COUNCIL REPORT

City of Mountain View

DATE: March 22, 2022

CATEGORY: New Business

DEPT.: Public Works

TITLE: **Recycled Water Feasibility Study Update, Project 18-71**

RECOMMENDATION

1. Approve the Recycled Water Feasibility Study Update Draft Report (Attachment 1), including the list of recommendations in this Council report.

2. Transfer and appropriate $50,000 from the Water Fund to Recycled Water Feasibility Study Update, Project 18-71. (Five votes required)

3. Authorize the City Manager or designee to amend the professional services agreement with Carollo Engineers for Recycled Water Feasibility Study Update, Project 18-71, increasing compensation by $40,000 for a total amount not to exceed $205,000.

BACKGROUND

Recycled water currently serves 4% of the City of Mountain View's (City's) water needs and is a droughtproof water source. With the current climate change, constraints from imported supplies through the City's water wholesalers (i.e., San Francisco Public Utilities Commission and Valley Water), and the State's third year in a drought, the use and expansion of recycled water becomes more significant to serve the needs of residents and businesses in the City.

Wastewater from the City is treated at the City of Palo Alto's Regional Water Quality Control Plant (RWQCP) under an agreement (Partners Agreement). The treated wastewater is discharged to the Bay or further treated and used as recycled water in both cities. While the recycled water has historically been used for irrigation, "dual-plumbed" buildings are being constructed that will use the recycled water for flushing and other nonpotable uses.

Under the Partners Agreement, the City owns the rights to its wastewater flow entering the plant and leaving the plant as recycled water or treated effluent. In 2005, the City and Palo Alto entered into an agreement to construct a recycled water distribution system from the RWQCP to the City's North Bayshore Area. The system was completed in 2009 and is shown in Figure 1. The 2005 agreement provides for the City to receive up to 3 MGD through 2035, though historic

recycled water use is typically under 0.5 MGD. The agreement was amended and restated in 2007. The agreement was amended again in 2017 to add language defining each city's operation and maintenance responsibilities of the joint recycled water system and extended the terms of the agreement to 2060 at no additional cost.

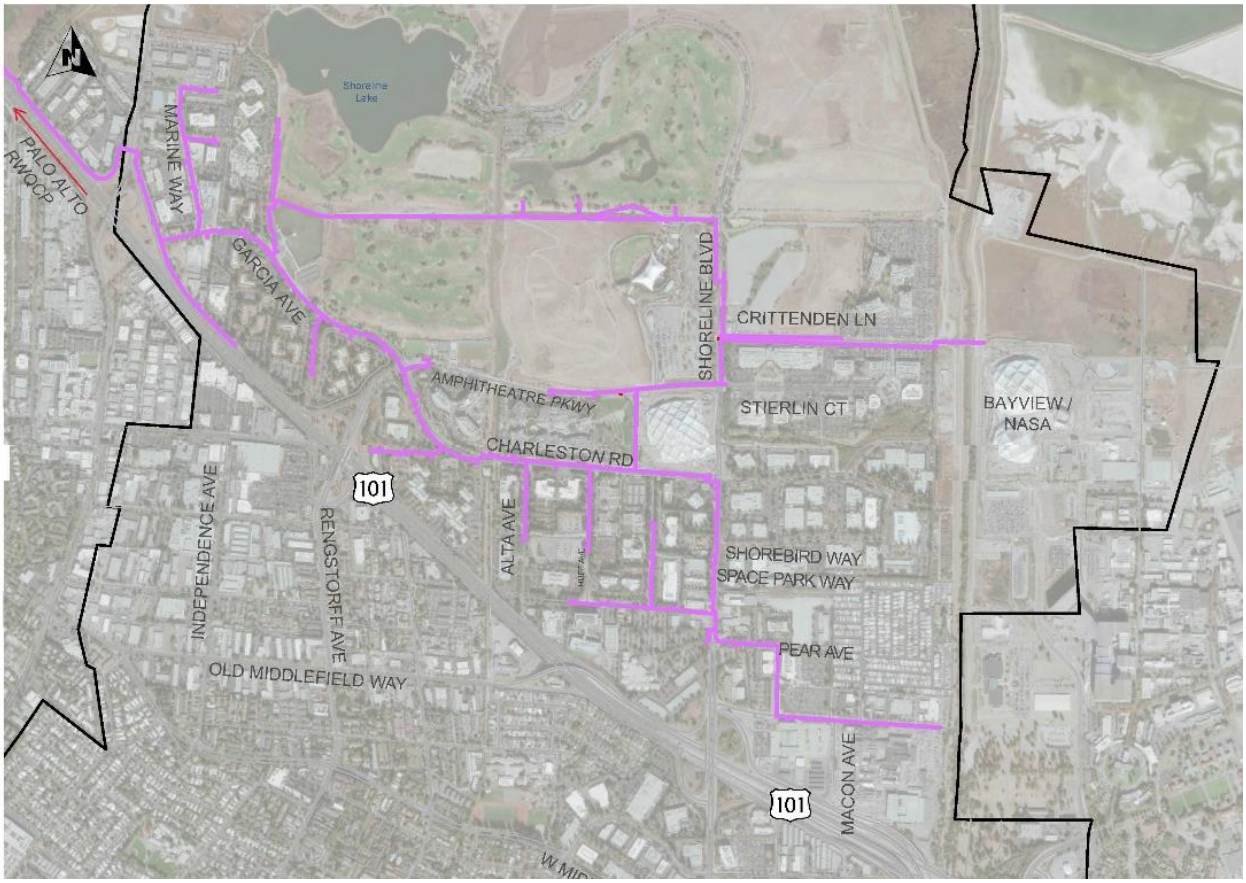

Figure 1: City of Mountain View Existing Recycled Water Distribution System (Alternative 0)

In 2014, the City completed the Recycled Water Feasibility Study (Study) to review the feasibility and estimated costs of expanding the recycled water distribution system. The results of the study were presented to Council on April 1, 2014, with a recommendation that the system be expanded to serve all potential customers within the North Bayshore Area and to serve the Bay View development and customers at National Aeronautics and Space Administration (NASA) facilities on the east side of Stevens Creek.

Since the 2014 Study, the City and Palo Alto completed pump system improvements at both the Shoreline Irrigation Pump Station and at the RWQCP, though the City has not constructed pipelines to additional customers.

Recycled Water Quality

The primary challenge regarding increasing use of recycled water has been the high level of salinity, which is typically expressed in parts per million of total dissolved solids. High salinity is not favorable for some landscape plants, including redwood trees, and causes corrosion in building systems such as cooling towers. Palo Alto and Mountain View have both taken steps to reduce salinity in the wastewater stream, but the salinity remains too high for many plants.

In December 2019, the City, Palo Alto, and Valley Water entered into an agreement whereby Valley Water would contribute $16 million toward an advanced treatment system to reduce recycled water salinity to an acceptable level. Remaining costs would be borne by the City and Palo Alto in proportion to each city's recycled water allocation (75% Mountain View, 25% Palo Alto) and grants, if available. In exchange for the $16 million contribution, Valley Water would be entitled to receive up to 9 MGD of wastewater to be used for their own water reuse programs. Valley Water is currently working with Palo Alto to construct a larger regional water purification project at the former Los Altos Wastewater Treatment Plant site on San Antonio Road at Terminal Boulevard. The City's recycled water allocation of 3 MGD would not be reduced unless wastewater flows are reduced drastically due to drought or other emergencies.

