

# TECHNICAL MEMORANDUM

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## City of San Bruno Wastewater Collection System Hydraulic Modeling Support

SUBJECT: Sanitary Sewer Capacity Evaluation for Glenview Highlands Development  
PREPARED BY: Gisa Ju, Woodard & Curran, CA PE No. 31823  
REVIEWED BY: Cathy Greenman, Woodard & Curran, CA PE No. 66157  
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This Technical Memorandum (TM) summarizes the evaluation of the potential sanitary sewer capacity impact of the proposed Glenview Highlands development at 850 Glenview Drive in the City of San Bruno. The development is located on the northeast corner of San Bruno Avenue West and Glenview Drive. The proposed development is a residential development with 58 3-bedroom townhome-style condominiums.

The sewer capacity evaluation used the City's hydraulic model of the trunk sewer system developed as part of its 2014 Sewer Master Plan. For that study, the sewer network was developed using GIS data available at the time, supplemented with old AutoCAD maps and some record drawings for specific trunk sewer lines. A limited update of the model was performed in 2019 as part of the Sanitary Sewer Impact Study for the Bayhill Specific Plan area, and some additional updates to the network have been made as part of other recent development impact studies. In general, however, the modeled sewer network has not been significantly updated since the 2014 Master Plan. As part of the Bayhill Specific Plan study, the existing base wastewater flow (BWF) "loads" were updated to 2018 conditions based on more current data from water use records (the original model reflected conditions in 2010/11); however, because of issues with extracting the records, that update may have missed some connections in the City, so the flows may be underestimated in some areas.

## 1. MODEL INPUT

### 1.1 Sewer Network

The development is proposed to connect to the existing 8-inch sewer in Glenview Drive north of San Bruno Avenue. The majority of the development flow will discharge to a new manhole just upstream of manhole (MH) 167 in Glenview Drive. From there, the flow would be conveyed north

to Earl Avenue, and then downstream to Claremont Drive, Concord Way, through Crestmoor Canyon, ultimately connecting to the 21-inch trunk sewer in Sneath Lane at I-280.

The 8-inch sewer in Glenview Drive was not previously included in the City's hydraulic model but was added for this study. **Figure 1** shows the area tributary to the Glenview Drive sewer and the location of the development and modeled sewers.

## **1.2 Sewer Subcatchments and Loads**

In order to simulate the flows in the local model network, the Master Plan model subcatchment in which the development is located was subdivided into several parts, and new, smaller subcatchments representing the area tributary to the Glenview Drive sewer were created. The model loads for parcels tributary to the sewers along Glenview Drive and Estates Drive were attributed to those new subcatchments. The existing base wastewater flows based on the updated 2018 water use data, as well as the previously estimated infiltration/inflow (I/I) flows, were distributed to the new subcatchments.

The proposed Glenview Highlands development includes 58 single family residential dwelling units (DUs). The average BWF contributed by the development was estimated based on design unit flow factor of 170 gallons per day (gpd) per DU, as used to estimate future flows for the 2014 Sewer Master Plan. Therefore, the total average BWF generated by the Glenview Highlands development was estimated to be 9,860 gpd for the purpose of this model analysis.

## **1.3 Design Flow Parameters**

System capacity was evaluated based on the ability of the sanitary sewer system to convey peak wet weather flow (PWWF) under design storm conditions. The analysis for this study used the same BWF diurnal curves for residential and non-residential flows, as well as the same rainfall-dependent inflow and infiltration (RDI/I) for this area applied to the 10-year return period design event, as used in the 2014 Sewer Master Plan

**Figure 1: Model Tributary Area and Development Location**



## 2. MODEL RESULTS

The model was run for existing PWWF conditions with the proposed development. The model results were evaluated to identify any predicted surcharge under design PWWF in the downstream sewers. The results show that there is no predicted surcharge in the 8-inch sewer in Glenview Drive with the proposed development. Under design storm PWWF, the sewer is predicted to run only about 15 percent full.

