Appendix G:
Hotel Sewer Capacity Analysis Memo

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CITY OF COTATI

HOTEL SEWER CAPACITY ANALYSIS

TECHNICAL MEMORANDUM PROPOSED HOTEL EVALUATION

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CITY OF COTATI

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PROPOSED HOTEL SEWER CAPACITY ANALYSIS

1.0 BACKGROUND

The City of Cotati (City) is located in Sonoma County, approximately 45 miles north of San Francisco in the 101 corridor between Rohnert Park and Petaluma. Carollo Engineers Inc. (Carollo) completed a sewer collection system master plan update (Master Plan Update) for the City in 2017. The Master Plan Update identified areas of the collection system where peak flows exceeded the City's established hydraulic evaluation criteria. Capital improvement projects were recommended to increase capacity. The Master Plan also developed a plan to construct sewer facilities that will serve future development within the City's planning area.

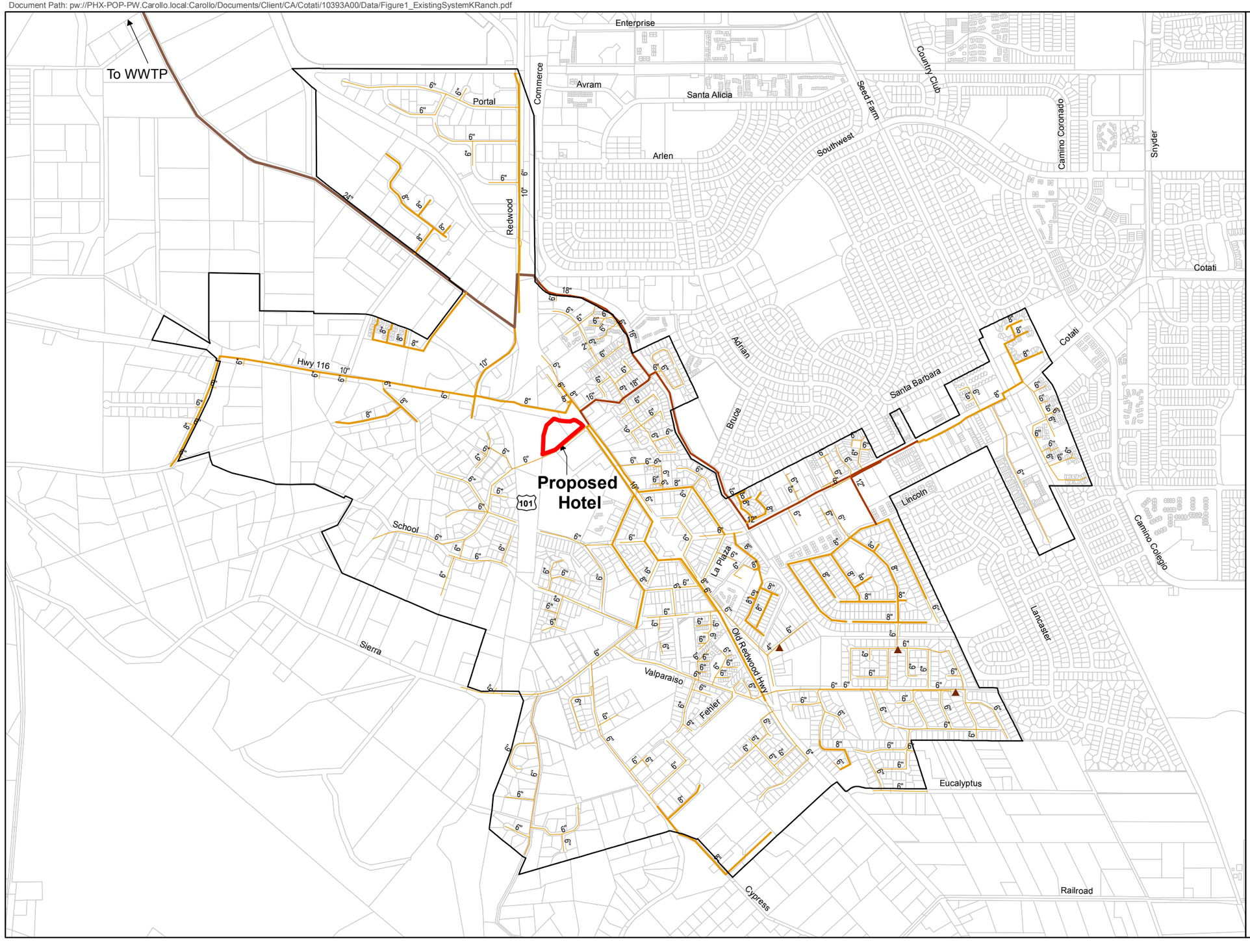
Carollo was contracted by the City to complete a capacity analysis of the City's wastewater collection system to determine potential impacts of a proposed 147-room hotel (Project) to be located at the southwest corner of Old Redwood Highway and Highway 116. The Project covers a total of 2.92 acres and includes 147-room hotel, a restaurant, and an attached marketplace selling pre-packaged food. Figure 1 shows the City's existing wastewater collection system and the location of the Project.