Palo Alto recently completed preliminary design of the first phase of the advanced water purification system, which would provide up to 1.125 MGD of highly treated water that would be blended with untreated recycled water to provide the desired salinity. Final design is projected to be complete by early 2023. A second phase of similar size could be constructed when needed to meet future demand, bringing the total advanced treatment capacity to 2.25 MGD for blending with untreated, recycled water.

The following **two areas of concern** have arisen related to the first phase of the project:

- Estimated Cost Increase—The estimated cost of the first phase has more than doubled from $22.3 million to $51.4 million since Palo Alto applied for a State Revolving Fund (SRF) Loan for the project in 2019. Reasons for the increased estimate include rising material costs, supply chain challenges, and a modified scope of work that includes building the project at a higher elevation to prepare for sea level rise. City staff is working closely with Palo Alto to examine ways to control costs, amend the SRF Loan, and seek outside funding sources, including grants.

- Valley Water's Proposed Funding Source for Its $16 Million Includes Taking Funding Intended for Mountain View—Several communities in north Santa Clara County that receive less than 15% of their water supplies from Valley Water, including the City's property owners, have been paying property taxes that are used to support the State Water Project (SWP) through Valley Water. In 2017, the Valley Water Board of Directors adopted a resolution that calls for returning these funds to these communities, including Mountain

View, through a grant program to be used for eligible water conservation programs and recycled water infrastructure. **The City of Mountain View's share of these funds for Fiscal Year 2018-19 through Fiscal Year 2023-24 is approximately $8.5 million.**

In August 2021, the Valley Water Board modified one of the guiding principles (No. 5 or GP5) related to the SWP tax funds, whereby "*At Valley Water's discretion, GP5 moneys may be used to fund all or a portion of Valley Water's commitments in the December 2019 agreement between Valley Water, Palo Alto, and Mountain View*." Through recent discussions with Valley Water staff, City staff's understanding of how the program is to be implemented is that Valley Water will take $6 million each from Palo Alto and the City's allocation to pay toward their $16 million wastewater purchase. If this occurs, the $8.5 million intended for the City would be reduced to $2.5 million.

Staff is working with Palo Alto staff to draft a joint letter to Valley Water to express our cities' objections to this action, noting the following: (1) Mountain View and Palo Alto have other needs for the SWP funds, including our cities' own recycled water and/or water conservation projects; and (2) this is not consistent with the intent of the 2019 agreement, whereby Valley Water is using the $16 million to purchase wastewater that they need, which would otherwise be used for Mountain View and Palo Alto recycled water supply needs.

ANALYSIS

Since the 2014 Study, the City adopted the 2017 Dual Plumbing Ordinance, updated the North Bayshore Precise Plan, and adopted the East Whisman Precise Plan to encourage and provide opportunities for increased recycled water use. The City's Dual Plumbing Ordinance requires private commercial development greater than 25,000 square feet to be dual-plumbed. To analyze the impacts of these changes, the City contracted with Carollo Engineers (Carollo) to provide an update (Update) to the Study that includes:

1. Recycled water use projections within the current service area.

2. Recycled water demand projections for the East Whisman Precise Plan and North Bayshore Precise Plan areas and new developments east of Stevens Creek, including Bay View and NASA/Ames facilities.

3. Analysis of the impact of the City's 2017 Dual Plumbing Ordinance and recommended changes in the City's recycled water operation.

4. Analysis of the impact of new customers on system performance.

5. Review of the need for recycled water storage and pumping facilities to ensure delivery of adequate water supply and pressure.

6. Updated cost estimates to expand the system to the NASA/Ames property and East Whisman.

7. Updated expansion alternatives.

Based on the updated projections and new dual plumbing demands, Carollo identified potential future customers, projected consumptions, determined project obstacles, and developed four main alternatives (1, 2, 3, and 4) and four sub-alternatives (5A, 5B, 5C, and 5D) to expand the existing recycled water system throughout the City as shown in Figure 2 and listed in Table 1. The four main alternatives evaluated various expansion options to NASA/Ames, North Bayshore, and East Whisman Precise Plan areas, while the four sub-alternatives evaluated expansion to other areas of the City that have current or future private development projects with dual plumbing.

