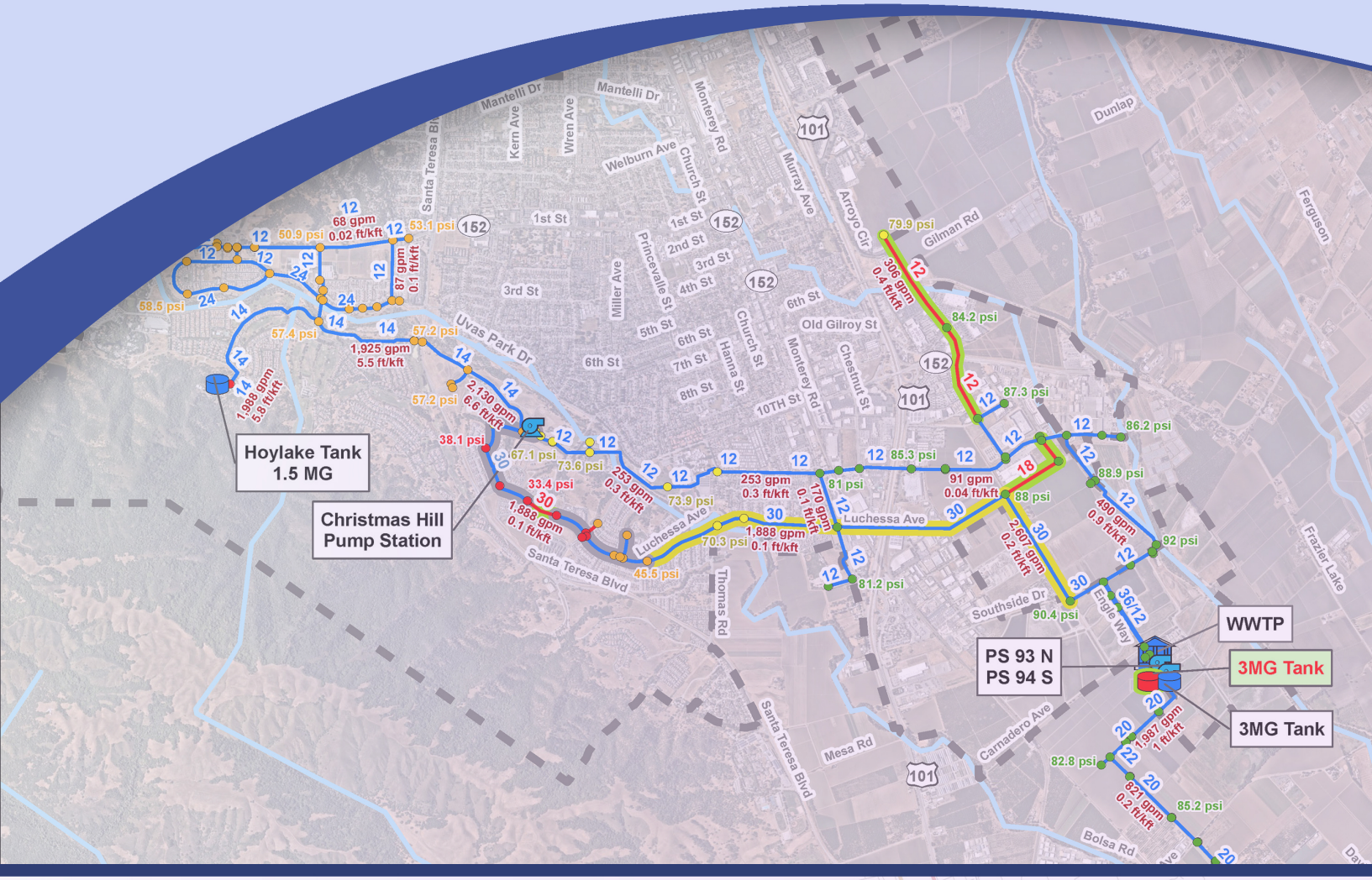
Valley Water

FINAL



MAY 2024

2024 South County Recycled Water Master Plan Update

CITY OF MORGAN HILL

gilroy

AKEL
ENGINEERING GROUP, INC.

South County Regional
Wastewater Authority

2024 SOUTH COUNTY RECYCLED WATER MASTER PLAN UPDATE

FINAL

May 2024

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Smart Planning Our Water Resources

May 1, 2024

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Attention: Mr. David Tucker, P.E.
Associate Engineer, Project Manager

Subject: 2024 South County Recycled Water Master Plan Update

Dear David:

We are pleased to submit this 2024 South County Recycled Water Master Plan Update. The report includes the following major tasks:

- Performing a capacity analysis and evaluation of the existing distribution system and improvement alternatives.
- Provide recommendations for mitigating existing distribution system capacity deficiencies and servicing the short-term users.
- Summarizing the Morgan Hill recycled water options.
- Developing mapping of the existing distribution system, customers, and proposed improvements.
- Developing an updated distribution system Capital Improvement Program (CIP) for a short-term horizon (5-yr).

We are extending our thanks to you and your staff, and to Saeid Vaziry, South County Regional Wastewater Authority; Chris Ghione, City of Morgan Hill Public Services Director; Karl Bjarke, City of Gilroy Interim Public Works Director; who's courtesy and cooperation were valuable components in completing this study and producing this report.

Sincerely,

AKEL ENGINEERING GROUP, INC.

Tony Akel, P.E., D.WRE
President

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Valley Water

2024 South County Recycled Water Master Plan Update

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South County Recycled Water Master Plan Update

1.0 PURPOSE AND SCOPE

This 2024 South County Recycled Water Master Plan Update provides an update of the distribution system capacity evaluation component of the previous 2015 South County Recycled Water Master Plan (2015 Master Plan) prepared for Santa Clara Valley Water District (Valley Water) and the South County Regional Wastewater Authority (SCRWA) in May of 2016. Since the completion of the 2015 Master Plan, new pipelines have been constructed, customer usage has changed, and operation at the Wastewater Treatment Plant (WWTP) has become increasingly challenging during peak usage and the high demand season.

Purpose

This study provides an updated **distribution system capacity evaluation** to the 2015 South County Recycled Water Master plan, with a 5-year short-term planning horizon. It also provides a summary for the **Morgan Hill potential RW options**.

This project, located in South Santa Clara County in the City of Gilroy (Figure 1), consisted of updating and evaluating the short-term capacity requirements for the South County Recycled Water Distribution System. It is intended as an update superseding the capacity analysis from the 2015 Master Plan.

Scope

This report documents the following scope of work tasks:

- Updating the inventory of the existing South County recycled water pipelines.
- Documenting the existing and short-term users recycled water demands.
- Updating the short-term recycled water demand projections.
- Performing a capacity analysis and evaluation of the existing distribution system and improvement alternatives.
- Providing recommendations for mitigating existing distribution system capacity deficiencies and servicing the short-term users.
- Summarizing the Morgan Hill recycled water options.
- Developing detailed mapping of the existing distribution system, customers, and proposed improvements.
- Developing an updated distribution system Capital Improvement Program (CIP) for a short-term horizon (5-yr).

2.0 RELEVANT DOCUMENTS

The 2015 South County Recycled Water System Master Plan is the primary document that was updated in this effort. This section lists other relevant reports that were referenced during the completion of this recycled water master plan update to the 2015 Master Plan, along with a brief description of each document.

- **2020 Countywide Water Reuse Master Plan (2020 CoRe Plan).** This document was developed to identify opportunities for Santa Clara County to expand water reuse and improve water supply reliability. This plan included water reuse options for the North County (San Jose, Palo Alto, and Sunnyvale) and the South County (Morgan Hill, Gilroy)
- **2019 Sustainable Water Management Plan (2019 SWMP).** This document presents water supply alternatives available for the Llagas and Coyote Valley Groundwater Subbasins and included a qualitative analysis and ranking system to prioritize impacts for each project and the benefits for each alternative.
- **2015 South County Recycled Water Master Plan Update (2015 Master Plan).** This report was an update to the 2004 Master Plan and updated the existing recycled water demands, identified and prioritized future users, performed a hydraulic analysis, and prepared a capital improvement program to mitigate existing system deficiencies and serve future users.
- **2010 South County Recycled Water Pipeline Short-Term Phase 1, Planning Study Report (2010 Planning Study).** This document includes information for the updated potential future users list and contains updates to the 2004 Master Plan short term facilities.
- **2004 South County Recycled Water Master Plan (2004 Master Plan).** This report included the development of potential recycled water users and a hydraulic model of Valley Water's recycled water system. The hydraulic model was used to evaluate the existing recycled water system and recommended improvements to accommodate future growth.
- **2000 South Bay Water Recycling, Phase 2 Concept Design Report (2000 Design Criteria).** This document includes Valley Water's design criteria for the recycled water system facilities.

3.0 EXISTING AND PLANNED RECYCLED WATER DISTRIBUTION SYSTEM

This section documents the existing recycled water infrastructure including the distribution system pressure zones, pump stations, storage tanks and includes a brief description for the planned baseline system.

3.1 Existing System

The existing recycled water distribution system is comprised of two separate delivery systems: the North System and the South System (Pajaro River Pipeline). The system consists of approximately 91,300 linear feet (17.3 miles) of 8-inch to 36-inch diameter pipelines, a 4 million gallons per day (mgd) booster pump station, and a 1.5 million gallons (MG) off-site storage tank, and is supported by a 3 MG on-site reservoir, a 6.9 mgd pump station, and a 6.0 mgd pump station at the SCRWA WWTP shown graphically on **Figure 2** and documented in **Table 1.**

3.1.1 North System Distribution Pipelines

The North System is comprised of two pressure zones and serves the existing recycled water customers north of the SCRWA WWTP. The North System Pressure Zones are documented on **Figure 2**.

- **Pressure Zone 1:** This zone is pressurized by the Area 93 Pump Station at the WWTP and includes a 200 cubic feet (ft^3) pressurized surge tank.

  The existing pipeline alignment heads north from the WWTP along Engle Way with parallel 12-inch and 36-inch mains and east with a 12-inch main along Southside Drive to supply the Gilroy Shooting Range. The 12-inch main then follows the Miller Slough north to the Princevalle Drain flood control maintenance road. A 12-inch spur from this intersection supplies the Calpine Energy Center to the east.

  From the Calpine Energy Center spur, the 12-inch main continues west along the Princevalle Drain to supply the McCarthy Business Park and United Natural Food. The 12-inch pipeline continues west to supply water to B&T Farms and then crosses under Highway 101. At Monterey Road and the Princevalle Drain, a 12-inch extension supplies water south to the Gilroy Sports Park. The 12-inch pipeline then continues west along the Princevalle Drain and crosses through Gilroy High School to supply water to Christmas Hill Park and ending at the Zone 2 Pump Station.

  Construction of a 30-inch main from Southside Drive in Luchessa Avenue (and through the Glen Loma development) to Christmas Hill Pump Station is nearing completion. There is one section of pipeline in the Glen Loma Development along Luchessa Avenue between Miller Avenue and Vintner Court that is not constructed. Once this last section is constructed, the southern loop will be complete which will enhance the existing system operations.

- **Pressure Zone 2:** This zone is supplied by the Zone 2 Pump Station (Christmas Hill Park) located just west of Christmas Hill Park which pumps water to the 1.5 MG Hoylake Tank.

  From the Zone 2 Pump Station a 14-inch pipeline parallels the Uvas Creek Preserve along Grenache Way. At Club Drive there is an 8-inch spur which has been used to temporarily

supply the Glen Loma Ranch Development with recycled water for grading and other construction activities. From Club Drive the 14-inch continues north-west to Santa Teresa Boulevard where the turnout is located for the Eagle Ridge Golf Course. From Santa Teresa Boulevard the 14-inch continues west where the pipeline splits to the north and west. The 12-inch north branch supplies water to the Gilroy Golf Course, a couple of HOA's, and City of Gilroy parks. The 14-inch west branch continues southwest along Club Drive and connects to the 1.5 MG Hoylake Tank.

3.1.2 South System Distribution Pipelines (Pajaro River Pipeline)

The majority of the South System is owned and maintained by SCRWA under joint operations since it primarily serves agricultural customers that pay Valley Water. The pipeline was installed for discharge to the river in case of an emergency (e.g. high inflow conditions and low recycled water demands), but SCRWA has never used it for such a purpose, and instead distributes recycled water year-round to agricultural customers south of the WWTP.

This system is pressurized by the Area 94 Pump Station which pumps into a 20-inch pipeline that heads south-west then south-east from the WWTP (**Figure 2**). The pipeline goes through a right-of-way in the SCRWA Farms Agriculture lands to the intersection of Bloomfield Avenue and Sheldon Avenue. A 22-inch, inner diameter main continues south-east for 700 feet and decreases in diameter to a 20-inch main which continues south-east to a discharge turnout located on the Pajaro River near the railroad tracks. Turnouts along this pipeline serve the San Felipe Farms.

3.1.3 Distribution System Pump Stations

The existing recycled water distribution system has three pump stations, documented on **Table 1**, and summarized as follows:

- **Area 93 Pump Station (North System, Pressure Zone 1).** The Area 93 Pump Station is located at the SCRWA WWTP at an elevation of 154 feet and is comprised of five pumps. Each of the five pumps has a variable frequency drive that provides up to 1,530 gallons per minute (gpm). Thus, the total existing capacity is 7,650 gpm and the firm capacity is 6,120 gpm. During peak months the pumps are generally operated to maintain approximately 95 pounds per square inch (psi) in the North System Pressure Zone 1.

- **Zone 2 Christmas Hill Pump Station (North System Pressure Zone 2**). The Zone 2 Christmas Hill Pump Station is located west of Christmas Hill Park at an elevation of 222 feet and is comprised of three pumps. Each of the three pumps has a variable frequency drive that provides up to 1,375 gpm. Thus, the total existing capacity is 4,125 gpm and the firm capacity is 2,750 gpm. The pumps are generally operated by water levels in the Hoylake Tank that is located west of Santa Teresa Boulevard within the Eagle Ridge Golf Community.

The existing distribution system currently experiences high headlosses in the pipelines due to high water demands, resulting in low pressures near the Christmas Hill Pump Station. Due to the restrictions in the existing system (causing low pressures) this pump station's speed is operated between 65% to 85% in order to maintain a suction pressure of 20 psi.

- **Area 94 Pump Station (South System**). The Area 94 Pump Station is located at the SCRWA WWTP at an elevation of 154 feet and is comprised of three pumps. Each of the three pumps has a variable frequency drive that provides up to 2,100 gpm. Thus, the total existing capacity is 6,300 gpm and the firm capacity is 4,200 gpm. When serving customers in the South System the pumps are generally operated with high head to maintain approximately 80-85 psi in the South System. During river discharge pumping, which generally does not occur, the pumps are operated with low head as high pressures are not required for river discharges.

3.1.4 Storage Tanks/Reservoirs

The existing distribution system has two storage tanks/reservoirs with a combined volume of 4.5 MG.

- **3.0 MG Reservoir at the SCRWA WWTP.** The 3.0 MG reservoir located at the SCRWA WWTP has a base elevation of 160 feet. This reservoir also has a return pump station with a capacity of 3 mgd, and which is used to drain the 3.0 MG reservoir. The same pipeline that is used to drain this reservoir is also used to fill it. Therefore, this critical reservoir operates by alternating between fill and drain mode but cannot do both at the same time. This reservoir is used to support the distribution system during peak demands, provides equalization of treatment flows at the WWTP, and the Area 93 and Area 94 Pump Stations both pump from this reservoir.

  This critical reservoir operates by alternating between fill-and-drain cycles but cannot do both at the same time. Operational enhancements are recommended at this critical facility.

- **1.5 MG Reservoir in Pressure Zone 2 (North System).** The Hoylake Tank is the second storage reservoir, and it is located in Zone 2 (North System). This tank is located at the end of Hoylake Court, has a capacity of 1.5 MG, and a base elevation of 385 feet. The Zone 2 Christmas Hill Pump Station is set to fill this tank based on the water levels.

3.2 Planned Recycled Water System (Baseline System)

The planned recycled water system (baseline) from the 2015 Recycled Water Master Plan was developed to mitigate the existing system deficiencies and to expand service to the most viable customers based on the market assessment that was performed. These planned and future alignments included in this distribution system capacity master plan are documented on **Figure 3**.

The hydraulic analysis will focus on these pipelines and identify the potential customers in close proximity that could connect with minimal required infrastructure.

4.0 OPERATIONAL CONSTRAINTS

The South County recycled water system is operated by the South County Regional Wastewater Authority, and at the Wastewater Treatment Facility located in the City of Gilroy. Jacobs Solutions Inc. have been providing management and staffing assistance at the SCRWA Wastewater Treatment Facility for many years, and they were consulted during this study. This section documents the operational constraints observed by the system operators, and they include distribution constraints that are being mitigated by the large distribution main projects constructed by Valley Water, and on-site storage constraints experienced during peak season usage.

4.1 Distribution System Constraints

Valley Water is addressing the distribution constraints by completing several large diameter conveyance pipeline segments in the North System.

The distribution main constraints were identified in previous studies including the 2004 and 2015 South County Master Plans. The existing 12-inch main in the North System, Pressure Zone 1 experiences high headlosses during peak recycled water usage resulting in low pressures and restricted operations at the Christmas Hill Booster Station. Valley Water has been diligently working on resolving the distribution bottle necks and has completed several large diameter pipeline projects in 2023 with one near-term project in Glen Loma remaining to complete the pipeline project from the WWTP to the Christmas Hill Pump Station. SCRWA operational staff commented on the constraints as follows:

> *"The SCRWA recycled water system has evolved over the years. In the past 7 years, constraints on the system have also evolved. Early on the main constraint was being able to get water offsite. With the upgrades to SCRWA's 93 pumpstation and flow meters, this constraint has been alleviated to some degree".* (SCRWA operations staff, 2022).

It should be noted that since Valley Water has been actively resolving the distribution system bottlenecks, staff will further experience enhanced operations.

4.2 SCRWA WWTP On-site Operational Storage Constraints

The SCRWA WWTP on-site operational storage constraints were identified in the 2015 South County Master Plan. These current constraints are related to recycled water delivery scheduling, chances of overlapping delivery hours, and the unpredictable nature of the users. Additional storage and pumping will alleviate the current on-site operational constraints. The projects to address these constraints have not been initiated, and they include on-site storage as well as updates to the booster station. SCRWA operations staff commented on this constraint as follows: *"Our main current constraints are **storage and pumping capacity**".*

Additional storage and pumping capacity add resilience to the Recycled Water system operation and provide SCRWA operations staff with leverage to better serve existing and anticipated future customers.

Operations staff currently schedule all planned equipment maintenance activities during the low recycled water usage season (wet months). However, when issues arise during the dry season, and which require immediate repairs, they work harder to resolve the operational issue, and mitigate service interruptions.

> *"If an issue arises prior to refilling the reservoir, we work with the users to reduce their demand. This includes but is not limited to having farmers switch from recycled water to their well systems, shutting off Eagle Ridge Golf course (if their pond is full), reducing onsite usage, and working with other users as necessary to lower usage".* (SCRWA operations staff, 2022).

Additional storage and pumping capacity add resilience to the Recycled Water system and provide SCRWA operations staff more leverage to better serve existing and anticipated future customers.

5.0 SUPPLY ANALYSIS AND RECYCLED WATER DEMANDS

This section documents the recycled supply versus demand analysis, the existing and potential recycled water users, usage types, and diurnal patterns.

5.1 Supply vs. Demand Analysis

The recycled water system relies on water from the SCRWA Wastewater Treatment and Reclamation Plant, which collects and treats wastewater flows from the cities of Morgan Hill and Gilroy. Approximately 73% of the influent flows are from residential customers, 17% from commercial/institutional customers, and 10% are from industrial customers. Figure 4 documents the monthly historical WWTP influent flow versus the recycled water production. Since 2017, the WWTP influent water has been trending down due to conservation measures and plumbing code changes, while the recycled water production has been trending higher.

The monthly recycled water usage is documented on **Figure 5** which identifies the recycled water use type (landscape irrigation, municipal and industrial (M&I), agriculture water (crop irrigation), and utility) by month (June 2021 to May 2022) as compared to the wastewater annual treatment plant influent flow. The WWTP influent average is approximately 6.1 mgd and the annual recycled water usage is 2.09 mgd, however during peak usage recycled water demands increase up to 5.7 mgd. The maximum day demands by hour are documented on **Figure 6**, which shows peak recycled water use above the WWTP influent flows during high use periods. These peak flows have to be supplied by the existing 1.5 MG tank in Zone 2 and the 3.0 MG recycled water tank at the WWTP. There is approximately 0.4 mgd of surplus capacity for future users during peak summer months.

5.2 Existing Recycled Water User Demands

The existing recycled water users (meter locations) are identified on **Figure 7**. The historical recycled water use has been generally consistent as documented on **Figure 4**, with only a slight upward trend. Based on the historical recycled water production analysis, the existing recycled water demands for these users are based on the most recent monthly billing records from June 2021 to May 2022 and adjusted to the total recycled water production. These recent demands and allocation will provide the most up to date and accurate results for the hydraulic analysis. The annual recycled water use (including utility water) was approximately 2,338 AFY as documented on **Table 2.**

The maximum day demands were developed based on peak month SCADA from the Area 93 and 94 pump stations and is estimated at 3,945 gpm as documented on **Table 2** (North System: 1,912 gpm and South System: 1,404 gpm). The peak hour demands were developed based on the reported hours of operation extracted from the yearly recycled water use permits that are submitted to SCRWA. **Figure 8** and **Figure 9** document the north and south system user demands diurnals.

5.3 Potential Recycled Water Users and Demands

The 2015 Recycled Water Master Plan included a thorough market assessment and customer ranking system for potential recycled water users. This capacity analysis focused on these high ranking and potential customers near the baseline system as identified on **Figure 10** and documented on **Table 3**. The annual demands for each user were extracted from the 2015 Master Plan and the peaking factors developed from the updated existing system demand analysis were applied to determine the projected maximum day demands. The projected demand of the baseline potential users is approximately 4,529 gpm. Two potential long-term users were also included in this analysis, Gilroy Gardens and Western Tree and Nursery.

