Santero Way Rezoning

Santero Way Rezoning Water and Wastewater Assessment

FINAL / January 2025

Santero Way Rezoning

Santero Way Rezoning Water and Wastewater Assessment

FINAL / January 2025

Digitally signed by Jill Blosk Kjellsson
Contact Info: Carollo Engineers, Inc
Date: 2025.01.30 14:21:24-08'00'

Contents

Appendices

Tables

Figures

SECTION 1 INTRODUCTION

The City of Cotati (City) contracted with Carollo Engineers, Inc. (Carollo) to conduct analyses related to the Rezoning of the Santero Way Specific Plan Area (SWSPA or Project). The City's hydraulic models were used to evaluate the impacts of development of Santero Way in accordance with the proposed zoning on the City's water distribution and wastewater collection systems. This project memorandum summarizes the analyses performed and documents the findings and recommendations that result from the analysis.

SECTION 2 PROJECT SCOPE

This evaluation includes the following scope of services:

- Update the hydraulic models to include development projects completed since the last model update and development projects currently in the planning stages.
- Develop water demands and wastewater flows attributed to the development of the Project.
- Update the City's hydraulic model to reflect the Project's wastewater flows and water demands.
- Evaluate the Project's impact to the water and wastewater systems.

SECTION 3 BACKGROUND

The SWSPA is located along Santero Way from the end to East Cotati Avenue, as shown in Figure 1. The SWSPA is 18.1 acres (excluding right of ways). The rezoning of the SWSPA proposes a mix of commercial and residential uses with a total of 535 residential units and 459,077 square feet of commercial space.

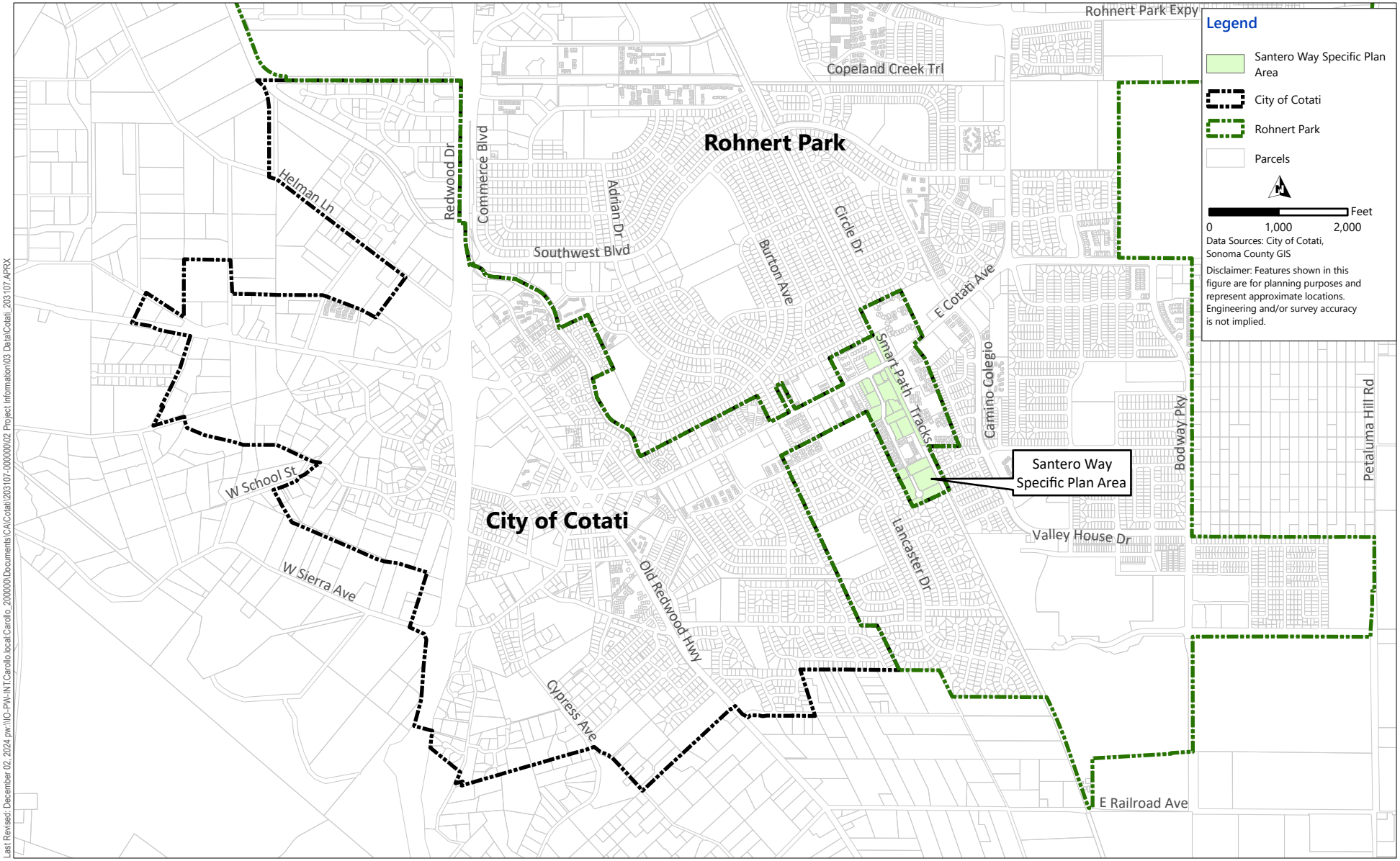


Figure 1 Project Site
CITY OF COTATI

3.1 Wastewater System

The City's wastewater collection system includes approximately 32 miles of sewer pipeline ranging in diameter from 4 inches to 24 inches, and 4 lift stations. Ultimately, all wastewater flow is conveyed to the City of Santa Rosa's Laguna Wastewater Treatment Plant via the Helman Interceptor.

The existing average sewer flow generated within the City's service area is approximately 0.68 million gallons per day (mgd) based on the maximum annual sewer flow recorded between 2019 to 2022. Figure 2 shows the existing configuration of the City's wastewater collection system.

Figure 3 is a close-up of the Project's location and shows the configuration and pipe diameter of the sewers in the vicinity of the Project. Sewer flows generated by the SWSPA will be served by the existing 6-inch and 8-inch pipeline in Santero Way. The existing 6-inch and 8-inch pipeline in Santero Way connects downstream to the 8-inch and 12-inch sewer in East Cotati Avenue; the 12-inch to 24-inch sewer along the Laguna de Santa Rosa or the 18-inch relief sewer along Arthur Street, George Street, and Old-Redwood Highway; and finally, the 24-inch Helman Interceptor where the flows from the Laguna de Santa Rosa and Old Redwood Highway sewers combine.

3.2 Water System

The City's water supply system consists of 30 miles of potable water distribution lines. The City relies primarily on groundwater purchased from the Sonoma County Water Agency (Sonoma Water). The water is extracted through six collector wells by Sonoma Water and conveyed to the City through an aqueduct. The City has two Sonoma Water turnouts. In addition, the City pumps from its own local groundwater wells.

The distribution system includes two City-owned water storage facilities totaling 1.1 million gallons (MG). However, the 100,000-gallon Cypress Tank is currently out of service.

Figure 4 illustrates the layout of the City's water distribution system. Figure 3is a close-up of the Project's location and shows the configuration and pipe diameters of the water distribution system in the proximity of the Project. The Project will be served by the existing 10-inch diameter main in Santero Way.

The City's maximum average day demand (ADD) between the period 2019 to 2022 was 0.85 mgd. The ADD is defined as the total water delivered over the entire year divided by the number of days in the year. Water demand, and therefore ADD, has declined over the years. Figure 5 shows the water demand from 1995 to 2022.