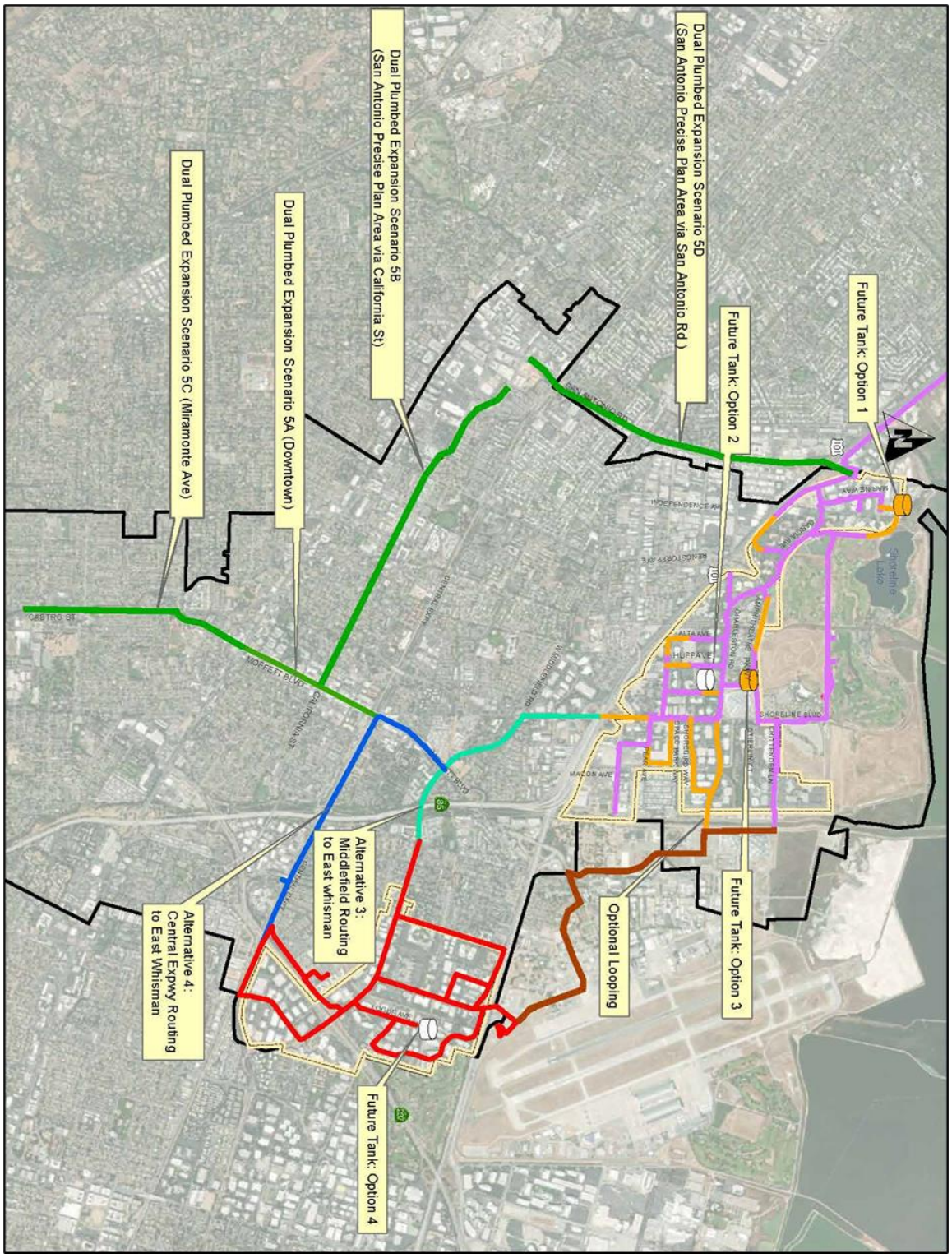

Figure 2: Recycled Water Expansion—All Alternatives

Table 1: Recycled Water Expansion Alternatives

Alternative	Description
0	Existing 2022 Recycled Water System
1	Alt 0 + New North Bayshore, Bayview, and NASA
2	Alt 1 + East Whisman via NASA
3	Alt 1 + East Whisman via Shoreline Blvd./Middlefield Rd.
4	Alt 1 to East Whisman via Central Expressway
Sub-Alternatives	
5A	From Alt 4 to Downtown Mountain View
5B	From Alt 4 to San Antonio Precise Plan area
5C	5A to South Mountain View (Saint Francis High School)
5D	Alt 0 to San Antonio Precise Plan area

Project Alignment Alternatives

Carollo modeled the City's existing and future recycled water system demand under each alternative. The study of water demand requires the analysis of the following factors:

1. Average Day Demand (ADD)—the average estimated demand of recycled water use on a single day throughout the year.

2. Max Day Demand (MDD)—the maximum estimated demand of recycled water use on a single day of the year.

3. Peak-Hour Demand (PHD)—the peak estimated demand of recycled water use on a single hour of the year.

4. Approximate Storage Requirement—calculated as the difference between the PHD and MDD, multiplied by the irrigation window in a given day.

The analysis uses a conservative estimate that irrigation occurs during an eight-hour window (usually at night) and the recycled water supply from RWQCP is 3 MGD, based on the City's current agreement with Palo Alto. Table 2 highlights the comparison of the demands and storage needs for the base case and each of the four alternatives.

Table 2: Quantitative Comparisons of Expansion Alternatives

Alternative Options	Total Customers	Total Average Day Demand (MGD)	Max Day Demand (MGD)	Peak Hour Demand (MGD)	Approx. Storage Requirement (MG)	Approximate Additional Recycled Water Supply Requirement (MGD)
0 Base Case (Existing North Bayshore System)	52	0.46	1.2	4.4	1.3	0.0
1 Alternative 0 + New North Bayshore users + NASA demands	133	1.45	3.7	8.5	1.9	0.7
2 Alternative 1 + NASA pipeline expansion + East Whisman	226	2.30	6.2	15.8	3.8	3.2
3 Alternative 1 + East Whisman (via Middlefield Road)	257	2.39	6.4	16.9	4.2	3.4
4 Alternative 1 + East Whisman (via Central Expressway)	358	2.40	6.5	17.1	4.2	3.5

Notes:

1. New North Bayshore demands were calculated considering billing data and records along with estimated land use demand factors identified in the North Bayshore Precise Plan.
2. NASA demands were calculated using the previous 2014 Recycled Water Feasibility Study demands per the 2001 NASA EIS.
3. East Whisman demands were calculated considering ultimate build-out of East Whisman using estimated land use demand factors identified in the East Whisman Precise Plan.

Alternative 0 (Base Case)

Alternative 0 is considered as the existing system which serves 52 current recycled water users within the North Bayshore Area as shown in Figure 1. With several dead-end segments and a single source of supply (RWQCP) to North Bayshore, system reliability can be compromised with one point of failure in the City's recycled water distribution system. If no expansion is planned, a 1.3-million-gallon (MG) storage reservoir is still recommended to provide reliable service for existing customers. The number, size, and site options for recycled water storage will be discussed later in this report.