6.0 HYDRAULIC MODEL UPDATE AND CALIBRATION

The South County's recycled water distribution system hydraulic model combines information on the physical characteristics of the recycled water system (pipelines, pump, storage reservoirs) and operational characteristics (how they operate). The hydraulic model then performs calculations and solves a series of equations to simulate flows in pipes and calculate pressures at nodes or junctions. The recycled water model was developed using the water modeling software, InfoWater Pro by Autodesk, which offers an intuitive graphical interface and robust integration with ESRI's ArcGIS.

6.1 Hydraulic Model Update

The hydraulic model was updated to reflect current facility improvements and pipeline alignments based on recent construction. The existing water demands were also updated in the hydraulic model to reflect the most recent billing records and spatial allocation.

6.2 Hydraulic Model Calibration

Calibration is intended to instill a level of confidence in the pressures and flows that are simulated, and it generally consists of comparing model predictions to field measured results, and making necessary adjustments. The calibrated hydraulic model was updated with system operational controls, and was verified with Supervisory Control and Data Acquisition (SCADA) system data obtained for July 2021.

The model calibration consisted of comparing the pump flows from the Area 93 and Area 94 pump stations to SCADA for the summer months. Figure 11 documents multiple peak use days from July 2021 (SCADA) as compared to the hydraulic model outputs. The demand allocation and diurnal patterns developed in the demand analysis resulted in an acceptable match between the SCADA and model outputs. The hydraulic model is now an established benchmark and can be used for system evaluations.

7.0 HYDRAULIC ANALYSIS AND USER OPTIMIZATION

The section documents the evaluation criteria utilized in the hydraulic analysis for the existing and planned baseline system and includes recommendations for system operations to optimize and maximize the capacity of the existing facilities and limited supply. The scenarios included in this analysis are as follows:

- **Existing System Evaluation:** This scenario evaluates the existing system (pre-2023) and recycled water usage to identify the deficiencies in the distribution system. This scenario does not include the recently constructed 30-inch Luchessa pipeline.
- **Existing Recycled Water User Optimization:** This scenario evaluates the existing system with optimized use of recycled water usage.

- **Baseline System Evaluation with Optimized Operations:** This scenario evaluates the existing system plus the recently constructed and near-term baseline system improvements with optimized operations.
- **Near-Term Users Evaluation with Optimized Operations:** This scenario evaluates the baseline system with additional users to maximize the available recycled water.
- **Conceptual Baseline System Buildout:** This scenario evaluates the conceptual buildout of the baseline system (included for long-range planning purposes only).

7.1 Design Criteria

Velocity, headlosses and pressures are important factors in the design of a recycled water distribution system. To properly serve customers, the velocities and headlosses need to be a reasonable and provide adequate pressure for customers.

The criterion used in the analysis of the recycled water system was originally obtained from the South Bay Water Recycling, Phase 2 Concept Design Report, dated February 2000. The criterion is intended for maintaining efficient system operation while providing a reliable service to the recycled water system customers.

Design Criteria

- Velocities less than 5 feet per second (fps).
- Headlosses less than 4 feet per 1,000 feet (ft/kft).
- Minimum Pressures at 35 pounds per square inch (psi).
- Operating pressures ranging between 60 and 120 psi (ideal).

Table 4 documents the criterion used for evaluating the capacity adequacy of the distribution system during peak day demands and peak hour demands.

7.2 Existing System Evaluation

The existing system evaluation was performed for the pre-2023 distribution system, and does not include the recently constructed 30-inch main in Luchessa Ave. This scenario highlights the system constraints operations staff have experienced in the previous few years.

The hydraulic analysis for the existing system identified numerous pipelines and pressures under the SCRWA criteria. The existing 12-inch main will experience headlosses up to 17 ft/1000ft (criteria is < 4 ft/1000ft). These high headlosses result with service pressures below the 35 psi minimum criteria (preferred 60-120 psi). As a result, the Christmas Hill booster station has to operate at a lower speed in order to maintain a suction pressure above 20 psi. The hydraulic analysis results are documented on Figure 12.

The existing system operations are documented on Figure 13. This figure documents the recycled water flow as compared to the system demands and the high peak demands that must be supplied by the existing tanks in order to meet the demands. The peak demands in the system are 9.2 mgd while peak flows from the WWTP are 7.5 mgd. Additionally, due to the low pressures at Christmas Hill booster station, the pump runs at a reduced capacity resulting with near constant flow during high demand periods to maintain the Hoylake Tank.

7.3 Existing Recycled Water User Optimization

During summer months the recycled water system experiences high peak usage due to the agricultural and irrigation uses. Being able to shift some of the water usage during peak hours to off-peak will ease the operations and depletion of the storage tanks.

Stantec was retained by SCRWA during this distribution system master plan update to perform a high-level analysis to identify opportunities for shifting demands during peak usage, and thus optimize the system operations. The approach of this optimization is summarized as follows:

- Step 1. Identify which users' "hours of use" can be shifted. Which users are not flexible, which are flexible.
- Step 2. Work with the "flexible" users to optimize the daily water use.

The existing user demands, and their current hours of operations are inventories on **Table 2**. This information was provided to Stantec to review the permitted hours of operation, and the results of the high-level analysis provided by Stantec are summarized as follows:

> *"We have reviewed the data for each user and … There are a lot of limitations with the users and why their hours cannot change. For the few users that have flexibility, the changes are very minor and therefore would not help to optimize the existing recycled water usage. We have talked about this with* Valley Water staff *as well and* they *agree any changes would be minor and not help to optimize the recycled water usage. There is potential to take the data … provided into consideration when new users come online and set their hours of operation accordingly".* Stantec, 2023.

Operation limitations on the users' side indicate no flexibility in shifting the desired deliveries. Thus, **the recycled water system's current operation is considered running at, or near, an optimized level.**

Based on the results of this analysis the users' hours of operation will remain the same for the future system analyses.

7.4 Baseline System Evaluation with Optimized Operations

Valley Water is actively constructing several segments along the distribution system, which are intended to resolve existing bottlenecks and for future system expansion. The construction of the segments in the North System (baseline system) are occurring in difference phases, with some segments constructed but are currently inactive while others are under construction as documented on **Figure 3**. The baseline improvements in this scenario include the 30-inch main from Southside Drive to the Christmas Hill booster station (P-1, P-2, P-4, plus the constructed but inactive mains) and the 18-inch main that links the new 30-inch main to the existing 12-inch main in Cameron Boulevard (P-3). Please note this segment (P-3) has not been constructed and may not since Valley Water has been unable to secure an easement.

With the construction and activation of the Baseline system improvements, pipeline headlosses are reduced resulting in higher and more adequate pressures experienced in Zone 1. These higher pressures allow the Christmas Hill booster station to operate at a higher capacity and allow for more optimized operations. With the higher suction pressures, Christmas Hill pumping capacity can be increased back to full capacity allowing for filling the Hoylake Tank during off-peak hours. Figure 14 documents Baseline system with existing demands but with optimized operations. The peak hour flows are reduced from 7.5 mgd to 6.4 mgd which eases the stress on the WWTP operations and tank depletion.

Completing the imminent and near-term improvements will result with more adequate pressures in Zone 1, and more efficient and reliable operations at the Christmas Hill Booster Station.

The hydraulic analysis results for the Baseline system with optimized operations are documented on Figure 15. The 14-inch discharge pipeline in Zone 2 had pipeline headlosses over criteria (up to 6.6 ft/kft), but system pressures and operations are not impacted.

7.5 Near-Term Users Evaluation with Optimized Operations

The near-term scenario includes two new potential users (Glen Loma and the Data Center) to maximize the use of the available recycled water. The selection of users presented here is speculative and actual potential customers will vary depending on their projected demands and interest in using recycled water. There is approximately 0.4 mgd of surplus capacity for future near-term users during peak summer months.

The hydraulic analysis utilized the optimized operations at Christmas Hill and is documented on Figure 16. The hydraulic analysis results are documented on Figure 17. The addition of these new users causes minor impacts to the baseline system but will increase the stress on the WWTP operations and reliance on WWTP on-site reservoir.

7.6 Conceptual Baseline System Buildout

The conceptual baseline buildout (long-term) scenario includes each of the potential future users from Table 3. This scenario will require the following improvements:

- Zone 2 pipeline improvements (P-5, P-6)
- Pipe improvements to service the large users of Gilroy Gardens and Western Tree and Nursery on the west side of the system (LT-P-8, LT-P-9).
- A new booster station from Zone 2 to the new Zone 3.
- Booster station capacity upgrades at Area 93 and Christmas Hill.
- Additional storage in Zone 2.

System expansion for the baseline long-term users will require additional improvements to the existing distribution system.

The hydraulic analysis results are documented on **Figure 18**. The Zone 2 pipeline improvements P5, and P-6 mitigate the high headlosses observed in the previous scenarios and the planned baseline improvements are adequate for the potential long-term demands.

Please note, this scenario is conceptual and is highly dependent on wastewater influent flow increases plus additional treatment capacity. The existing WWTP influent flow is approximately 6.1 mgd and the buildout demands in this scenario is 11.6 mgd. This buildout scenario is conceptual and included for long-range planning purposes only.

8.0 RECYCLED WATER OPTIONS FOR MORGAN HILL

There is currently no recycled water delivered within the City of Morgan Hill's service area, though delivering recycled water to Morgan Hill from the SCRWA WWTP and other sources has been considered in the 2015 Master Plan and in other feasibility studies. Morgan Hill has been consistently interested in exploring potential feasible opportunities where recycled water can be implemented in the future and added to their water supply portfolio. This section is intended to provide an updated summary of the currently considered six feasible reuse options.

> Morgan Hill has been consistently interested in exploring potential opportunities to add water reuse to their supply portfolio. This section provides an update on six potentially feasible options.

8.1 Morgan Hill Reuse Options Relevant Studies

This section lists previous relevant reports and studies which explored the opportunities and potential costs of adding recycled water to the water supply portfolio in Morgan Hill.

- **2015 South County Recycled Water Master Plan Update**. The Santa Clara Valley Water District, the South County Regional Wastewater Authority, the City of Morgan Hill (Morgan Hill), and the City of Gilroy (Gilroy) partnered to explore the continued use, promotion, and expansion of the recycled water in the region. The agencies retained the services of Stantec and Akel Engineering Group to complete the 2015 South County Recycled Water Master Plan Update and which included a market assessment and developed project alternatives for expanding the existing recycled water system currently serving the City of Gilroy and adjacent County users. One of the considered alternatives included extending a recycled water pipeline from the SCRWA wastewater plant northward to service the City of Morgan Hill.

- **2016 Recycled Water Feasibility Evaluation**. With intent to provide more focus on the City of Morgan Hill recycled water needs, Morgan Hill retained the services of Akel Engineering Group and Stantec to further explore opportunities in recycled water for Morgan Hill, and to prepare the 2016 Recycled Water Feasibility Evaluation. This study identified potential recycled water users through a market assessment and included high

level costs for the potential alternatives. As identified in the market assessment, the potential future users of recycled water in the City include landscape irrigation, agricultural irrigation, industrial processes, and indirect potable reuse. As part of the 2016 RWFE, infrastructure required to convey recycled water from the South County Regional Wastewater Authority Wastewater Treatment Plant in the City of Gilroy to the potential users was identified.

- **2019 Sustainable Water Management Plan**. The 2019 Sustainable Water Management Plan, by Akel Engineering Group, Inc. was finalized in September 2019 for the cities of Morgan Hill and Gilroy. This plan documents the water supply alternatives analysis and project rankings for the Llagas Groundwater Subbasin and Coyote Valley. This report is intended to identify on-going and potential projects impacting the water supplies for the groundwater aquifers and includes a quantitative analysis to rank each alternative.

- **2020 Countywide Water Reuse Master Plan (2020 CoRe Plan).** This Countywide Water Reuse Master Plan (CoRe Plan) by Brown and Caldwell was finalized in June 2021. This countywide plan explores opportunities for reliable local water, imported water, and recycled water within Valley Water's service area. This report is intended to identify opportunities to expand water reuse throughout Valley Water's service area, including the City of Morgan Hill. The report identified three alternatives (options) with potential costs and risk levels, which are documented in this section.

8.2 Updated Morgan Hill Reuse Options

This section summarizes six potential recycled water options for the City of Morgan Hill. These six options were extracted from the following relevant studies, which were referenced in the previous section: *2020 Valley Water's Countywide Reuse Master Plan, 2016 Recycled Water Feasibility Evaluation, 2015 South County Recycled Water Master Plan Update, and the 2019 Sustainable Water Management Plan.*

The six Morgan Hill reuse options were further refined and developed during discussions between Valley Water, Morgan Hill, and Gilroy. It should be noted that during peak recycled water usage there is no additional wastewater available for treatment. For this scenario, either reductions to existing users or additional storage would be required to supply recycled water.

8.2.1 Option 1a and 1b – Direct Potable Reuse

In December of 2023 the California State Water Resources Control Board adopted new regulations for direct potable reuse (DPR). While not explored in-depth in the CoRe Plan, direct potable reuse or the planned introduction of recycled water either directly into a public drinking water system, or into a raw water supply immediately upstream of a drinking water treatment plant may provide opportunity for a secure water source that can supply recycled water directly into the City of Morgan Hill's water system. Once the new regulations are finalized in 2024, water systems

will be able to submit plans for DPR for approval. Should DPR projects prove to be a feasible path in the future, the City of Morgan Hill could consider moving in that direction.

There are two likely options to deliver purified water to the Morgan Hill Water System (**Figure 19**): The 1a option consists of the development of a satellite wastewater treatment facility in combination with an Advanced Water Purification Facility (AWPF) that utilizes the City's wastewater. The 1b option consists of the construction of the AWPF at the South County Regional Wastewater Authority and pumping the treated water back to Morgan Hill.

> **Option 1a**: Direct Potable Reuse via Treated Water Augmentation into water system (via Satellite WWTP and AWPF). This option would include a satellite WWTP and an AWPF.
>
> **Option 1b**: Direct Potable Reuse via Treated Water Augmentation into water system (via purified water pumped from SCRWA). This option would include an AWPF at SCRWA, approximately 12 miles of 24-inch pipeline, and a pump station.

These options were not included in the CoRe Plan but a brief summary of benefits and limitations is provided as follows:

> ***Benefits**. These options would require less pipeline infrastructure and have less operations and maintenance (O&M) costs than a satellite WWTP and AWPF. Provides a drought-resilient water supply for the City of Morgan Hill.*
>
> ***Limitations.** There is a high cost of infrastructure which would be borne by Llagas subbasin unless there is grant funding, high O&M costs, and additional solids loading and reduced recycled water availability at SCRWA.*

8.2.2 Option 2 – NPR+ from South Bay Water Recycling

This option includes importing recycled water supplies from South Bay Water Recycling (SBWR) via 16 miles of 16-inch pipeline. A transmission main from SBWR would connect to a future recycled water distribution system in Morgan Hill. This option is documented on **Figure 20**.

> ***Benefits**. According the 2020 CoRe Plan, this option would improve groundwater management (water supply reliability) for Morgan Hill by importing NPR+ supply from SBWR to serve non-potable demands in place of groundwater, which is currently the sole water source of Morgan Hill.*
>
> ***Limitations.** According to the 2020 CoRe Plan, an agreement to establish terms of exporting SBWR NPR+ supply from San Jose and neighboring areas to Morgan Hill would be needed, as the existing Silver Creek Agreement between Valley Water and San José expires in 2027. Long-term supply reliability is unconfirmed. Operational impacts to the SBWR system have not been evaluated, and a new reservoir may be needed to supply reliable summertime flows. Valley Water may need to reassess the potential impacts of recycled water on the Llagas Subbasin prior to moving forward as there is potential for groundwater quality degradation*

from using recycled water for irrigation. Given shifting development trends in Morgan Hill, an updated NPR market assessment is needed. Additionally, without grant funding the cost would be borne entirely by Llagas subbasin for the operations and maintenance.

8.2.3 Option 3 – Satellite Advanced Water Purification Facility for Groundwater Recharge (GWR)

This option includes recharging the Llagas subbasin in the San Pedro Ponds with purified water, which would be produced at a satellite WWTP treating the City's wastewater and an AWPF. This purified water would be conveyed to San Pedro Ponds through 3 miles of 16-inch pipelines along Maple Avenue and Hill Road. This option is shown on **Figure 21**.

Benefits. *According to the 2020 CoRe Plan, this option would improve water supply reliability and drought resilience for Morgan Hill by recharging the Llagas Subbasin with purified water.*

Limitations. *According to the 2020 CoRe Plan, high unit costs with uncertain value to improving South County water supply reliability. Limited wastewater available for satellite treatment in Morgan Hill and relied upon for meeting existing South County Recycled Water System (RWS) demands. A Morgan Hill satellite facility would increase solids loads to SCRWA, posing operational issues that may be substantial. If implemented in Morgan Hill, solids handling requires further study and may increase costs significantly. Density and proximity of active private wells limit GWR locations in South County. San Pedro Ponds recharge facility is assumed the delivery point; which currently have significant recharge restrictions due to groundwater level issues/septic interference. Valley Water has recently finished a high-level feasibility study to identify alternatives to restore the capacity of these ponds, however conditions and reliability of increasing raw water delivery to Llagas Subbasin and specific recharge facility still need to be confirmed. A drought-resilient source of water would be ideal to combat droughts as Valley Water delivers raw water to all recharge facilities in Llagas Subbasin when supplies are available. Prolonged droughts impact the deliveries, albeit Valley Water does prioritize Morgan Hill facilities. Additionally, the assumed location for the evaporation pond for reverse osmosis concentrate management (ROC) in Gilroy gets inundated with stormwater (unsuitable for evaporation pond). New permits from Regional Board(s) and/or State Water Resources Control Board's Division of Drinking Water are also needed for discharging purified water.*

8.2.4 Option 4 – Satellite Advanced Water Purification Facility for Surface Water Augmentation (SWA)

This option includes supplementing recharge of the Llagas Subbasin with water supplies provided by Valley Water, which would be delivered to ponds within the City's service area. In exchange for these water supplies, the City would deliver purified water delivered to Valley Water's Anderson Reservoir northeast of the City's service area. This option would include a satellite WWTP, an AWPF, and approximately 6 miles of 16-inch pipeline. This option is shown on **Figure 22**.

Benefits. *According to the 2020 CoRe Plan, this option would improve water supply reliability and drought resilience for Morgan Hill by recharging the Llagas Subbasin with raw water supplied from Valley Water via the Santa Clara Conduit in exchange for an equivalent amount of purified water delivered to Anderson Reservoir for SWA.*

Limitations. *According to the 2020 CoRe Plan, high unit costs with uncertain value to improving South County water supply reliability. Limited wastewater available for satellite treatment in Morgan Hill and relied upon for meeting existing South County RWS demands. Morgan Hill satellite facility would increase solids loads to SCRWA, posing operational issues that may be substantial. If implemented in Morgan Hill, solids handling requires further study and may increase costs significantly. New permits from Regional Board(s) and/or State Water Resources Control Board's Division of Drinking Water needed for discharging purified water to Anderson Reservoir. Conditions and reliability of increasing raw water delivery to Llagas Subbasin and specific recharge facility need to be confirmed.*

8.2.5 Option 5 – Pumping Recycled Water from SCRWA to a Morgan Hill Recycled Water System

This recycled water option was extracted from the 2015 South County Recycled Water Master Plan Update and was also a high-ranking project in the 2019 Sustainable Water Management Planning study. This is identified as Alternative 1 or 2 in the 2015 SCRWMP Update and includes 9 miles of 24-inch transmission mains, 4 miles of distribution mains, and a pump station. This option would deliver recycled water from SCRWA to a recycled water system in the City of Morgan Hill. This option is shown on **Figure 23**.

This option was not included in the CoRe Plan but a brief summary of benefits and limitations is provided as follows:

Benefits*. This option would provide recycled water services to Morgan Hill and require less O&M costs than a satellite plant.*

Limitations. *This option has a high cost of infrastructure and there is currently no recycled water availability during peak usage periods. As with Option 2, Valley Water may need to reassess potential impacts of recycled water in the Llagas Subbasin prior to moving forward.*

8.2.6 Option 6 – SCRWA Advanced Water Purification Facility for Groundwater Recharge in Morgan Hill

This recycled water option was also extracted from the 2015 South County Recycled Water Master Plan Update and was one of the highest high-ranking projects in the 2019 Sustainable Water Management Planning study. This option includes an AWPF at the SCRWA, 12-miles of 24-inch pipeline, and a pump station. This option would deliver purified water from SCRWA for groundwater recharge in the City of Morgan Hill. This option is shown on **Figure 24**.

This option was not included in the CoRe Plan but a brief summary of benefits and limitations is provided as follows:

> ***Benefits**. This option would provide recycled water for groundwater recharge in Morgan Hill.*
>
> ***Limitations.** This option has a high cost of infrastructure which would be borne by Morgan Hill and Gilroy/Llagas subbasin if there is no grant funding.*

8.3 Morgan Hill Recycled Water Options Comparison

The six Morgan Hill reuse options are summarized on **Table 5**, with a brief description, the amount of reuse augmentation added to the Morgan hill portfolio, the major infrastructure requirements, high-level opinion of conceptual project costs, likelihood of implementation, feasibility of implementation, advantages, and disadvantages.

It should be noted that the costs presented on **Table 5** were extracted from the relevant reports and may include varying levels of assumptions, cost estimate classification, cost accuracy, and contingencies. This study recommends these costs be further revisited and scrutinized for a more accurate and fair comparison of costs between the presented options.

When comparing the high-level opinion of conceptual costs, Option 2 (NPR+ from South Bay Water Recycling) seems to have one of the lowest implementation costs and highest feasibility ratings, however actual implementation requires negotiations and an agreement with the City of San José.

Morgan Hill intends to continue to work in partnership with Valley Water to determine the best path forward to enhance its water supply and resiliency portfolio.

Newer technologies and recently adopted DPR regulations may unlock new options for the City of Morgan Hill in the future leading to Options 1a and 1b becoming more feasible. The City of Morgan Hill intends to continue to work in partnership with Valley Water to determine the best path forward to enhance its water supply and resiliency portfolio.