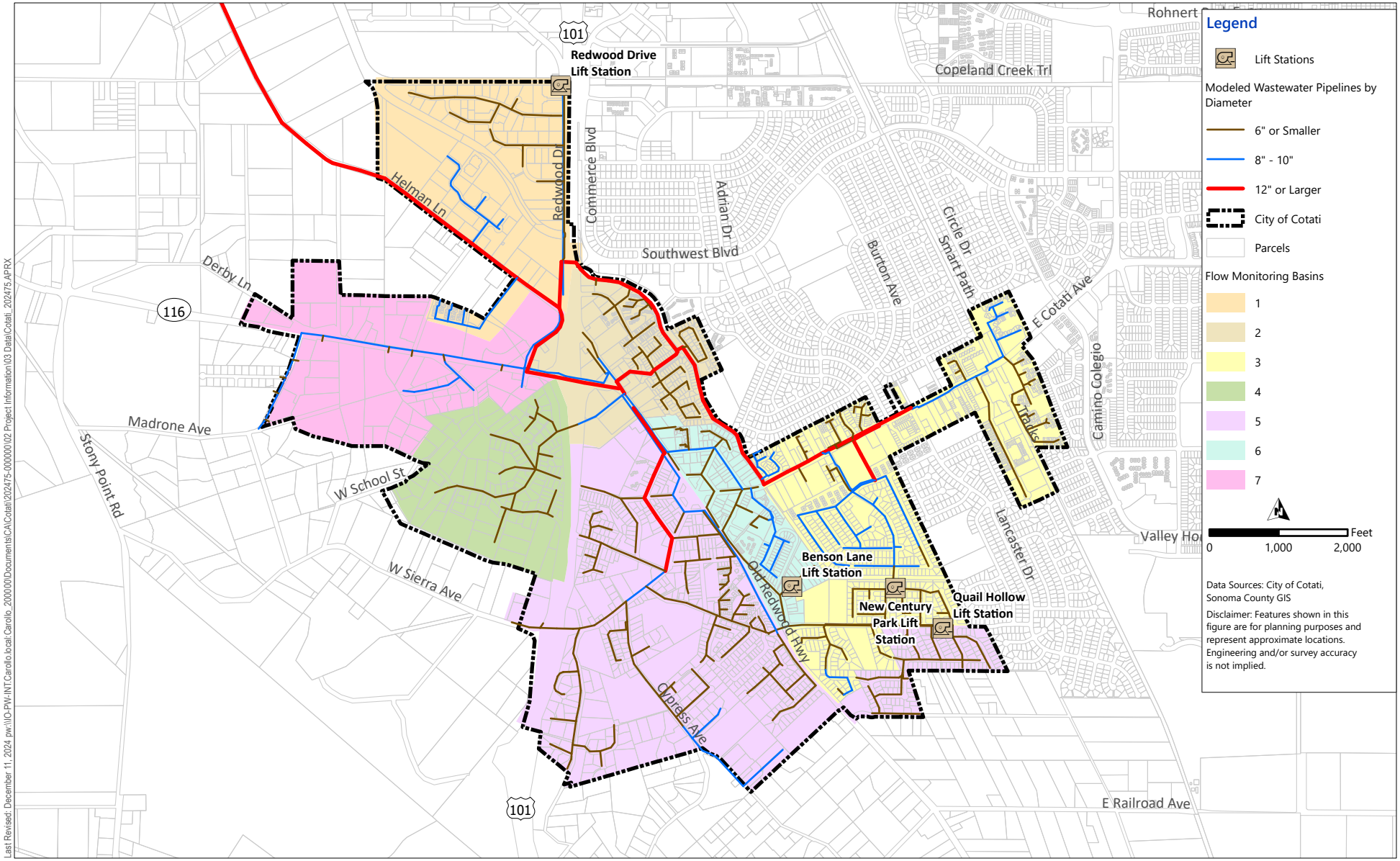


Figure 2 Existing Wastewater System
CITY OF COTATI

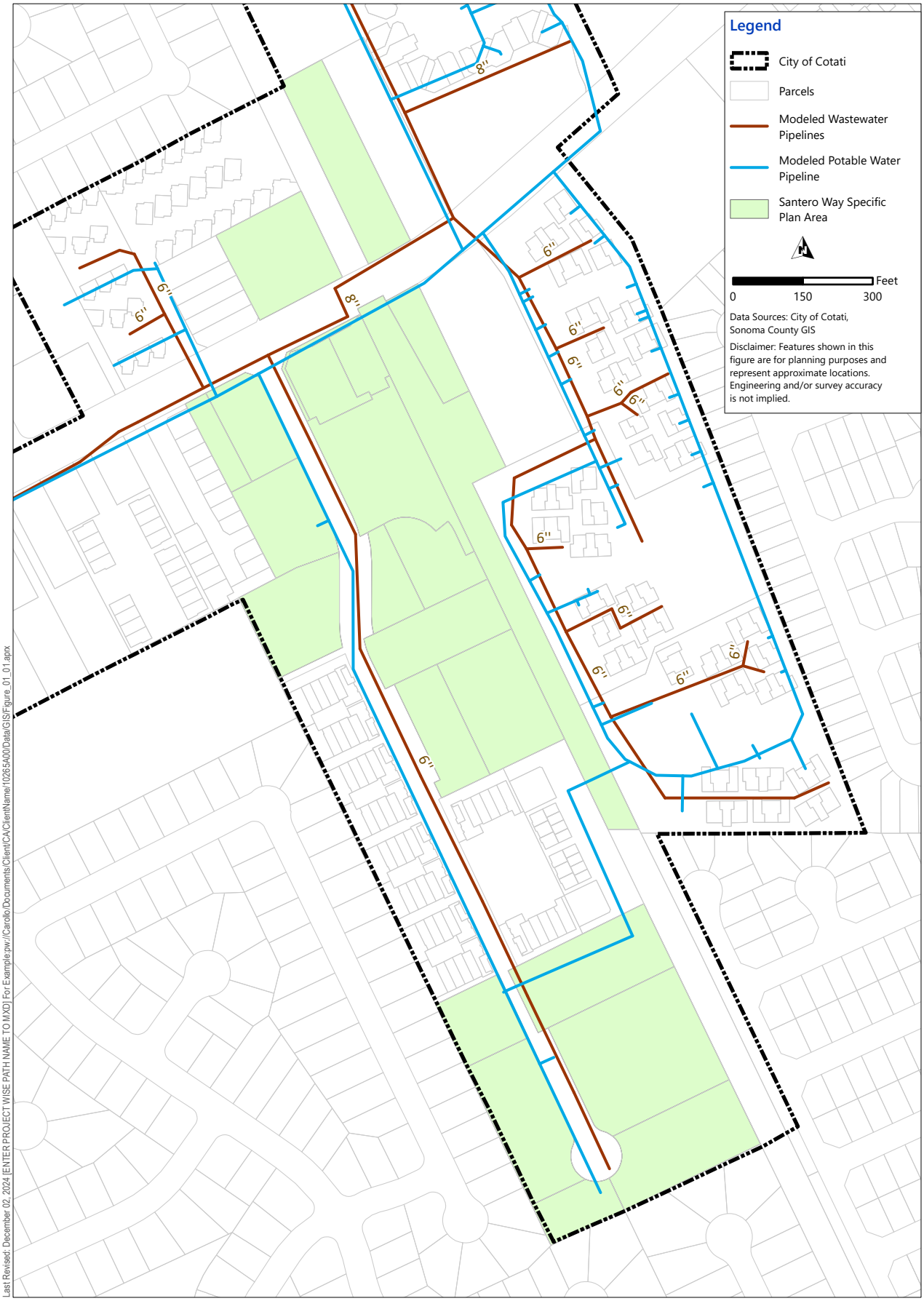


Figure 3 Project Site
CITY OF COTATI

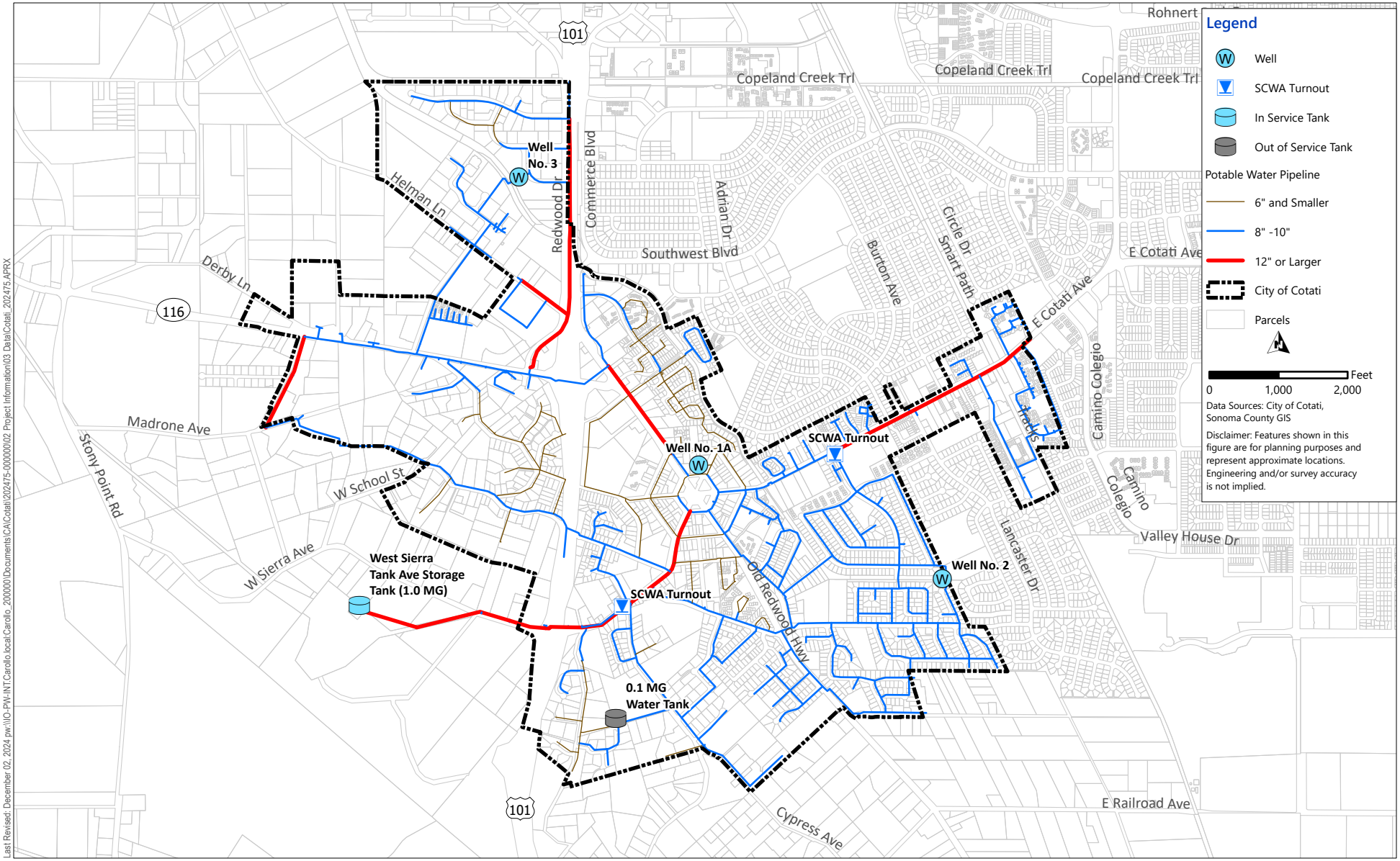


Figure 4 Existing Potable Water System
CITY OF COTATI

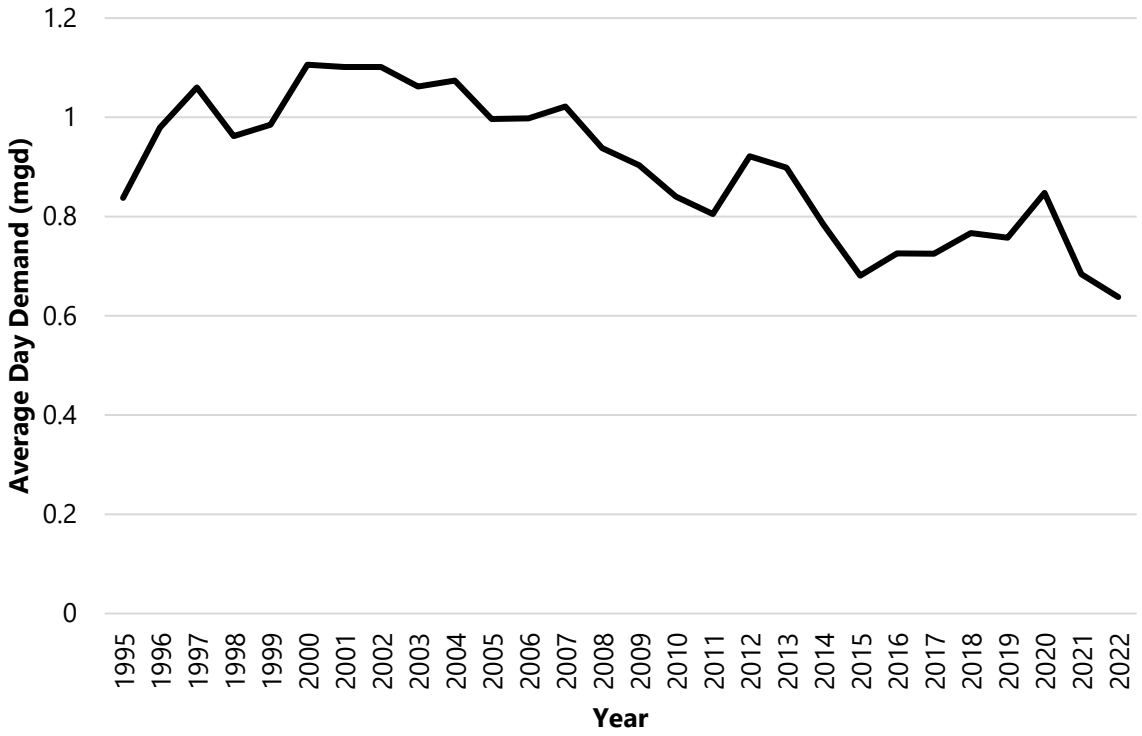


Figure 5 Average Day Demand From 1995 to 2022

3.3 Previous Studies

The City contracted with Carollo in 2010 to develop a Water Distribution and Sewer Collection System Master Plan (SCSMP) (2011 Master Plans). As part of the 2011 Master Plans, Carollo developed a hydraulic model in Innovyze's InfoWater and InfoSWMM modeling software. The models were calibrated to flow monitoring data and pressure logger data collected by a consultant and City staff under direction of Carollo. The models were used to evaluate the existing water distribution system and collection system's capacity and to determine if adequate capacity exists to provide adequate supply and pressure for the water system, and to determine if the wastewater collection system could convey peak flows that occur during wet weather events.

In 2016 Carollo completed a wastewater system capacity analysis for the Kessing Ranch development located in the southern portion of the service area where Valparaiso Avenue meets Old Redwood Highway. The analysis found that flow from the development exacerbated the existing capacity deficiencies downstream of the development. Ultimately, an overflow was constructed at Valparaiso Avenue and Fehler Lane so that flow could be split west toward the main in West Sierra Avenue or east towards the main in Old Redwood Highway with the pipe invert to the east set 3 inches higher.

In 2017, Carollo completed a 2017 Collection System Master Plan Update which recommended several improvement projects to address existing and future deficiencies. In 2020, Carollo completed a Collection System Master Plan Addendum. The improvement projects, as amended in the addendum, are shown in Figure 6. Since the 2017 Master Plan and 2020 Addendum, projects P-1, P-3, P-4, P-8 and P-9 have been constructed. The construction of project P-1 was completed in 2019. Project P-1 includes the installation of a 21-inch diameter gravity main along Old Redwood Highway (starting at Saint Joseph Way), continuing along Highway 116, and finally continuing along Redwood Drive to Helman Lane. Project P-9 (upsize the 6-inch diameter pipeline on Saint Joseph Way to an 8-inch diameter pipeline) was constructed in approximately 2018. The City completed Project P-3 (portion in Olof Street), P-8 in 2020, P-3 (portion in West Sierra Avenue), and P-4 in 2022. The City completed sewer repairs, including laterals in West Sierra Avenue from Cypress Avenue to Water Road in 2022, and completed repairs to the existing 6-inch sewer in Cypress