Appendix E

WSC Technical Memorandum

Technical Memorandum

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Subject:	Annexation Study

1.0 Introduction

This technical memorandum provides foundational background analysis for the City of Santa Maria's Sphere of Influence (SOI) and Annexation applications. The purpose of this analysis is to support the City in evaluating the capacity of its existing water and wastewater systems to meet current and future needs, including potential annexation areas.

The memorandum is organized as follows:

- Present and Probable Needs
- Capacity Analysis of Sewer and Water Facilities
- Recommended Infrastructure to Support Annexation Area

2.0 Present and Probable Needs

This section addresses SOI Section 10.B: “Present and probable needs for sewer and water facilities.” It is divided into two primary parts: one focusing on the present water and sewer system needs and the other summarizes the projected buildout needs.

2.1 Present Needs

Table 2.1 summarizes the City’s current water system demand. System demand represents the total quantity of water used, encompassing customer consumption, authorized non-customer usage, and distribution losses. This demand is calculated by summing supply data from all sources over a calendar year, covering the years 2020 through 2023, with an average calculated over this period.

Table 2.1 Current System Water Demand in acre-feet per year

	2020	2021	2022	2023	Average
Annual Water Demand (AFY)[1]	13,106	13,091	12,515	12,597	12,827

[1] System-wide demand calculated from total water production data provided by the City.

Table 2.2 summarizes the City's current wastewater flow, based on influent data from the City's Wastewater Treatment Plant (WWTP) for the years 2019 through 2023.

Table 2.2 Existing Wastewater Flow in million gallons per day

	2019	2020	2021	2022	2023	Average
Annual Wastewater Flow at WWTP (mgd)[1]	6.80	7.30	6.95	7.31	7.7	7.2

[1] Flow data provided by the City.

2.2 Probable Buildout Needs

Water demand and wastewater flow at buildout was estimated by multiplying the average annual per capita need with the population expected at buildout. The population at buildout was estimated based on the existing and proposed housing units within City limits, proposed housing units in the annexation area, and a persons per household factor of 3.76 sourced from US Census data. Table 2.3 shows the projected housing units and population at buildout.

Table 2.3 Projected Population at Buildout

	Housing Units [1]	Population [2,3]
Existing in City Limits	29,860	112,273
Proposed in City Limits	12,260	46,098
Proposed in Annexation	3,880	14,589
Total at Buildout	46,000	172,960

[1] Total household units at buildout per City staff.
[2] 3.73 person per household sourced from census.gov (United States Census Bureau, 2024)
[3] Total population at buildout calculated as the total housing units at buildout multiplied by the persons per housing unit factor.

The water demand at buildout was estimated by combining the projected demand from proposed growth with the existing water demand. The projected demand was determined using the anticipated population growth and a per capita water use factor of 109 gallons per person per day (gpcd) as indicated in the City's 2020 Urban Water Management Plan (UWMP). This water demand factor was used because the UWMP is the City's most recently published planning document. Table 2.4 summarizes the projected buildout water demand for the City and the annexation area.

Table 2.4 Buildout System Water Demand

	Population	Annual Water Demand	
		gpd	AFY
Existing in City Limits[1]	112,273	11,451,208	12,827
Proposed in City Limits[2]	46,098	5,024,638	5,628
Proposed in Annexation[2]	14,589	1,590,179	1,781
Total at Buildout	172,960	18,852,640	20,236

[1] Existing Annual Water Demand is based on historical data as presented in Table 2.1.
[2] Water demand projections assume 109 gpcd to be consistent with the City's 2020 UWMP.

Similar to the water demand projections, sewer flow at buildout was estimated by combining the projected flows from proposed growth with the existing sewer flows. The projected flow was determined based on the anticipated population growth and a per capita flow factor of 66.1 gpcd. This factor was selected as it aligns with the City's draft Wastewater Treatment Plant Master Plan, currently in development. Table 2.5 summarizes the projected wastewater flow at buildout.

Table 2.5 Projected Wastewater Flow at Buildout

	Population	Annual Water Demand[1]	
		gpd	mgd
Existing in City Limits[1]	112,273	7,200,000	7.20
Proposed in City Limits[2]	46,098	3,047,051	3.05
Proposed in Annexation[2]	14,589	964,320	0.96
Total at Buildout	172,960	11,211,371	11.21

[1] Existing sewer flow is based on historical data as presented in Table 2.2.
[2] Sewer flow projections assume 66.1 gpcd per the City's draft WWTP Master plan.