9.0 RECOMMENDED IMPROVEMENTS AND SYSTEM OPERATIONS

This section provides a summary of the recommended recycled water distribution system improvements to mitigate existing capacity deficiencies and accommodate future system expansion within the City of Gilroy. The recommended improvements are shown on **Figure 3** and summarized on **Table 6**. They are also described in this section.

9.1 Constructed but Inactive Improvements

These pipelines have been constructed but are currently inactive. There is approximately 13,650 feet of 30-inch main that can be activated once the remaining baseline system improvements in Zone 1 are constructed. These pipelines are highlighted in gray on **Figure 3**.

9.2 Recently Constructed Improvements

- **P-1.** This 30-inch pipeline starts at Southside Drive, continues north through an agriculture right of way, and ends at Luchessa Avenue. This pipe is approximately 3,380 feet in length.
- **P-2**. This 30-inch pipeline starts at Luchessa Avenue and an agricultural right of way, continues west on Luchessa Avenue and ends at Greenfield Drive. This pipeline is approximately 10,270 feet in length.

9.3 Near-Term Improvements

- **P-3**. This 18-inch pipeline starts at Luchessa Avenue and an agricultural right of way, continues east on Luchessa Avenue turns north at Cameron Boulevard and ends at the Princevalle Drain. This pipeline is approximately 2,450 feet in length.
- **P-4**. This 30-inch pipeline starts at the roundabout intersection of Miller and Luchessa Avenue continues west on Luchessa Avenue, and ends at the roundabout intersection of Vintner Street and W Luchessa Avenue. This pipeline is approximately 715 feet in length.
- **WWTP-1**. This improvement is a 3 MG recycled water reservoir expansion at the WWTP.
- **WWTP-2**. This improvement is a recycled water pump station at the WWTP to aid in filling/draining of the on-site storage reservoir.
- **WWTP-3**. This improvement is for the on-site pipelines (approximately 1,500 feet) for the reservoir expansion and proposed pump station improvements.

9.4 Long-Term Improvements *(Conceptual)*

- **P-5**. This 24-inch pipeline starts at the Zone 2 pump station, continues west through the Home Ranch development, and ends at Uvas Creek. This pipeline is approximately 4,250 feet in length.
- **P-6**. This 24-inch pipeline starts at Uvas Creek, continues west on Santa Teresa Boulevard, and ends at Cobblestone Court. This pipeline is approximately 1,620 feet in length.
- **LT-P-8**. This 18-inch pipeline starts at the Meritage development, continues west in the Uvas Creek right of way and then south in the Gilroy Gardens Service Road, and ends at the new Zone 2 Tank/Zone 3 Booster Station. This pipeline is approximately 3,700 feet in length.

- **LT-P-9**. This 18-inch pipeline starts at the new Zone 2 Tank Site/Zone 3 Booster Station, continues west in the Gilroy Gardens right of way, and ends at Lake Kathryne. This pipeline is approximately 3,230 feet in length.
- **LT-T1**. This improvement is a new 1.5 MG storage reservoir in Zone 2.
- **LT-BS1**. This improvement is for a new 2,250 gpm total capacity Zone 3 booster pump station.
- **LT-BS2**. This improvement is for a Christmas Hill pump station capacity upgrade to 5.5 mgd (total).
- **LT-BS3**. This improvement is for an Area 93 pump station capacity upgrade to 9.3 mgd (total).

Please note that this Long-Term scenario is conceptual and is highly dependent on wastewater influent flow increases plus additional treatment capacity. The existing WWTP influent flow is approximately 6.1 mgd and the buildout demands in this scenario is 11.6 mgd.

9.5 Operational Improvements

Due to the existing system restrictions and storage constraints, the Christmas Hill pump station operates at a reduced flow to maintain adequate suctions pressures and needs to operate almost 24/7 during high use periods (**Figure 13**). With the activation and construction of the recently constructed and Near-Term pipelines, the Christmas Hill pump station will be able to pump at its design capacity. This will allow operations to pump during off-peak hour to fill the Hoylake tank and ease the storage constraints at the WWTP (**Figure 14**).

10.0 CAPITAL IMPROVEMENT PROGRAM (5-YR)

This section provides a summary of the recommended domestic water system improvements costs. The section also presents the cost criteria and methodologies for developing the Capital Improvement Program.

10.1 Cost Estimate Accuracy

Cost estimates presented in the capital improvement program were prepared for general master planning purposes and, where relevant, for further project evaluations. The final costs of a project will depend on several factors including the specific project scope of work, costs of labor and material, and market conditions during construction.

AACE International (Association for the Advancement of Cost Engineering, International) has defined five estimate classes for general construction based on the maturity level of the project scope definition. These estimate classes are extracted from the *AACE International Recommended Practice No. 56R-08, Cost Estimate Classification System – As Applied in*

Engineering, Procurement, and Construction for the Building and General Construction Industries (Rev. August 2020) and briefly summarized on the following matrix.

Costs developed in this study should be considered "Class 5" and have an expected accuracy range of **-30 percent** and **+50 percent**.

Class	Description	Data Availability and Percent Accuracy
Class 5	This classification is also known as an order of magnitude estimate and is generally intended for long-range capital planning and **master plans**. This estimate is not supported with detailed engineering data about the specific project, and its accuracy is dependent on historical data and cost indices.	The data is 0% to 2% complete and includes the location and proposed project. It is generally expected that this estimate would be accurate within **-30 percent to +50 percent.**

10.2 Cost Estimate Methodology

Cost estimates presented in this section are opinions of probable construction and other relevant costs developed from several sources including cost curves, Akel experience on other master planning projects, and input from City staff. Where appropriate, costs were escalated to reflect the more current ENR (formerly Engineering News Record) Construction Cost Index (CCI). The ENR CCI is a cost estimating tool updated weekly, used by engineers to gage the current cost for new construction.

This section documents the unit costs used in developing the opinion of probable construction costs, the Construction Cost Index, and markups to account for construction contingency and other project related costs.

10.2.1 Unit Costs

The unit cost estimates used in developing the CIP are summarized in **Table 7**. The unit costs are intended for developing the Class 5, Order of Magnitude estimates, and do not account for site specific conditions, changes in labor or material costs during the time of construction, final project scope, implementation schedule, detailed utility and topography surveys, investigation of alternative routings for pipes, and other various factors. The CIP included in this report accounts for construction and project-related contingencies as described in this section.

10.2.2 Construction Cost Index

Costs estimated in this study are adjusted utilizing the ENR CCI, which is widely used in the engineering and construction industries.

The costs in this Water System Master Plan were calculated using a 20-City national average ENR CCI of 13,171, reflecting a date of August of 2022.

10.2.3 Estimating Contingency Allowance

Knowledge about site-specific conditions for each proposed project is limited at the master planning stage; therefore construction contingencies were used. In the absence of bid tabulations, the estimated construction cost includes a **20 percent** contingency allowance to account for unforeseen events and unknown field conditions.

10.3.1 Project Related Costs

The capital improvement costs also account for project-related costs, comprised of construction and administration. The construction costs contingency is comprised of engineering design, construction management, and inspection. In the absence of bid tabulations, the construction related costs were estimated by applying an additional **20 percent** to the baseline costs. The administration contingency costs are comprised of project administration (developer and City staff) and legal costs and are estimated by applying an additional **30 Percent** to the baseline.

10.4 CAPITAL IMPROVEMENT PROGRAM

This section documents the capital improvement program, including estimated costs.

10.4.1 Capital Improvement Costs

The Capital Improvement Program costs for the projects identified in this master plan update for mitigating existing deficiencies and for servicing potential future growth near the baseline system are summarized on **Table 8**. The Capital Improvement Program lists the type of improvement, location, and cost.

Each improvement was assigned a unique coded identifier associated with the improvement type and is summarized graphically on **Figure 3**.

FIGURES

Monterey
Hale
101
Morgan Hill
San Pedro
Tennant
Maple
Middle
Edmundson
San Martin
Coolidge
Watsonville
101
Church
Masten
New
Day
Buena Vista
Leavesley
Dunlap
Gilroy
101
SCRWA WWTP
Bloomfield

Legend

PRELIMINARY

Morgan Hill to Gilroy System
- Future Relief Trunk
- Existing Relief Trunk
- Joint Trunk
- Existing Major Sewer Trunks

Recycled Water Distribution System
- SCRWA WWTP
- Distribution Pipelines

Existing Features
- City Limits Boundary
- City Limits Area
- Roads

N
W GIS E
S

0 0.5 1 2 Mile

Updated:May 1, 2024

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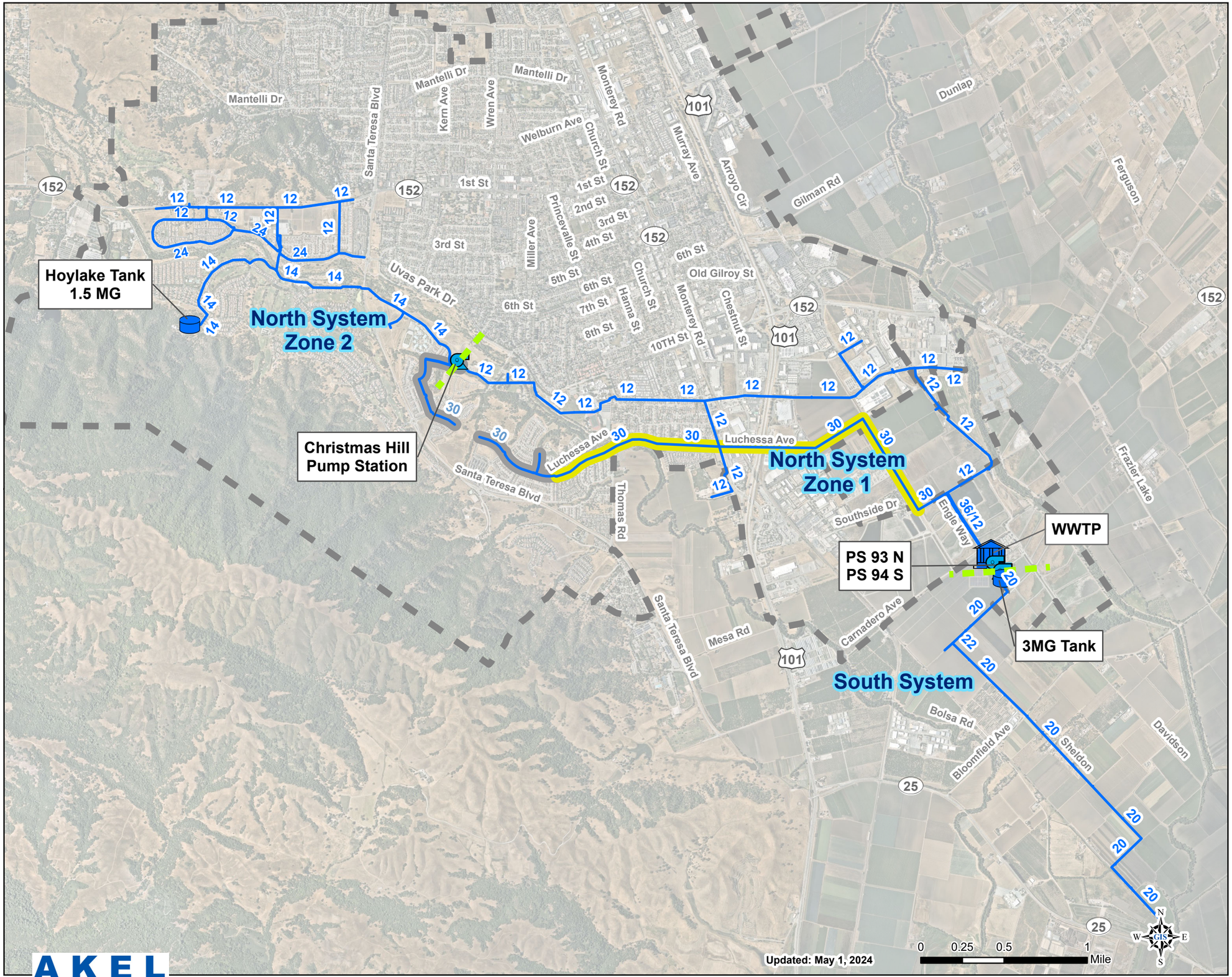
Figure 1
Study Area

2024 Sourth County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water



Legend

Existing System

- WWTP
- Booster Station
- Storage Tank
- Pipes
- Constructed but Inactive
- Recent Construction
- Pressure Zone Boundary

Existing Features

- Rivers
- City Limits

Figure 2
Existing System
2024 Sourth County Recycled Water
Master Plan Update
Santa Clara Valley Water District

Valley Water

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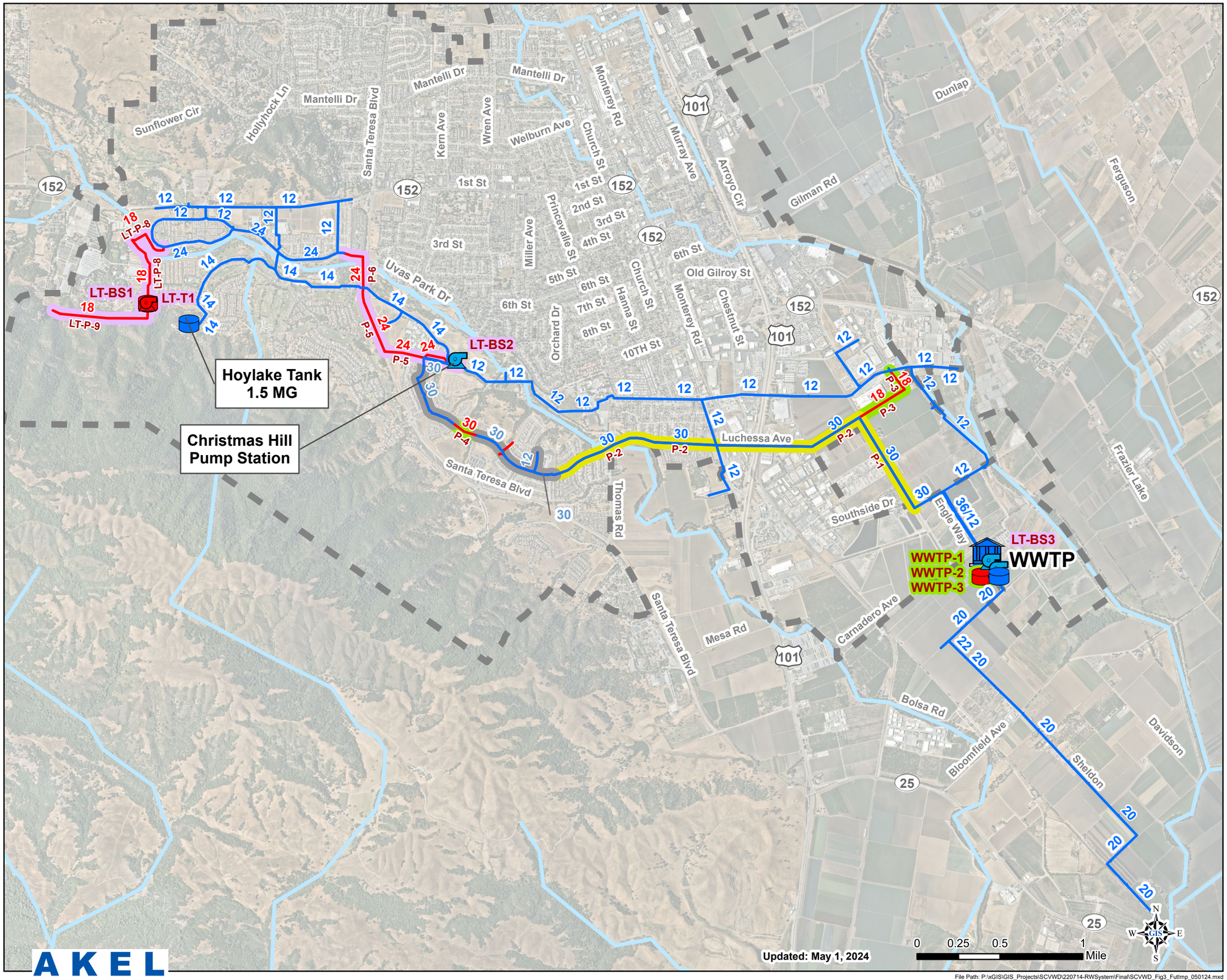

Legend

Baseline System Improvements

- Tanks
- Booster Stations
- Pipelines
- Constructed but Inactive
- Recent Construction
- Near-Term Improvements
- Long-Term Improvements

Existing System

- WWTP
- Booster Station
- Storage Tank
- Pipelines

Existing Features

- Rivers
- City Limits

Figure 3
Planned / Future Pipeline Improvements
2024 Sourth County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

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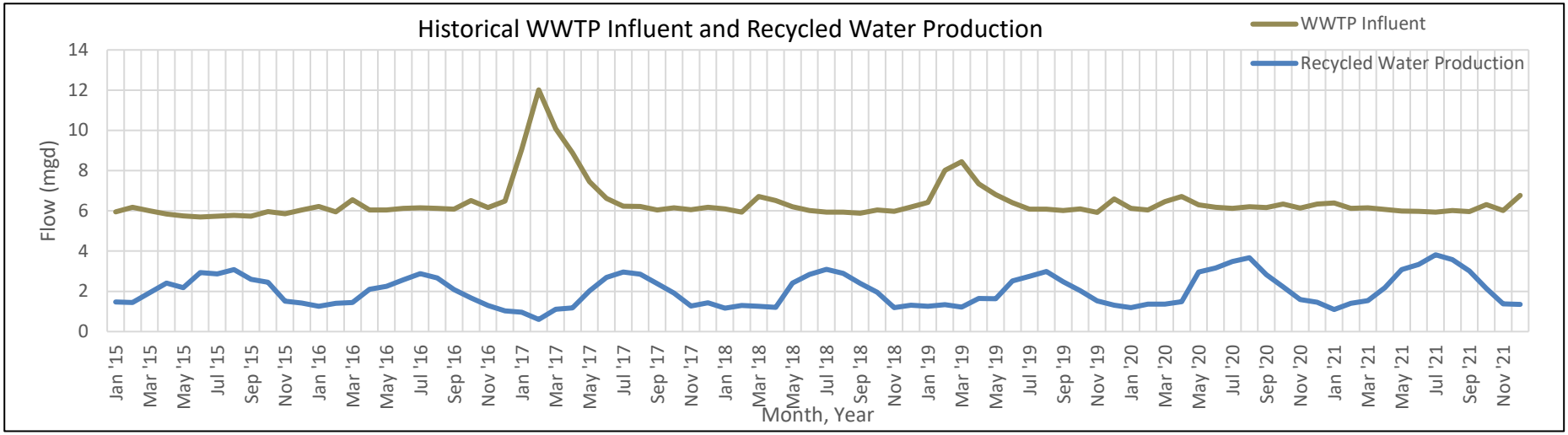
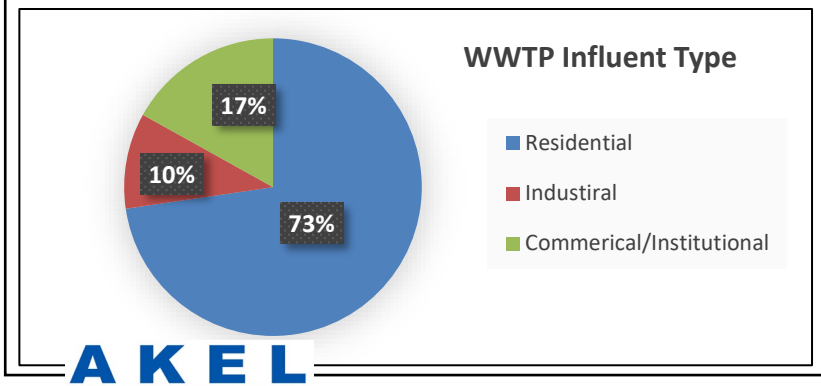
Season	2015		2016		2017		2018		2019		2020		2021	
	WWTP Influent (mgd)	Recycled Water Production (mgd)	WWTP Influent (mgd)	Recycled Water Production (mgd)	WWTP Influent (mgd)	Recycled Water Production (mgd)	WWTP Influent (mgd)	Recycled Water Production (mgd)	WWTP Influent (mgd)	Recycled Water Production (mgd)	WWTP Influent (mgd)	Recycled Water Production (mgd)	WWTP Influent (mgd)	Recycled Water Production (mgd)
Summer	5.7	2.9	6.1	2.6	6.3	2.7	5.9	2.8	6.1	2.7	6.2	3.3	6.0	3.4
Shoulder	5.9	2.2	6.3	1.9	8.1	1.6	6.4	1.7	7.2	1.6	6.5	2.0	6.1	2.2
Winter	6.0	1.5	6.2	1.2	8.3	1.1	6.1	1.2	6.7	1.4	6.2	1.4	6.3	1.3
Total	**5.9**	**2.2**	**6.2**	**1.9**	**7.6**	**1.8**	**6.1**	**1.9**	**6.7**	**1.9**	**6.3**	**2.2**	**6.1**	**2.3**