in Fall/Winter 2023 (no increase to pipe size). Carollo has performed various sewer and water assessments for proposed developments since the 2011 Master Plans. This analysis builds off the previous studies and updates. In 2023, Carollo updated the hydraulic models to include water and wastewater system capital projects completed to date, and to update the water demands and wastewater flow based on recent data. The sewer system model was updated by transferring the previous model into a new InfoSWMM model. The previously loaded flows were then scaled to reflect recorded 2023 flows. The water system model was updated by first transferring the previous model into a new InfoWater Pro model. The previously loaded demands were scaled to reflect recorded 2022 demands.

SECTION 4 EVALUATION CRITERIA

Hydraulic design criteria outlined in the City's SCSMP and Water Distribution System Master Plan (WDSMP) were used to evaluate the impact of the proposed rezoning of the SWSPA. This section summarizes the relevant evaluation criteria from the Master Plans.

4.1 Wastewater

Gravity sewer pipe capacities are dependent on many factors. These factors include roughness of the pipe, maximum allowable depth of flow downstream, and limiting velocity and slope. Table 1 summarizes the evaluation criteria used for the analysis of the wastewater collection system as part of this study.

The criteria that typically has the greatest impact on the system is the maximum flow depth for existing sewers. During the preparation of the SCSMP, it was decided that the existing collection system sewers would be allowed to surcharge to 3 feet below the manhole rim during peak wet weather flows (PWWF).

Table 1 Wastewater System Evaluation Criteria

Wastewater System Evaluation Criteria	
Manning's "n" Coefficients	
n = 0.013	
Maximum Flow Depth for Existing Sewers	
PWWF:	3 Feet Below Manhole Rim
Maximum d/D for New Sewers	
Pipe Diameter (inches)	Maximum d/D Ratio (During Peak Flows)
Less than or equal to 12	0.50
12 to 18	0.67
Larger than 18	0.75
Design Velocity	
Minimum Velocity = 2 ft/sec	
Sewer Main Diameter	
Minimum Public Main = 8 inches	

Notes:
d/D - flow depth to pipe diameter ratio; ft/sec - feet per second.

4.2 Potable Water

The City's water system was evaluated under a range of normal and emergency operating conditions and includes:

- Peak hour demand (PHD).
- Maximum day demand (MDD).
- MDD plus fire flow.

Distribution system evaluation criteria are required to determine the performance of the City's water system under a wide range of operating conditions to identify system deficiencies. The evaluation criteria for this study are consistent with the WDSMP and are summarized in Table 2. The criteria include allowable pressures, pipeline velocities, allowable head loss, as well as fire flow and storage criteria.