Alternative 1—North Bayshore Area Expansion

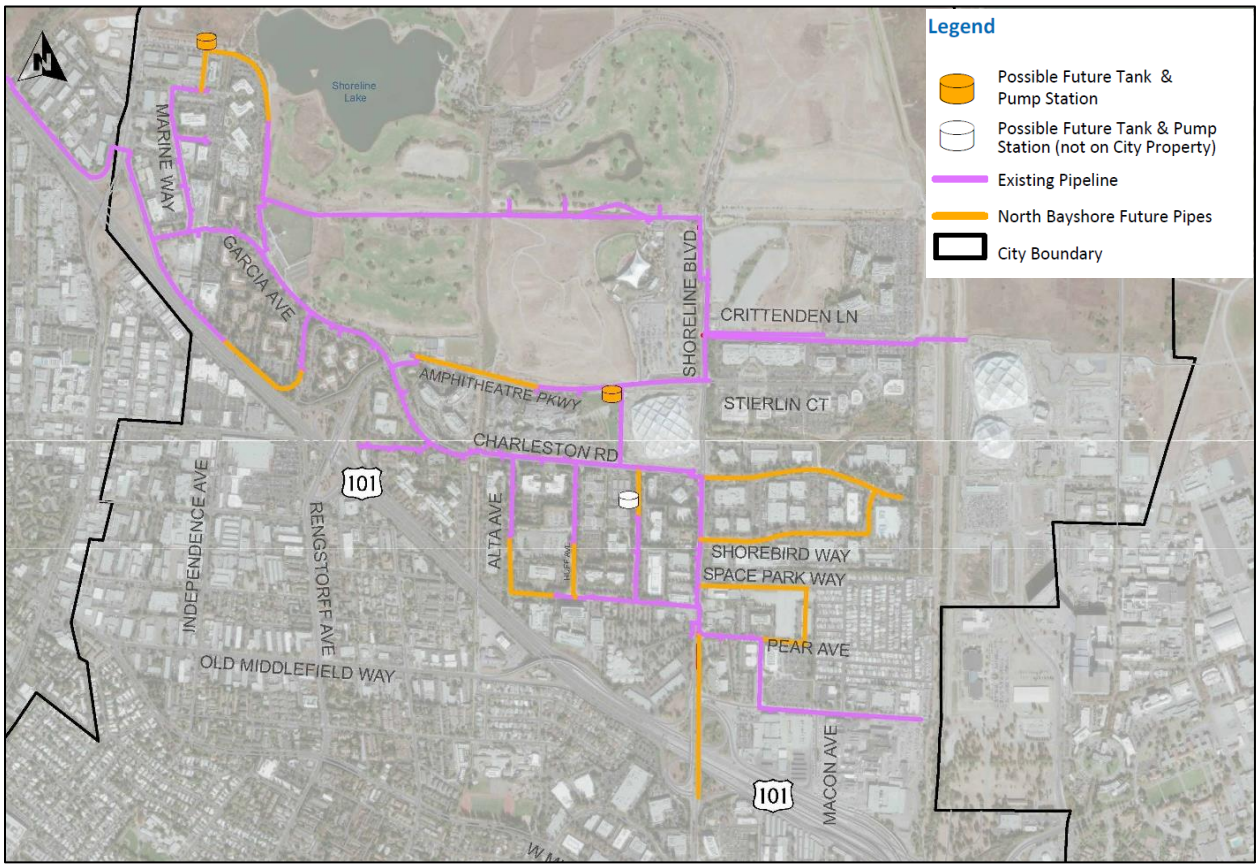

Figure 3: Alternative 1—Full Expansion within the North Bayshore Area

Expansion Alternative 1 would add infrastructure to serve 133 total customers in the North Bayshore Area, including businesses on Stierlin Court, Shorebird Way, Charleston Road, Google sites in the Bay View development, and the Army Reserve and NASA/Ames campus. Alternative 1 provides needed reliability and redundancy for existing and future customers in the North Bayshore and at NASA. NASA recycled water demand projections are based on their

2001 Environmental Impact Statement for the future growth within NASA. Alternative 1 extends south on Shoreline Boulevard to include the future bike/pedestrian bridge crossing U.S. 101 just west of Shoreline Boulevard. The design for the bike/pedestrian bridge will include the support and means to build a pipeline from North Bayshore to south of U.S. 101.

This option requires the least design and construction improvements with most of the work performed in the City's right of way and could be constructed within a shorter timeline compared to other alternatives. A minimum 1.9-MG storage reservoir and 0.7 MGD of additional supply to meet the maximum day demand are required. A discussion on recycled water supply options for this and all expansion alternatives will be provided after the alignment alternative analysis.

Alternative 2—East Whisman Expansion via NASA

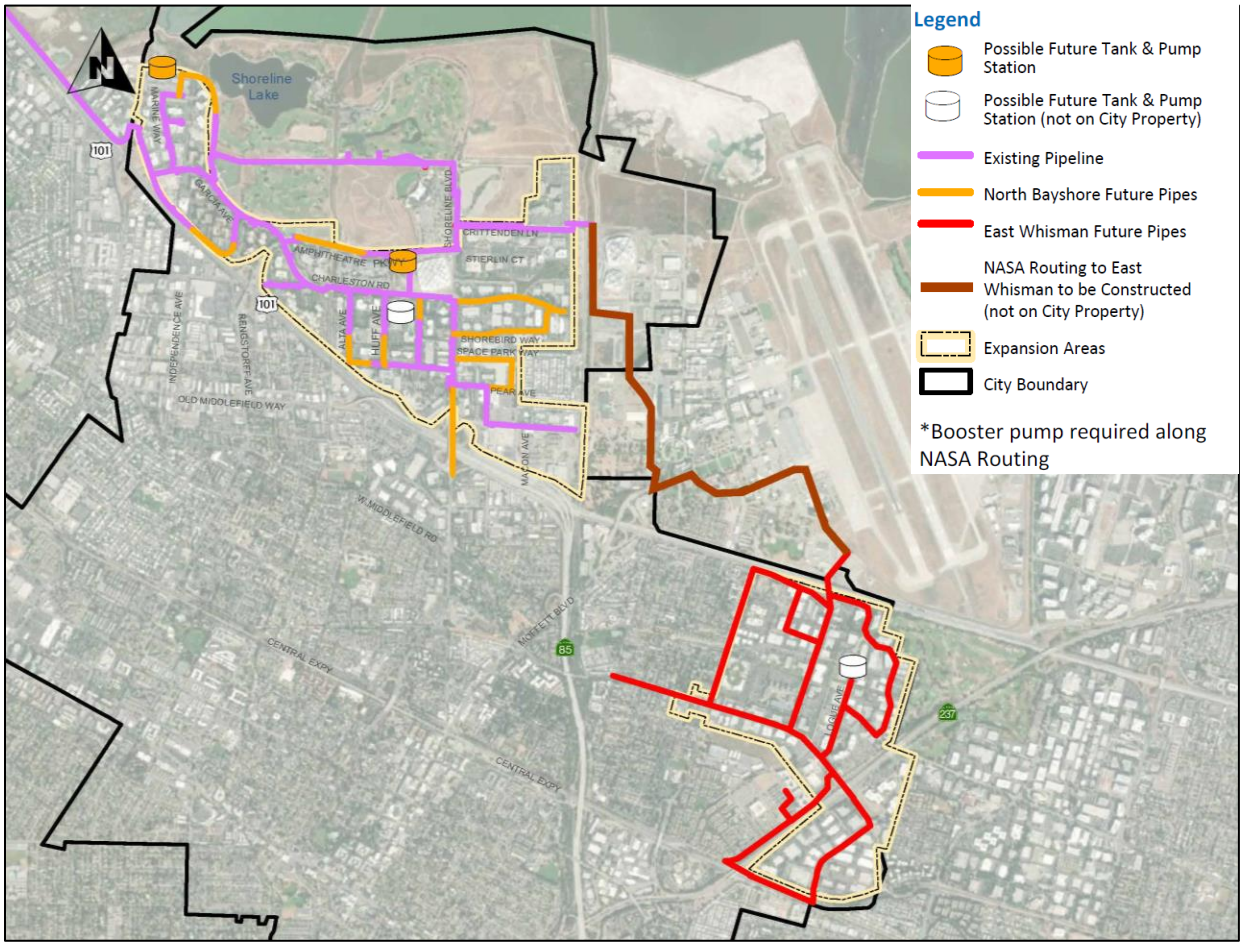

Figure 4: Alternative 2—Expansion to East Whisman via NASA

Alternative 2 would extend pipelines identified in Alternative 1 to serve the East Whisman area through the NASA corridor. Service would be provided to a total of 226 customers. This option

includes the full build-out in North Bayshore and expansion into East Whisman by extending the system across Stevens Creek from Crittenden Lane through NASA/RT Jones corridor to the U.S. 101/Ellis Street intersection. Designing and constructing improvements out of the City's right of way will include additional agency coordination with NASA compared to the other East Whisman alignment alternatives.

In the past, NASA has discussed the possibility of the City using an existing recycled water main along the RT Jones corridor. However, staff cannot verify the construction and condition of the pipeline since the City was not involved in reviewing the design plans or constructing the pipeline. In addition, NASA has stated that the City would need to pay full market value for use of the pipeline. As use of the NASA pipeline has not been approved, this alternative is analyzed in this Update as a new pipeline being built on NASA property. At a minimum, a combined 3.8 MG of storage in North Bayshore and East Whisman, along with 3.2 MGD of additional supply to meet the MDD, are required for Alternative 2.

Operating and maintaining a City-owned recycled water pipeline through NASA, which serves NASA and later feeds supply to East Whisman, is challenging. Development in NASA does not need to be reviewed or approved by the City. As such, it will be difficult for staff to be involved in future development projects in NASA, to provide project reviews, and manage customer connections/accounts and long-term operations and maintenance. This, in return, could affect the potential supply and reliability of recycled water to the East Whisman area.