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May 1, 2024

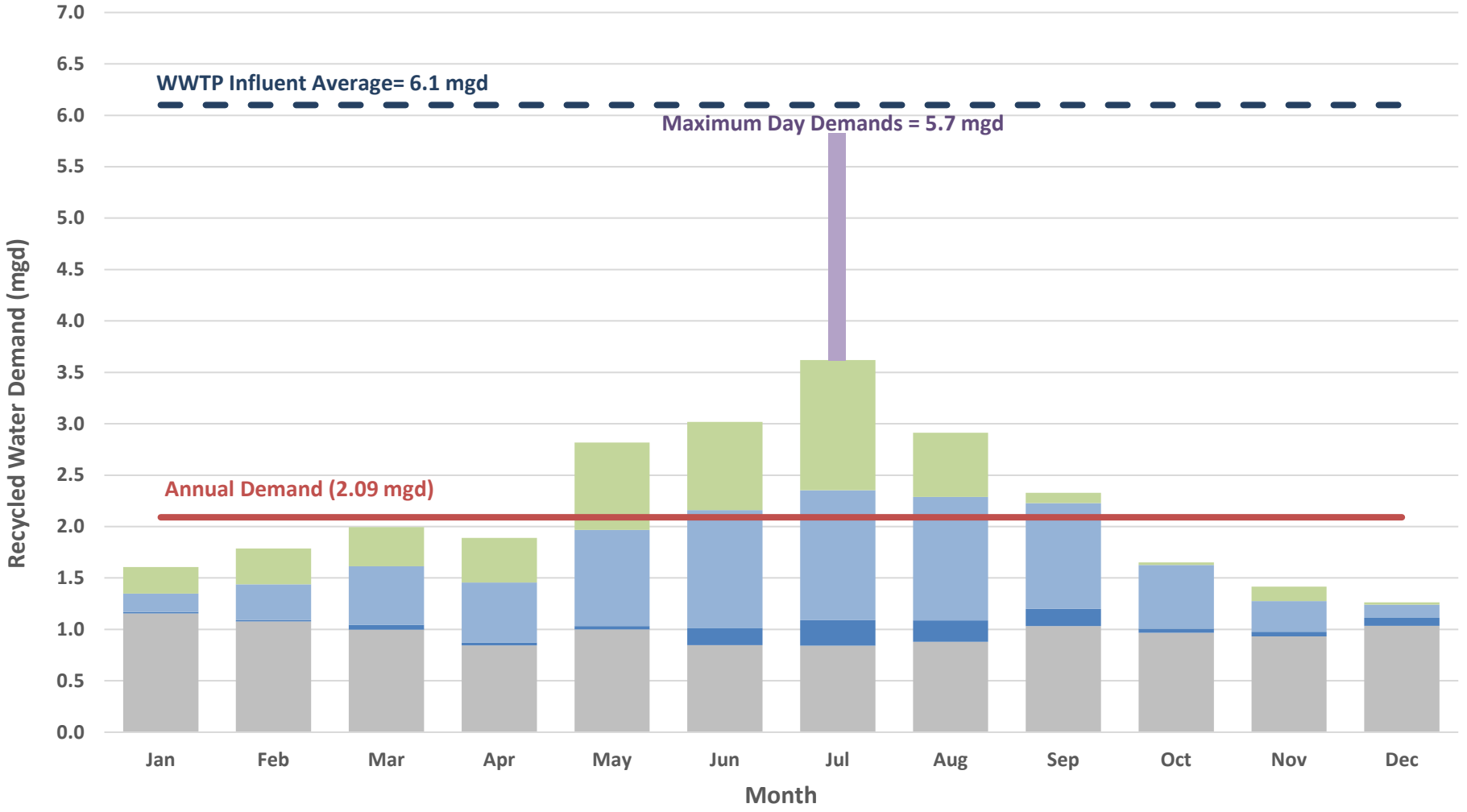
Figure 4

Historical WWTP Influent and RW Production

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

Valley Water



LEGEND

- WWTP Utility Water
- M&I
- Irrigation
- Agriculture
- Average Monthly Demand (Billing Records)

May 1, 2024

Figure 5
Existing Users Monthly Demands
2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

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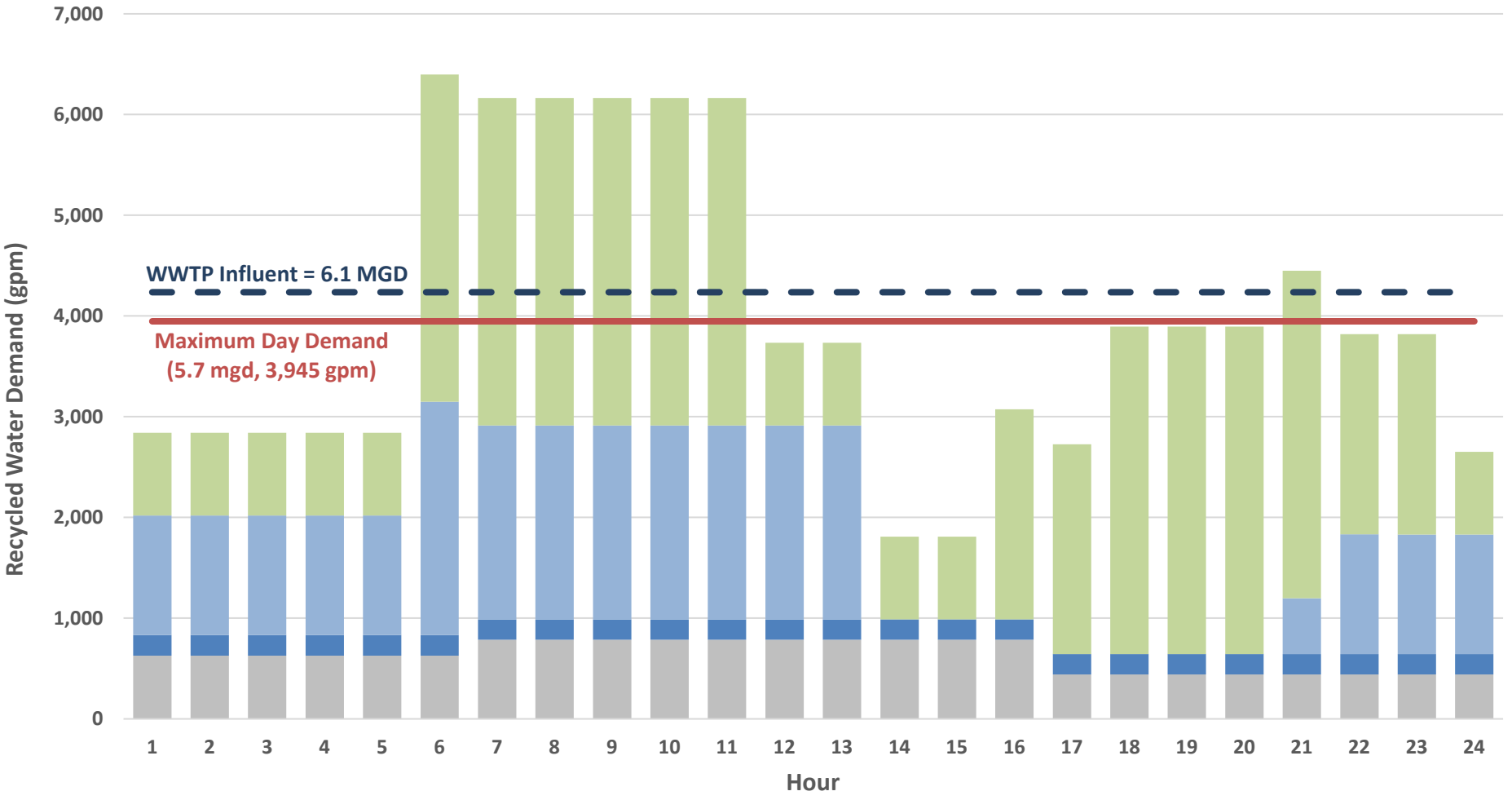

LEGEND

- Utility
- M&I
- Irrigation
- Agriculture
- Average Recycled Water Use

May 1, 2024

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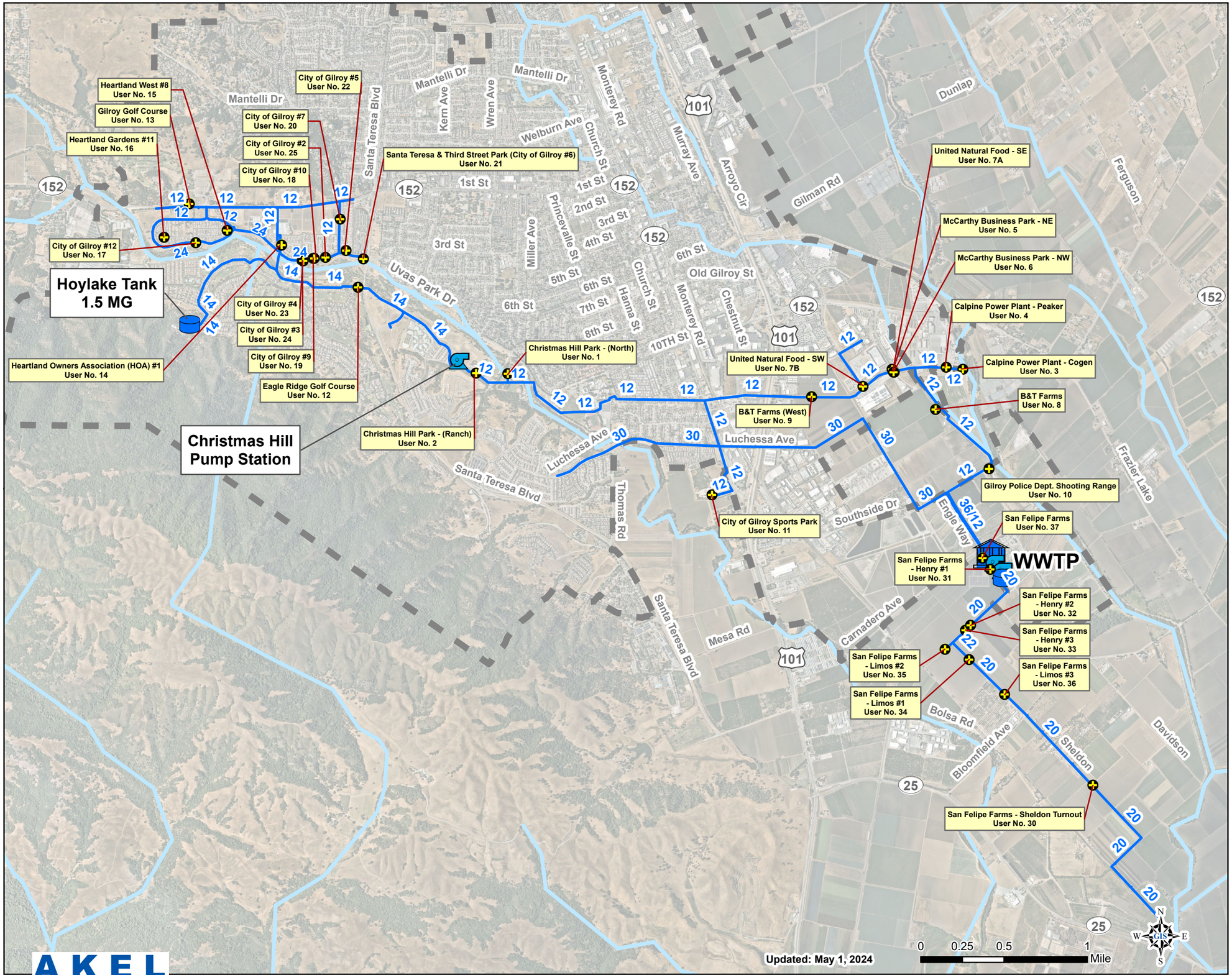
Figure 6
Existing User Hourly Demands, MDD

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

Valley Water



Legend

Existing System

- WWTP
- Booster Station
- Storage Tank
- Recycled Water Meters
- Pipes

Existing Features

- Rivers
- City Limits

Figure 7
Existing Customer Connections
2024 Sourth County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

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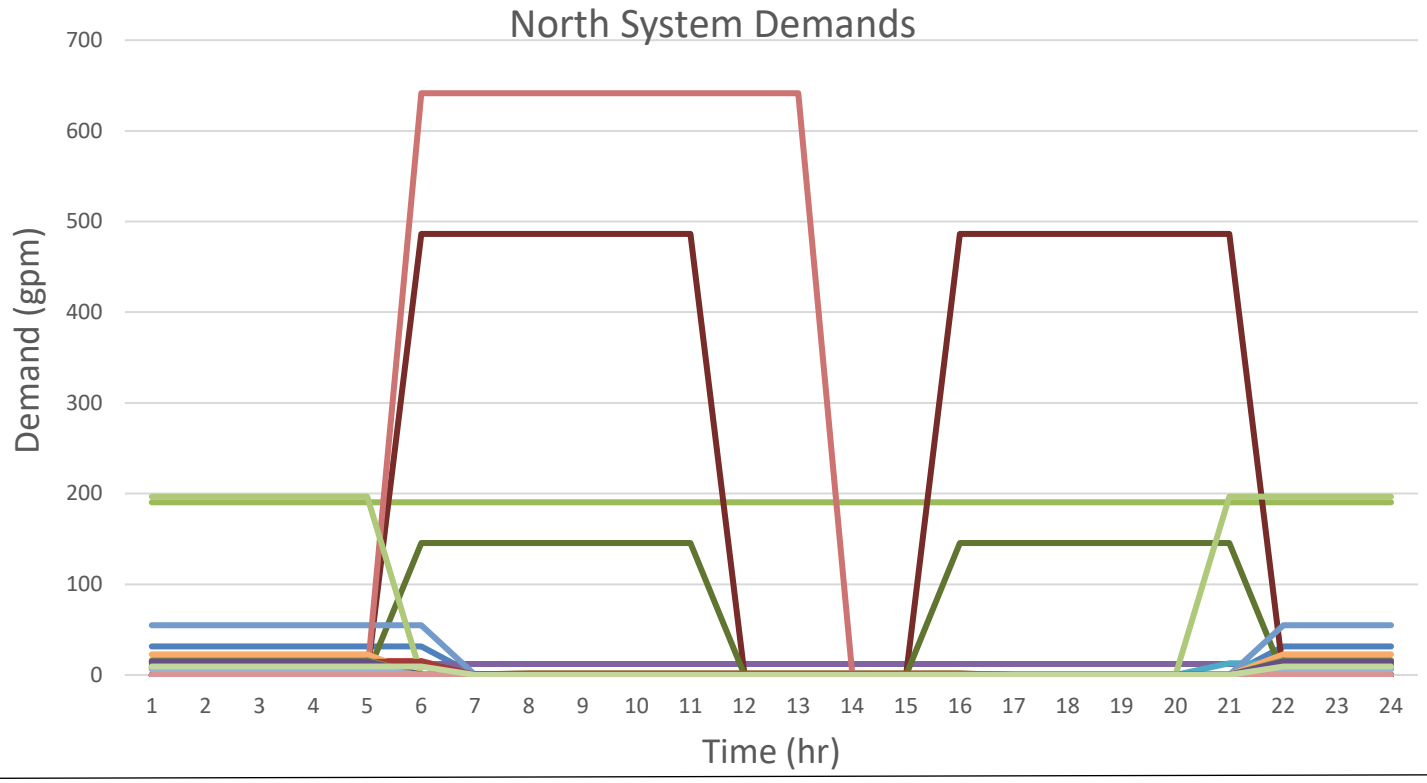

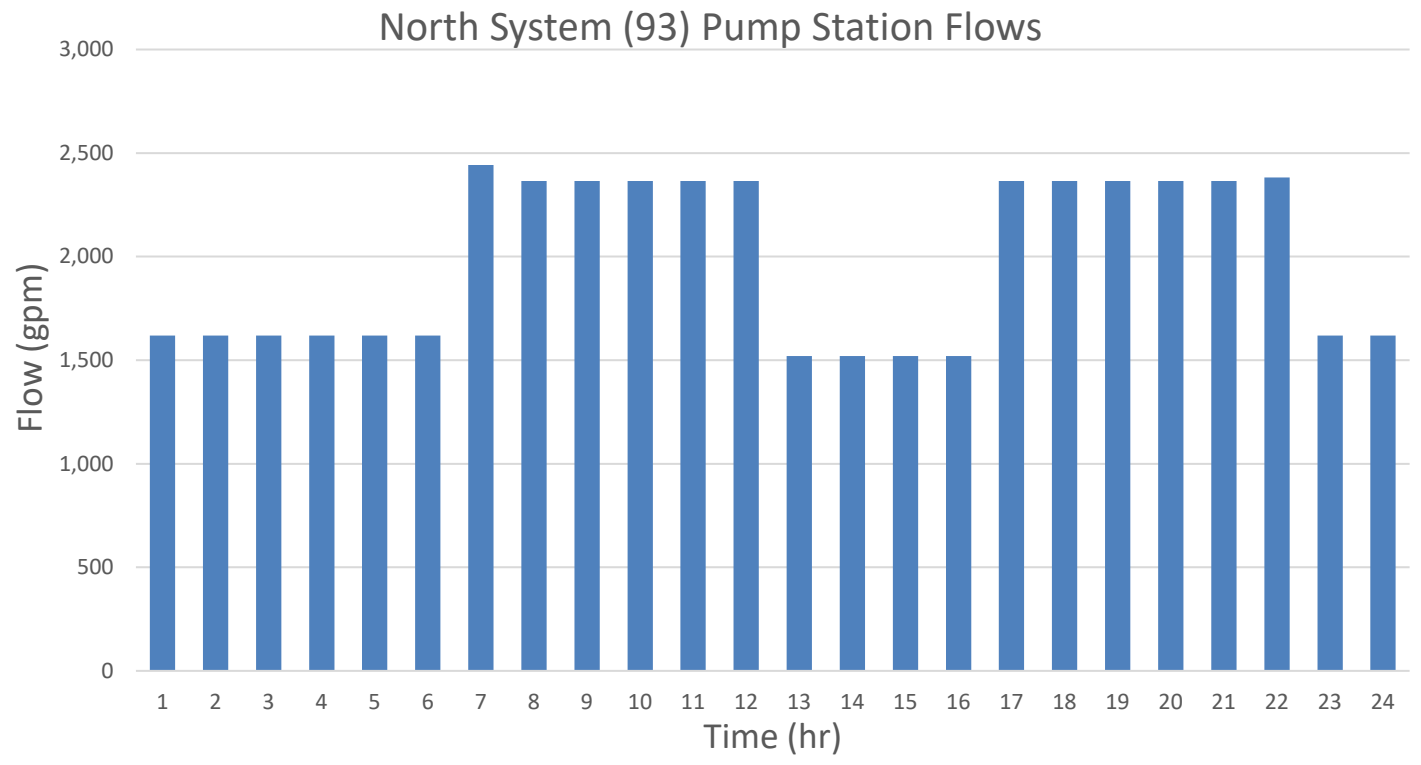

LEGEND

- Christmas Hill Park - (North)
- Christmas Hill Park - (Ranch)
- Calpine Power Plant - Cogen
- Calpine Power Plant - Peaker
- McCarthy Business Park - NE
- McCarthy Business Park - NW
- United Natural Food
- B&T Farms
- B&T Farms (West)
- Gilroy Police Dept. Shooting Range
- Tri Pointe (North)
- Tri Pointe (South)
- City of Gilroy Sports Park
- Eagle Ridge Golf Course
- Gilroy Golf Course
- Heartland Owners Association (HOA) #1
- Heartland Owners Association (HOA) #8
- Heartland Owners Association (HOA) #11
- Trinchero Construction Company
- City of Gilroy #12
- City of Gilroy #10
- City of Gilroy #9
- City of Gilroy #7
- Santa Teresa & Third Street Park (City of Gilroy #6)

May 1, 2024

Figure 8
North System Demands
2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