Table 2 Potable Water System Evaluation Criteria

Description	Value	Units
Service Pressures		
Maximum Pressure (during ADD)	90	psi
Minimum Pressure (during MDD)	40	psi
Minimum Pressure (PHD)	35	psi
Minimum Residual Pressure (MDD + fire)	20	psi
Pipeline Criteria		
Maximum Velocity with MDD	8	ft/sec
Maximum Velocity with PHD	10	ft/sec
Water Use Peaking Factors		
MDD	2.4 x ADD	
PHD	3.6 x ADD	
Fire Flow Requirements		
Residential Fire Flow	1,500	gpm for 2 hours
Commercial Fire Flow	1,500	gpm for 2 hours
Industrial Fire Flow	2,500	gpm for 2 hours
Ag/Rural Residential/Parks Fire Flow	1,500	gpm for 2 hours
Storage Volume		
Operational	25 percent of MDD	
Fire Fighting Storage	0.30 MG (2,500 gpm for 2 hours)	
Emergency Storage	100 percent ADD	

Notes:
gpm - gallons per minute; psi - pounds per square inch.

SECTION 5 PROJECTED WATER DEMANDS AND WASTEWATER FLOWS

This section describes the methodology used to calculate the water demand and wastewater loads. Details for the recently constructed development projects, and projects in the planning stage were provided by the City. Details of the SWSPA and the areas identified as Transit-Oriented Communities (TOC), including number of residential and non-residential units and square footage (SF), were provided in the Draft Environmental Impact Report Project Description provided by 4Leaf, Inc., on August 26, 2024. Development projects that were recently constructed or are in the planning stage, the TOC areas, and the SWSPA are shown in Figure 6.

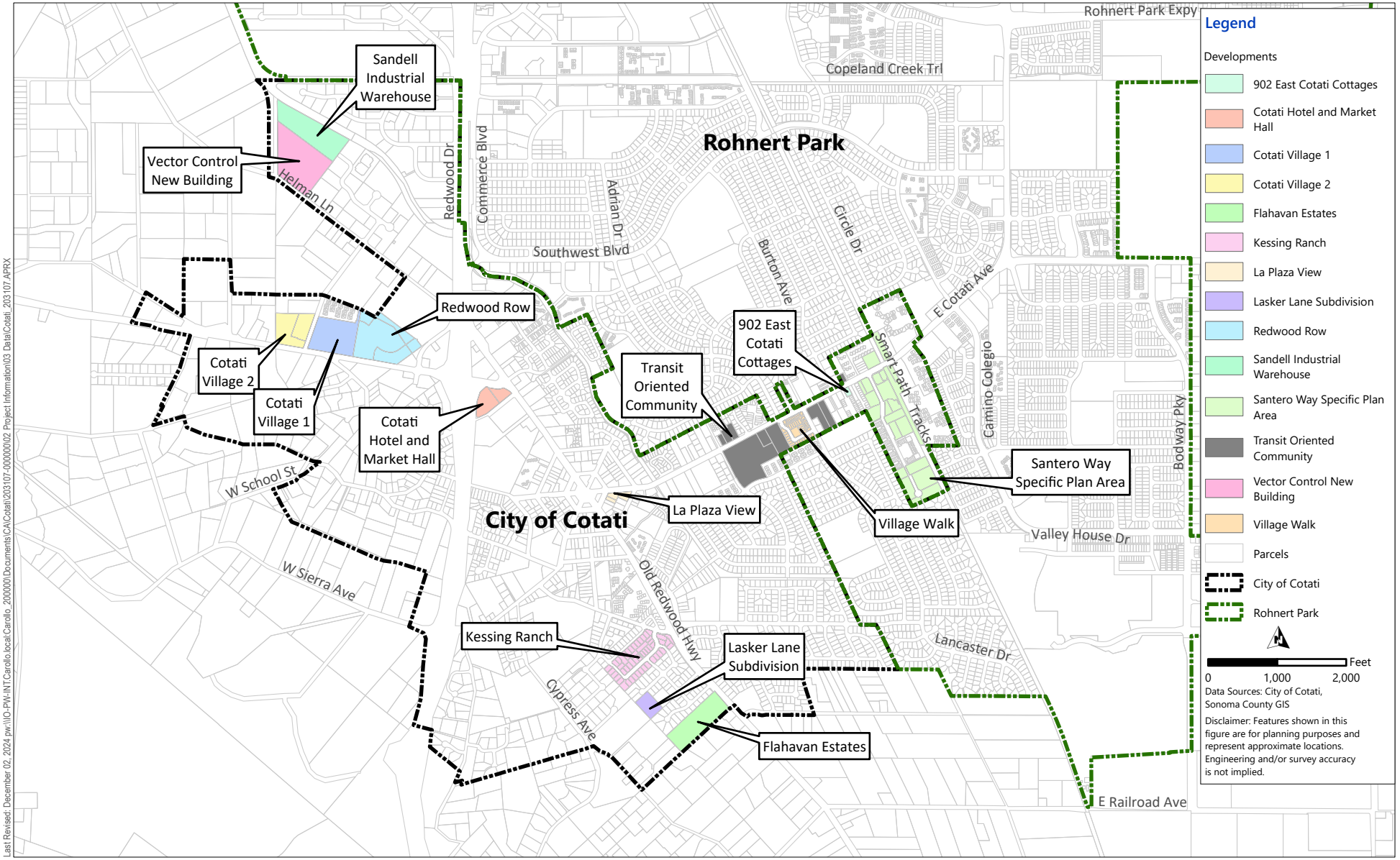


Figure 6 City of Cotati Developments

5.1 Updated Baseline Model

Modeled demands and flows were scaled to align with the maximum annual flow and demand from the period 2019 to 2022. Flows and demands for recently completed development projects and projects in the planning stage were added to the water and sewer hydraulic models. Demands and flows from areas identified as TOC were also added to the models. Flows and demands were either obtained from previous water and sewer analyses (if available) or were calculated using flow and demand coefficients, expressed in gallons per day per acre (gpd/ac), established in the City's master plans, and updated to reflect the planned densities based on the number of units and commercial square footage for each development project provided by the City. Most of the sites of the recently constructed or planned projects are vacant, so existing flow and demand from the parcels are assumed to be zero or negligible. Figure 6 shows the location of the recently constructed projects, planned projects, and TOC. Table 3 and Table 4 summarize the flow and demands for these projects which were added to the hydraulic models to update the baseline to which the SWSPA results were compared.

5.2 Average Dry Weather Wastewater Flow from Project

This study utilized the wastewater flow coefficients established in the City's SCSMP, which allowed for the transformation of land use acreage into a corresponding average wastewater flow. The flow coefficients, expressed in gpd/ac for the SCSMP, range from 200 gpd/ac to 1,600 gpd/ac. The Project falls within the SWSPA (Santero Way) land use designation. However, the rezoning of the Project area will impact the previously developed coefficient, which assumed primarily commercial use. The revised zoning is primarily high-density residential and commercial, so the updated flow coefficient is based on the Neighborhood, Urban High Density Residential (NU) land use flow coefficient to reflect the new zoning for the Project area.

The NU land use flow coefficient was first adjusted to reflect a typical return to sewer ratio of 85 percent to better align with the maximum applied water allocation (MAWA) landscape irrigation demand. Then the flow coefficient was multiplied by 200 percent to reflect the proposed density of 25 to 35 dwelling units per acre, which is twice the density of the NU land use designation of 15 dwelling units per acre and multiplied by 150 percent to align with the 50 percent density bonus allowed under the California State Code section 65915 (f).

Flow was attributed to each parcel for allocation in the hydraulic model.

The wastewater generation coefficients in the SCSMP were developed based on data from the City's temporary flow monitoring program and provide a realistic estimate of the flow generated by specific land use categories citywide. Hourly multipliers within a diurnal curve are used to generate peak flows. Based on the analysis of peak flows from the flow monitoring data, a peaking factor of 1.52 was used to simulate peak dry weather flow conditions (PDWF) for the Project's estimated flows.

PWWF is the highest observed hourly flow that occurs following a storm event. PWWF is a combination of average dry weather flow (ADWF) and the peak infiltration and inflow (I/I). For the City's SCSMP, peak I/I rates for future development were derived using a peak I/I rate of 1,000 gpd/ac. ADWF, PDWF, and PWWF for the Project are summarized in Table 3.

5.3 Potable Water Demands from Project

This study utilized the WDSMP methodology to estimate water demand for the Project based on parcel acreage and water demand coefficients. The water demand coefficients, expressed in gpd/ac, range from 400 to 4,200 gpd/ac for existing and 300 to 3,300 gpd/ac for future. Reduced coefficients for the future are based on projected water conservation and were used for this assessment. The NU demand coefficient was multiplied by 200 percent to reflect the proposed density of 25 to 35 dwelling units per acre, which is twice the density of the NU land use designation of 15 dwelling units per acre and 150 percent to align with the 50 percent density bonus allowed under the California State Code section 65915 (f). Table 4 summarizes water demand associated with the Project. Additionally, the table compares the demand utilized to evaluate the supply, storage, and distribution system.

