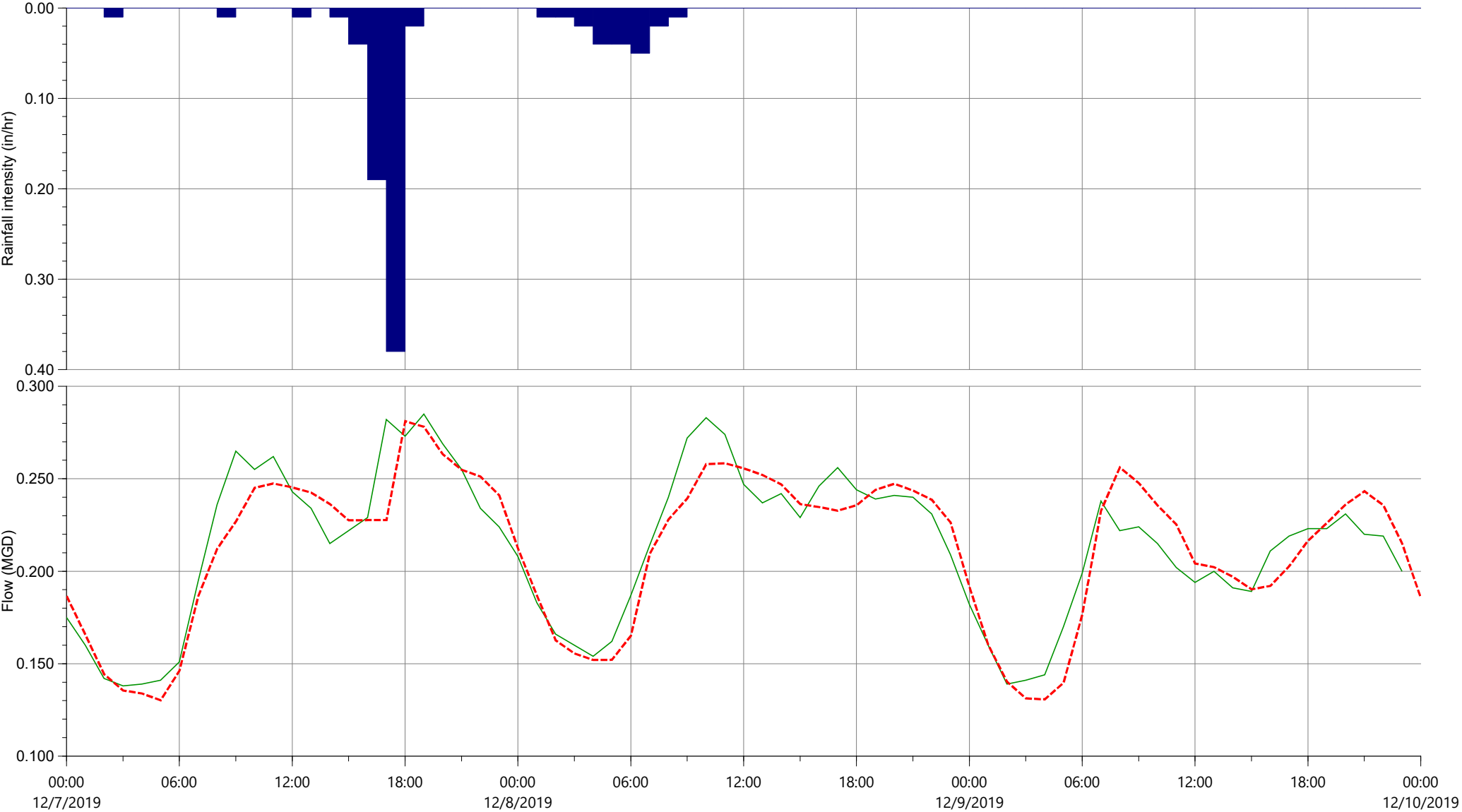


|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.197     | 0.674     | 1.313            |
| Model    |            |              |                 | 0.129     | 0.680     | 1.325            |

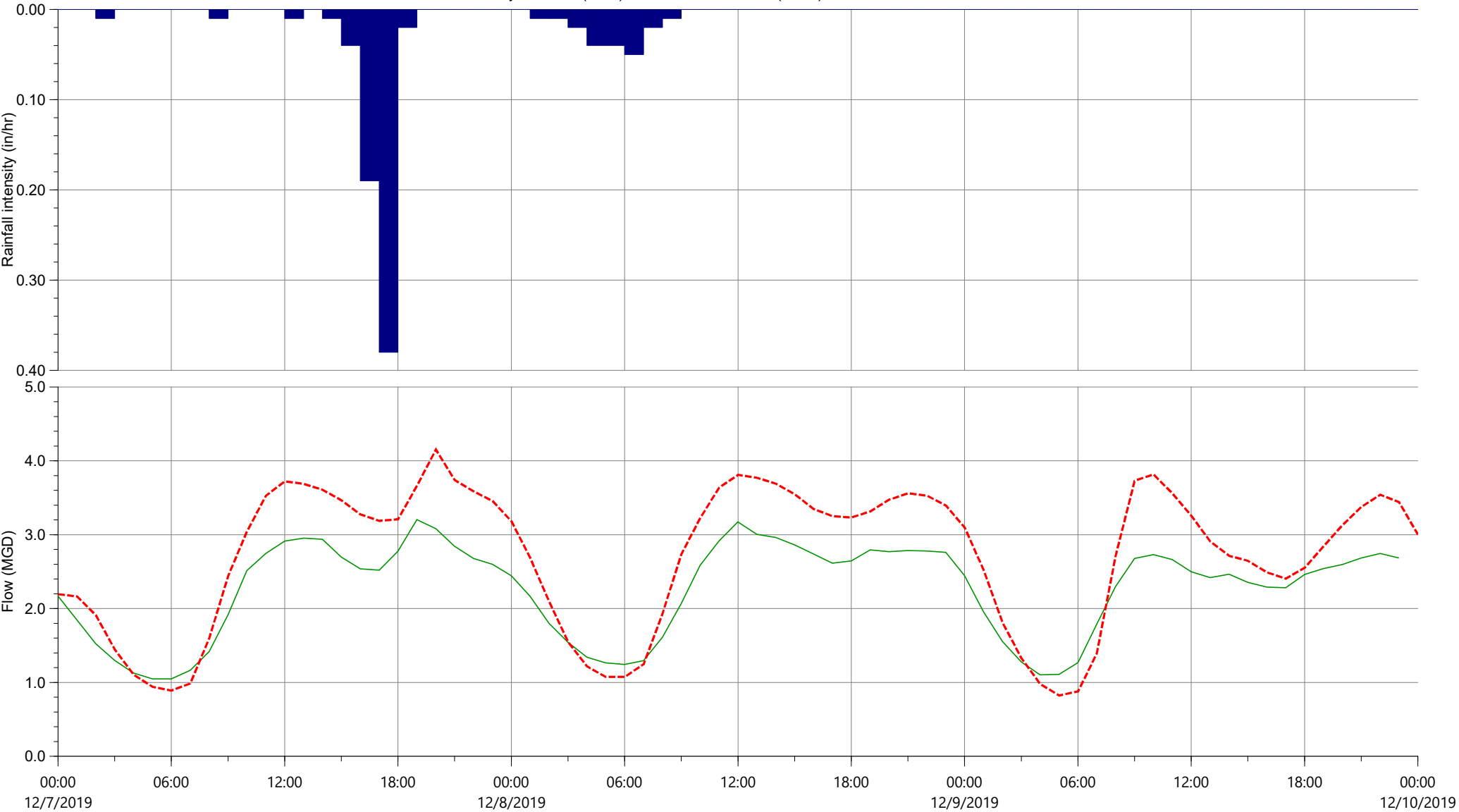




| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
|          | 0.870      | 0.380        | 0.012           | 0.481     | 1.321     | 2.985            |
| Observed |            |              |                 | 0.433     | 1.299     | 2.858            |
| Model    |            |              |                 |           |           |                  |

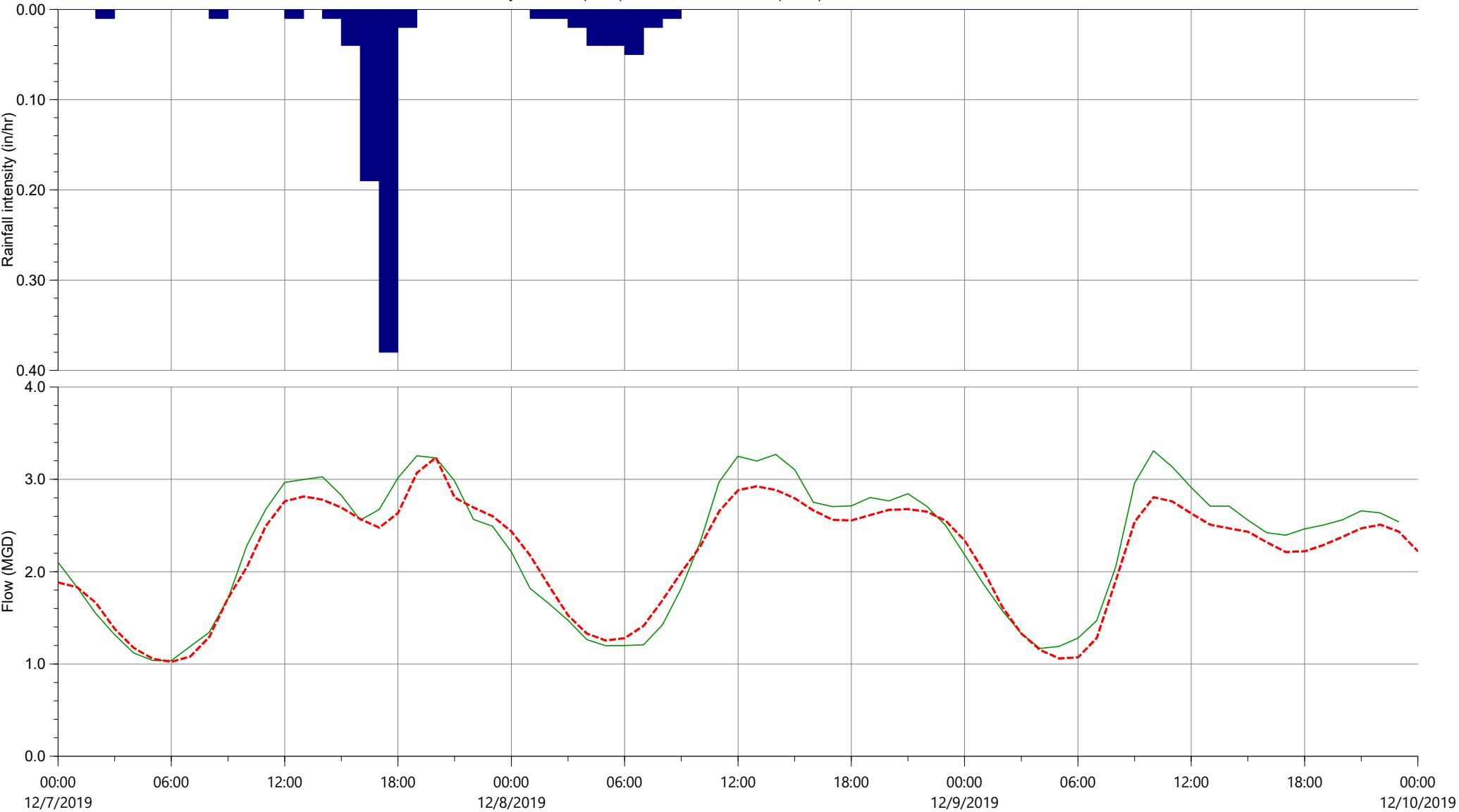


| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
|          | 0.870      | 0.380        | 0.012           | 0.138     | 0.285     | 0.632            |
| Observed |            |              |                 | 0.130     | 0.281     | 0.635            |
| Model    |            |              |                 |           |           |                  |

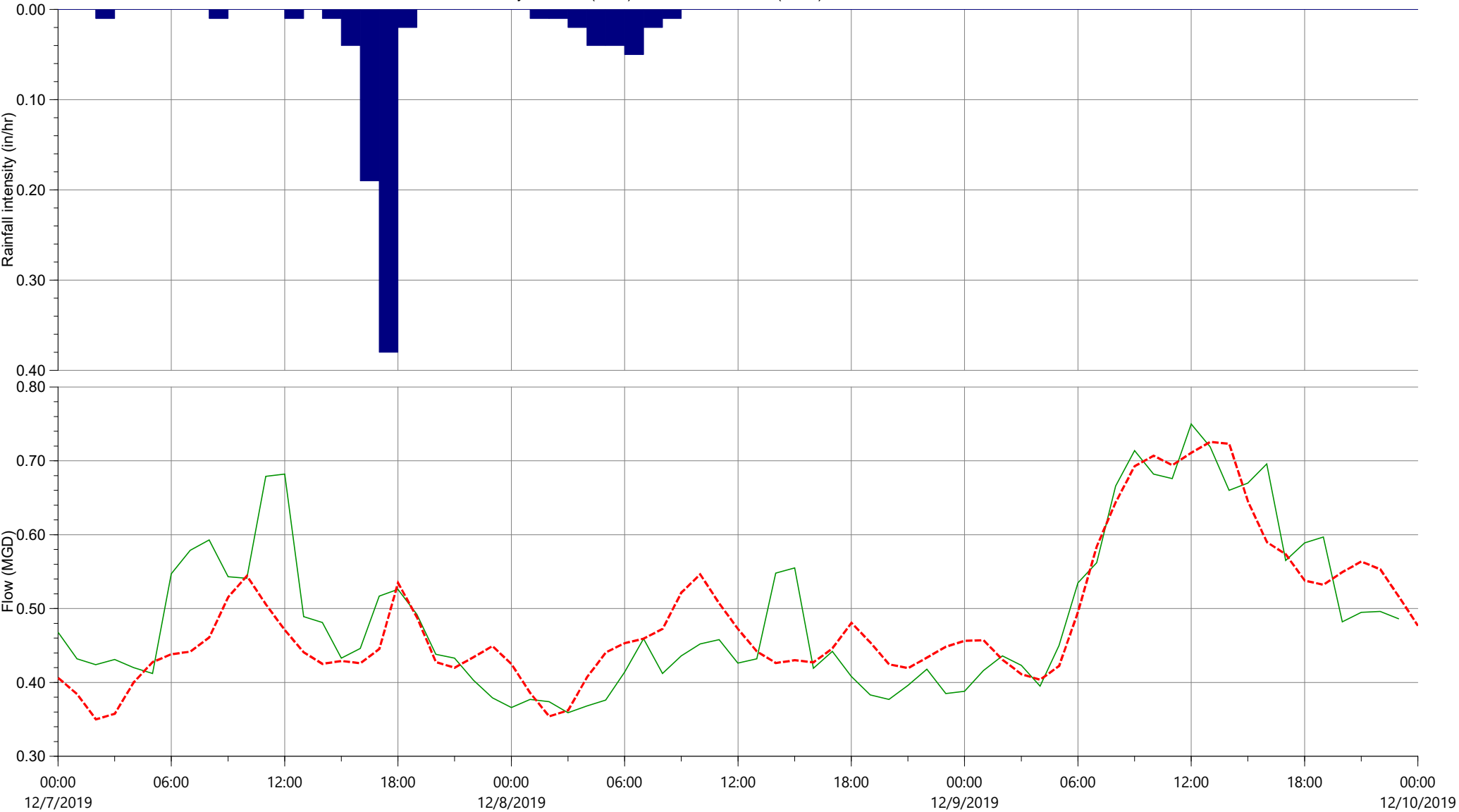


| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Observed | 0.870      | 0.380        | 0.012           | 1.047     | 3.205     | 6.675            |
| Model    |            |              |                 | 0.824     | 4.153     | 8.127            |

# Observed / Predicted Report (Custom graph) - Wet Weather Calibration FINAL

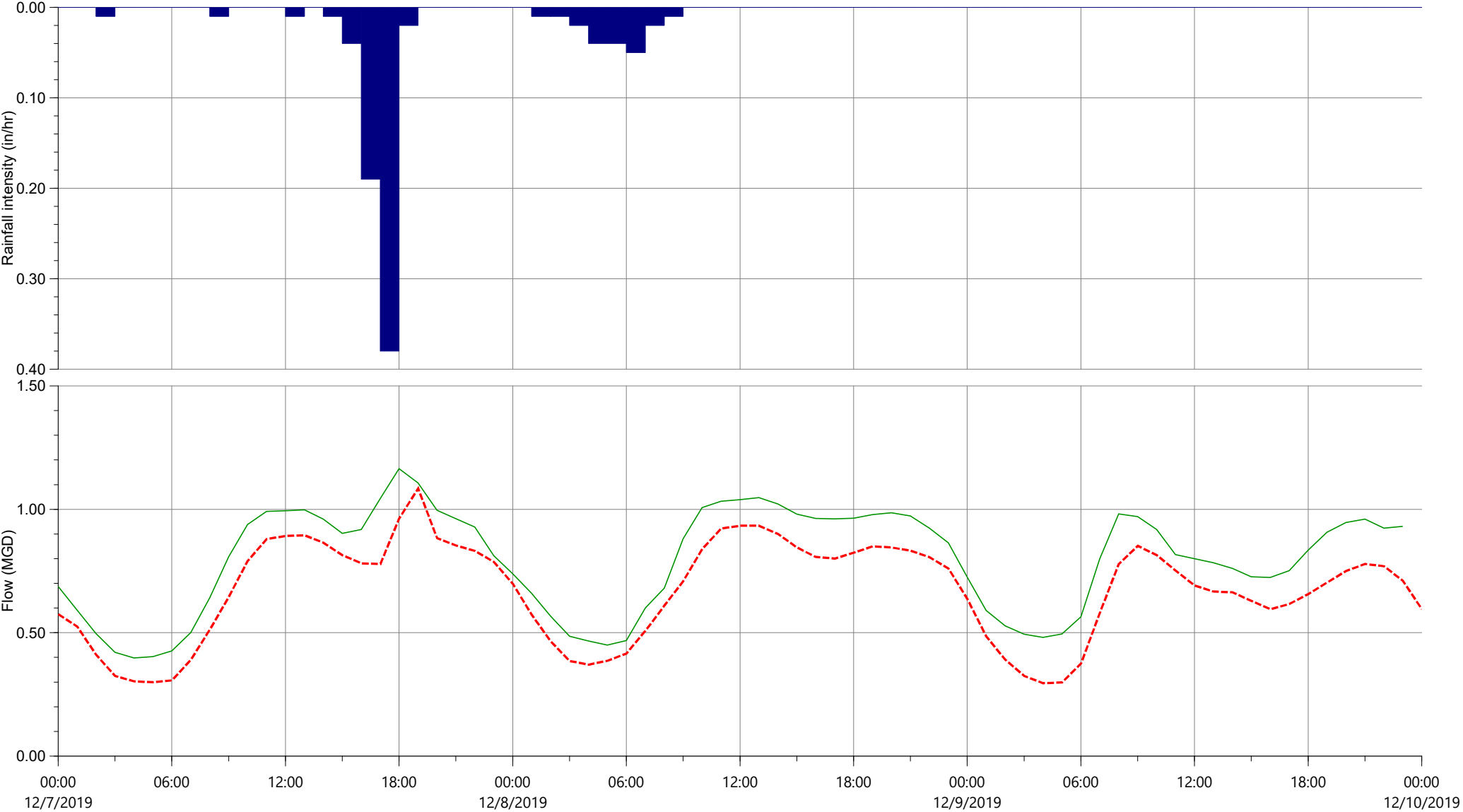


| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
|          | 0.870      | 0.380        | 0.012           | 1.036     | 3.308     | 6.717            |
| Observed |            |              |                 | 1.023     | 3.238     | 6.544            |
| Model    |            |              |                 |           |           |                  |

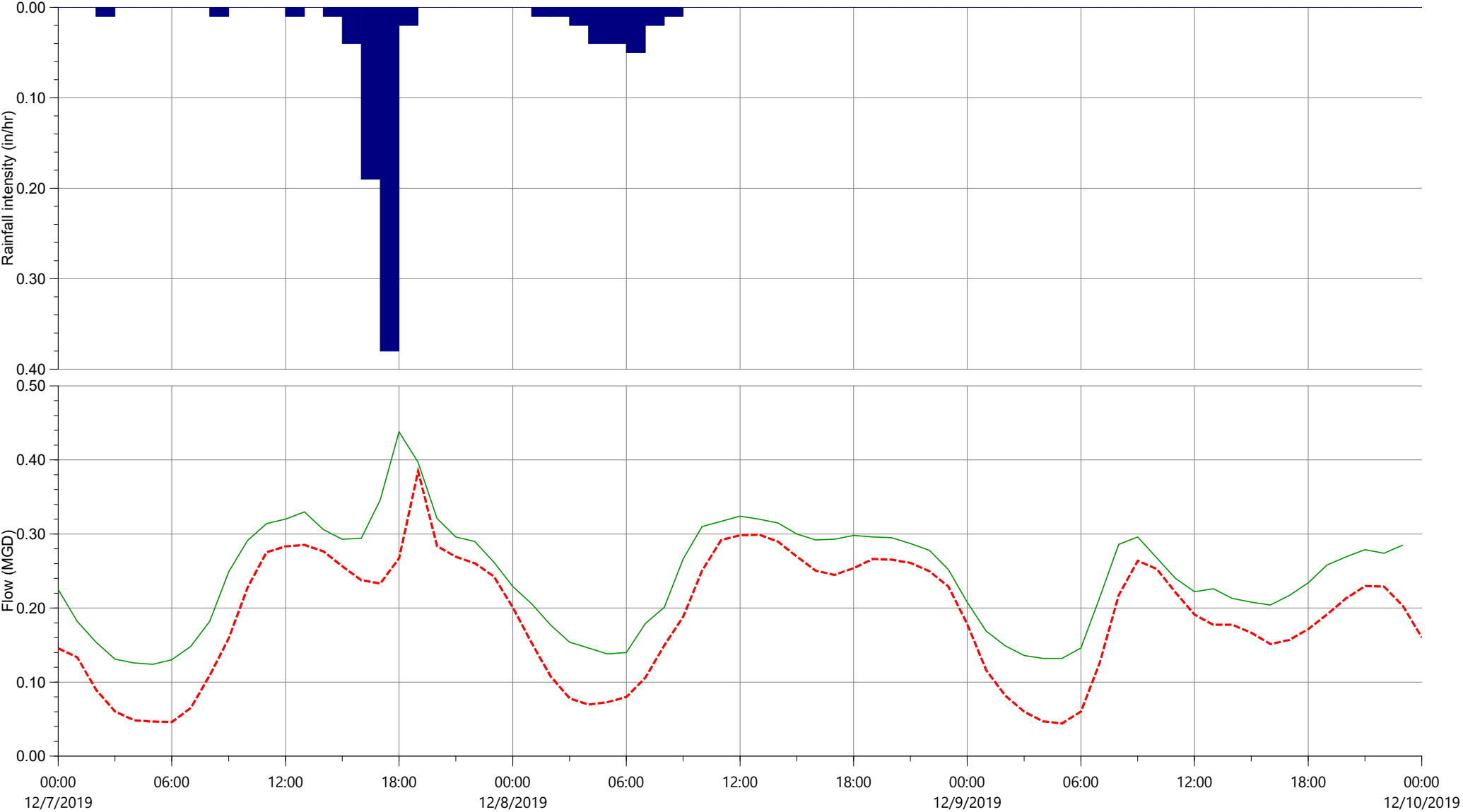


|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.359     | 0.750     | 1.454            |
| Model    |            |              |                 | 0.350     | 0.726     | 1.455            |

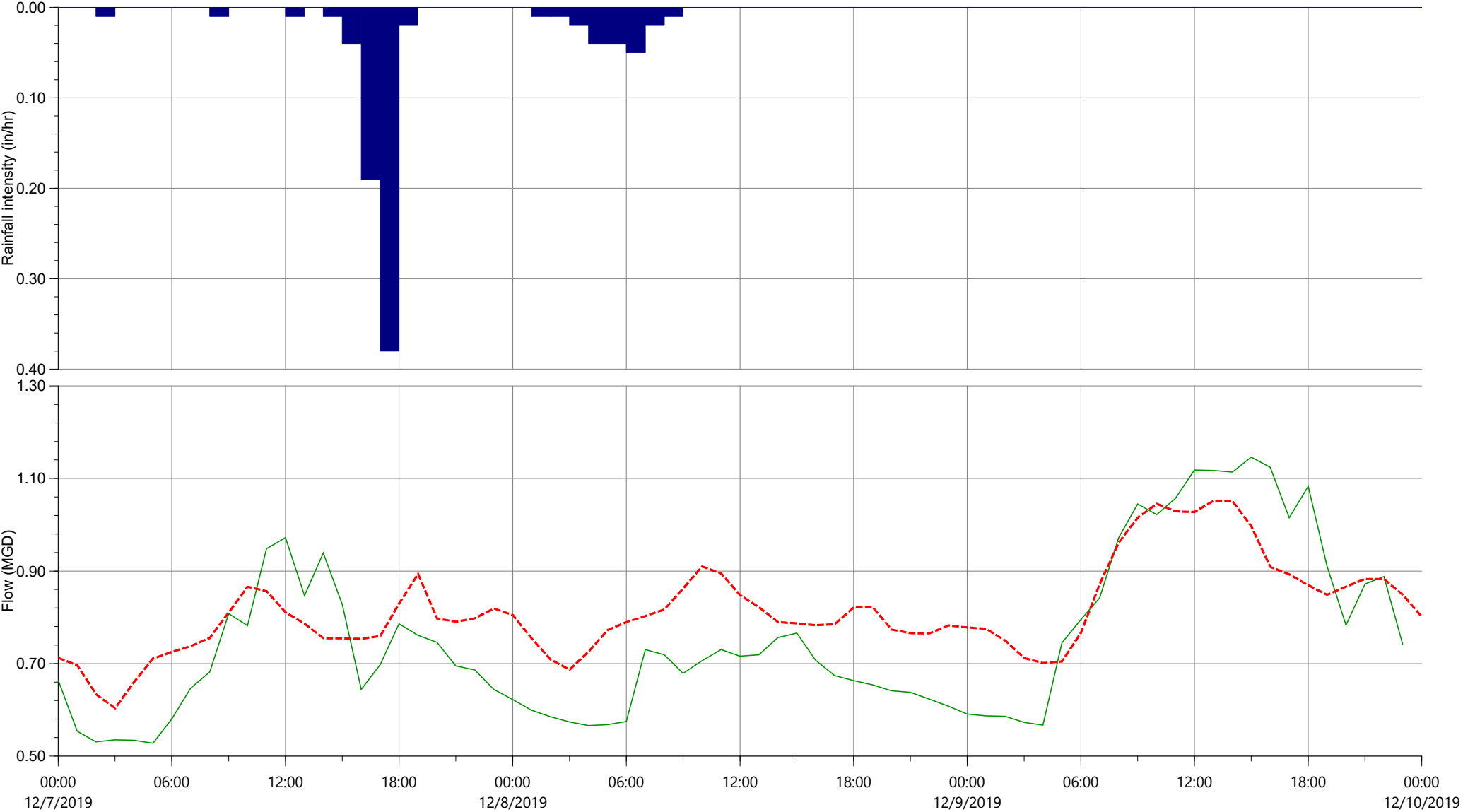




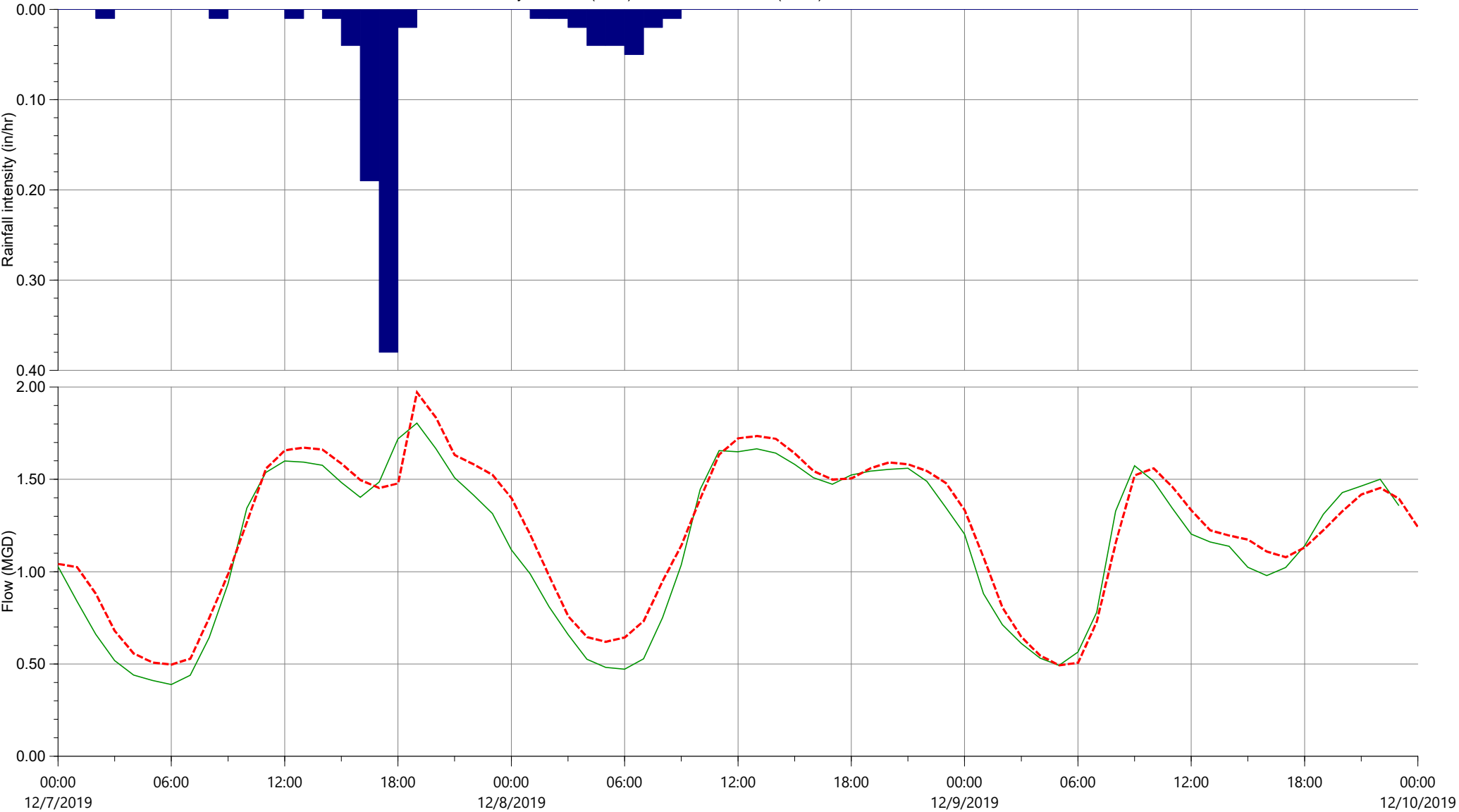
| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
|          | 0.870      | 0.380        | 0.012           | 0.398     | 1.165     | 2.351            |
| Observed |            |              |                 | 0.296     | 1.085     | 2.011            |
| Model    |            |              |                 |           |           |                  |



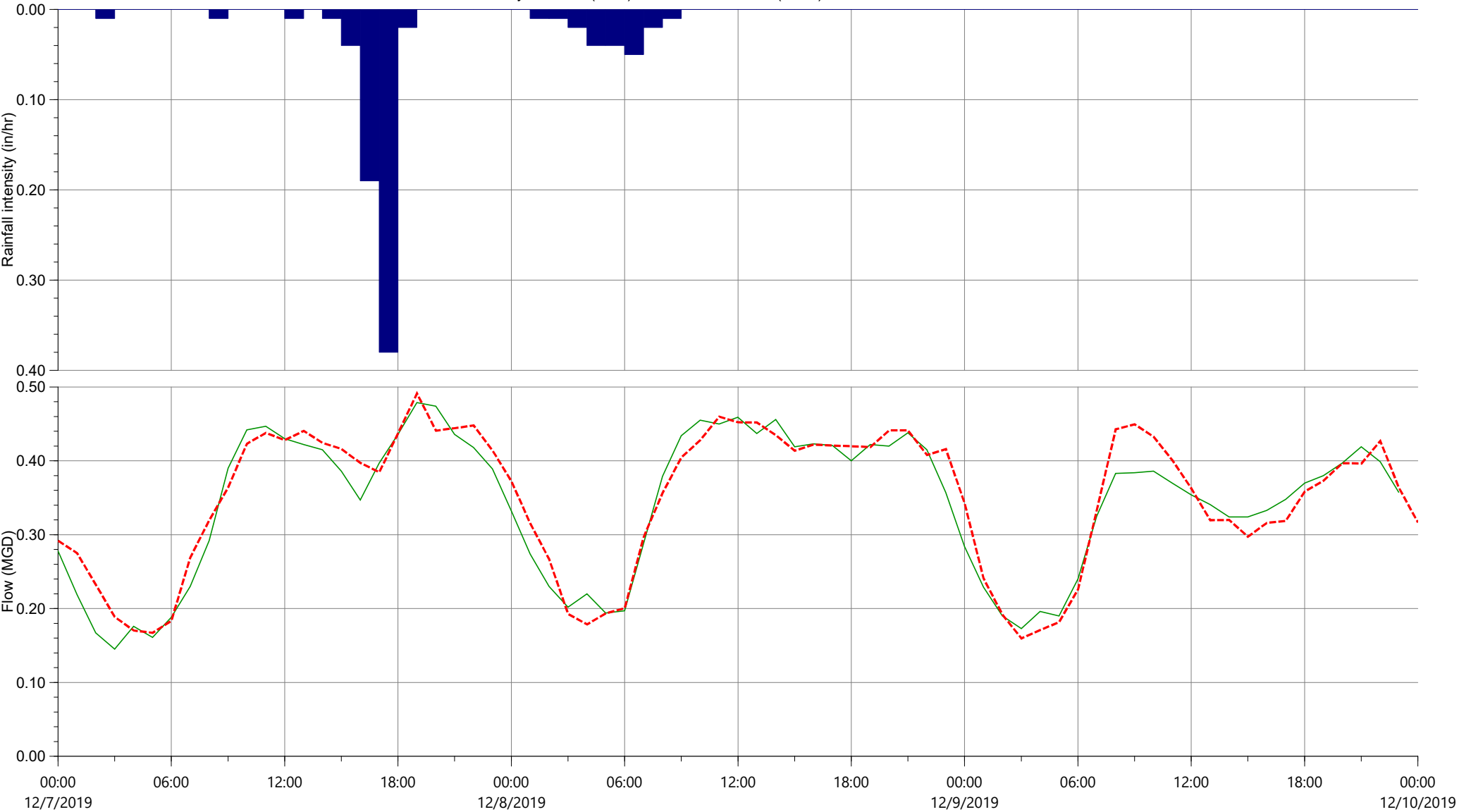
| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Observed | 0.870      | 0.380        | 0.012           | 0.124     | 0.438     | 0.715            |
| Model    |            |              |                 | 0.044     | 0.385     | 0.565            |



| Rain     | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Observed | 0.870      | 0.380        | 0.012           | 0.528     | 1.146     | 2.227            |
| Model    |            |              |                 | 0.603     | 1.052     | 2.445            |



|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.388     | 1.804     | 3.408            |
| Model    |            |              |                 | 0.494     | 1.971     | 3.670            |



|          | Rainfall   |              |                 | Flow      |           |                  |
|----------|------------|--------------|-----------------|-----------|-----------|------------------|
|          | Depth (in) | Peak (in/hr) | Average (in/hr) | Min (MGD) | Max (MGD) | Volume (US Mgal) |
| Rain     | 0.870      | 0.380        | 0.012           |           |           |                  |
| Observed |            |              |                 | 0.145     | 0.479     | 1.011            |
| Model    |            |              |                 | 0.160     | 0.492     | 1.047            |



**APPENDIX F**  
City of Milpitas  
Sewer Master Plan Study  
Los Esteros Ranch Agreement

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Fees.... \* No Fees  
 Taxes....  
 Copies...  
 AMT PAID

**Control No. 2003-008**

Recording requested by:

**City of Milpitas**

When recorded mail to:

**City of Milpitas**

**City Engineer's Office**

**455 E. Calaveras Blvd.**

**Milpitas, Ca 95035**

Record without fee under Section  
 6103-Government Code, State of  
 California

BRENDA DAVIS  
 SANTA CLARA COUNTY RECORDER  
 Recorded at the request of  
 City

RDE # 003  
 11/25/2003  
 9:18 AM

**AGREEMENT  
 BETWEEN  
 THE CITY OF MILPITAS  
 AND  
 LOS ESTEROS RANCH PARTNERSHIP  
 FOR  
 USE OF CERTAIN CITY OF MILPITAS  
 SANITARY SEWER AND WATER FACILITIES  
 BY THE CITY OF SAN JOSE**

This agreement ("Agreement"), is made and entered into this 6<sup>th</sup> day of August, 2003 ("Effective Date"), by and between the City of Milpitas, California, a general law city of the State of California ("Milpitas") and Los Esteros Ranch Partnership ("Property Owner"). Milpitas and Property Owner may be referred to herein individually as a "Party" or collectively as the "Parties" or the "Parties to this Agreement".

**RECITALS**

The purpose for which this Agreement is made, and all pertinent recitals, is described below:

- A. Property Owner owns or leases certain real property located in the city of San Jose as shown on Exhibit A. The properties subject to this Agreement are Parcel 1, hereinafter referred to as the "East of McCarthy Boulevard Parcel", Parcel 2, hereinafter referred to as the "West of McCarthy Boulevard Parcel" and Parcel 3, hereinafter referred to as the "BFI Recyclery Parcel" ("Subject Properties"). Parcel 1 and Parcel 2 are jointly subject to the terms and conditions of San Jose PDC No. 99-09-078

and PD 01-084. Parcel 3 is subject to the terms and conditions of San Jose Planned Development Zoning PDC93-044, Planned Development Permit PD95-068, and Planned Development Permit Adjustments AD01-637 and AD02-679.

- B. Property Owner wishes to be allowed to discharge sewage into the Milpitas-Owned Sewer System as shown on Exhibit B; and receive potable water from the Milpitas-Owned Water System.
- C. The City of Jose and Milpitas are preparing to enter into sewer and water agreements to enable the Subject Properties to receive sewage discharge and receive water services from the City of Milpitas without cost or expense to Milpitas ("City Agreements") attached hereto and incorporated herein as Exhibit C.
- D. Property Owner, in consideration for Milpitas entering into the City Agreements, provides the commitments herein.

Therefore, in consideration of their mutual covenants, promises and undertakings, Property Owner and Milpitas agree as follows:

### **1. EFFECTIVE DATE**

This Agreement will become effective immediately upon the execution of both the City Agreements by San Jose and Milpitas and this Agreement.

### **2. DEFINITIONS**

For the purpose of this Agreement, the following words or terms shall have the following meanings, unless otherwise stated in this Agreement:

- A. Milpitas-Owned Sewer System - "Milpitas-Owned Sewer Lines" means those sewer lines and related facilities including pump stations within the legal boundaries of Milpitas, or outside Milpitas where rights are defined by ownership of property, easements, public right of way or other agreements.
- B. Milpitas-Owned Water System - "Milpitas-Owned Water Lines" means those water lines and related facilities within the legal boundaries of Milpitas, or outside Milpitas where rights are defined by ownership of property, easements, public right of way or other agreements.

### **3. LAND USE CONSENT**

A. Property Owner acknowledges that the subject Property is located adjacent to the McCarthy Business Park and is in an area that serves as a gateway entrance to Milpitas. Milpitas, therefore, has a significant interest in ensuring that any new development or redevelopment on the subject Property is consistent and/or compatible with the McCarthy Business Park and with the City's goals for this gateway area. Property Owner hereby agrees that there shall be no new change in use, or other development, redevelopment, or change in design of the subject Property, or improvement thereon, without the prior consent of the Milpitas Planning Manager or employee with equivalent responsibilities.

B. Milpitas has reviewed and approved the terms and conditions of San Jose PDC99-09-078 and the plans for the development of the West of McCarthy Boulevard Parcel. Milpitas consents to this development receiving sewer and water service. All connections to Milpitas facilities will be performed at no cost to Milpitas.

C. No development has been initiated for the East of McCarthy Boulevard Parcel. Prior to any future development on this parcel receiving water and sewer service pursuant to the City Agreements, the Property Owner shall comply with Section 3.A of this Agreement.

D. The BFI Recyclery Parcel contains an existing use and improvements. This Agreement shall serve as Milpitas' consent to this parcel receiving sewer and water service from San Jose to serve this existing use.

#### **4. INDEMNIFICATION**

A. The City of San Jose has agreed to defend, hold harmless, and indemnify Milpitas, its elective and appointive boards and commissions; and its officers, agents, and employees for loss or damage to any person or entity, and to defend, indemnify, hold harmless and release Milpitas, its agents and employees, from and against any and all actions, regulatory proceedings, claims, damages, liabilities, fines, penalties, or expenses that may be asserted by any person or entity, including San Jose arising out of or in connection with the performance of the Agreement hereunder, whether or not there is concurrent negligence on the part of the Milpitas, but excluding liability due to the sole active negligence or sole willful misconduct of the Milpitas.

B. Property Owner has agreed to provide an indemnification to the City of San Jose which indemnifies that city to the full extent of its indemnification of Milpitas.

#### **5. WAIVERS**



Waiver by any party to this Agreement of any breach, default, or violation of any term or condition of this Agreement shall not be deemed to be a waiver of any other term or condition of this Agreement, or a waiver of any subsequent breach or violation of the same, or any other term or condition.

## **6. NOTICES**

All notices and other communications required or permitted to be given under this Agreement shall be in writing and shall be personally served or mailed, postage prepaid and return-receipt requested, addressed to the respective Parties, or by facsimile, as follows:

To Property Owner: Los Esteros Ranch  
c/o Mr. Will Oswald  
1125 North Amphlett Blvd.  
San Mateo, CA 94401

Copy To: Realty Law, LLP  
c/o Joan Gallo  
125 S. Market St. Suite 500  
San Jose, CA 95112

To Milpitas: City Engineer  
City of Milpitas  
455 E. Calavaras Blvd.  
Milpitas, CA 95035  
Or by facsimile at (408) 586-3305

Notice shall be deemed effective on the date personally delivered or, if mailed, three (3) days after deposit in the mail.

## **7. NO TITLE OR PROPERTY RIGHTS CONFERRED**

This Agreement is not intended to and shall not confer title or any other property right to Property Owner in any part of Milpitas Owned Sewer or Water Lines.

## **8. RECORDATION**

This Agreement is intended to and shall run with the land. Property Owner shall cause this Agreement to be recorded within thirty (30) days after the effective date and shall provide a copy of the recorded document to Milpitas.

**9. TERMINATION AND NONRENEWAL**

The City Agreements give rights of termination to both cities. Milpitas shall immediately give notice to Property Owner of any violation under the City Agreements Termination clause. In addition, the City Agreements are subject to a limited term of twenty years with a provision that allows for an extension of not more than ten (10) years. Milpitas shall endeavor to provide property owners with one year advance notice should it determine for any reason that it will not extend either of the City Agreements. This Agreement shall terminate if such termination or refusal to extend by either City shall ever become effective. If in the future, for any reason, services to a property subject to this Agreement are provided by the City of San Jose, this Agreement shall terminate with respect to that property. In addition, each Property Owner may terminate this Agreement on ninety (90) days advance written notice to the City, at which time this Agreement will be of no further force or effect.

**10. GOVERNING LAW**

The law governing this Agreement shall be that of the State of California.

**11. COMPLIANCE WITH LAWS**

Parties agree to comply with all applicable laws, ordinances, codes and regulations of the federal, state and local governments.

**12. VENUE**

In the event that suit shall be brought by either Party to this Agreement, the Parties agree that venue shall be exclusively vested in the State Courts of the County of Santa Clara, or where otherwise appropriate, exclusively in the United States District Court, Northern District of California, San Jose, California.

**13. PRIOR AGREEMENTS AND AMENDMENTS**

This Agreement, including all Exhibits attached hereto, represents the entire understanding of the Parties as to those matters contained herein. No prior or written understanding shall be of any force or effect with respect to those matters covered hereunder.

**14. INTERPRETATION OF AGREEMENT**

The Parties to this Agreement acknowledge that each Party and their respective counsel have participated in the drafting and revision of this Agreement. Accordingly, the Parties agree that any rule of construction to the effect that ambiguities are to be resolved against the drafting party shall not apply in the interpretation of this Agreement or any Exhibit hereto.

**15. THIRD PARTY BENEFICIARY**

This Agreement shall be binding on and inure to the benefit of the Parties any owner, tenant or other person with an interest in the subject Properties.

**16. AMENDMENT**

This Agreement may be modified only by a written amendment duly executed by the Parties to this Agreement.

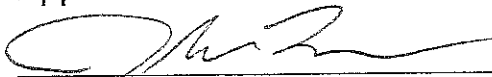
The Parties acknowledge and accept the terms and conditions of this Agreement as evidenced by the following signatures of their duly authorized representatives. It is the intent of the Parties that this Agreement shall become operative on the Effective Date.

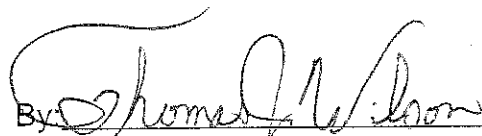
**PROPERTY OWNER**

  
\_\_\_\_\_  
Will Oswald, Partner  
Los Esteros Ranch Partnership

**MILPITAS**

Approved as to Form:

  
for Steven T. Mattas, City Attorney

By   
THOMAS WILSON  
City Manager

ATTEST:

  
\_\_\_\_\_  
Gail Blalock, City Clerk

Attach Notary Certificate

# CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of CALIFORNIA

County of SAN MATEO

On AUGUST 6, 2003 before me, LORI L. HORN, NOTARY PUBLIC

personally appeared WILL OSWALD

☐ personally known to me – OR – ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



WITNESS my hand and official seal.

Lori L. Horn  
Signature of Notary Public

## OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

### Description of Attached Document

Title or Type of Document: \_\_\_\_\_

Document Date: \_\_\_\_\_ Number of Pages: \_\_\_\_\_

Signer(s) Other Than Named Above: \_\_\_\_\_

### Capacity(ies) Claimed by Signer(s)

Signer's Name: \_\_\_\_\_

- ☐ Individual  
☐ Corporate Officer  
Title(s): \_\_\_\_\_  
☐ Partner — ☐ Limited ☐ General  
☐ Attorney-in-Fact  
☐ Trustee  
☐ Guardian or Conservator  
☐ Other: \_\_\_\_\_

Signer Is Representing: \_\_\_\_\_

RIGHT THUMBPRINT  
OF SIGNER  
Top of thumb here

Signer's Name: \_\_\_\_\_

- ☐ Individual  
☐ Corporate Officer  
Title(s): \_\_\_\_\_  
☐ Partner — ☐ Limited ☐ General  
☐ Attorney-in-Fact  
☐ Trustee  
☐ Guardian or Conservator  
☐ Other: \_\_\_\_\_

Signer Is Representing: \_\_\_\_\_

RIGHT THUMBPRINT  
OF SIGNER  
Top of thumb here

# CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of

Santa Clara

SS.

On 11-20-2003

Date

before me, GAIL A. BLALOCK, Notary Public

Name and Title of Officer (e.g., "Jane Doe, Notary Public")

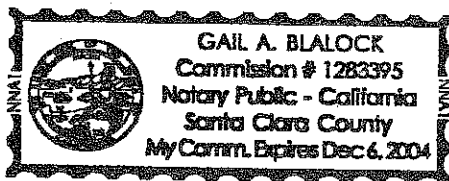
personally appeared

THOMAS J. WILSON

Name(s) of Signer(s)

☒ personally known to me

☐ proved to me on the basis of satisfactory evidence



to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Place Notary Seal Above

Signature of Notary Public

## OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

### Description of Attached Document

Title or Type of Document: Agreement for Sanitary Sewer & Water

Document Date: August 6, 2003 Number of Pages: 6 + exhibits

Signer(s) Other Than Named Above: Will Oswald

### Capacity(ies) Claimed by Signer

Signer's Name: THOMAS J. WILSON

☐ Individual

☒ Corporate Officer — Title(s): CITY MANAGER

☐ Partner — ☐ Limited ☐ General

☐ Attorney in Fact

☐ Trustee

☐ Guardian or Conservator

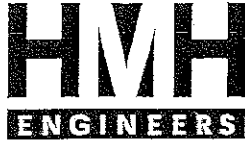
☐ Other: \_\_\_\_\_

Signer Is Representing: CITY OF MILPITAS

RIGHT THUMBPRINT  
OF SIGNER

Top of thumb here





San Jose  
(408) 487-2200  
Pleasanton  
(925) 600-7335  
Gilroy  
(408) 846-0707  
www.hmh-engineers.com

William J. Wagner  
Thomas A. Armstrong  
Michael L. Morsilli  
David M. Wilson  
James E. Thompson

July 9, 2003  
HMH 2734-01-099  
Page 1 of 2

### EXHIBIT "A"

All that certain real property situate in the City of San Jose, County of Santa Clara, State of California, described as follows:

#### PARCEL A

A portion of that certain parcel of land described in the deed from J. E. Fifer and Ellie E. Fifer, His Wife, to A. M. Standish dated September 23, 1946 and recorded in Book 1534 Official Records at page 499, Santa Clara County Records, said portion being bounded and described as follows:

COMMENCING at a 3/4 inch iron pipe found in the Northerly line of said parcel conveyed from J. E. Fifer, et ux, to A. M. Standish at the Westerly line of a 60 foot strip of land conveyed by William Boots, et al., to the County of Santa Clara, by deed dated April 26, 1876 and recorded July 11, 1876 in Book 41 of Deeds, page 469, Santa Clara County Records, said 3/4 inch iron pipe being N. 34° 39' 00" E., 3209.7 feet from a one (1) inch bar found at the section corner common to Sections 1 and 2, Township 6 South, Range 1 West, M.D.B. & M. and Sections 35 and 36, Township 5 South, Range 1 West, M.D.B. & M. as surveyed by Mission Engineers, Inc., in April 1963.