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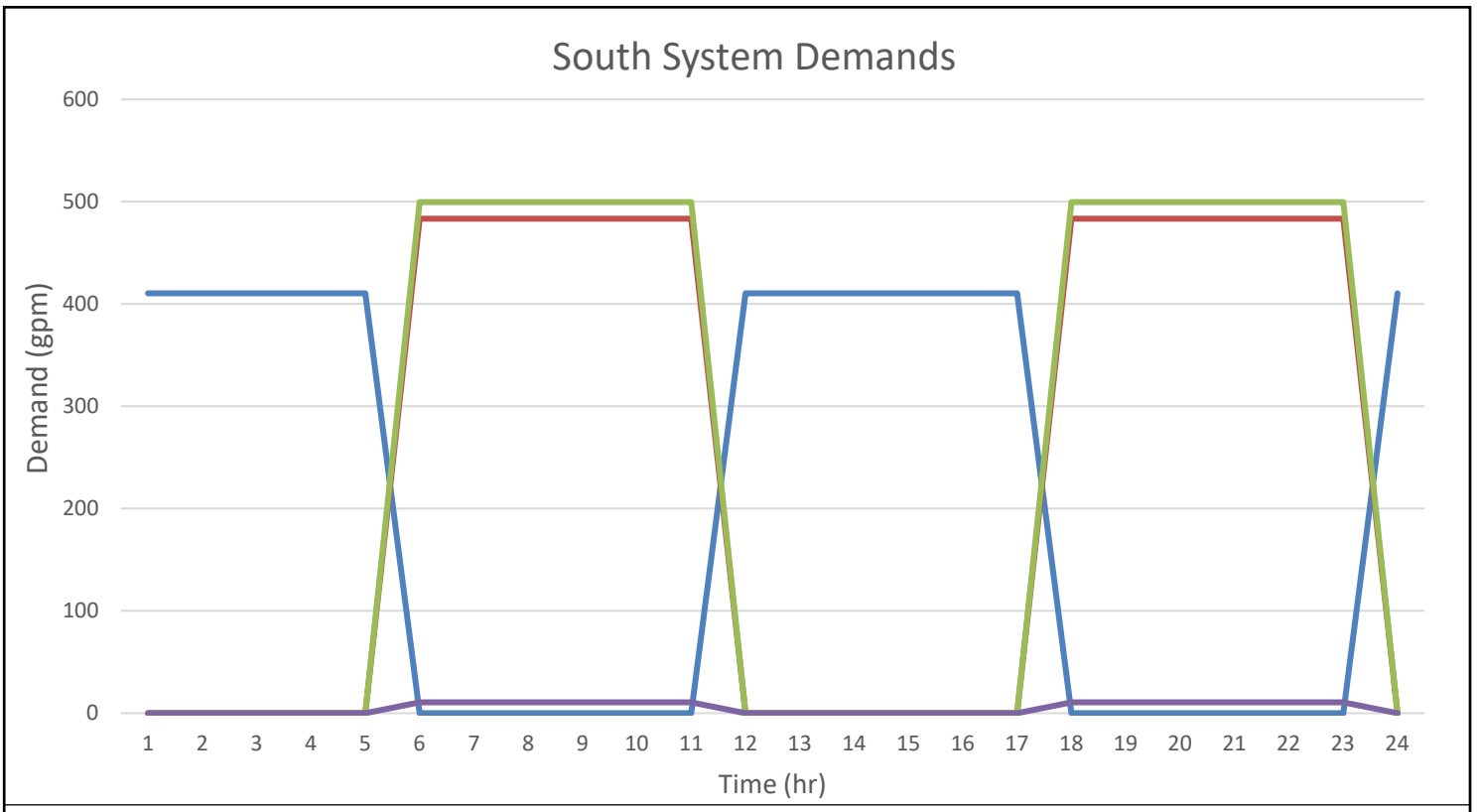
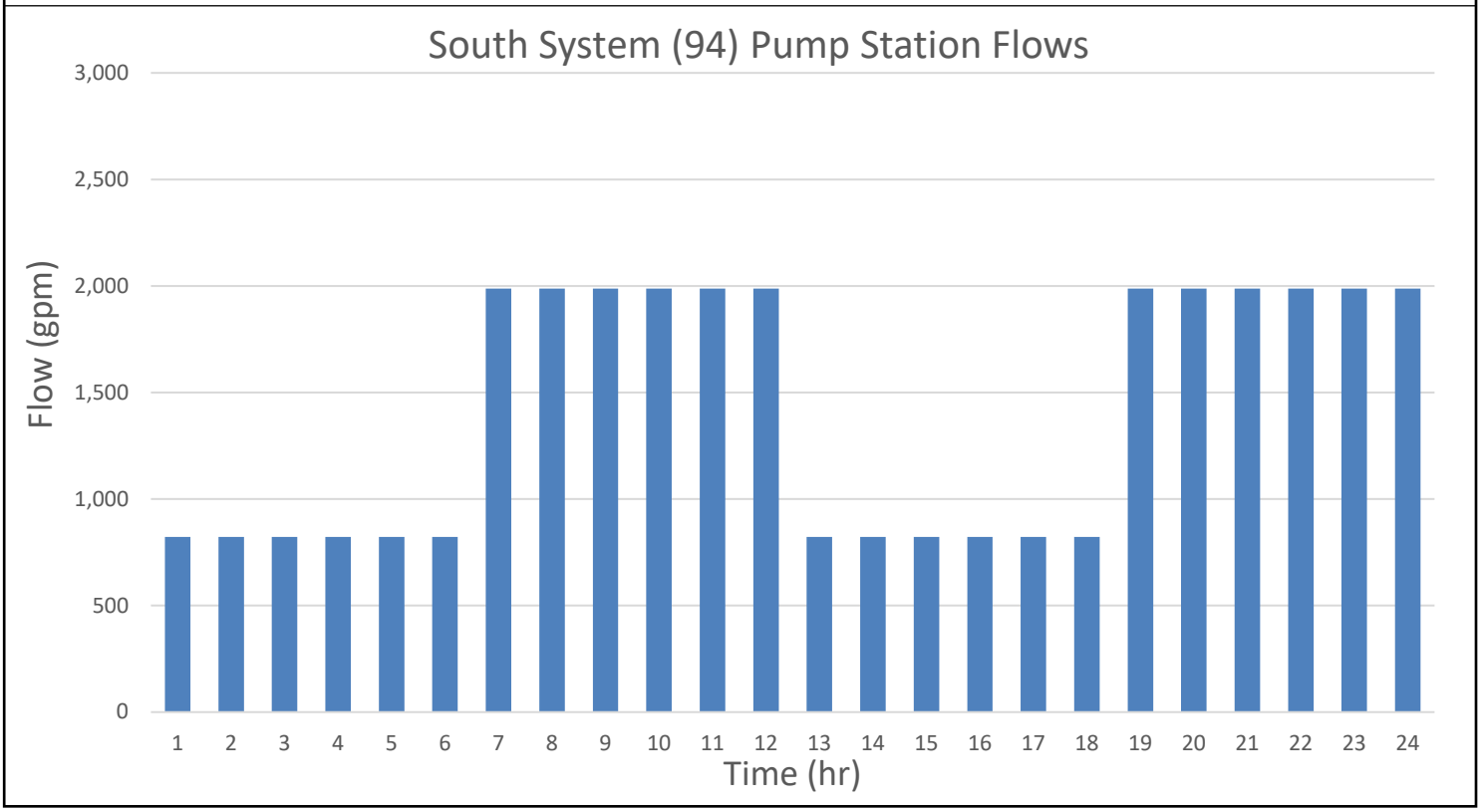




LEGEND

- San Felipe Farms - Sheldon Turnout
- San Felipe Farms #135116
- San Felipe Farms #135115
- San Felipe Farms #135711

May 1, 2024

Figure 9
South System Demands
2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

AKEL ENGINEERING GROUP, INC.

Legend

Future System

- Planned Baseline System
- Immediate Potential Users

Existing System

- WWTP
- Booster Station
- Storage Tank
- Pipelines

Existing Features

- Rivers
- City Limits

Figure 10
Potential Future Users
2024 Sourth County Recycled Water
Master Plan Update
Santa Clara Valley Water District

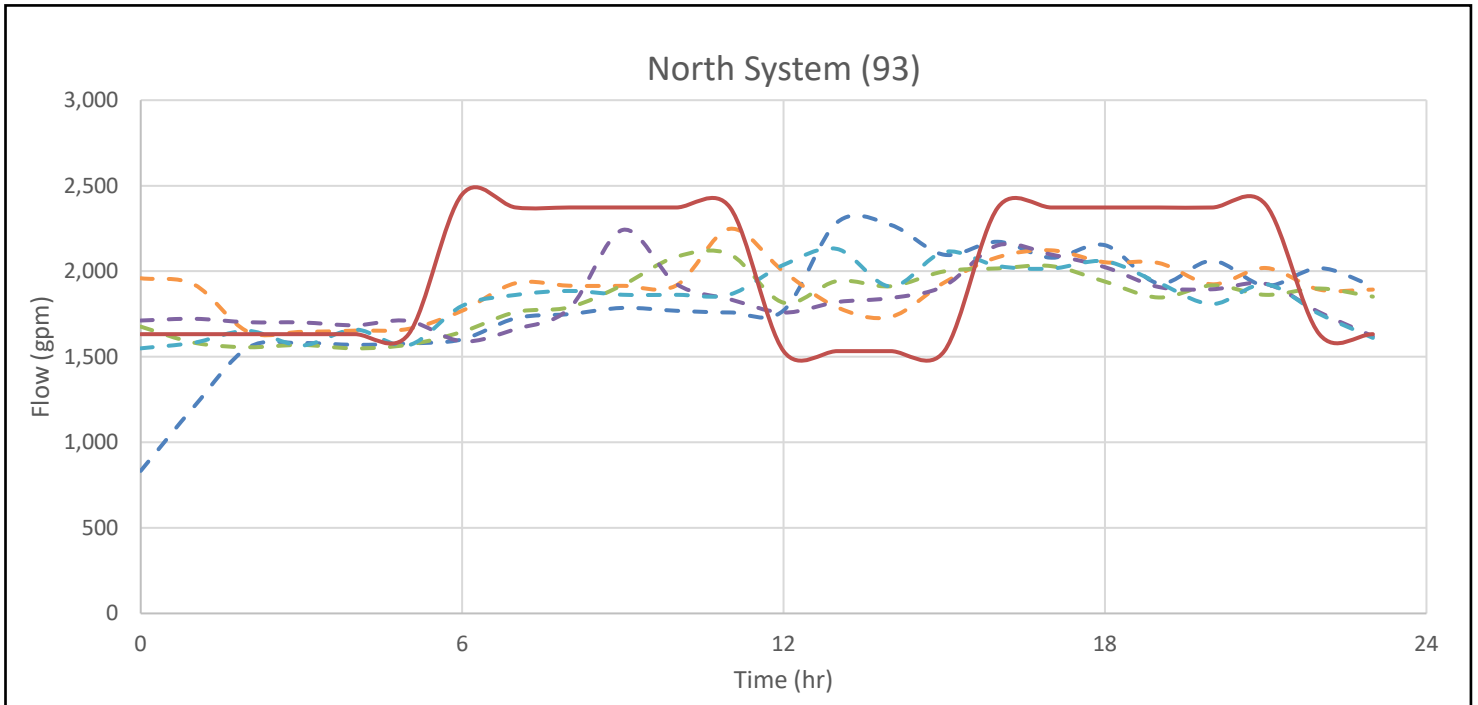
Valley Water

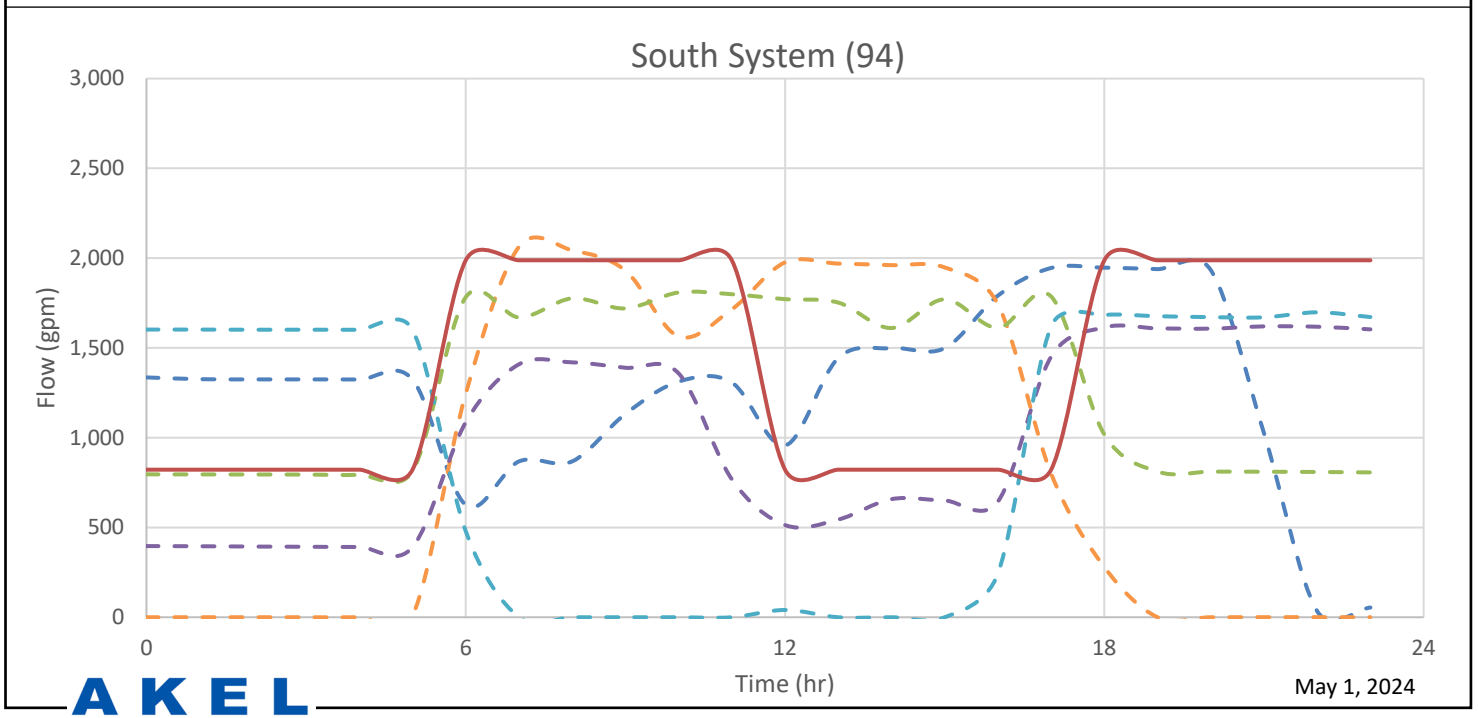
AKEL
ENGINEERING GROUP, INC.

Updated: May 1, 2024

0 0.25 0.5 1 Mile

File Path: P:\xGIS\GIS_Projects\SCVWD\220714-RWSystem\Final\SCVWD_Fig10_PotentialUsers_050124.mxd





LEGEND

- 7/9/2021
- 7/10/2021
- 7/13/2021
- 7/20/2021
- 7/23/2021
- Model

- 7/2/2021
- 7/7/2021
- 7/10/2021
- 7/14/2021
- 7/15/2021
- Model

Figure 11
Hydraulic Model Calibration
2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

May 1, 2024

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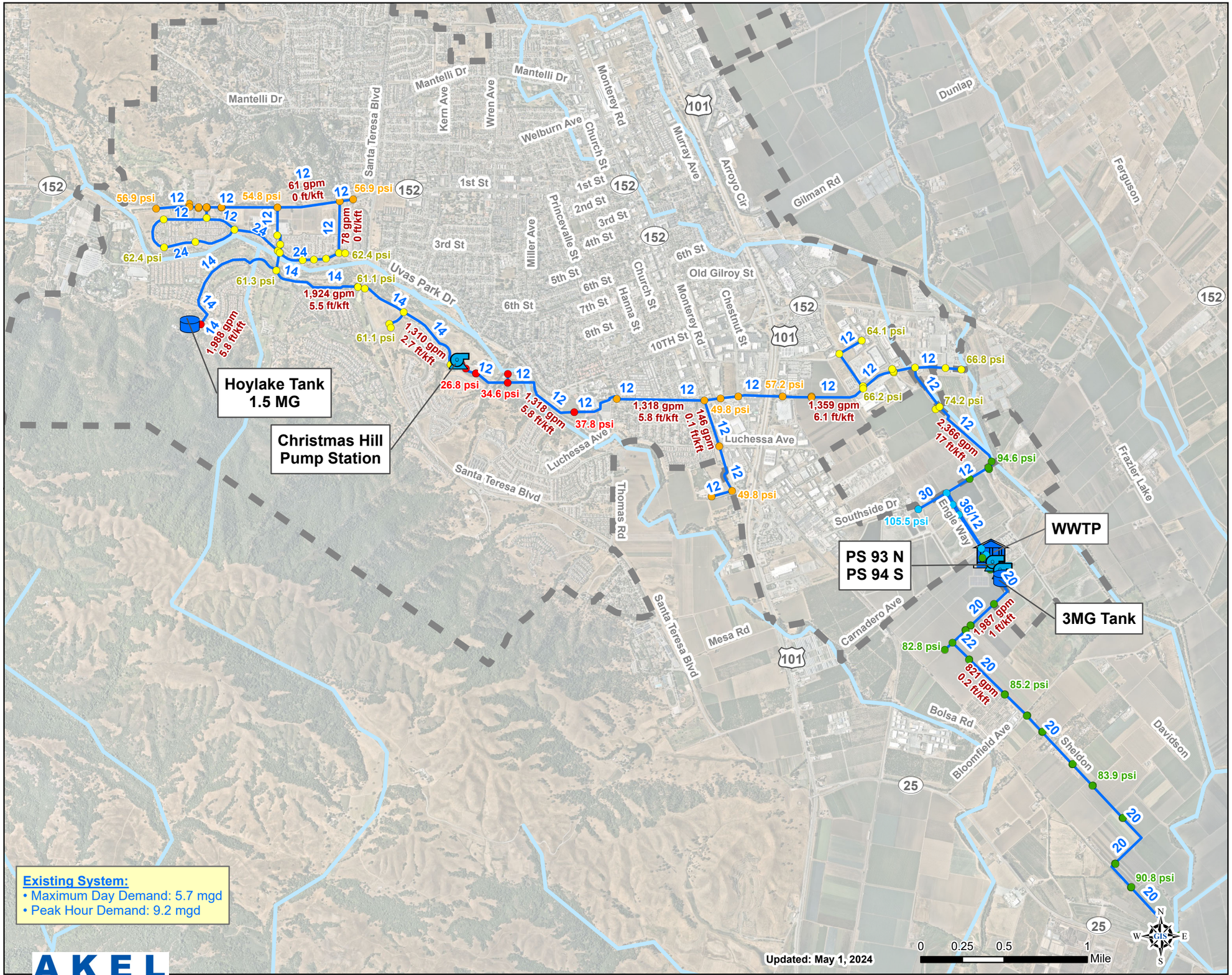
Valley Water



Legend

Peak Hour Pressures

- Greater than 100 psi
- 80 - 100 psi
- 60 - 80 psi
- 40 - 60 psi
- Less than 40 psi

Existing System

- WWTP
- Booster Station
- Storage Tank
- Pipes

Existing Features

- Rivers
- City Limits

Notes:

- Christmas Hill Pump Station flow limited due to low suction pressures caused by high pipeline headlosses
- Maximum Day Demand: 5.7 mgd
- Peak Hour Demand: 9.2 mgd
- Pipe flows and system pressures documented are during peak hour demands

Existing System:

- Maximum Day Demand: 5.7 mgd
- Peak Hour Demand: 9.2 mgd

Figure 12
Existing System Evaluation

2024 Sourth County Recycled Water
Master Plan Update
Santa Clara Valley Water District

Valley Water

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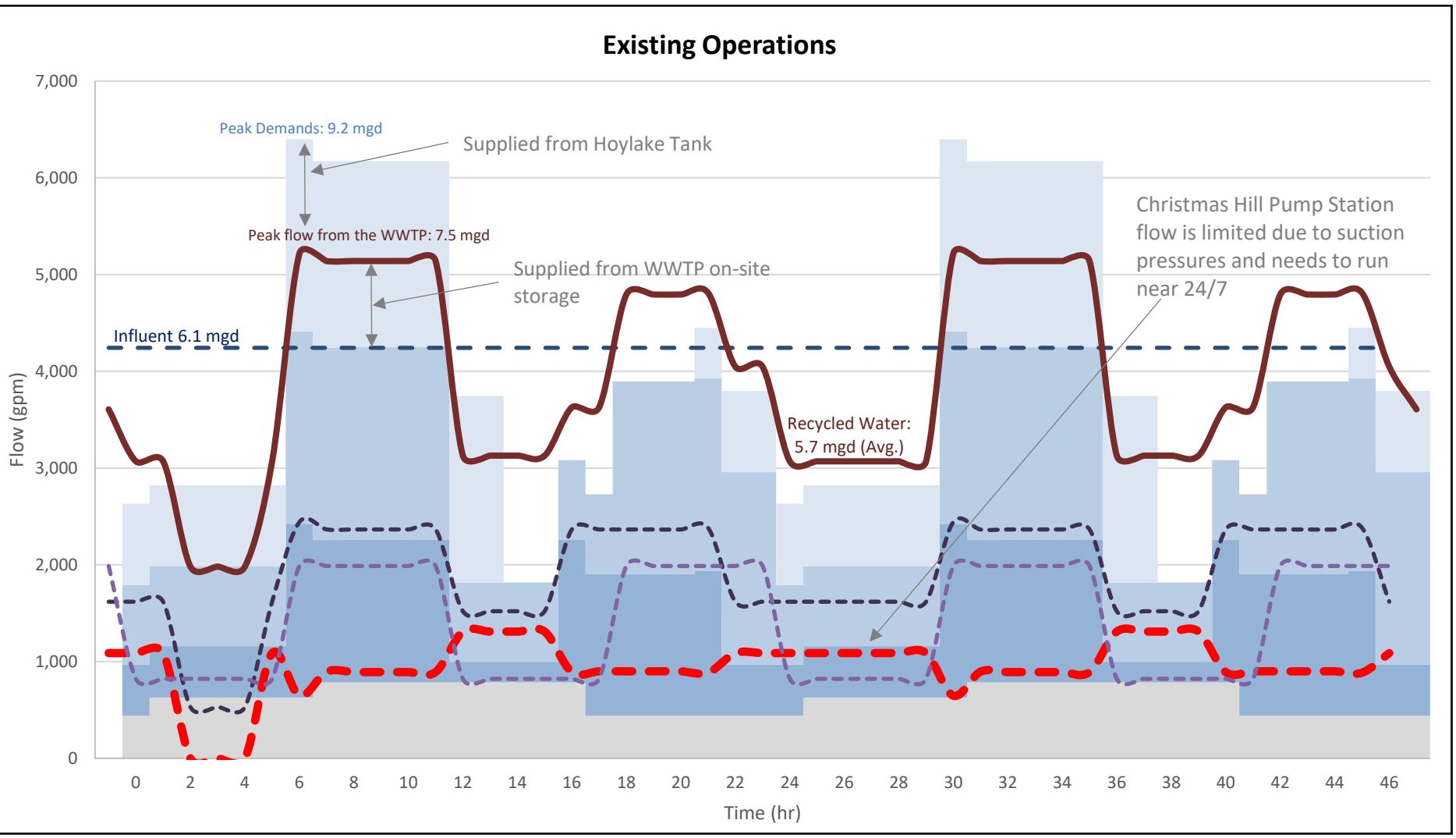
File Path: P:\xGIS\GIS_Projects\SCVWD\220714-RWSystem\Final\SCVWD_Fig12_ExistingSystemEval_050124.mxd



LEGEND

- Zone 2 Demands
- South Demands
- Zone 1 Demands
- WWTP Utility Water
- X-Mas Hill PS Flow
- WWTP Influent (Avg.)
- Recycled Effluent
- North PS (Area 93) Flow
- South PS (Area 94) Flow