The purpose of this sewer evaluation is to determine the impact of the proposed Project on the existing and future sewer system under peak wet weather flow (PWWF) conditions. This TM documents the findings and recommendations of this analysis.

1.1 Existing Wastewater Collection System

Based on preliminary plans provided by BKF Engineers (January 16, 2019), the Project is planned to tie into the City's existing wastewater collection system at Saint Joseph Way, south of Old Redwood Highway. The wastewater collection system immediately upstream of where the Project ties in consists of an 8-inch and 6-inch diameter gravity main along Saint Joseph Way, under Highway 101, and along Maple Avenue.

Document Path: pw://PHX-POP-PW.Carollo.local:Carollo/Documents/Client/CA/Cotati/10393A00/Data/Figure1_ExistingSystemKRanch.pdf



Legend

- Lift Station
- Incorporated City Limits

Existing Pipeline
Diameter in Inches

- <= 6
- 8 - 10
- 12 - 18
- >= 20

Parcels
(Source: Sonoma County)

N

Miles
0 0.25 0.5

Figure 1
Existing System with Proposed Hotel

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Several improvement projects were recommended in the 2017 Master Plan Update to address existing and future deficiencies. The design of Project P-1 was completed in 2017 and construction is expected to be complete early 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. With the construction of Project P-1, flow from Old Redwood Highway and Saint Joseph Way will be rerouted through the new 21-inch on Old Redwood Highway. Currently, flow from St Joseph Way and Old Redwood Highway is conveyed down Gravenstein Way and the Laguna De Santa Rosa Trail to Helman Lane. Figure 2 shows a detail of how flows are rerouted as a result of Project P-1. The detail shown on Figure 2 is taken from the 2011 Master Plan. It should be noted that Project P-9 (upsize the 6-inch diameter pipeline on Saint Joseph Way to an 8-inch diameter pipeline) was constructed approximately two years ago.

1.2 Project Wastewater Flows

Wastewater flow for the proposed Project was estimated based on the following assumptions:

- Number of rooms: 147
- Wastewater generation flowrates (Metcalf and Eddy):
  - 53 gallons per day (gpd)/guest
  - 8 gpd/employee
- Number of guests and employees:
  - 2 guests/room
  - 12 employees/10 rooms
- Hotel occupancy rate of 100 percent
- PWWF/ADF peaking factor of 3.0
- Marketplace flows based on wastewater flow factor of 800 gpd/acre for the Specific Plan Downtown land use type (2017 Master Plan Update) and marketplace acreage
- Restaurant flows were assumed to be included in the hotel wastewater generation flowrates

Based on the assumptions listed above, the proposed Project is projected to have an estimated average daily flow (ADF) and PWWF of 17,100 gpd and 51,300 gpd, respectively. The Project PWWF was allocated into the existing hydraulic model and was run to determine the impact on the City's collection system.