THENCE, along said Westerly line of a 60 foot strip of land conveyed by William Boots, et al, to the County of Santa Clara, the following courses and distances:

S. 69° 34' 00" E., 473.39 feet; S. 9° 09' 00" E., 111.36 feet; S. 48° 59' 00" W., 99.64 feet; S. 77° 15' 00" W., 478.87 feet; N. 85° 56' 00" W., 250.14 feet;

Thence S. 53° 33' 00" W. a distance of 11.67 feet, more or less, to the point of intersection with the Easterly prolongation of the common boundary lines of Parcels 1 and 2 above described (the course of said common boundary being N. 89° 58' 00" W.); thence N. 89° 58' 00" W. along said Easterly prolongation of said common boundary line a distance of 122.09 feet, more or less, to the Southeasterly corner of said Parcel 1 above described; thence along the Easterly boundary line of said Parcel 1 N. 43° 02' 00" E. a distance of 595.61 feet to a one (1) inch iron pipe in the said Northerly line of the said parcel conveyed to A. M. Standish; thence along said Northerly line S. 89° 58' 00" E., a distance of 55.46 feet to the point of commencement.

Being a portion of the Swamp and Overflow Survey No. 59 in Section 36, Township 5 South, Range 1 West, M.D.B. & M.

PARCEL B

BEGINNING at a point on the general Southerly line of that certain parcel of land described in the Deed from J. E. Fifer et ux to A. M. Standish, recorded December 1, 1947 in Book 1534, Official Records, at page 499, Santa Clara County Records distant thereof North 77° 15' 00" East 175.16 feet from the Southwesterly terminus of that certain course designated as North 77° 15' 00" East, 478.87 feet; thence leaving said point of beginning along said general Southerly line North 77° 15' 00" East 279.04 feet to a point hereinafter referred to as Point "A"; thence leaving said general Southerly line from a tangent bearing of South 42° 14' 45" West along a curve to the right with a radius of 190.00 feet through a central angle of 48° 03' 04" for an arc length of 159.34 feet and North 89° 42' 11" West, 130.53 feet to the point of beginning.

PARCEL THREE

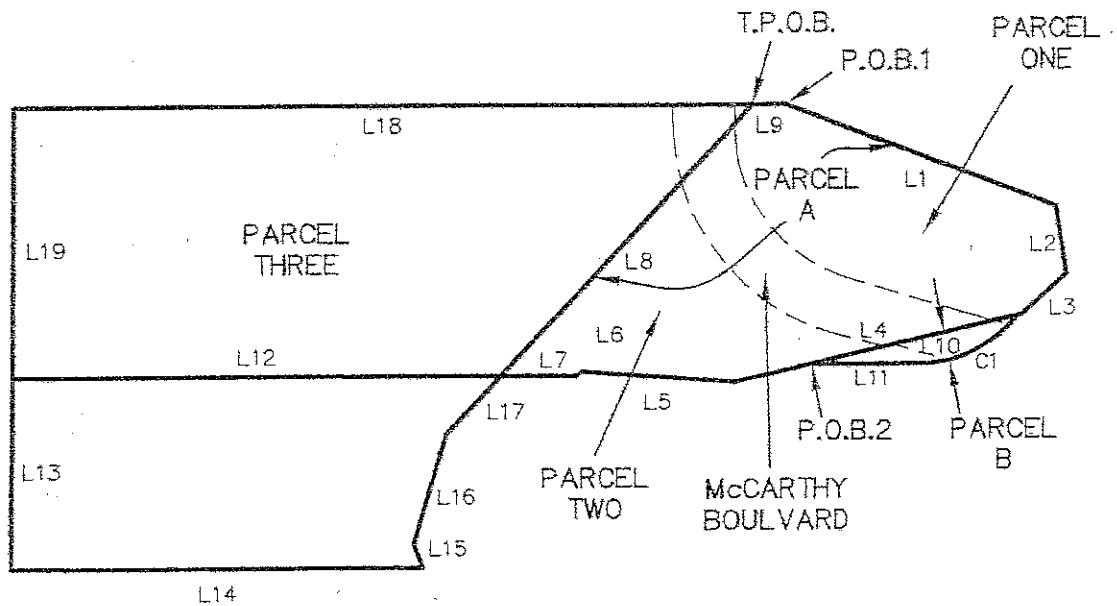
A portion of that certain parcel of land described in the deed from J. E. Filer and Ellie E. Filer, his wife, to A. M. Standish dated September 23, 1946 and recorded in Book 1534 Official Records at page 499, Santa Clara County Records, said portion being bounded and described as follows:

COMENCING at a 3/4 inch iron pipe found in the northerly line of said parcel conveyed from J. E. Filer, et ux to A. M. Standish at the westerly line of a 60 foot strip of land conveyed by William Boots, et al., to the County of Santa Clara, by deed dated April 26 1876 and recorded July 11, 1876 in Book 41 of Deeds, page 469, Santa Clara County Records; said 3/4 inch iron pipe being N. 34° 39' 00" E., 3209.7 feet from a one (1) inch bar found at the section corner common to Sections 1 and 2, Township 6 South, Range 1 West, M.D.B. & M. and Sections 35 and 36; Township 5 South, Range 1 West, M.D.B. & M. as surveyed by Mission Engineers, Inc. in April, 1963.

THENCE, on and along the said northerly line of said parcel conveyed to A. M. Standish N. 89° 58' 00" W., 55.46 feet to a one (1) inch iron pipe and the TRUE POINT OF COMMENCEMENT.

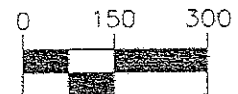
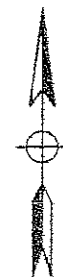
THENCE, along said northerly line N. 89° 58' 00" W., 1203.10 feet to a one (1) inch iron pipe; thence, S. 0° 02' 00" W., 435.60 feet to a one (1) inch iron pine; thence, S. 89° 58' 00" E., 796.90 feet to a one (1) inch iron pipe; thence, N. 43° 02' 00" E., 595.61 feet to the true point of commencement.

And being a portion of the Swamp and Overflow Survey No. 59 in Section 36, Township 5 South, Range 1 West, M.D.B. & M.



| LINE | BEARING     | DISTANCE |
|------|-------------|----------|
| L1   | S69°34'00"E | 473.39'  |
| L2   | S09°09'00"E | 111.36'  |
| L3   | S48°59'00"W | 99.64'   |
| L4   | S77°15'00"W | 478.87'  |
| L5   | N85°56'00"W | 250.14'  |
| L6   | S53°33'00"W | 11.67'   |
| L7   | N89°58'00"W | 122.09'  |
| L8   | N43°02'00"E | 595.61'  |
| L9   | S89°58'00"E | 55.46'   |
| L10  | N77°15'00"E | 279.04'  |
| L11  | N89°42'11"W | 130.53'  |
| L12  | S89°58'00"E | 796.90'  |
| L13  | S00°02'00"W | 310.52'  |
| L14  | S89°58'00"E | 671.84'  |
| L15  | N22°54'00"W | 41.59'   |
| L16  | S16°40'00"W | 185.40'  |
| L17  | N43°02'00"E | 129.32'  |
| L18  | N89°58'00"W | 1203.10' |
| L19  | S00°02'00"W | 435.60'  |

| CURVE | RADIUS  | DELTA     | LENGTH  |
|-------|---------|-----------|---------|
| C1    | 190.00' | 48°03'04" | 159.34' |



GRAPHIC SCALE  
1 INCH = 300 FT.

SHEET 1 OF 1

Date: 7-09-03  
Scale: 1"=300'  
Designed: -  
Drawn: dt  
Checked: DT  
Proj. Engr: -  
Draw Name: 2734PL11

**HMH**  
**ENGINEERS**

San Jose  
(408) 487-2200  
Pleasanton  
(925) 800-7235  
Gilroy  
(408) 846-0707  
www.hmh-engineers.com

PLAT TO ACCOMPANY  
EXHIBIT "A"  
LOS ESTEROS RANCH PROPERTIES"  
SAN JOSE CALIFORNIA

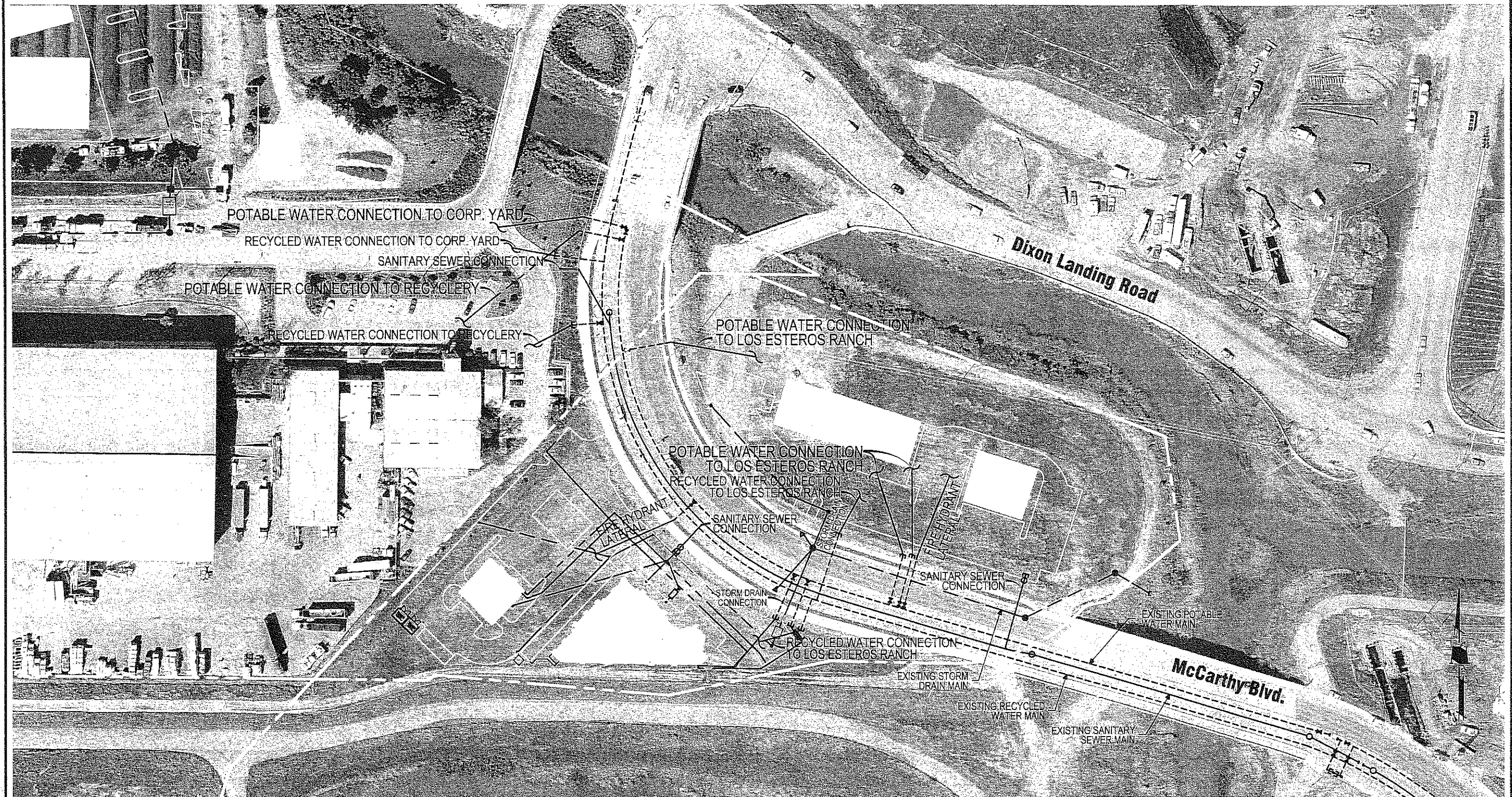
1020

12  
200

# LEGEND

|          |                     |          |          |                |          |
|----------|---------------------|----------|----------|----------------|----------|
| EXISTING | POTABLE WATER LINE  | PROPOSED | EXISTING | SANITARY SEWER | PROPOSED |
| EXISTING | RECYCLED WATER LINE | PROPOSED | EXISTING | STORM DRAIN    | PROPOSED |

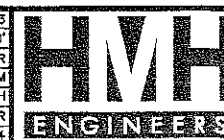
## EXHIBIT B



| BY | DATE | REVISIONS |
|----|------|-----------|
|    |      |           |
|    |      |           |
|    |      |           |
|    |      |           |
|    |      |           |

The Los Esteros Ranch  
1125 N. Amphlett  
San Mateo, CA 94401

Date: 7.29.03  
Scale: 1"=100'  
Designed: DRR  
Drawn: JAM  
Checked: RTH  
Proj. Engr: DRR  
File: 273401EX04



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(408) 487-2200  
Pleasanton  
(925) 600-7335  
Gilroy  
(408) 846-0707  
www.hmh-engineers.com

The Los Esteros Ranch - Site One & Two  
BFI Proposed Corporation Yard  
Utility Connections

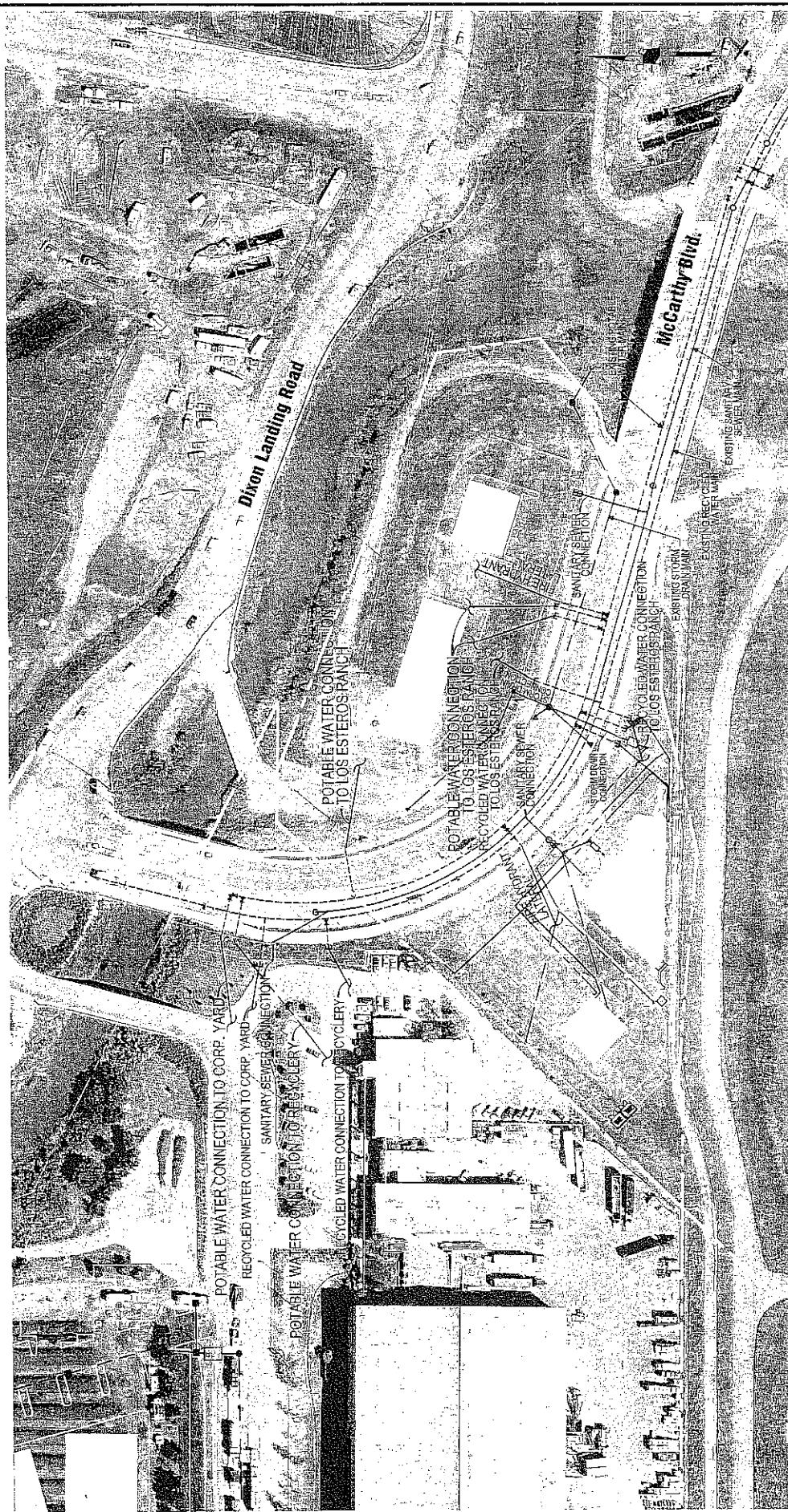
Sheet  
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Of 1 Sheets  
JOB NUMBER  
2734-01



# LEGEND

|          |                     |          |          |                |          |
|----------|---------------------|----------|----------|----------------|----------|
| EXISTING | POTABLE WATER LINE  | PROPOSED | EXISTING | SANITARY SEWER | PROPOSED |
| EXISTING | RECYCLED WATER LINE | PROPOSED | EXISTING | STORM DRAIN    | PROPOSED |

## EXHIBIT B



|                                                                                                |  |                                                                                                                  |  |                                       |
|------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------|--|---------------------------------------|
| <b>THE LOS ESTEROS RANCH</b><br>1125 N. Amphlett<br>San Mateo, CA 94401                        |  | <b>HMM</b><br>ENGINEERS                                                                                          |  | SHEET NO. 1<br>OF 1 SHEETS<br>2734-01 |
| THE LOS ESTEROS RANCH - SITE ONE & TWO<br>BFI PROPOSED CORPORATION YARD<br>UTILITY CONNECTIONS |  | DATE: 11/11/09<br>DRAWN BY: J. L. LEE<br>CHECKED BY: J. L. LEE<br>DESIGNED BY: J. L. LEE<br>PROJECT NO.: 2734-01 |  | SCALE: 1" = 40'                       |



## **EXHIBIT C**

### **City Agreements**

**APPENDIX G**  
City of Milpitas  
Sewer Master Plan Study  
Sanitary Sewer Force Main Cleaning and CCTV Inspection  
Project Report

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# PROJECT REPORT

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## SANITARY SEWER FORCE MAIN CLEANING AND CCTV INSPECTION

### CITY OF MILPITAS ENGINEERING DEPARTMENT

PREPARED BY: LYHAK EAM, P.E.  
REVIEWED BY: MICHAEL SILVEIRA, P.E.  
DATE: FEBRUARY 22, 2021





### EXECUTIVE SUMMARY

The City of Milpitas sanitary sewer system consists of two force mains that carries the City’s wastewater from the City of Milpitas Main Lift Sewer Pump Station at North McCarthy Boulevard to the San Jose-Santa Clara Regional Wastewater Treatment Plants. Force Main A and B were constructed in 1974 and 2000, respectively. The objective of this project was to perform an internal assessment of Force Main A (“FM-A”), but it was not possible to complete within budget due to unforeseen conditions and challenges. Engineering Department reported the findings to Public Works and recommends FM-A be either rehabilitated or replaced due to the its condition and age.

### PROJECT BACKGROUND

Cathodic Protection Improvement Project No. 6131 (“Project”) is in the approved Capital Improvement Program 2020-2025. The Project provides for the replacement of two existing mag meters at the Milpitas Main Lift Station, installation of cathodic protection system along the FM-A, removal or abandonment of the existing diverter valve vault near the Coyote Creek, evaluation and renovation of existing pinch valve vaults, and an assessment of FM-A. Per the “Water Pollution Control Facilities Project” record drawing dated April 1972 (**Attachment A**), FM-A is approximate 12,000 feet including 12 access manholes spaced approximately 1,000 feet apart. The force main extends from the Main Lift Pump Station, crossing under the Coyote Creek as a siphon, going underneath San Jose Residual Sludge Management (RSM) drying beds (Lagoons) and Zander Road, and connecting to the San Jose-Santa Clara Regional Wastewater Treatment Plants. (**Figure 01**).

JDH Corrosion Consultant, Inc. was retained to perform an indirect pipe assessment by using a Close Interval Survey (CIS) to measure the soil corrosivity surrounding the FM-A. The survey concluded the soils are inherently very corrosive and can potentially corrode and damage the steel force main (**Attachment B**). Based on the survey and the age of the system, Pipe and Plant Solutions Inc (PPSI) was retained to perform the cleaning and CCTV inspection to assess the internal condition of the force main. The work included site investigation of all sewer manholes, replacement of any corroded bolts and gaskets as needed, clearing and grubbing surrounding areas for safe and secure access, removal and disposal of any debris from the sanitary sewer force main, and performing CCTV inspection.





*Figure 1- Ariel Map of City Force Mains*



### SITE INVESTIGATION FINDINGS/CHALLENGES

The following is a summary of findings/challenges that Engineering staff encountered during the site investigation.

#### 1. RIGHT-OF-WAY/PERMITTING PROCESS

The entire FM-A (**Figure 02**) is located within the Santa Clara-San Jose Wastewater Treatment Plant property, and the City of Milpitas has an easement to maintain and operate the facility at any time (**Attachment B**). Without any additional provisions or requirements mentioned in the easement, the City of San Jose requires the City of Milpitas to enter into Right of Entry agreement (**Attachment C**) to access the City right-of-way for any work. The City attorney reviewed the languages in the easement and re-affirmed that the City of Milpitas has the right to access and perform work necessary without any further restriction by San Jose. Due to the schedule and need to investigate the FM-A, Engineering applied for a Right of Entry permit and tabled the discussion of the City of Milpitas rights to their Right of way. The permit process took approximately 3 months.



*Figure 2- Force Main A Alignment*



# CITY OF MILPITAS

## Engineering Department



In addition, the City is required to obtain an encroachment permit from Santa Clara Valley Water District (Valley Water) to access manhole #1 because of its close proximity to Coyote Creek that falls under their jurisdiction (**Figure 3**). At the time, Valley Water issued a permit for pedestrian access for site investigation search of the manhole with no excavation allowed. To obtain a vehicle access permit, the Valley Water will require an environmental assessment of invasive plants in the area. The assessment shall include the impacts of the work and any mitigation measures to preserve the surrounding area.

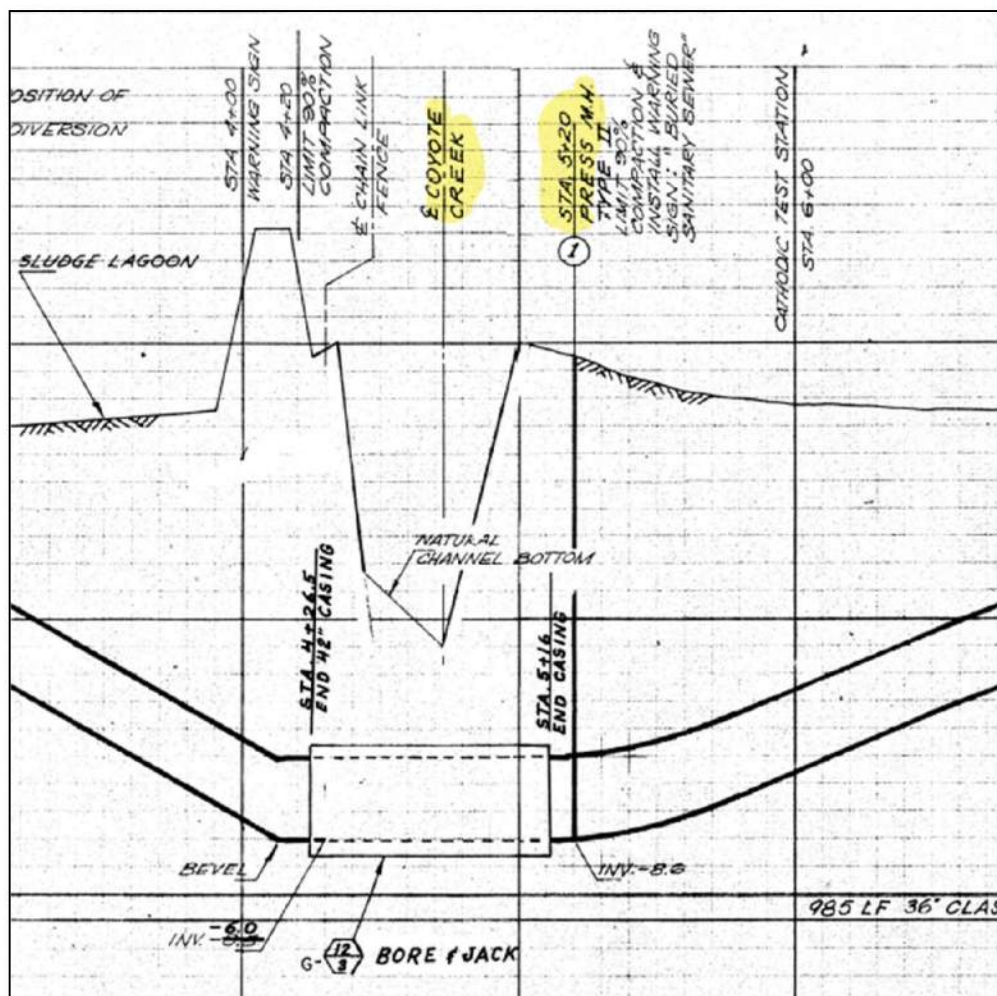


Figure 3- Manhole #1 Location Per As built



### 2. MISSING MANHOLES

After securing necessary permits, the contractor began to locate and assess all the manholes to access FM-A for cleaning and CCTV inspection. The contractor was able to locate manhole #2-6, 9-12, but unable to locate manhole #1, 7, and 8.

Manhole #1: Per Record Drawings, the manhole is located adjacent to Coyote Creek (**Figure 04**) under District jurisdiction. The manhole was not found because the permit issued by Valley Water is limited to pedestrian access and no excavation or removal of vegetation allowed. In order to locate the manhole, heavy equipment will have to be used to excavate and remove the vegetation around the area.



*Figure 4: Force Main Manhole #1 Location*

Manhole #7: Per Record Drawings, the manhole is approximate 972 feet from manhole #6 (**Figure 05**). Contractor was unable to locate the manhole and speculated it is buried under the existing access road.



**Figure 5: Force Main Manhole #7 Location**

According to the force main profile shown in **Figure 06**, manhole #7 is a critical access point to remove debris from pipe segment between manhole 6-7, 7-8 & 8-9 because it is the low point in the system.



**Figure 6: Force Main Profile**

**Manhole #8:** Contractor searched for the manhole without success but found a 30' high vertical pipe where the manhole should be located as shown in **Figure 07**. It is assumed the manhole was modified for this vertical pipe. Public Works staff does not have knowledge or the functionality of this pipe. The City does not have existing records of this modification.

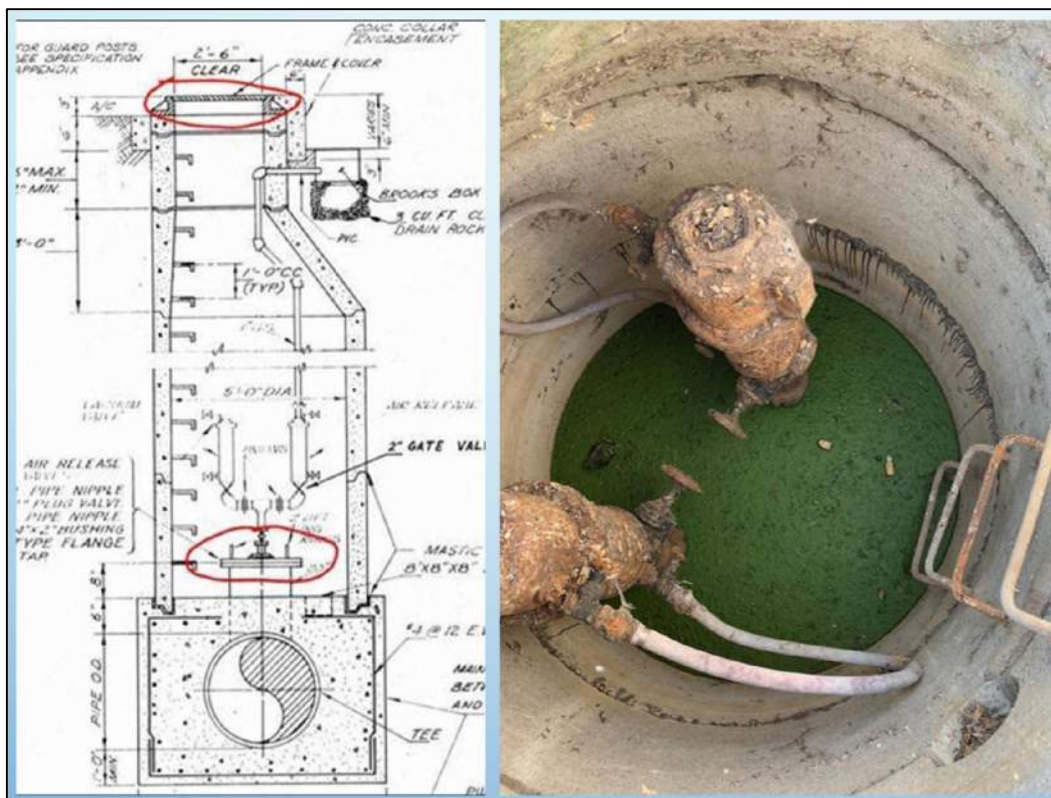




*Figure 7: Force Main Manhole #8 Location*

### 3. CORRODED MANHOLES' COMPONENTS

The Contractor investigated available manholes and the internal components including air release valves, bolts, gaskets and blind flanges. The components in manholes #9-12 appeared to be in good conditions. However, components in manholes #2 – 6, located in the lagoon area, are significantly corroded and not functional, see **Figure 8 & 9**.



**Figure 8:** Force Main Manhole



**Figure 9:** Corroded Air Release Valve and Blind Flange



In order to access the force main at manholes, both air release valves and blind flanges must be removed. Since components at manhole #2-6 are significantly corroded, they must be replaced to ensure the force main is properly sealed. The cost of replacing these components with stainless steel is approximately \$25,000, which is not included in the project scope and budget. Therefore, the cleaning and CCTV inspection of the segments between manhole #2-6 were postponed until the aforementioned issues are resolved.

#### 4. HIGH LEL AND H2S GAS LEVELS

During first attempt of the removal of the blind flange at MH#12, the Contractor encountered H2S and LEL gases levels that were beyond the maximum value of 100%, which was considered very hazardous. The Contractor had to immediately seal the blind flange and evacuate the area. It was assumed that the existence of high gas levels was due to the stagnant wastewater in the force main for approximate 4 weeks and could not be completely flush out of the system due to challenges accessing the system. Not knowing the exact source of the gases, staff recommended to resume the operation of the FM-A for 48-hours in the hope the gas would dissipate. The strategy was successful, and the Contractor was able to access the manhole safely. The source of the gases were not determined and may appear again in future work if the wastewater is stagnant for a period of time.

#### 5. SEWER OVERFLOW INCIDENT AND UNFUNCTIONAL SLIDE GATE

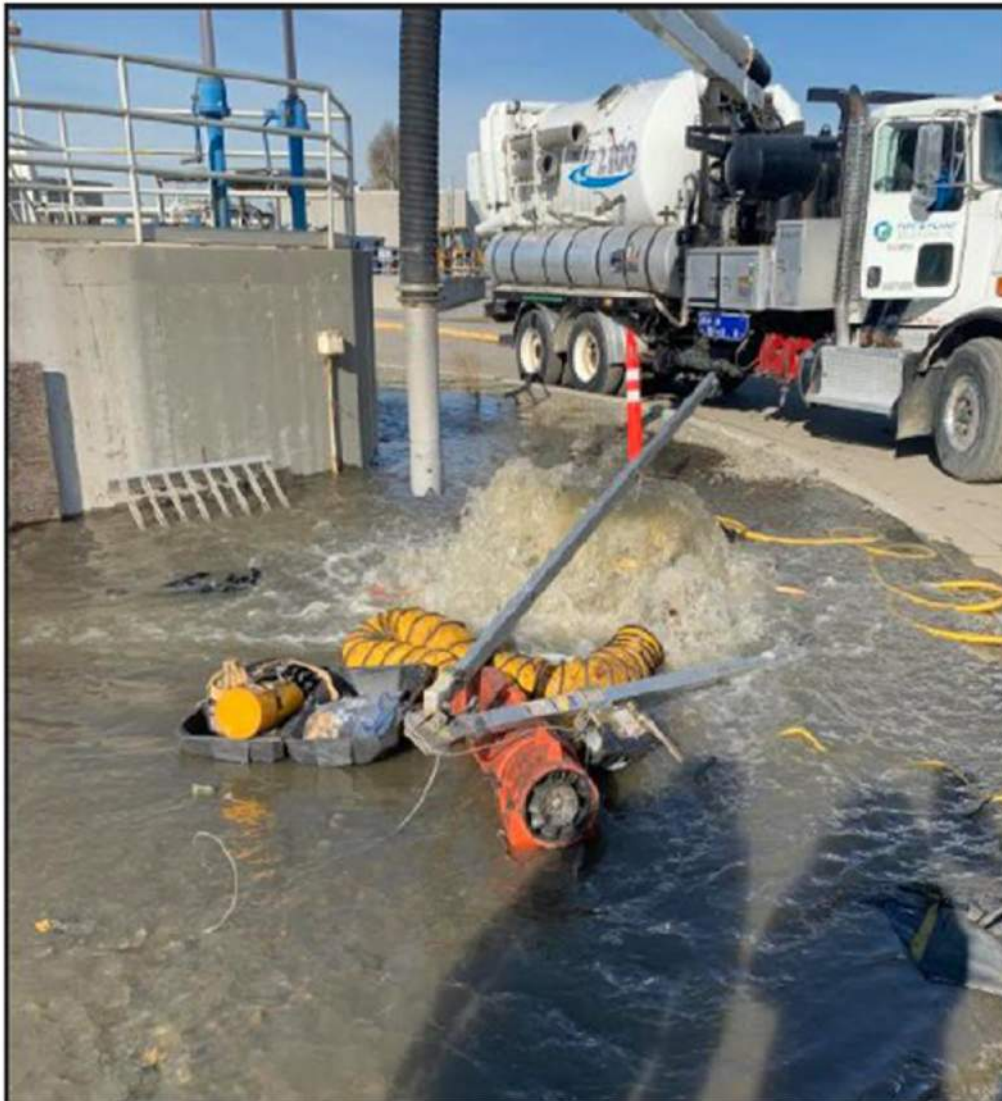
After resolving the gas issue, Public Works switched the wastewater operation from Force Main A to Force Main B (FM-B) to allow the Contractor to access manhole #12. As the contractor began to remove the blind flange, effluent started to overflow out of the manhole as shown in **Figure 10**. The overflow was a result from the wastewater from FM-B backflowing into FM-A at the Milpitas structure (**Figure 11**). Both FM-A and FM-B are connected directly to the Milpitas structure (**Figure 12**) that serves as a detention basin to receive and store all effluent before sending down to the Plant for treatment via an overflow weir wall.

In order to prevent the backflow from FM-B to FM-A, the FM-A sliding gate in the structure needs to be closed which is currently non-operational. Public Works shut down both force mains to stop the





overflow and allow the contractor to re-install the blind flange. The non-functional sliding gate caused effluent to backflow into the entire system because the elevation of force main A is lower than the Milpitas Structure. Such condition will create the potential overflow situation at other manholes similar to that encountered at manhole #12. To conduct any inspections of FM-A by CCTV, the sliding gate needs to be repaired to isolate the force main from one another.



*Figure 10: Sewer Overflow at MH #12*

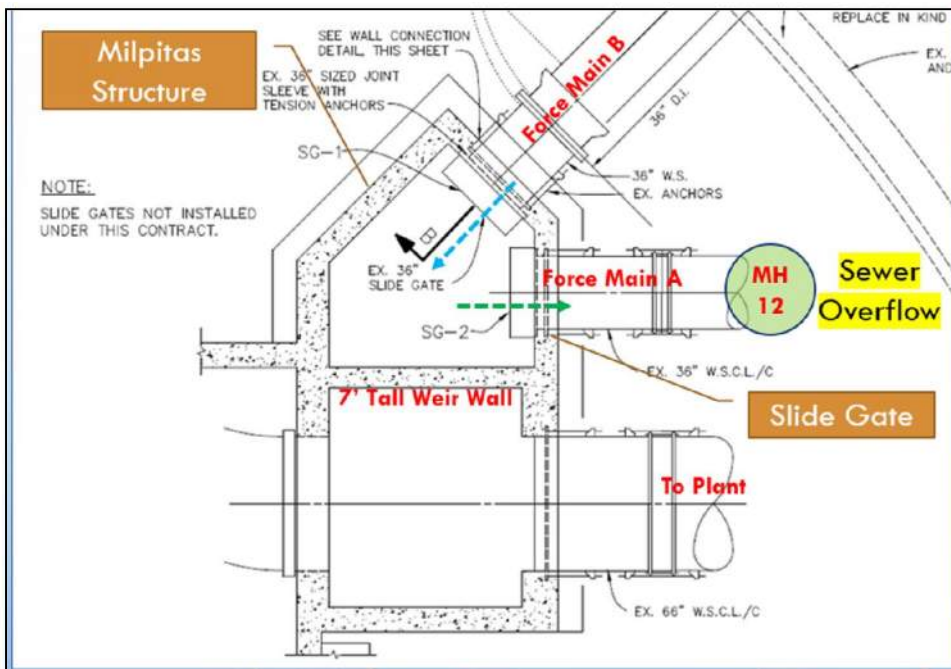


Figure 11: Milpitas Structure Drawing



Figure 12: Milpitas Structure





### CONCLUSION

Due to numerous issues as described, the following tasks shall be completed prior to performing the cleaning and CCTV inspection of the force main.

1. Locate all missing manholes along the force main including manholes #1, 7, and 8.
2. Replace all corroded air release valves and blind flanges for manhole #2 to #6.
3. Repair slide gate at Milpitas Structure so that the FM-A can be isolated from the structure itself.

Based upon this preliminary evaluation, the cost to complete the cleaning and CCTV inspection and all associated work is approximate \$ 850,000. The following is the summary of the cost breakdown.

| Description                                                            | Cost      |
|------------------------------------------------------------------------|-----------|
| Cleaning and CCTV inspection                                           | \$350,000 |
| Replacement of (6) manholes' parts ( bolts, blind flange, gasket, ARV) | \$150,000 |
| Repair slide gate and bypass pumping                                   | \$150,000 |
| Permitting process                                                     | \$30,000  |
| Bidding process and construction administration                        | \$30,000  |
| Construction contingency (20%)                                         | \$140,000 |
| TOTAL                                                                  | \$850,000 |

It is assumed the condition of the force main is deteriorating and doesn't meet industrial standards due to the age of the system, level of soil corrosivity surrounding the steel pipe, and the minimal routine maintenance since it was installed in 1974. The City should consider to either rehabilitate or replace the system in the near future. Rehabilitation of existing force main with a liner may extend its service life; however, the City should hire a professional license engineer to evaluate the existing system and provide improvement options and estimated cost. The installation of new force main is another option that the City should consider to ensure the well-being of this critical infrastructure for next 50 years. The estimated project cost for the construction of a new force main is as follows, and detailed cost breakdown is provided in **Attachment D**.

# CITY OF MILPITAS

## Engineering Department



|                                         |                     |
|-----------------------------------------|---------------------|
| Improvement Cost                        | \$14,197,000        |
| Design (20%)                            | \$ 2,839,400        |
| Administration ( 15%)                   | \$ 2,129,550        |
| Testing and Inspection (5%)             | \$ 709,850          |
| Environmental Review & Permitting ( 5%) | \$ 709,850          |
| TOTAL                                   | <b>\$20,585,650</b> |

Note the Engineering cost estimate provided are based on the construction cost of the Force Main B in 2000 and cost escalations over the past decades. No details planning or study has been conducted as part of this process. The basis for this estimate includes the following assumptions:

- 12,000 linear feet of 36" HDPE line
- The new force main is parallel to the existing force main B (HDPE)
- 12 manholes access with air release valves
- Bore and Jack under Zanker Road & Milpitas Structure
- Micro-tunneling- Coyote Creek crossing

### ATTACHMENTS

- Attachment A : Water Pollution Control Facilities As built
- Attachment B : Close Internal Survey Report
- Attachment C : Right of Entry Agreement
- Attachment C : Detailed Cost Estimate to Construct New Fore Main





HydroScience is a civil engineering firm that plans, designs, and manages the construction of water, wastewater, and recycled water projects. With offices in Berkeley, San Jose, Concord, and Sacramento, we understand and address the complex water and wastewater needs of Northern California.

**HydroScience** 

741 Allston Way  
Berkeley, CA 94710  
510.540.7100



## CITY OF MILPITAS AGENDA REPORT (AR)

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>            | Approve and Authorize the City Manager to Execute a Five-Year Professional Services Agreement with up to two additional two-year options to extend the service with PFM Asset Management LLC to Provide Section 115 Pension Trust Management Services and Establish a Section 115 Pension Trust                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Category:</b>              | Consent Calendar-Leadership and Support Services                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Meeting Date:</b>          | 5/18/2021                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Staff Contact:</b>         | <b>Walter C. Rossmann, Deputy City Manager, 408-585-3012; Lauren Lai, Finance Director/Risk Manager, 408-586-3111</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b><u>Recommendation:</u></b> | <ol style="list-style-type: none"> <li>1. Approve and authorize the City Manager to execute a Five-Year Professional Services Agreement with PFM Asset Management LLC to Provide Section 115 Pension Trust Management Services.</li> <li>2. Authorize the City Manager to execute up to two (2) additional two-year options to extend services without further City Council Action.</li> <li>3. Authorize the City Manager to execute any Trust related documents after approval as to form by the City Attorney.</li> <li>4. Adopt the Resolution for the Post-Employment Benefits Trust Agreement between PFM Assets Management LLC ("PFM") as Trust Administrator and Wells Fargo Bank, N.A. ("Wells Fargo") as directed Trustee; approve the Investment Earnings Goal for the Trust; and designate the City Trust Administrators.</li> </ol> |

### **Background:**

On March 3, 2020, the City Council reviewed the Pension Actuarial Report and directed staff to return to City Council with the necessary documents for the establishment of a 115 Pension Trust to invest reserve funds set aside to pay future pension obligations. Since there are several firms who offer such trust management services, staff issued a Request for Proposal to select the firm which would provide the most advantageous proposal to the City as described below.

The City has two pension plans with the California Public Employees Retirement System (CalPERS); the Safety Plan for its sworn employees and the Miscellaneous Plan for its non-sworn employees with a combined net pension liability in the amount of \$196.2 million as of June 30, 2020. The net pension liability represents outstanding funding needed for services provided by active or former City employees. As of June 30, 2020, the City Council set aside \$35.4 million of City funds (\$33.9 million General Fund and \$1.5 million Sewer Fund) in PERS Rate Stabilization Reserves. Per the City's reserve policies for the General and Utility Funds, year-end savings are allocated annually once to the PERS Rate Stabilization Reserves once certain other reserve requirements are met.

Per the City's Reserve Policies, as approved by the City Council, the funds for this reserve shall remain in the respective fund or be transferred into a Section 115 Trust. Establishing a Section 115 Trust and transferring moneys into the Trust has several advantages versus leaving the moneys in the respective funds as outlined in the table below.



| Considerations                                            | City's Cash Pool                                                      | Section 115 Trust                                                |
|-----------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------|
| Utilization of Reserve Funds                              | Council may re-designate the use of the reserve funds for any purpose | Funds can only be used for pension related expenditures          |
| Flexibility to address potential future budget shortfalls | High                                                                  | Medium (funds can only be used for pension related expenditures) |
| Reserve Funds estimated investment earnings               | approximately 1%                                                      | 3% to 6%                                                         |
| Long-term Investment Loss Risk                            | Low                                                                   | Moderate                                                         |

The City also has a trust for its Retiree Medical Benefit or Other Post Employment Benefit which has been managed by the California Employers' Retiree Benefit Trust (CERBT) Fund administered by CalPERS for over a decade. CERBT is a Section 115 trust fund dedicated to prefunding Other Post-Employment Benefits (OPEB) for all eligible California public agencies.

#### **Analysis:**

On August 21, 2020 the City's Purchasing Division released RFP No. 2467 for Section 115 Trust Management Services for a Pension Trust with the option to award trust management services to one firm for a Pension and OPEB Trust. The RFP was publicly noticed in accordance with the City's Municipal Code, advertised on the City's website, emailed to companies registered with the City via ProcureNow.com (the City's eProcurement system). Additionally, the RFP was published on the City's website.

Upon release, 154 firms received notice of the solicitation and ten firms downloaded the RFP documents. One addendum was issued and ten clarifying questions were answered by City staff. Four firms responded to the RFP by the published closing date of September 18, 2020. The proposals received were reviewed by Purchasing staff for compliance and responsiveness and all were accepted.

The four (4) companies that submitted accepted proposals were:

1. PARS
2. Chandler Asset Management Inc.
3. CalPERS
4. PFM Asset Management LLC

The evaluation committee comprised of five City staff members from the Department of Finance reviewed the submitted proposals based on the following criteria:

1. Overall Experience
2. Program Team and Relationship Services
3. Trustee and Trust Administration Services
4. Investment Requirements and Investment Performance
5. Fees
6. Implementation Plan and Schedule
7. References

After an initial evaluation by the evaluation committee for Pension Trust management services, the three highest ranked firms, PARS, CalPERS, and PFM Asset Management LLC, were invited to and attended video interview (due to the on-going Shelter-in-Place order) to gather further information regarding their proposals and offer the evaluation committee the opportunity to ask clarifying questions before issuing a Best and Final Offer (BAFO) to the three finalists. The BAFO process also included an evaluation of combined trust management services for pension and OPEB. After evaluating the BAFO submissions, it became clear that CERBT is providing very competitive OPEB trust management services. Therefore, staff decided to only consider an award of contract for pension trust management services. The table below shows the final evaluation scores with the recommended firm highlighted in green:

|                                                       |                          |      |         |                           |
|-------------------------------------------------------|--------------------------|------|---------|---------------------------|
| Section 115 Trust Management Services<br>RFP No. 2467 | PFM Asset Management LLC | PARS | CalPERS | Chandler Asset Management |
| Final Overall Score                                   | 88.5                     | 80.1 | 81.8    | 79.6                      |

Therefore, staff recommends awarding the contract for pension trust management services to PFM, which submitted the most advantageous proposal.

After issuing the notice of intended award, staff worked with PFM and the City Attorney's Office to set an investment goal, review the trust documents and establish the administrative policies for trust oversight. Based on that work, staff recommends that the Council approve the attached resolution which awards the RFP for pension trust management services to PFM Assets Management LLC ("PFM"); authorizes the City Manager to execute the professional services agreement with PFM for the initial term of July 1, 2021 – June 30, 2026 and execute the resulting two (2) two-year extensions as well as any Trust related documents after approval as to form by the City Attorney without additional action by the City Council; adopts the Post-Employment Benefits Trust Agreement between PFM Assets Management LLC ("PFM") as Trust Administrator and Wells Fargo Bank, N.A. ("Wells Fargo") as directed Trustee; approves the Investment Earnings Goal for the Trust; and designates the City Pension Trust Administrators. It is important to note that the City is joining a multi-employer trust, which is set up for pension and other post-employment benefits. However, per the agreement with PFM, the City is only contracting for pension trust management services.

Based on the City's Actuary, the City's pension costs are expected to increase within the next 10 to 12 years and decline thereafter (see attached staff report from the March 3, 2020 City Council agenda). Therefore, staff recommends investing the PERS Rate Stabilization funds in the amount of \$35.4 million for 5 – 10 years to achieve a 3% to 6% investment earnings goal at a moderate investment risk level. Then, after investing the funds for a minimum of 5 to 10 years, the Council could consider paying off the pension liability and smooth out annual pension costs for several years.

### **Policy Alternatives:**

**Alternative 1:** Not establishing a Section 115 Pension Trust and continue investing the PERS Rate Stabilization Reserve funds at a 1% interest rate

Pros: The funds will be only exposed to low investment risk and are expected to generate approximately \$3.7 million in earnings, growing to about \$39.1 million over 10 years.

Cons: Given the current interest environment and accommodating Federal Reserve interest policy, the funds are expected to earn a low interest rate of about 1% for the foreseeable future.