Table 3 Projected Wastewater Flows From Recently Constructed and Planned Development Projects

	Residential Units	Commercial Square Footage	Acreage	Flow Source	Flow Coefficient (gpd/ac)	ADWF (gpd)	PDWF (gpd)	PWWF (gpd)
Constructed Projects								
Kessing Ranch	43			Previous Assessment		15,750	23,940	47,250
Village Walk	46		2.92		1,100	3,212	4,882	7,802
Sandell Industrial Warehouse		85,000	8.24		400	3,296	5,010	13,250
Planned Projects								
Flahavan Estates	43			Previous Assessment		6,390	9,713	16,813
Cotati Villages 1	177	29,415		Previous Assessment		27,767	42,205	50,025
Cotati Villages 2	126			Previous Assessment		18,282	27,789	33,409
Cotati Hotel and Market Hall	153 rooms with commercial market			Previous Assessment		17,100	25,992	51,300
Lasker Lane Subdivision (1,2)	36		1.82		3,300	5,996	9,114	10,931
La Plaza Mixed Use Project (1,2,3,4)	52		0.88		7,000	6,153	9,353	10,232
Redwood Row (1,2,4)	170	21,000	10.65		3,700	39,420	59,918	70,572
902 East Cotati Cottages (1,2)	6		0.23		3,300	756	1,149	1,378
Vector Control New Building		10,000	10.94		400	4,376	6,652	17,592
Transit Oriented Communities								
TOC (1,2,5)	236	192,289	14.35		3,900	55,965	85,067	99,417
TOTAL ADDED TO BASELINE						**282,503**	**678,006**	**1,017,009**
Santero Way Specific Plan Area								
SWSPA (1,2,3)	535	459,076	18.10		6,600	119,460	181,579	199,679
TOTAL OF SWSPA EVALUATED						**119,460**	**181,579**	**199,679**

Notes:
gpd - gallons per day
(1) Increased wastewater flow coefficient for NU from 1,600 gpd/ac to 2,200 gpd/ac to align with typical return to sewer percent, 85 percent.
(2) Increased wastewater flow coefficient by 50 percent to align with California State Code section 65915 (f) 50 percent density bonus.
(3) Increased wastewater flow coefficient by 100 percent to align with the planned density twice that of the NU land use.
(4) Added 400 gpd/ac (CI) to flow coefficient for mixed-use.

Table 4 Projected Water Demands From Recently Constructed and Planned Development Projects

	Residential Units	Commercial Square Footage	Acreage	Demand Source	Demand Coefficient (gpd/ac)	ADD (gpd)	MDD (gpd)	PHD (gpd)
Constructed Projects								
Kessing Ranch	43			Previous Assessment		20,800	49,920	74,880
Village Walk	46		2.92		1,800	5,256	12,614	18,922
Sandell Industrial Warehouse		85,000	8.24		800	6,592	15,821	23,731
Planned Projects								
Flahavan Estates	43			Previous Assessment		9,230	22,152	33,228
Cotati Villages 1	177	29,415		Previous Assessment		34,093	81,822	122,733
Cotati Villages 2	126			Previous Assessment		21,645	51,947	77,921
Cotati Hotel and Market Hall	153 rooms with commercial market			Previous Assessment		20,118	48,282	72,424
Lasker Lane Subdivision (1)	36		1.82		3,900	7,086	17,007	25,511
La Plaza Mixed Use Project (1,2,3)	52		0.88		8,600	7,559	18,143	27,214
Redwood Row (1,3)	170	21,000	10.65		4,700	50,074	120,177	180,266
902 East Cotati Cottages (1)	6		0.23		3,900	893.1	2,143	3,215
Vector Control New Building		10,000	10.94		800	8,752	21,005	31,507
Transit Oriented Communities								
TOC (1,3)	236	192,289	14.35		6,300	90,405	216,972	325,458
TOTAL ADDED TO BASELINE						**282,503**	**678,005**	**691,552**
Santero Way Specific Plan Area								
SWSPA (1,2)	535	459,076	18.10		7,800	141,180	338,832	508,248
TOTAL OF SWSPA EVALUATED						**141,180**	**338,832**	**508,248**

Notes:
(1) Increased NU demand coefficient by 50 percent to align with California State Code section 65915 (f) 50 percent density bonus.
(2) Increased wastewater flow coefficient by 100 percent to align with the planned density twice that of the NU land use.
(3) Added 800 gpd/ac (CI) to demand coefficient for mixed-use.

SECTION 6 SYSTEM CAPACITY EVALUATION

To evaluate the impacts of the Project on the water distribution and wastewater collection systems, the updated hydraulic models were run for two scenarios—updated Baseline model (which includes recently constructed and planned development projects as well as TOC) and the updated Baseline model with the Project. This section describes the wastewater and water capacity analyses.

6.1 Wastewater Capacity Analysis

The City's wastewater hydraulic model was evaluated under PWWF conditions to determine the impact of the proposed Project on the system. There are two evaluation criteria presented in Table 1 which are impacted. The first is the minimum sewer diameter requirements. Currently, the existing sewer main in Santero Way that will serve the Project is 6 inches in diameter and considered deficient according to City's Standard Details and Specifications manual. Table 1 highlights the City's design standards, and states that a diameter of 8 inches is the minimum allowable size for public sewer mains. The existing 6-inch diameter sewer main extends approximately 2,000 feet along Santero Way and connects to an 8-inch diameter sewer line in East Cotati Avenue. The 6-inch sewer within the Project area should be upsized to 8 inch.

The second area where the evaluation focused was to identify areas directly downstream of the Project where pipeline capacity is inadequate to convey the estimated PWWFs. This analysis was conducted under existing flow conditions, updated with flows from the recently constructed development projects and projects in the planning stage, including the TOC.

The improvement projects recommended as part of the SCSMP Update and revised as part of the 2017 and 2020 Addendums are shown on Figure 7and are briefly summarized below. There are a total of six projects numbered 1 through 7. Project 6 was removed as part of the 2017 CSMP Addendum. Projects 8 and 9 were constructed prior to the 2020 Addendum and therefore are not shown in Figure 7. Only two projects are relevant to this study. Projects P-1 and P-2 are downstream of the proposed development. Project P-1 was constructed in 2019. Project P-2 requires re-evaluation due to an increase in wastewater generation.

- **Improvement Number P-1 and P-2:** The SCSMP recommended that the City construct a new 15-inch and 21-inch diameter relief trunk sewer that extends from the intersection of East Cotati Avenue and Gravenstein Way to the 24-inch diameter interceptor on Helman Lane at Redwood Drive. These improvements mitigate existing capacity deficiencies in the sewer system.

Evaluation of the system without the Project results in some surcharging along east Cotati Avenue, upstream of the proposed Project P-2, but does not exceed the 3-foot freeboard during PWWF criteria; therefore, no additional improvements are required. The model results indicate a freeboard at MH 1228 of 5.42 for the updated Baseline scenario and 4.00 feet after the flows from development of the SWSPA are added. Hydraulic profiles from the Project downstream, before and after the Project, are included as an appendix to this report.

The City has also identified a need for frequent jetting of the sewer in Cotati Ave downstream of the SWSPA. Cleaning of the pipe is a maintenance issue and not a capacity issue; however, it could indirectly cause a capacity issue if debris in the pipe or the pipe geometry causes a restriction, which may not be identified from the hydraulic model. It is recommended that the sewer in Cotati Ave be inspected via closed circuit television (CCTV) to identify the cause of the sediment buildup and whether a long-term solution exists that can eliminate the need for frequent cleaning.