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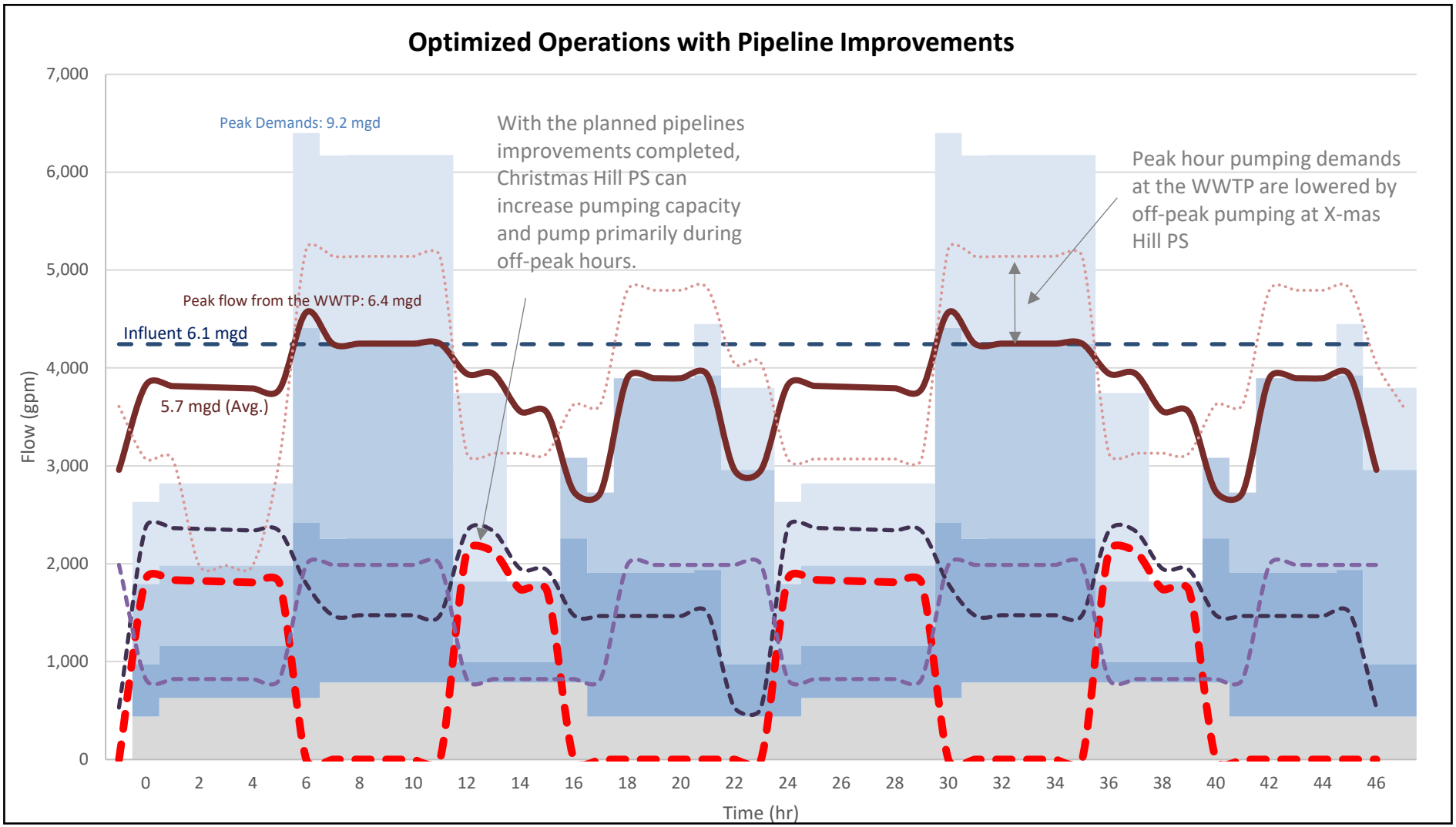
Figure 13
Existing MDD Operations
2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water



LEGEND

- Zone 2 Demands
- South Demands
- Zone 1 Demands
- WWTP Utility Water
- X-Mas Hill PS Flow
- WWTP Influent (Avg.)
- Recycled Water Effluent
- North PS (Area 93) Flow
- South PS (Area 94) Flow
- Existing Recycled Effluent

Notes:
1. Pipeline improvements include the Under Construction, Constructed but Inactive, and Imminent pipelines

May 1, 2024

Figure 14

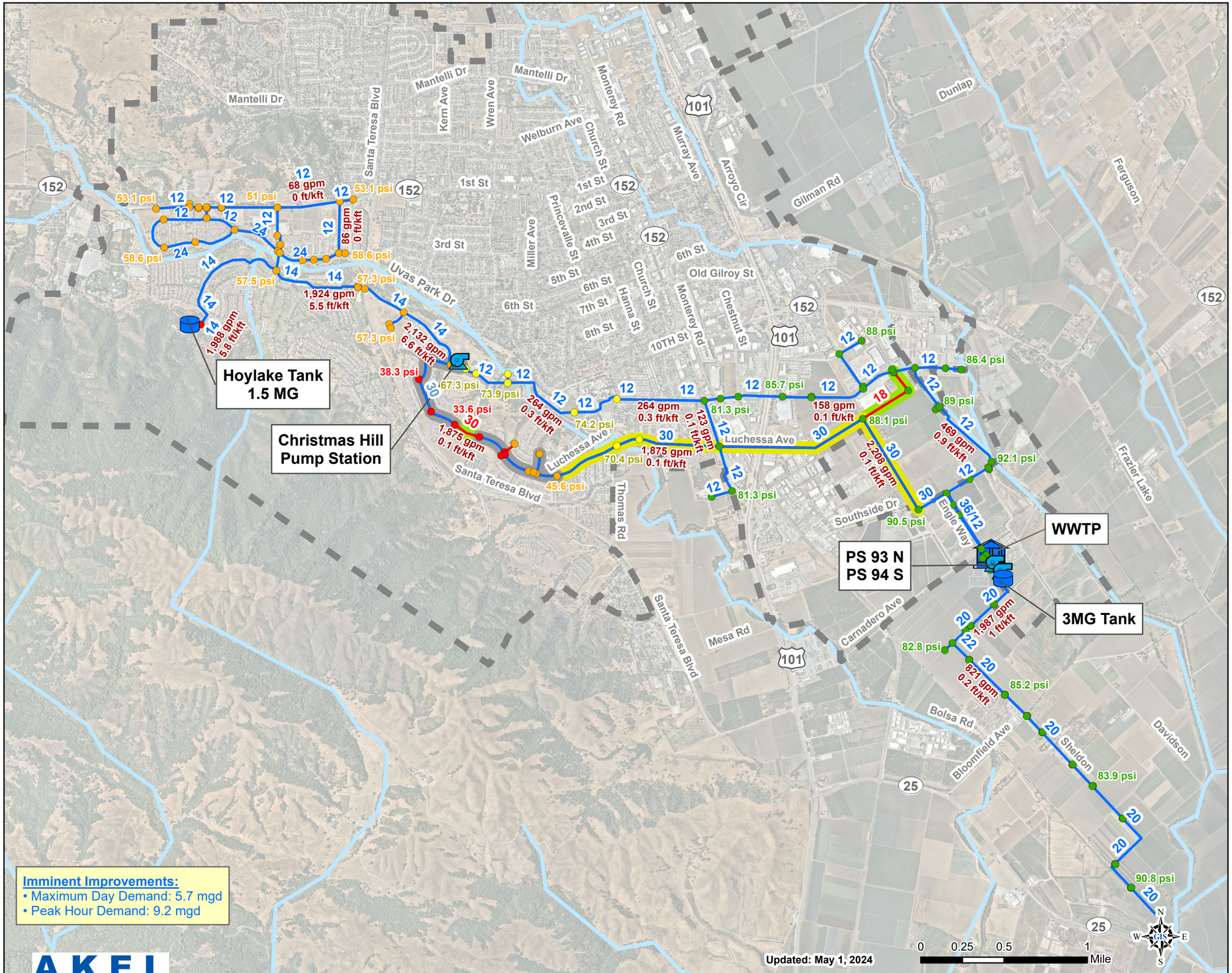
Optimized MDD Operations

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

AKEL ENGINEERING GROUP, INC.

Valley Water



Imminent Improvements:
- Maximum Day Demand: 5.7 mgd
- Peak Hour Demand: 9.2 mgd

Legend

Peak Hour Pressures
- Greater than 100 psi
- 80 - 100 psi
- 60 - 80 psi
- 40 - 60 psi
- Less than 40 psi

Baseline System Improvements
- Pipelines
- Constructed but Inactive
- Recent Construction
- Near-Term Improvements

Existing System
- WWTP
- Booster Station
- Storage Tank
- Pipes

Existing Features
- Rivers
- City Limits

Notes:
- Christmas Hill Pump Station operates during off-peak hours
- Maximum Day Demand: 5.7 mgd
- Peak Hour Demand: 9.2 mgd
- Pipe flows and system pressures documented are during peak hour demands

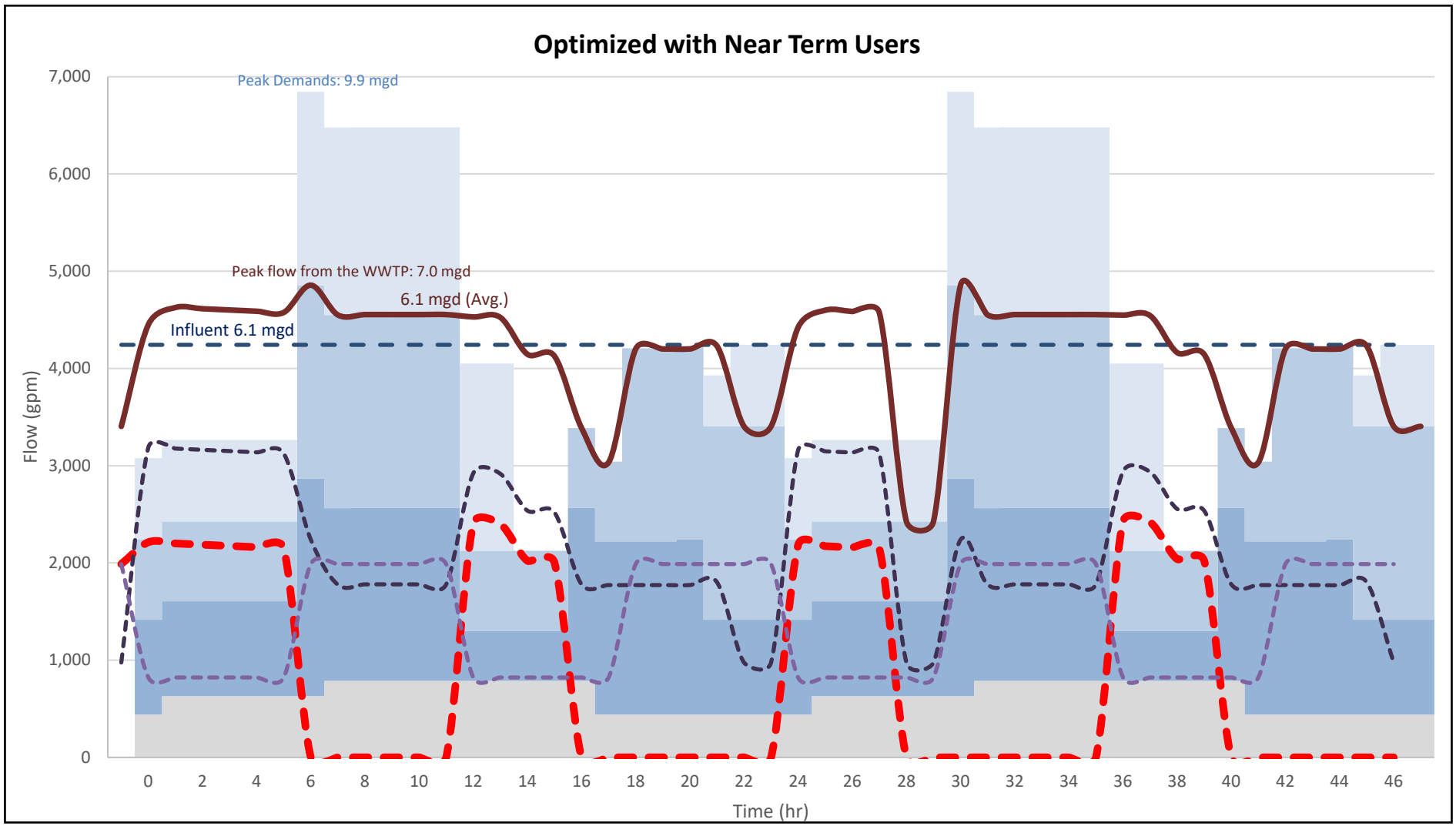
Figure 15
Baseline Improvements Plus Optimization Evaluation

2024 Sourth County Recycled Water Master Plan Update
Santa Clara Valley Water District

AKEL ENGINEERING GROUP, INC.

Valley Water

File Path: P:\xGIS\GIS_Projects\SCVWD\220714-RWSystem\Final\SCVWD_Fig15_ImminentConst_050124.mxd



LEGEND

- Zone 2 Demands
- South Demands
- Zone 1 Demands
- WWTP Utility Water
- X-Mas Hill PS Flow
- WWTP Influent (Avg.)
- Recycled Effluent
- North PS (Area 93) Flow
- South PS (Area 94) Flow

Notes:
1. Pipeline improvements include the Under Construction, Constructed but Inactive, and Imminent pipelines
2. Near-Term users include Gilroy Data Center and Glen Loma

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Figure 16

Optimized MDD Operations + Near Term Users

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

Valley Water

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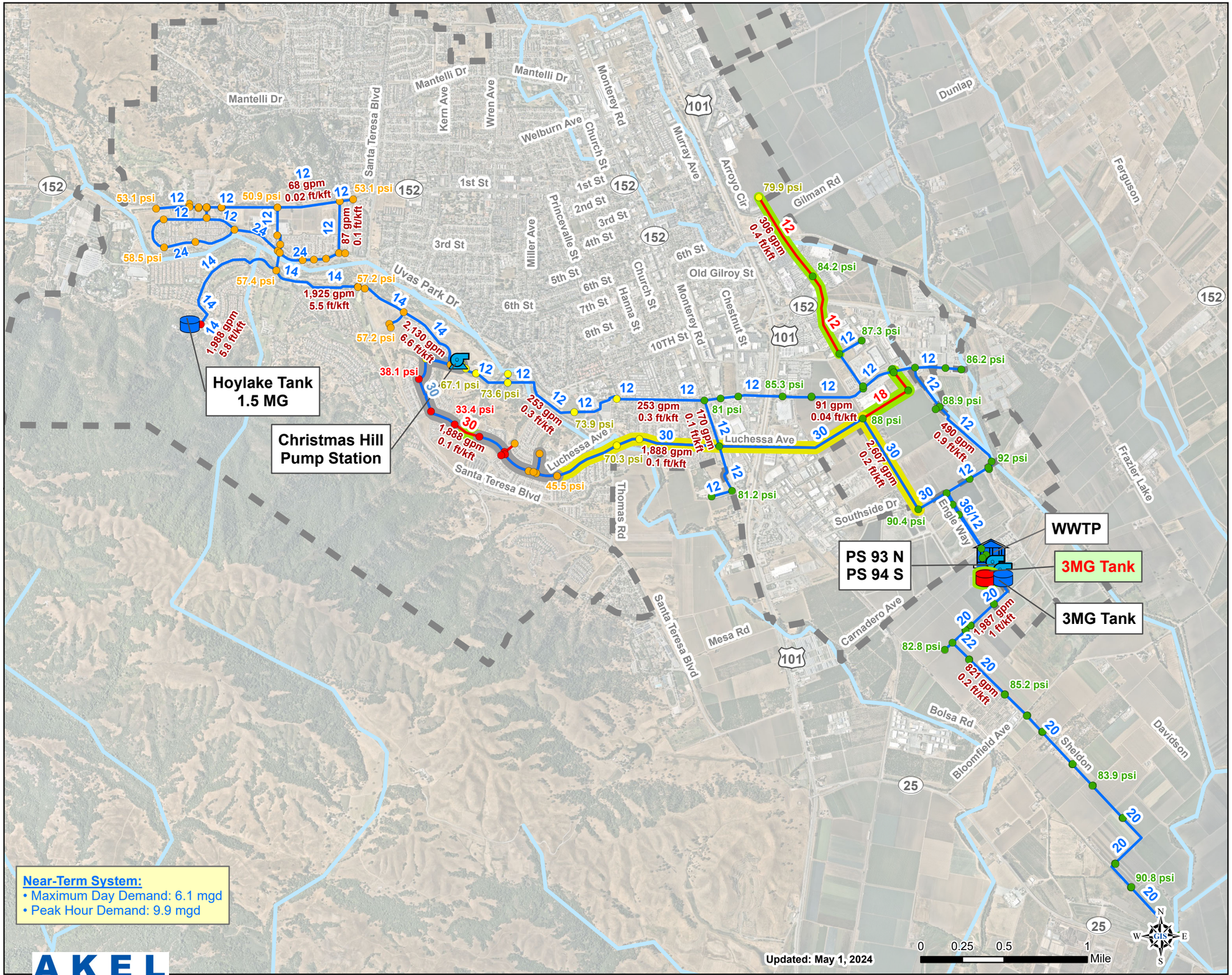


Legend

Peak Hour Pressures
- Greater than 100 psi
- 80 - 100 psi
- 60 - 80 psi
- 40 - 60 psi
- Less than 40 psi

Baseline System Improvements
- Tanks
- Pipelines
- Constructed but Inactive
- Recent Construction
- Near-Term Improvements

Existing System
- WWTP
- Booster Station
- Storage Tank
- Pipes

Existing Features
- Rivers
- City Limits

Notes:
- Christmas Hill Pump Station operates during off-peak hours
- Maximum Day Demand: 6.1 mgd
- Peak Hour Demand: 9.9 mgd
- Pipe flows and system pressures documented are during peak hour demands
- Near-Term users included are the Gilroy Data Center and Glen Loma

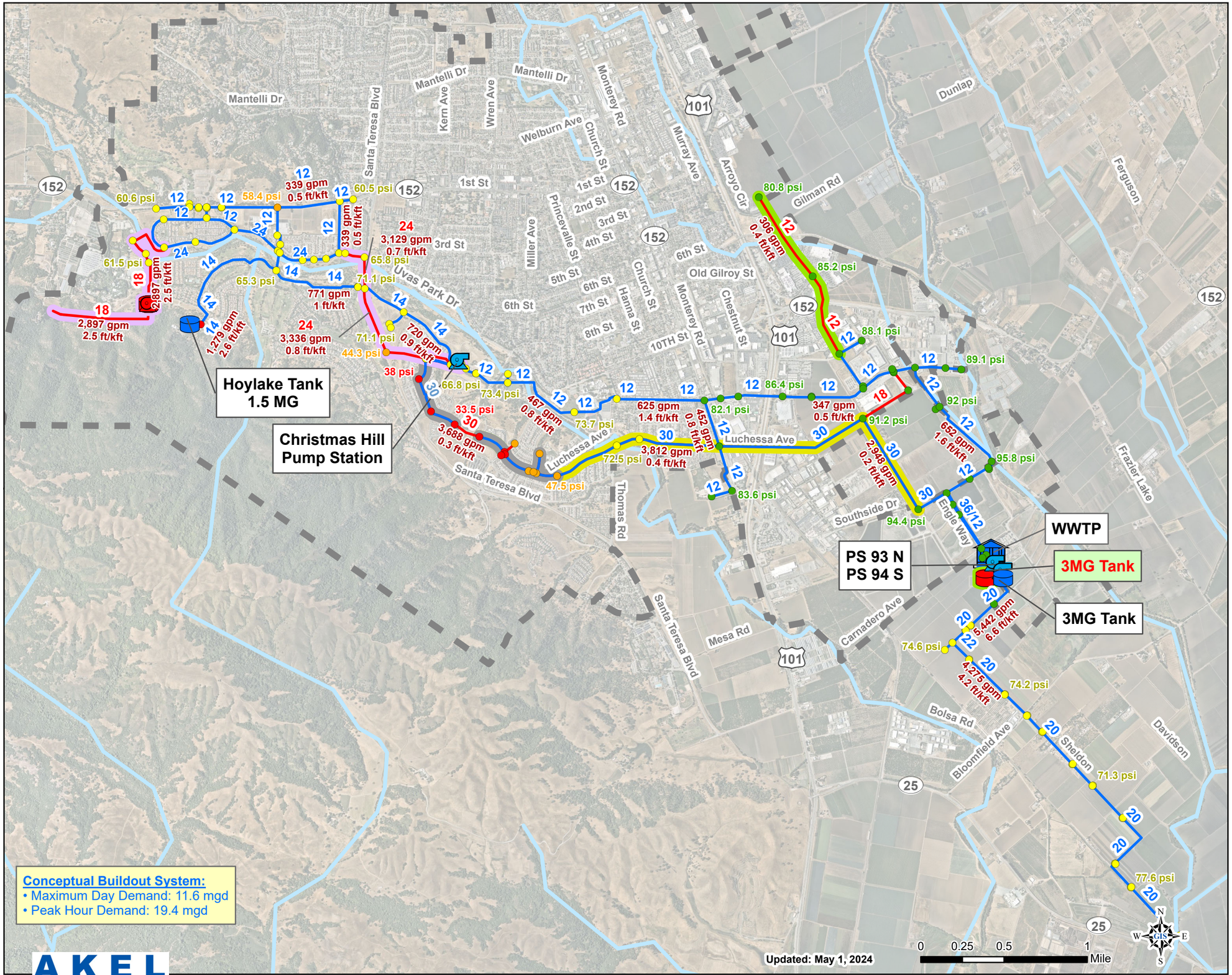
Near-Term System:
- Maximum Day Demand: 6.1 mgd
- Peak Hour Demand: 9.9 mgd

Figure 17
Near-Term Users Evaluation with Optimized Operations

2024 Sourth County Recycled Water Master Plan Update
Santa Clara Valley Water District

AKEL ENGINEERING GROUP, INC.

Valley Water



Legend

Peak Hour Pressures

- Greater than 100 psi
- 80 - 100 psi
- 60 - 80 psi
- 40 - 60 psi
- Less than 40 psi

Baseline System Improvements

- Tanks
- Booster Stations
- Pipelines
- Constructed but Inactive
- Under Construction
- Near-Term Improvements
- Long-Term Improvements

Existing System

- WWTP
- Booster Station
- Storage Tank
- Pipes

Existing Features

- Rivers
- City Limits

Notes:

- Maximum Day Demand: 11.6 mgd
- Peak Hour Demand: 19.4 mgd
- Pipe flows and system pressures documented are during peak hour demands

Conceptual Buildout System:

- Maximum Day Demand: 11.6 mgd
- Peak Hour Demand: 19.4 mgd

Figure 18
Conceptual Baseline Buildout

2024 Sourth County Recycled Water Master Plan Update
Santa Clara Valley Water District

AKEL ENGINEERING GROUP, INC.