Reason not recommended: By investing the funds for 5 – 10 years, investment risk is mitigated. With a moderate investment goal to achieve 3% to 6% investment earnings, over 10 years the trust fund balance is expected to increase from \$35.4 million to between \$47.6 million and \$63.4 million or net earnings between \$12.2 million and \$28.0 million

### **Fiscal Impact:**

With a moderate investment goal to achieve 3% to 6% investment earnings, over 10 years the trust fund balance is expected to increase from \$35.4 million to between \$47.6 million and \$63.4 million or net earnings between \$12.1 million and \$28.0 million.

### **California Environmental Quality Act:**

Not applicable. The selection and contractual arrangement of banking services do not constitute a project, in accordance with Section 15378 of the CEQA Guidelines

**Recommendation:**

1. Approve and authorize the City Manager to execute a Five-Year Professional Services Agreement with PFM Asset Management LLC to Provide Section 115 Pension Trust Management Services.
2. Authorize the City Manager to execute up to two (2) additional two-year options to extend services without further City Council Action.
3. Authorize the City Manager to execute any Trust related documents after approval as to form by the City Attorney.
4. Adopt the Resolution for the Post-Employment Benefits Trust Agreement between PFM Assets Management LLC ("PFM") as Trust Administrator and Wells Fargo Bank, N.A. ("Wells Fargo") as directed Trustee; approve the Investment Earnings Goal for the Trust; and designate the City Trust Administrators.

**Attachments:**

1. Pension Actuarial Report March 3, 2020 Council Agenda
2. Professional Services Agreement (PSA) for Pension Trust Management Services
3. Post-Employment Benefits Trust Agreement (Attachment A to the PSA)
4. Adoption Agreement for the Post-Employment Benefits Trust (Attachment B to the PSA)
5. Trust Administrative Services Agreement (Exhibit B to the Adoption Agreement)
6. Wells Fargo Services Agreement (Attachment C to the PSA)
7. Resolution



## CITY OF MILPITAS AGENDA REPORT (AR)

|                        |                                                                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item Title:</b>     | <b>Review the Pension Actuarial Report and Direct Staff to Return to the Council with the necessary Documents for the Establishment of a 115 Pension Trust</b> |
| <b>Category:</b>       | Leadership and Support Services                                                                                                                                |
| <b>Meeting Date:</b>   | 3/3/2020                                                                                                                                                       |
| <b>Staff Contact:</b>  | Walter C. Rossmann, 408-586-3111                                                                                                                               |
| <b>Recommendation:</b> | Review the Pension Actuarial Report and direct staff to return to City Council with the necessary documents for the establishment of a 115 Pension Trust.      |

### **Background:**

The City has two pension plans with CalPERS; the Safety Plan for its sworn employees and the Miscellaneous Plan for its non-sworn employees. Since the deep recession about a decade ago, the cost for the City's pension benefit has risen drastically. In FY 2009-10, the pension cost was approximately \$7 million for both plans. By 2018-19 the cost increased to approximately \$17 million, an increase of 143% over ten years. The primary reasons for the cost increase are investment losses, demographic changes, and CalPERS policy changes (contribution policy changes; amortization policy changes; and discount rate changes).

The major demographic changes are an increase in the retiree population and a longer life expectancy. In FY 2008-09, the City had 276 active or employed Miscellaneous or non-sworn employees versus 228 retired employees. In 2018, the City had 202 active Miscellaneous employees versus 383 retired employees. Within ten years, the retiree population increased by 68%. During the last five years, CalPERS changed various policies to improve funding to the pension system thereby increasing the annual cost to CalPERS agencies such as the City of Milpitas. Changes to the contribution policy included closed versus rolling amortization periods, discontinuing asset smoothing, and introducing five-year ramp-ups to fund changes in the Unfunded Actuarial Liability (UAL). Further, CalPERS reduced its discount rate, the interest rate which its investment portfolio is targeted to earn annually, from 7.75% in FY 2012-13 to 7.00% in FY 2020-21.

Due to the impact of the deep recession, enhanced benefits granted in the 2000s, and CalPERS policy changes, the City's unfunded actuarial liability (UAL) for the Miscellaneous and Sworn Plans combined as of June 30, 2018 stands at \$207 million with a combined funded ratio of 65.2%. In FY 2006-07, both plans were more than 100% funded.

Over the last decade this Council as well as previous Councils have taken several actions to mitigate increased pension costs:

1. Planning for funding in the annual budget to ensure that the City pay its annual pension contribution as determined by CalPERS;
2. Working with its bargaining units, the City approved a lower and less expensive pension benefit (Tier 2) for classic employees (effective October 2011 for Miscellaneous employees and April 2012 for Sworn employees); and
3. Setting aside during the last two to three years approximately \$34 million of one-time General Fund dollars in the PERS Rate Stabilization Reserve to address the pension plans' UAL.

During the FY 2020-21 Preliminary Budget Study Session, staff presented the FY 2021-2030 Ten-Year General Fund Financial Forecast, which includes the full CalPERS pension impact given the Pension System's current methodology of ramping up investment gains and losses over five years. The full impact of any

investment gains and losses incurred are reflected in the sixth year of the Forecast and beyond. Further report provides an actuarial outlook regarding pension costs over the next 30 years.

### Analysis:

At the Council meeting, the City's actuary from Bartel and Associates will present the attached pension actuarial report as summarized below and staff will present options to address the City's UAL and investment and utilization of the PERS Rate Stabilization Reserve in the amount of \$34 million.

### Pension Actuarial Report

Annually, CalPERS issues pension valuations reports for Miscellaneous and Sworn employees' plans providing anticipated pension costs for the current plus five years. To fully understand the long-term impact of pension costs over 30 years staff contracted with Bartel & Associates. Bartel Associates, LLC specializes in providing states, counties, cities, and other public agencies with actuarial consulting services. Its 300+ clients range from special districts, to small and large cities, to state governments.

The attached report provides detailed demographic and historical information as well as pension cost projections for Miscellaneous and Sworn Plans, discusses recent CalPERS policy changes, and provides options for paying down the UAL. Bartel & Associates' representatives will attend the Council meeting to present the report and address Council questions. Additionally, the report will be presented to employees.

### City's Pension Unfunded Actuarial Liability

During the last two to three years, the Council set aside \$34 million in a PERS Rate Stabilization Reserve to address the City's Pension UAL in the amount of \$207 million. Per the City's Reserve Policies, as approved by the City Council, the funds for this reserve shall remain in the General Fund or be transferred into a Section 115 Trust. Based on Council direction, staff reviewed various options to utilize and/or invest the PERS Rate Stabilization Reserve funds as summarized in the table below.

| Considerations                                            | City's Cash Pool                                                      | Section 115 Trust                                                | CalPERS                                                                    |
|-----------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Utilization of Reserve Funds</b>                       | Council may re-designate the use of the reserve funds for any purpose | Funds can only be used for pension related expenditures          | Funds can only be used to pay off the Unfunded Actuarial Liability         |
| Flexibility to address potential future budget shortfalls | High                                                                  | Medium (funds can only be used for pension related expenditures) | None (funds are transferred to CalPERS and cannot be accessed by the City) |
| Reserve Funds estimated investment earnings               | approximately 2%                                                      | 4% to 5% depending on the investment strategy                    | CalPERS currently assumed interest rate of 7%                              |
| Investment Strategy Choice                                | Limited                                                               | Yes                                                              | None (CalPERS administers the funds)                                       |
| Investment Loss Risk                                      | Very Low                                                              | Low to Medium depending on investment strategy                   | High                                                                       |

To preserve flexibility for utilization of the funds allocated to the PERS Rate Stabilization Reserve while improving the potential to improve interest earnings, staff recommends that the Council direct staff to return



the Council with the necessary documents to establish a Section 115 Trust. Since there are several firms that offer such a trust and related investment services, staff intends to issue a Request for Proposal to recommend the most qualified firm to the Council.

### **Policy Alternatives:**

Alternative 1: Do not direct staff to return to the Council with the necessary documents to establish a Section 115 Trust and keep funds in the PERS Rate Stabilization Reserve.

Pros: Staff time will be dedicated to other high priority projects.

Cons: The City will keep investing PERS Rate Stabilization Reserve funds in the City's investment pool earning a rate around 2%.

Reason not recommended: Keeping the funds in the PERS Rate Stabilization Reserve will yield a lower long-term yield. Furthermore, future Councils will have the option of using the reserve for other purposes, thereby potentially leaving a significant liability unresolved.

Alternative 2: Transfer the PERS Rate Stabilization Reserve funds to CalPERS to pay down the UAL.

Pros: Through an upfront payment of \$30 million, the annual payment to CalPERS for pension obligations is estimated to be reduced by several millions.

Cons: The City will no longer have access to the funds transferred to CalPERS.

Reason not recommended: By transferring PERS Rate Stabilization Reserve funds to CalPERS, the City will substantially reduce its ability to address budget shortfalls related to pension contributions during recessionary times. Further, CalPERS investments are exposed to a higher volatility and investment risk in order to achieve a 7% assumed investment earnings.

### **Fiscal Impact:**

There is no fiscal impact from issuing a Request for Proposal to seek the most qualified firm for the establishment of a Section 115 Trust other than staff time. However, if the City Council directs staff to return with the necessary documents to establish a 115 Trust, the City will have to pay a fee for the management of the City's assets by an investment firm. The selection of the firm and related costs will be determined through a competitive RFP process.

### **Recommendation:**

1. Review the Pension Actuarial Report; and
2. Direct staff to return to City Council with the necessary documents for the establishment of a 115 Pension Trust.

### **Attachment:**

Bartel and Associates Actuarial Report



**CITY OF MILPITAS**  
**MISCELLANEOUS AND SAFETY PLANS**

---

**B**ARTEL  
ASSOCIATES, LLC

**CalPERS Actuarial Analysis – 6/30/18 Valuation**

**Doug Pryor, Vice President**

Bianca Lin, Assistant Vice President

Tina Liu, Associate Actuary

**Bartel Associates, LLC**

January 21, 2020

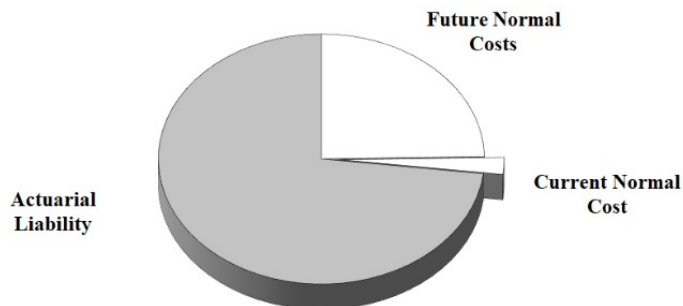
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Present Value of Benefits  
June 30, 2018



## ■ PVB - Present Value of all Projected Benefits:

- The value now of amounts due to be paid in the future
- Discounted value (at valuation date - 6/30/18), of all future expected benefit payments based on various (actuarial) assumptions

## ■ Current Normal Cost (NC):

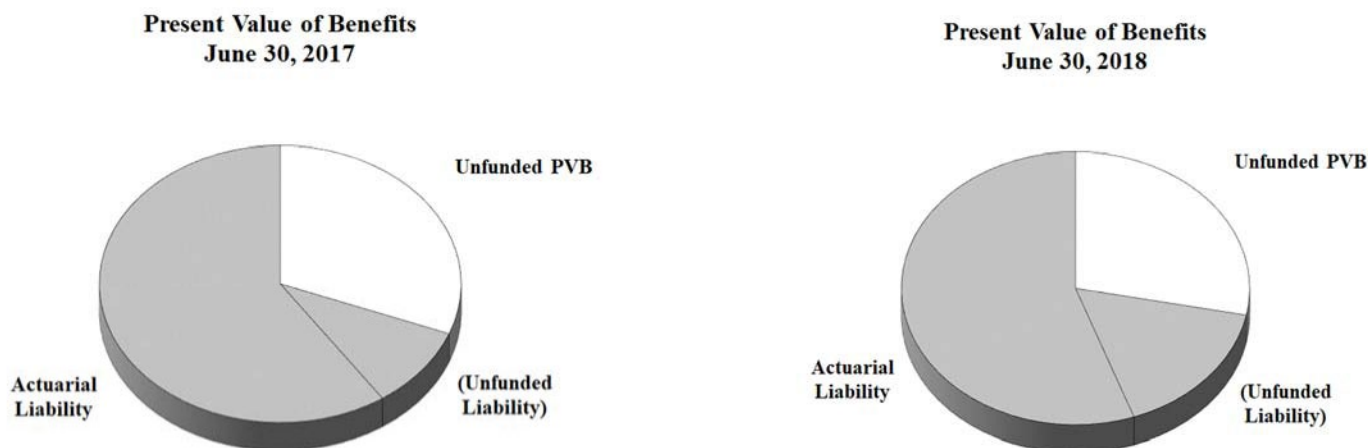
- Portion of PVB allocated to (or “earned” during) current year
- Value of employee and employer current service benefit

## ■ Actuarial Liability (AAL):

- Discounted value (at valuation date) of benefits earned through valuation date [value of past service benefit]
- Portion of PVB “earned” at measurement

## DEFINITIONS

450



- **Target-** Have money in the bank to cover Actuarial Liability (past service)
- **Unfunded Liability (UAAL or UAL) -** Money short of target at valuation date
  - If all actuarial assumptions were always exactly met, then the plan assets would always equal AAL
  - Any difference is the unfunded (or overfunded) AAL
  - Every year, the actuary calculates the difference between the expected UAAL and Actual UAAL. This is a new layer or amortization base
  - Each new layer gets amortized (paid off) over a period of time as part of the contribution [rate].



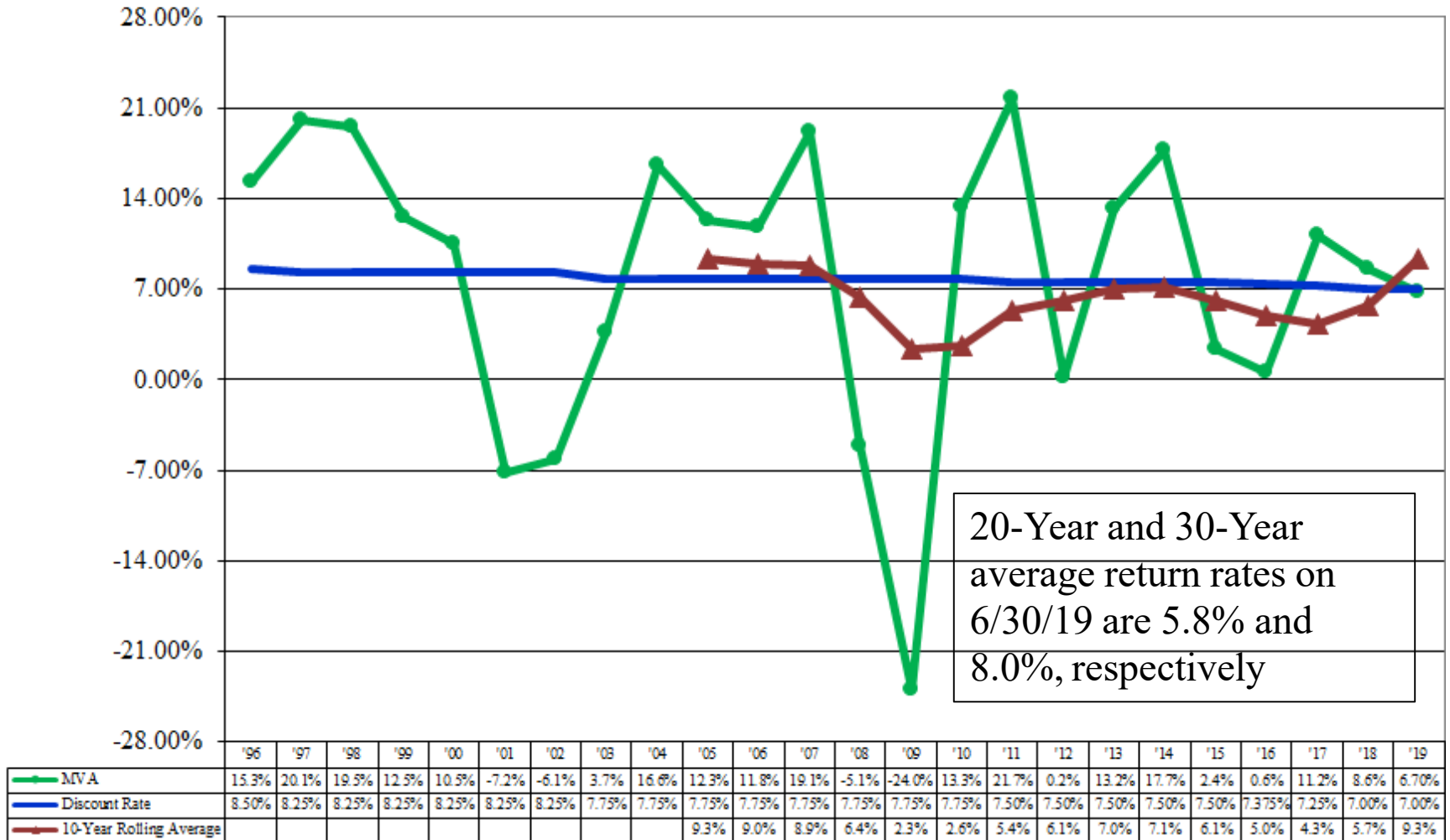
- Investment Losses
- CalPERS Contribution Policy
- Enhanced Benefits
- Demographics



# HOW WE GOT HERE – INVESTMENT RETURN

452

## Annual Return on Market Value of Assets



Returns (after 2001) shown are gross returns, unreduced for administrative expenses. The discount rate is based on expected returns net of administrative expenses.



## HOW WE GOT HERE – OLD CONTRIBUTION POLICY

453

- Effective with 2003 valuations:
  - Slow (15 year) recognition of investment losses into funded status
  - Rolling 30 year amortization of all (primarily investment) losses
- Designed to:
  - First smooth rates and
  - Second pay off UAL
- Mitigated contribution volatility



## HOW WE GOT HERE – ENHANCED BENEFITS

454

- At CalPERS, Enhanced Benefits implemented using all (future & prior) service
- Typically not negotiated with cost sharing
- City of Milpitas

|                       | <b>Tier 1</b> | <b>Tier 2<sup>1</sup></b> | <b>PEPRA</b> |
|-----------------------|---------------|---------------------------|--------------|
| ● Miscellaneous       | 2.7%@55 FAE1  | 2%@60 FAE3                | 2%@62 FAE3   |
| ● Safety <sup>2</sup> | 3%@50 FAE1    | 3%@55 FAE1                | 2.7%@57 FAE3 |

- Note:

- FAE1 is highest one year (typically final) average earnings
- FAE3 is highest three years (typically final three) average earnings

- PEPRA tier implemented for new employees hired after 1/1/13
  - Employee pays half of total normal cost
  - 2019 Compensation limit
    - Social Security participants: \$124,180
    - Non-Social Security participants: \$149,016

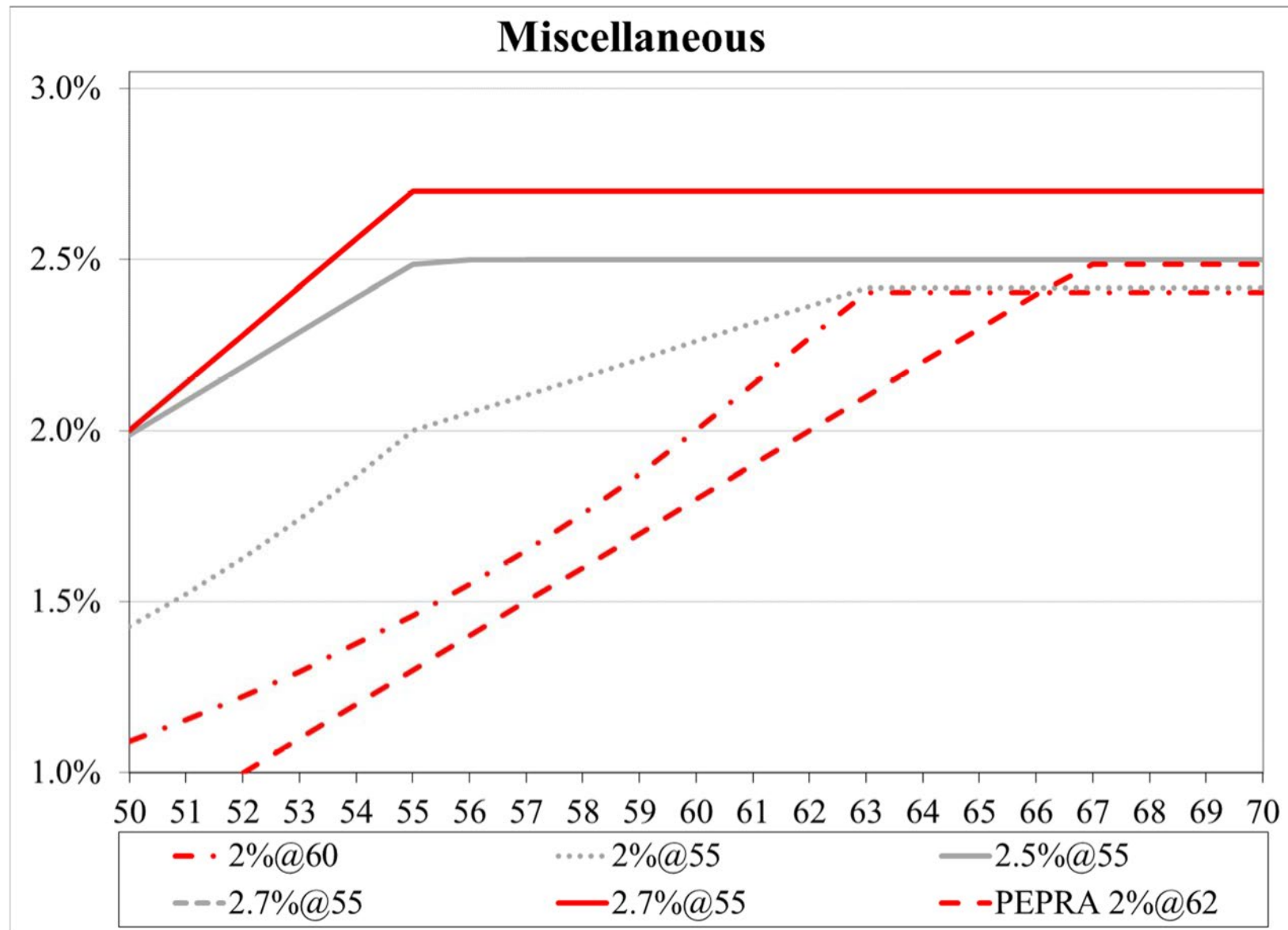
<sup>1</sup> Hired after October 9, 2011 for Miscellaneous and after April 8, 2012 for Safety

<sup>2</sup> Fire and Police members are combined in this group



# HOW WE GOT HERE – ENHANCED BENEFITS

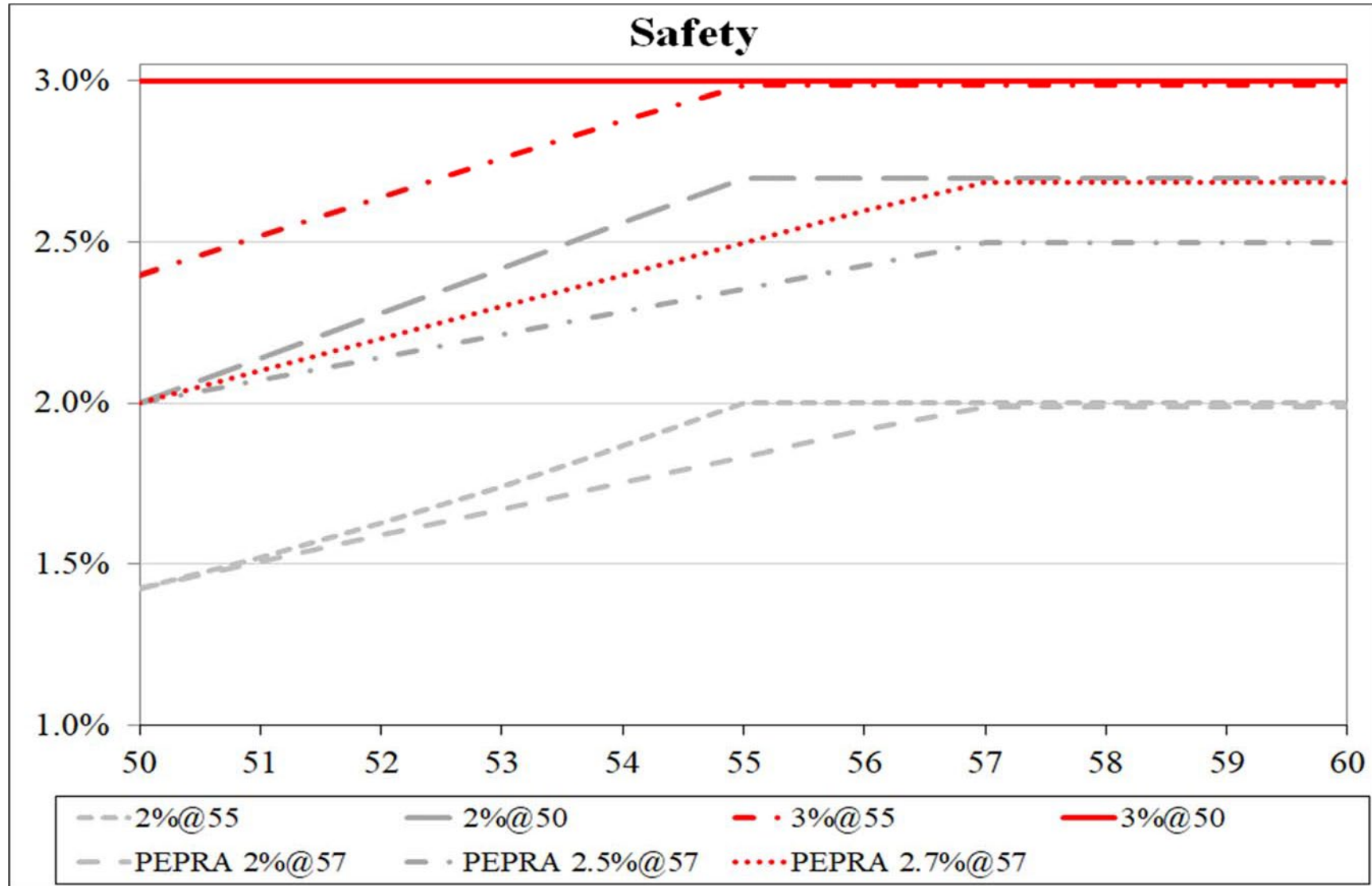
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# HOW WE GOT HERE – ENHANCED BENEFITS

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January 21, 2020



- Around the State
  - Large retiree liability compared to actives
    - State average: 59% for Miscellaneous, 62% for Safety
  - Declining active population and increasing number of retirees
  - Higher percentage of retiree liability increases contribution volatility
- City of Milpitas percentage of liability belonging to retirees:
  - Miscellaneous 61%
  - Safety 70%

- Recent contribution policy changes:
  - No asset smoothing
  - No rolling amortization
  - 5-year ramp up
- February 2018: CalPERS adopted new amortization policy
  - Applies only to newly established amortization bases
    - Fixed dollar amortization rather than % pay
    - Amortize gains/losses over 20 rather than 30 years
    - 5-year ramp up (not down) for investment gains and losses
    - No ramp up/down for other amortization bases
  - Minimizes total interest paid over time and pays off UAL faster
  - Effective June 30, 2019 valuation for 2021/22 contributions
- CalPERS Board changed the discount rate:

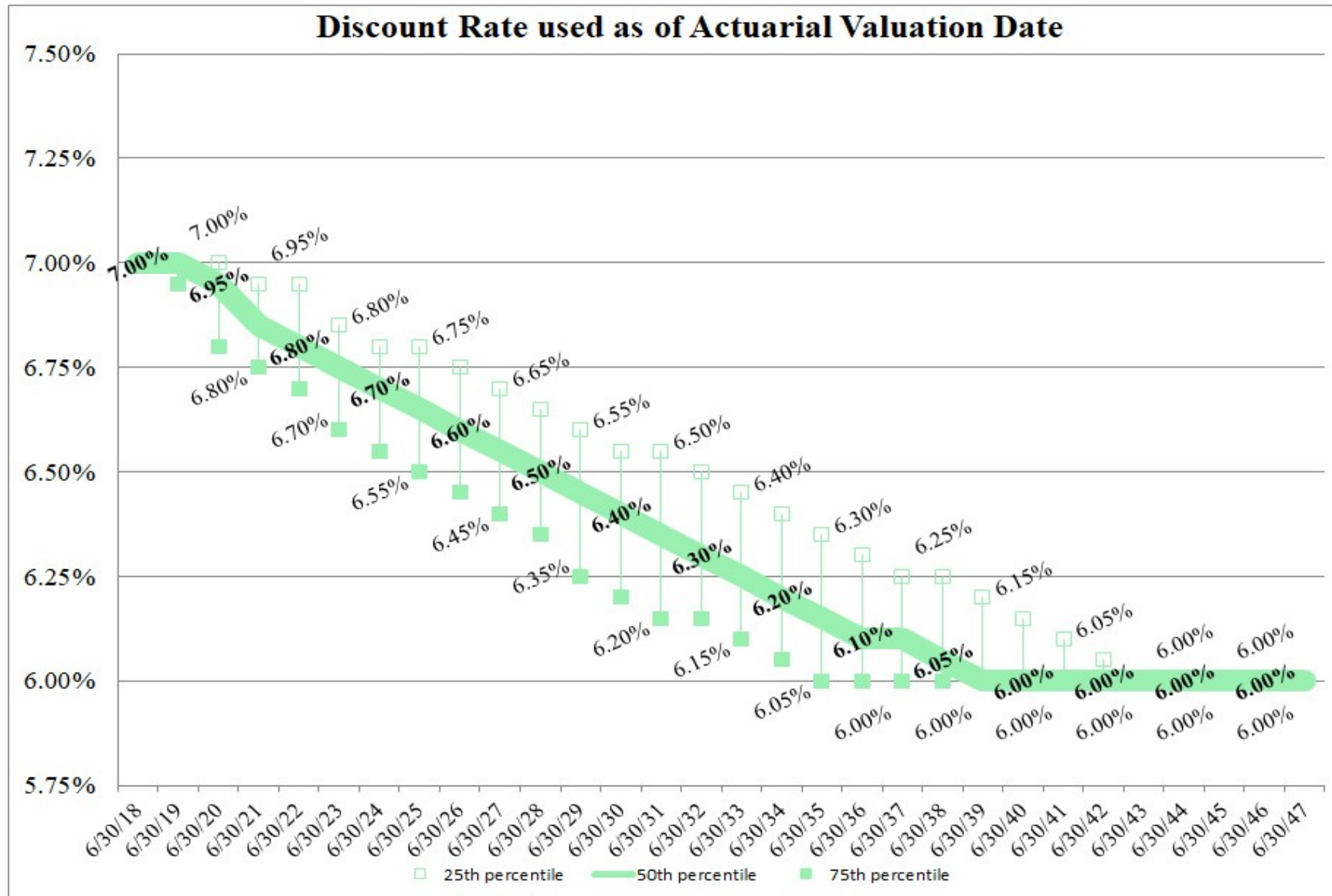
|                     | <u>Rate</u> | <u>Initial Impact</u> | <u>Full Impact</u> |
|---------------------|-------------|-----------------------|--------------------|
| ● 6/30/16 valuation | 7.375%      | 18/19                 | 22/23              |
| ● 6/30/17 valuation | 7.25%       | 19/20                 | 23/24              |
| ● 6/30/18 valuation | 7.00%       | 20/21                 | 24/25              |

### ■ Risk Mitigation Strategy

- Move to more conservative investments over time to reduce volatility
- Only when investment return is better than expected
- Lower discount rate in concert
- Essentially use  $\approx 50\%$  of investment gains to pay for cost increases
- Likely get to 6.0% discount rate over 20+ years
- Risk mitigation suspended from 6/30/16 to 6/30/18 valuation
- Did not trigger for 6/30/19 valuation

# CALPERS CHANGES

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# SUMMARY OF DEMOGRAPHIC INFORMATION - MISCELLANEOUS

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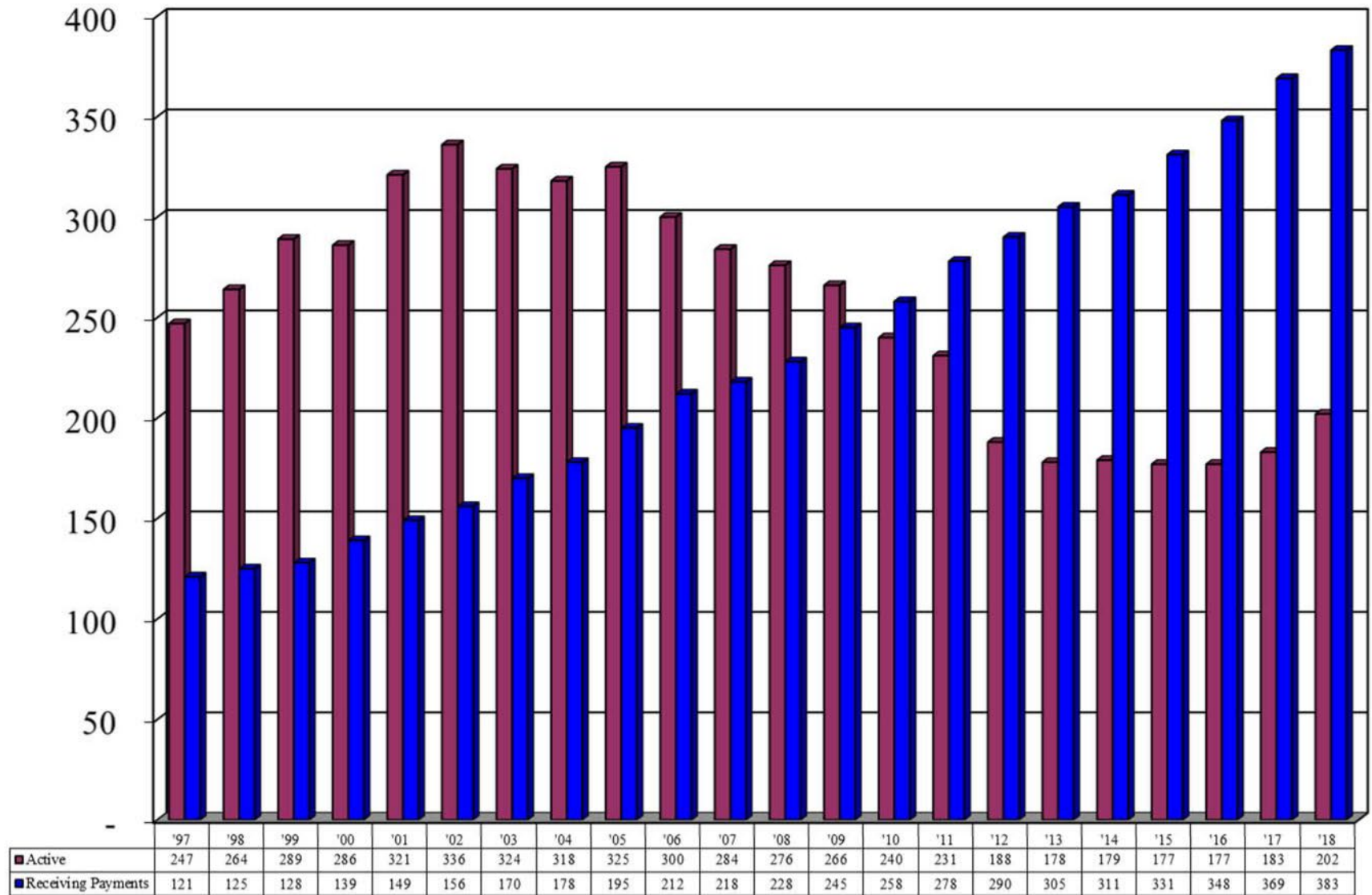
|                                                                          | 1998       | 2008       | 2017       | 2018       |
|--------------------------------------------------------------------------|------------|------------|------------|------------|
| <b>Actives</b>                                                           |            |            |            |            |
| ■ Counts                                                                 | 264        | 276        | 183        | 202        |
| ■ Average                                                                |            |            |            |            |
| • Age                                                                    | 42         | 45         | 46         | 45         |
| • City Service                                                           | 8          | 11         | 12         | 11         |
| • PERSable Wages                                                         | \$ 55,200  | \$ 81,400  | \$ 92,700  | \$ 96,100  |
| ■ Total PERSable Wages                                                   | 14,600,000 | 22,500,000 | 17,000,000 | 19,400,000 |
| <b>Inactive Members</b>                                                  |            |            |            |            |
| ■ Counts                                                                 |            |            |            |            |
| • Transferred                                                            | 82         | 158        | 182        | 185        |
| • Separated                                                              | 66         | 113        | 133        | 135        |
| • Retired                                                                |            |            |            |            |
| □ Service                                                                | 105        | 194        | 322        | 331        |
| □ Disability                                                             | 10         | 16         | 23         | 24         |
| □ Beneficiaries                                                          | 10         | 18         | 24         | 28         |
| □ Total                                                                  | 125        | 228        | 369        | 383        |
| ■ Average Annual City Provided Benefit for Service Retirees <sup>3</sup> | 9,200      | 20,300     | 30,500     | 31,200     |

<sup>3</sup> Average City-provided pensions are based on City service & City benefit formula, and are not representative of benefits for long-service employees.



# SUMMARY OF DEMOGRAPHIC INFORMATION - MISCELLANEOUS

462



# PLAN FUNDED STATUS - MISCELLANEOUS

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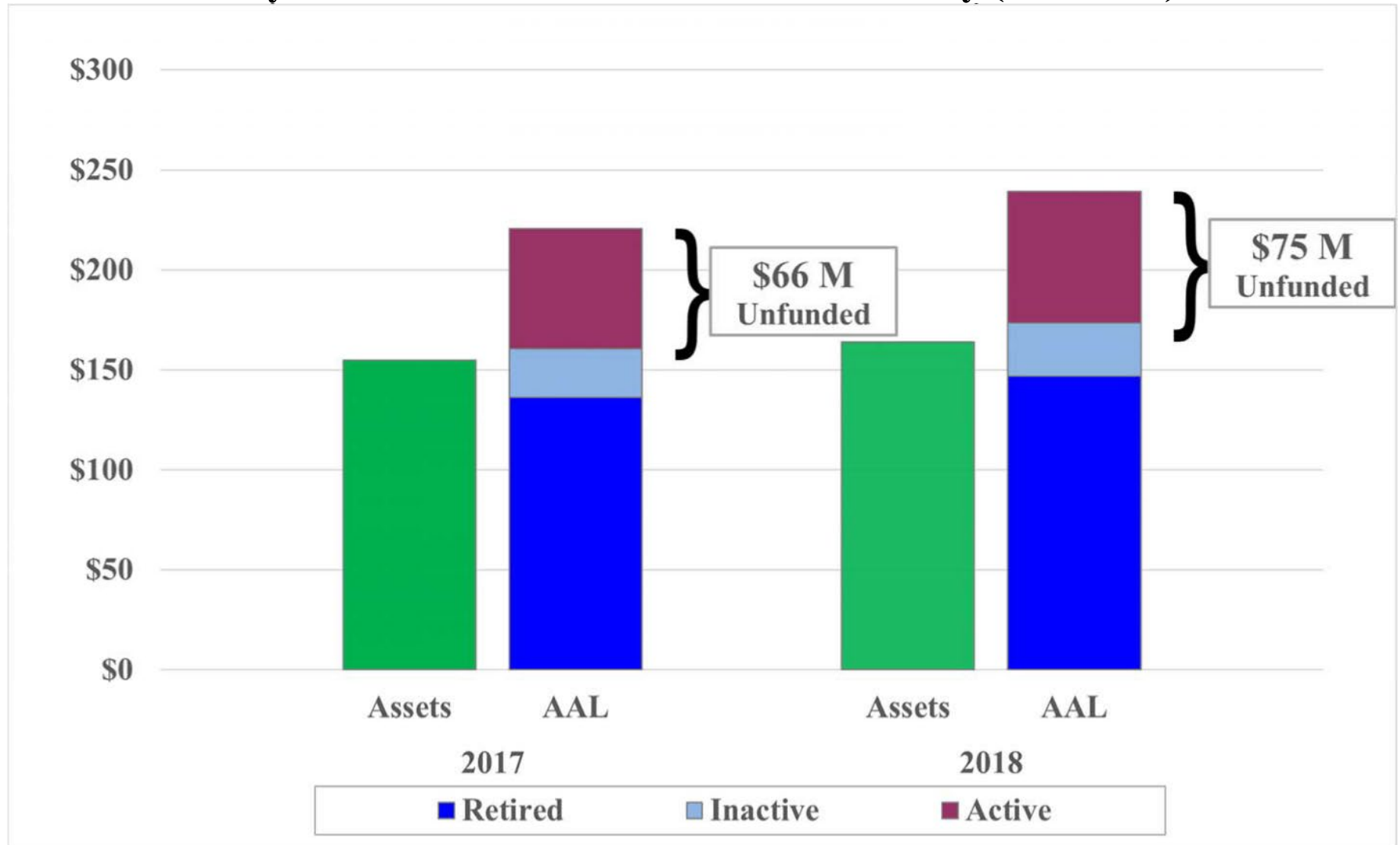
|                                      | <u>June 30, 2017</u> | <u>June 30, 2018</u> |
|--------------------------------------|----------------------|----------------------|
| ■ <b>Actuarial Accrued Liability</b> |                      |                      |
| ● Active                             | \$ 60,300,000        | \$ 66,000,000        |
| ● Retiree                            | 136,200,000          | 147,000,000          |
| ● Inactive                           | <u>24,200,000</u>    | <u>26,400,000</u>    |
| ● Total                              | 220,700,000          | 239,400,000          |
| ■ <b>Assets</b>                      | <u>154,800,000</u>   | <u>164,100,000</u>   |
| ■ <b>Unfunded Liability</b>          | 65,900,000           | 75,300,000           |
| ■ <b>Funded Ratio</b>                | 70.1%                | 68.5%                |



January 21, 2020



## City CalPERS Assets and Actuarial Liability (\$Millions)



**Discount Rate Sensitivity**

**June 30, 2018**

|                           | <b>Discount Rate</b> |                     |                     |
|---------------------------|----------------------|---------------------|---------------------|
|                           | <b><u>7.00%</u></b>  | <b><u>6.50%</u></b> | <b><u>6.00%</u></b> |
| <b>AAL</b>                | \$ 239,400,000       | \$ 255,300,000      | \$ 271,100,000      |
| <b>Assets</b>             | 164,100,000          | 164,100,000         | 164,100,000         |
| <b>Unfunded Liability</b> | 75,300,000           | 91,200,000          | 107,000,000         |
| <b>Funded Ratio</b>       | 68.5%                | 64.3%               | 60.5%               |



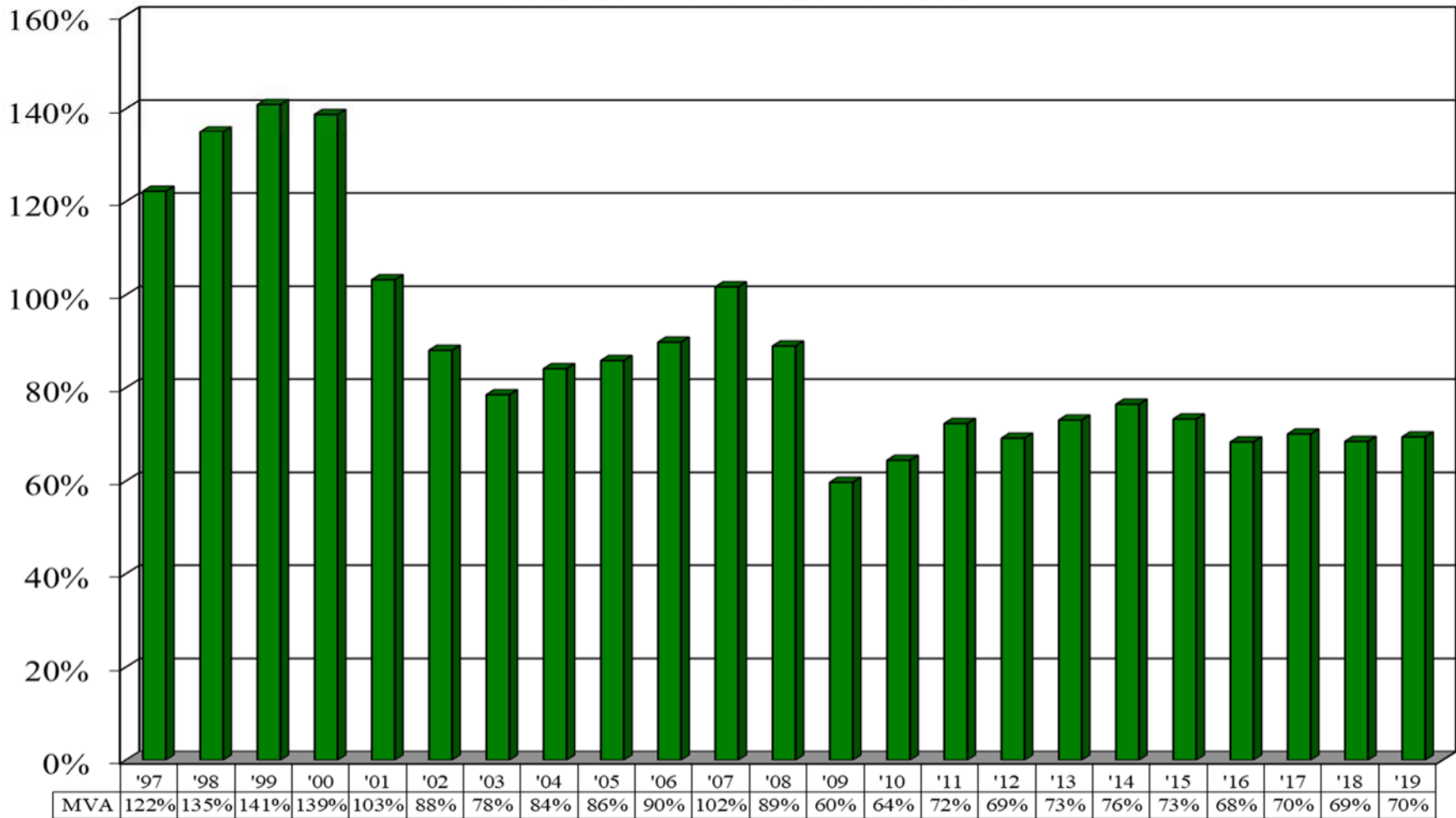
**Unfunded Accrued Liability Changes**

|                                                   |             |                  |
|---------------------------------------------------|-------------|------------------|
| ■ Unfunded Accrued Liability on 6/30/17           |             | \$ 65,900,000    |
| ■ Expected 6/30/18 Unfunded Accrued Liability     |             | 66,600,000       |
| ■ Other Changes                                   |             |                  |
| • Asset Loss (Gain) (8.6% return for FY 2018)     | (1,800,000) |                  |
| • Assumption Change (DR 7.25% → 7%)               | 6,400,000   |                  |
| • Method Change (Software system)                 | 1,600,000   |                  |
| • Contribution & Experience Loss (Gain)           | 2,500,000   |                  |
| • Total                                           |             | <u>8,700,000</u> |
| ■ Unfunded Accrued Liability on 6/30/18           |             | 75,300,000       |
| ■ Projected Unfunded Accrued Liability on 6/30/19 |             | 75,600,000       |