Alternative 3—East Whisman via Shoreline/Middlefield

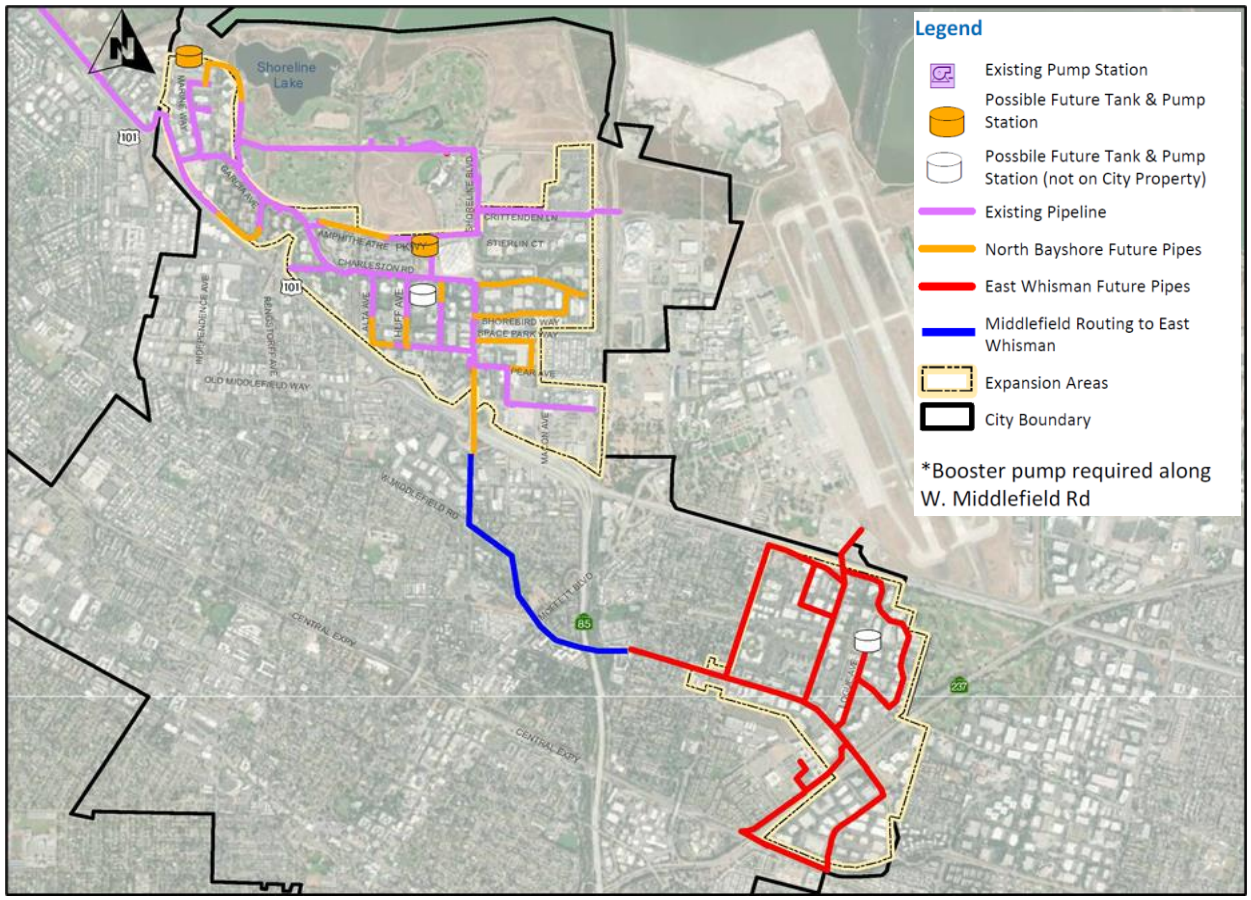

Figure 5: Alternative 3—Expansion to East Whisman via Shoreline Boulevard/Middlefield Road

Expansion Alternative 3 would extend pipelines identified in Alternative 1 to serve the East Whisman Area through the Shoreline Boulevard and Middlefield Road corridor. Service would be provided to a total of 257 customers. This option includes the full build-out in North Bayshore and expansion into East Whisman by extending the system from the Shoreline Boulevard/U.S. 101 bike/pedestrian bridge into Shoreline Boulevard and Middlefield Road. Since construction along this alignment is generally within the City's right of way, this option was ranked higher in both ease of implementation and agency coordination compared to Alternatives 2 and 4. At a minimum, a combined 4.2 MG of storage in North Bayshore and East Whisman, along with 3.4 MGD of additional supply to meet the MDD, are recommended for Alternative 3.

