Technical Memorandum

Subject:	**Sanitary Sewer Capacity Evaluation for the International Swimming Center Development (APN: 290-26-029)**
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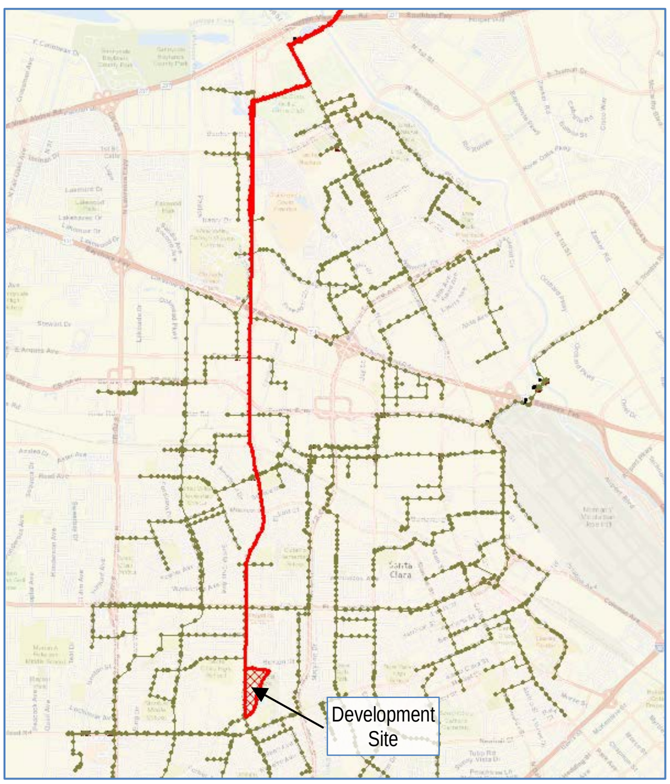
At the request of the City of Santa Clara (City), RMC evaluated the potential sanitary sewer capacity impact of the proposed International Swimming Center development project located at 936 Kiely Blvd. using the City's updated sanitary sewer hydraulic model. This technical memorandum (TM) summarizes the approach, model input, and results of the analysis.

Figure 1 shows the location of the development site and sewer lines that are affected by the additional flow from this development (affected lines in red). Flow from the development would enter the City's sanitary sewer system at manhole S23-4 in Kiely Blvd., drain northward in Bowers Ave. and Great America Pkwy., and then eastward to the Rabello and Northside pump stations. Note that the Rabello and Northside pump stations are included in the model but are subject to further study as part of the City's 2015 Sanitary Sewer Master Plan Update (2015 Master Plan) effort. As such, this analysis only evaluated the capacity impact of the development to its downstream pipes, but did not include any evaluation of the capacities of the two pump stations or force mains.

Figure 1: Trunk Sewers Downstream of the Proposed Development Site



1 Approach

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

- *Sewer Network*: the City's most current network was used. The network consists of the City's expanded trunk sewer system that was developed as part of the 2015 Sanitary Sewer Master Plan Update (2015 Master Plan). The network includes all constructed improvements (e.g., Phase I and Phase II Improvement Projects, Walsh, etc.) and also those that are currently under construction.
- *Sanitary Sewer Load*: Updated General Plan Phase 3 Loads (aka 2035 Loads) were used for this analysis. These loads were recently developed for the City's 2015 Master Plan project, 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 now. In addition to the wastewater flows generated within the City's service area, the City also receives wastewater flow from the Cupertino Sanitary District (CuSD). For planning purposes, the model capped the peak wet weather flow (PWWF) discharge at 13.8 mgd, which is the contractual maximum flow rate that CuSD is allowed to discharge into the Santa Clara system.
- *Design storm*: 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 is being used for the 2015 Master Plan project.

2 Model Input

The development was added to the model as an individual subcatchment with the following settings:

- *Sanitary Sewer Load*: Per information provided by the developer, the site is expected to discharge a peak flow of 390 gpm; of which, 200 gpm is for backwash activity that will occur once per week. The chance of such activity being scheduled during a 10-year storm event is extremely rare. As such, the peak flow was not used in this analysis. Instead, this analysis uses the average daily flow estimated based on land use, as summarized below:

Land Use	**Quantity**	**Unit Flow** (1)	**Average Daily Flow (gpd)**
Recreation/Swim Center	275,369 sq. ft.	0.3 gpd/sf	82,611
Theater	400 seats	5 gpd/seat	2,000
			84,611

(1) The City's 2007 Sanitary Sewer Capacity Assessment and the San Jose-Santa Clara Water Pollution Control Plan Specific Use Code & Sewage Coefficient do not have a unit flow factor for swim center developments. The unit factor of 300 gpd/1,000 sf presented in the ISC Sanitary Sewer Impact Calculation (footnote 3, which referenced the unit flow factor from the 2008 City of Oakland Sewer Design Guidelines for gym) was deemed reasonable and used for this analysis.

<u>Since the analysis is based on the assumption that backwash activity will not occur at the same time as a design storm event, it is critical for the developer and the facility operator/engineer to note that backwash activity should not be scheduled on the same day as a large storm event.</u>

- *Rainfall Profile:* The City's design storm profile was applied to the model to predict system performance under PWWF condition. The storm was timed to cause peak rainfall-dependent infiltration/inflow (RDI/I) at approximately the same time as the peak BWF of the system.

- *Contributing Area and I/I Parameters*: The I/I contributing area was set to be equal to the parcel area. I/I parameters were set to be the same as an area in the immediate vicinity.

3 Model Results

Hydraulic profiles of the sewers downstream of the loading manhole under peak wet weather flow (PWWF) conditions were reviewed.

Without the development, the model showed that the 24- to 30-inch line downstream of manhole S23-4 in Kiely Blvd. would be about 60 to 80 percent full; the 33-inch line in Bower Ave. north of Central Expressway would be about 75 to 90 percent full. Further downstream, one of the parallel lines – commonly referred to as the “East Line” – on Great America Parkway would be almost full, while the “West Line” showed a surcharge of about 4 inches near Tasman Drive.

With the development, the model showed that the 24- to 30-inch line downstream of manhole S23-4 in Kiely Blvd. would be about 65 to 80 percent full; the 33-inch line in Bower Ave. north of Central Expressway would be about 75 to 95 percent full. Further downstream, the East Line on Great America Parkway would be almost full, while the West Line would show a slightly worsened surcharge. All the surcharged locations show a surcharge of less than 1 foot and are therefore considered acceptable per City’s hydraulic design criteria. As such, **no capacity improvement is needed**.

As previously stated, this analysis did not include any evaluation of the pump capacities of the Rabello and Northside pump stations. According to the pump station capacity tests conducted as part of the Sanitary Sewer Master Plan Update, the combined firm capacity[1] of the two stations is 41 mgd. The City is in the process of completing its Sanitary Sewer Master Plan Update, which would determine the required improvements to increase the stations’ firm capacity to accommodate the proposed development flow.

[1] Firm capacity is defined as the capacity of a pump station with the largest pump out of service.