# FUNDED RATIO - MISCELLANEOUS

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## Historical Funded Ratio



6/30/19 funded status estimated



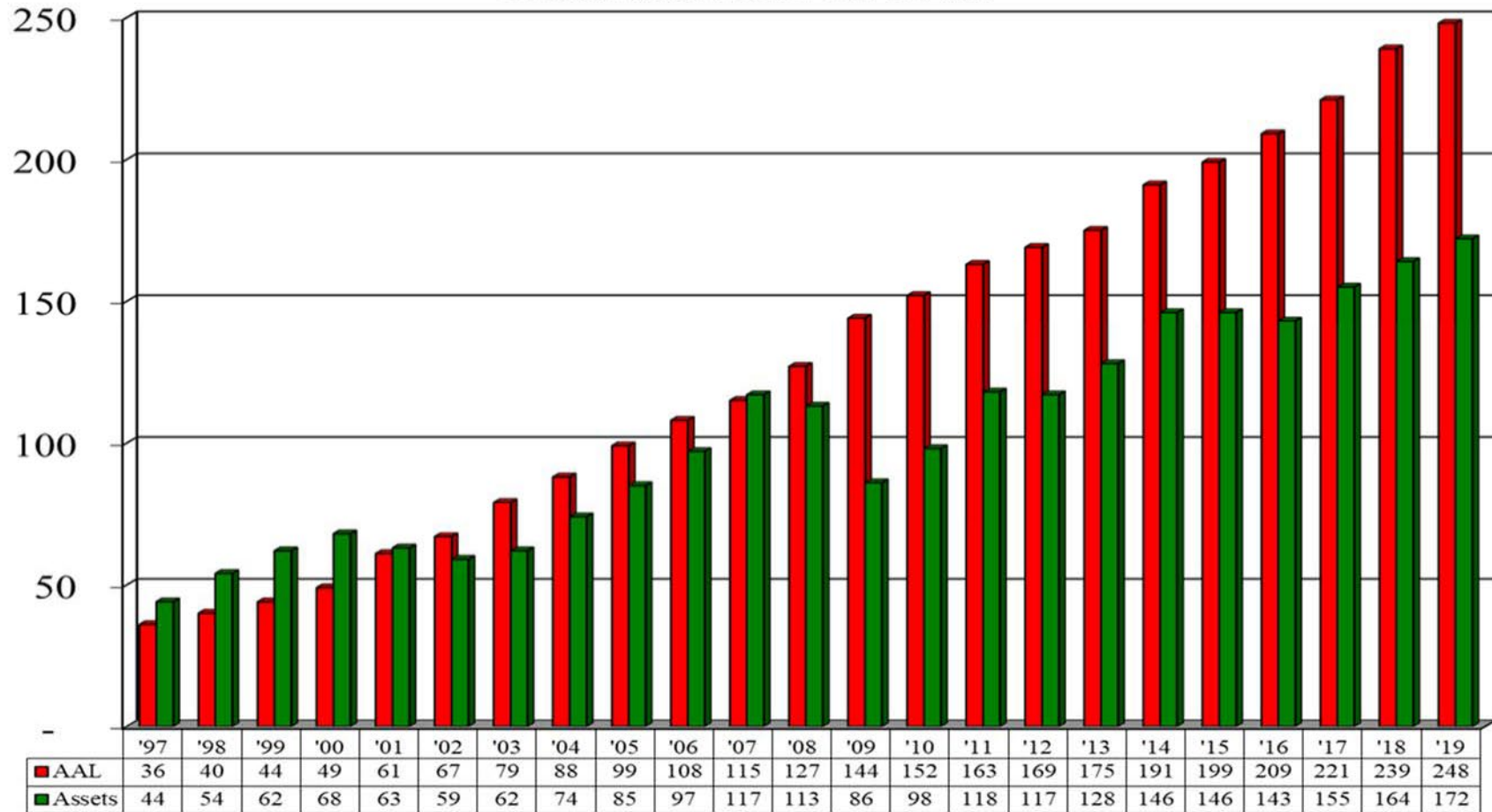
January 21, 2020



# FUNDED STATUS (MILLIONS) - MISCELLANEOUS

468

**Historical AAL vs. MVA**



6/30/19 funded status estimated



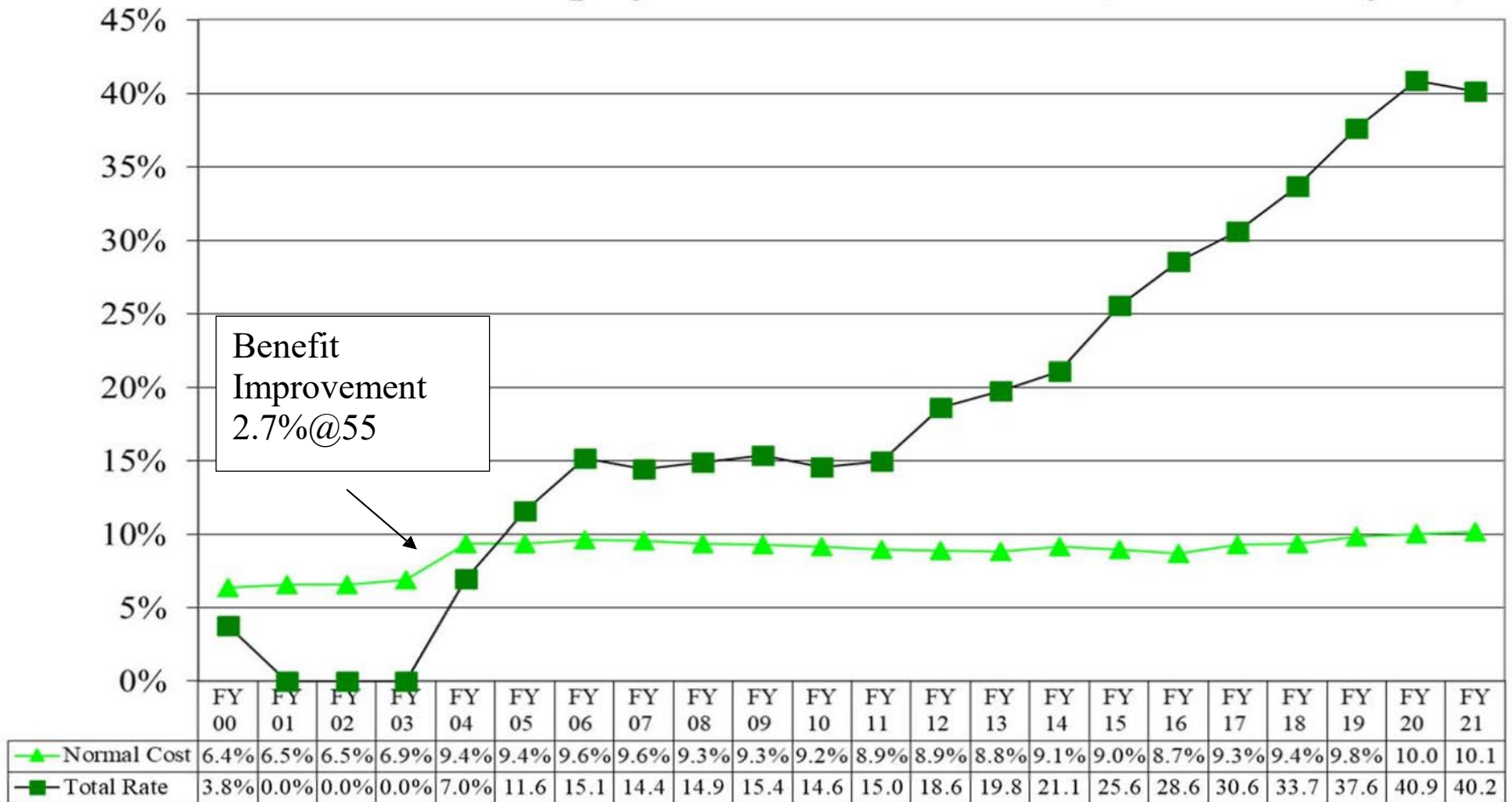
January 21, 2020



# CONTRIBUTION RATES - MISCELLANEOUS

469

## Historical Employer Contribution Rates (Percent of Payroll)



January 21, 2020



## CONTRIBUTION RATES - MISCELLANEOUS

470

|                                                            | <b>6/30/17<br/><u>2019/2020</u></b> | <b>6/30/18<br/><u>2020/2021</u></b> |
|------------------------------------------------------------|-------------------------------------|-------------------------------------|
| ■ Total Normal Cost                                        | 17.3%                               | 17.4%                               |
| ■ Employee Normal Cost                                     | <u>7.3%</u>                         | <u>7.3%</u>                         |
| ■ Employer Normal Cost                                     | 10.0%                               | 10.1%                               |
| ■ Amortization Payments                                    | <u>30.9%</u>                        | <u>30.1%</u> <sup>4</sup>           |
| ■ Total Employer Contribution Rate                         | 40.9%                               | 40.2%                               |
| ■ 2019/20 Employer Contribution Rate                       |                                     | 40.9%                               |
| ● Payroll > Expected                                       |                                     | -3.4%                               |
| ● 6/30/14 Assumption Change (5 <sup>th</sup> Year)         |                                     | 1.2%                                |
| ● 6/30/16 Discount Rate Change (3 <sup>rd</sup> Year)      |                                     | 0.4%                                |
| ● 6/30/17 Discount Rate & Inflation (2 <sup>nd</sup> Year) |                                     | 0.4%                                |
| ● 6/30/18 Discount Rate change (1 <sup>st</sup> Year)      |                                     | 1.4%                                |
| ● Other (Gains)/Losses                                     |                                     | <u>-0.7%</u>                        |
| ■ 2020/21 Employer Contribution Rate                       |                                     | 40.2%                               |

<sup>4</sup> Equivalent to 8.4% of UAL. One year, 7% interest on the UAL is 25.1% of payroll.





## CONTRIBUTION PROJECTIONS - MISCELLANEOUS

471

### ■ Market Value Investment Return:

- June 30, 2019 6.7%<sup>5</sup>

- Future returns based on stochastic analysis using 1,000 trials

| <u>Single Year Returns at<sup>6</sup></u> | <u>25<sup>th</sup> Percentile</u> | <u>50<sup>th</sup> Percentile</u> | <u>75<sup>th</sup> Percentile</u> |
|-------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Current Investment Mix                    | <b>0.1%</b>                       | <b>7.0%</b>                       | <b>14.8%</b>                      |
| Ultimate Investment Mix                   | <b>0.8%</b>                       | <b>6.0%</b>                       | <b>11.4%</b>                      |

- Assumes investment returns will, generally be 6.5% (as compared to 7.0%) over the next 9 years and higher beyond that.

### ■ Discount Rate decreases due to Risk Mitigation policy

### ■ No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements

### ■ Different from CalPERS projection

<sup>5</sup> Gross return based on July 2019 CalPERS press release

<sup>6</sup> N<sup>th</sup> percentile means N percentage of our trials result in returns lower than the indicated rates.



## CONTRIBUTION PROJECTIONS - MISCELLANEOUS

472

### ■ New hire assumptions:

- 92.5% of 2019/20 new hires are PEPRAs members and 7.5% are Classic members
- Percentage of PEPRAs member future hires to increase from 92.5% to 100% over 3 years

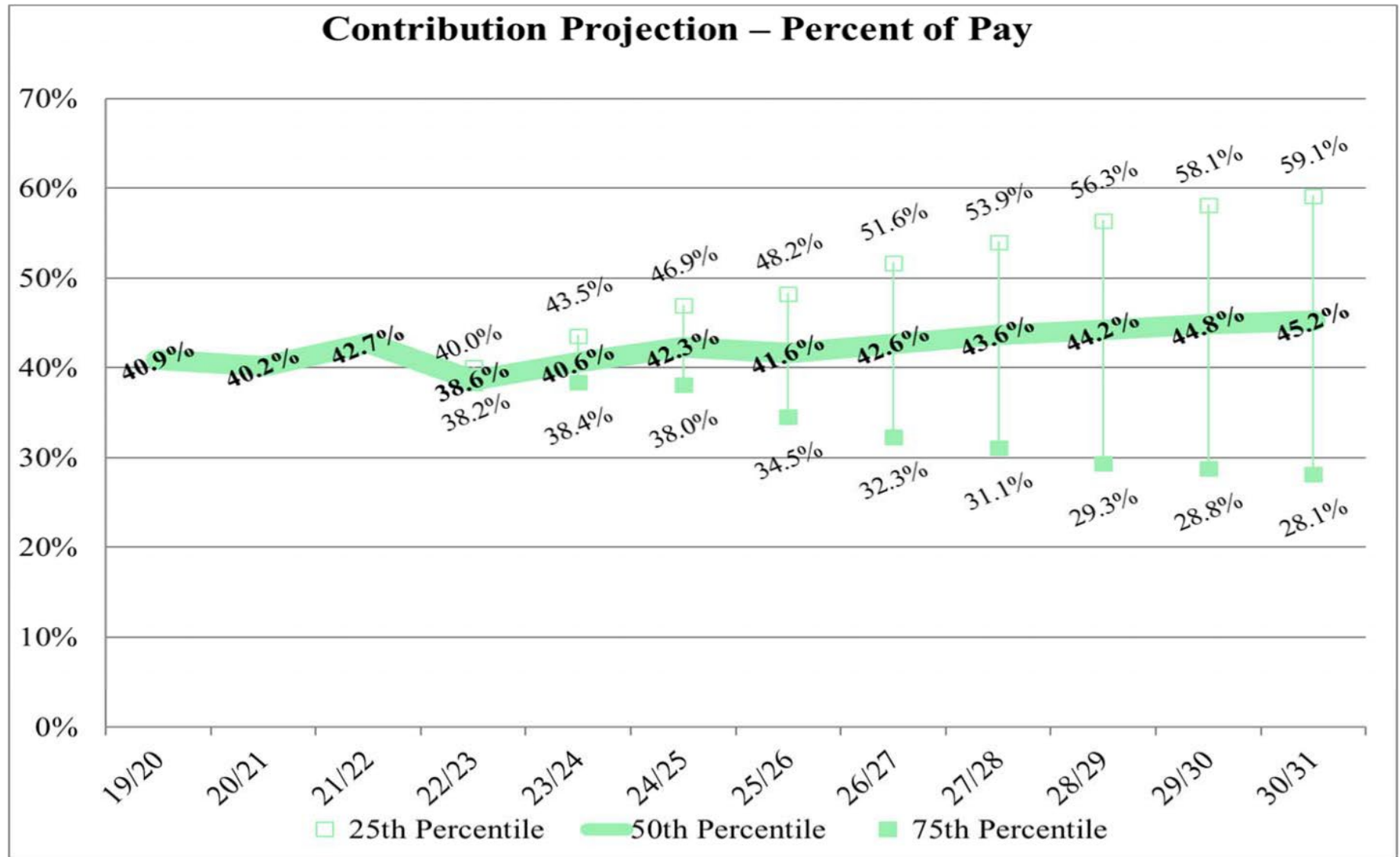
### ■ 6/30/18 employee distribution:

| Benefit Tier         | Count | 6/30/18 Payroll |
|----------------------|-------|-----------------|
| ● 2.7%@55 FAE1       | 104   | \$ 10,234,138   |
| ● 2%@60 FAE3         | 23    | 3,062,422       |
| ● 2%@62 FAE3 (PEPRA) | 75    | 6,243,845       |



# CONTRIBUTION PROJECTIONS - MISCELLANEOUS

473

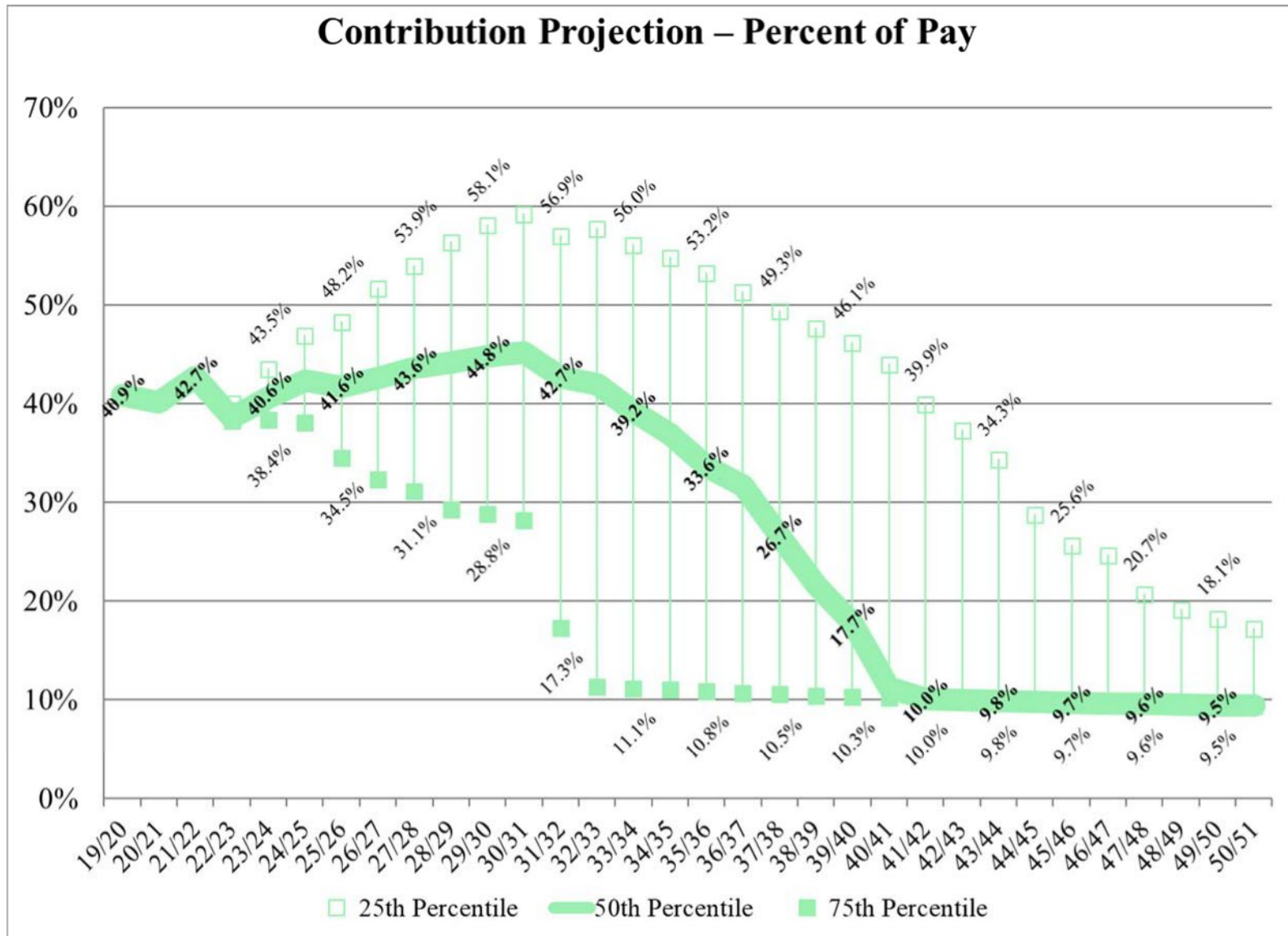


January 21, 2020



# CONTRIBUTION PROJECTIONS - MISCELLANEOUS

474

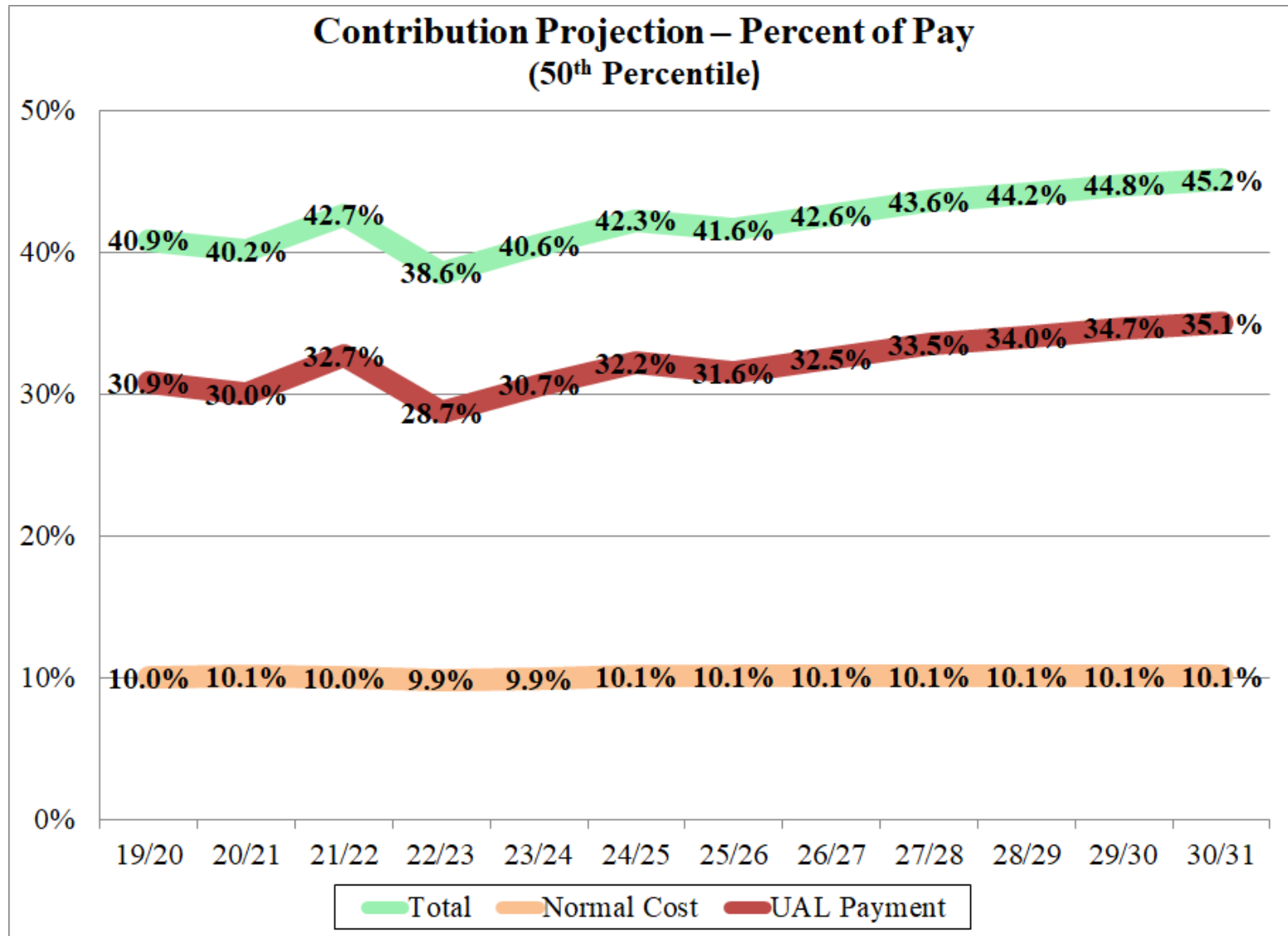


January 21, 2020



# CONTRIBUTION PROJECTIONS - MISCELLANEOUS

475



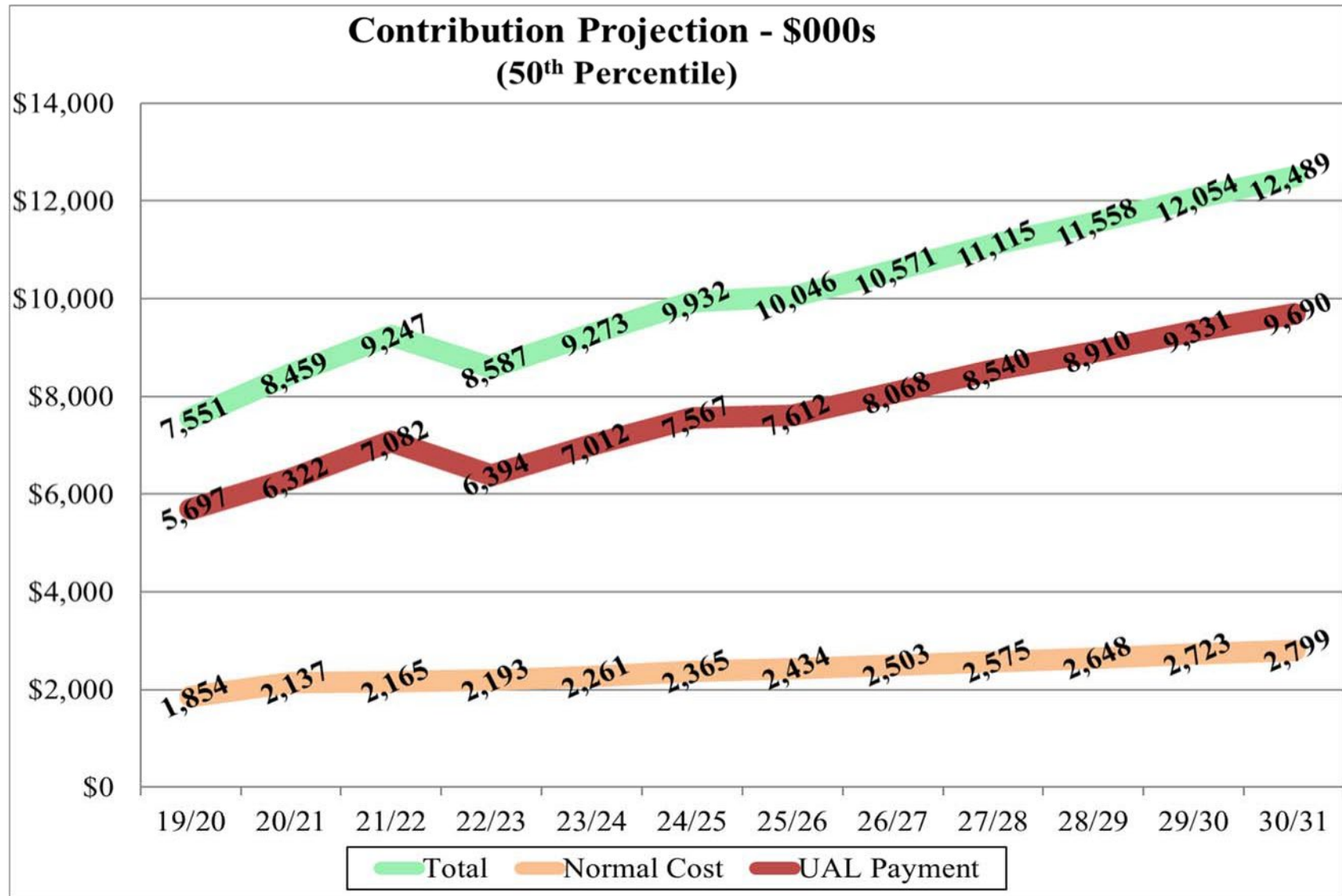
January 21, 2020





# CONTRIBUTION PROJECTIONS - MISCELLANEOUS

476

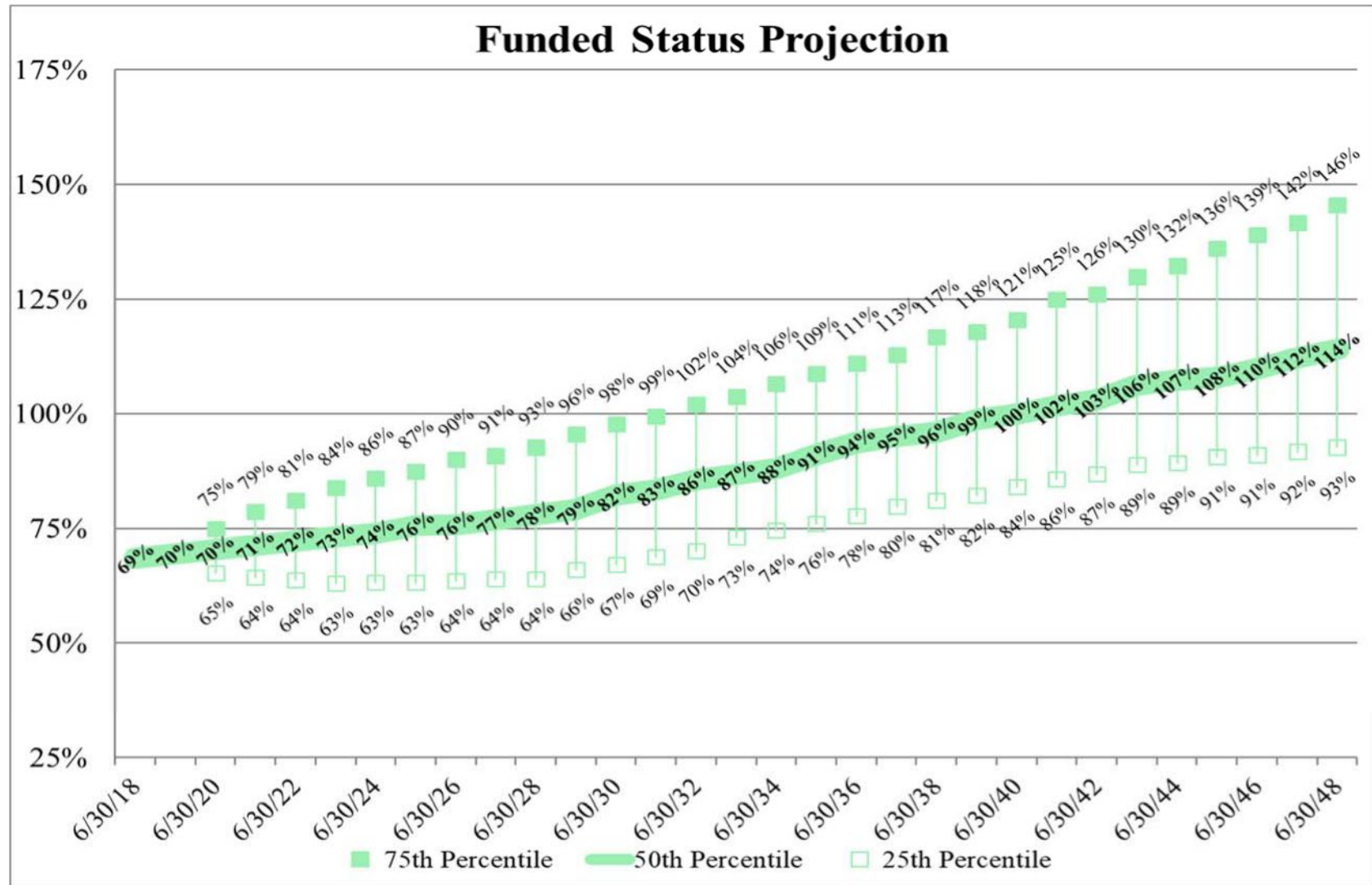


January 21, 2020



# FUNDED STATUS - MISCELLANEOUS

477



January 21, 2020



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# SUMMARY OF DEMOGRAPHIC INFORMATION -SAFETY

479

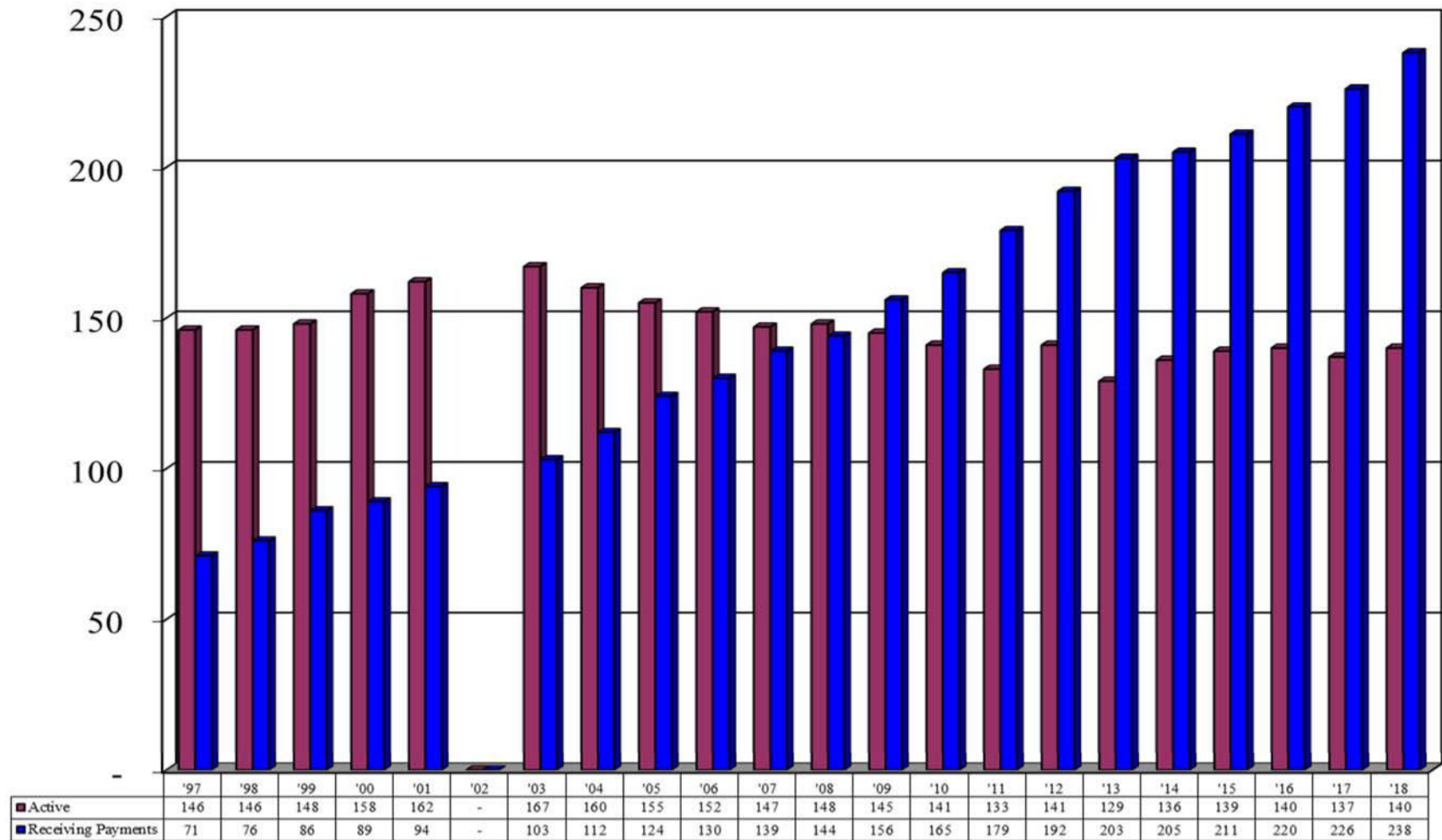
|                                                                          | 1998       | 2008       | 2017       | 2018       |
|--------------------------------------------------------------------------|------------|------------|------------|------------|
| <b>Actives</b>                                                           |            |            |            |            |
| ■ Counts                                                                 | 146        | 148        | 137        | 140        |
| ■ Average                                                                |            |            |            |            |
| • Age                                                                    | 39         | 41         | 42         | 41         |
| • City Service                                                           | 12         | 14         | 13         | 12         |
| • PERSable Wages                                                         | \$ 85,700  | \$ 127,500 | \$ 148,000 | \$ 150,700 |
| ■ Total PERSable Wages                                                   | 12,500,000 | 18,900,000 | 20,300,000 | 21,100,000 |
| <b>Inactive Members</b>                                                  |            |            |            |            |
| ■ Counts                                                                 |            |            |            |            |
| • Transferred                                                            | 26         | 37         | 17         | 16         |
| • Separated                                                              | 18         | 18         | 14         | 14         |
| • Retired                                                                |            |            |            |            |
| □ Service                                                                | 25         | 66         | 129        | 134        |
| □ Disability                                                             | 46         | 64         | 73         | 75         |
| □ Beneficiaries                                                          | 5          | 14         | 24         | 29         |
| □ Total                                                                  | 76         | 144        | 226        | 238        |
| ■ Average Annual City Provided Benefit for Service Retirees <sup>7</sup> | 31,000     | 62,600     | 80,200     | 84,100     |

<sup>7</sup> Average City-provided pensions are based on City service & City benefit formula, and are not representative of benefits for long-service employees.



# SUMMARY OF DEMOGRAPHIC INFORMATION -SAFETY

480



6/30/2002 data are not available.



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# PLAN FUNDED STATUS -SAFETY

481

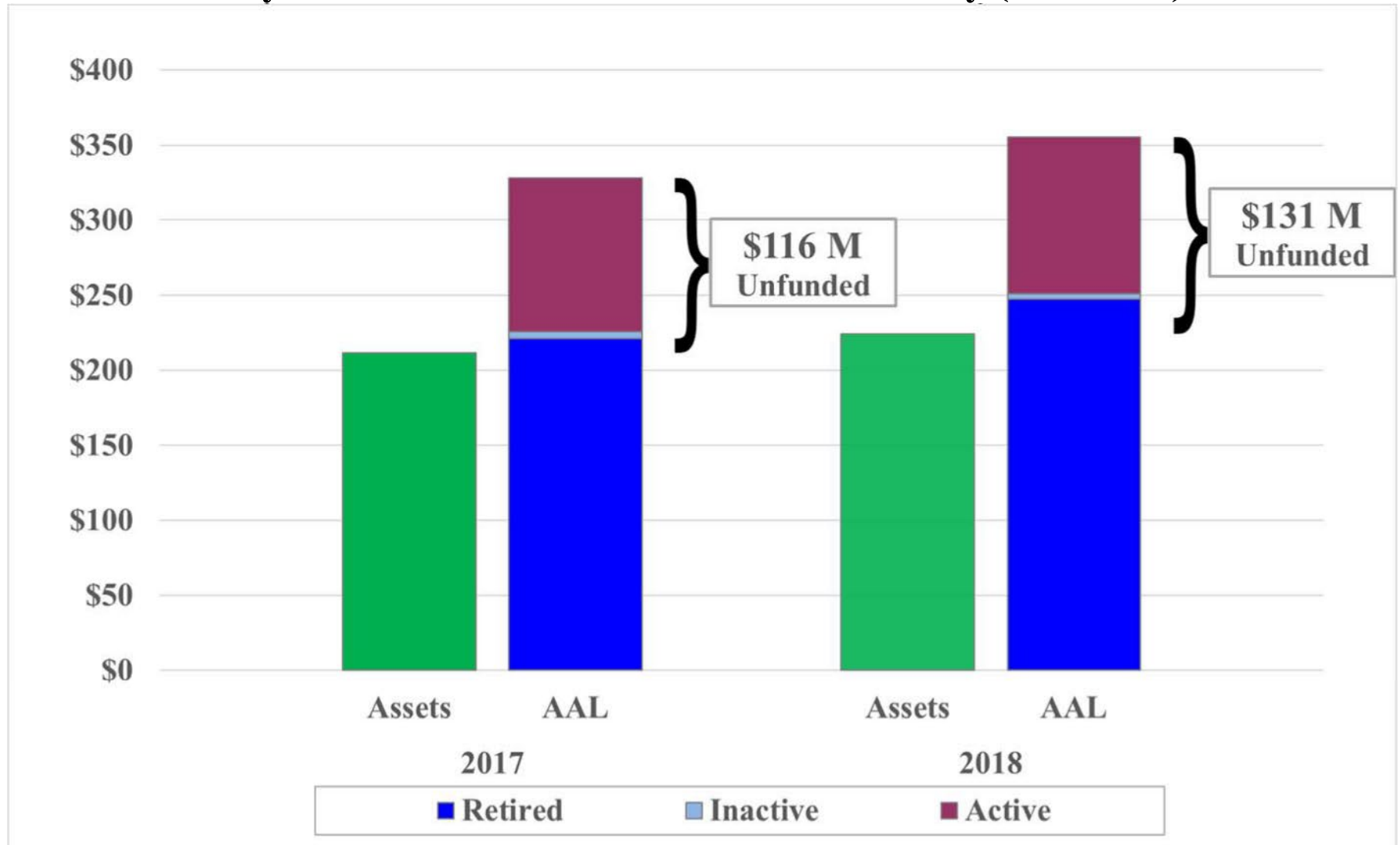
|                                      | <u>June 30, 2017</u> | <u>June 30, 2018</u> |
|--------------------------------------|----------------------|----------------------|
| ■ <b>Actuarial Accrued Liability</b> |                      |                      |
| ● Active                             | \$ 102,500,000       | \$ 104,700,000       |
| ● Retiree                            | 221,300,000          | 247,300,000          |
| ● Inactive                           | <u>4,300,000</u>     | <u>3,600,000</u>     |
| ● Total                              | 328,100,000          | 355,600,000          |
| ■ <b>Assets</b>                      | <u>211,700,000</u>   | <u>224,300,000</u>   |
| ■ <b>Unfunded Liability</b>          | 116,400,000          | 131,300,000          |
| ■ <b>Funded Ratio</b>                | 64.5%                | 63.1%                |



January 21, 2020



## City CalPERS Assets and Actuarial Liability (\$Millions)



**Discount Rate Sensitivity**

**June 30, 2018**

|                           | <b>Discount Rate</b> |                     |                     |
|---------------------------|----------------------|---------------------|---------------------|
|                           | <b><u>7.00%</u></b>  | <b><u>6.50%</u></b> | <b><u>6.00%</u></b> |
| <b>AAL</b>                | \$ 355,600,000       | \$ 379,500,000      | \$ 403,400,000      |
| <b>Assets</b>             | 224,300,000          | 224,300,000         | 224,300,000         |
| <b>Unfunded Liability</b> | 131,300,000          | 155,200,000         | 179,100,000         |
| <b>Funded Ratio</b>       | 63.1%                | 59.1%               | 55.6%               |

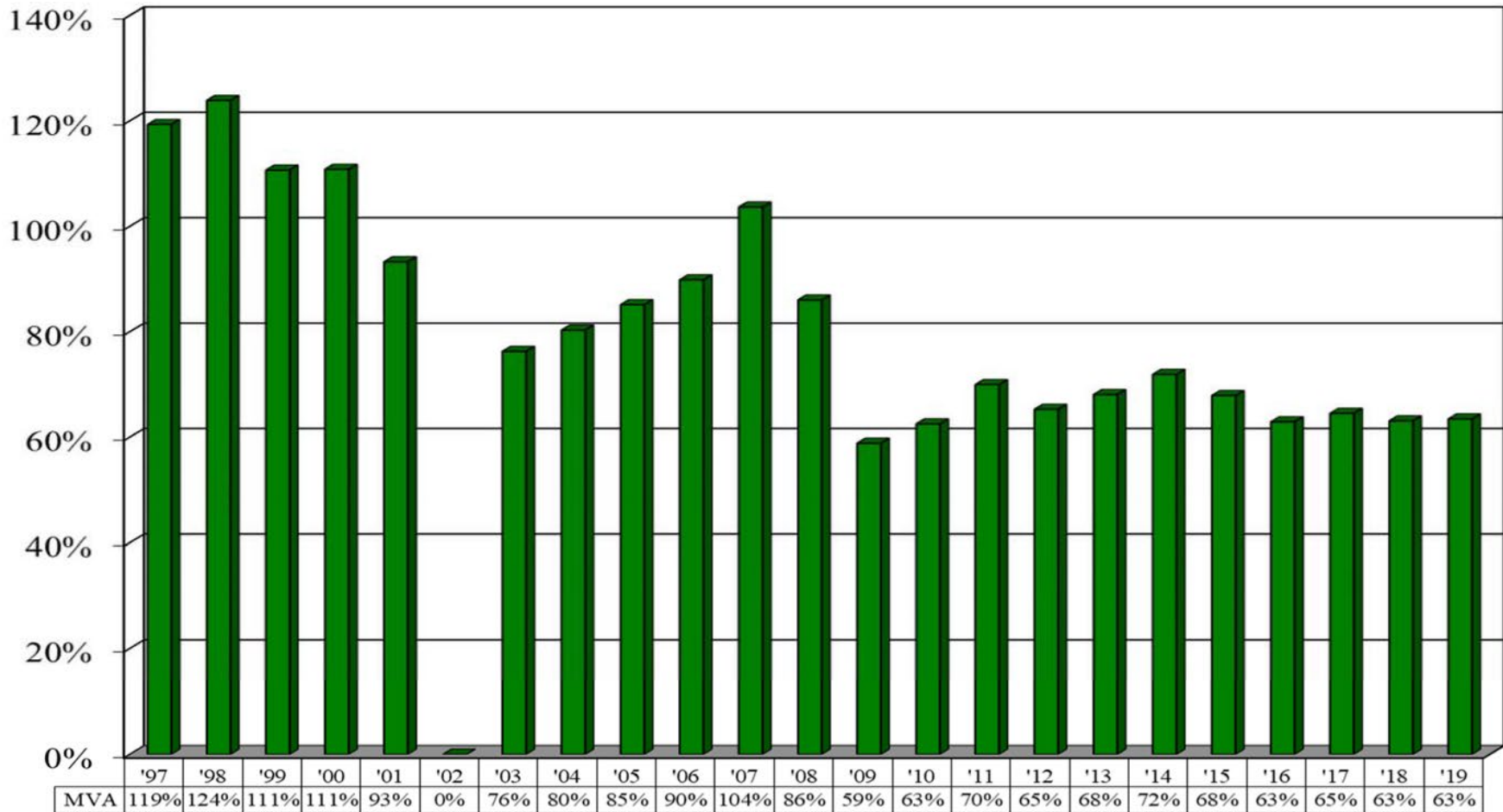
**Unfunded Accrued Liability Changes**

|                                                          |             |                   |
|----------------------------------------------------------|-------------|-------------------|
| ■ <b>Unfunded Accrued Liability on 6/30/17</b>           |             | \$ 116,400,000    |
| ■ <b>Expected 6/30/18 Unfunded Accrued Liability</b>     |             | 119,700,000       |
| ■ <b>Other Changes</b>                                   |             |                   |
| • Asset Loss (Gain) (8.6% return for FY 2018)            | (2,500,000) |                   |
| • Assumption Change (DR 7.25% → 7%)                      | 9,900,000   |                   |
| • Method Change (Software system)                        | 1,800,000   |                   |
| • Contribution & Experience Loss (Gain)                  | 2,400,000   |                   |
| • Total                                                  |             | <u>11,600,000</u> |
| ■ <b>Unfunded Accrued Liability on 6/30/18</b>           |             | 131,300,000       |
| ■ <b>Projected Unfunded Accrued Liability on 6/30/19</b> |             | 135,100,000       |

# FUNDED RATIO - SAFETY

485

## Historical Funded Ratio



Funded status for 6/30/02 is not available. 6/30/19 funded status is estimated.



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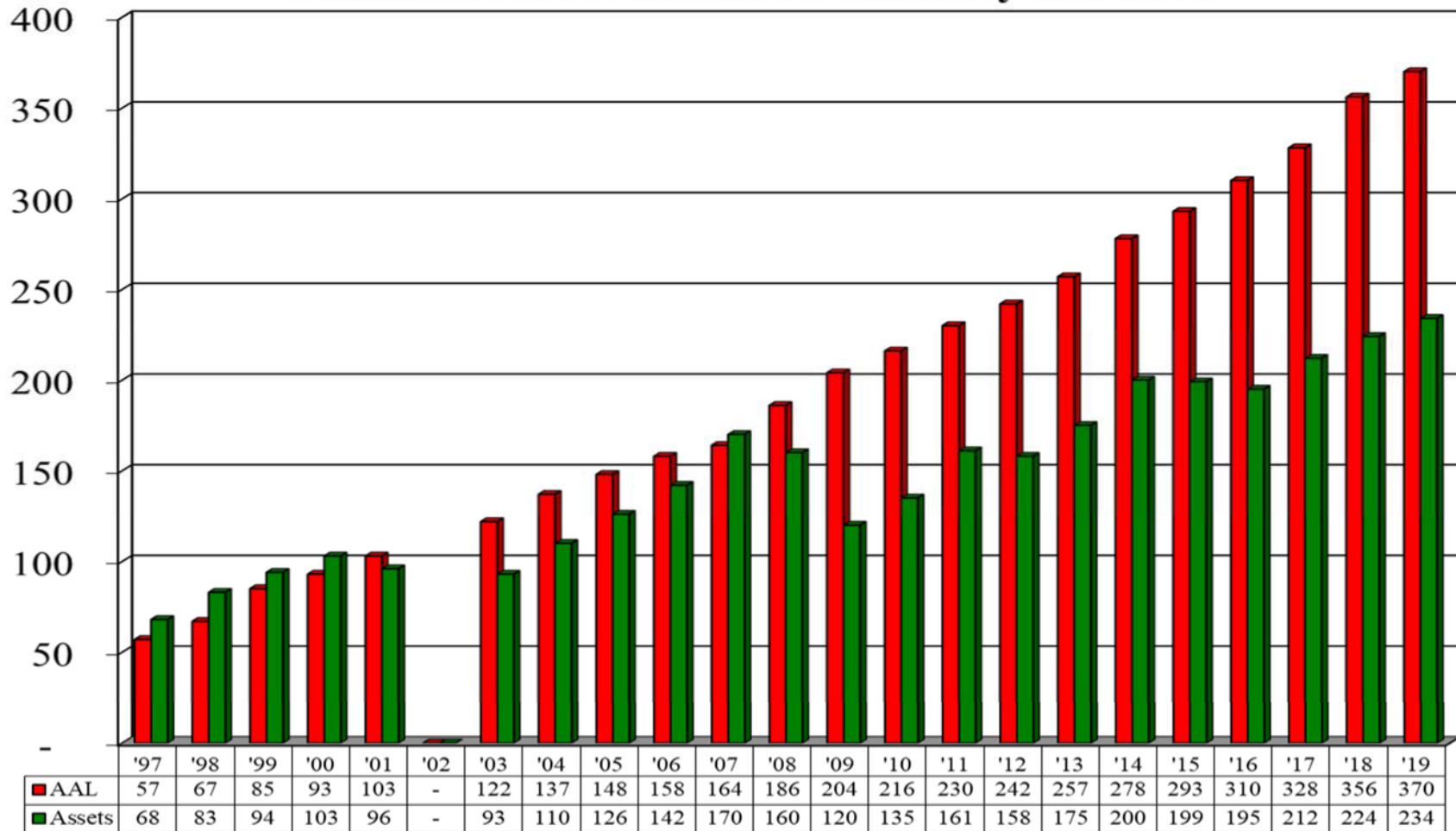




## FUNDED STATUS (MILLIONS) -SAFETY

486

**Historical Actuarial Accrued Liability vs. Assets**



Funded status for 6/30/02 is not available. 6/30/19 funded status is estimated.