Valley Water

File Path: P:\xGIS\GIS_Projects\SCVWD\220714-RWSystem\Final\SCVWD_Fig18_LongTermConst_050124.mxd

MORGAN HILL
GILROY
AWPF
Wastewater Treatment Plant
AWPF
Kirby
Hale
Peet
Main
Monterey
Diana
Dunne
Spring
Lakeview
Oakwood
Tennant
Hill
Maple
Middle
Sycamore
Center
Foothill
Edmundson
Watsonville
California
Harding
Highland
Church
Fitzgerald
Rucker
Buena Vista
New
Marcella
Las Animas
Leavesley
Ferguson
Gilman
Day
Burchell
Wren
4th
Monterey
Miller
Southside
Bolsa
Santa Teresa
Bloomfield
San Martin
101
152
24
12
14
18
20
30
12/36
30/ 24

Note:
- Option 1a: Direct Potable Reuse via Raw Water Augmentation into water system (via Satellite WWTP and AWPF)
- Option 1b: Direct Potable Reuse via Raw Water Augmentation into water system (via purified water pumped from SCRWA)

Legend

Option 1a
- Water Purification Facility

Option 1b
- Water Purification Facility
- Booster Stations
- Recycled Water Recharge Pipeline

SCVWD Improvements
- Baseline Improvements

Existing
- WWTP
- Storage Tanks
- Booster Stations
- Recycled Water Pipelines
- Morgan Hill Water System

- City Limits
- Roads
- Lakes

PRELIMINARY

Updated: May 1, 2024

0 0.25 0.5 1 Mile

N W GIS E S

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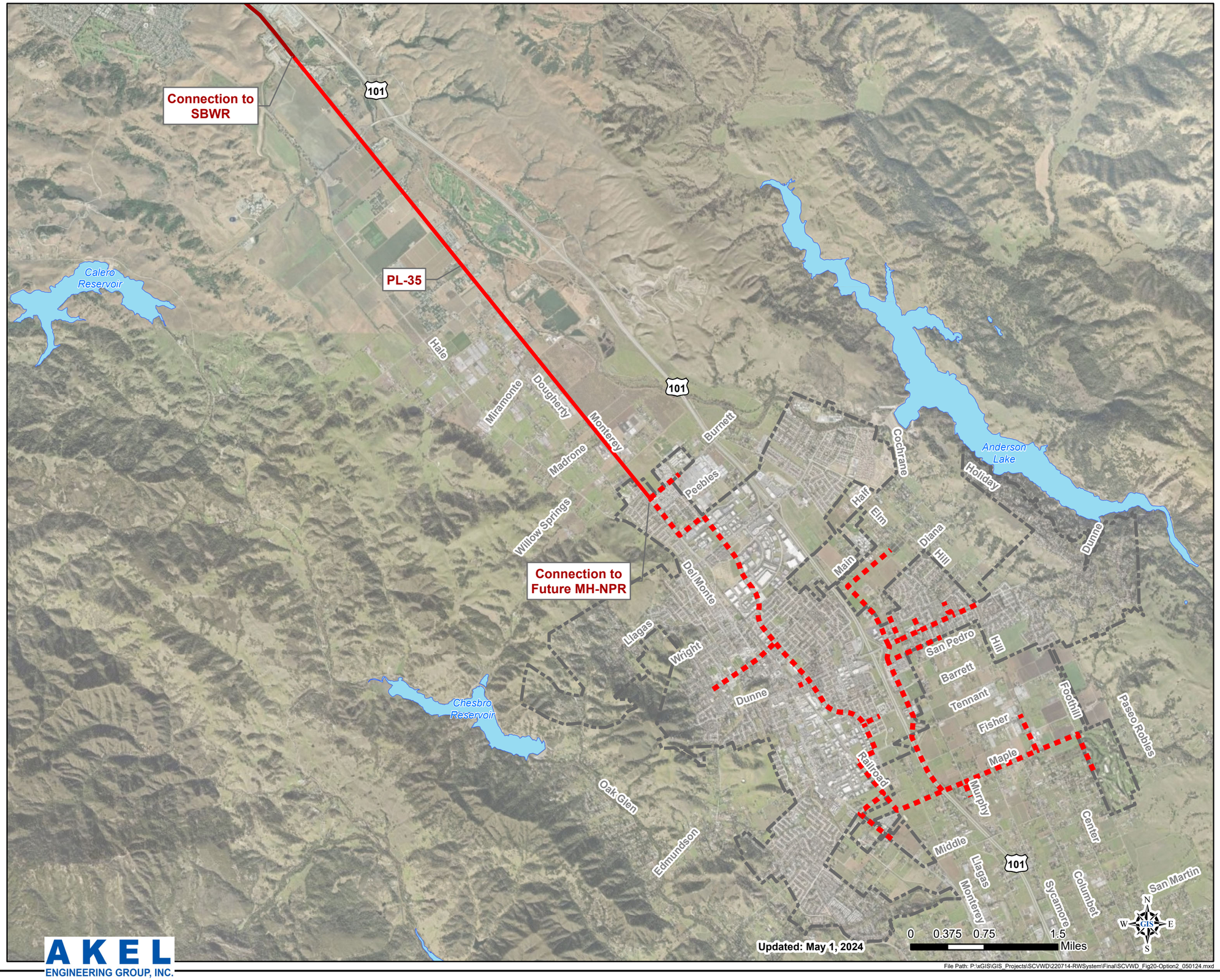
File Path: P:\xGIS\GIS_Projects\SCVWD\220714-RWSystem\Final\SCVWD_Fig19-Option1_050124.mxd

Figure 19
Morgan Hill Recycled Water Option 1 - Direct Reuse

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water



Legend

Raw Water System

- Existing SBWR Pipeline
- Proposed RW Pipeline
- Morgan Hill RW System
- Lakes
- City Limits

Source:
Countywide Water Reuse Master Plan (CoRe Plan), October 2020

Note:
- NPR+ from South Bay Water Recycling

Figure 20
Morgan Hill Recycled Water Option 2 - NPR +

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

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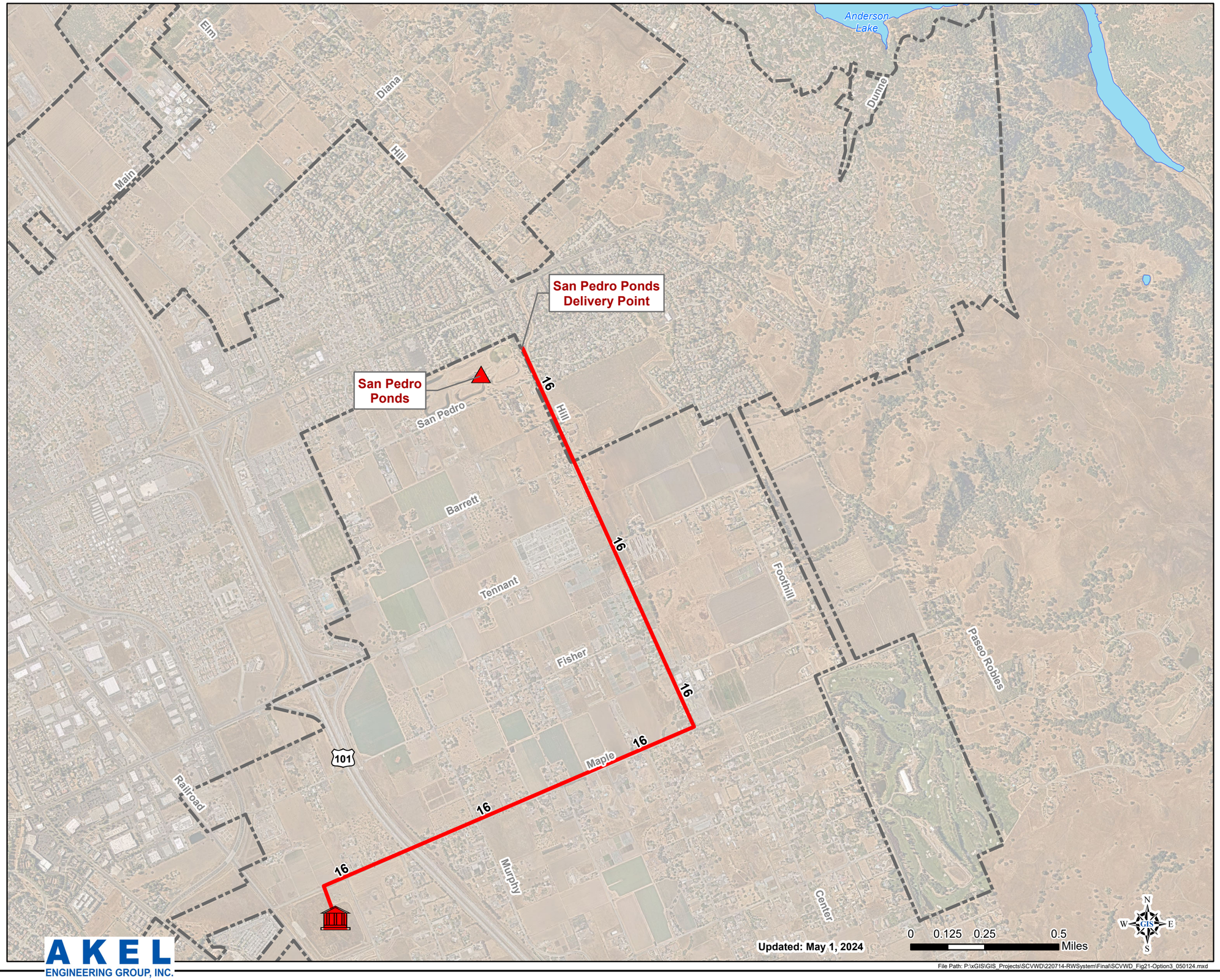
File Path: P:\xGIS\GIS_Projects\SCVWD\220714-RWSystem\Final\SCVWD_Fig20-Option2_050124.mxd



Legend

Water Purification System

- Water Purification Facility
- San Pedro Ponds
- Purified Water Pipelilne
- Lakes
- City Limits

Source:
Countywide Water Reuse Master Plan (CoRe Plan), October 2020

Note:

- Satellite Advanced Water Purification Facility (AWPF) for Groundwater Recharge (GWR)

Figure 21
Morgan Hill Recycled Water Option 3 - GWR

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

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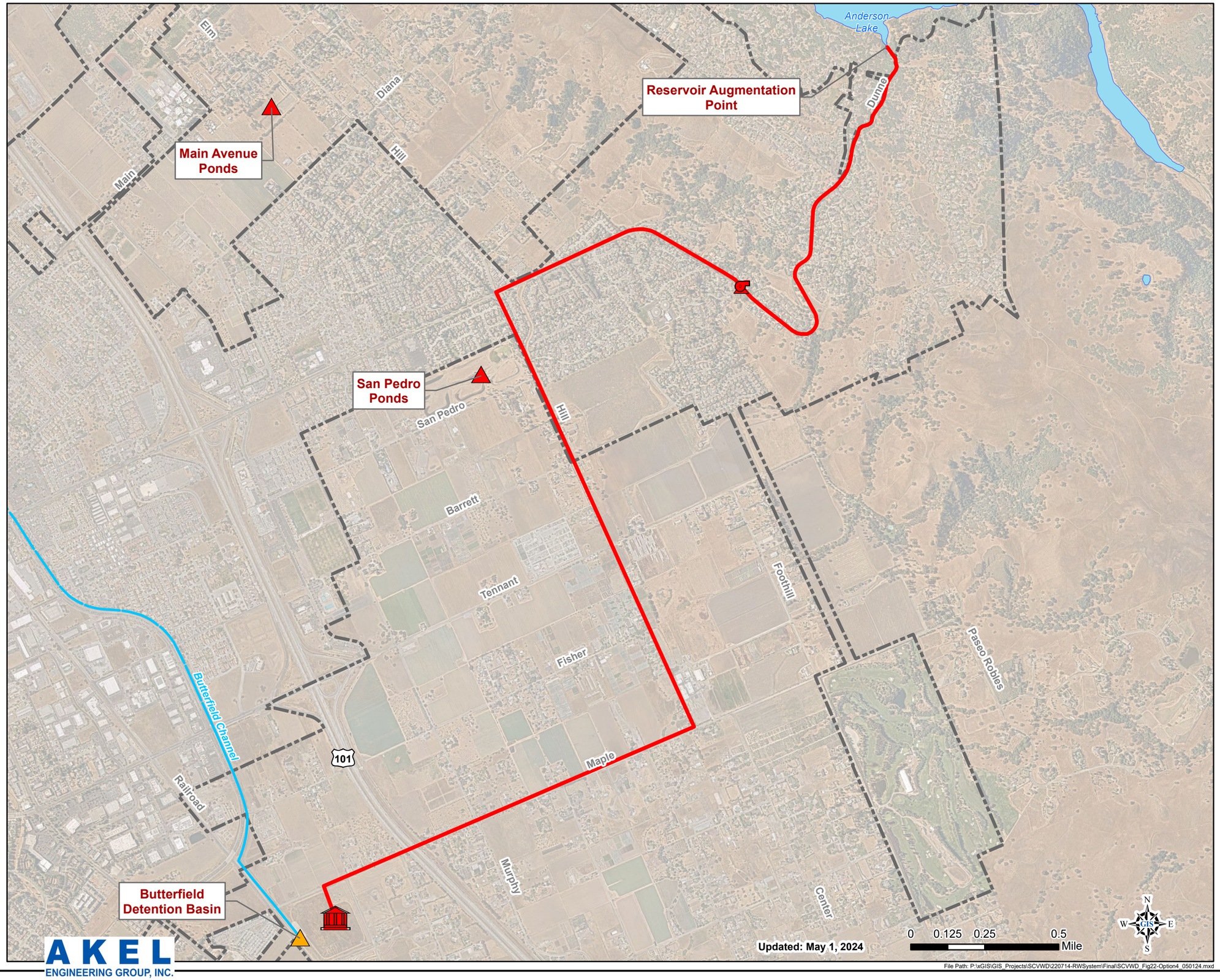
Valley Water



Legend

Water Purification System

- Water Purification Facility
- Booster Station
- Detention Basin
- Recharge Ponds
- Purified Water Pipelilne
- Butterfield Channel
- Lakes
- City Limits

Source:
Countywide Water Reuse Master Plan (CoRe Plan), October 2020

Note:
- Satellite Advanced Water Purification Facility (AWPF) for Surface Water Augmentation (SWA)

Figure 22
Morgan Hill Recycled Water Option 4 - SWA

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

AKEL ENGINEERING GROUP, INC.

Valley Water

MORGAN HILL
GILROY
Kirby
Hale
Peet
Lakeview
Main
Monterey
Diana
Oakwood
Dunne
Spring
Tennant
Hill
Maple
Middle
Edmundson
Sycamore
Watsonville
California
San Martin
Center
Foothill
Harding
Highland
Church
Fitzgerald
Rucker
Buena Vista
Day
New
Marcella
Las Animas
Leavesley
Ferguson
Burchell
Wren
Gilman
4th
Miller
Southside
Bolsa
Santa Teresa
Bloomfield
101
152
24
12
14
30
20
12/36
Proposed Pump
Wastewater Treatment Plant

Note:
- Pumping Recycled Water from SCRWA to a Morgan Hill Recycled Water System (RW Master Plan - Alt 1 or 2)

Legend

Option 5
- Booster Stations
- Recycled Water Recharge Pipeline
- Morgan Hill's Proposed RW System

Proposed
- Storage Tanks
- Booster Stations
- Baseline Improvements

Existing
- WWTP
- Storage Tanks
- Booster Stations
- Recycled Water Pipelines

- Recharge Ponds
- City Limits
- Roads
- Lakes

Updated: May 1, 2024

0 0.25 0.5 1 Mile

N W GIS E S

File Path: P:\xGIS\GIS_Projects\SCVWD\220714-RWSystem\Final\SCVWD_Fig23-Option5_050124.mxd

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Figure 23
Morgan Hill Recycled Water Option 5 - RW from SCRWA

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

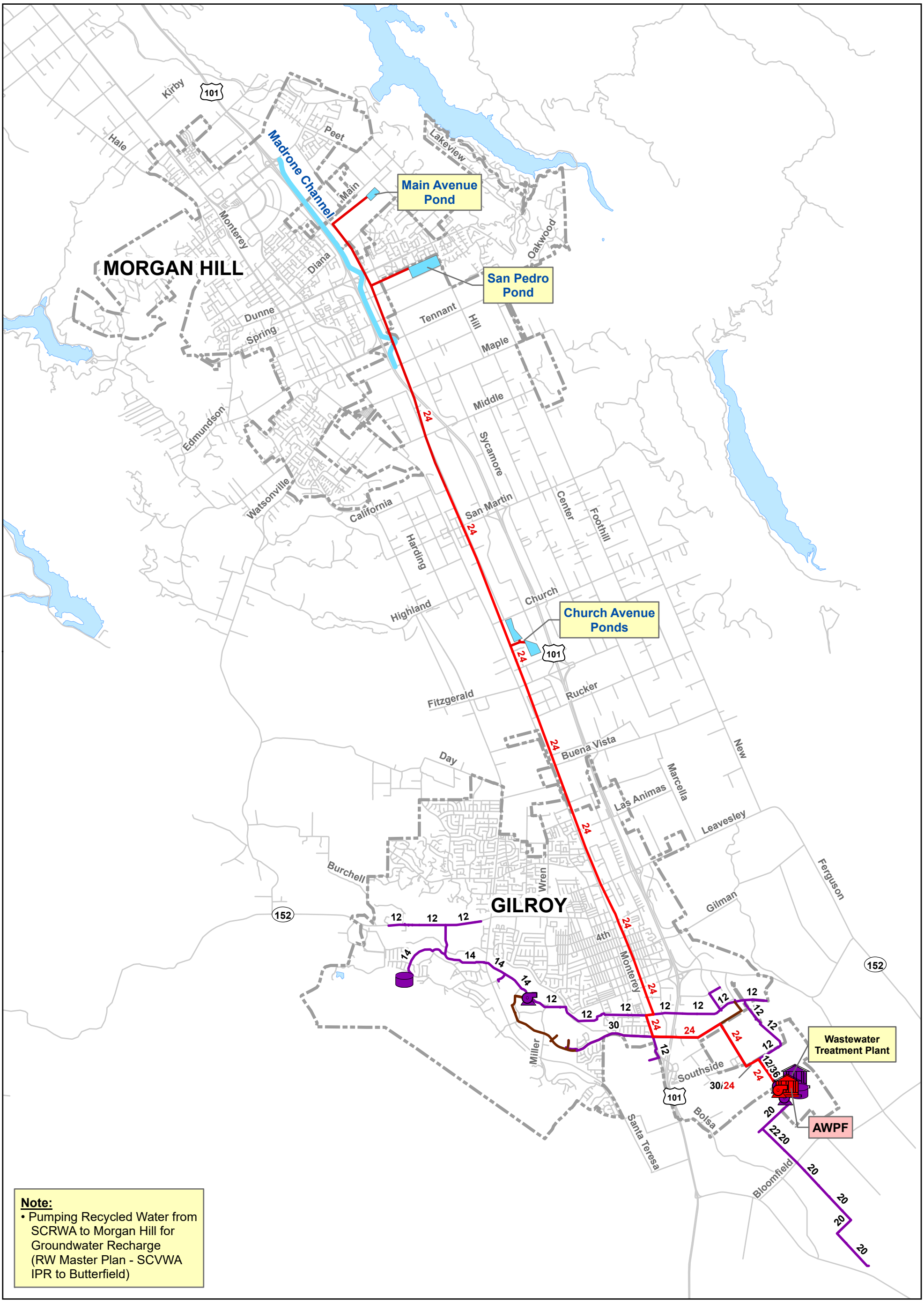

Figure 24
Morgan Hill Recycled Water Option 6 - AWPF Water from SCRWA for GWR

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Valley Water

TABLES

Table 1 Existing System Inventory

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Pipes		
Pipe Diameter (in)	**Length** (ft)	(mi)
North System		
8	750	0.1
12	50,600	9.6
14	11,750	2.2
24	6,350	1.2
30	1,400	0.3
36	3,100	0.6
Sub-Total	73,950	**14.0**
South System		
10	350	0.1
12	400	0.1
20	15,650	3.0
22	750	0.1
30	200	0.0
Sub-Total	17,350	**3.3**
Total	91,300	**17.3**

Booster Stations			
Booster Station ID	**Pump No.**	**Head** (ft)	**Flow** (gpm)
North System			
Zone 1 Pump Station (Area 93)	1	295	1,200
	2	295	1,200
	3	295	1,200
	4	295	1,200
	5	295	1,200
	Total Capacity	6,000 gpm / 8.6 mgd	
	Firm Capacity	4,800 gpm / 6.9 mgd	
Zone 2 Pump Station (Christmas Hill)	1	276	1,375
	2	276	1,375
	3	276	1,375
	Total Capacity	4,125 gpm / 5.9 mgd	
	Firm Capacity	2,750 gpm / 4.0 mgd	
South System			
South Zone Pump Station (Area 94)	1	170	2,100
	2	170	2,100
	3	170	2,100
	Total Capacity	6,300 gpm / 9.0 mgd	
	Firm Capacity	4,200 gpm / 6.0 mgd	

Tanks				
Tank ID	**Height** (ft)	**Diameter** (ft)	**Volume** (MG)	**Base Elevation** (ft)
WWTP Reservoir	22.5	150	**3.0**	160
North System Tank (Hoylake)	22.5	105	**1.5**	385

