

APPENDIX I
SANITARY SEWER CAPACITY
EVALUATION

Technical Memorandum



Subject: Sanitary Sewer Capacity Evaluation for Proposed Tasman East Specific Plan
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At the request of the City of Santa Clara (City), Woodard & Curran evaluated potential sanitary sewer capacity impacts of the proposed Tasman East Specific Plan using the City’s sanitary sewer hydraulic model. This technical memorandum (TM) summarizes the approach, model input, and results of the analysis. The proposed specific plan redevelops 36 existing parcels along Calle del Mundo, Calle de Luna, and Calle del Sol. The area is bounded by Tasman Drive to the south, Lafayette Street to the west, the Guadalupe River to the east, and the Santa Clara Golf Club to the north.

The specific plan is still in early planning stages. However, flow from the redeveloped parcels would likely enter the City’s sanitary sewer system at numerous locations along the streets within the specific plan, as well as Tasman Drive and Lafayette Street. The existing sewers serving the area are all at least 12-inches in diameter. A portion of the flow would enter sewers upstream of the Primavera lift station (located at Calle de Sol and Calle de Luna). All of the flow from the specific plan would eventually drain west to the existing 36-inch trunk sewer on Lafayette Street (at manholes S104-49, S104-35, and S104-31), from where it would be conveyed north and east to the Northside pump station and pumped to the San Jose/Santa Clara Regional Wastewater Facility for treatment. Although the Lafayette Street trunk from the specific plan area drains to the Northside pump station, increased flows in this trunk also affect inflows to the Rabello pump station, as the flow level affects routing of the flow from the Great America Parkway trunks. **Figure 1** shows the sewer lines that would receive flow from the specific plan area (affected lines in red), and **Figure 2** shows the site and surrounding modeled sewers.



Figure 1: Trunk Sewers Downstream of the Proposed Project Site



Figure 2: Modeled Sewers around Proposed Specific Plan Site, Showing Assumed Discharge Location by Parcel

1 Approach

To evaluate the potential sewer capacity impact of the proposed development, the following model configurations were used:

- *Sewer network:* The City’s current solution network was used. The network consists of the City’s expanded trunk sewer system that was developed as part of the Sanitary Sewer Master Plan Update (2016 Master Plan). The network includes the improvements recommended by the 2016 Master Plan (P1, P2, P3, P4, P5, P6 Alternative, and E1). There are no proposed capacity improvement projects downstream of the specific plan site.
- *Sanitary sewer load:* The Updated General Plan Phase 3 Loads (aka 2035 Loads) were used for this analysis. The 2035 loads were recently updated for the 2016 Master Plan Update, which includes updated base loads, updated development assumptions consistent with the City’s 2035 General Plan, and projected loads for additional developments that were approved between 2009 (after the completion of the original 2035 Loads) and the completion of the 2016 Master Plan Update. The model also includes proposed developments that have been evaluated since completion of the 2016 Master Plan Update. In addition to the wastewater flows generated within the City’s service area, the City also receives flow from the Cupertino Sanitary District (CuSD). For planning purposes, the model capped the peak wet weather flow (PWWF) discharge from CuSD at 13.8 mgd, which

is the contractual maximum flow rate that CuSD is allowed to discharge into the Santa Clara system.

- *Flow Scenario:* System capacity was evaluated based on the ability of the sanitary sewer system to convey future PWWF under design storm conditions. This analysis used the same 10-year design storm that was used for the 2016 Master Plan.