3.0 Capacity Analysis of Sewer and Water Facilities

This section addresses SOI Section 10.C, which evaluates the "Present capacity of sewer and water facilities and adequacy of sewer and water facilities the affected agency provides or is authorized to provide." The City's water and wastewater system capacities are analyzed and compared to current and projected needs below.

3.1 Water System Capacity

This analysis evaluates the City's water system capacity in terms of supply, storage, and distribution.

3.1.1 Supply Capacity

The supply capacity of the City's water system was assessed for normal, single dry, and multiple dry year conditions. Available supply under each scenario is based on the City's 2020 Urban Water Management Plan (UWMP). (Provost & Pritchard Consulting Group, 2021)

Tables 3.1, 3.2, and 3.3 present the available supply under each scenario. All scenarios show the City having sufficient supply to meet demand. The City anticipates that annexation will include the transfer of water rights sufficient to reliably offset the increased demand created by the annexation, thereby increasing the City's available supply.

Table 3.1. Normal Year Water Supply Capacity

	2025	2030	2035	2040	2045	Buildout
Available Supply (AFY)	36,558	36,403	36,250	36,095	35,941	35,941
Projected Demand (AFY)	15,026	17,247	17,869	18,490	18,716	20,237
Surplus/(Deficit) (AFY)	21,532	19,156	18,381	17,605	17,225	15,704

Table 3.2. Single Dry Year Water Supply Capacity

	2025	2030	2035	2040	2045	Buildout
Water Supply Total (AFY)	26,419	26,571	26,724	26,876	27,029	27,029
Projected Demand (AFY)	15,026	17,247	17,869	18,490	18,716	20,237
Surplus/(Deficit) (AFY)	11,393	9,324	8,855	8,386	8,313	6,792

Table 3.3 Multiple Dry Year Water Supply Capacity

		2025	2030	2035	2040	2045	Buildout
1st Year	Supply totals[1]	29,189	29,662	30,136	30,610	31,084	31,084
	Demand totals[1]	15,026	17,247	17,869	18,490	18,716	20,237
	Surplus/(Deficit)	14,163	12,415	12,267	12,120	12,368	10,847
2nd Year	Supply totals[1]	29,605	28,989	28,374	27,758	27,143	27,143
	Demand totals[1]	15,026	17,247	17,869	18,490	18,716	20,237
	Surplus/(Deficit)	14,579	11,742	10,505	9,268	8,427	6,906
3rd Year	Supply totals[1]	27,169	26,417	25,665	24,913	24,161	24,161
	Demand totals[1]	15,026	17,247	17,869	18,490	18,716	20,237
	Surplus/(Deficit)	12,143	9,170	7,796	6,423	5,445	3,924
4th Year	Supply totals[1]	30,126	30,121	30,116	30,111	30,106	30,106
	Demand totals[1]	15,026	17,247	17,869	18,490	18,716	20,237
	Surplus/(Deficit)	15,100	12,874	12,247	11,621	11,390	9,869
5th Year[2]	Supply totals[1]	25,180	25,180	25,180	25,180	25,180	25,180
	Demand totals[1]	15,026	17,247	17,869	18,490	18,716	20,237
	Surplus/(Deficit)	10,154	7,933	7,311	6,690	6,464	4,943

[1] Supply and demand values are in acre-feet.

[2] Fifth year demand values have been revised from what is in the UWMP to match those in the first through fourth year scenarios because the UWMP inexplicably shows an increase in demand in the fifth year of a drought.

3.1.2 Storage Capacity

The City's storage capacity was assessed based on the 2012 UCS. Usable storage volume is approximately 18 MG, distributed across three reservoirs.

Table 3.5 presents current and buildout storage requirements, including operational, fire flow, and emergency storage needs. The operational and emergency storage volumes are calculated as factors of ADD and PHD compared to reliable well capacity. The fire flow storage volume is calculated based on the City's largest fire flow. (Water Systems Consulting (WSC), Inc, 2015)

To meet buildout needs, storage improvements will be required, as indicated in the 2012 UCS. The 2012 UCS recommended increasing the number of generators in the distribution system from 3 to 5. This analysis found that 5 generators would be sufficient with the addition of the annexed areas. This analysis is summarized in Table 3.6.