Similarly, no capacity deficiencies are predicted in the downstream sewers in Earl Avenue, Claremont Drive, Concord Way, and through Crestmoor Canyon based on the flows from the Master Plan model, although a slight surcharge is predicted in the existing deep 8-inch pipe in Claremont Drive and the easement sewer between Earl Avenue and Claremont Drive.

**Figure 2** shows a profile of the sewers in Glenview Drive, Earl Avenue, and Claremont Drive under design storm PWWF for existing conditions with the Glenview Highlands development. (A profile legend is included in Attachment A.) The sewers further downstream have adequate capacity to handle these flows.

It should be noted that the model assumes that the sewer mains are clear of obstructions and are in good condition. It should also be noted that the City has experienced surcharge during large storm events and a previous overflow at MH1742 on Earl Avenue, just upstream of Glenview Drive. Therefore, City staff monitor conditions in this line closely during wet weather conditions and set up a flow bypass when surcharge is observed in order to prevent another overflow.

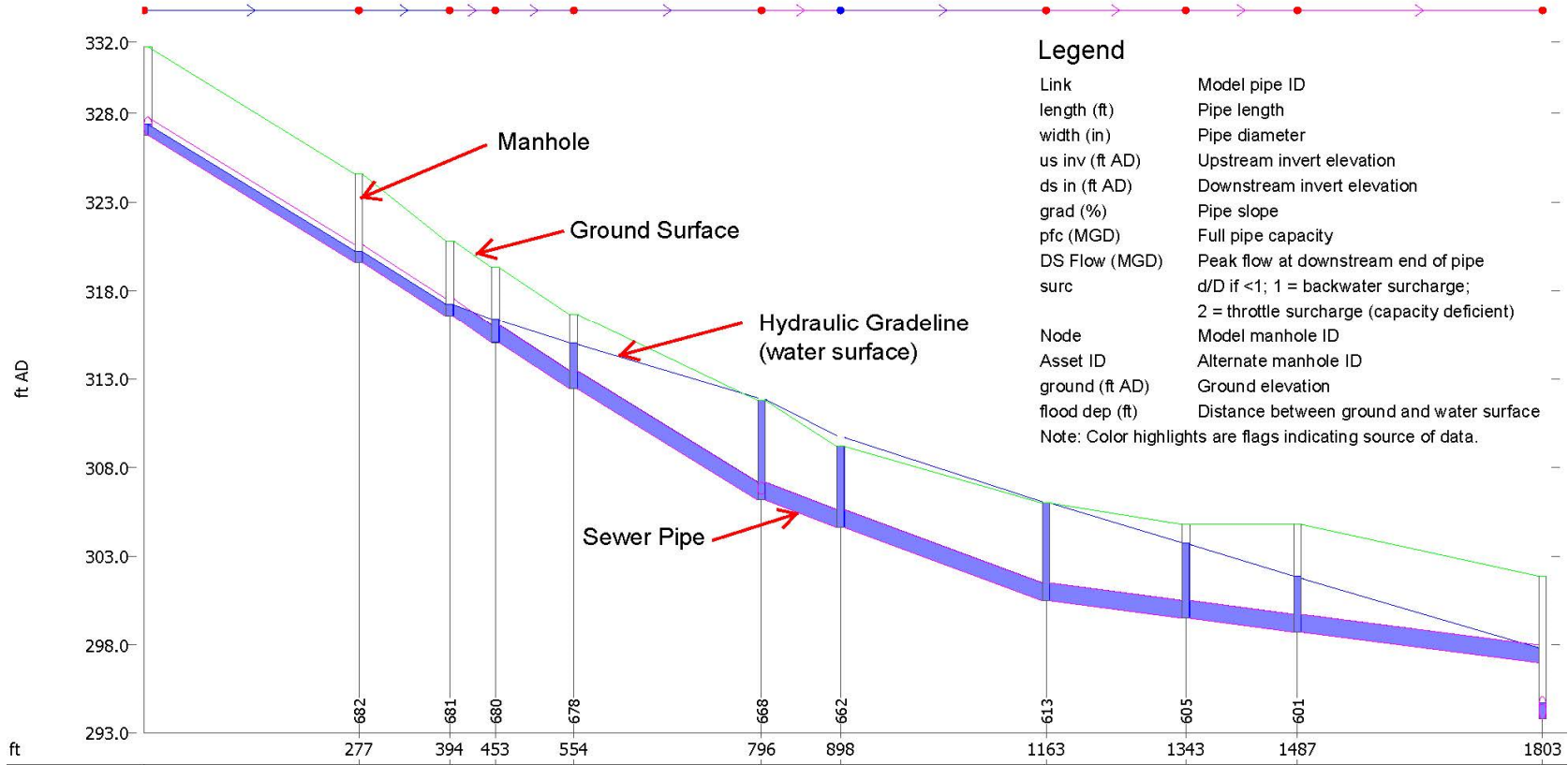
Since these conditions are not currently predicted by the model, the City is currently undertaking an investigation to try to identify the cause of the observed surcharge. The study will include flow monitoring at three locations along Earl Avenue and Claremont Drive during the 2023/24 wet weather season, and review of closed-circuit television (CCTV) inspection and other available data for the sewers and storm drains in this area. The flow monitoring data will be used to refine the calibration of the hydraulic model and determine if the sewer lines are, in fact, capacity deficient.