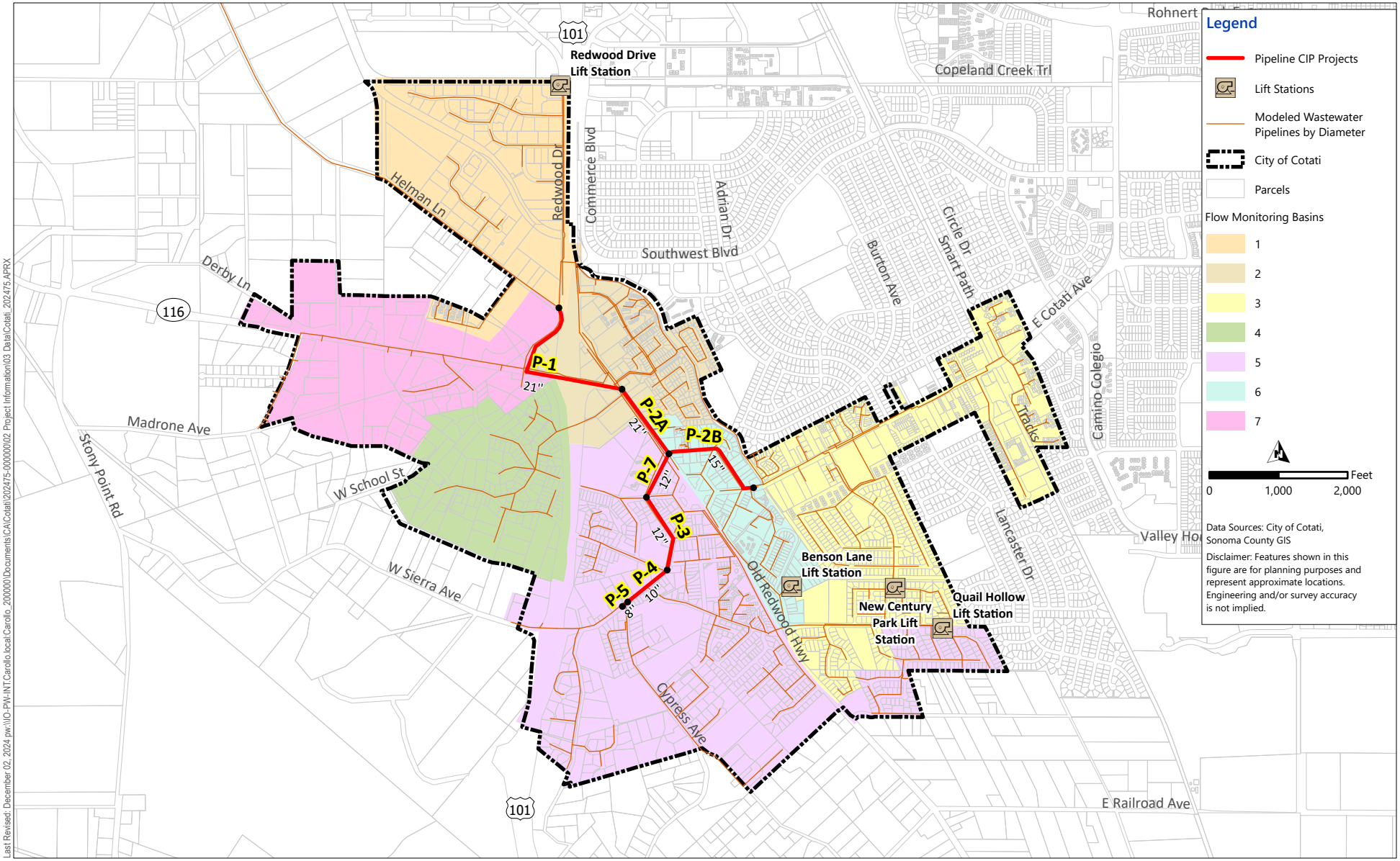


Figure 7 Collection System Master Plan Capital Improvement Projects
CITY OF COTATI

6.2 Potable Water Analysis

6.2.1 Water Supply Analysis

The water supply requirements for the City were determined in the WDSMP by comparing the available water supplies with the water demand. The WDSMP indicated the City should maintain a firm capacity at a minimum equal to the MDD. The City's current firm capacity is approximately 2.96 mgd (assuming the largest well—Well #3—is out of service and available supply from Sonoma Water is 50 percent of the entitlement limit per the contractual agreement).

Based on 2013 data provided by City staff, the water demand was on average 0.9 mgd, with a MDD of 2.16 mgd. However, as shown in Figure 5, water demand has declined from 1995 to present. Based on data provided by City staff for this analysis, the maximum water demand from 2019 to 2022 was 0.85 mgd, with a MDD of 2.03 mgd. The constructed and planned development projects will require a MDD of approximately 0.46 mgd, and the TOC will require an additional MDD of approximately 0.22 mgd for a total MDD of 2.71 mgd. The Project will require a MDD of approximately 0.34 mgd, increasing the City's existing MDD to 3.05 mgd. Based on the firm capacity of 2.96 mgd, there is a deficiency in supply with the Project of 0.09 mgd. Table 5 summarizes the results of the supply analysis.

The development of the SWPSA exacerbates the need for additional supply once the development projects in the planning stages and TOC are constructed. The 2017 WDSMP recommended:

- **Improvement Number W-4:** Construct a new supply well at the intersection of Gravenstein Highway and Alder Avenue with a capacity of 1.25 mgd to accommodate future growth.

Table 5 Potable Water Supply Analysis With Projects

Scenario	ADD (mgd)	MDD (mgd)	Firm Capacity(1) (mgd)	Deficiency (-) / Excess Capacity (+) (mgd)
Existing System Water Demand (2023)	0.85	2.03	2.96	0.93 (+)
Updated Existing System Water Demand with Constructed and Planned Projects (2024)	1.04	2.49	2.96	0.47 (+)
Updated Existing System Water Demand with Constructed and Planned Projects and TOC (2024)	1.13	2.71	2.96	0.25 (+)
Updated Existing System Water Demand with Constructed and Planned Projects, TOC, and SWSPA (2024)	1.27	3.05	2.96	0.09 (-)

Notes:
(1) Firm capacity is the City's total supply capacity with the largest well (Well #3) out of service and Sonoma Water supply at 50 percent.

6.2.2 Water Storage Analysis

The primary function of storage is to provide a reserve supply of water for operational equalization, emergency, and fire flow needs. According to the WDSMP, the City's existing 1.0 MG storage reservoir is not sufficient to meet storage requirements. Table 6, summarizes the required storage needs based on existing and future demands and compares the needs of the City before and after the proposed Project. As shown in Table 6, the project could increase the existing needs for storage by an approximate 0.23 MG, increasing the deficiency from 1.11 MG to 1.34 MG. The future analysis assumes an increase of storage due to the construction of the New Cypress and West Sierra Tanks recommended in the WDSMP. These projects are summarized below:

- **Increase Storage (T-1, T-2):** The storage capacity analysis of the WDSMP indicated that the City currently has a storage deficiency. Therefore, additional storage tanks are recommended. According to the WDSMP, to fully mitigate the existing storage deficiency and to service future growth, it is recommended that a 0.4 MG and 1.0 MG tank be constructed.

With the Project, future storage capacity needs are projected to be approximately 2.34 MG, a quantity of 0.06 MG below total available storage.

Table 6 Potable Water Storage Capacity Analysis

Scenario	ADD (mgd)	MDD (mgd)	Storage Criteria							Capacity Increase		Deficiency (-) / Excess Capacity (+)	
			25% of MDD (MG)	+	2,500 gpm for 2 hours (MG)	+	100% of ADD (MG)	=	Total Required Storage (MG)	Total Storage Capacity (MG)	Proposed Future Storage Capacity (MG)	Existing (MG)	Future (MG)
Existing System (2023)	0.85	2.03	0.51		0.30		0.85		1.66	1.0	2.4	-0.66	0.74
Existing System with Constructed and Planned Projects (2024)	1.04	2.49	0.62		0.30		1.04		1.96	1.0	2.4	-0.96	0.44
Existing System with Constructed and Planned Projects and TOC (2024)	1.13	2.71	0.68		0.30		1.13		2.11	1.0	2.4	-1.11	0.29
Existing System with Constructed and Planned Projects, TOC, and SWSPA (2024)	1.27	3.05	0.76		0.30		1.27		2.34	1.0	2.4	-1.34	0.06

6.2.3 Water Distribution Analysis

The City's WDSMP recommended capital improvement projects to address existing deficiencies in the distribution system. These projects are shown in Figure 8 and are described below. For more detailed information on the projects, refer to the WDSMP.

- **Improvement Number P-1 (Existing):** It is recommended that the City replace the existing 6-inch and 8-inch diameter water main on Aaron Street, Mercantile Drive, and Portal Street with a 10-inch diameter water main to meet the required 2,500 gpm fire flow for this industrial zoning area.
- **Improvement Number P-2 (Existing):** To meet the required 1,500 gpm fire flow for the area near West Cotati Avenue west of Highway 101 and south of Highway 116, it is recommended that the existing 4-inch diameter water main on West Cotati Avenue from Maple Avenue to west of Cohen Court be replaced with a new 8-inch diameter water main.
- **Improvement Number P-3 and P-4 (Existing):** Construct a new 10-inch diameter and 8-inch diameter water mains near the proposed 400,000-gallon Cypress Tank (Improvement Number T-1) to create a new boosted fire zone. The new boosted fire zone also includes Improvement Number BP-1: New booster pump station.
- **Improvement Number P-5 through P-9 (Existing):** Replace various dead end 6-inch diameter water mains throughout the City with 8-inch diameter water mains to meet the required fire flow criteria.
- **Improvement Number P-10 through P-14 (Future):** Construct various 8-inch, 10-inch, and 12-inch diameter water mains to connect loops within currently undeveloped areas within the City.

The City's water model was evaluated under ADD, MDD, PHD, and fire flow scenarios to determine the impact of the Project on the system. The existing system with demands from the recently completed and planned projects, including the TOC, has eleven junctions with a minimum pressure below the minimum allowable pressure, according to the evaluation criteria for MDD. Figure 9 shows the location of these junctions. There are 71 junctions that do not meet the minimum pressure under a MDD with fire flow scenario.

The existing system with demands from the recently completed and planned projects, including the TOC and with additional demands from the proposed Project, has 13 and 82 junctions with a minimum pressure below the minimum allowable pressure according to the performance criteria under MDD and MDD with fire flow scenarios, respectively. Figure 10 shows the location of junctions below the minimum allowable pressure under the MDD scenario with the Project demands. Therefore, the proposed Project does not create additional deficiencies or impact the operation of the system, and no additional improvements beyond any existing needs are required.