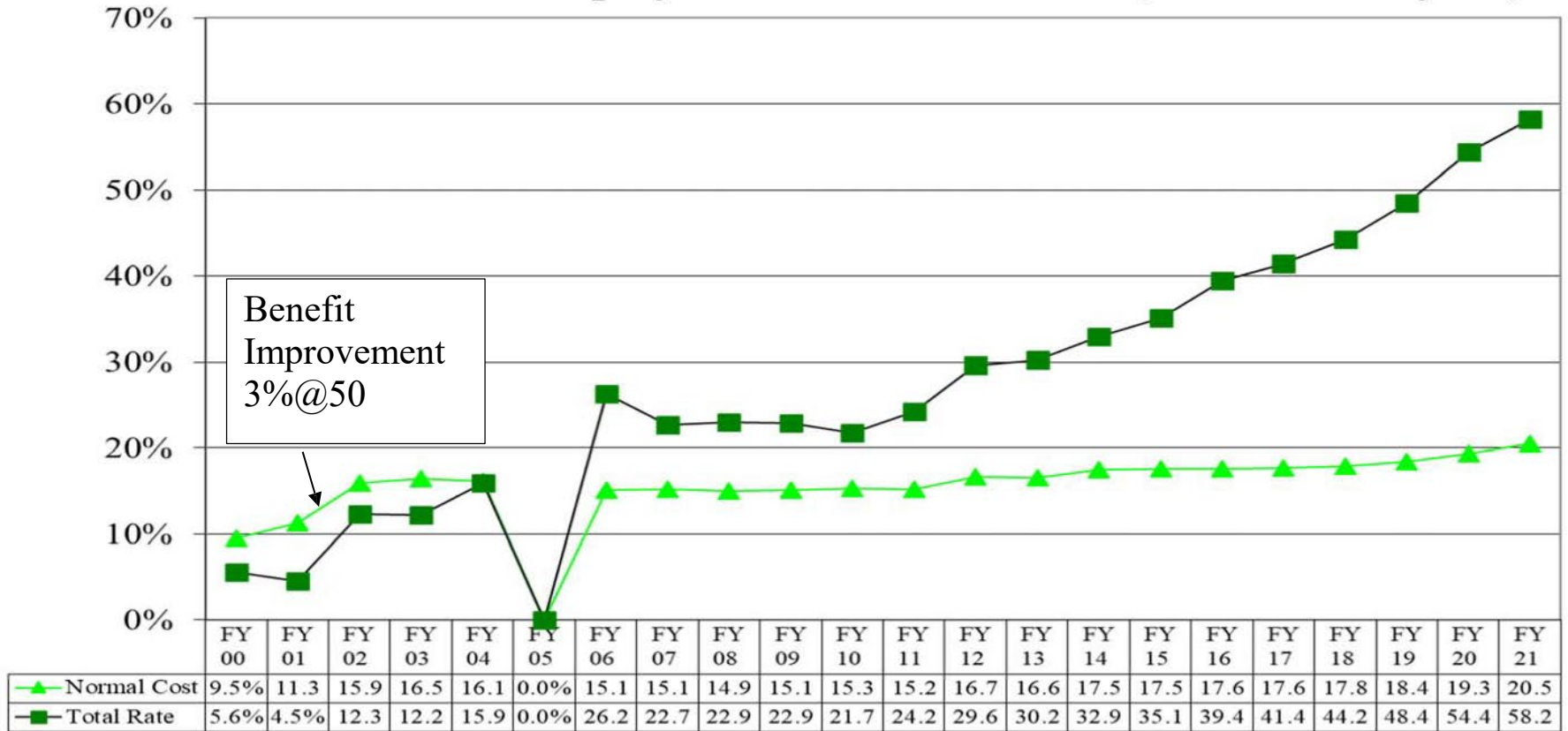
January 21, 2020



# CONTRIBUTION RATES - SAFETY

487

## Historical Employer Contribution Rates (Percent of Payroll)



Rates for FY05 are not available



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## CONTRIBUTION RATES - SAFETY

488

|                                                            | <b>6/30/17<br/><u>2019/2020</u></b> | <b>6/30/18<br/><u>2020/2021</u></b> |
|------------------------------------------------------------|-------------------------------------|-------------------------------------|
| ■ Total Normal Cost                                        | 28.4%                               | 29.6%                               |
| ■ Employee Normal Cost                                     | <u>9.1%</u>                         | <u>9.1%</u>                         |
| ■ Employer Normal Cost                                     | 19.3%                               | 20.5%                               |
| ■ Amortization Payments                                    | <u>35.1%</u>                        | <u>37.7%</u> <sup>8</sup>           |
| ■ Total Employer Contribution Rate                         | 54.4%                               | 58.2%                               |
| ■ 2019/20 Employer Contribution Rate                       |                                     | 54.4%                               |
| ● Payroll > Expected                                       |                                     | -0.3%                               |
| ● 6/30/14 Assumption Change (5 <sup>th</sup> Year)         |                                     | 1.3%                                |
| ● 6/30/16 Discount Rate Change (3 <sup>rd</sup> Year)      |                                     | 0.5%                                |
| ● 6/30/17 Discount Rate & Inflation (2 <sup>nd</sup> Year) |                                     | 0.6%                                |
| ● 6/30/18 Discount Rate change (1 <sup>st</sup> Year)      |                                     | 2.2%                                |
| ● Other (Gains)/Losses                                     |                                     | <u>-0.5%</u>                        |
| ■ 2020/21 Employer Contribution Rate                       |                                     | 58.2%                               |

<sup>8</sup> Equivalent to 6.3% of UAL. One year, 7% interest on the UAL is 41.6% of payroll.



■ Market Value Investment Return:

● June 30, 2019 6.7%<sup>9</sup>

● Future returns based on stochastic analysis using 1,000 trials

| <u>Single Year Returns at<sup>10</sup></u> | <u>25<sup>th</sup> Percentile</u> | <u>50<sup>th</sup> Percentile</u> | <u>75<sup>th</sup> Percentile</u> |
|--------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Current Investment Mix                     | <b>0.1%</b>                       | <b>7.0%</b>                       | <b>14.8%</b>                      |
| Ultimate Investment Mix                    | <b>0.8%</b>                       | <b>6.0%</b>                       | <b>11.4%</b>                      |

● Assumes investment returns will, generally be 6.5% (as compared to 7.0%) over the next 9 years and higher beyond that.

■ Discount Rate decreases due to Risk Mitigation policy

■ No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements

■ Different from CalPERS projection

<sup>9</sup> Gross return based on July 2019 CalPERS press release.

<sup>10</sup> N<sup>th</sup> percentile means N percentage of our trials result in returns lower than the indicated rates.

## CONTRIBUTION PROJECTIONS - SAFETY

490

### ■ New hire assumptions:

- 92.5% of 2019/20 new hires are PEPRA members and 7.5% are Classic members
- Percentage of PEPRA member future hires to increase from 92.5% to 100% over 3 years

### ■ 6/30/18 employee distribution:

| Benefit Tier           | Count | 6/30/18 Payroll |
|------------------------|-------|-----------------|
| ● 3%@50 FAE1           | 92    | \$ 15,210,753   |
| ● 3%@55 FAE1           | 20    | 2,500,260       |
| ● 2.7%@57 FAE3 (PEPRA) | 28    | 3,455,032       |

### ■ Employee Cost Sharing:

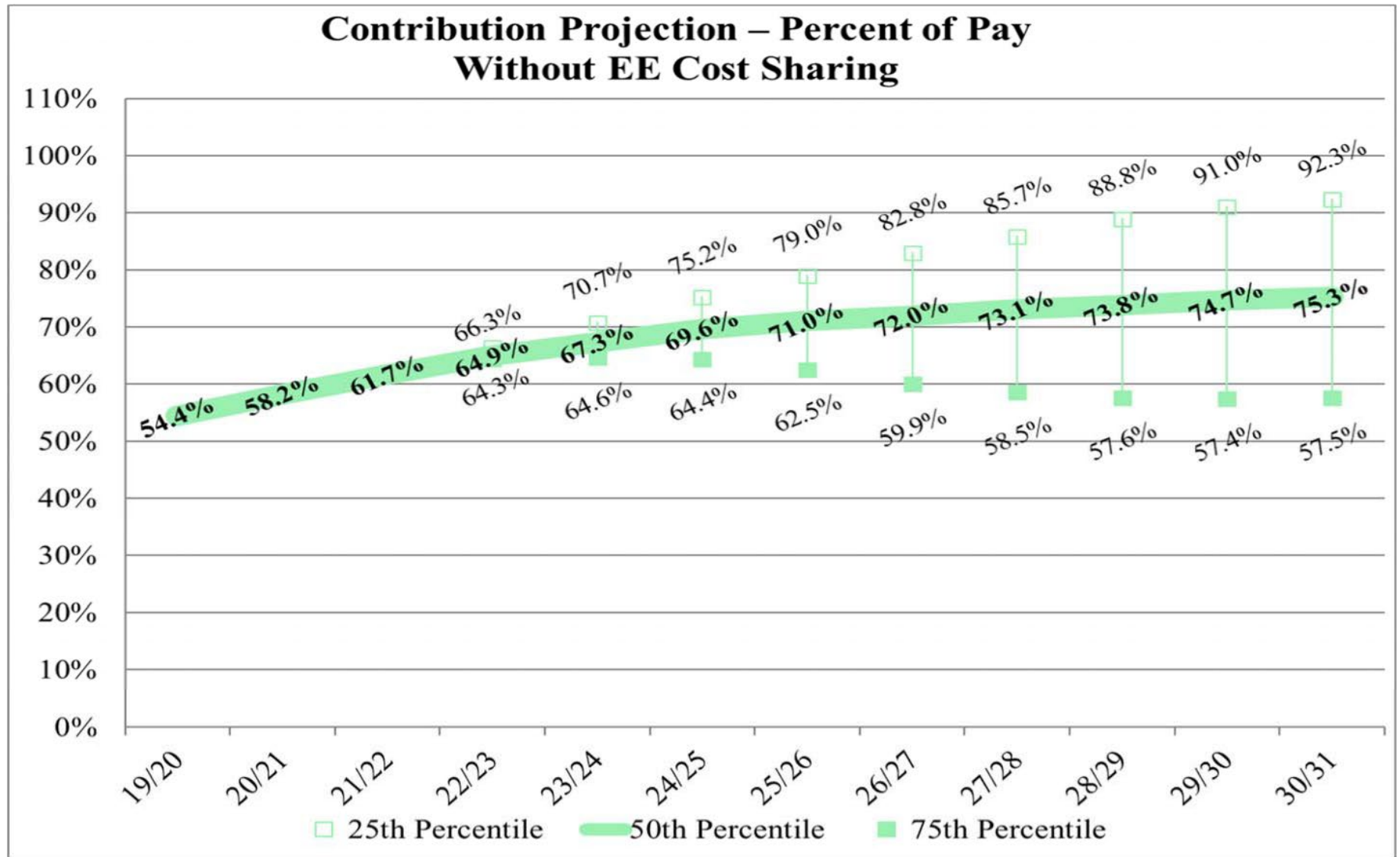
- All Fire employees (Classic and PEPRA) pay 3% toward employer rates
- City provided: 45% of 2018/19 total Safety payroll belongs to Fire employees





# CONTRIBUTION PROJECTIONS - SAFETY

491

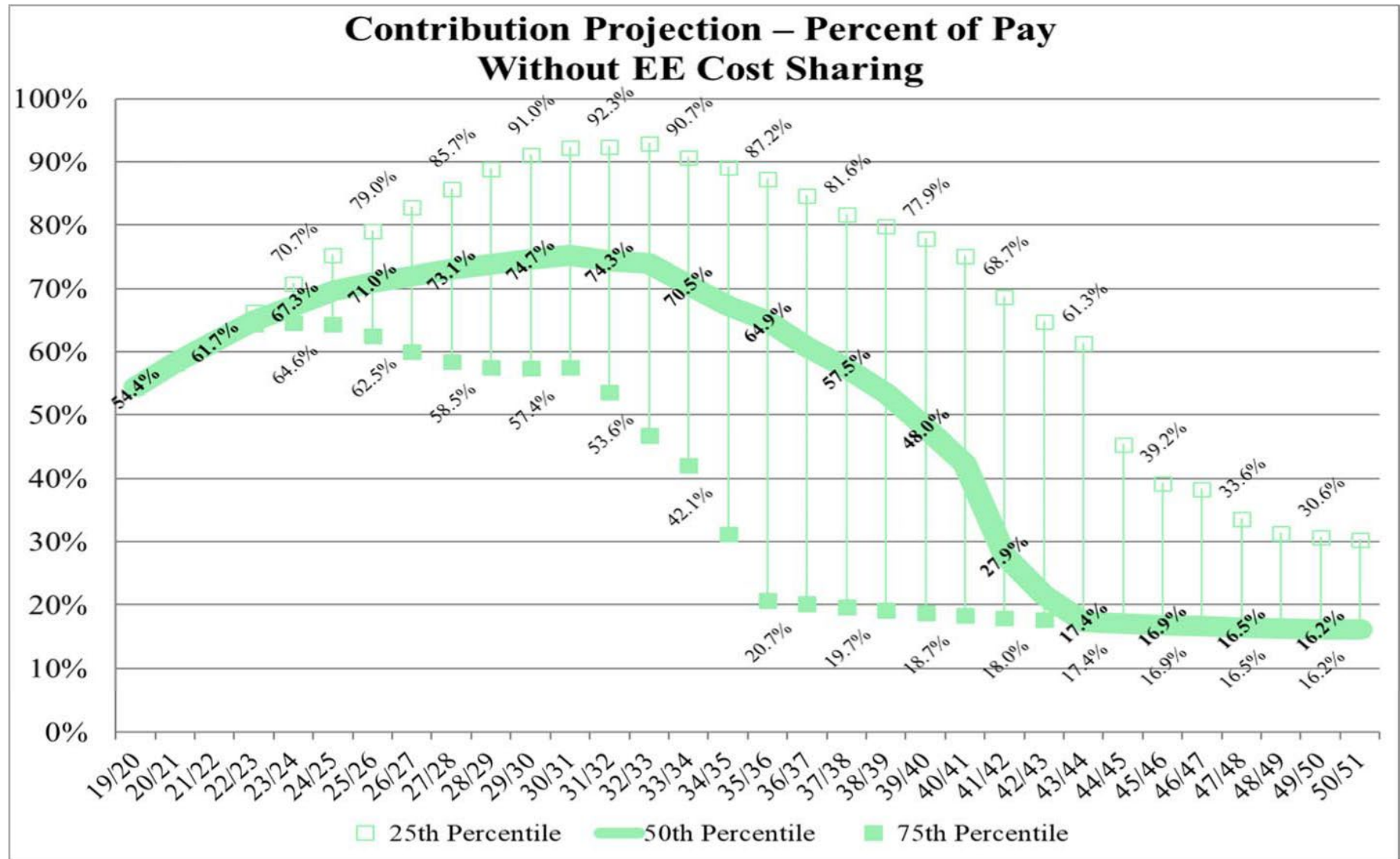


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# CONTRIBUTION PROJECTIONS - SAFETY

492

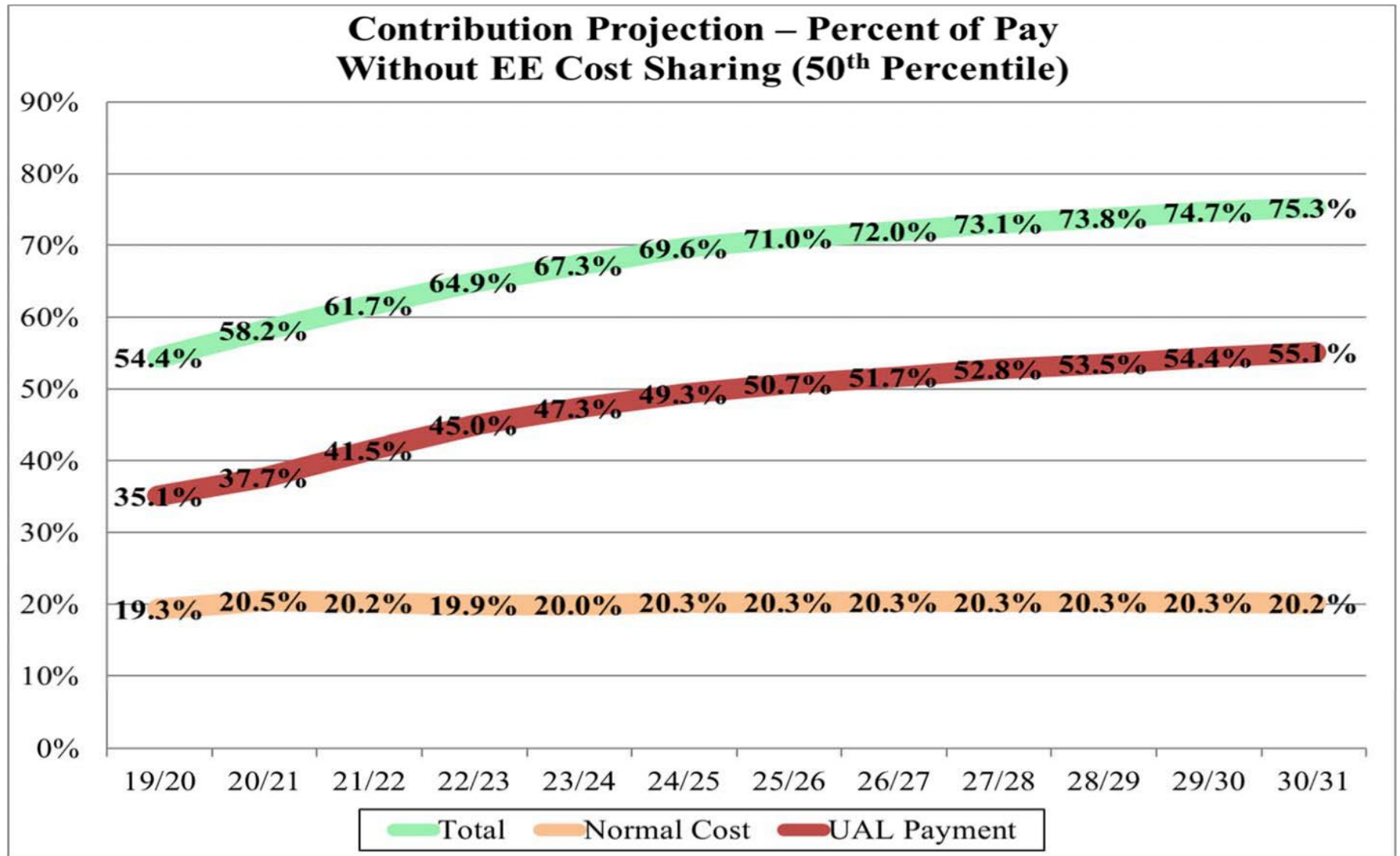


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## CONTRIBUTION PROJECTIONS - SAFETY

493

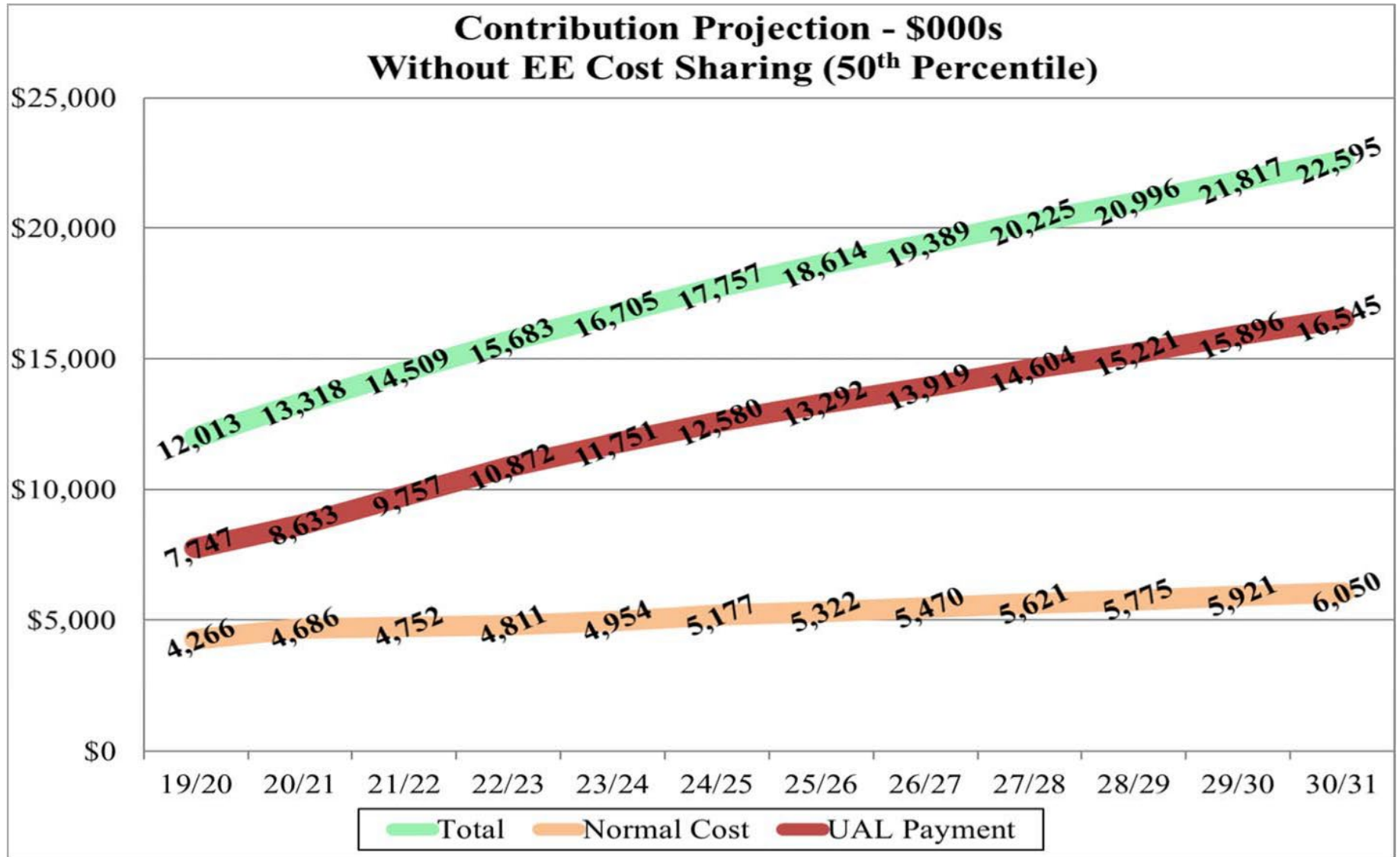


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# CONTRIBUTION PROJECTIONS - SAFETY

494

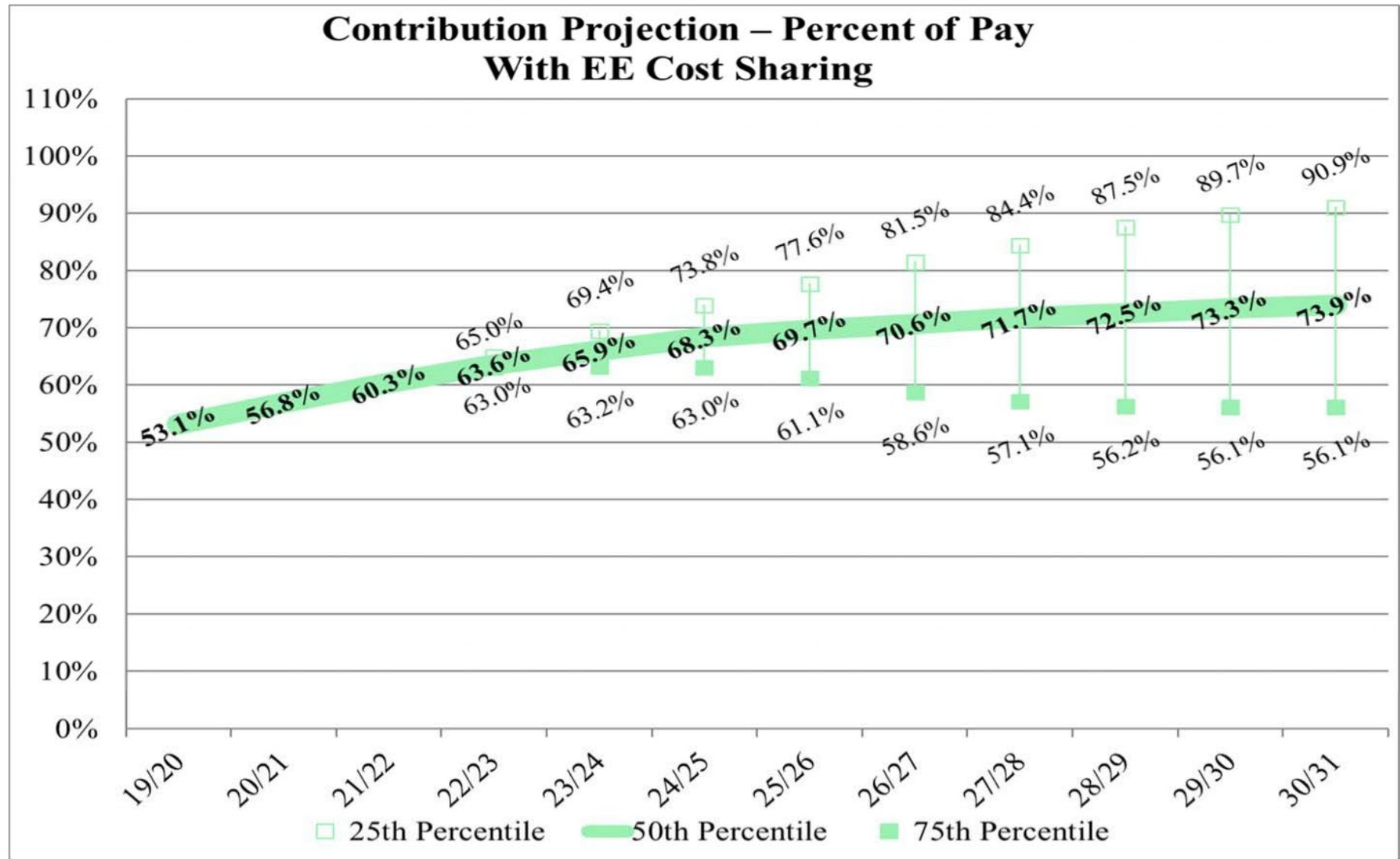


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# CONTRIBUTION PROJECTIONS - SAFETY

495



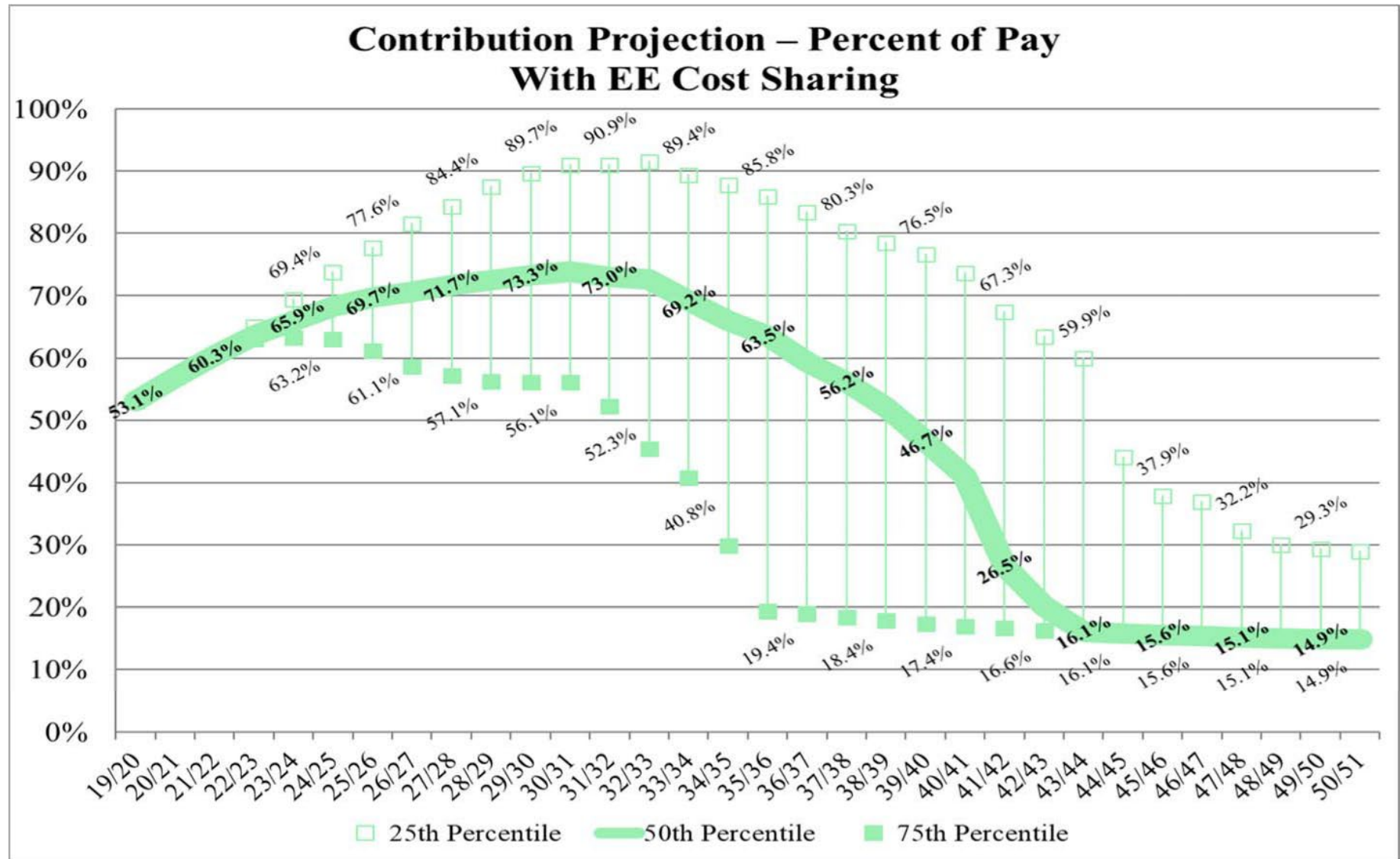
January 21, 2020





# CONTRIBUTION PROJECTIONS - SAFETY

496

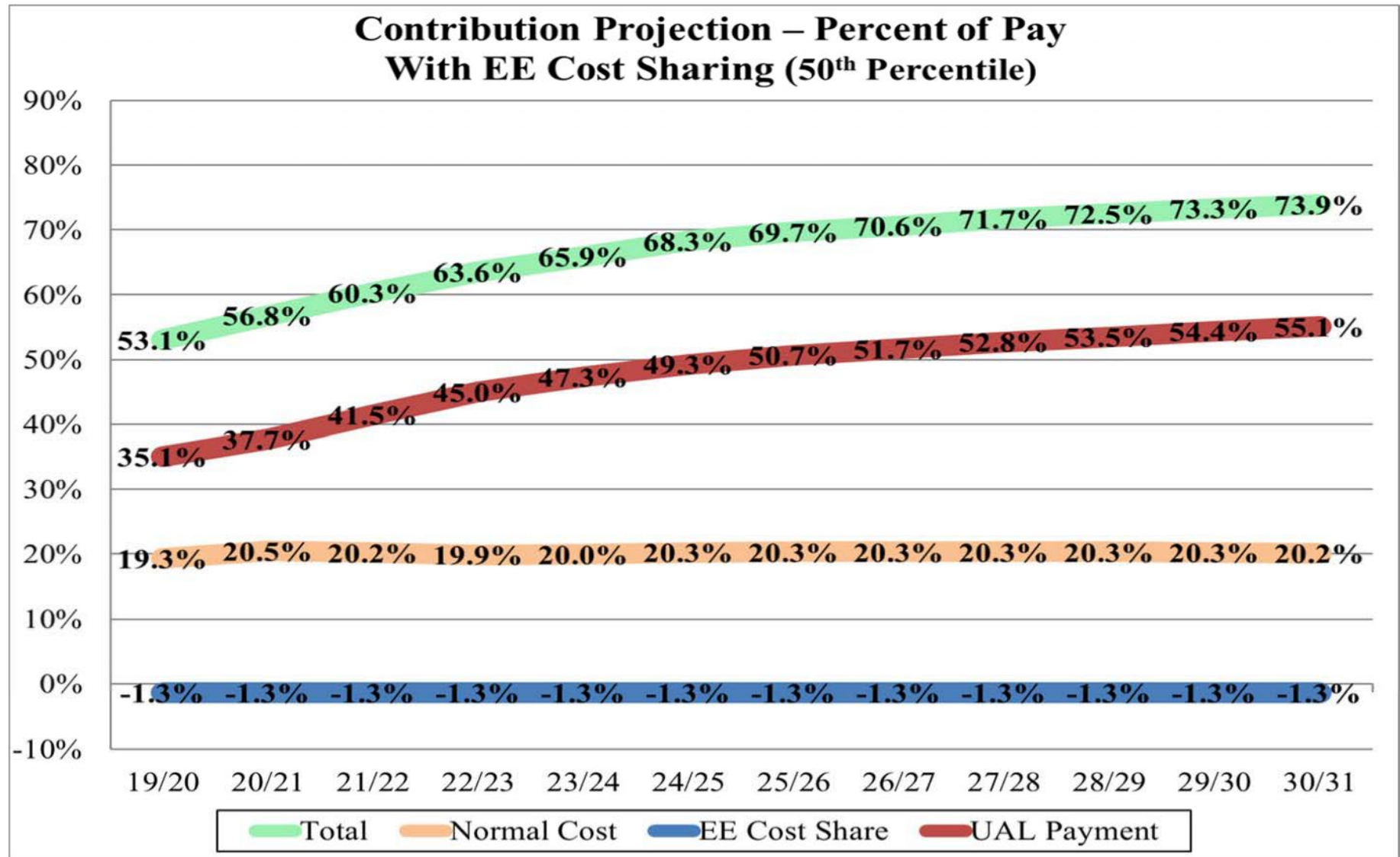


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## CONTRIBUTION PROJECTIONS - SAFETY

497

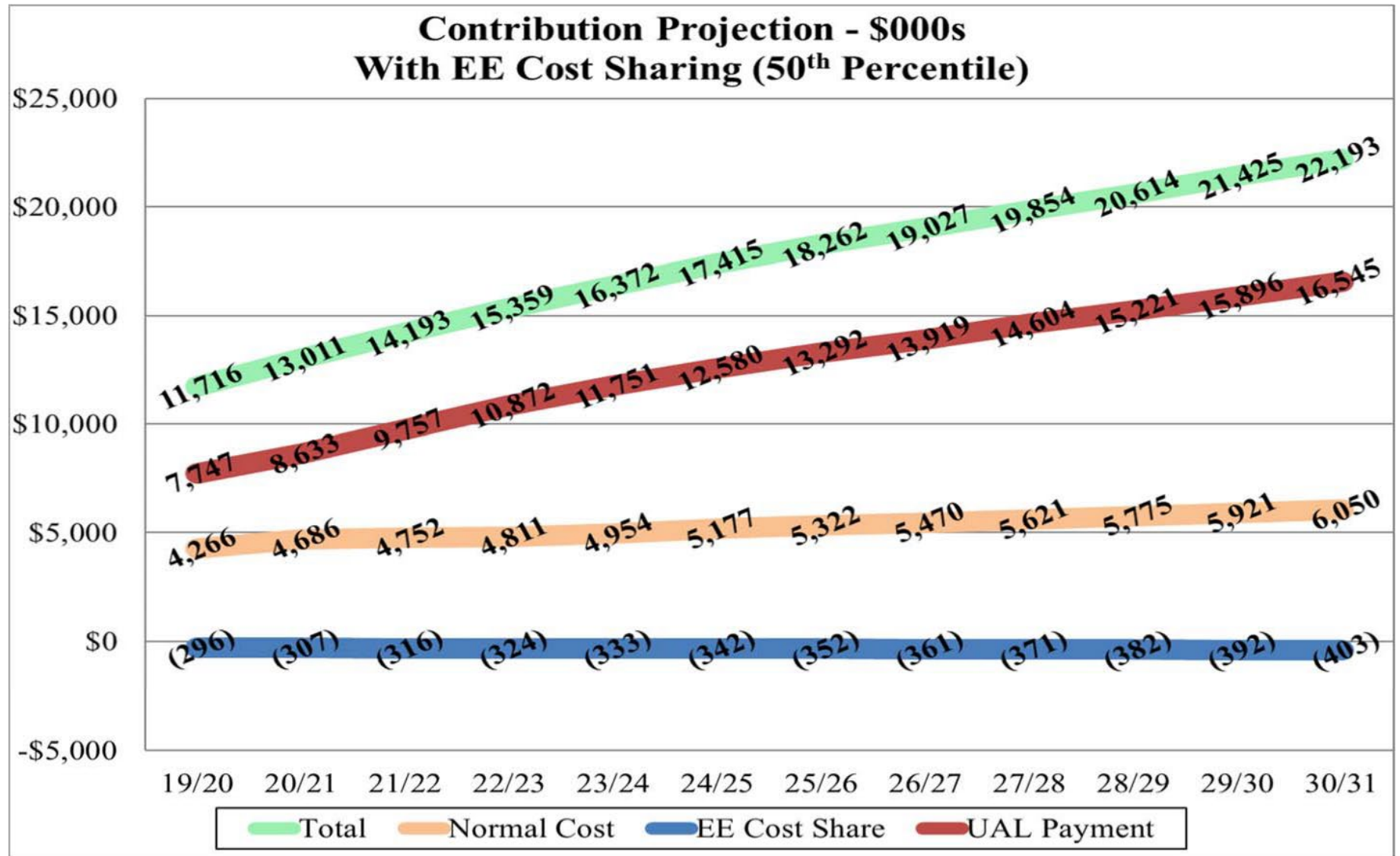


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# CONTRIBUTION PROJECTIONS - SAFETY

498

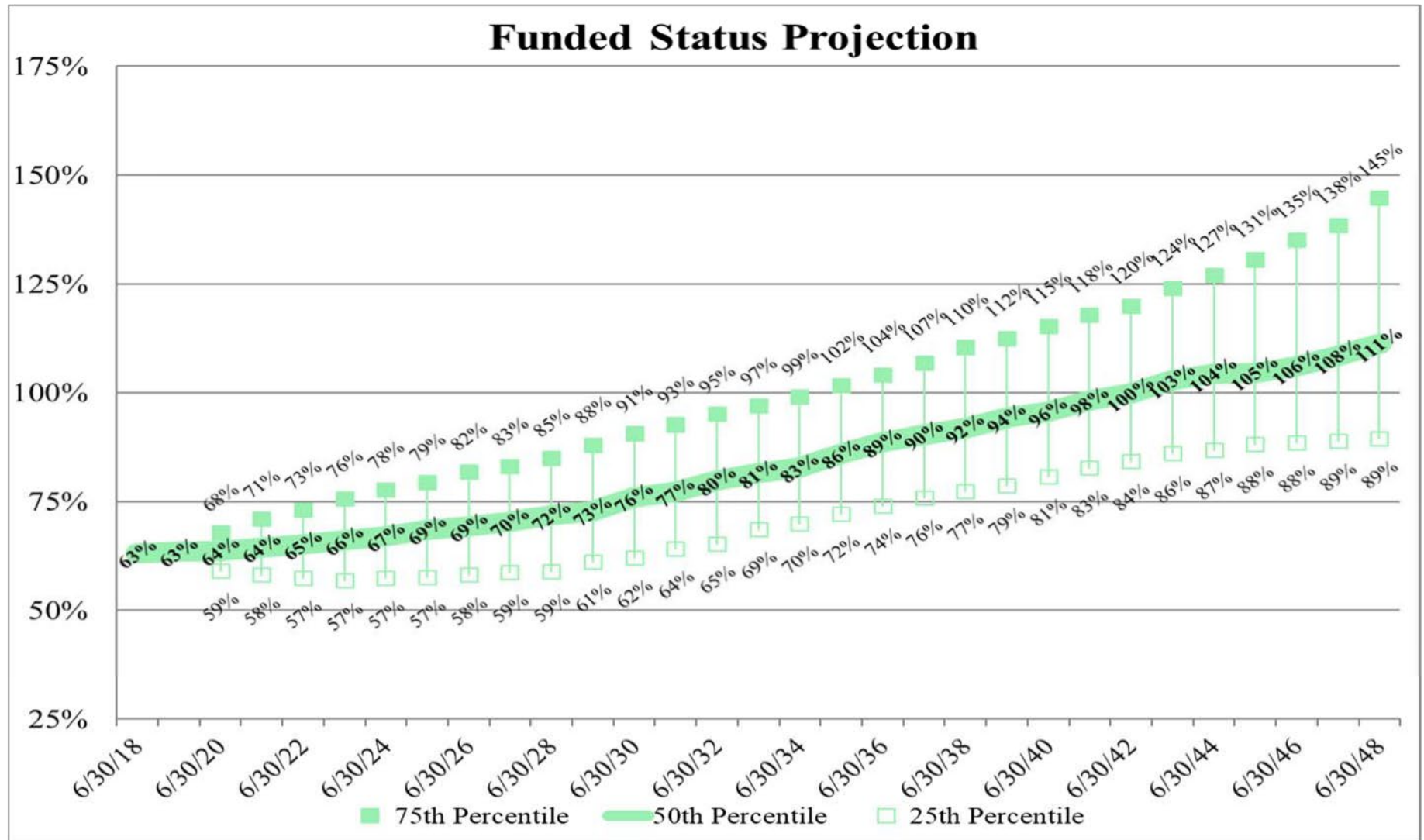


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50



1100



## COMBINED MISCELLANEOUS AND SAFETY

500

### **Funded Status Summary on June 30, 2018**

(Amounts in \$Millions)

|                | Miscellaneous | Safety     | Total      |
|----------------|---------------|------------|------------|
| ■ AAL          | \$ 239        | \$ 356     | \$ 595     |
| ■ Assets       | <u>164</u>    | <u>224</u> | <u>388</u> |
| ■ Unfunded AAL | 75            | 132        | 207        |
| ■ Funded Ratio | 68.5%         | 63.1%      | 65.2%      |



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- Target of 50% of total normal cost paid by all employees
- *PEPRA members* must pay greater of 50% of total normal cost or bargained amount if higher
- Employer cannot pay any part of *PEPRA member* required employee contributions
- Employer may impose current employees pay 50% of total normal cost (limited to 8% of pay for Miscellaneous and 12% for Safety) if not agreed through collective bargaining by 1/1/18
- Miscellaneous Plan 2020/21:

|                        | <u>Classic Members</u> |                     | <u>New Members</u>  |
|------------------------|------------------------|---------------------|---------------------|
|                        | <u>Tier 1</u>          | <u>Tier 2</u>       | <u>PEPRA</u>        |
|                        | <u>2.7% @ 55 FAE1</u>  | <u>2% @ 60 FAE3</u> | <u>2% @ 62 FAE3</u> |
| ● Employer Normal Cost | 11.6%                  | 10.6%               | 7.57%               |
| ● Member Normal Cost   | <u>8.0%</u>            | <u>7.0%</u>         | <u>6.25%</u>        |
| ● Total Normal Cost    | 19.6%                  | 17.6%               | 13.82%              |
| ● 50% Target           | 9.8%                   | 8.8%                | 6.91%               |

# PEPRA COST SHARING

502

## ■ Safety Plan 2020/21:

|                        | <u><b>Classic Members</b></u> |                            | <u><b>New Members</b></u>    |
|------------------------|-------------------------------|----------------------------|------------------------------|
|                        | <b>Tier 1</b>                 | <b>Tier 2</b>              | <b>PEPRA</b>                 |
|                        | <b><u>3% @ 50 FAE1</u></b>    | <b><u>3% @ 55 FAE3</u></b> | <b><u>2.7% @ 57 FAE3</u></b> |
| ● Employer Normal Cost | 21.9%                         | 21.8%                      | 13.50%                       |
| ● Member Normal Cost   | <u>9.0%</u>                   | <u>9.0%</u>                | <u>10.00%</u>                |
| ● Total Normal Cost    | 30.9%                         | 30.8%                      | 23.50%                       |
| ● 50% Target           | 15.5%                         | 15.4%                      | 11.75%                       |

## ■ PEPRA Member Contributions:

| <b>Group</b>  | <b>2019/20</b>          |                    | <b>2020/21</b>           |               |                    |               |
|---------------|-------------------------|--------------------|--------------------------|---------------|--------------------|---------------|
|               | <b>Total NC (Basis)</b> | <b>Member Rate</b> | <b>Total Normal Cost</b> | <b>Change</b> | <b>Member Rate</b> | <b>Method</b> |
| Miscellaneous | 12.63%                  | 6.25%              | 13.19%                   | 0.55%         | 6.25%              | Pool Basis    |
| Safety        | 20.17%                  | 10.00%             | 22.33%                   | 2.16%         | 11.25%             | Pool Basis    |



This report presents analysis of the City of Milpitas's CalPERS pension plans. The purpose of this report is to provide the City:

- Historical perspective on the plan investment returns, assets, funded status and contributions.
- Projections of likely future contributions and the impact of investment volatility

The calculations and projections in this report are based on information contained in the City's June 30, 2018 and earlier CalPERS actuarial valuation reports. We reviewed this information for reasonableness, but do not make any representation on the accuracy of the CalPERS reports.

Future investment returns and volatility are based on Bartel Associates Capital Market model which results in long term returns summarized on pages 23 and 41.

Future results may differ from our projections due to differences in actual experience as well as changes in plan provisions, CalPERS actuarial assumptions or methodology. Other than variations in investment return, this study does not analyze these.

To the best of our knowledge, this report is complete and accurate and has been conducted using generally accepted actuarial principles and practices. As members of the American Academy of Actuaries meeting the Academy Qualification Standards, we certify the actuarial results and opinions herein.

Respectfully submitted,



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Doug Pryor, ASA, EA, MAAA  
Vice President  
Bartel Associates, LLC  
January 21, 2020



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Bianca Lin, FSA, EA, FSA, MAAA  
Assistant Vice President  
Bartel Associates, LLC  
January 21, 2020



January 21, 2020



**RESOLUTION NO. \_\_\_\_\_**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MILPITAS TO AWARD RFP NO. 2467 FOR SECTION 115 TRUST ASSET MANAGEMENT SERVICES TO PFM ASSET MANAGEMENT LLC, ADOPT THE POST-EMPLOYMENT BENEFITS TRUST AGREEMENT BETWEEN PFM ASSETS MANAGEMENT LLC AS TRUST ADMINISTRATOR AND WELLS FARGO BANK, N.A. AS DIRECTED TRUSTEE, APPROVE THE INVESTMENT EARNINGS GOAL FOR THE TRUST, AND DESIGNATE THE CITY TRUST ADMINISTRATORS**

**WHEREAS**, on August 2021, the City released RFP No. 2467 – Section 115 Trust Management Services in accordance with all applicable procurement policies and procedures; and

**WHEREAS**, after the evaluation of all proposals received, the City’s Evaluation Committee recommends the award of RFP No. 2567 – Section 115 Trust Management to PFM Asset Management LLC (“PFM”), the firm adjudged to offer the best value to the City to provide Section 115 Pension Trust Management services; and

**WHEREAS**, the City set aside funds in the General Fund, Water Fund and Sewer Fund’s CalPERS Rate Stabilization Reserves for future pension benefits obligations given the anticipated annual increases in pension contributions, and

**WHEREAS**, per the City’s actuary, pension costs are projected to increase within the next 10 to 12 years and decline thereafter; and

**WHEREAS**, the City desires to create a Section 115 trust to invest these set aside funds in a diversified portfolio in a manner more advantageous for the City and help mitigate the expected budgetary impact of increasing CalPERS contributions; and

**WHEREAS**, the City desires to achieve a 3% to 6% investment earnings goal during the next 5 to 10 years at a moderate investment risk level; and

**WHEREAS**, in order to set up and execute the trust, the City must adopt the Post-Employment Benefits Trust Agreement between PFM Assets Management LLC (“PFM”) as Trust Administrator and Wells Fargo Bank, N.A., (“Wells Fargo”) as directed Trustee; and

**WHEREAS**, it is prudent to designate certain employees to serve as Trust Administrators.

**NOW, THEREFORE**, the City Council of the City of Milpitas hereby finds, determines, and resolves as follows:

1. The City Council has duly considered the full record before it, which may include but is not limited to such things as the City staff report, testimony by staff and the public, and other materials and evidence submitted or provided to it. Furthermore, the recitals set forth above are found to be true and correct and are incorporated herein by reference.
2. The City Council hereby awards RFP No. 2467 for Section 115 Pension Trust Asset Management Services to PFM Asset Management LLC and hereby authorizes the City Manager to execute the professional services agreement with PFM for the initial term of July 1, 2021 – June 30, 2026 and execute the resulting two (2) two-year extensions as well as any Trust related documents after approval as to form by the City Attorney without additional action by the City Council.

3. The City adopts the Post-Employment Benefits Trust Agreement between PFM Assets Management LLC (“PFM”) as Trust Administrator and Wells Fargo Bank, N.A. (“Wells Fargo”) as directed Trustee.
4. The City Council approves, ratifies, and confirms the appointment of Wells Fargo as the Trustee and PFM as the Trust Administrator as of the effective date of the Adoption Agreement.
5. The City Council approves the investment of the set aside funds in a Section 115 Trust in order to invest funds with moderate risk achieving a 3% to 6% investment earnings goal during the next 5 to 10 years to mitigate the rising pension costs.
6. The City Council designates the City Manager, Assistant City Manager, Deputy City Manager and Finance Director to act individually on behalf of the City working with PFM to achieve the desired investment earnings goal as approved by Council.