Alternative 4—East Whisman via Central Expressway

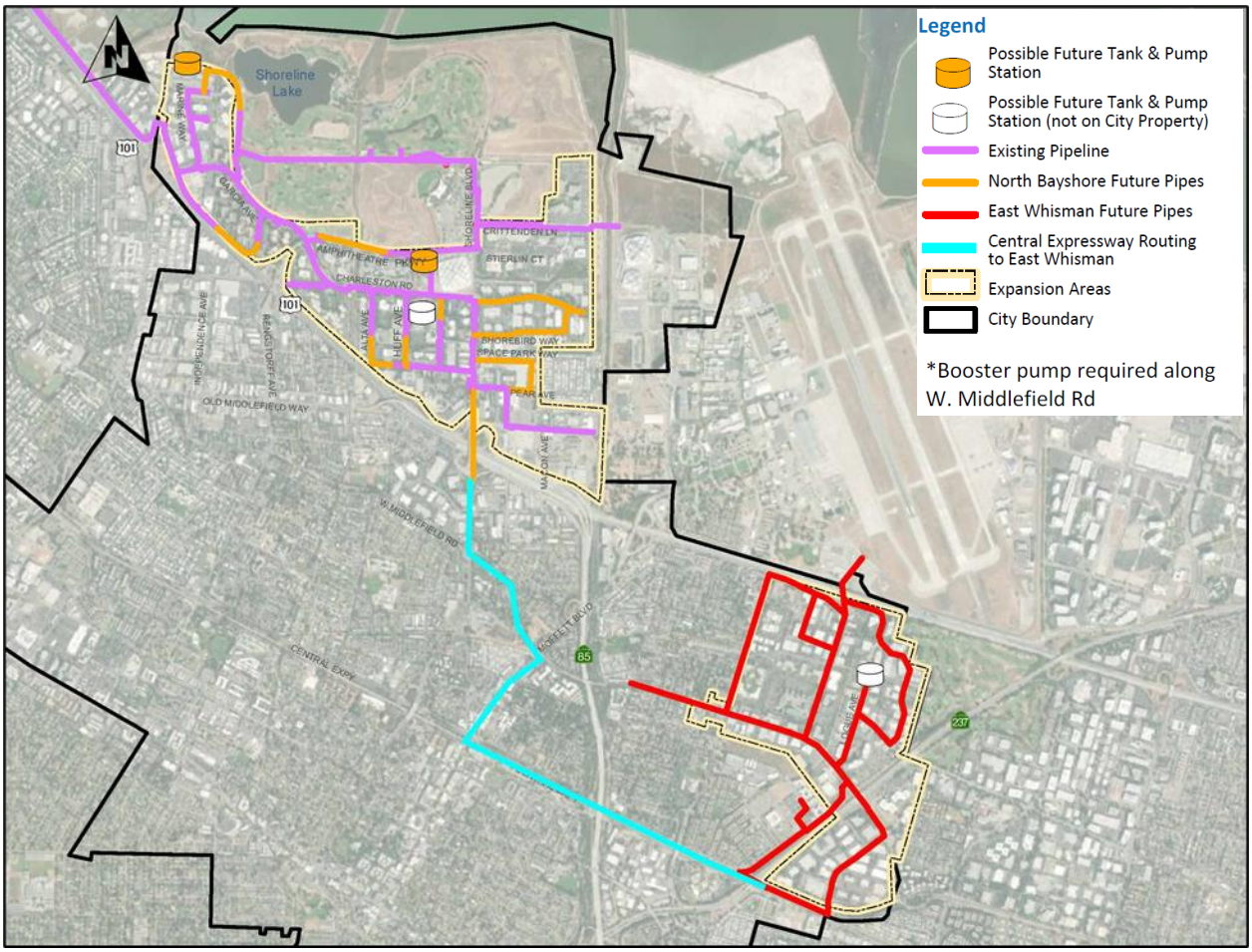

Figure 6: Alternative 4—Expansion to East Whisman via Central Expressway

Expansion Alternative 4 would extend pipelines identified in Alternative 1 to serve the East Whisman Area through the Shoreline Boulevard and Central Expressway corridor. Service would be provided to a total of 358 customers. This option includes the full build-out in North Bayshore and expansion into East Whisman by extending the system from the Shoreline Boulevard/U.S. 101 bike/pedestrian bridge through Shoreline Boulevard, Moffett Boulevard, and Central Expressway. Designing and constructing improvements out of the City's right of way will include agency coordination with County of Santa Clara compared to the other East Whisman alignment alternatives. This option includes the highest total project cost based on recycled water demand with the most environmental impacts. At a minimum, a combined 4.2MG of storage in North Bayshore and East Whisman, along with 3.5 MGD of additional supply to meet the MDD, are recommended for Alternative 4.

Sub-Alternatives—Dual Plumbing Expansion Alignment Options

The City evaluated four sub-alternatives for expansions to other areas of the City that have current or future private development projects with dual plumbing as shown in Figure 7. In addition to dual plumbing demands, these projects would also use recycled water for irrigation and could use it for cooling towers if appropriate. Along the pipeline alignment, any City parks, publicly irrigated landscaping, and private development projects could use recycled water for irrigation.

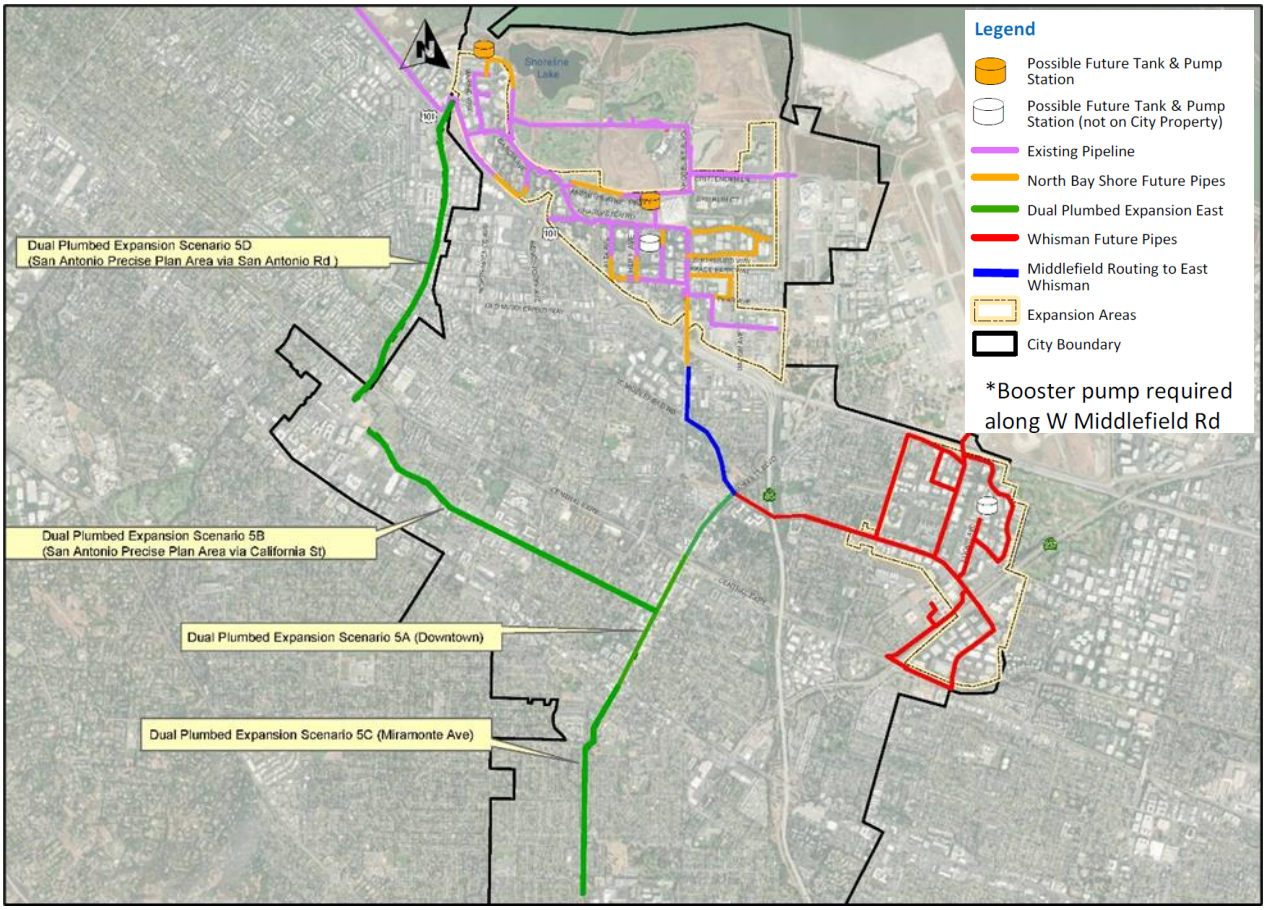

Figure 7: Alternative 1 + Alternative 3 to East Whisman Reservoir via Middlefield Road with Dual Plumbing Options

Sub-Alternative 5A—Downtown

Sub-Alternative 5A would extend pipelines constructed through Alternative 3 to downtown via Moffett Boulevard and Castro Street. This alternative would add average daily demands of 0.05 MGD and need 4,000 linear feet of new pipeline and storage at an estimated total capital cost of $3 million.

Sub-Alternative 5B—San Antonio Precise Plan Area

Sub-Alternative 5B would extend pipelines through Alternative 3 to the San Antonio Precise Plan Area via Moffett Boulevard, Castro Street, and California Street. This alternative would add average daily demands of 0.14 MGD with about 11,000 linear feet of new pipeline and storage at an estimated total capital cost of $12 million.