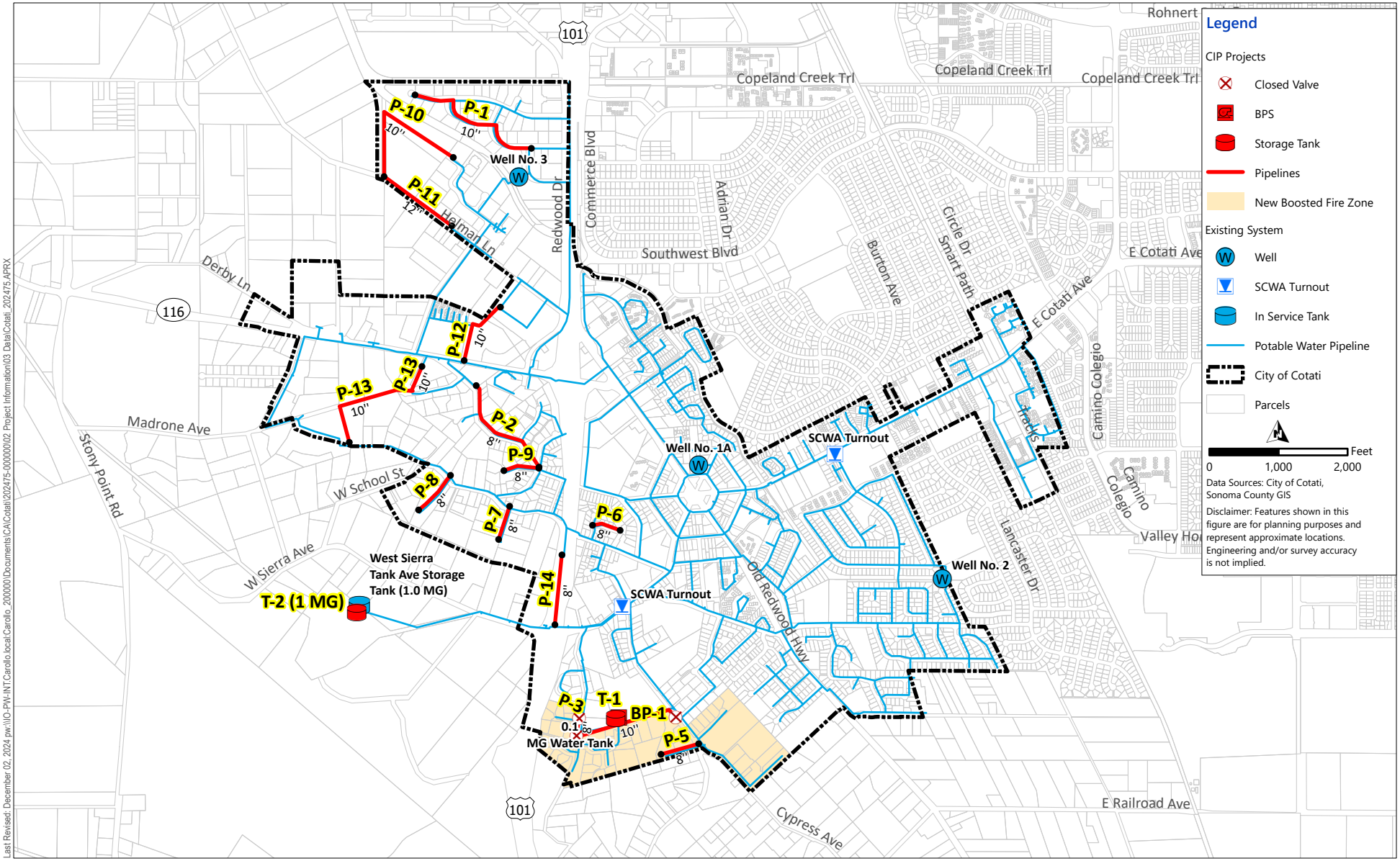


Figure 8 Water System Plan Capital Improvement Projects
CITY OF COTATI

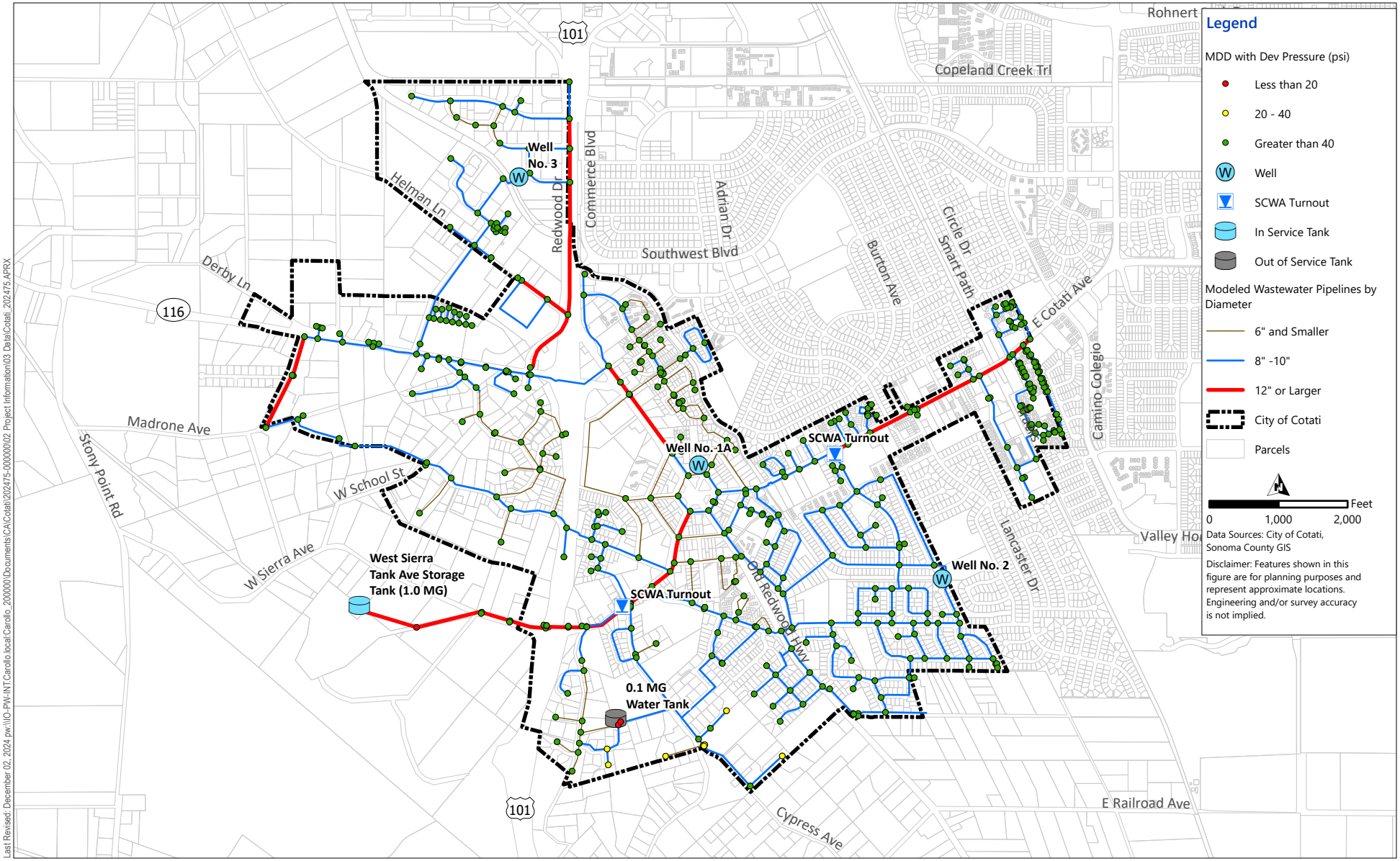


Figure 9 Maximum Day Demand Pressure Results - Existing System with Recently Constructed and Planned Development Projects, and Transit Oriented Communities