Table 2 Existing Recycled Water System Demands

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

User No.	Customer Name	Meter Number	Usage Type	System	Zone [1]	Hours of Usage (period)	Hours of Usage (hrs)	Annual Demand [1] (AFY)	Annual Demand [1] (gpm)	Maximum Month Demand [2] (gpm)	Maximum Day Demand [3] (gpm)	Peak Hour Demand [4,5] (gpm)
Existing Users - North System												
1	Christmas Hill Park - (North)	893178	Irrigation	North	1	10pm - 7am	9	19.2	11.9	25.3	31.5	83.9
2	Christmas Hill Park - (Ranch)	70020157	Irrigation	North	1	10pm - 7am	9	10.6	6.6	12.4	15.4	41.2
3	Calpine Power Plant - Cogen	64897928	M&I	North	1	24hr	24	97.9	60.7	153.0	190.4	190.4
4	Calpine Power Plant - Peaker	61767407	M&I	North	1	24hr	24	4.6	2.9	9.7	12.1	12.1
5	McCarthy Business Park - NE	65660171	Irrigation	North	1	9pm - 7am	10	11.8	7.3	10.3	12.9	30.9
6	McCarthy Business Park - NW	64308108	Irrigation	North	1	9pm - 7am	10	0.0	0.0	0.0	0.0	0.0
7	United Natural Food SW	66435006	Irrigation	North	1	10pm - 7am	9	8.4	5.2	7.9	9.8	26.2
7a	United Natural Food SE	66435007	Irrigation	North	1	-	-	-	-	-	-	-
8	B&T Farms	904393	Agricultural	North	1	6am - 12pm and 4pm to 10pm	12	164.2	101.8	390.7	486.4	972.7
9	B&T Farms (West)	994024-8	Agricultural	North	1	6am - 12pm and 4pm to 10pm	12	67.3	41.8	116.9	145.5	291.0
10	Gilroy Police Dept. Shooting Range	60852362	Irrigation	North	1	7am - 11pm	16	0.2	0.1	0.1	0.2	0.3
11	City of Gilroy Sports Park	77132138	Irrigation	North	1	10pm - 7am	9	38.1	23.7	44.0	54.8	146.2
12	Eagle Ridge Golf Course	892545	Irrigation	North	2	6am - 2pm	8	532.3	330.0	515.4	641.5	1,924.5
13	Gilroy Golf Course	84633020	Irrigation	North	2	9pm - 6am	9	82.4	51.1	158.0	196.6	524.3
14	Heartland Owners Association (HOA) #1	78846906	Irrigation	North	2	10pm - 6am	8	2.2	1.3	5.2	6.5	19.4
15	Heartland West #8	64926314	Irrigation	North	2	10pm - 6am	8	7.3	4.5	6.7	8.4	25.1
16	Heartland Gardens #11	65939514	Irrigation	North	2	10pm - 6am	8	13.3	8.3	18.2	22.7	68.1
17	City of Gilroy #12	63267486	Irrigation	North	2	10pm - 7am	9	5.3	3.3	11.6	14.4	38.5
18	City of Gilroy #10	65939449	Irrigation	North	2	10pm - 6am	8	9.3	5.8	13.0	16.2	48.5
19	City of Gilroy #9	63267477	Irrigation	North	2	10pm - 6am	8	15.7	9.7	12.0	14.9	44.7
20	City of Gilroy #7	81877686	Irrigation	North	2	10pm - 6am	8	5.3	3.3	7.0	8.7	26.2
21	Santa Teresa & Third Street Park (City of Gilroy #6)	81877638	Irrigation	North	2	10pm - 6am	8	5.2	3.2	5.8	7.2	21.5
22	City of Gilroy #5	79448993	Irrigation	North	2	10pm - 6am	8	4.5	2.8	5.1	6.3	19.0
23	City of Gilroy #4	78255939	Irrigation	North	2	10pm - 6am	8	0.0	0.0	0.0	0.0	0.0
24	City of Gilroy #3	78846903	Irrigation	North	2	10pm - 6am	8	0.0	0.0	0.0	0.0	0.0
25	City of Gilroy #2	78293084	Irrigation	North	2	10pm - 7am	9	5.5	3.4	7.5	9.3	24.8
						Existing Users - North Subtotal		**1,111**	**689**	**1,536**	**1,912**	**3,782**
Temporary Construction Users - North System												
26	Overaa Construction	-	Construction	North	1	7am - 3:30pm	8.5	-	-	-	-	-
27	Tri Pointe (North)	1567721	Construction	North	1	7:30am - 5pm	9.5	1.8	1.1	1.1	1.4	3.5
28	Tri Pointe (South)	1590955	Construction	North	1	7:30am - 5pm	9.5	2.0	1.3	1.3	1.6	4.1
29	Trinchero Construction Company	A1068	Construction	North	2	7am - 3:30pm	8.5	0.9	0.6	0.6	0.7	2.1
Existing Users - South System												
30	San Felipe Farms - Sheldon Turnout	135164	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	108.0	67.0	171.5	410.5	820.9
31	San Felipe Farms - Henry #1	134051	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	0.0	0.0	0.0	0.0	0.0
32	San Felipe Farms - Henry #2	78334101	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	0.0	0.0	0.0	0.0	0.0
33	San Felipe Farms - Henry #3	20091455-08	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	0.0	0.0	0.0	0.0	0.0
34	San Felipe Farms - Limos #1	135116	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	59.0	36.6	202.0	483.4	966.8
35	San Felipe Farms - Limos #2	135115	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	96.6	59.9	208.7	499.6	999.2
36	San Felipe Farms - Limos #3	135711	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	2.1	1.3	4.4	10.6	21.2
37	San Felipe Farms	862840	Agricultural	South	-	6am - 12pm and 6pm - 12am	12	0.0	0.0	0.0	0.0	0.0
						Existing Users - South Subtotal		**266**	**165**	**587**	**1,404**	**1,988**
	WWTP Utility Water [6]	-	M&I	WWTP	-	24hr	24	961.2	597.0	716.0	629.0	786.3
						Total		**2,338**	**1,450**	**2,838**	**3,945**	**6,557**

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Notes:

1. Annual demands are based on monthly billing records from June 2021 to May 2022 and adjusted to production
2. Billing records from June 2021 to May 2022 were used to develop peak month factors for each user.
3. Maximum Day Demands were derived using SCADA from peak month of July to develop a MDD to MMD peaking factor for north and south users.
4. Peak hour demand was estimated using the formula PHD=(24/hours of permitted usage) x MDD
5. User peak hour demands are not additive, peak hour demand sub-totals and totals based on hours of operation
6. WWTP utility water historically peaks in the winter months, the MDD and PHD documented is based on max usage observed in SCADA from July 2021 (recycled water system maximum month).

Table 3 Potential Recycled Water Users

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Customer Name[1]	Usage Type	System	Zone	Hours of Usage	Hours	Site Area (acres)	Average Demand[2] (gpm)	Maximum Month Demand[3] (gpm)	Maximum Day Demand[3] (gpm)	Peak Hour Demand[4] (gpm)
Baseline System - Potential Users										
Gilroy Data Center	M&I	North	1	12am-12am	24	56.3	13.0	37.7	305.6	305.6
Glen Loma Ranch Development	Irrigation	North	1	10pm-7am	9	318.7	18.0	41.4	52.2	139.2
International Paper	M&I	North	1	8am-5pm	9	20.0	10.2	29.6	37.7	100.6
Vineyard Christian School	Irrigation	North	2	10pm-7am	9	3.3	4.0	9.2	11.6	30.9
Ascension Solorsano Middle School	Irrigation	North	1	10pm-7am	9	17.0	17.0	39.1	49.3	131.5
Gilroy Sports Park Expansion	Irrigation	North	1	10pm-7am	9	10.6	10.0	23.0	29.0	77.3
Gilroy Sports Park (Agriculture)	Agricultural	North	1	6am-5pm	11	5.7	21.0	75.6	113.4	247.4
Pacheco Pass Shopping Center	Irrigation	North	1	10pm-7am	9	67.0	3.4	7.7	9.7	25.9
Sydney Casper Park	Irrigation	North	1	10pm-7am	9	3.3	8.0	18.4	23.2	61.9
Syngenta	Irrigation	North	2	8am-5pm	9	29.1	12.0	27.6	34.8	92.8
Santa Teresa & Third Street Park	Irrigation	North	2	10pm-7am	9	2.2	8.0	18.4	23.2	61.9
City Park (Hecker Pass)	Irrigation	North	2	10pm-7am	9	2.0	8.0	18.4	23.2	61.9
Las Animas Elementary	Irrigation	North	1	10pm-7am	9	8.1	8.0	18.4	23.2	61.9
City Park (Santa Teressa Blvd and Club Drive)	Irrigation	North	2	10pm-7am	9	4.8	8.0	18.4	23.2	61.9
Cintas Corporation	M&I	North	1	24hr	24	2.2	74.0	214.6	273.8	273.8
Gilroy Gardens	Irrigation	North	2	10pm-7am	9	136.8	105.0	241.5	304.5	812.0
Western Tree Nursery	Irrigation	North	2	24hr	24	160.4	371.0	853.3	1,075.9	1,075.9
Gilroy High School	Irrigation	North	1	10pm-7am	9	55.4	48.0	110.4	139.2	371.2
Bonfante Nurseries	Agricultural	South	-	6am-5pm	11	44.9	133.0	478.8	718.2	1,567.0
Christopher Ranch	Agricultural	South	-	6am-5pm	16	149.4	233.0	838.8	1,258.2	1,887.3
						Sub-Total	**1,113**	**3,120**	**4,529**	**7,448**
Long-Term Potential Users										
Gilroy Gardens	Irrigation	North	3	10pm-7am	9	136.8	105.0	241.5	304.5	812.0
Western Tree Nursery	Irrigation	North	3	24hr	24	160.4	371.0	853.3	1,075.9	1,075.9
						Sub-Total	**476**	**1,095**	**1,380**	**1,888**
						Total	**1,589**	**4,215**	**5,910**	**9,336**

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Notes:
1. This table represents users within close proximity to existing recycled water pipelines and planned baseline system that have a potential for using recycled water
2. Average day demands were obtained from the 2015 South County Recycled Water Master Plan.
3. Maximum month and day peaking factors are based on billing records from June 2021 to May 2022 for similar use types (Ag, M&I, and Irrigation).
4. Peak hour demand was estimated using the formula PHD=(24/hours of permitted usage) x MDD

Table 4 Recycled Water System Criteria

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

Distribution System Performance Criteria	
Pipe Headloss	< 4 ft/kft
Pipe Velocity	< 5 fps
Minimum Pressure	35 psi
Normal Pressure Range	60 to 120 psi
Pump Station Performance Criteria	
Pressure Zone with Storage	Meet maximum day demand with largest unit out of service.
Pressure Zones without Storage	Meet peak hour demands with largest unit out of service.
Demand Peaking Factors	
Maximum Day Demand	
Agricultural Users	5.4 x ADD
M&I Users	3.7 x ADD
Irrigation Users	2.9 x ADD

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Table 5 Morgan Hill Recycled Water Options

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

Options[1,2,3]	Brief Description	Portfolio	Major Infrastructure	Costs[4,5]	Likelihood	Feasibility	Advantages	Disadvantages
1	2	3	4	5	6	7	8	9
Option 1	Option 1a: Direct Potable Reuse via Treated Water Augmentation into water system (via Satellite WWTP and AWPF)	*1,100 - 2,900 AFY*	Satellite WWTP and AWPF Facility	***$120M***	Med./Low	Med./Low	- Less pipeline infrastructure required	- DPR recycled water regulations have not been adopted - High Cost of Infrastructure (satellite WWTP and AWPF) - Additional solids loading and reduced recycled water availability at SCRWA - High O&M Costs
	Option 1b: Direct Potable Reuse via Treated Water Augmentation into water system (via purified water pumped from SCRWA)	*1,100 - 2,900 AFY*	AWPF at SCRWA, 12 miles of 24-inch pipeline, pump station	***$150M***	Med./Low	Med./Low	- Less O&M costs than a satellite WWTP/AWPF	- Current recycled water regulations - High Cost of Infrastructure (AWPF, pipelines, and pump station) - Additional solids loading and reduced recycled water availability at SCRWA
Option 2	NPR+ from South Bay Water Recycling	Delivers **2,900 AFY** of NPR+ from SBWR to a new Morgan Hill recycled water system	16 miles of 16-inch pipeline	***$80M***	Med./Low	Med.	- Availability of Water - Less O&M costs that a satellite plant and AWPF - Lowest cost opportunity	- Requires agreement with San Jose - High Cost of Infrastructure - Potentially high cost of water due to long distance pumping
Option 3	Satellite Advanced Water Purification Facility (AWPF) for Groundwater Recharge (GWR)	Delivers **1,900 AFY** from a Morgan Hill 2.5-mgd satellite WWTP and 2.1-mgd AWPF to recharge facilities in Morgan Hill for GWR	Satellite WWTP and AWPF Facility 3 miles of 16-inch pipeline	***$140M***	Low	Low	Groundwater recharge in Morgan Hill	- High Cost of Infrastructure (satellite plant, AWPF, and pipelines) - Inability to meet existing Customer demands during peak demand periods - Inadequate flow in sewer collection system could create odor and clogging problems - Resulting sludge loading and reduced flow could substantially change composition of WWTP influent potentially leading to compliance issues - High O&M Costs
Option 4	Satellite Advanced Water Purification Facility (AWPF) for Surface Water Augmentation (SWA)	Delivers **1,900 AFY** from a Morgan Hill 2.5-mgd satellite WWTP and 2.1-mgd AWPF to Anderson Reservoir for SWA	Satellite WWTP and AWPF Facility 6 miles of 16-inch pipeline	***$160M***	Low	Low	Surface Water Augmentation in Anderson Reservoir	- High Cost of Infrastructure (satellite plant, AWPF, and pipelines) - Inability to meet existing Customer demands during peak demand periods - Inadequate flow in sewer collection system could create odor and clogging problems - Resulting sludge loading and reduced flow could substantially change composition of WWTP influent potentially leading to compliance issues - High O&M Costs
Option 5	Pumping Recycled Water from SCRWA to a Morgan Hill Recycled Water System (RW Master Plan - Alt 1 or 2)	Delivers **3,000 AFY** NPR water from SCRWA to Morgan Hill	9 miles of 24-inch pipeline, 4 miles of distribution pipelines, pump station	***$75M***	Low	Med./Low	- RW Service to Morgan Hill - Less O&M costs than a satellite plant	- High Cost of Infrastructure (Pipelines, and Pump Station) - Availability of RW during peak usage
Option 6	Pumping Recycled Water from SCRWA to Morgan Hill for Groundwater Recharge (RW Master Plan - SCVWA IPR to Butterfield)	Delivers **3,000 AFY** of AWPF water from SCRWA for IPR in Butterfield Channel	AWPF at SCRWA, 12 miles of 24-inch pipeline, pump station	***$146M***	Low	Med./Low	RW Groundwater recharge in Morgan Hill	- High Cost of Infrastructure (AWPF, Pipelines, EIR, CalTrans Permits for crossing Hwy 101, and a Pump Station)

Notes:

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1. Option 1a and 1b are potential future options depending on changes in the recycled water regulations
2. Options 2, 3, 4 were extracted from the 2020 Countywide Water Reuse Master Plan (CoRe Plan)
3. Options 5 and 6 were extracted from the 2019 Sustainable Water Management Plan
4. Costs documented have been escalated to April 2023 (ENR 13230)
5. Costs for each option and are order of magnitude. Cost information for Options 1a, 2, 3, and 4 are based on the CoRe Plan and Options 1b, 5, and 6 are based on the 2015 Recycled Water Master Plan

Table 6 Baseline System Improvement Summary

2024 South County Recycled Water Master Plan Update

Santa Clara Valley Water District

Scenario	Demands Maximum Day (mgd)	Distribution System Improvement Summary
Existing	5.7 mgd	-
Baseline System: Imminent -Term	5.7 mgd	**Imminent Term Distribution System Improvements:** • Recent Construction: 13,650 feet of 30-inch diameter pipeline • Constructed but Inactive: 6,120 feet of 30-inch diameter pipeline 770 feet of 16-inch diameter pipeline 640 feet of 12-inch diameter pipeline
Baseline System: Near - Term	6.1 mgd	**Near-Term Distribution System Improvements:** • 715 feet of 30-inch diameter pipeline • 2,450 feet of 18-inch diameter pipeline **Planned WWTP Recycled Water Projects:** • Reservoir Expansion (Additional 3 MG) • New Reservoir Pump Station • 1,500 feet of on-site piping
Conceptual Baseline Buildout: Long - Term [1]	*11.7 mgd*	***Long-Term Distribution System Improvements:*** • *5,870 feet of 24-inch diameter pipeline* • *6,930 feet of 18-inch diameter pipeline* • *New 1.5 MG Zone 2 Tank* • *New 1,500 gpm (Firm) Zone 3 Pump Station* • *Christmas Hill Pump Station Capacity Upgrade to 5.5 mgd* • *Area 93 Pump Station Firm Capacity Upgrade to 9.3 mgd*

Notes: 5/1/2024

1. Long-Term recycled water usage dependent on wastewater influent flow increase plus treatment capacity

Table 7 Cost Estimating Criteria

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Santa Clara Valley Water District

Pipe Size (Inner Diameter) (in)	Unit Costs[1] ($/lineal foot)
8	187
10	211
12	253
14	283
16	304
18	312
24	400
30	500
36	560
Pump Stations	
Pump Station Within WWTP or Upgraded Capacity at Existing Site Estimated Pumping Station Project Cost = 1.2 * 10^(0.7583*log(Q)+3.1951); where Q is in gpm	
New Pump Station Outside WWTP Estimated Pumping Station Project Cost = 2.4 * 10^(0.7583*log(Q)+3.1951); where Q is in gpm	
Storage Reservoirs ($/gal)	
Earthwork, Lined and Covered Storage Pond	$0.25
Steel Tank - Above Ground	
≤ 1.0 MG	$2.69
1.1 MG - 3.0 MG	$2.15
3.1 MG - 5.0 MG	$1.55
> 5.0 MG	$1.16
Costs Estimating Contingencies[2]	
Estimating	20%
Construction	20%
Administration	30%

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Notes:

1. Construction costs estimated using August 2022 ENR CCI of 13,171.
2. Contingencies:
   - Estimating contingency of 20% to account for unforeseen events and unknown conditions.
   - Construction contingency of 20% to account for engineering design and construction management and inspection.
   - Administration contingency of 30% to account for administration and legal costs.

Table 8 Capital Improvement Program

2024 South County Recycled Water Master Plan Update
Santa Clara Valley Water District

Itemized Cost Estimate

Improvement Number	Pressure Zone	Type of Improv.	Street	Limits	Pipeline and Appurtenances Costs: Diam. (in)	Length (ft)	Unit Cost[2] ($)	Pipe Cost ($)	Baseline Construction Cost ($)	Estimating Contingency Cost[3] ($)	Construction Contingency Cost[4] ($)	Administration Contingency Cost[5] ($)	Total Estimated Capital Cost ($)
Recent Construction Improvements													
Distribution System													
P-1	North - Zone 1	Pipe	Through Agriculture Fields ROW	Southside Dr. to Luchessa Ave.					Cost extraced from bid tabs - Phase 1B, 2A, 2B				21,300,000
P-2	North - Zone 1	Pipe	Luchessa Avenue	Agriculture ROW to Greenfield Dr									
									Recent Construction Subtotal				**21,300,000**
Near-Term Improvements													
Distribution System													
P-3	North - Zone 1	Pipe	Luchessa Avenue/Cameron Boulevard	Luchessa Ave to Princevalle Drain						Cost extraced from bid tabs - Phase 1C			1,700,000
P-4	North - Zone 1	Pipe	Luchessa Avenue	Miller Avenue to Vintner Street						See Note 6			1,270,000
												Distribution System Subtotal	**2,970,000**
Other On-Site WWTP Recycled Water Projects													
WWTP-1	WWTP	Lined Reservoir[1]	Recycled Water Reservoir Expansion (Additional 3 MG)		3.0 MG				2,060,000	412,000	412,000	618,000	3,500,000
WWTP-2	WWTP	Pump Station[1]	New Reservoir Pump Station						815,000	163,000	163,000	244,500	1,390,000
WWTP-3	WWTP	Pipe	On-Site Pipelines						500,000	100,000	100,000	150,000	850,000
												WWTP On-Site Subtotal	**5,740,000**
									Near-Term Subtotal				**8,710,000**
Long-Term Improvements													
Distribution System													
P-5	North - Zone 2	Pipe	ROW through Home Ranch Development	Zone 2 Pump Station Outlet to Uvas Creek	24	4,250	400	1,700,000	1,700,000	340,000	340,000	510,000	2,890,000
P-6	North - Zone 2	Pipe	Santa Teresa Boulevard	Uvas Creek to Cobblestone Ct	24	1,620	400	648,000	648,000	129,600	129,600	194,400	1,100,000
LT-P-8	North - Zone 2	Pipe	Uvas Creek ROW/Gilroy Gardens Service Rd	Meritage Loop to New Zone 2 Tank Site/Zone 3 PS (Elev. 383)	18	3,700	312	1,154,400	1,154,400	230,880	230,880	346,320	1,960,000
LT-P-9	North - Zone 2	Pipe	Gilroy Gardens ROW	New Zone 2 Tank Site/Zone 3 PS to Lake Kathryne	18	3,230	312	1,007,760	1,007,760	201,552	201,552	302,328	1,710,000
LT-T1	North - Zone 2	Tank[1]	Gilroy Gardens	Zone 2 Storage Expansion	1.5 MG			3,225,551	3,225,551	645,110	645,110	967,665	5,480,000
LT-BS1	North - Zone 3	Pump Station[1]	2 x 750 gpm Duty + 750 gpm Standby		2,250 gpm (total)			1,310,000	1,310,000	262,000	262,000	393,000	2,230,000
LT-BS2	North - Zone 2	Pump Station[1]	Christmas Hill Capacity Upgrade		5.5 mgd (total)			978,390	978,390	195,678	195,678	293,517	1,660,000
LT-BS3	North - Zone 1	Pump Station[1]	North (Area 93) Recycled Water Pump Station Upgrade		9.3 mgd (total)			1,457,121	1,457,121	291,424	291,424	437,136	2,480,000
									Long-Term Subtotal				**19,510,000**

Capital Improvement Summary

Recent Construction:	**21,300,000**
Immediate and Near-Term Subtotal:	**8,710,000**
Estimated Total:	**49,520,000**

Note:
1. Tank and pump station pricing can vary widely with site conditions.
2. Cost estimates are based on the Engineering News Record (ENR) construction cost index (CCI) of 13171 for the 20 cities for August 2022.
3. Baseline construction cost plus 20% to account for unforeseen events and unknown conditions (Estimating Contingency).
4. Baseline construction cost plus 20% to cover other costs including: engineering design, construction management, and inspection (Construction Contingency),
5. Baseline construction cost plus 30% to account for project administration (developer and City staff) and legal costs (Administration Contingency).
6. Improvment P-4 cost extracted from the Canyon Creek Recycled Water Pipeline Alignment Study by Kennedy Jenks, April 2024.