2 Model Input

Parcels included in the specific plan were added to the model as individual subcatchments with the following settings, based on the sewer model run request received May 25, 2018:

- *Sanitary Sewer Loads:* The specific plan will replace all existing uses and would allow up to 4,500 dwelling units, up to 106,000 square feet of mixed retail, and a school for up to 600 students. Ground floor retail will be required along Calle del Sol (which will also be extended through to Calle del Mundo), and will also provide an opportunity for light industrial uses to locate on the ground floor of buildings. However, more specific locations and uses are unknown at this time. Therefore, anticipated sewer loads from the specific plan development were spread equally across all parcels, proportional to the parcel area. The specific plan is estimated to discharge a total of 585,300 gpd. This flow replaces 132,257 gpd as estimated for these parcels for the Master Plan 2035 model. **Table 1** summarizes the estimated flows and unit flow factors by land use, and **Table 2** documents the resulting assumed flows by parcel, along with the assumed discharge location.

Table 1: Sewer Load Estimates for the Specific Plan

Proposed Usage ⁽¹⁾	Allowable Development ⁽¹⁾	Unit Flow	Estimated Average Sewer Flow (gpd)
Very High Density Residential	4,500 dwelling units	121 gpd/unit ⁽²⁾	544,500
Retail	106,000 square feet	0.30 gpd/sf ⁽³⁾	31,800
School	600 Students	15 gpd/student ⁽⁴⁾	9,000
Total Flow			585,300

Notes:

1. Land use and allowable development were obtained from the sewer model run request received May 25, 2018.
 2. Unit flow factor per the *San Jose – Santa Clara Water Pollution Control Plant Specific Use Code & Sewer Coefficient* table for dwellings of 5+ units. Because of the very high density nature of this development, this unit flow factor was more appropriate than the 154 gpd/unit for general multi-family housing used in the City’s 2016 Sanitary Sewer Master Plan Update (Table 2-1).
 3. Unit flow allows for a mix of retail and non-residential uses ranging from 0.073 gpd/sf for “large structure” retail to 1.04 gpd/sf for full service restaurants per the *San Jose – Santa Clara Water Pollution Control Plant Specific Use Code & Sewer Coefficient* table.
 4. Typical value used is other Bay Area communities.
- *Diurnal Profile:* Per Figure 2-3 in the City’s 2016 Sewer Master Plan Update, the commercial diurnal curve was applied to the non-residential flows, and the “Lafayette Area Residential Flow” diurnal curve was applied to the residential flows. The Lafayette Residential curve has a higher peak flow in the morning compared to the typical residential curve. It was calibrated during the Master Plan based on flows near Lafayette Street and Montague Expressway, largely made up of relatively high density newer housing. Similar patterns have been observed in other Bay Area communities. It is possible that areas consisting of very similar housing attract residents that tend to have more similar usage patterns than older areas with more diverse housing stock, resulting in higher peak usage.
 - *Rainfall Event:* The rainfall event used was the same 10-year design event used for the 2016 Master Plan Update.
 - *RDI/I Parameters:* The RDI/I parameters used were the calibrated parameters from the 2016 Master Plan. This means that RDI/I response is assumed to neither increase nor decrease with the specific plan.

Table 2: Sewer Load Estimates and Assumed Discharge Location by APN

APN	Manhole ID	Estimated Average Sewer Flow (gpd)		
		Residential	Non-Residential	Total
097-05-056	S105-4	94,670	7,094	101,764
097-05-057	S105-3	30,162	2,260	32,422
097-05-058	S105-2	47,615	3,568	51,182
097-05-059	S105-1	14,854	1,113	15,967
097-05-060	S105-1	12,683	950	13,634
097-05-061	S104-33	13,112	983	14,095
097-05-062	S104-33	13,099	982	14,081
097-05-063	S104-33	12,813	960	13,773
097-05-064	S104-32	15,347	1,150	16,497
097-46-001	S104-32	6,991	524	7,515
097-46-002	S104-32	6,017	451	6,468
097-46-003	S104-33	6,043	453	6,496
097-46-004	S104-33	5,822	436	6,258
097-46-005	S104-33	5,978	448	6,426
097-46-006	S104-33	5,978	448	6,426
097-46-007	S105-7	5,965	447	6,412
097-46-008	S105-7	5,965	447	6,412
097-46-009	S105-8	5,874	440	6,314
097-46-010	S105-8	6,459	484	6,943
097-46-011	S105-8	11,696	876	12,572
097-46-015	S104-42	18,284	1,370	19,654
097-46-016	S104-48	16,062	1,204	17,266
097-46-017	S105-38	19,454	1,458	20,912
097-46-018	S105-37	16,166	1,211	17,377
097-46-019	S105-5	25,120	1,882	27,002
097-46-020	S105-4	13,580	1,018	14,598
097-46-021	S105-5	12,410	930	13,340
097-46-022	S105-7	1,079	81	1,159
097-46-023	S105-7	11,969	897	12,865
097-46-024	S104-33	12,748	955	13,704
097-46-025	S105-1	6,290	471	6,761
097-46-026	S105-1	6,524	489	7,012
097-46-027	S105-2	13,619	1,020	14,639
097-46-028	S105-10	20,922	1,568	22,490
097-46-029	S105-41	9,915	743	10,658
097-46-030	S105-29	13,216	990	14,206
Total (gpd)		544,500	40,800	585,300