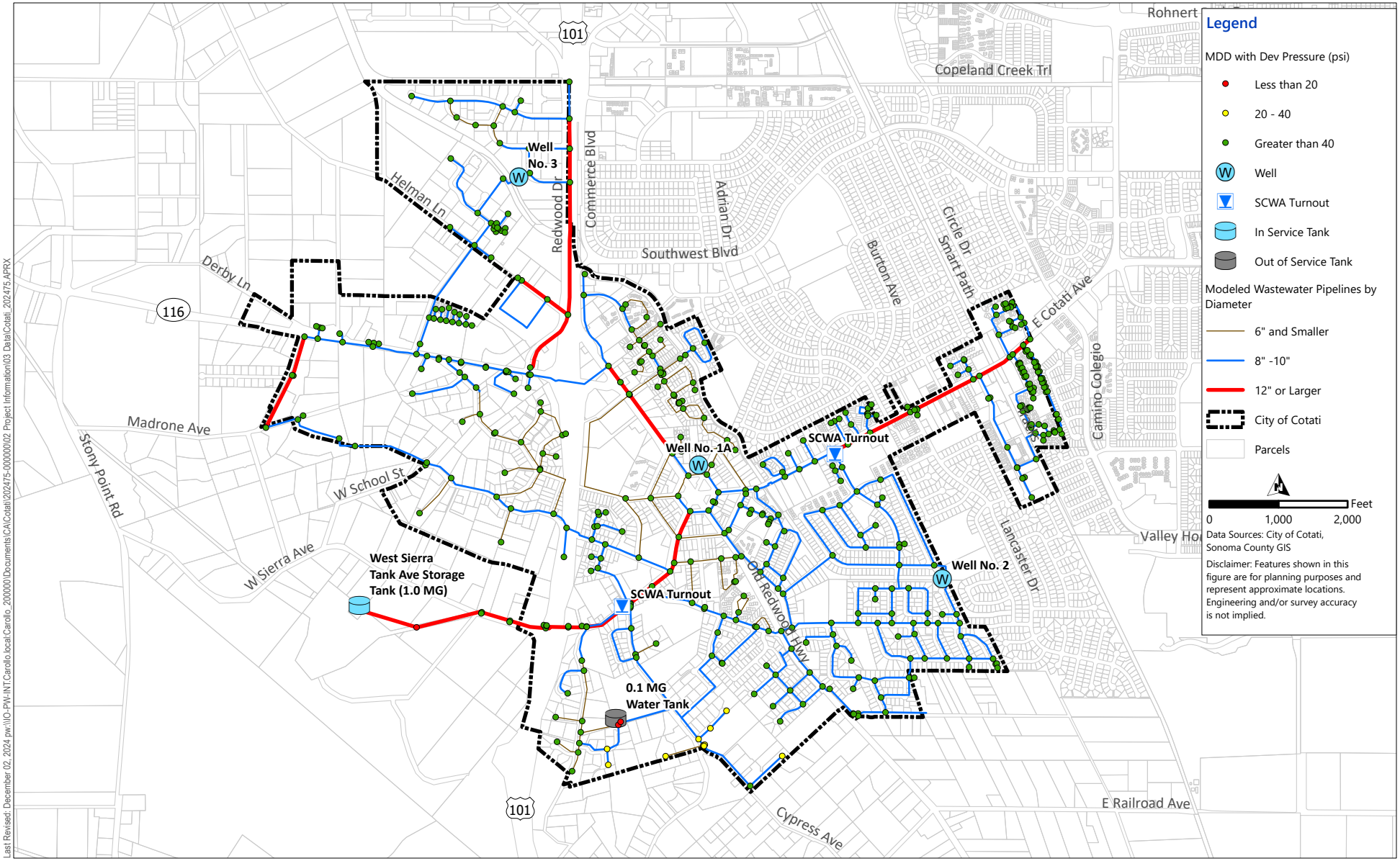


Figure 10 MDD Existing with Constructed Projects, Pipeline Projects, Transit-Oriented Communities, and Santero Way Specific Plan Area

CITY OF COTATI

SECTION 7 SUMMARY OF FINDINGS

The objectives of this study were to determine the impact of the proposed Project—rezoning of the SWSPA—on the existing sewer collection and water distribution systems. The following list summarizes the findings of this study:

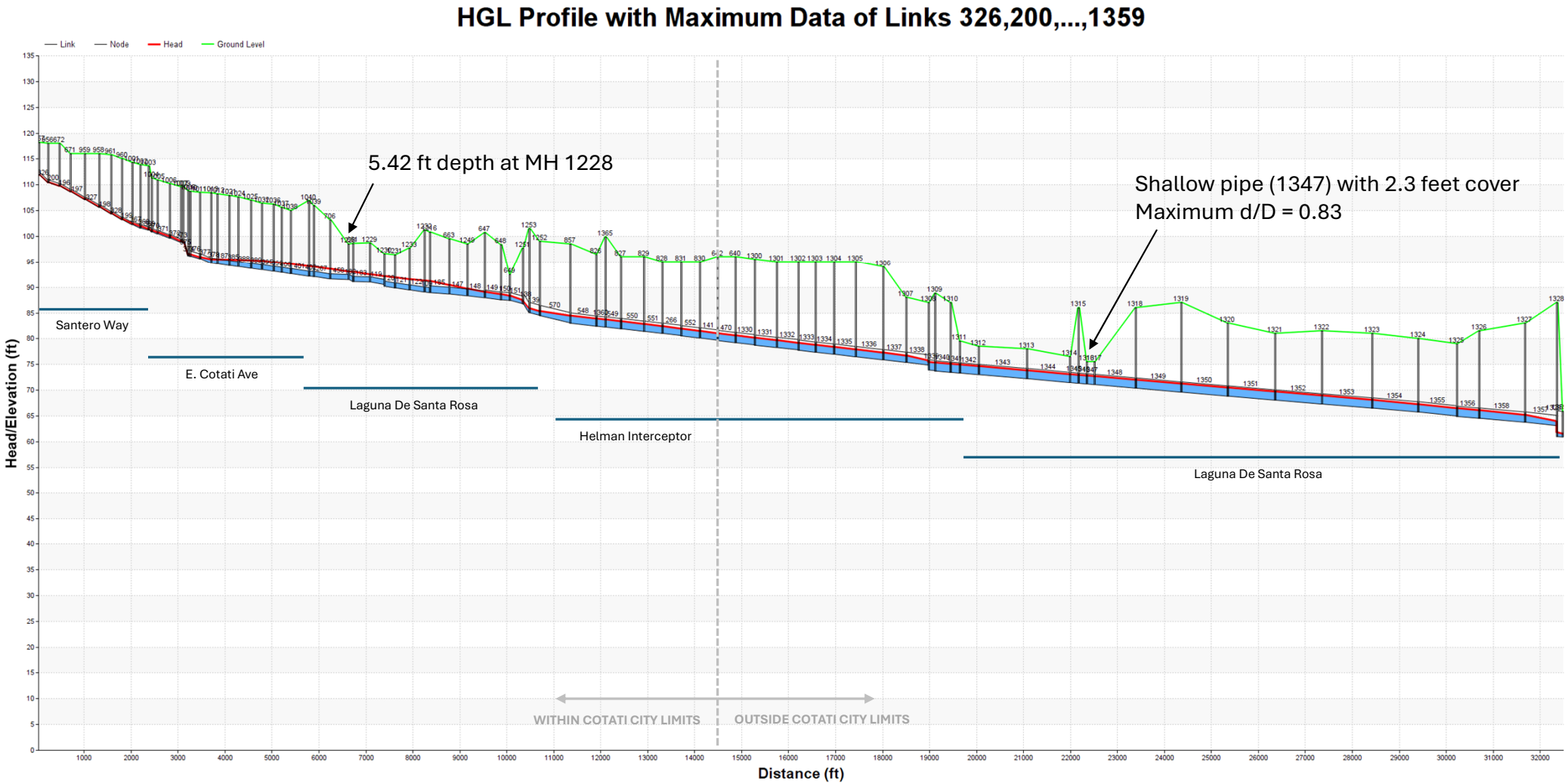
- The updated sewer model showed that the existing 6-inch sewer in Santero Way should be upsized to 8-inch diameter to meet the City's minimum public sewer diameter standards, and to have sufficient capacity to convey existing PWWF with the additional flows from the Project.
- The hydraulic model results show that the collection system evaluation criteria is not exceeded with the additional flow from the proposed Project under existing PWWF conditions with the recently constructed and planned development projects and TOC added.
- The City reported a need for regular jetting of the sewer in Cotati Ave. This is a maintenance issue that could be caused by a sag or belly in the pipe or offset joints. Inspecting this pipe via CCTV is recommended.
- The City's existing firm supply source does not have adequate capacity to meet the existing and projected MDD. There is a deficiency of 0.09 mgd that the City is planning to address by providing additional supply as part of its Capital Improvement Program (i.e. Improvement Number W-4 from the WDSMP) funded by connection fees and water rates.
- The existing system storage is deficient. The deficiency is exacerbated by the additional demands from the Project and other planned developments. The City is planning to address the storage deficiency through its Capital Improvement Program (i.e. Improvement Number T-1 and T-2 from the WDSMP) funded by ongoing collection of connection fees and water rates.
- The existing water system may have deficiencies related to low pressures, particularly under fire flow conditions. The proposed Project exacerbates these issues but no new improvement projects beyond those recommended in the WDSMP are needed.
- There are no recommended changes to the proposed improvements provided in the 2011 WDSMP or the 2017 SMP Update. The timing of improvement projects becomes clearer as developments become entitled.

In summary, The City's Capital Improvement Program is to address existing and future deficiencies (i.e. improvement projects W-4, T-1, and T-2 from the WDSMP) in response to continued development coming online and as connection fees and rates allow. No improvements from the SMP are needed to serve the Project; however, the sewer in Santero Way should be upsized. Additionally, the sewer in Cotati Ave, downstream of the SWSPA, should be inspected.

APPENDIX A

HYDRAULIC PROFILES

2023 WWF with Constructed and Pipeline Projects, including TOCs



2023 WWF with Constructed Projects, Pipeline Projects, TOCs and SWSPA