PASSED AND ADOPTED this \_\_\_\_\_ day of \_\_\_\_\_, 2021, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

APPROVED:

\_\_\_\_\_  
Wendy Wood, City Clerk

\_\_\_\_\_  
Rich Tran, Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
Christopher J. Diaz, City Attorney



**CITY OF MILPITAS  
PROFESSIONAL SERVICES AGREEMENT**

This Agreement is made and entered into as of \_\_\_\_\_ (“Effective Date”) by and between the City of Milpitas, a municipal corporation organized and operating under the laws of the State of California with its principal place of business at 455 E. Calaveras Boulevard, Milpitas, California 95035 (“City”), and **PFM Asset Management LLC**, a Delaware limited liability company with its principal place of business at **213 Market Street, Harrisburg, PA 17101** (hereinafter referred to as “Consultant”). City and Consultant are sometimes individually referred to as “Party” and collectively as “Parties” in this Agreement.

**RECITALS**

A. City is a public agency of the State of California and is in need of professional services for the following project:

**Section 115 Pension Trust Management Services**  
(hereinafter referred to as “the Project”).

B. Consultant is duly licensed and has the necessary qualifications to provide such services.

C. The Parties desire by this Agreement to establish the terms for City to retain Consultant to provide the services described herein.

**AGREEMENT**

**NOW, THEREFORE, IT IS AGREED AS FOLLOWS:**

1. Services.

Consultant shall provide the City with the services described in the Scope of Services attached hereto as Exhibit A, and as further described in Section 1 of the Trust Administrative Services Agreement (the “Administrative Services Agreement”), which is attached hereto as Attachment C and incorporated herein by reference.

2. Compensation.

a. Subject to paragraph 2(b) below, the City shall pay for such services in accordance with the Schedule of Charges set forth in Exhibit B.

b. Periodic payments shall be made in accordance with the provisions of Section 4 of the Administrative Services Agreement. Payments to Consultant for work performed will be made on a monthly billing basis.

3. Additional Work.

If changes in the work seem merited by Consultant or the City, and informal consultations with the other party indicate that a change is warranted, it shall be processed in the following manner: a letter outlining the changes shall be forwarded to the City by Consultant with a statement of estimated changes in fee or time schedule. An amendment to this Agreement shall be prepared by the City and executed by both Parties before performance of such services, or the City will not be required to pay for the changes in

the scope of work. Such amendment shall not render ineffective or invalidate unaffected portions of this Agreement.

4. Maintenance of Records.

Books, documents, papers, accounting records, and other evidence pertaining to costs incurred shall be maintained by Consultant and made available at all reasonable times during the Agreement term and for four (4) years from the date of final payment under the Agreement for inspection by City.

5. Term.

The term of this Agreement shall be from **[Insert start date]** to **[Insert end 2026]**, unless earlier terminated as provided herein. The City reserves the right to exercise, in writing, two (2) two (2)-year renewal options, which writing such be delivered to the Consultant not less than thirty (30) days prior to the then current expiration date. .

6. Delays in Performance.

a. Neither City nor Consultant shall be considered in default of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the non-performing party. For purposes of this Agreement, such circumstances include but are not limited to, abnormal weather conditions; floods; earthquakes; fire; epidemics; war; riots and other civil disturbances; strikes, lockouts, work slowdowns, and other labor disturbances; sabotage or judicial restraint.

b. Should such circumstances occur, the non-performing party shall, within a reasonable time of being prevented from performing, give written notice to the other party describing the circumstances preventing continued performance and the efforts being made to resume performance of this Agreement.

7. Compliance with Law.

a. Consultant shall comply with all applicable laws, ordinances, codes and regulations of the federal, state and local government, including Cal/OSHA requirements.

b. If required, Consultant shall assist the City, as requested, in obtaining and maintaining all permits required of Consultant by federal, state and local regulatory agencies.

c. If applicable, Consultant is responsible for all costs of clean up and/ or removal of hazardous and toxic substances spilled as a result of his or her services or operations performed under this Agreement.

8. Standard of Care

Consultant's services will be performed in accordance with the standard of care set forth in Section 7.1 of the Adoption Agreement for the Post-Employment Benefits Trust ("Adoption Agreement"), which is attached hereto as Attachment B and incorporated herein by reference.

9. Assignment and Subconsultant

Consultant shall not assign, sublet, or transfer this Agreement or any rights under or interest in this Agreement without the written consent of the City, which may be withheld for any reason. Any attempt to

so assign or so transfer without such consent shall be void and without legal effect and shall constitute grounds for termination. Subcontracts, if any, shall contain a provision making them subject to all provisions stipulated in this Agreement. Nothing contained herein shall prevent Consultant from employing independent associates, and subconsultants as Consultant may deem appropriate to assist in the performance of services hereunder.

10. Independent Consultant

Consultant is retained as an independent contractor and is not an employee of City. No employee or agent of Consultant shall become an employee of City. The work to be performed shall be in accordance with the work described in this Agreement, subject to such directions and amendments from City as herein provided.

11. Insurance. Consultant shall not commence work for the City until it has provided evidence satisfactory to the City it has secured all insurance required under Exhibit D (Insurance Requirements), attached hereto and incorporated herein by this reference. In addition, Consultant shall not allow any subcontractor to commence work on any subcontract until it has secured all insurance required therein.

12. Indemnification.

a. To the fullest extent permitted by law, Consultant shall defend (with counsel of City's choosing), indemnify and hold the City, its officials, officers, employees, volunteers, and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, in any manner arising out of, pertaining to, or incident to any negligent acts, errors or omissions, or willful misconduct of Consultant, its officials, officers, employees, subcontractors, consultants or agents in connection with the performance of the Consultant's services, the Project or this Agreement, including without limitation the payment of all damages, expert witness fees and attorney's fees and other related costs and expenses. Consultant's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by Consultant, the City, its officials, officers, employees, agents, or volunteers.

b. If Consultant's obligation to defend, indemnify, and/or hold harmless arises out of Consultant's performance of "design professional" services (as that term is defined under Civil Code section 2782.8), then, and only to the extent required by Civil Code section 2782.8, which is fully incorporated herein, Consultant's indemnification obligation shall be limited to claims that arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of the Consultant, and, upon Consultant obtaining a final adjudication by a court of competent jurisdiction, Consultant's liability for such claim, including the cost to defend, shall not exceed the Consultant's proportionate percentage of fault.

13. California Labor Code Requirements.

a. Consultant is aware of the requirements of California Labor Code Sections 1720 et seq. and 1770 et seq., which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects ("Prevailing Wage Laws"). If the services are being performed as part of an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and if the total compensation is One Thousand Dollars and Zero Cents (\$1,000.00) or more, Consultant agrees to fully comply with such Prevailing Wage Laws. Consultant shall defend, indemnify and hold the City, its officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or alleged failure to comply with the Prevailing Wage Laws. It shall be mandatory upon the Consultant and all subconsultants to comply with all California Labor Code provisions, which include but are not limited to prevailing wages (Labor Code

Sections 1771, 1774 and 1775), employment of apprentices (Labor Code Section 1777.5), certified payroll records (Labor Code Sections 1771.4 and 1776), hours of labor (Labor Code Sections 1813 and 1815) and debarment of contractors and subcontractors (Labor Code Section 1777.1). The requirement to submit certified payroll records directly to the Labor Commissioner under Labor Code section 1771.4 shall not apply to work performed on a public works project that is exempt pursuant to the small project exemption specified in Labor Code Section 1771.4.

b. If the services are being performed as part of an applicable “public works” or “maintenance” project, then pursuant to Labor Code Sections 1725.5 and 1771.1, the Consultant and all subconsultants performing such services must be registered with the Department of Industrial Relations. Consultant shall maintain registration for the duration of the Project and require the same of any subconsultants, as applicable. Notwithstanding the foregoing, the contractor registration requirements mandated by Labor Code Sections 1725.5 and 1771.1 shall not apply to work performed on a public works project that is exempt pursuant to the small project exemption specified in Labor Code Sections 1725.5 and 1771.1.

c. This Agreement may also be subject to compliance monitoring and enforcement by the Department of Industrial Relations. It shall be Consultant’s sole responsibility to comply with all applicable registration and labor compliance requirements. Any stop orders issued by the Department of Industrial Relations against Consultant or any subcontractor that affect Consultant’s performance of services, including any delay, shall be Consultant’s sole responsibility. Any delay arising out of or resulting from such stop orders shall be considered Consultant caused delay and shall not be compensable by the City. Consultant shall defend, indemnify and hold the City, its officials, officers, employees and agents free and harmless from any claim or liability arising out of stop orders issued by the Department of Industrial Relations against Consultant or any subcontractor.

14. Verification of Employment Eligibility.

By executing this Agreement, Consultant verifies that it fully complies with all requirements and restrictions of state and federal law respecting the employment of undocumented aliens, including, but not limited to, the Immigration Reform and Control Act of 1986, as may be amended from time to time, and shall require all subconsultants and sub-subconsultants to comply with the same.

15. City Material Requirements.

[RESERVED]

16. Laws and Venue.

This Agreement shall be interpreted in accordance with the laws of the State of California. If any action is brought to interpret or enforce any term of this Agreement, the action shall be brought in a state or federal court situated in the County of Santa Clara, State of California.

17 Termination or Abandonment

a. City has the right to terminate or abandon any portion or all of the work under this Agreement in accordance with Section 7 of the Administrative Services Agreement . In such event, City shall be immediately given title and possession to all original field notes, drawings and specifications, written reports and other documents produced or developed for that portion of the work completed and/or being abandoned. City shall pay Consultant the reasonable value of services rendered for any portion of the work completed prior to termination. If said termination occurs prior to completion of any task for the

Project for which a payment request has not been received, the charge for services performed during such task shall be the reasonable value of such services, based on an amount mutually agreed to by City and Consultant of the portion of such task completed but not paid prior to said termination. City shall not be liable for any costs other than the charges or portions thereof which are specified herein. Consultant shall not be entitled to payment for unperformed services and shall not be entitled to damages or compensation for termination of work.

b. Consultant may terminate its obligation to provide further services under this Agreement in accordance with Section 7 of the Administrative Services Agreement.

c. The Consultant understands and accepts that at all times; the Agreement is subject to appropriation of funds by the Milpitas City Council. The Agreement may terminate without penalty, liability or expense of any kind to the City at the end of Agreement term. The City has no obligation to make appropriations for the Agreement in lieu of appropriations for new or other contracts. City budget decisions are subject to the discretion of the Mayor and City Council. Consultant's assumption of risk of possible non-appropriation is a part of the consideration for the Agreement. This section controls against any and all other provisions of the Agreement.

18. Documents. Except as otherwise provided in "Termination or Abandonment," above, all original field notes, written reports, Drawings and Specifications and other documents, produced or developed for the Project shall, upon payment in full for the services described in this Agreement, be furnished to and become the property of the City.

19. Organization

Consultant shall assign **Ellen Clark** as Project Manager. If the Consultant's Project Manager leaves employment or is otherwise not utilized in the performance of the work, the Consultant shall (i) notify the City of any resulting substitution, (ii) introduce the individual serving as the replacement to the Consultant's Project Manager, and (iii) provide the City with a résumé and any other information regarding the individual that may be reasonably requested by the City. Any substitute shall not have a lesser standard of qualifications that the Consultant's Project Manager at the time of contract award.

20. Limitation of Agreement.

This Agreement is limited to and includes only the work included in the Project described above.

21. Notice

Any notice or instrument required to be given or delivered by this Agreement may be given or delivered by depositing the same in any United States Post Office, certified mail, return receipt requested, postage prepaid, addressed to:

CITY:

City of Milpitas  
455 E. Calaveras Boulevard  
Milpitas, California 95035  
Attn: Director of Finance

CONSULTANT:

PFM Asset Management LLC  
44 Montgomery Street, 3<sup>rd</sup> Floor  
San Francisco, CA 94104  
Attn: Ellen Clark, Director

and shall be effective upon receipt thereof.



22. Third Party Rights

Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than the City and the Consultant.

23. Equal Opportunity Employment.

Consultant represents that it is an equal opportunity employer and that it shall not discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, sex, age or other interests protected by the State or Federal Constitutions. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination.

24. Entire Agreement

This Agreement, with its exhibits, represents the entire understanding of City and Consultant as to those matters contained herein, and supersedes and cancels any prior or contemporaneous oral or written understanding, promises or representations with respect to those matters covered hereunder. Each party acknowledges that no representations, inducements, promises or agreements have been made by any person which are not incorporated herein, and that any other agreements shall be void. This Agreement may not be modified or altered except in writing signed by both Parties hereto. This is an integrated Agreement.

25. Severability

The unenforceability, invalidity or illegality of any provision(s) of this Agreement shall not render the provisions unenforceable, invalid or illegal.

26. Successors and Assigns

This Agreement shall be binding upon and shall inure to the benefit of the successors in interest, executors, administrators and assigns of each party to this Agreement. However, Consultant shall not assign or transfer by operation of law or otherwise any or all of its rights, burdens, duties or obligations without the prior written consent of City. Any attempted assignment without such consent shall be invalid and void.

27. Non-Waiver

None of the provisions of this Agreement shall be considered waived by either party, unless such waiver is specifically specified in writing.

28. Time of Essence

Time is of the essence for each and every provision of this Agreement.

29. City's Right to Employ Other Consultants

City reserves its right to employ other consultants, including engineers, in connection with this Project or other projects.

30. Prohibited Interests

Consultant maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Consultant, to solicit or secure this Agreement. Further,

Consultant warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Consultant, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, City shall have the right to rescind this Agreement without liability. For the term of this Agreement, no director, official, officer or employee of City, during the term of his or her service with City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

31. Wage Theft Prevention

a. Consultant, and any subconsultant it employs to complete work under this Agreement, shall comply with all applicable federal, state and local wage and hour laws. Applicable laws may include, but are not limited to, the Federal Fair Labor Standards Act, the California Labor Code and the Milpitas Minimum Wage Ordinance.

b. BY SIGNING THIS AGREEMENT, CONSULTANT AFFIRMS THAT IT HAS DISCLOSED ANY FINAL JUDGMENTS, DECISIONS OR ORDERS FROM A COURT OR INVESTIGATORY GOVERNMENT AGENCY, FINDING IN THE FIVE (5) YEARS PRIOR TO EXECUTING THIS AGREEMENT THAT CONSULTANT OR ITS SUBCONSULTANTS HAS VIOLATED ANY APPLICABLE WAGE AND HOUR LAWS. CONSULTANT FURTHER AFFIRMS THAT IT OR ITS SUBCONSULTANT(S) HAS EITHER FULLY SATISFIED EACH JUDGMENT, DECISION OR ORDER, OR, IF ANY JUDGMENT, DECISION OR ORDER HAS NOT BEEN FULLY SATISFIED, CONSULTANT AFFIRMS THAT IT OR ITS SUBCONSULTANT(S) IS CURRENTLY SATISFYING SAID JUDGMENT, DECISION OR ORDER THROUGH A PAYMENT OR ALTERNATIVE PLAN APPROVED BY THE APPLICABLE COURT/GOVERNMENT AGENCY AND THAT CONSULTANT OR ITS SUBCONSULTANT(S) ARE IN COMPLIANCE WITH SAID PLAN AS OF THE DATE OF EXECUTING THIS AGREEMENT.

c. If at any time during the term of this Agreement, a court or investigatory government agency issues a final judgment, decision or order finding that Consultant or a subconsultant it employs to perform work under this Agreement has violated any applicable wage and hour law, or Consultant learns of such a judgment, decision, or order that was not previously disclosed in its bid/proposal, Consultant shall inform the City no more than fifteen (15) calendar days after the judgment, decision or order becomes final or from the date of learning of the final judgment, decision or order. Consultant or its subconsultant(s) shall, within thirty (30) calendar days after notifying the City, either (i) fully satisfy any such judgment, decision, or order and provide the City with documentary evidence of satisfying said judgment, decision or order; or (ii) provide the City documentary evidence of a payment or other alternative plan approved by the court/government agency to satisfy the judgment, decision or order. If the Consultant or its subconsultant is subject to a payment or other alternative plan, the Consultant or its subconsultant shall continue to submit documentary evidence every thirty (30) calendar days during the term of the Agreement demonstrating continued compliance with the plan until the judgment, decision or order has been fully satisfied.

d. For purposes of this Section, a "final judgment, decision, or order" refers to one for which all appeals have been exhausted or the time period to appeal has expired. Relevant investigatory government agencies include: the United States Department of Labor, the California Division of Labor Standards Enforcement, the City, or any other governmental entity or division tasked with the investigation and enforcement of wage and hour laws.

e. Failure to comply with any part of this Section constitutes a material breach of this Agreement. Such breach may serve as a basis for immediate termination of this Agreement and/or any other remedies available under this Agreement and/or law.

f. Notice provided to the City shall be addressed to: Attention: Finance Director, 455 E. Calaveras Blvd. Milpitas, CA 95035. The Notice provisions of this Section are separate from any other notice provisions in this Agreement and, accordingly, only notice provided to the above address satisfies the notice requirements in this Section.

**[SIGNATURES ON FOLLOWING PAGE]**

**SIGNATURE PAGE FOR PROFESSIONAL SERVICES AGREEMENT  
BETWEEN THE CITY OF MILPITAS  
AND PFM ASSET MANAGEMENT LLC**

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first written above.

**CITY OF MILPITAS**

*Approved By:*

\_\_\_\_\_  
Steven G. McHarris, City Manager

\_\_\_\_\_  
Date

*Approved As To Form:*

\_\_\_\_\_  
Christopher J. Diaz, City Attorney

*Approved:*

\_\_\_\_\_  
Lauren Lai, Director of Finance/ Risk Manager

**PFM ASSET MANAGEMENT LLC**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

## EXHIBIT A

### Scope of Services

- **Trust Objectives.** Based on the Consultant's specific prior knowledge and experience as a Trust services provider, advise City staff in establishment of a pension trust program including establishment of an IRS Section 115 Trust and recommended annual funding strategies.
- **Trust Administration.** Based on the Consultant's specific prior knowledge and experience as a Trust services provider, offer trust structure, administration and related trustee services, including coordinating all City contributions to the Trust and processing requests for distributions.
- **Fiduciary Investment Advisory Services.** Based on the Consultant's specific prior knowledge and experience as a Trust services provider offer a full scope of fiduciary investment management services, including but not limited to developing a written investment policy for the trust assets, developing a recommended asset allocation strategy based on the Trust's funding and investment objectives and the City's risk tolerance.
- **Reporting.** Provide monthly, quarterly, and annual comparative performance analyses and evaluation reports of the Trust's investments compliant with Global Investment Performance Standards (GIPS).

### CITY RESPONSIBILITIES

A. **Technical Support and Assistance.** City's Finance staff and responsible management personnel will be available for needed sources of information, documentation, and explanations. It is expected that the Consultant will rely on the assistance of City staff to a minimum level, in consideration of limited staff capacity.

B. **Manner of Payment.** The City expects that all fees will be assessed as part of the Trust's administration fees including annual administration and trustee and investment services as set forth in the firms submitted RFP based upon total assets in the Trust under management.

### Additional Documents

The following Attachments are incorporated herein by this reference to this agreement:

1. Attachment A – Post-Employment Benefits Trust Agreement
2. Attachment B – Adoption Agreement for the Post-Employment Benefits Trust
3. Attachment C – Wells Fargo Services Agreement



## **EXHIBIT B**

### **Schedule of Charges/Payments**

Consultant will invoice City on a monthly cycle in accordance with the Fee Schedule, attached as Exhibit 1 to the Administrative Services Agreement, which is incorporated herein. Consultant will inform City regarding any out-of-scope work being performed by Consultant.

**EXHIBIT C**  
**Activity Schedule**

PFM will provide ongoing services including, but not limited to, the following:

Deliver Quarterly performance reports delivered within 45 business days of the end of the quarter

Meet with the City at least semi-annually, or as needed

Review Investment Policy for City of Milpitas Section 115 Trust Fund with City's Investment Committee annually.

## EXHIBIT “D”

### INSURANCE REQUIREMENTS

Please refer to the insurance requirements listed below. **Those that have an “X” indicated in the space before the requirement apply to Contractor’s or Consultant’s Agreement.**

Contractor or Consultant shall procure and maintain for the duration of the Agreement insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Contractor or Consultant, its agents, representatives, employees or subcontractors.

Contractor or Consultant shall provide its insurance broker(s)/agent(s) with a copy of these requirements and request that they provide Certificates of Insurance complete with copies of all required endorsements.

Contractor or Consultant shall furnish City with copies of original endorsements affecting coverage required by this **Exhibit D**. The endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. All endorsements and certificates are to be received and approved by City before work commences. City has the right to require Contractor’s or Consultant’s insurer to provide complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications.

#### **Commercial General Liability (CGL):**

☐ Coverage at least as broad as Insurance Services Office (“ISO”) Form CG 00 01 covering CGL on an “occurrence” basis, including products and completed operations, property damage, bodily injury and personal and advertising injury with limits no less than \$2,000,000.00 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.

☒ Coverage at least as broad as ISO Form CG 00 01 covering CGL on an “occurrence” basis, including products and completed operations, property damage, bodily injury and personal and advertising injury with limits no less than \$1,000,000.00 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.

☐ Coverage at least as broad as ISO Form CG 00 01 covering CGL on an “occurrence” basis, including products and completed operations, property damage, bodily injury and personal and advertising injury with limits no less than \$5,000,000.00 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.

#### **Automobile Liability:**

☒ Coverage at least as broad as ISO Form Number CA 0001 covering, Code 1 (any auto), of if Contractor or Consultant has no owned autos, Code 8 (hired) and 9 (non-owned), with limits no less than \$1,000,000.00 combined single limit for bodily injury and property damage.

☐ Coverage at least as broad as ISO Form Number CA 0001 covering, Code 1 (any auto), with limits no less than \$5,000,000.00 combined single limit for bodily injury and property damage.

\_\_\_ Garage keepers' extra liability endorsement to extend coverage to all vehicles in the care, custody and control of the Contractor or Consultant, regardless of where the vehicles are kept or driven.

**Professional Liability (Errors and Omissions):**

\_\_\_ Insurance appropriate to the Contractor or Consultant's profession, with limit no less than \$1,000,000.00 per occurrence or claim, \$2,000,000.00 aggregate.

\_\_\_ (If Design/Build), with limits no less than \$1,000,000.00 per occurrence or claim, and \$2,000,000.00 policy aggregate.

X Insurance appropriate to the Contractor or Consultant's profession, with limit no less than \$2,000,000.00 per occurrence or claim, \$2,000,000.00 aggregate

**Workers' Compensation Insurance:**

X Insurance as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than \$1,000,000.00 per accident for bodily injury or disease. *(Not required if Contractor or Consultant provides written verification it has no employees)*

The Employer's Liability policy shall be endorsed to waive any right of subrogation as respects the City, its elected and appointed officials, officers, attorneys, agents, and employees.

**Builder's Risk (Course of Construction):**

\_\_\_ Insurance utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions. If the project does not involve new or major reconstruction, at the option of the City, an Installation Floater may be acceptable. For such projects, a Property Installation Floater shall be obtained that provides for the improvement, remodel, modification, alteration, conversion or adjustment to existing buildings, structures, processes, machinery and equipment. The Property Installation Floater shall provide property damage coverage for any building, structure, machinery or equipment damaged, impaired, broken, or destroyed during the performance of the Work, including during transit, installation, and testing at the City's site.

**Contractor's or Consultant's Pollution Legal Liability:**

\_\_\_ Contractor's or Consultant's pollution legal liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) with limits no less than \$1,000,000.00 per occurrence or claim and \$2,000,000.00 policy aggregate.

If the Contractor or Consultant maintains higher limits than the minimums shown above, the City requires and shall be entitled to coverage for the higher limits maintained by the Contractor or Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to City.

**Cyber Liability Insurance**

\_\_\_ Cyber Liability Insurance with limits not less than \$1,000,000 per claim.

Coverage shall be sufficiently broad to respond to the duties and obligations as is undertaken by Contractor or Consultant in this Agreement and shall include, but not be limited to, claims involving infringement of intellectual property, including but not limited to infringement of copyright, trademark, trade dress, invasion of privacy violations, information theft, damage to or destruction of electronic information, release of private information, alteration of electronic information, extortion, and network security.

The policy shall provide coverage for breach response costs as well as regulatory fines and penalties, and credit monitoring expenses with limits sufficient to respond to these obligations.

#### **Surety Bonds:**

Contractor shall provide the following Surety Bonds:

\_\_\_\_ Bid Bond  
\_\_\_\_ Performance Bond  
\_\_\_\_ Payment Bond

The Payment Bond and Performance Bond shall be in a sum equal to the contract price. Bonds shall be duly executed by a responsible corporate surety, authorized to issue such bonds in the State of California and secured through an authorized agent with an office in California.

#### **Other Insurance Provisions:**

The insurance policies are to contain, or be endorsed to contain the following provisions:

#### **X Additional Insured Status and Primary/Non-Contributory Language:**

Contractor's general liability and automobile liability policies shall be primary and shall not seek contribution from the City's coverage and be endorsed to add the City and its officers, officials, employees, and agents as additional insureds under such policies using Insurance Services Office form CG 20 10 (or equivalent) on the general liability policy. For construction projects, an endorsement providing completed operations coverage for the additional insured on the general liability policy, ISO form CG 20 37 (or equivalent), is also required.

The limits of insurance required in this Agreement may be satisfied by a combination of primary and umbrella or excess insurance. Any umbrella or excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of City (if agreed to in a written contract or agreement) before the City's own insurance or self-insurance shall be called upon to protect it as a named insured.

#### **\_\_\_\_ Loss Payee Status – Builder's Risk/Course of Construction Insurance (applicable to Construction Contracts only)**

Contractor or Consultant may submit evidence of Builder's Risk insurance in the form of Course of Construction coverage. Such coverage shall name the City as a loss payee as their interest may appear.

#### **X Notice of Cancellation, Suspension or Otherwise Voiding Policies:**

Each insurance policy required above shall contain or be endorsed to contain that coverage shall not be suspended, voided or canceled except with thirty (30) days' prior written notice by certified mail, return receipt requested to the City. The Consultant agrees to provide thirty (30) days' prior written notice of any



reduction in coverage or in limits of each insurance policy relied upon by the City in executing and delivering this Agreement.

**X Waiver of Subrogation:**

Contractor or Consultant hereby grants to City a waiver of any right to subrogation which any insurer (except its professional liability insurer) of said Contractor or Consultant may acquire against the City by virtue of the payment of any loss under such insurance. Contractor or Consultant agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation, but this provision applies regardless of whether or not the City has received a waiver of subrogation endorsement from the insurer. The Workers' Compensation Policy shall be endorsed with a waiver of subrogation in favor of the City for all work performed by Contractor or Consultant, its employees, agents and subcontractors.

**Completed Operations**

For Construction Agreements, Contractor shall maintain insurance as required by this Agreement to the fullest amount allowed by law and shall maintain insurance for a minimum of five (5) years following the completion of this project. In the event Contractor fails to obtain or maintain completed operations coverage as required by this Agreement, the City at its sole discretion may purchase the coverage required and the cost will be paid by Contractor.

**THE FOLLOWING PROVISIONS APPLY TO ALL AGREEMENTS**

**Deductibles and Self-Insured Retentions ("SIR"):**

Any deductibles or self-insured retentions must be declared to and approved by City. The City may require the Contractor or Consultant to provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention.

All SIRs must be disclosed to Risk Management for approval and shall not reduce the limits of liability.

Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or the City.

City reserves the right to obtain a full-certified copy of any insurance policy and endorsements. Failure to exercise this right shall not constitute a waiver of right to exercise later.

**Acceptability of Insurers:**

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A-:VII, unless otherwise acceptable to City.

**Claims Made Policies: (note - should be applicable only to professional liability, see below)**

1. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.
2. Insurance must be maintained, and evidence of insurance must be provided for at least five (5) years after completion of contract of work.

3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Contractor or Consultant must purchase “extended reporting” coverage for a minimum of five (5) years after completion of work.
4. A copy of the claims reporting requirements must be submitted to the City for review.
5. If the services involve lead-based paint or asbestos identification/remediation, the Contractor’s Pollution Liability Policy shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification/remediation, the Contractors Pollution Liability Policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.

**Subcontractors:**

Contractor or Consultant shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and Contractor shall ensure that City is an additional insured on insurance required from subcontractors.

Subcontractor agrees to be bound to Contractor and City in the same manner and to the same extent as Contractor is bound to City under this Agreement and any other contract documents. Subcontractor further agrees to include the same requirements and provisions of this Agreement, including the indemnity and insurance requirements, with any sub-subcontractor to the extent they apply to the scope of the sub-subcontractor’s work. A copy of the City indemnity and insurance provisions will be furnished to the subcontractor upon request.

**Verification of Coverage:**

Contractor or Consultant shall furnish the City with original certificates and endorsements or copies of the applicable policy language effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the City before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor or Consultant’s obligation to provide them. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

**Special Risks or Circumstances**

City reserves the right to modify these requirements, including limits, at the time of renewal, based on the nature of the risk, prior experience, insurer, coverage or other special circumstances.

**Failure to Comply:**

Each insurance policy required above shall contain or be endorsed to contain that any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City, its elected and appointed officials, officers, attorneys, agents, and employees.

**Applicability of Coverage:**

Each insurance policy required above shall contain or be endorsed to contain that the Contractor's or Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

# Post-Employment Benefits Trust Agreement

By and between



**PFM Asset Management LLC**

as Trust Administrator

and



as Trustee

Effective July 1, 2015

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## **POST-EMPLOYMENT BENEFITS TRUST AGREEMENT**

This Post-Employment Benefits Trust Agreement ("Agreement") is made effective July 1, 2015, between WELLS FARGO BANK, N.A. (together with any successor trustee hereunder, the "Trustee") and PFM ASSET MANAGEMENT LLC (together with any successor trust administrator hereunder, the "Trust Administrator");

WHEREAS, the Trust Administrator wishes to establish a means by which public-agency employers may set aside moneys to fund the employers' obligations to provide eligible persons ("Beneficiaries") with (i) pension benefits and (ii) retiree-health benefits and other post-employment benefits other than pension benefits ("OPEB");

WHEREAS, to accomplish these objectives, the Trustee wishes to establish a multiple-employer trust ("Trust") for the exclusive purpose of providing amounts to fund participating employers' obligations to provide OPEB or pension benefits, or both, with the intent that (i) the Trust's income will be exempt from federal and state income tax (under Internal Revenue Code Section 115 with respect to federal income tax), (ii) contributions and transfers to the Trust will not be taxable to Beneficiaries, (iii) Trust assets are intended to qualify as "plan assets" to the maximum extent permitted under Governmental Accounting Standards Board statements applicable to OPEB and pension benefits, and (iv) all assets of the Trust are and will be irrevocably dedicated to, and will be used for the exclusive purposes of, providing for payments of OPEB and pension obligations as described in this Agreement, and paying the reasonable expenses of administering the Trust, and will not be available to any participating employer's creditors;

WHEREAS, the Trust Administrator and Trustee are unaffiliated entities;

WHEREAS, the Trustee is willing to accept the Trust;

WHEREAS, the Trust is an entity separate from the participating employers for the exclusive benefit of the Beneficiaries and not of the employers;

WHEREAS, the indicia of ownership of Trust assets will be held by the Trustee at all times and the Trust assets will not be considered participating employers' funds or assets for any purpose;

WHEREAS, PFM Asset Management LLC is willing to serve as the Trust Administrator of the Trust with the rights and duties of the Trust Administrator provided in this Agreement;

WHEREAS, the Trust Administrator will have exclusive authority and responsibility for the management, administration, and investment of Trust assets in its sole judgment in accordance with this Agreement, without any requirement of consent by any participating employer or, except as expressly provided herein, of notice to any participating employer;

WHEREAS, every Employer is a state, political subdivision of a state, or other entity whose income is excludible from gross income under Section 115 of the Code; and

WHEREAS, the Trustee is a national banking association and a corporate trustee, with all requisite powers and capabilities to act as the Trustee and administer the Trust as set forth in this Agreement.

NOW, THEREFORE, the Trust Administrator and the Trustee agree as follows:

## **ARTICLE 1**

### **DEFINITIONS**

- 1.1 "Account" is defined in Section 4.6.
- 1.2 "Adoption Agreement" means the written instrument by which the Employer adopts and participates in the Trust in accordance with this Agreement, and by which the Employer makes certain elections relating to its participation in the Trust.
- 1.3 "Agreement" means this Post-Employment Benefits Trust Agreement between the Trustee and the Trust Administrator.
- 1.4 "Beneficiary" means a person who is entitled to post-employment benefits under the Employer's OPEB Plan or Pension Plan.
- 1.5 "Code" means the Internal Revenue Code of 1986, as amended.
- 1.6 "Employer" means each public agency that executes the Adoption Agreement, thereby becoming a participating agency in the Trust. Such agency must be a state, a political subdivision of a state, or an entity whose income is excludible from gross income under Section 115 of the Code.
- 1.7 "Investment Policy Statement" means the separate statement of policy for investing the assets of each Employer's Account, a copy of which is attached to the Employer's Adoption Agreement and which is satisfactory to the Employer.
- 1.8 "Omnibus Account" is defined in Section 4.6.
- 1.9 "OPEB" means post-employment health and welfare benefits (other than pensions) provided by the Employer under the OPEB Plan to Beneficiaries, including medical, dental, vision, life insurance, long-term care and other similar benefits.
- 1.10 "OPEB Account" is defined in Section 4.6.
- 1.11 "OPEB Obligation" means the Employer's obligation to provide OPEB under the Employer's OPEB Plan, including the direct costs of the OPEB and the expenses associated with providing the OPEB.
- 1.12 "OPEB Plan" means the policies, collective bargaining agreement, or other arrangements under which a Beneficiary is entitled to receive OPEB, but only if the policy, agreement, or other arrangement is specified by the Employer in the Adoption Agreement.
- 1.13 "Pension Account" is defined in Section 4.6.
- 1.14 "Pension Obligation" means the Employer's obligation to contribute to the qualified trust of the Employer's Pension Plan and to pay the expenses associated with providing





benefits under the Pension Plan. For this purpose, "qualified trust" means a trust that is qualified under Section 401(a) of the Code and that funds retirement benefits provided under the Pension Plan. A qualified trust is separate from this Trust and will not be considered part of this Trust for any purpose.

- 1.15 "Pension Plan" means one or more defined-benefit plans, each of which is (i) qualified under Section 401(a) of the Code, (ii) sponsored by the Employer in order to provide retirement benefits to Beneficiaries, including but not limited to a stand-alone plan maintained solely by the Employer or a multiple-employer or multiemployer plan in which the Employer participates along with one or more other employers, (iii) partly or wholly funded by the Employer's contributions, and (iv) specified by the Employer in the Adoption Agreement.
- 1.16 "Plan Administrator" means the person(s) or entity appointed by the Employer with the plenary authority over the Account. The Plan Administrator may delegate all or any part of its authority to any person(s) or entity. The Employer must, at the time and in the manner specified by the Trustee and the Trust Administrator, certify in writing to the Trustee and the Trust Administrator the names and specimen signatures of the Plan Administrator and its delegates; no appointment or delegation under this Section 1.16 will be effective without that certification. If no person or entity is appointed as Plan Administrator, the Employer will be the Plan Administrator.
- 1.17 "Trust" means the Post-Employment Benefits Trust established by this Agreement.
- 1.18 "Trust Administrative Services Agreement" means the agreement in the form attached to each Adoption Agreement and executed between the Employer and the Trust Administrator which authorizes the Trust Administrator to administer the Employer's Account.
- 1.19 "Trust Administrator" means PFM Asset Management LLC or any successor thereof designated by the Employers under Article 12.
- 1.20 "Trustee" means Wells Fargo Bank, N.A., or any successor trustee designated by the Trust Administrator in accordance with Article 13.

## **ARTICLE 2**

### **ESTABLISHMENT AND PURPOSE**

The Trust is a multiple-employer trust arrangement established and maintained for the sole purposes of holding the assets used to fund Employers' OPEB Obligations and Pension Obligations, and for paying each Employer's reasonable, allocable expenses of administering the Trust. As such, the Trust is divided into separate Accounts to hold the assets of each participating Employer. Consistent with its purpose, the Trust is intended to qualify as a tax-exempt trust performing an essential governmental function within the meaning of Section 115 of the Code. Each participating Employer retains an interest only in the assets held in that Employer's Account as set forth in Section 4.6.

## **ARTICLE 3**

### **PARTICIPATION**

- 3.1 Eligibility. Only public agencies may become participating Employers in the Trust. For this purpose, a public agency means a state, political subdivision of a state, or an entity whose income is excludible from gross income under Section 115 of the Code.
- 3.2 Commencement of Participation. A public agency may become a participating Employer in the Trust by furnishing the Trust Administrator with the following: (i) an executed Adoption Agreement, (ii) an executed Trust Administrative Services Agreement, (iii) a certified copy of a resolution, minutes, or other documentary evidence of the Employer's governing body approving the adoption of the Agreement, and (iv) any other documentation as the Trust Administrator may require. The public agency will become a participating Employer upon the Trust Administrator's written acceptance of the documents described in the preceding sentence.
- 3.3 Termination of Participation.
- (a) An Employer may elect in writing to withdraw from the Trust by filing such election with the Trust Administrator and the Trustee at least 30 days before the effective date of the withdrawal. As soon as administratively practicable after the effective date, the Trustee will segregate the withdrawing Employer's Account and transfer the assets in such Account to a trust established by agreement between the Employer and a successor trustee, but only if the Employer certifies in writing to the Trust Administrator that the trust satisfies the requirements of Section 115 of the Code.
  - (b) In the event the Trust Administrator contemplates an assignment of this Agreement in connection with a change of control or otherwise (collectively, an "assignment"), the Trust Administrator will provide each Employer with written notice at least 60 days before the effective date of such assignment. Upon receipt of such notice, each Employer may elect to terminate participation and withdraw from the Trust at any point prior to the effective date of the assignment as set forth in the notice. If an Employer does not provide notice of its desire to terminate within the 60-day notice period, the Employer's consent to the contemplated assignment will be implied.
  - (c) If the Employer has an Omnibus Account and both its Pension Obligation and OPEB Obligation have terminated, Section 14.3(b) will apply. If the Employer has an OPEB Account and its OPEB Obligation has terminated, Section 14.3(c) will apply. If the Employer has a Pension Account and its Pension Obligation has terminated, Section 14.3(d) will apply. An Employer's Pension Obligation or OPEB Obligation will be deemed terminated for these purposes upon the Trust Administrator's receipt of a certified copy of a resolution, minutes, or other documentary evidence of the Employer's governing body approving of the respective termination.
  - (d) Each Employer agrees to immediately notify the Trust Administrator upon receipt of a determination from the Internal Revenue Service that has the effect of rendering the Employer's Account ineligible for the tax exemption under Section



115 of the Code, such as any determination that the Employer is not a public agency. In such a case, as soon as administratively practicable after the Trust Administrator notifies the Trustee of the Internal Revenue Service's determination, the Trustee will segregate and place the Employer's Omnibus Account, OPEB Account, and Pension Account (as applicable) in a separate trust established for the exclusive purpose of funding the Employer's OPEB and Pension Obligation, OPEB Obligation only, or Pension Obligation only, respectively.

## **ARTICLE 4**

### **GENERAL TRUST PROVISIONS**

- 4.1 **Irrevocable Trust.** The Trust is irrevocable.
- 4.2 **No Diversion.** The principal of the Trust, together with any earnings thereon, will be held in trust by the Trustee separate and apart from any assets of the Employer. Except as provided in Sections 14.3 and 14.4, all assets in each Account and all income thereon are irrevocably dedicated to, and will be used for the exclusive purpose of, making payments of OPEB Obligations or Pension Obligations, as applicable, under the OPEB Plan or Pension Plan for which the Account was established and for paying the reasonable expenses of the Employer's participation in the Trust. At no time will the assets in any Employer's Account be used for, or diverted to, any other purposes, including but not limited to payment of any other Employer's OPEB Obligations or Pension Obligations.
- 4.3 **Title to Trust Assets.** The Trustee has exclusive right, title, and interest in and to the assets of the Trust.
- 4.4 **Spendthrift Provision.** Assets held in the Trust may not be used to satisfy claims of creditors of any Employer. No Beneficiary will be deemed a third-party beneficiary of this Agreement, nor will any Beneficiary have the right to compel any payment of any amount from the assets of the Trust or to enforce any duties of any party to or other entity referred to in this Agreement. Beneficiaries will not have any preferred claim, lien on, or security interest in, or any beneficial interest in any particular assets of the Trust. Beneficiaries will be entitled to receive payments of assets of the Trust only when, as, and if determined by the Employer in accordance with this Agreement. Except to the extent allowed by law, the Trust is not subject to attachment or garnishment or other legal process by any creditor of any such Beneficiary, nor will any Beneficiary have the right to alienate, anticipate, commute, pledge, encumber, or assign any Trust assets.
- 4.5 **Account Assets.** Each Employer may at any time make (or cause to be made) contributions or transfers of cash or other assets acceptable to the Trustee to the Trust from any source. Neither the Trustee nor any Beneficiary or any party to or any other entity referred to in this Agreement will have any right to compel such contributions or transfers or any duty to determine whether any such contributions or transfers comply with the Employer's OPEB Plan or Pension Plan, as applicable. In addition, neither the Trustee nor the Trust Administrator is responsible for separately accounting of any contributions or transfers to the Trust or for determining the source of these amounts.

#### 4.6 Separate Accounts.

- (a) Upon the effective date of an Employer's participation in the Trust under Article 3, the Trustee will establish a separate Account to which the Trustee will (i) credit all contributions or transfers from the Employer to the Trust and any income and gains attributable to those amounts, and (ii) debit all distributions, transfers from the Trust, and any losses and expenses attributable to those amounts. The Employer will have an interest only in the assets in the Employer's Account, and those assets will be available only to pay the Employer's OPEB Obligations and Pension Obligations and will not be available to pay any other Employer's obligations.
- (b) At the direction of the Trust Administrator, the Trustee may pool or commingle for investment purposes assets in the Employer's Account with other assets of the Trust and may invest all or a portion of those assets in any separate fund or account (including common investment pools or trusts) established under this Agreement or other investments permitted under this Agreement as set forth in Article 7. If any of the Employer's Account assets are pooled or commingled for investment purposes with other assets of the Trust or invested with other assets of the Trust in a separate fund or account, the Employer's Account will have an undivided beneficial interest in the Trust itself or in the particular investment funds, as the case may be, and these ownership interests will be represented by units or shares that the Trustee will hold in the Employer's Account.
- (c) Each Employer's Account contains up to three types of subaccounts (each of which may contain one or more subaccounts): an "Omnibus Account," "Pension Account," and "OPEB Account". Assets under the Omnibus Account are available to fund the Employer's Pension Obligations or OPEB Obligations and allocable expenses of participating in the Trust. Assets under the Employer's Pension Account are available only to fund the Employer's Pension Obligation and allocable expenses of participating in the Trust. Assets under the Employer's OPEB Account are available only to fund the Employer's OPEB Obligation and allocable expenses of participating in the Trust. Contributions or transfers to an Employer's Account will be allocated to the subaccounts as follows:
  - (1) Contributions and transfers received by the Trust on the Employer's behalf will be allocated to the Omnibus Account, Pension Account or OPEB Account, or any combination of these subaccounts, as directed by the Plan Administrator.
  - (2) Any contributions or transfers for which the Plan Administrator does not provide allocation directions will be held in the Omnibus Account. The Plan Administrator may at any time direct the allocation of amounts in the Omnibus Account to either the Pension Account or the OPEB Account.
  - (3) Once allocated to the Pension Account or the OPEB Account, amounts under the Trust may not subsequently be transferred to any other subaccount. Notwithstanding the preceding sentence, at the Plan Administrator's direction, the Trustee will reverse any allocation to the Pension Account or OPEB Account and deposit the funds (together with allocable earnings and losses) in one or both of the other two



subaccounts, but only if the Plan Administrator notifies the Trustee in writing within 30 days after the allocation that the allocation was due to mistake of fact and provides any other documentation required by the Trustee in its sole discretion.

## **ARTICLE 5**

### **TRUST ADMINISTRATOR**

- 5.1 **Powers and Duties of the Trust Administrator.** The Trust Administrator has sole discretion and authority to do any of the following:
- (a) At the direction of the Plan Administrator, instruct the Trustee to make distributions from the Employer's Account, including from any subaccount under the Account;
  - (b) Direct the Trustee to pay the fees of the Trust Administrator;
  - (c) Direct the Trustee as to the investment and management of Trust assets; and
  - (d) Such other acts as may be agreed to by the Employer and the Trust Administrator in the Trust Administrative Services Agreement or are necessary or appropriate to effect the intent of this Agreement.
- 5.2 **Reliance.** In the performance of its duties hereunder, the Trust Administrator is entitled to rely on, and is under no obligation to investigate instructions or data received from the Plan Administrator, including whether the amount of contributions or transfers made to the Trust by the Employer comply with the Employer's OPEB Plan or Pension Plan. Accordingly, the Trust Administrator will not be liable for action or inaction that is caused directly or indirectly by erroneous or late instructions or data furnished by the Plan Administrator.
- 5.3 **Annual Audit.** The Trust Administrator shall appoint a responsible accounting firm to conduct an annual audit of the Trust at the sole expense of the Employers. The results of such audit will be provided to the Trust Administrator, the Trustee, and each of the Employers. The Employer will be solely responsible for any expenses associated with any separate audit of the Employer's Account or the Employer's participation in the Trust, and no Trust assets outside the Employer's Account may be used to pay any part of those expenses.
- 5.4 **Trust Administrator not Custodian of Trust Assets.** The Trustee shall have sole custody of cash, securities and other assets of the Trust. The Trust Administrator is authorized to give instructions to the Trustee as to deliveries of securities and payments of cash for the account of the Trust. The Trust Administrator shall not take possession of or act as custodian for the cash, securities or other assets of the Trust and shall have no responsibility in connection therewith.
- 5.5 **Furnishing of Administrative Services, Office Space, Equipment and Personnel.** The Trust Administrator shall furnish at its own expense all necessary administrative services, office space, equipment, clerical personnel, telephone and other





communication facilities, and executive and supervisory personnel required to perform its duties under this Agreement.

- 5.6 Registered Investment Advisor. The Trust Administrator hereby represents that it is a registered investment advisor under the Investment Advisers Act of 1940. The Trust Administrator shall immediately notify every Employer and the Trustee if at any time during the term of this Agreement it is not so registered or if its registration is suspended. The Trust Administrator agrees to perform its duties and responsibilities under this Agreement with reasonable care as provided by law. The federal securities laws impose liabilities under certain circumstances on persons who are required to act in good faith. Nothing in this Agreement shall in any way constitute a waiver or limitation of any rights which the Employers, the Trust Administrator, or the Trustee may have under any federal securities laws.
- 5.7 Investment Advice to Other Clients. The Employers and the Trustee understand that the Trust Administrator performs investment advisory services for various other clients which may include investment companies, commingled trust funds and individual portfolios. The Employers and the Trustee agree that the Trust Administrator may give advice or take action with respect to any of its other clients which may differ from advice given or the timing or nature of action taken with respect to the Trust, so long as it is the policy and practice of the Trust Administrator, to the extent practical, to allocate investment opportunities to the Trust over a period of time on a fair and equitable basis relative to other clients. The Trust Administrator will not have any obligation to purchase, sell or exchange any security for the Trust solely by reason of the fact that the Trust Administrator, its principals, affiliates, or employees may purchase, sell or exchange such security for the account of any other client or for themselves.
- 5.8 Notice of Regulatory Action. The Trust Administrator shall promptly give notice to each Employer and the Trustee if the Trust Administrator has received written notice of the filing against it or any professional of the Trust Administrator who has performed any service with respect to the Trust in the 24 preceding months, of any complaints or disciplinary actions by the Securities and Exchange Commission or any other regulatory agency or department of the United States, any registered securities exchange, the FINRA, any Attorney General, or any regulatory agency or authority of any State.
- 5.9 Trust Administrator Separate from Employer and Trustee. The Trust Administrator, its employees, officers and representatives, shall not be deemed to be employees, agents, partners, servants, and/or joint ventures of any of the Employers or the Trustee by virtue of this Agreement or any actions or services rendered under this Agreement.
- 5.10 Recordkeeping. The Trust Administrator shall maintain appropriate records of all its activities hereunder.
- 5.11 Disclosure Statement. The Trust Administrator warrants that at least five business days before the execution of this Agreement, it has delivered to the Trustee the Trust Administrator's current Securities and Exchange Commission Form ADV, Part II. The Trustee hereby acknowledges receipt of the disclosure statement at least five business days before the execution of this Agreement.



- 5.12 Survival of Agreement and Assignment. The provisions of this Agreement will be binding on the Trust Administrator and its successors and assigns. The Trust Administrator may not, however, assign this Agreement without the consent of the Employers, which consent will be obtained through the process described in Section 3.3(b).