Sub-Alternative 5C—Miramonte Avenue

Sub-Alternative 5C would extend pipelines through Alternative 3 to Saint Francis High School via the Moffett Boulevard, Castro Street, and Miramonte Avenue corridors. This sub-alternative would add demands of 0.13 MGD with about 10,000 linear feet of new pipeline and storage at an estimated total capital cost of $12 million.

Sub-Alternative 5D—San Antonio Road

Sub-Alternative 5D would extend pipelines constructed through the San Antonio Road corridor to serve the San Antonio Precise Plan area. This alternative would add demands of 0.03 MGD with about 10,000 linear feet of new pipeline and storage at an estimated total capital cost of $6 million.

Recycled Water Storage Reservoir

The City's current recycled water distribution system lacks a storage reservoir, which would provide a much more stable and reliable distribution system for customers instead of a direct-feed system from Palo Alto. The lack of a reservoir to serve customers has resulted in fluctuating water pressure and lack of a backup supply if the RWQCP system has disruptions. Similar to the water reservoir under the Graham Middle School sports field, recycled water reservoirs may be located completely underground or partially underground if ground conditions are challenging.

One of the first projects recommended for the recycled water system is a storage reservoir in the North Bayshore Area. Potential reservoir locations currently include Charleston Park (North), the Terminal Boulevard parking lot, or a future neighborhood park in the North Bayshore Area to be dedicated from Google's North Bayshore Master Plan.

To properly serve East Whisman with recycled water, a second storage reservoir is recommended to be constructed in East Whisman, which is included in Alternatives 2, 3, and 4. Staff is considering a potential tank location in the future neighborhood park to be dedicated from the East Whisman Precise Plan.

Staff proposes conducting a recycled water reservoir siting study to consider the various locations, the underlying environment of the sites, as well as the aesthetics and costs of the project.

Meeting Recycled Water Demand

As shown in Table 2, Quantitative Comparisons of Expansion Alternatives, the 3 MGD recycled water contractually guaranteed to the City is sufficient for the average day demand (ADD) for the four main alternatives; however, it is not sufficient for the maximum day demand (MDD). The range of additional supply necessary for MDD use ranges from 0.7 MGD for Alternative 1 to 3.4 MGD for Alternatives 3 and 4. Based on available data, the MDD use of recycled water occurs a handful of times each summer, typically during the hottest days of the year for several consecutive days. Constructing storage reservoirs would help meet the MDD; however, needing MDD for several consecutive days would make it challenging to refill the storage reservoirs in time from day-to-day. These supply needs are based on full build-out of the development areas planned for 2030. With some time before the supply requirements need to be met, staff plans to further explore supply options in the next few years, including:

1. The City could supplement recycled water with potable water, when needed, to meet the MDD. Although it is not desirable to use potable water for irrigation, this is a cost-effective solution to handle the high demands that currently occur occasionally in the summer, as long as potable water is available.

2. To meet MDD, the City could restrict recycled water irrigation use to a certain number of days per week similar to current potable water irrigation use during droughts.

3. Staff will continue ongoing discussions with Palo Alto to consider increasing the City's recycled water allocation by evaluating the refurbishment of the existing filtration system, increasing pump and storage improvements at the RWQCP, and revising the current recycled water supply agreement.

4. Staff is working closely with Google to assess the Private Utility District concept at their North Bayshore and Middlefield Master Plan sites. Google is considering generating their own recycled water from their wastewater and using the recycled water in their Master Plan areas. This concept would reduce recycled water demand but would also reduce the amount of wastewater going to the RWQCP. In addition, Google may be considering the City's potable and/or recycled water supply to be a backup to the Private Utility District system.

5. LinkedIn's Middlefield Road campus is interested in using recycled water from the City of Sunnyvale, which has a recycled water pipeline within close proximity to their property. LinkedIn, the City of Sunnyvale, and City staff are working on agreement terms for the City

of Sunnyvale to provide recycled water. In this scenario, the City will be the customer of Sunnyvale so LinkedIn can remain the City's customer. The agreement terms stipulate that LinkedIn will use the City's recycled water when it becomes available.

Cost Estimates

A summary of the four main alternatives considering construction and capital costs is presented in Table 3, Capital Cost Estimates for Project Alternatives. These project costs provide a standard basis for comparing expansion alternatives to include water reservoirs, pump stations, and piping considerations.

Table 3: Capital Cost Estimates for Project Alternatives

Cost Element	Alternative Cost ($ Million)			
	1[1]	2[2]	3[3]	4[4]
Pipeline Capital Cost[5]	$ 6.8	$15.9	$19.4	$23.2
Storage Reservoir Capital Cost	$17.8	$18.3	$21.3	$21.8
Booster Station Capital Cost	$ 2.8	$ 7.2	$ 7.2	$ 7.2
Total Capital Cost for Single Alternative	$27.4	$41.4	$47.9	$52.2
Total Capital Cost for Alternative Plus Necessary Subsequent Alternatives	$27.4	$68.8	$75.3	$79.6
TOTAL BUILD-OUT YEARS	**9**	**23**[6]	**25**[6]	**27**[6]

Notes:
1. Includes existing system and expansion to additional North Bayshore users, including NASA.
2. Includes Alternative 1 and expansion to East Whisman via NASA (not including right-of-way costs).
3. Includes Alternative 1 and expansion to East Whisman via Middlefield Road (not including right-of-way acquisition costs).
4. Includes Alternative 1 and expansion to East Whisman via Central Expressway (not including right-of-way acquisition costs).
5. For the purposes of comparisons, an average pipe diameter of 12" is used for all alternatives. A detailed project cost for Alternative 1, with actual pipe diameters, is shown in the Update.
6. The total build-out years assumes an average annual recycled water infrastructure budget of $3 million.

Each alternative was qualitatively evaluated based on the following criteria:

1. **Energy Use:** Considers pumping of recycled water from the RWQCP to the proposed storage site and from the storage reservoir to the proposed users.

2. **Environmental Impact:** Considers alignment factors relative to California Environmental Quality Act (CEQA) requirements, such as traffic, utilities, and construction activity duration.

3. **Ease of Implementation:** Considers implementation issues identified by the City. Includes acquiring easements and construction challenges on busy roads.

4. **Agency Coordination:** Considers the number of agencies needed to implement the given alternative.

5. **Potable Water Offset:** Considers the volume of recycled water use.

6. **Cost:** Considers the overall project cost based on recycled water demand for the given alternative.

Each alternative is scored on a scale of 1 to 3, with respect to each technical and nontechnical criterion. A low score for a particular criterion and alternative indicates that the criterion has a less desirable outcome for the alternative and vice-versa. Once the scores for all criteria per alternative were identified, an average score was calculated and compared with the other alternatives. The scoring and ranking is summarized in Table 4, Summary of Alternatives Evaluation.