Table 3.5. Existing Storage Requirements with Annexation

Storage Component	Required Volume (in million gallons)		
	Existing	Buildout (no improvements)	Buildout (with 5 Generators)
Operational Storage[1]	3.2	5.0	3.9
Fire Flow Storage[2]	0.7	0.7	0.7
Emergency Storage[3]	4.4	14.5	1.1
Total (MG) =	8.3	20.2[4]	5.7

[1] Calculated as 4 hours of PHD minus existing reliable well capacity. Note that the MDD peaking factor was calculated from 2023 production data while the PHD peaking factor was taken from the California Department of Public Health's criteria.

[2] Assumes a fire flow of 3,000 gpm for 4 hours.

[3] Calculated as 2 days of ADD minus existing reliable well capacity.

[4] Required volumes at buildout are greater than available storage volume.

3.1.3 Distribution System Capacity

Once an annexation area is determined, the City's hydraulic model will be used to analyze the system's capability to meet this increased demand. The City's water system is well looped, has average system pressures between 60 and 80 psi, and has a strong background of mains that are 18-inch diameter or greater. These factors indicate that the distribution system is adequately sized to provide maximum day demand + fire flows under existing plus annexation demands. Minor distribution system improvements may be recommended to meet build-out demands.

3.2 Wastewater System Capacity

The wastewater capacity analysis evaluates both the WWTP and the wastewater collection system.

3.2.1 Wastewater Treatment Plant Capacity

The City's current WWTP capacity is 8.0 mgd (California Regional Water Quality Control Board, Central Coast Region, 2010). Table 3.8 compares the current WWTP capacity to various flow conditions.

Table 3.8. WWTP Capacity Evaluation

	Existing	Existing + Annexation	Buildout + Annexation
WWTP Capacity (mgd)	8.0	8.0	8.0
System Flow (mgd)	7.2	8.2	11.2
Surplus/(Deficit) (mgd)	0.8	(0.2)	(3.2)

The City is currently updating its wastewater treatment plant master plan and has submitted a time schedule compliance plan to the Regional Water Quality Control Board with timelines for upgrading and expanding the existing WWTP to meet more strict discharge requirements and increased flows due to annexation and buildout. Based on this draft master plan, the WWTP will be expanded in two phases. The first phase, expected to be complete in 2032, will increase the WWTP's capacity to 10 mgd. The second phase, expected to be complete in 2052, will further increase the WWTP's capacity to 11.5 mgd. Buildout flows, including annexation, are projected at 11.2 mgd, so no additional improvements will be necessary.

3.2.2 Wastewater Collection System

The annexation will increase wastewater flows and likely require upgrades to the City's collection system. The existing collection system experiences some capacity issues, specifically in pipes near the WWTP, which can experience surcharging during high flows. The annexation will require either upsizing the City's existing trunk lines between the annexation area and the WWTP or the installation of dedicated sewer trunk lines from the annexation area to the WWTP. Final annexation details will determine specific improvements.

4.0 Recommended Infrastructure to Support Annexation Area

This section addresses requirements outlined in Annex Section 14.B, "Describe the level and range of the proposed sewer and water infrastructure," and Annex Section 14.D, "Indicate any improvements or upgrading of sewer and water facilities that will be required."

4.1 Proposed Infrastructure for Annexation Area

The annexation area will be developed with essential infrastructure, including water distribution system piping, valves, and other components, as well as wastewater collection system piping, manholes, and related appurtenances. Both water and wastewater systems will be integrated into the City's existing infrastructure, designed to support reliable service to the annexation area.

4.2 Required Improvements of Existing Systems

For the water system, no substantial improvements are anticipated. The current system has adequate supply and storage capacity to accommodate the annexation area, and the areas under consideration fall within the City's existing pressure zone, eliminating the need for additional capacity adjustments.

The wastewater system, however, will likely require the construction of a new sewer trunk line extending approximately 6.5 to 8.5 miles to effectively serve the annexation area. Additionally, if development proceeds rapidly, the City's WWTP may require upgrades to meet the increased

demand from both the annexation area and future growth within the City, ensuring sufficient treatment capacity for planned expansion.

References

California Regional Water Quality Control Board, Central Coast Region. (2010). *Waste Discharge Requirements.* Santa Maria: California Regional Water Quality Control Board.

Provost & Pritchard Consulting Group. (2021). *City of Santa Maria 2020 Urban Water Management Plan.* Santa Maria: City of Santa Maria Utilities Department.

United States Census Bureau. (2024, December 16). *Santa Maria City, California*. Retrieved from census.gov: https://www.census.gov/quickfacts/fact/table/santamariacitycalifornia/PST045223

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