## **ARTICLE 6**

### **TRUSTEE**

- 6.1 Powers and Duties of the Trustee. To the extent directed by the Trust Administrator, the Trustee is authorized and empowered to do the following:
- (a) Invest and reinvest Trust assets, together with the income therefrom.
  - (b) Establish and maintain Accounts to which the Trustee will (i) credit all contributions or transfers from the Employer to the Trust and any income and gains attributable to those amounts, and (ii) debit all distributions, transfers from the Trust, and any losses and expenses attributable to those amounts.
  - (c) Maintain accounts with, execute transactions through, and lend stocks, bonds or other securities on an adequately secured basis to, any brokerage firm.
  - (d) Perform accounting and maintain records of each Employer's Account and reconciling such Account with the Trust.
  - (e) Vote upon or tender any stocks, bonds or other securities and to give general or special proxies or powers of attorney with or without power of substitution; to exercise any conversion privileges, subscription rights or other options of which the Trustee receives actual notice, and to make any payments incidental thereto; to consent to or otherwise participate in corporate reorganizations or other changes affecting corporate securities and to delegate discretionary powers and to pay any assessments or charges in connection therewith; and generally to exercise any of the powers of an owner with respect to stocks, bonds, securities or other property held in Trust.
  - (f) Deposit or invest all or any part of the assets of the Trust in savings accounts or certificates of deposit or other deposits in a bank or savings and loan association or other depository institution, including the Trustee or any of its affiliates; provided that, with respect to such deposits with the Trustee or an affiliate, the deposits bear a reasonable rate of interest.
  - (g) Invest and reinvest any Trust assets in one or more collective investment funds.
  - (h) Hold, manage, improve, repair and control all investment property, real or personal, forming part of the Trust; to sell, convey, transfer, exchange, partition, pledge, encumber, lease for any term, even extending beyond the duration of this Trust, and otherwise dispose of the same from time to time.
  - (i) Take such actions as may be necessary or desirable to protect the Trust from loss due to the default on mortgages held in the Trust including the appointment



of agents or trustees in such other jurisdictions as may seem desirable, to transfer property to such agents or trustees, to grant to such agents such powers as are necessary or desirable to protect the Trust, to direct such agent or trustee, or to delegate such power to direct, and to remove such agent or trustee.

- (j) Settle, compromise or abandon all claims and demands in favor of or against the Trust.
- (k) Borrow money from any source and to execute promissory notes, mortgages, or other obligations and to pledge or mortgage any Trust assets as security.
- (l) Designate and engage the services of such agents, representatives, advisers, counsel and accountants, any of whom may be an affiliate of the Trustee or a person who renders services to such an affiliate and, as part of its expenses under this Agreement, to pay their reasonable expenses and compensation.
- (m) Hold in cash, without liability for interest, such portion of the Trust assets as is pending investment, or payment of expenses, or distribution.
- (n) Make, execute and deliver, as the Trustee, any and all deeds, leases, mortgages, conveyances, waivers, releases or other instruments in writing necessary or appropriate for the accomplishment of any powers listed in this Agreement.
- (o) Register securities, or any other property, in its name or in the name of any nominee, including the name of any affiliate or the nominee name designated by any affiliate, with or without indication of the capacity in which property shall be held, or to hold securities in bearer form and to deposit any securities or other property in a depository or clearing corporation.
- (p) Pay or cause to be paid from the Trust any and all real or personal property taxes, income taxes or other taxes with respect to the Trust.
- (q) Enter into interest rate, currency, cash-flow, indexed (including indexed to equities) and other types of swaps and hedges designed to hedge payment, interest rate, currency, duration, spread or similar exposure related to any investment or program of investments of Trust assets or to manage asset/liability matching between investments and OPEB Obligations or Pension Obligations, or both, to be paid therefrom.
- (r) Exercise all of the further rights, powers, options and privileges granted, provided for, or vested in trustees generally under applicable state law so that the powers conferred upon the Trustee herein shall not be in limitation of any authority conferred by law or under this Agreement, but shall be in addition thereto; provided that such powers satisfy applicable state law requirements (if any).
- (s) Any other acts which the Trustee deems necessary or appropriate for the protection of the Trust.

## ARTICLE 7

### INVESTMENTS

- 7.1 Trustee. The Trustee shall hold and administer Trust assets without distinction between principal and income.
- 7.2 Trust Administrator. The Trust Administrator has exclusive authority and responsibility for the management and investment of Trust assets, and the Trustee is authorized and directed to comply with the written directions of the Trust Administrator concerning Trust assets. The Trust Administrator may, from time to time and in its sole discretion, allocate some or all of the cash in an Account at the end of each business day into a sweep investment fund managed by the Trust Administrator. Any amounts held in a sweep investment fund would typically be reallocated on the next business day. The Trust Administrator may not issue any such direction in violation of the terms of the Trust. The Trustee has no duty or authority to (i) review, question, approve or make inquiries as to any investment directions given pursuant to this Agreement, or (ii) determine whether investments directed by the Trust Administrator are in compliance with any applicable State laws.
- 7.3 Combining of Assets for Investment. As instructed by the Trust Administrator, the Trustee may commingle, for investment or administration purposes, the assets (or a portion of the assets) of the Trust in any group trust within the meaning of Section 401(a)(24) of the Code, but only if the commingled trust qualifies as tax exempt under Revenue Ruling 2011-1 and any subsequent relevant guidance from the Internal Revenue Service. In addition, at the Trust Administrator's direction, the Trustee may aggregate the balances of one or more Accounts within the Trust for investment or administrative purposes, in which case the Trustee will credit and debit each Account in accordance with Section 4.6.
- 7.4 Investment Direction. The Trust Administrator will direct the Trustee to invest the assets of each Employer's Account in accordance with the principles set forth in the Investment Policy Statement in any investments permitted under this Agreement.
- 7.5 Broker Executed Investments. Transactions in investments that require execution through a broker will be executed through such broker or brokers as the Trust Administrator will select. The indicia of ownership of Trust assets will be held by the Trustee at all times, and the Trustee shall serve as sole custodian of Trust assets.
- 7.6 Affiliated Broker/Dealers. Neither the Trustee nor any affiliate of the Trustee will act as broker dealer to execute transactions, including the purchase of securities directly distributed, underwritten or issued by an affiliate of the Trustee, or otherwise provide investment services with respect to the Trust; provided, however, that the Trustee (or its affiliate) may provide ancillary non-advisory investment services with respect to the Trust, including investment of Trust assets in money market or stable value funds distributed, underwritten or issued by the Trustee (or its affiliate) to the extent these investments are permitted under this Agreement. The Trustee and the Trust Administrator will disclose any services or relationships to each Employer before the Employer's commencement of participation in the Trust and at least annually thereafter, and any such services will be provided at standard commission rates, mark-ups or concessions.



- 7.7 Quarterly Reports. The Trust Administrator will provide to each Employer a quarterly analysis of the performance of the investments of each Account and statement of any changes in investments made in such quarter. The asset information for such analysis will be supplied to Trust Administrator by the Trustee. The report required by this Section 7.7 is separate from the reports required by Section 10.3.

## **ARTICLE 8**

### **PAYMENTS FROM TRUST**

8.1 Plan Administrator.

- (a) Each Employer's Plan Administrator has the exclusive authority and responsibility to determine the extent to which amounts will be paid from the Employer's Account. Neither the Trust Administrator nor the Trustee will make or authorize disbursements or transfers from any Employer's Account without the explicit written direction from the Employer's Plan Administrator.
- (b) From time to time, the Plan Administrator will direct the Trustee in writing to disburse amounts from the Employer's Omnibus Account for any purpose permitted under Section 8.1(c) or (d).
- (c) From time to time, the Plan Administrator will direct the Trustee in writing to disburse amounts from the Employer's OPEB Account for OPEB Obligations to (i) the Plan Administrator for subsequent distribution to or for the benefit of the Employer's Beneficiaries, (ii) any party providing services for the Employer's OPEB Plan, including but not limited to any insurer, third-party administrator, or other service provider, (iii) the Employer's Beneficiaries themselves directly, or (iii) the Employer as reimbursement for any OPEB Obligation amount paid or incurred by the Employer.
- (d) From time to time, the Plan Administrator will direct the Trustee in writing to disburse amounts from the Employer's Pension Account to (i) the Pension Plan as contributions to the plan's qualified trust, (ii) the Plan Administrator, for subsequent payment of the Employer's Pension Obligation, (iii) any party providing services for the Employer's Pension Plan, including but not limited to any insurer, third-party administrator, or other service provider, or (iv) the Employer as reimbursement for any Pension Obligation amount paid or incurred by the Employer.

- 8.2 Trustee Reliance. Except as otherwise provided by law, the Trustee will be fully protected in making payments out of any Employer's Account at the direction of the Employer's Plan Administrator. The Trustee's sole obligation as to those disbursements shall be to observe the instructions of the Plan Administrator to the extent that the Account has assets to make disbursements as instructed by the Plan Administrator. Nothing in the Trust or any Plan shall constitute a guarantee that Trust assets will be sufficient to pay the Employer's OPEB Obligations or Pension Obligations.

- 8.3 Payments. The Trustee is authorized to disburse amounts from the Trust to pay the fees and expenses of administering the Trust as expressly authorized by this Agreement, or as instructed in writing by the Trust Administrator.



## **ARTICLE 9**

### **TAXES, EXPENSES AND COMPENSATION OF THE TRUSTEE AND TRUST**

#### **ADMINISTRATOR**

- 9.1 Payment of Fees. Subject to Section 4.2, each Employer's Account will be charged for allocable Trustee Fees, Trust Administration Fees, and any other fees specified in the Trust Administrative Service Agreement. To the extent permitted in the Trust Administrative Service Agreement and Adoption Agreement, the Employer may elect in the Adoption Agreement to instead pay such fees from the Employer's assets.
- 9.2 Trust Administration Fees. "Trust Administration Fees" means the fees of the applicable investment funds and the fees for all services of the Trust Administrator specified in the Trust Administrative Services Agreement. The Trust Administrator is authorized to instruct the Trustee to disburse funds from the Account for the payment of the Trust Administration Fees to the Trust Administrator to the extent not paid by the Employer or deducted from the gross earnings of the investment funds. If and to the extent that the Trustee requests that the Trust Administrator render services to the Trust other than those to be rendered by the Trust Administrator hereunder, such additional services will be compensated separately on terms to be agreed upon between the Trust Administrator and the Trustee.
- 9.3 Trustee Fees. "Trustee Fees" means the Trustee's fees for services provided by it under this Agreement. These fees will be separately disclosed to the Employer prior to the commencement of the Employer's participation in the Trust. The Trustee is authorized to disburse funds from the Trust to itself for the payment of these fees to the extent not paid by the Employers. The Trustee will notify the Trust Administrator in writing of any change in the Trustee Fees at least 90 days before the effective date of the change.
- 9.4 Reimbursement of Expenses. Except as expressly provided otherwise herein, the Trustee is authorized to disburse funds from the Trust to pay all reasonable expenses of administering the Trust, including, without limitation, any taxes payable by the Trust, fees and expenses of legal counsel to the Trust, insurance premiums, and expenses associated with performing the annual audit provided for in Section 5.3.

## **ARTICLE 10**

### **RECORDKEEPING AND VALUATION**

- 10.1 Trust Records. The Trustee will keep accurate and detailed records of all investments, receipts, disbursements, and all other transactions, including such specific records as may be agreed upon in writing between the Trust Administrator and the Trustee with respect to the Trust.
- 10.2 Separate Account Records. The Trustee will keep accurate and detailed records of all investments, receipts, disbursement, and all other transactions with respect to each separate Employer Account.
- 10.3 Quarterly Reports. Within 45 days after the last day of each calendar quarter (and within 60 days after removal or resignation of the Trustee), the Trustee will deliver to the Trust



Administrator and each Employer a written account of the Employer's Account during such calendar quarter (or during the period from the close of the last preceding calendar quarter to the date of such removal or resignation), setting forth all deposits, investments, receipts, disbursements and other transactions effected by it with respect to the Account, including a description of transfers made and income received by the Account, all securities and investments purchased and sold with the cost or net proceeds of such purchases or sales (accrued interest paid or receivable being shown separately), all disbursements for the payment of OPEB Obligations and Pension Obligations, administrative expenses (any amounts paid to the Trustee shown separately) of the Trust paid from the Account, and showing all cash, securities and other property held in the Account at the end of such calendar quarter or as of the date of such removal or resignation, as the case may be.

- 10.4 Valuation. All securities will be valued at fair market value as of the date of valuation, as determined by the Trustee on the basis of all available information that the Trustee deems reasonable.

## **ARTICLE 11**

### **STANDARD OF CARE AND INDEMNIFICATION**

- 11.1 Exclusive Purpose. Except as provided in Sections 14.3 and 14.4, all Trust assets and all income thereon will be used for the exclusive purpose of providing for the payments of OPEB Obligations and Pension Obligations and for paying the reasonable expenses of administering the Trust.
- 11.2 Standard of Care. The Trustee and the Trust Administrator, when making, selling or otherwise managing investments of the funds, will discharge their duties with respect to the investment of the funds (i) solely in the interest of, and for the exclusive purposes of funding OPEB Obligations and Pension Obligations, maximizing the amount available for such funding, and paying reasonable expenses of administering the Trust, and (ii) with the care, skill, prudence, and diligence under the circumstances then prevailing that a prudent person acting in a like capacity and familiar with these matters would use in the conduct of an enterprise of a like character and with like aims. The Trust Administrator will invest assets in each Employer's Account accordance with the applicable Investment Policy Statement, but only to the extent that doing so does not conflict with the duties described in the preceding sentence.
- 11.3 Trustee Indemnification of Trust Administrator. The Trustee, solely from its assets and not from the Trust assets, will indemnify the Trust Administrator and each of its affiliates against, and will hold them harmless from, any and all damages imposed upon or incurred by any of them by reason of, or in connection with the Trustee's or affiliate's performance (or non-performance) of its duties under this Agreement in a manner that constitutes willful misconduct or willful breach of the standard of care articulated in Section 11.2, except to the extent that such damages resulted from the Trust Administrator's or affiliate's performance (or non-performance) of its duties under this Agreement in a manner that constitutes willful misconduct or willful breach of the standard of care articulated in Section 11.2.
- 11.4 Trust Administrator Indemnification of Trustee. The Trust Administrator, solely from its assets and not from the Trust assets, will indemnify the Trustee and each of its affiliates



against, and will hold them harmless from, any and all damages imposed upon or incurred by any of them by reason of, or in connection with the Trustee's and each of its affiliates' services under this Agreement, except to the extent that such damages resulted from the Trustee's or affiliate's performance (or non-performance) of its duties under this Agreement in a manner that constitutes willful misconduct or willful breach of the standard of care articulated in Section 11.2. The foregoing shall in no way limit or otherwise restrict any rights to indemnification which the Trust Administrator may have under any Adoption Agreement executed and delivered by the Trust Administrator and an Employer.

- 11.5 Survival of Indemnifications. The indemnification obligations provided for in this Agreement will survive the termination of this Agreement.

## **ARTICLE 12**

### **RESIGNATION AND REMOVAL OF TRUST ADMINISTRATOR**

- 12.1 Resignation or Removal of Trust Administrator. The Trust Administrator may resign at any time upon 90 days' prior written notice to each of the Employers, which notice may be waived in writing by the Employers. With the approval of at least two-thirds of the participating Employers, the Employers may remove the Trust Administrator upon 90 days' prior written notice to the Trust Administrator and the Trustee, which notice may be waived by the Trust Administrator.
- 12.2 Designation of Successor Trust Administrator. Upon notice of the Trust Administrator's resignation, the Employers will promptly designate a successor Trust Administrator qualified to act as the Trust Administrator of the Trust under applicable state law, such resignation to be effective upon acceptance of appointment by such successor Trust Administrator. The Employers will not remove the Trust Administrator unless Employers have designated such a successor Trust Administrator who shall have agreed with Employers and the Trustee to act as the Trust Administrator under an agreement substantially similar to this Agreement.
- 12.3 Compensation Pending Appointment of Successor. Until a successor Trust Administrator is appointed and assumes its duties as the Trust Administrator under this Agreement, the Trust Administrator shall be entitled to compensation for its services in accordance with Article 9.
- 12.4 Merger, Conversion, Consolidation or Sale of Trust Administrator. Any company into which the Trust Administrator may be merged or converted or with which it may be consolidated or any company resulting from any merger, conversion or consolidation to which it shall be a party or any company to which the Trust Administrator may sell or transfer all or substantially all of its investment advisory business, shall be, with the prior consent of Employers in the manner set forth in Section 3.3(b), the successor to such Trust Administrator.
- 12.5 Successor Trust Administrator - No Duty to Investigate. A successor Trust Administrator shall have no duty to audit or otherwise inquire into the acts or transactions of its predecessor.



## **ARTICLE 13**

### **RESIGNATION AND REMOVAL OF TRUSTEE**

- 13.1 Resignation of Trustee. The Trustee may resign at any time upon 90 days prior written notice to the Trust Administrator, which notice may be waived by the Trust Administrator.
- 13.2 Removal of Trustee. With approval of at least two-thirds of the participating Employers, the Employers may instruct the Trust Administrator in writing to remove the Trustee (or any successor trustee) upon 90 days prior written notice to the Trustee, which notice may be waived in writing by the Trustee, and to replace the Trustee with a corporate Trustee satisfactory to the Trust Administrator in its sole judgment.
- 13.3 Designation of Successor Trustee. Upon notice of the Trustee's resignation or removal, the Trust Administrator shall promptly designate a successor corporate Trustee qualified to act as the Trustee of the Trust under applicable state law, such resignation or removal to be effective upon acceptance of appointment by such successor corporate Trustee.
- 13.4 Application to Court to Designate Successor. If the Trust Administrator does not designate a successor corporate Trustee, or if a successor corporate Trustee designated by the Trust Administrator has not accepted its appointment within 90 days after the Trustee gives notice of its resignation or receives notice of removal, the Trustee may, at the expense of the Trust, apply to a court of competent jurisdiction to appoint a successor corporate Trustee.
- 13.5 Trustee Compensation Pending Appointment of Successor. Until a successor corporate Trustee is appointed and assumes its duties, the Trustee shall be entitled to compensation for its services according to its fee schedule then in effect for acting as the Trustee in accordance with the Trust.
- 13.6 Merger, Conversion, Consolidation or Sale of Trustee. Any company into which the Trustee may be merged or converted or with which it may be consolidated or any company resulting from any merger, conversion or consolidation to which it shall be a party or any company to which the Trustee may sell or transfer all or substantially all of its corporate trust business, shall be, with the prior written consent of the Trust Administrator, the successor to such Trustee.
- 13.7 Transfer of Assets and Records. A resigning Trustee shall transfer the Trust assets and shall deliver the books, accounts and records of the Trust to the successor corporate Trustee as soon as practicable.
- 13.8 Payment of Expenses. A resigning Trustee is authorized to reserve such amount as may be necessary for the payment of its fees and expenses incurred prior to its resignation or removal, and the Trust assets shall remain liable to reimburse the resigning or removed Trustee for any costs or fees payable to the Trustee under the terms of this Agreement.
- 13.9 Successor Trust Administrator - No Duty to Investigate. A successor corporate Trustee shall have no duty to audit or otherwise inquire into the acts or transactions of its predecessor.

## **ARTICLE 14**

### **AMENDMENT, TERMINATION, MERGER, TRANSFER**

- 14.1 Amendment. With the approval of at least two-thirds of the Employers then participating in the Trust, the Trust Administrator and the Trustee may amend the Trust; provided, however, that no amendment may:
- (a) cause any assets held in any Employer's Account to be used for or diverted to any purpose other than for the exclusive purposes of funding the Employer's OPEB Obligations or Pension Obligations, as applicable, or defraying the reasonable expenses of administering the Account; or
  - (b) eliminate the requirement that none of the assets held in any Employer's Account revert to the Employer prior to the satisfaction of all OPEB Obligations or Pension Obligations (as applicable) under the OPEB Plan or Pension Plan for which the Account was established.
- 14.2 Termination of Trust.
- (a) The Trust may be terminated by the unanimous agreement of all Employers, which action must be in writing and delivered to the Trustee and Trust Administrator. Upon termination of the Trust, the Trust will continue to exist and the Trust Administrator and the Trustee will continue to have all powers provided in this Agreement as are necessary or desirable for the orderly liquidation and distribution of Trust assets in accordance with the provisions hereof until all Trust assets have been distributed. The Trustee will distribute assets remaining in each Employer's Account at the direction of the Trust Administrator in the following order of priority: (1) payment of reasonable administrative expenses (including taxes and termination costs) of the Trust, (2) payment of the OPEB Obligations and Pension Obligations currently payable under the Employer's OPEB Plan and Pension Plan, as applicable, and (3) payment to a trust that satisfies the requirements of Section 115 of the Code and any other applicable law.
  - (b) Contributions and transfers to the Trust are conditioned on initial qualification of the Trust under Section 115 of the Code. If the Trust receives an adverse determination with respect to its initial qualification, then the Trust and this Trust Agreement will automatically terminate without any action by any Employer or other parties. After such termination, the assets of each Employer's Omnibus Account, Pension Account, or OPEB Account, as applicable, will be returned by the Trustee to the Employer as directed by the Plan Administrator in accordance with this Section 14.2(b) to the extent permitted by law and consistent with the requirements of Section 115 of the Code. This Section 14.2(b) will cease to apply upon the Trust's receipt of a favorable determination with respect to its initial qualification.





**14.3 Termination of Employer's Account.**

- (a) An Employer's Account will automatically terminate upon the termination of the Employer's participation in the Trust and the transfer of the assets in the Employer's Account under Section 3.3.
- (b) If an Employer has an Omnibus Account and maintains an OPEB Plan or Pension Plan, but not both, Section 14.3(b) or (c) (as applicable) will apply to the assets in the Omnibus Account. If the Employer maintains both an OPEB Plan and Pension Plan, the Trustee will continue to maintain, and will have all of the powers and duties under this Agreement with respect to, the Employer's Omnibus Account until the Employer's OPEB Obligation under its OPEB Plan and Pension Obligation under its Pension Plan are fully satisfied. Any assets remaining in the Employer's Omnibus Account after both such obligations are fully satisfied will be paid to the Employer to the extent permitted by law and consistent with the requirements of Section 115 of the Code.
- (c) If an Employer's OPEB Plan terminates, the Trustee will continue to maintain, and will have all of the powers and duties under this Agreement with respect to, the Employer's OPEB Account until the Employer's OPEB Obligation under its OPEB Plan is fully satisfied. Any assets remaining in the Employer's OPEB Account after its OPEB Obligation is fully satisfied will be paid to the Employer to the extent permitted by law and consistent with the requirements of Section 115 of the Code.
- (d) If an Employer's Pension Plan terminates, the Trustee will continue to maintain, and will have all of the powers and duties under this Agreement with respect to, the Employer's Pension Account until the Employer's Pension Obligation under its Pension Plan is fully satisfied. Any assets remaining in the Employer's Pension Account after its Pension Obligation is fully satisfied will be paid to the Employer to the extent permitted by law and consistent with the requirements of Section 115 of the Code.

**14.4 Mistake of Fact.** At the written direction of an Employer and after receipt of any indemnification that the Trustee may require from the Employer, the Trustee will return any contribution or transfer made to the Trust by the Employer due a mistake of fact, excluding any earnings but reduced by any losses, to the Employer within one year after the Employer discovers the mistake.

**14.5 Merger or Transfer.** At any time that there is in existence any trust created by Employer which satisfies the requirements in Articles 2 and 4, at the direction of Employer, the Trust may be merged with such trust, or all or part of its assets (net of any amount as may be reasonably necessary to pay the fees and expenses of the Trust Administrator, the Trustee and other expenses of the Trust) transferred to such trust; provided, however, that no such merger or transfer may increase the Trustee's obligations under this Agreement without the Trustee's written approval, no such merger or transfer may render the Trust "revocable" or otherwise adversely affect the status of the Trust as described in Articles 2 and 4.

**14.6 Reversion.** Neither the Trust Administrator nor the Employers nor any entity related to any of them will have any beneficial interest in the Trust or receive any amounts upon



termination of the Trust or at any other time, except as provided in Sections 14.3 and 14.4.

## **ARTICLE 15**

### **MISCELLANEOUS**

- 15.1 Choice of Law. The Trust is governed by, and will be interpreted in a manner consistent with, the laws of the Commonwealth of Pennsylvania and, to the extent applicable, the Internal Revenue Code.
- 15.2 No Joint Powers Agreement. This Agreement is not a joint exercise of powers agreement, does not create a joint powers or joint action authority, and the obligations of Employer, the Trustee, and the Trust Administrator are several and not joint. Neither the Trustee nor the Trust Administrator is responsible for any contributions, costs, benefits, distributions, acts or omissions of the Employers or the Plan Administrators.
- 15.3 Authorized Signatories. Each party to this Agreement represents and warrants that the person or persons signing this Agreement on behalf of such party are authorized and empowered to sign and deliver this Agreement for such party.
- 15.4 List of Persons Authorize to Act for Employer. Each of the Employers will certify to the Trust Administrator and the Trustee in writing of the person or persons, by office or other position of employment, who are authorized to act on behalf of the Employer in all matters relating to the Trust.
- 15.5 List of Persons Authorized to Act for Trust Administrator. The Trust Administrator shall notify the Trustee and each of the Employers in a separate writing of all those who are authorized to act on behalf of the Trust Administrator in all matters relating to the Trust.
- 15.6 Agreement Controls. If there is any conflict between any Pension Plan or OPEB Plan and this Agreement, this Agreement will control.
- 15.7 Severability. In the event any provision of this Agreement is held to be invalid for any reason, such invalidity will not affect any other provisions of this Agreement and this Agreement will be construed and enforced as if the invalid provision had never been included.
- 15.8 Counterparts. This Agreement may be executed in any number of counterparts, each of which will be considered as an original.
- 15.9 Delivery of Communications. All communications under this Agreement must be in writing and will be deemed to have been duly given (1) on the date of receipt if served personally or by confirmed facsimile or other similar communication; (2) on the first business day after sending if sent for guaranteed next day delivery by a next-day courier service; or (3) on the fourth business day after mailing if mailed to the party or parties to whom notice is to be given by registered or certified mail, return receipt requested, postage prepaid, and properly addressed as follows:

**If to an Employer:**

At the address listed for such purpose on the  
Employer's Adoption Agreement

**If to Trust Administrator:**

PFM Asset Management LLC  
Two Logan Square, Suite 1600  
18<sup>th</sup> and Arch Streets  
Philadelphia, PA 19103  
Attention: Leo Karwejna

**If to Trustee:**

Wells Fargo Bank, N.A.  
1751 Pinnacle Drive, 3rd Floor  
McLean, VA 22102  
Attention: Timothy S. Rueling

**IN WITNESS WHEREOF**, and as evidence of establishment of the Trust created  
hereunder, the parties have caused this Agreement to be executed as of the date set forth  
below:

**PFM ASSET MANAGEMENT LLC,  
As Trust Administrator**

By:   
Name: Michael W. Harris  
Title: Managing Director  
Date: 7/8/2015

**WELLS FARGO BANK, N.A.  
As Trustee**

By:   
Name: Timothy Rueling  
Title: Vice President  
Date: 7/13/15

**ADOPTION AGREEMENT  
FOR THE  
POST-EMPLOYMENT BENEFITS TRUST**



PFM ASSET MANAGEMENT LLC,  
Trust Administrator



WELLS FARGO BANK, N.A.  
Trustee

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## INTRODUCTION

By executing this Adoption Agreement, the Employer named in Article 1 of this Adoption Agreement hereby adopts and agrees to be bound by the terms of the Post-Employment Benefits Trust Agreement (the "Trust Agreement"), a copy of which is attached as Exhibit A. To the extent there is a conflict between this Adoption Agreement and the Trust Agreement, the Trust Agreement will control. Unless otherwise specified below, initially capitalized terms used in this Adoption Agreement are defined in the Trust Agreement.

## ARTICLE 1

### EMPLOYER INFORMATION

1.1 Employer's Name, Address, and Telephone Number

(a) Name: City of Milpitas \_\_\_\_\_

(b) Address: \_\_\_\_\_

(c) Telephone: \_\_\_\_\_

1.2 Employer's Taxpayer Identification Number: \_\_\_\_\_

## ARTICLE 2

### PLAN INFORMATION

2.1 Plan Name

Pension Plan: ("Plan") \_\_\_\_\_

("Plan")

2.2 Employer-designated: Plan Administrator's Name, Title, Address, and Telephone Number:

(a) Name: \_\_\_\_\_

(b) Title: \_\_\_\_\_

(c) Address: \_\_\_\_\_

(d) Telephone: \_\_\_\_\_

## ARTICLE 3

### TRUST ADMINISTRATIVE SERVICES

As a condition of the Employer's participation in the Trust, the Employer and the Trust Administrator have executed the Trust Administrative Services Agreement attached as Exhibit B.



## ARTICLE 4

### INVESTMENTS

The Employer hereby directs the Trust Administrator to direct the Trustee to invest the assets in the Employer's Account in accordance with the investment strategy mutually agreed to by the Employer and the Trust Administrator as set forth in the Investment Policy Statement attached as Exhibit C.

## ARTICLE 5

### TRUST FEES AND EXPENSES

5.1 Method of Payment. Unless the Employer otherwise elects below, the Trust Administration Fees (as defined in Section 9.2 of the Trust Agreement), Trustee Fees (as defined in Section 9.3 of the Trust Agreement), and any other reasonable fees and expenses of administering the Employer's Account will be paid from the Employer's Account. In lieu of payments from its Account, the Employer hereby elects to pay the following amounts:

- ☐ Trust Administration Fees
- ☐ Trustee Fees
- ☐ All expenses of the Employer's Account other than fees
- ☐ Other (please insert description):

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Please refer to Section 4 of the Trust Administrative Services Agreement for further information about payment of fees and expenses.

## ARTICLE 6

### REPRESENTATIONS AND WARRANTIES

- 6.1 The Employer hereby represents and warrants that each of the following statements is true and correct to the best of its knowledge:
- (a) The Employer is a state, a political subdivision of a state or another public agency whose income is excludable from gross income under section 115 of the Internal Revenue Code that is established and maintained under the laws of the State of California.
  - (b) The Employer has established and maintains a Plan the exclusive purpose of which is to provide retirement benefits to its former employees.
  - (c) The exclusive purpose of the Employer's participation in the Trust is to fund the Pension Obligation under the Employer's Plan.



- (d) The Employer's participation in the Trust is for the purpose of funding the Pension Obligation under the Employer's Plan is authorized under the laws of the State of California.
- (e) The Employer's Plan does not permit participants to direct or otherwise exercise in any manner, whether direct or indirect, control over the investment of their accounts or benefits accrued under the Plan.
- (f) The Employer has received copies, and has read and understands the terms, of the Trust Agreement.

## ARTICLE 7

### STANDARD OF CARE AND INDEMNIFICATION

- 7.1 Standard of Care. The Trustee and the Trust Administrator must discharge their duties with respect to the investment and management of Trust assets in accordance with the standard of care set forth in Section 11.2 of the Trust Agreement.
- 7.2 Employer Indemnification of Trustee. The Employer, from its own funds and not from any assets of the Trust, agrees to indemnify the Trustee and each of its affiliates against, and will hold them harmless from, any and all loss, claims, liability, and expense, including cost of defense and reasonable attorneys' fees, imposed upon or incurred at any time by any of them by reason of or in connection with the performance of the Trustee's services under this Agreement, except to the extent such damages resulted from the Trustee's or affiliate's performance (or non-performance) of its duties under the Trust Agreement in a manner that constitutes negligent or intentional misconduct or negligent or intentional breach of the standard of care articulated in Section 11.2 of the Trust Agreement.
- 7.3 Employer Indemnification of Trust Administrator. Employer, from its own funds and not from any assets of the Trust, agrees to indemnify the Trust Administrator and each of its affiliates against, and will hold them harmless from, any and all damages imposed upon or incurred by any of them by reason of, or in connection with its services under the Trust Agreement or the Trust Administrative Services Agreement, except to the extent that such damages resulted from the Trust Administrator's or affiliate's performance (or non-performance) of its duties under the Trust Agreement or the Trust Administrative Services Agreement in a manner that constitutes negligent or intentional misconduct or negligent or intentional breach of the standard of care articulated in Section 11.2 of the Trust Agreement.

## ARTICLE 8

### AMENDMENT

The Employer understands and agrees that the Trust Agreement may be amended from time to time by the Trustee and the Trust Administrator with the approval of two-thirds of the Employers then participating in the Trust.

## ARTICLE 9

### NO GUARANTEE OF INVESTMENT RESULTS

The Employer understands and acknowledges that investments in the Trust involve risk and that there is no guarantee of investment performance or other performance of the Trust, including but not limited to custodians, depositories, or counterparties to investment strategies of the Trust.



## ADOPTION OF TRUST AGREEMENT

By executing this Adoption Agreement, the Employer hereby adopts and agrees to be bound by the terms of the Trust Agreement and hereby approves, ratifies and confirms the appointment of Wells Fargo Bank, N.A. as the Trustee and PFM Asset Management LLC as the Trust Administrator as of the effective date of this Adoption Agreement. This Adoption Agreement and the Trust Agreement are effective on the \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

### EMPLOYER

\_\_\_\_\_

By: \_\_\_\_\_

Its: \_\_\_\_\_

Date: \_\_\_\_\_

### ACCEPTED:

**TRUST ADMINISTRATOR  
PFM ASSET MANAGEMENT LLC**

By: \_\_\_\_\_

Its: \_\_\_\_\_

Date: \_\_\_\_\_

**TRUSTEE  
WELLS FARGO BANK, N.A.**

By: \_\_\_\_\_

Its: \_\_\_\_\_

Date: \_\_\_\_\_



# EXHIBIT A

## FEES

| Trust Administration Fees |                |            |
|---------------------------|----------------|------------|
| Assets Under Management   |                | Annual Fee |
| Up to                     | \$ 25,000,000  | 0.30%      |
| Next                      | \$ 75,000,000  | 0.15%      |
| Next                      | \$ 150,000,000 | 0.10%      |
| Next                      | \$ 250,000,000 | 0.05%      |
| thereafter                |                | 0.02%      |

*Minimum annual account fee is \$25,000*

| Trustee/Custody Fees                              |                                             |                        |
|---------------------------------------------------|---------------------------------------------|------------------------|
| Trustee/Custody Per Annum Fees                    | Unit Price                                  |                        |
| Domestic Administration<br>Total Portfolio Assets | Base Fee                                    | Per Additional Account |
| \$0 - \$20 million                                | \$5,000                                     | \$500                  |
| \$20 million - \$100 million                      | \$8,000                                     | \$500                  |
| Over \$100 million                                | Individually priced on a deal-by-deal basis |                        |
| Benefit Payments                                  |                                             |                        |
| Web-Based Online Reporting & Administration – RPP | Included                                    |                        |
| Periodic ACH without Advice                       | \$1.50                                      |                        |
| Periodic Check/ACH with Advice                    | \$2.00                                      |                        |
| Lump Sum Payments                                 | \$20.00                                     |                        |
| Form 1099 Reports                                 | \$0.00                                      |                        |
| Stop Payments                                     | \$0.00                                      |                        |

|        | Out-of-Pocket Annual Fee Cap* |
|--------|-------------------------------|
| Year 1 | \$80,000                      |
| Year 2 | \$90,000                      |

*\*Fee cap on the combined investment advisory, administration, and trustee fees for the first two years of engagement.*







**EXHIBIT B**

**TRUST ADMINISTRATIVE SERVICES AGREEMENT**



**EXHIBIT C**  
**INVESTMENT POLICY STATEMENT**

[See City's Investment Policy Statement as amended from time to time on file with the Finance Department]





## TRUST ADMINISTRATIVE SERVICES AGREEMENT

This agreement ("Agreement") is made this \_\_\_\_ day of \_\_\_\_\_, 20\_\_, by and between \_\_\_\_\_ (the "Employer" or "Plan Administrator") and PFM ASSET MANAGEMENT LLC, a Delaware limited liability company (the "Trust Administrator").

**WHEREAS**, the Employer has adopted one or more plans or policies ("Plans") the exclusive purpose of each is to provide other post-employment health and welfare benefits (other than pensions) ("OPEB") or retirement benefits; and

**WHEREAS**, the Trust Administrator, Wells Fargo Bank, N.A. (the "Trustee"), and various public agencies have entered into an agreement (the "Trust Agreement") establishing the Post-Employment Benefits Trust (the "Trust"); and

**WHEREAS**, the Employer has adopted the Trust by executing the adoption agreement to which this Agreement is attached (the "Adoption Agreement") in order to fund the OPEB and retirement benefits payable under the Plans; and

**WHEREAS**, the Employer wishes to retain the services of the Trust Administrator to administer the Employer's account under the Trust ("Account").

**NOW THEREFORE**, the Employer and the Trust Administrator hereby agree as follows:

Capitalized words not defined this document are defined in the Trust Agreement.

### 1. Trust Administrator Services

The Trust Administrator will provide the following services for the Employer's Account:

#### 1.1 Administrative Services

- A. Instruct the Trustee to make disbursements from the Employer's Account at the direction of the Plan Administrator for the payment of OPEB or retirement benefits under the Employer's Plans funded by the Account;
- B. Coordinate the annual audit of the Trust, the results of which will be provided to the Employer; and
- C. Coordinate such other actions with the Trustee as directed by the Plan Administrator that are within the scope of the Trust Administrator's duties under the Trust Agreement.

## 1.2 Investment Management Services

- A. Determine the asset allocation of investments in the Employer's Account ("Investment Strategy") based on information provided by the Employer or the Plan Administrator, including the anticipated amounts of cash required by the Plans for distributions and other expenses, and the appropriate risk tolerance for the Plans based on the Plans' asset-liability characteristics and the Employer's resources;
- B. Prepare a recommended policy statement of the Account's Investment Strategy acceptable to the Employer to the extent necessary to accomplish the Account's Investment Strategy ("Investment Policy Statement");
- C. Execute the Account's Investment Strategy by instructing the Trustee to buy and sell shares of investments permitted under the Trust in accordance with the Investment Policy Statement;
- D. In consultation with the Employer, reassess and alter the Investment Strategy and Investment Policy Statement at least annually to the extent necessary to "rebalance" the Account investments;
- E. Perform reviews at least annually of the performance of the investments held in the Account, add or reduce allocations to each investment or add or delete investments in its judgment (to the extent permitted under the Investment Policy Statement and the Trust), and promptly advise the Employer of any additions or deletions of Account investments; and
- F. Provide the Employer after the end of each calendar quarter with an analysis of the performance of the investments of the Account and a statement of the changes in the investments made during such calendar quarter.

## 2. Compensation

- 2.1 Fees.** For all services provided by the Trust Administrator under this Agreement and the Trustee under the Trust Agreement, the following fees will apply:

**See attached Exhibit 1.**

- 2.2 Fees for Additional Services.** If and to the extent that the Employer requests the Trust Administrator to render services other than those described under this Agreement, such additional services will be compensated separately on terms to be agreed upon between the Trust Administrator and the Employer.





**2.3 Pooled Investments.** Assets invested by the Trust Administrator under the terms of this Agreement may from time to time be invested in individual securities, or in a proprietary money market mutual fund or local government investment pool (either, a “Pool”). Each Pool is a commingled fund managed by the Trust Administrator. Average daily net assets subject to the fees described in this section shall not take into account any funds invested in the Pool. Expenses of the Pool, including compensation for the Trust Administrator and the Pool custodian, are described in the relevant prospectus or information statement and are paid from the Pool.

### **3. Expenses**

**3.1 Furnishing of Administrative Services, Office Space, Equipment and Personnel.** The Trust Administrator will furnish at its own expense all necessary administrative services, office space, equipment, clerical personnel, telephone and other communication facilities, investment advisory facilities, and executive and supervisory personnel required to perform the services under this Agreement, inclusive of reasonable costs required to attend meetings with the Employer.

**3.2 Expenses of Employer’s Account.** Except as otherwise provided in this Agreement, Employer agrees to pay all expenses under the Trust incurred by (or allocable to) the Employer’s Account including, without limitation, taxes, expenses (including front- or back-end charges) of an investment fund, fees and expenses of the Account’s independent auditors and legal counsel, insurance premiums, expenses of the Trustee, the keeping of books and accounts, and the allocable costs of the annual Trust audit described in Section 5.3 of the Trust Agreement. The Trust Administrator will calculate expenses allocable to the Account on a pro-rata basis, or in any other reasonable and equitable manner determined by the Trust Administrator.

**4. Payment Terms.** At the end of each calendar month, the Trust Administrator will prepare and submit to the Employer for approval a monthly invoice for fees and expenses under this Agreement as described in Sections 2.1 and 3.2. The invoice will include a statement of the basis upon which the fees and expenses were calculated. Except to the extent that the Employer has elected in the Adoption Agreement to pay such invoices, the Employer authorizes the Trust Administrator to charge such invoices to the Employer’s Account and authorizes and instructs the Trustee to disburse funds from the Account for the payment of the fees and expenses. If the Employer has elected in the Adoption Agreement to pay such invoices, but does not fully pay any invoice within 15 calendar days after the invoice’s postmark, then the Employer hereby authorizes the Trust Administrator to charge the unpaid amount to the Account and instructs the Trustee to disburse such amount from the Account for the payment of the fees and expenses. If sufficient funds are not available or cannot for any reason otherwise be disbursed from the Account, the Trust Administrator will notify the Employer, and the Employer will pay the unpaid amount to the Trust Administrator from other sources within 10 calendar days after receiving the notice.

**5. Registered Advisor; Duty of Care.** The Trust Administrator hereby represents it is a registered investment advisor under the Investment Advisers Act of 1940. The Trust Administrator will immediately notify the Employer if at any time during the term of this



Agreement it is not so registered or if its registration is suspended. The Trust Administrator agrees to perform its duties and responsibilities under this Agreement with reasonable care. Notwithstanding the foregoing, the Trust Administrator has no responsibility or liability for determining whether or to what extent the Trust or Trustee is eligible to receive funds from the Employer under applicable law; and it is the Employer's sole responsibility to make such determination upon the establishment of its account under the Trust and at all subsequent times. The federal securities laws impose liabilities under certain circumstances on persons who act in good faith. Nothing herein in any way constitutes a waiver or limitation of any rights which the Employer or the Trust may have under any federal securities laws. The Employer hereby authorizes the Trust Administrator to sign an Internal Revenue Service Form W-9 on behalf of the Employer and to deliver such form to broker-dealers or others from time to time as required in connection with securities transactions pursuant to this Agreement.

6. **Trust Administrator's Other Clients.** The Employer understands that the Trust Administrator performs investment advisory services for various other clients which may include investment companies, commingled trust funds and/or individual portfolios. The Employer agrees that the Trust Administrator, in the exercise of its professional judgment, may give advice or take action with respect to any of its other clients which may differ from advice given or the timing or nature of action taken with respect to the Account. The Trust Administrator has no obligation to purchase, sell or exchange any security for the Employer solely by reason of the fact that the Trust Administrator, its principals, affiliates, or employees may purchase, sell or exchange such security for the account of any other client or for itself or its own accounts.
7. **Term of Agreement.** This Agreement will remain in effect until terminated by either party at any time by giving 90 days' written notice to the other party of its intent to terminate.
8. **Force Majeure.** The Trust Administrator has no liability for any losses arising out of the delays in performing or inability to perform the services which it renders under this Agreement which result from events beyond its control, including interruption of the business activities of the Trust Administrator or other financial institutions due to acts of God, acts of governmental authority, acts of war, terrorism, civil insurrection, riots, labor difficulties, or any action or inaction of any carrier or utility, or mechanical or other malfunction.
9. **Disciplinary Actions.** The Trust Administrator will promptly notify the Employer if the Trust Administrator is found to have violated any state or federal securities law or regulation in any final and unappealable judgment in any criminal action or civil suit in any state or federal court or in any disciplinary proceeding before the Securities and Exchange Commission or any other regulatory agency or department of the United States, any registered securities exchange, the Financial Industry Regulatory Authority, or any regulatory authority of any State based upon the performance of services as an investment advisor.
10. **Confidentiality.** The Trust Administrator will not disclose any information relating to the Plans or the Account except to authorized officers of the Employer, the Plan Administrator the Trustee and third parties retained by the Trust Administrator to perform specific services within this Agreement without the Employer's consent, unless such disclosure is required by law or by regulatory or judicial process. The Employer will not



disclose any information relating the Trust to individuals other than authorized officers of the Employer and the Plan Administrator, or their respective designees, without the Trust Administrator's consent.

11. **Independent Contractor.** The Trust Administrator, its employees, officers and representatives, will not be deemed to be employees, agents (except as to the purchase or sale of securities described in Section 1), partners, servants, and/or joint ventures of the Employer or the Account by virtue of this Agreement or any actions or services rendered under this Agreement.
12. **Records.** The Trust Administrator will maintain appropriate records of all its activities hereunder. The Trust Administrator will use its best efforts to provide the Employer with a statement within 60 days following the end of each calendar quarter showing deposits, withdrawals, purchases and sales (or maturities) of investments, earnings received during the quarter, and the value of assets held on the last business day of the calendar quarter, all as provided for in the Trust Agreement, based on the information requested from and furnished to it by the Trustee.
13. **Ownership of Reports and Documents.** The Trust Administrator acknowledges that the originals of all correspondence, documents, reports and records produced in the course of providing the services pursuant to this Agreement are the property of the Employer. In the event this Agreement is terminated, the Trust Administrator agrees to provide such originals to the Employer. The Trust Administrator will not furnish copies of any such correspondence, documents reports and records to any party other than the Employer or the Plan Administrator, or their respective designees, or third parties retained by the Trust Administrator to perform services under this Agreement without the Employer's consent.
14. **Trust Administrator's Brochure and Brochure Supplement.** The Trust Administrator warrants that it has delivered to the Employer prior to the execution of this Agreement, the Trust Administrator's current Securities and Exchange Commission Form ADV, Part 2A (brochure) and Part 2B (brochure supplement). The Employer acknowledges receipt of such brochure and brochure supplement prior to the execution of this Agreement.
15. **Amendment.** This Agreement shall not be changed, modified, terminated or discharged in whole or in part, except by an instrument in writing signed by both parties hereto, or their respective successors or assigns.
16. **Successors and Assigns.** The provisions of this Agreement are binding on the Trust Administrator and its respective successors and assigns, provided, however, that the rights and obligations of the Trust Administrator may not be assigned without the Employer's consent.
17. **Designees.** In accordance with Section 1.8 of the Trust Agreement, the Employer will certify to the Trust Administrator in writing the persons or entity with the plenary authority pursuant to applicable state law over the investment and management of the Employer's Plans or its designee ("Plan Administrator"). The Plan Administrator has the authority to act on behalf of, and to exercise any of the rights of, the Employer under this Agreement. In accordance with Section 6.1(l) of the Trust Agreement, the Trust Administrator may designate and engage the services of such agents, representatives, advisors, counsel, accountants and other third parties, including affiliates of the Trust Administrator, and



delegate its authority to perform specified services under this Agreement to such third parties. Any such designee shall have the authority to perform the services delegated to it by the Trust Administrator. Any officer of the Trust Administrator has the authority to exercise any of the rights of the Trust Administrator under this Agreement.

18. **Notice.** Written notices required under this Agreement will be sent by regular mail, certified mail, overnight delivery or courier, and will be deemed given when received at the parties' respective addresses shown below. Either party must notify the other party in writing of a change in address.

Employer's Address:

City of Milpitas  
Attn: City Manager  
455 E Calaveras Blvd  
Milpitas CA 95035

Trust Administrator's Address:

PFM Asset Management LLC  
44 Montgomery Street, 3<sup>rd</sup> Floor  
San Francisco, CA 94104  
Attn: Ellen Clark

With a Copy to:

PFM Asset Management LLC  
1735 Market Street, 42<sup>nd</sup> Floor  
Philadelphia, PA 19103  
Attn: Controller

19. **Applicable Law.** This Agreement will be construed, enforced and administered according to the laws of the **State of California**, without regard to its conflicts of law principles. In the event that either party institutes legal proceedings against the other, venue will lie in any court of competent jurisdiction in the **State of California**.
20. **Entire Agreement.** This Agreement, including exhibits and any other documents referenced herein, constitutes the entire agreement of the parties with respect to the subject matter of this Agreement, and supersedes all prior negotiations, agreements, and understandings, whether written or oral, with respect thereto.
21. **Severability.** If any provision of this Agreement is held by any court of competent jurisdiction to be invalid or unenforceable, the remaining provisions of the Agreement will continue in full force and effect.
22. **Counterparts.** This Agreement may be executed in any number of counterparts and by different parties in separate counterparts, each of which when so executed will be deemed to be a complete original and all of which together will constitute one and the same Agreement.



**IN WITNESS WHEREOF**, the parties hereto have caused this Agreement to be executed by their authorized officers on the date set forth in the first paragraph of this Agreement.