3 Model Results

Hydraulic profiles and predicted PWWF under future (2035) conditions in the sewers downstream of the specific plan site were reviewed.

Without the specific plan: The model predicts the following results for the various sewer lines within and downstream the specific plan area (percentages full are based on the depth of flow):

- *Calle del Mundo/Calle del Luna upstream of Primavera PS, 12-inch (S104-33 to S105-35):* 18% to 29% full.
- *Tasman and Calle del Sol to Primavera PS, 24-inch (S105-29 to S105-6):* 35% to 40% full.
- *Calle del Sol from Tasman to Primavera PS, 12-inch (S105-26 to S105-36):* 20% to 33% full
- *Calle del Luna from Primavera PS to Lafayette, 15-inch (S105-7 to S104-35):* 35% to 40% full
- *Calle del Luna from Primavera PS to Lafayette, 21-inch (S105-37 to S104-35):* approximately 49% full
- *Lafayette from specific plan area to Northside pump station:* approximately 60% full to slightly surcharged (surcharge depth approximately 4.2 inches)
- *Primavera lift station inflow:* The predicted PWWF inflow to the Primavera PS is 2.1 mgd
- *Rabello/Northside PS inflow (combined):* 43.1 mgd

With the specific plan: The model predicts the following results for the various sewer lines within and downstream the specific plan area (percentages full are based on the depth of flow):

- *Calle del Mundo/Calle del Luna upstream of Primavera PS, 12-inch (S104-33 to S105-35):* 29% to 58% full.
- *Tasman and Calle del Sol to Primavera PS, 24-inch (S105-29 to S105-6):* 35% to 41% full.
- *Calle del Sol from Tasman to Primavera PS, 12-inch (S105-26 to S105-36):* 23% to 34% full.
- *Calle del Luna from Primavera PS to Lafayette, 15-inch (S105-7 to S104-35):* 44% full.
- *Calle del Luna from Primavera PS to Lafayette, 21-inch (S105-37 to S104-35):* approximately 55% full.
- *Lafayette from specific plan area to Northside pump station:* approximately 65% full to slightly surcharged (surcharge depth approximately 4.5 inches)
- *Primavera lift station inflow:* The predicted PWWF inflow to the Primavera PS is 2.5 mgd
- *Rabello/Northside PS inflow (combined):* 43.5 mgd

The sanitary sewer pipes serving the specific plan area have sufficient capacity for the proposed specific plan, as does the Primavera lift station (estimated firm capacity of 5.7 mgd).

The proposed specific plan is predicted to increase flows to the Rabello and Northside pump stations by about 0.4 mgd. While this increase is small compared to the total flow to these pump stations, the combined model-predicted future PWWF to the pump stations does slightly exceed their estimated firm capacities (capacity with the largest pump out of service). Although this exceedance does not warrant expanding pump station capacity at this time, the City may wish to consider planning for future pump station capacity improvements.