Table 4: Summary of Alternatives Evaluation

ALTERNATIVE	Energy Use	Environmental Impact	Ease of Implementation	Agency Coordination	Potable Water Offset	Cost Impacts	OVERALL RANKING
1 Alt. 0 + new North Bayshore users + NASA demands	3	3	3	3	1	3	**2.7**
2 Alt. 1 + NASA pipeline expansion + East Whisman	2	2	1	1	2	2	**1.7**
3 Alt. 1 + East Whisman (via Middlefield Road)	2	2	2	2	3	2	**2.2**
4 Alt 1. + East Whisman (via Central Expressway)	2	1	1	1	3	2	**1.7**

Legend:

- 3—Most Desirable
- 2—Neutral
- 1—Least Desirable

Overall Ranking Score: Highest number is the most desirable. Lowest number is the worst/least desirable.

Project Priorities

Based on evaluation of the alternatives, staff recommends prioritizing Alternative 1 to serve existing and additional users by providing redundancy and reliability in the North Bayshore Area and to NASA. To support Alternative 1, an approximate 2-MG reservoir and booster pump station would be proposed, with approximately 13,000 linear feet of new recycled water main in the North Bayshore Area. The estimated capital cost for Alternative 1 is $27 million. Staff will complete a reservoir siting study with hydrogeological studies to assess reservoir elevation impacts and evaluate optimal locations with additional pipeline costs prior to design.

Upon full build-out of Alternative 1 and meeting the required pump and supply thresholds, staff recommends a supplemental evaluation to implement the East Whisman expansion as described in Alternative 3 since it is the most cost-effective approach, while balancing the other nontechnical considerations. Alternative 3, which extends to East Whisman via Shoreline Boulevard and Middlefield Road, would require an approximate 2.5-MG reservoir and booster pump to be installed in the East Whisman Precise Plan area. An approximate 37,000 linear feet of new water main installations and a new booster pump station along the Middlefield corridor would be required to extend to East Whisman. The estimated capital cost for Alternative 3 is $48 million, in addition to the $27 million for Alternative 1, for a total cost of $75 million.

Concurrently, staff will continue discussions with NASA regarding Alternative 2 to serve their recycled water needs and further explore opportunities to use or share NASA infrastructure to expand the recycled water system to the south towards East Whisman.

Summary of Recommendations

The following are staff's recommendations for the Recycled Water System based upon the findings in the Study Update and current conditions:

1. Continue to work with Palo Alto and Valley Water on the first phase of the advanced water purification system, including securing grants or other funding for the $29.1 million in estimated cost increase, of which $21.8 million (75%) would be the City's responsibility.

2. Conduct a recycled water storage reservoir siting study in the North Bayshore at these potential locations: Charleston Park (North), Terminal Boulevard, or a future neighborhood park in the North Bayshore to be dedicated from Google's North Bayshore Master Plan.

3. Proceed with Alternative 1 to build out the recycled water system, including a water storage reservoir in North Bayshore, at a capital cost of approximately $27 million.

4. For the future expansion of the recycled water system to East Whisman, support Alternative 3 via Shoreline Boulevard and Middlefield Road for an additional capital cost of $48 million.

5. Support locating a second recycled water storage reservoir at a future neighborhood park in the East Whisman area to be dedicated from the East Whisman Precise Plan.

6. Reevaluate opportunities to serve other areas throughout the City (Sub-Alternatives 5A, 5B, 5C, and 5D) upon the completion of the expansion of the system in the North Bayshore and East Whisman areas. Currently, each of these sub-alternatives require a high level of infrastructure investment for relatively small increases in recycled water consumption. The

demand for recycled water and opportunities to pursue one of these sub-alternatives may increase while Alternatives 1 and 3 are being constructed.

7. Direct staff to continue assessing recycled water demand and the options available to provide reliable supplies to customers as described in the Meeting Recycled Water Supply section.

Consultant Agreement

Since Carollo Engineers began this Update project in 2018, additional changes have been considered that may potentially impact recycled water operations. These changes include, but are not limited to, diurnal versus supply analysis and additional pump and system upgrades in Palo Alto, along with new private developments (i.e., LinkedIn's Middlefield Road campus) affecting demand. Carollo has had to evaluate additional scenario options and make updates to the recycled water computer model and their analyses due to these changes. Staff recommends amending the Carollo agreement for these additional services and increasing compensation by $40,000 for a total not-to-exceed contract amount to $205,000.

FISCAL IMPACT

Recycled Water Feasibility Study Update, Project 18-71, is funded with $194,000 from the Water Fund. Working with Carollo, the City has obtained a $75,000 grant from the State Water Resources Control Board (SWRCB) for this project. Upon the SWRCB's review and approval of this Update, the City may be reimbursed up to $75,000.

Staff recommends transferring $50,000 from the Water Fund to Recycled Water Feasibility Study Update, Project 18-71, providing a total project funding of $244,000 to fund the $40,000 Carollo agreement compensation increase, additional project management, and administrative fees.

The recommendations in the Update will require funding and staffing resources. Funding for immediate short-term projects, such as the North Bayshore Storage Reservoir Siting Study, will be considered as part of the upcoming proposed Capital Improvement Program (CIP) for Fiscal Year 2022-23.

In total, the CIP cost estimates for the recommendations ranges from $92 million to $102 million. This includes a possible City share of $17 million to $27 million for the first phase of the advanced water purification system at the RWQCP, depending on availability of loans and grants, and $75 million to expand in North Bayshore Area and to East Whisman. As the City currently does not have a rate structure established to support such a robust recycled water program, Public Works and Finance and Administrative Services staff will continue to develop options to support the financing of the recycled water program if the Council approves the recommendations for expanding the system.

CONCLUSION

The Recycled Water Feasibility Study Update provides updated recycled water supply and future demand analyses throughout the City as a result of development and the 2017 Dual Plumbing Ordinance. The Update included system needs to address full build-out of recycled water use in the North Bayshore and means for the City to serve NASA as well as expansion to East Whisman. Staff provided recommendations to complete the first phase of the water purification system at the RWQCP and for the first expansion priorities to include build out of the recycled water distribution system in North Bayshore and the future preferred alignment to serve East Whisman. There are several approaches that need further analyses and discussions with partnering agencies and private development to meet the future recycled water use demand. These approach discussions are ongoing, and staff will provide updates to the City Council as appropriate.

ALTERNATIVES

1. Modify or do not approve the Recycled Water Feasibility Study Update recommendations.

2. Do not authorize the Agreement Amendment with Carollo Engineers or increase the appropriation to the project.

3. Provide other direction.

PUBLIC NOTICING

In addition to the City's standard agenda posting, copies of this Council report were sent to the City of Palo Alto and NASA; notifications were emailed to neighborhood associations; and postings were made on social media and the City's website.

Prepared by:

Jason Chou
Senior Civil Engineer

Reviewed by:

Tina S. Tseng
Principal Civil Engineer/Engineering
and Environmental Compliance

Lisa Au
Assistant Public Works Director

Approved by:

Dawn S. Cameron
Public Works Director

Kimbra McCarthy
City Manager

JC/TS/4/CAM
949-03-22-22CR
201622

Attachment: 1. Recycled Water Feasibility Study Update Draft Report

cc: APWD—Au, PCE—Tseng, USM—Vasquez, SCE—Chou, WRM—Flegel, AE—Husaini, F/c