**TRUST ADMINISTRATOR  
PFM ASSET MANAGEMENT LLC**

By: \_\_\_\_\_

Its: \_\_\_\_\_

**AGENCY  
CITY OF MILPITAS**

By: \_\_\_\_\_

Its: \_\_\_\_\_

\_\_\_\_\_





**EXHIBIT 1**  
**FEES**

| Trust Administration Fees |               |            |
|---------------------------|---------------|------------|
| Assets Under Management   |               | Annual Fee |
| Up to                     | \$ 25,000,000 | 0.30%      |
| Next                      | \$ 75,000,000 | 0.15%      |
| Next                      | \$150,000,000 | 0.10%      |
| Next                      | \$250,000,000 | 0.05%      |
| Thereafter                |               | 0.02%      |

*Minimum annual account fee is \$25,000*

| Trustee/Custody Fees                              |                                             |                        |
|---------------------------------------------------|---------------------------------------------|------------------------|
| Trustee/Custody Per Annum Fees                    | Unit Price                                  |                        |
| Domestic Administration<br>Total Portfolio Assets | Base Fee                                    | Per Additional Account |
| \$0 - \$20 million                                | \$5,000                                     | \$500                  |
| \$20 million - \$100 million                      | \$8,000                                     | \$500                  |
| Over \$100 million                                | Individually priced on a deal-by-deal basis |                        |
| Benefit Payments                                  |                                             |                        |
| Web-Based Online Reporting & Administration – RPP | Included                                    |                        |
| Periodic ACH without Advice                       | \$1.50                                      |                        |
| Periodic Check/ACH with Advice                    | \$2.00                                      |                        |
| Lump Sum Payments                                 | \$20.00                                     |                        |
| Form 1099 Reports                                 | \$0.00                                      |                        |
| Stop Payments                                     | \$0.00                                      |                        |

|        | Out-of-Pocket Annual Fee Cap* |
|--------|-------------------------------|
| Year 1 | \$80,000                      |
| Year 2 | \$90,000                      |

*\*Fee cap on the combined investment advisory, administration, and trustee fees for the first two years of engagement.*





## Wells Fargo Account Agreement Documentation

The attached agreements, disclosures and account setup documentation ("Account Documentation") contain information specific to the services that City of Milpitas ("Owner") has selected Wells Fargo Bank, N.A. ("Wells Fargo") to provide as Trustee/Custodian under the governing Trust/Custody Agreement, executed by Wells Fargo and the Owner for the Post-Employment Benefits Trust Agreement ("Account")

# Wells Fargo Account Agreement Documentation

## **Acceptance**

Owner Name ("Owner"): **City of Milpitas**

Account Name ("Account"): **Post-Employment Benefits Trust Agreement**

Wells Fargo Account Number(s): **26467400** and all related sub accounts

The undersigned individuals represent that they are duly authorized to take action on behalf of City of Milpitas and Wells Fargo, respectively. The parties certify that they are executing this Acceptance to signify receipt of, and agreement to the terms and conditions specified in the Account Documentation listed below, as of the effective date specified on each document.

## **ACCOUNT DOCUMENTATION (only checked items apply):**

☒ **Disclosure Statement**

☒ **Sweep Investment Direction**

## **Accepted:**

### **City of Milpitas**

Name: \_\_\_\_\_  
(please print)

Title: \_\_\_\_\_  
(please print)

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

### **Wells Fargo Bank, N.A.**

Name: \_\_\_\_\_  
(please print)

Title: \_\_\_\_\_  
(please print)

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

# Definitions and Disclosure Statement

## **Definitions**

**"Asset Based Fees Paid by Fund"** are fees that are paid by the fund company for mutual funds or the bank trust company for collective investment funds. These fees are taken out of the fund prior to the calculation of the net asset value ("NAV") for the fund. For assets invested in mutual funds, these are a part of those fees already paid by the shareholders of the applicable fund to the fund/affiliated party as disclosed in the prospectus. The portion being disclosed by Wells Fargo are only those fees received by Wells Fargo from the fund companies parties for certain shareholder services performed by Wells Fargo. Changes to such fees will be disclosed on the trust statements. Any such fees are part of the fund's expense ratio and do not result in an increased payment by the Trust. Ongoing asset based fees are stated as annual rates and are calculated by the fund's manager pursuant to its established practice and procedure. Certain funds may also pay one-time asset based fees to Wells Fargo which are calculated based on the value of funds invested by an individual who was not previously an investor in the fund and are calculated in accordance with the manager's procedures. Asset based fees may be paid by the fund family from one or more sources and under one or more programs provided for in the prospectuses of the funds, such as sub-transfer agency fees, 12b-1 fees, shareholder and administrative services fees, and distribution related fees.

## **Wells Fargo Mutual Funds**

A current prospectus for any Wells Fargo Funds included in the Account is available at [www.wellsfargofunds.com](http://www.wellsfargofunds.com) or by calling Wells Fargo Funds Investor Services at 1-800-222-8222.

The prospectus contains important information about fees payable to Wells Fargo Bank or its affiliates. The Funds fees and expenses are stated in the *Organization and Management of the Funds* and *Summary of Expenses* sections of the Prospectus and in the *MANAGEMENT* section of the *Statement of Additional Information*.

## **Alternative Notification of Securities Transactions under 12 CFR §12.5**

Whenever you, as Owner initiate trades, and Wells Fargo Bank, N. A. ("Wells Fargo") places those trades in your Account at Wells Fargo, federal regulations (12 CFR §12.4) require that Wells Fargo inform you of your right to receive a separate notification containing details of those security transactions.

Wells Fargo can comply by forwarding you, at no charge, copies of each trade confirmation or, in the absence thereof, written notification of the details that would have been contained therein. Alternatively, you may determine that in lieu of receiving separate trade confirmations, the periodic Account statements provided to you by Wells Fargo are adequate to inform you of the Account trade activity. This alternative reporting is allowed pursuant to 12 CFR §12.5.

By signing the Acceptance Page, you agree that the periodic statements provided by Wells Fargo are adequate notification and that you do not wish to receive separate trade confirmations. If you wish to receive separate trade confirmations, please provide your request in writing to Wells Fargo.

### **Shareholder Communications Act Disclosure**

The Securities and Exchange Commission adopted the Beneficial Owner Information Disclosure Rule #14b-2 (Rule) in 1986 as part of its effort to improve communications between publicly held companies and beneficial owners of the securities registered in the name of certain nominees.

Under these rules, Wells Fargo Bank, N.A. (Wells Fargo) is required to contact each customer for whom we hold securities and determine whether you authorize us to provide your name, address and share position to the issuer of the securities you own. For your protection, the rules prohibit the requesting company from using your name and address for any purpose other than corporate communications.

Please complete the authorization below by checking one of the alternatives.

☐ Wells Fargo is authorized to release my name, address and share position (Consents to disclosure).

☐ Wells Fargo is NOT authorized to release my name, address and share position (Objects to disclosure).

**Note:** Under the Rule, Wells Fargo is required to treat a non-response as a "Consents to disclosure" response.



### **Regulation R Limitations (Non-ERISA Custody accounts only)**

Regulation R restricts Wells Fargo from executing certain **customer initiated** trades in non-employee benefit plan custody accounts ("Restricted Trades").

Regulation R includes a list of exemptions that allow a bank to conduct specified security transactions without being registered as a broker/dealer. Transactions that fall outside of the exemptions must be performed by a registered broker/dealer.

Wells Fargo is permitted to execute Restricted Trades involving Exempt Investments. "Exempt Investments" are defined as any trades involving registered mutual funds and government issued securities.

Wells Fargo is permitted to execute Restricted Trades not involving Exempt Investments on an *accommodation basis*. With respect to the custody accounts it services, Wells Fargo, defines accommodation trading as follows:

- 1). Trades that involve **investing** cash deposits/income
  - Purchase - invest a cash deposit (new business initial funding activity)
  - Purchase - invest additional cash deposits in an existing account
- 2). Trades that involve **raising** cash for obligations
  - Sale - to raise cash for expenses (e.g., to pay a debt obligation, to cover an overdraft)
  - Sale - to raise cash for account transition to another custodian
- 3). Trades that involve **charitable gifts**
  - Sale - to liquidate asset gifts received in-kind from donors
  - Buy - to invest cash gifts received directly from donors (similar to #1 above)
- 4). Trades that involve special account circumstances
  - Trades to rebalance a portfolio on a periodic basis based on an established allocation
  - Purchase - to invest funds from a pledged asset maturity in a statutory account
  - Sale - to liquidate assets after an external investment manager has been terminated

Customers will be notified by their Relationship Manager when the trading practices of a non-employee benefit plan custody account falls outside of the exemptions under Regulation R.

# Sweep Investment Direction for Cash Balances

(Proprietary Money Market Mutual Fund)

Effective Date: **December 28, 2020**

Owner Name: **City of Milpitas**

Account Name: **Post-Employment Benefits Trust Agreement**

Wells Fargo Account Number(s): **26467400** and all related sub accounts

The Owner directs Wells Fargo Bank N.A. (Wells Fargo) to systematically invest cash received by or held in the account (including all related accounts) in the following short-term investment vehicle.

| <b>Sweep Investment Vehicle Name</b> | <b>Sweep CUSIP</b> | <b>CUSIP</b> | <b>Ticker</b> |
|--------------------------------------|--------------------|--------------|---------------|
| Wells Fargo Government Money Market  | VP4560000          | 94975P405    | GVIXX         |

## Money Market Mutual Fund Acknowledgement/Disclosure:

The Owner acknowledges that it has received and reviewed the fund prospectus for the mutual fund selected and have determined that such fund is an appropriate investment vehicle for the Account.

The Owner understands from reading the prospectus for the Wells Fargo Funds that Wells Fargo Funds Management, LLC serves as investment advisor and Wells Fargo Bank, N.A., and other affiliates may provide services to the funds. The Owner also understands that Wells Fargo Bank, N.A. and other affiliates may be paid, fees for services to the Wells Fargo Funds and that those fees are described in the prospectus.

The fees payable to Wells Fargo or an affiliate are stated in the Organization and Management of the Funds and the Summary of Expenses sections of the Prospectus and in the MANAGEMENT section of the Statement of Additional Information. The Statement of Additional Information, which the Prospectus incorporates by reference, is available upon request by calling Wells Fargo Funds Investor Services at 1-800-222-8222 or by going online at [www.wellsfargofunds.com](http://www.wellsfargofunds.com).

The Owner understands that investments in money market mutual funds are not obligations of, or endorsed or guaranteed by, Wells Fargo Bank, N.A., or its affiliates and are not insured by the Federal Deposit Insurance Corporation.

The Owner understands that it may change this direction at any time and that it shall continue in effect until revoked or modified by an authorized representative of the Account by written notice to Wells Fargo.



# Commercial Electronic Office (“CEO<sup>®</sup>”) Portal Online Access Agreement

You have requested access to the Commercial Electronic Office online banking portal (the “CEO Portal”) of Wells Fargo Bank, N.A. (“Wells Fargo”), through which you can access (a) certain financial services in which you have separately enrolled (the “Services”) and (b) third-party sites we may make available through the CEO Portal. We offer different channels through which you may access the CEO Portal, including personal computers and mobile devices. We may add or eliminate channels at any time. A Service or third-party site accessible through one channel may not be accessible through another channel. In this CEO Portal Online Access Agreement (the “Agreement”), the words “you” and “your” refer to the company or business entity using the CEO Portal. The words “we,” “our,” and “us” refer to Wells Fargo. The term “Affiliate” means the parent company of Wells Fargo, Wells Fargo & Company, and any present or future company that controls, is controlled by, or is under common control with Wells Fargo. The general terms and conditions applicable to your use of the CEO Portal are contained in this Agreement, which you must sign and return to Wells Fargo before you are allowed access to the CEO Portal. In addition, any person that you authorize to enter the CEO Portal on your behalf (each, an “Authorized Agent”) must also accept the CEO Portal Terms of Use. Finally, before you are able to use a Service through the CEO Portal, you must sign or accept the applications, agreements, instruments, rules, standards, policies, instructions, and other documents and forms required to use the Service (the “Service Documentation”). In the event of any inconsistency between the Service Documentation and this Agreement with respect to a Service, the Service Documentation will control, but only to the extent of such inconsistency; except, however, this Agreement will control with respect to the Online Access Process. As used in this paragraph, “Online Access Process” means (1) the terms under which you are allowed to access and use the Services via the CEO Portal; (2) the process or procedures you use in order to obtain access to the Services (including required Security Credentials, as defined below) via the CEO Portal; and (3) our right to change, suspend, or terminate this Agreement or your access to the Services via the CEO Portal.

1. **Using the CEO Portal.** You agree to use the CEO Portal and the Services only as provided in (a) this Agreement; (b) the rules, procedures, standards, requirements, and policies made applicable to the CEO Portal and the Services from time to time by Wells Fargo and Affiliates; (c) any communications, instructions, terms, or conditions appearing at the CEO Portal or in the Service Documentation; and (d) any state or federal laws or regulations applicable to the CEO Portal or the Services.
2. **Accessing the CEO Portal.**
  - (a) When you enroll in the CEO Portal, and as we may determine is necessary after enrollment, we will provide Security Credentials, as defined below, to your Authorized Agent(s). “Security Credentials” mean one or more methods we provide to access the Services and may include user IDs, passwords, token IDs, and other methods that we adopt from time to time. We have no obligation to separately verify or authenticate any communication we receive in your name through the CEO Portal, whether or not it was actually from an Authorized Agent. Wells Fargo

offers two options for administering access to the CEO Portal: Administration and Bank Administration.

- (b) If you enroll in the Administration option, there are three categories of Authorized Agents: Company Administrator, Administrator, and User. Unless you and we separately agree, we will provide Security Credentials only to your initial Company Administrator(s), who will assign Security Credentials to other individuals and designate those individuals as one of the following: (1) Company Administrator, who may perform all of your administrative functions in the CEO Portal, including managing all Users, Administrators, and Services, and who may enter into agreements on your behalf; (2) Administrator, who may perform all the functions of an Administrator including designating other Administrator(s) and User(s); or (3) User, who may access the Services designated by a Company Administrator or an Administrator as well as those Services in which we permit a User to self-enroll. Each Company Administrator and Administrator has the authority to enroll you in additional Services. Company Administrators may also remove an Authorized Agent’s access and disable an Authorized Agent’s Security Credentials. In addition to your use of Administration as described in this subsection, you may request that we assign Security Credentials to Users that you designate in writing to us. Your designation to us will specify the Services which the User is authorized to access in addition to those Services in which we permit a User to self-enroll.
- (c) For the Bank Administration option, there is one category of Authorized Agent: Users. We will assign Security Credentials to each User you designate.
- (d) You will promptly revoke the Security Credentials of any Authorized Agent or User when that individual is no longer authorized to access the CEO Portal. If you notify us in writing to revoke the Security Credentials of an Authorized Agent or User, we will have a reasonable time after receiving your written notification to revoke the individual’s access.
- (e) **FAILURE TO PROTECT THE SECURITY CREDENTIALS MAY ALLOW AN UNAUTHORIZED PARTY TO (i) USE THE SERVICES; (ii) CHANGE, VERIFY, OR SEND DATA; (iii) SEND INFORMATION TO, OR RECEIVE INFORMATION FROM, WELLS FARGO AND AFFILIATES; OR (iv) ACCESS YOUR ELECTRONIC COMMUNICATIONS AND FINANCIAL DATA. ALL ENTRIES INTO THE CEO PORTAL, ALL COMMUNICATIONS SENT, AND ALL USES OF THE SERVICES THROUGH YOUR SECURITY CREDENTIALS WILL BE DEEMED TO BE ENTRIES, COMMUNICATIONS, AND USES AUTHORIZED BY YOU AND BE BINDING UPON YOU. YOU ASSUME THE ENTIRE RISK FOR THE FRAUDULENT OR UNAUTHORIZED USE OF YOUR SECURITY CREDENTIALS, UNLESS SUCH UNAUTHORIZED USE IS DUE TO THE ESTABLISHED NEGLIGENCE OR WILLFUL MISCONDUCT OF WELLS FARGO, ITS AFFILIATES, OR ITS EMPLOYEES.** You acknowledge the importance of developing internal procedures to limit such risk, which procedures will include, at a minimum: (A) if you are using Bank Administration, notifying Wells Fargo immediately when any new person becomes an Authorized Agent or when any existing Authorized Agent stops being an Authorized Agent; (B) if you are using



## Commercial Electronic Office (“CEO<sup>®</sup>”) – Portal Online Access Agreement

Administration, disabling access to the CEO Portal immediately for each Authorized Agent that is no longer authorized by you to access the CEO Portal; and (C) keeping secure and protecting the confidentiality of your Security Credentials.

- (f) You agree to notify Wells Fargo immediately when you become aware of any loss or theft of, or any unauthorized use of, any Security Credentials.

3. **Financial Information.** Financial market data, quotes, news, research, and other financial information developed by third parties and transmitted to Wells Fargo (collectively, “Financial Information”) may be available to you at the CEO Portal. The posting of any Financial Information or any other information or data at the CEO Portal is not a recommendation by Wells Fargo or any Affiliate that any particular Service or transaction is suitable or appropriate for you or that you should receive or in any way use any Service. Neither Wells Fargo nor any Affiliate guarantees the accuracy, completeness, timeliness, or correct sequencing of any Financial Information, nor are they in any way responsible for the actions or omissions of the third parties developing or transmitting any Financial Information or for any decision made or action taken by you in reliance upon any Financial Information.

4. **Alerts.**

- (a) **Non-subscribed alerts.** When you enroll in the CEO Portal or any Service, you consent to receive by email or other delivery channels servicing messages that we determine are important or urgent. You do not need to subscribe to receive such alerts and you do not pay additional service fees.
- (b) **Subscribed alerts.** You may also enroll in fee-based alerts for applicable Services so that you can receive messages you subscribe to at the intervals and through delivery channels that you choose.

5. **Use of Certain Software to Access the CEO Portal.** In using the CEO Portal, you will be sending or receiving financial and other information directly to or from Wells Fargo and Affiliates through the Internet. You acknowledge that when the Internet, or any other electronic communications facility, is used to transmit or receive information, the information may be accessed by unauthorized third parties. To reduce the likelihood of such third party access, you agree to transmit and receive information through the CEO Portal using only software, including, but not limited to, browser software, or other access devices that support the Secure Socket Layer (SSL) protocol (or other protocols required by or acceptable to Wells Fargo), and to follow any Wells Fargo procedures that support such protocols.

6. **Disclaimers.** Neither Wells Fargo nor any Affiliate will be your advisor or fiduciary with respect to this Agreement. **NEITHER WELLS FARGO NOR ANY AFFILIATE MAKES ANY EXPRESS OR IMPLIED WARRANTY AS TO THE AVAILABILITY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OF THE CEO PORTAL, THE FINANCIAL INFORMATION, OR THE SERVICES, AND NEITHER WELLS FARGO NOR ANY AFFILIATE MAKES ANY OTHER WARRANTY, PROMISE, COMMITMENT, GUARANTEE, OR REPRESENTATION WITH RESPECT TO THE CEO**



**PORTAL, THE FINANCIAL INFORMATION, OR THE SERVICES, EXCEPT THOSE WARRANTIES, PROMISES, COMMITMENTS, GUARANTEES, OR REPRESENTATIONS SPECIFICALLY STATED IN THE SERVICE DOCUMENTATION.** If a Service cannot be used through the CEO Portal, Wells Fargo will make reasonable efforts for such Service to be used by other means.

7. **Limitation of Liability.** Neither Wells Fargo nor any Affiliate will be liable to you for any direct damages or losses suffered or incurred by you in connection with the CEO Portal, any Service, any Financial Information, any other information you receive through the CEO Portal, or any failure to provide, or delay in providing, access to the CEO Portal, any Service, or any Financial Information, except to the extent such damages or losses arise directly from the established negligence or willful misconduct of Wells Fargo or an Affiliate. Notwithstanding any provision of this Agreement or any Service Documentation to the contrary, **IN NO EVENT WILL WELLS FARGO OR ANY AFFILIATE HAVE LIABILITY FOR ANY CONSEQUENTIAL, SPECIAL, PUNITIVE, OR INDIRECT DAMAGES OR LOSSES, OR BUSINESS INTERRUPTION, LOSS OF PROFITS, LOSS OF BUSINESS, LOSS OF REVENUE, LOSS OF GOODWILL, LOSS OF OPPORTUNITY, LOSS OR INJURY TO REPUTATION, OR LOSS OF ANTICIPATED SAVINGS, WHETHER ANY CLAIM FOR SUCH DAMAGES OR LOSSES IS BASED ON TORT OR CONTRACT OR WHETHER WELLS FARGO OR ANY AFFILIATE KNEW OR SHOULD HAVE KNOWN THE LIKELIHOOD OF SUCH DAMAGES IN ANY CIRCUMSTANCE AND REGARDLESS OF THE FORM OF THE CLAIM OR ACTION.**
8. **Restricting or Terminating Access to the CEO Portal.** Wells Fargo may terminate this Agreement or your (including your Authorized Agent’s) access to the CEO Portal by providing you with thirty (30) days prior written notice. However, Services may be terminated earlier in accordance with the Service Documentation. In the event you or your Authorized Agent’s use of the CEO Portal or any Service (a) violates any provision of this Agreement or the Service Documentation, (b) is not permitted by applicable law, (c) is not authorized by you or any third party whose authorization we believe is necessary, or (d) should be denied for your or our protection (without us agreeing to or being required to make this determination in any circumstance), Wells Fargo may terminate your or the Authorized Agent’s access to the CEO Portal or the applicable Service upon immediate notice. Neither Wells Fargo nor any Affiliate shall have liability to you or any Authorized Agent for any losses or damages you may suffer or incur as a result of (i) any termination of this Agreement or (ii) inability to access the CEO Portal or any applicable Service.
9. **Waivers.** Neither Wells Fargo nor any Affiliate shall be deemed to have waived any of its rights under this Agreement unless such waiver is in writing and such writing is signed by an authorized representative of Wells Fargo or such Affiliate. No delay, extension of time, compromise, or other indulgence which may occur or be granted from time to time by Wells Fargo or any Affiliate under this Agreement shall impair the rights of Wells Fargo or any Affiliate under this Agreement.
10. **Amendments.** Wells Fargo may amend this Agreement at any time upon written notice to you. You will be deemed to have accepted such amendment if any of your Authorized Agents access the CEO Portal or use any Service through the CEO Portal more than thirty (30) calendar days after you receive notice of such amendment.

## Commercial Electronic Office (“CEO<sup>®</sup>”) – Portal Online Access Agreement

11. **Assignment.** You may not assign or transfer your rights or obligations under this Agreement, whether by operation of law, asset purchase, merger, or other corporate reorganization, or any other method, without Wells Fargo’s prior written consent.
12. **Governing Law.** Your rights and obligations and the rights and obligations of Wells Fargo and Affiliates under this Agreement will be governed by and subject to the law of the following U.S. state, excluding any applicable conflict of laws provisions: (a) the U.S. state in which the office of Wells Fargo that maintains the account you use in connection with the Services is located; or (b) if there is no such state, no one state, or no account associated with such Services, the State of New York.
13. **Severability.** The provisions of this Agreement are severable. If any provision of this Agreement is held to be invalid or unenforceable, the validity or enforceability of the remaining provisions will in no way be affected or impaired thereby.
14. **Entire Agreement.** This Agreement and the CEO Portal Terms of Use set forth the exclusive and entire agreement between Wells Fargo, the Affiliates, and you with respect to your use of the CEO Portal. Any prior agreements, representations, statements, negotiations, undertakings, promises, or conditions, whether oral or written, with respect to your use of the CEO Portal which conflict with the provisions in this Agreement are superseded by this Agreement.

This Agreement is signed below by your duly authorized officer or officers on the date stated below.

Date: \_\_\_\_\_

**City of Milpitas**

\_\_\_\_\_  
**[Company Name]**

By: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

**Company Address:** (please print below):

# Service Agreement

## (Retirement Plan Payment Services)

**City of Milpitas** ("Customer" ) has asked to be allowed to enter the *Commercial Electronic Office*® (the "CEO®") of Wells Fargo Bank, N. A. ("Wells Fargo") at Wells Fargo's website so it may use the Retirement Plan Payments Service (the "Service") of Wells Fargo or its affiliates (the "Affiliates") online. The specific terms and conditions applicable to the use of the Service are set forth in this Agreement.

1. **Using the Service.** Customer agrees to use the Service and the CEO only as provided in (a) this Agreement, (b) the rules, procedures, standards, requirements, and policies made applicable to the CEO from time to time by Wells Fargo and the Affiliates, (c) any communications, instructions, terms, or conditions appearing at the CEO, and (d) any state or federal laws or regulations applicable to the CEO.
2. **Retirement Plan Payments Service Description.** The Service will enable Customer to access Wells Fargo's benefit payment processing system permitting Customer, in turn, to review through the Internet the payment history of benefit recipients and, if Customer so elects, to create payments and modify existing payments.
  - a. Customer will have access to participant payment records for the past three years. All historical payment records include information regarding prior payments. All participant records are real time and include information regarding current payments to participants, withholdings, deductions by type, and profiles on individual participants.
  - b. Customer may select payment records to view online or print.
  - c. If Customer elects, Customer may use the Service to initiate periodic and lump sum payments, edit participant information, create new participant records, initiate regular and/or special payments, and insert plan wide messages on periodic payment checks and advices. Customer's use of the Service includes the ability to edit participant information with respect to the following:
    - i. Set up of new payment recipients
    - ii. Changing or revising addresses
    - iii. Modifying tax withholding information
    - iv. Adjusting benefit and deduction amounts
    - v. Revising direct deposit information
    - vi. Stopping payment on checks and re-issuing previously stopped checks
    - vii. Recovering or otherwise modifying ACH transactions



- d. If Customer selects the secondary authorization function, changes to beneficiary data will be implemented by Wells Fargo only after review and approval by a representative of Customer other than the representative who initially requested the change.
  - e. Customer may generate a detailed change report, lump sum summary report, stop and reissue report, or outstanding checks report to view online, print, or export in a variety of output formats.
  - f. Customer may create and generate ad hoc reports to view online, print, or export in a variety of output formats. Ad hoc reporting data is as of the previous business day.
3. **Access.** Access to the Service shall be controlled by means of one or more authorization codes that Wells Fargo shall issue to Customer. All customers using the Service are furnished with strong security authorization to access participant data.
- a. Customer may elect only the ability to read and inquire into the data maintained on the Service for Customer's retirement plans.
  - b. Customer may elect the ability to both inquire and to enter and modify information.
  - c. Customer shall be solely responsible for controlling the security and confidentiality of authorization codes and shall promptly notify Wells Fargo if it becomes aware of the unauthorized use of the authorization code(s) or suspects that an unauthorized use may occur.
4. **Fees.** Fees for the Service are included in the cost of payments processed by Wells Fargo, and therefore no additional fees are required to use it.
5. **Entire Agreement.** This Agreement sets forth the entire and only agreement among Customer, Wells Fargo and the Affiliates regarding use of the Service. Any prior agreements, representations, statements, negotiations, undertakings, promises or conditions, whether oral or written, with respect to the Service which conflict with the provisions in this Agreement are superseded by this Agreement.
6. **Waivers.** Neither Wells Fargo nor any Affiliate shall be deemed to have waived any of its rights or powers under this Service Agreement unless such waiver is in writing and such writing is signed by an authorized representative of Wells Fargo or such Affiliate. No delay, extension of time, compromise, or other indulgence which may occur or be granted from time to time by Wells Fargo or any Affiliate under this Service Agreement shall impair the rights or powers of Wells Fargo or any Affiliate under this Service Agreement.
7. **Amendments.** Wells Fargo may amend this Service Agreement at any time upon written notice to Customer. Customer will be deemed to have accepted an amendment of, or an addition to, this Service Agreement if any of its Users use the Service through the CEO more than 30 calendar days after Customer receives notice of such amendment or addition.

## Service Agreement – Retirement Plan Payment Services

8. **Assignment.** Customer's rights, duties and obligations under this Service Agreement may not be assigned by Customer without the prior written consent of Wells Fargo and the appropriate Affiliate. Nor may Wells Fargo assign its rights, duties and obligations hereunder without Customer's prior written consent.
9. **Governing Law.** Customer's rights and obligations and the rights and obligations of Wells Fargo and the Affiliates under or in connection with this Service Agreement will be governed by and be subject to the laws of the State of California.
10. **Severability.** If any provision of this Service Agreement shall be invalid, illegal or unenforceable in any jurisdiction, the validity, legality and enforceability of such provision in other jurisdictions, and of the remaining provisions of this Service Agreement in all jurisdictions, shall not in any way be affected or impaired.

This Agreement is effective upon acknowledgement by Customer by its duly authorized officer or officers on the date stated below.

Customer acknowledges and agrees to the terms of this Service Agreement for Retirement Plan Payments Service.

Acknowledged and accepted by:

**City of Milpitas**

Name: \_\_\_\_\_  
(please print)

Title: \_\_\_\_\_  
(please print)

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



# Service Agreement

## (Trust Portfolio Reporting Service)

**City of Milpitas** ("Customer") wishes to use the Trust Portfolio Reporting Service (the "Service") through the Commercial Electronic Office® (the "CEO®") provided by Wells Fargo Bank, N.A. ("Wells Fargo") on the Wells Fargo website. The specific terms and conditions applicable to use of the Service are set forth in this Agreement. All persons entering the CEO on behalf of Customer (the "Users") are required to also accept the terms of use for the Service and the CEO.

**11. Using the Service.** Customer agrees to use the Service and the CEO only as provided in (a) this Agreement, including any applicable addenda, (b) the rules and procedures made applicable to the CEO from time to time by Wells Fargo, (c) any communications, instructions, Terms or conditions appearing at the CEO website itself, and (d) any state or federal laws or regulations applicable to the CEO.

### 2. Trust Portfolio Reporting Service Description.

**General Reporting.** If Customer elects the General Reporting feature of the Service, it may access through the Internet its Trust cash, asset, and transaction information as follows:

- (a) Trust account information as of the close of the previous business day.
- (b) Settlement date cash and asset position information for the prior eighteen months. (Customer's information begins to accumulate from the date of first use of the Service.)
- (c) Transaction history for up to eighteen prior months. (Customer's history begins to accumulate from the date of first use of the Service.)
- (d) Pending transaction information as of the current business day for up to 45 subsequent calendar days.
- (e) Customer information may be sorted and selected in several combinations to view online, print, or export in a variety of output formats.

**Verified Reporting.** If Customer elects the Verified Reporting feature of the Service, it may access through the Internet Customer's financial and/or investment performance/and or portfolio analytics information for certain designated trust accounts as follows:

- (a) Account information as of the close of the previous accounting period as determined by pre-selected accounting cycle.
- (b) Historic cash and asset positions and transaction data for prior accounting periods beginning with the date an account is established on this platform.
- (c) Cash and asset positions and transaction information as of trade date.

(d) For any foreign assets, cash and asset positions and transaction history information in both base and local currency.

(e) Customer information may be sorted and selected in several combinations to view online, print, or export in a variety of output formats

**Cash Movement.** If Customer is qualified, it may elect the Cash Movement feature of the Service described more fully in the Cash Movement Addendum (the "Cash Movement Addendum").

**Trade Entry.** If Customer is qualified, it may elect the Trade Entry feature of the Service described more fully in the Trade Entry Addendum (the "Trade Entry Addendum").

3. **Access.** Access to the Service for all purposes is controlled by means of one or more authorization codes that Wells Fargo shall issue to Customer.

(a) In the event Customer elects General Reporting or Verified Reporting or both, Customer will be provided with a specific authorization code.

(b) In the event Customer elects Cash Movement, Customer will be furnished with a specific authorization code and will be required to comply with an additional level of authorization to invoke strong security authentication.

(c) In the event Customer elects Trade Entry, Customer will be furnished with a specific authorization code and will be required to comply with an additional level of authorization.

(d) Customer is responsible for controlling the security and confidentiality of the authorization codes provided to its employees and shall promptly notify Wells Fargo if it becomes aware of the unauthorized use of the authorization code(s) or suspects that an unauthorized use may occur.

4. **Fees.** Customer agrees to pay Wells Fargo for the Service in accordance with the schedule of charges attached hereto. Wells Fargo may change the schedule of charges at any time upon thirty (30) days' prior written notice to Customer.

5. **Sublicense.**

(a) Wells Fargo has separately licensed from third parties (the "Licensors") various securities pricing and characteristic databases (referred to as the "Securities Pricing and Characteristic Databases") for its use in delivering the Service. Wells Fargo grants to Customer a nonexclusive, nontransferable sublicense to access the Securities Pricing and Characteristic Databases solely and exclusively for Customer's own use and only in connection with its use of the Service. Customer agrees that the security pricing information contained in the Securities Pricing and Characteristic Databases is provided solely for Customer's use in connection with the Service and is not provided for any other use or manipulation by Customer, including the sale of such security pricing information to third parties. The Securities Pricing and Characteristic Databases shall at all times be the property of the Licensors and nothing in this Service Agreement shall be deemed a transfer of or create an ownership interest in the Securities Pricing and Characteristic Databases.

(b) Wells Fargo will have the right to terminate this sublicense if Customer:

(i) ceases to be a customer for the Service;

- (ii) attempts to further sublicense or transfer the rights granted in this Service Agreement or the Cash Movement Addendum;
  - (iii) assigns, or attempts to assign, this Service Agreement or any of its rights hereunder (the word "assign" to include, without limiting the generality thereof, a transfer of a majority interest in Customer);
  - (iv) neglects or fails to perform or observe any of its existing or future obligations to Wells Fargo, whether under this Service Agreement, the Cash Movement Addendum, the Trade Entry Addendum or otherwise;
  - (v) makes an assignment for the benefit of creditors, or a receiver, trustee in bankruptcy or similar officer is appointed to take charge of all or part of its property; or
  - (vi) is adjudged bankrupt, and such condition(s) is not remedied within ten (10) days after written notice thereof has been given to Customer.
- (c) Upon termination of this sublicense or of any license granted for the use of the Securities Pricing and Characteristic Databases, all rights of Customer to use the Securities Pricing and Characteristic Databases and related documentation under this Service Agreement will cease. Customer shall promptly discontinue its use of the Service and its access to the Securities Pricing and Characteristic Databases and any other software products provided under this Service Agreement and shall return the related documentation and software products and all copies thereof to Wells Fargo.
6. **Reliance on Third Parties.** Wells Fargo relies on information provided by third parties to establish market valuations and perform the portfolio analytics for Customer. Wells Fargo exercises reasonable care in selecting the third parties and believes the information provided (e.g., pricing and market indices) is accurate and reliable. Wells Fargo does not guarantee that accuracy, however, and is liable to Customer hereunder only to the extent of its own negligence or willful misconduct in delivering the Service.
7. **Entire Agreement.** This Agreement and any related addendum expressly executed by Customer (collectively, the "Agreement") shall constitute the sole agreement among Customer and Wells Fargo regarding use of the Service. Any prior agreements, representations, statements, negotiations, undertakings, promises or conditions, whether oral or written, with respect to the Service which conflict with the provisions in this Agreement are superseded by this Agreement.
8. **Waivers.** Wells Fargo shall not be deemed to have waived any of its rights or powers under this Agreement unless such waiver is in writing and signed by an authorized representative of Wells Fargo. No delay, extension of time, compromise, or other indulgence which may occur or be granted from time to time by Wells Fargo shall impair the rights or powers of Wells Fargo under this Agreement.
9. **Amendments.** Wells Fargo may amend this Agreement at any time upon prior written notice to Customer. Customer will be deemed to have accepted an amendment of this Agreement if any of its Users use the Service through the CEO more than 30 calendar days after Customer receives notice of such amendment.



## Service Agreement – Trust Portfolio Reporting Services

10. **Assignment.** Customer's rights, duties and obligations under this Agreement may not be assigned by Customer without the prior written consent of Wells Fargo. Nor may Wells Fargo assign its rights, duties and obligations hereunder without Customer's prior written consent.
11. **Termination.** Either party may terminate this Agreement for any reason upon 30 days' prior written notice to the other.
12. **Governing Law.** Customer's rights and obligations and the rights and obligations of Wells Fargo under this Agreement will be governed by and be subject to the laws of the State of California.
13. **Severability.** If any provision of either this Agreement, the Cash Movement addendum, or the Trade Entry Addendum (if selected by Customer) shall be invalid, illegal or unenforceable in any jurisdiction, the validity, legality and enforceability of such provision in other jurisdictions, and of the remaining provisions of this Agreement in all jurisdictions, shall not in any way be affected or impaired.

Customer acknowledges and agrees to the terms of this Service Agreement for the Trust Portfolio Reporting Service.

This Agreement is effective upon acknowledgement by Customer by its duly authorized officer or officers on the date stated below.

Acknowledged and Accepted By:

Customer

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

- ☒ [X] Customer elects the General Reporting feature of the Service.
- ☐ [ ] Customer elects the Verified Reporting feature of the Service.
- ☐ [ ] Customer elects the Cash Movement feature of the Service.  
Must execute TRUST PORTFOLIO REPORTING CASH MOVEMENT ADDENDUM.
- ☐ [ ] Customer elects the Trade Entry feature of the Service.  
Must execute TRUST PORTFOLIO REPORTING TRADE ENTRY ADDENDUM.

## **Trust Portfolio Reporting Fees**

Pursuant to section 4 of the Service Agreement for Trust Portfolio Reporting, Customer agrees to pay Wells Fargo the following fees:

Company: **City of Milpitas**

| <b>Fee</b>         | <b>Amount</b>   |
|--------------------|-----------------|
| Set-up Fee:        | <u>\$Waived</u> |
| Basic Service Fee: | <u>\$Waived</u> |

As set forth in section 4 of the Service Agreement, Wells Fargo may change this schedule of charges at any time upon 30 (thirty) days prior written notice to Customer.



**MILPITAS CITY COUNCIL  
AGENDA ITEM REQUESTS**

**NOTE: Deferred and completed items are not listed**

| <b>2021</b>        | <b>OPEN</b>                                                                                                                                          |                     |                                     |                                         |                                                                         |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------|-----------------------------------------|-------------------------------------------------------------------------|
| <b>Request No.</b> | <b>Topic</b>                                                                                                                                         | <b>Submitted by</b> | <b>A, F,<br/>CM,<br/>or<br/>CCM</b> | <b>Date requested<br/>or Rec'd Form</b> | <b>STATUS and/or DATE scheduled on<br/>City Council meeting agenda:</b> |
| <b>1</b>           | Discussion to create a special City Council fund to allocate money for benevolence.                                                                  | Montano             | A                                   | 5/11/2021                               |                                                                         |
| <b>2</b>           | Receive a presentation on the process and the systems in place for 51/50 calls                                                                       | Dominguez           | A                                   | 5/11/2021                               |                                                                         |
| <b>3</b>           | Discussion in the next fiscal year, to have a sliding scale permitting program for seniors and low-income residence for necessary safety renovations | Tran                | A                                   | 5/4/2021                                |                                                                         |
| <b>4</b>           | Information showing that the ordinance requiring developers to provide art features is being followed and an update on the Art developer fees.       | Montano             | A                                   | 5/4/2021                                |                                                                         |
| <b>5</b>           | Report on the Transit Occupational Tax (TOT) status                                                                                                  | Montano             | A                                   | 5/4/2021                                |                                                                         |
| <b>6</b>           | Bring back glass display at City Hall with safety glass                                                                                              | Montano             | A                                   | 5/4/2021                                |                                                                         |
| <b>7</b>           | Discussion to reduce the City's facilities deposit at the Senior Center                                                                              | Montano             | A                                   | 5/4/2021                                |                                                                         |
| <b>8</b>           | Discussion on a policy that makes human trafficking training mandatory in the hospitality industry                                                   | Dominguez           | A                                   | 4/20/2021                               |                                                                         |
| <b>9</b>           | Earth Day clean-up                                                                                                                                   | Montano             | A                                   | 4/20/2021                               |                                                                         |
| <b>10</b>          | Requested that the City have mini-libraries in the low-income areas of the City.                                                                     | Montano             | A                                   | 4/20/2021                               |                                                                         |

**MILPITAS CITY COUNCIL  
AGENDA ITEM REQUESTS**

| <b>Request No.</b> | <b>Topic</b>                                                                                                                              | <b>Submitted by</b> | <b>A, F, CM, or CCM</b> | <b>Date requested or Rec'd Form</b> | <b>STATUS and/or DATE scheduled on City Council meeting agenda:</b>                                            |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>11</b>          | Discussion on developing a pilot neighborhood association program                                                                         | Dominguez           | A                       | 4/6/2021                            | Councilmember to work with City Manager on this request and provide a memo to the City Council                 |
| <b>12</b>          | Staff to create a plan on how to increase the number of local businesses doing business with the City                                     | Chua                | A                       | 4/6/2021                            | Info memo will be prepared                                                                                     |
| <b>13</b>          | Staff to look into creating a rose garden with a children's memorial site                                                                 | Montano             | A                       | 4/6/2021                            |                                                                                                                |
| <b>14</b>          | Staff to look into creating "Welcome to Milpitas" signs in key areas of in the City                                                       | Montano             | A                       | 4/6/2021                            | To be agendized at a future City Council meeting                                                               |
| <b>15</b>          | Staff to provide information to place a measure on the ballot to change the Mayor from directly elected to a rotational at-large position | Tran                | CCM                     | 3/16/2021                           | To be agendized at a future City Council meeting, along with discussion of Mayor and Councilmember term limits |
| <b>16</b>          | Staff to provide information on a landmark policy for the City of Milpitas                                                                | Tran                | A                       | 3/16/2021                           | Policy to be sent to Council if existing, or a new policy to be brought for Council consideration by December  |
| <b>17</b>          | Discussion on exploring a mural program and requested information on the framework or best practices                                      | Montano             | A                       | 3/16/2021                           | To be agendized at a future City Council meeting, within 90 days                                               |
| <b>18</b>          | Discussion to memorialize those that have passed due to COVID19 and acknowledge the lives that have been lost in the City of Milpitas     | Dominguez           | A                       | 3/2/2021                            |                                                                                                                |
| <b>19</b>          | Discussion to explore opportunity housing and prohibit single family zoning                                                               | Phan                | A                       | 2/16/2021                           |                                                                                                                |

**MILPITAS CITY COUNCIL  
AGENDA ITEM REQUESTS**

| <b>2021</b>        | <b>ACTIVE</b>                                                                                                                                                                                                           |                     |                                     |                                         |                                                                                                                  |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Request No.</b> | <b>Topic</b>                                                                                                                                                                                                            | <b>Submitted by</b> | <b>A, F,<br/>CM,<br/>or<br/>CCM</b> | <b>Date requested<br/>or Rec'd Form</b> | <b>STATUS and/or DATE scheduled on<br/>City Council meeting agenda:</b>                                          |
| <b>20</b>          | Closed session presentation from a member of the executive team to receive an update on the City's preparedness against cyber-crime                                                                                     | Chua                | A                                   | 4/20/2021;<br>5/11/2021                 | To be agendized for 6/1/2021                                                                                     |
| <b>21</b>          | Discussion to explore the opportunity to create some middle-income workforce housing and spoke about a program through the California Statewide Communities Development Authority                                       | Phan                | A                                   | 5/4/2021                                | Agendized for 5/11/2021; return with more information at a future meeting                                        |
| <b>22</b>          | City Manager to provide a monthly progress report on homeless camp assessments; and Staff to provide statistics on how many Milpitas unhoused were assessed and what homeless sites the City has cleaned up and meeting | Chua                | A                                   | 3/02/2021; and<br>4/6/2021              | Agendized for 5/04/2021 City Council meeting; continued to 5/11/2021; continued to 5/18/2021                     |
| <b>23</b>          | Requested that the City provide a second round of small business grants using CDBG/Federal funds to help the small business community.                                                                                  | Montano             | A                                   | 3/2/2021                                | Agendized for discussion on 4/06/2021; CC direction to Agendize for 5/11/2021                                    |
| <b>24</b>          | Amendment to the existing ordinance for third-party food delivery vendor services to prohibit regulatory response fees                                                                                                  | Phan                | A                                   | 2/16/2021                               | Agendized for discussion on 3/16/2021, deferred to 4/06/2021; CC direction for City Attorney to prepare a report |
| <b>25</b>          | Performance Evaluation (Contract) of City Attorney                                                                                                                                                                      | Tran                | A                                   | 1/5/2021                                | 2/2/2021; 3/2/2021; 4/6/2021 closed session item; agendized for 5/4/2021                                         |
| <b>26</b>          | Emergency power resources during COVID-19                                                                                                                                                                               | Phan                | A                                   | 1/19/2021                               | Information will be prepared for Council in May                                                                  |
| <b>27</b>          | Amend Accessory Dwelling Units (ADU) ordinance to address unpermitted ADUs                                                                                                                                              | Chua                | A                                   | 1/5/2021                                | Target date: 3/16/2021; Council approved to move forward on                                                      |

**MILPITAS CITY COUNCIL  
AGENDA ITEM REQUESTS**

| <b>Request No.</b> | <b>Topic</b>                                                                             | <b>Submitted by</b> | <b>A, F,<br/>CM,<br/>or<br/>CCM</b> | <b>Date requested<br/>or Rec'd Form</b> | <b>STATUS and/or DATE scheduled on<br/>City Council meeting agenda:</b>                                                   |
|--------------------|------------------------------------------------------------------------------------------|---------------------|-------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>28</b>          | Form "Beautify Milpitas" subcommittee - for a future Task Force or Commission            | Chua                | A                                   | 12/15/2020                              | Info Memo to Council in March                                                                                             |
| <b>29</b>          | Amend ordinance to remove affordable housing in-lieu fee                                 | Chua                | A                                   | 12/15/2020                              | Agendized on 1/5/21, CC direction to agendize for further meeting                                                         |
| <b>30</b>          | Consider "Old Town" Main St. revitalization, funding, economic dev., improve area        | Montano             | A                                   | 12/15/2020                              | Info Memo to Council in March; Item on 4/20 CC Agenda; agendize for future discussion as part of budget process 5/11/2021 |
| <b>31</b>          | Ordinance to ban vaping in the City                                                      | Montano             | A                                   | 12/15/2020                              | Staff to bring back an Ordinance                                                                                          |
| <b>32</b>          | Review City policy on speed bumps                                                        | Tran                | A                                   | 12/15/2020                              | Presented to Transportation Subcommittee on 2/12                                                                          |
| <b>33</b>          | Discussion of Minute Man as City's image, when City branding comes back                  | Phan                | A                                   | 8/18/2020                               | Discuss when report on "Branding" is on CC agenda in 2021; agendized for 5/4/2021; continued to future meeting            |
| <b>34</b>          | Discuss a "safety first" or other event in lieu of National Night Out (per CAC)          | Phan (Nuñez)        | A                                   | 10/20/2020                              | Dec. 15: for 2021 @Public Safety month, new Police Chief                                                                  |
| <b>35</b>          | Bring back update report & discuss status of playing fields for girls' softball in Milp. | Dominguez           | A                                   | 10/20/2020                              | To City/Schools Subcomm. then CC. See C. Montano 10/14 Bobby Sox softball                                                 |
| <b>36</b>          | Consider naming "Milpitas Hills"                                                         | Dominguez           | A                                   | 10/20/2020                              | to Econ. Dev. Commission first. Return later to City Council                                                              |
| <b>37</b>          | Require implicit bias training for City Council, Commissioners & staff                   | Dominguez           | A                                   | 6/16/2020                               | approved 8/18/2020                                                                                                        |
| <b>38</b>          | Discussion/staff report on Beautify Milpitas, graffiti abatement, resources              | Montano             | A                                   | 6/30/2020                               | 8/18/20: Directed to staff develop program requiring min. staff resource & return to CC                                   |
| <b>39</b>          | Consider change in term limits for Mayor + Councilmembers                                | Montano             | A                                   | 6/16/2020                               | 8/4/2020: Voted 3 -2 to pursue                                                                                            |

**MILPITAS CITY COUNCIL  
AGENDA ITEM REQUESTS**

| Request No. | Topic                                          | Submitted by | A, F,<br>CM,<br>or<br>CCM | Date requested<br>or Rec'd Form | STATUS and/or DATE scheduled on<br>City Council meeting agenda:            |
|-------------|------------------------------------------------|--------------|---------------------------|---------------------------------|----------------------------------------------------------------------------|
| 40          | Restrict smoking in multi-unit bldgs           | Montano      | A                         | 1/7/2020                        | Ordinance pending. Discussed<br>3/03/2020 Affirmed 6/02/2020               |
| 41          | Request for Dumpster Days                      | Tran         | A                         | 1/7/2020                        | (from 2019) (from 2019) 5/12/2020 in<br>5/12/2020 FY 2020-21 budget. Mayor |
| 42          | Consider Community Museum and Park on Main St. | Nuñez, Phan  | F                         | 8/20/2019                       | to Rules 8/23/2019                                                         |

CCM: City Council Meeting

A: @Announcements

F: on a Form

CM: to/from City Manager



# MILPITAS CITY COUNCIL AGENDA PREVIEW LIST

**June 1, 2021**

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## **CLOSED SESSION**

**INVOCATION** (assigned to Mayor Tran)

## **PRESENTATION**

- LGBTQ Pride Celebration (Proclamation)

## **CONSENT CALENDAR**

1. Receive City Council calendar for May and June 2021 (City Clerk)
2. Approve City Council meeting minutes of May 18, 2021 (City Clerk)
3. Approve and Authorize the City Manager to Execute a Master Funding Agreement between the City and the Santa Clara Valley Transportation Authority (VTA) for 2016 Measure B Bike and Pedestrian Education and Encouragement Program (Steve Erickson)
4. Approve a Budget Amendment to Establish and Fund the Capital Improvement Project titled Pedestrian Trail Replacement (Sinnott, Browne and Murphy Parks) (Renee Lorentzen)

## **PUBLIC HEARING**

5. Conduct a Public Hearing and Approve the Fiscal Year 2021-22 Operating Budget (Lauren Lai)
6. Conduct a Public Hearing and Introduce Ordinance Amending Chapter 215 (Regulation of Smoking in Certain Places), Title V (Public Health, Safety and Welfare), of the Milpitas Municipal Code to Prohibit Smoking in Multi-Unit Housing and Certain Outdoor Areas (Ned Thomas and Jay Lee)

## **COMMUNITY SERVICES**

7. Parks and Recreation Master Plan (Renee Lorentzen)

## **LEADERSHIP**

8. Presentation to Provide an Update on the City's Cybersecurity (Mike Luu)

## **REPORTS**

9. Review list of Future Agenda Items Requested by City Councilmembers (Mayor & City Council / City Clerk)

## **PREVIEW NEXT AGENDA**

10. Preview list of items for June 15, 2021 (City Clerk)