Therefore, until the cause of these wet weather issues are determined, it can be assumed that any additional flow generated by new development could potentially increase the risk of overflows in the Earl Avenue sewer.

**Figure 2: Model Profile from MH166 (Glenview Drive) to MH191 (Claremont Drive) under Existing Design PWWF with Glenview Highlands Development**



## Attachment A: Model Profile Legend



### Legend

- |                |  |
|----------------|--|
| Link           | Model pipe ID  |
| length (ft)    | Pipe length  |
| width (in)     | Pipe diameter  |
| us inv (ft AD) | Upstream invert elevation  |
| ds inv (ft AD) | Downstream invert elevation  |
| grad (%)       | Pipe slope   |
| pfc (MGD)      | Full pipe capacity   |
| DS Flow (MGD)  | Peak flow at downstream end of pipe  |
| surc           | d/D if <1; 1 = backwater surcharge;<br>2 = throttle surcharge (capacity deficient) |
| Node           | Model manhole ID   |
| Asset ID       | Alternate manhole ID   |
| ground (ft AD) | Ground elevation   |
| flood dep (ft) | Distance between ground and water surface  |
- Note: Color highlights are flags indicating source of data.

ft		277	394	453	554		796	898		1163	1343	1487		1803
Link	5837.1	682.1	681.1	680.1	678.1		668.1	662.1		613.1	605.1	601.1		601.1
length (ft)	277.0	117.0	59.0	101.0	242.0		102.0	265.0		180.0	144.0	316.0		316.0
width (in)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0		12.0
us inv (ft AD)	326.783	319.613	-	315.058	312.444		306.180	304.630		300.500	299.510	298.730		298.730
ds inv (ft AD)	319.613	316.585	-	312.444	306.180		304.630	300.500		299.510	298.730	297.000		297.000
grad (%)	2.588	2.588	2.588	2.588	2.588		1.520	1.558		0.550	0.542	0.547		0.547
pfc (MGD)	3.71	3.71	3.71	3.71	3.71		2.84	2.88		1.71	1.70	1.70		1.70
DS Flow (MGD)	2.30485	2.30576	-	2.53147	2.54765		3.45051	2.62876		2.55746	2.54577	2.54206		2.54206
surc	0.61	0.67	1.00	1.00	1.00		2.00	1.00		2.00	2.00	2.00		2.00
Node	5837	682	681	680	678		668	662		613	605	601		593
Asset ID														
ground (ft AD)	331.750	324.583			316.667		311.800	309.200		306.000	304.800	304.800		301.880
flood dep (ft)	-4.370	-4.361	-3.582	-2.929	-1.630		-0.000	0.000		-0.000	-1.040	-2.921		-7.190