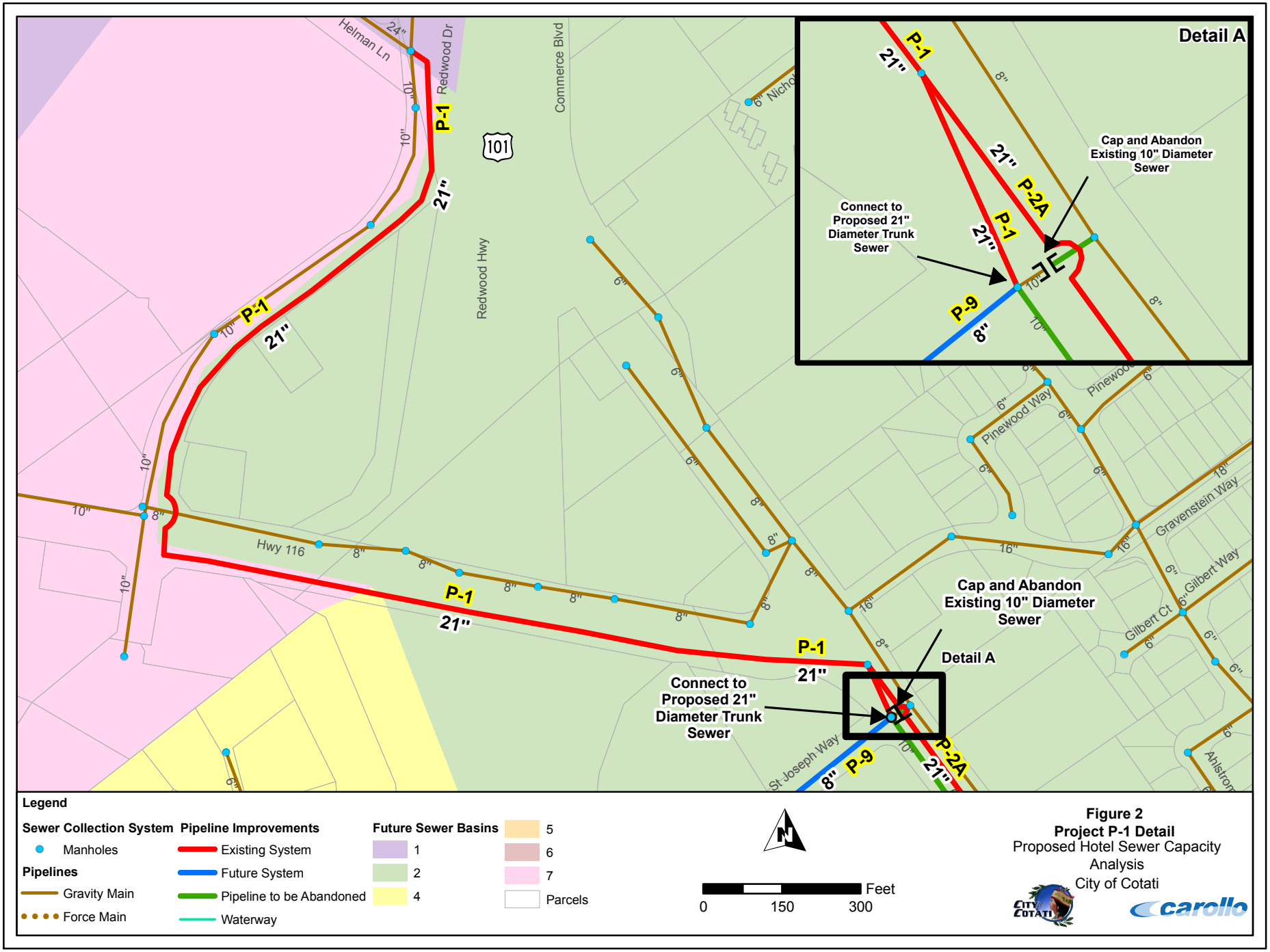

Figure 2
Project P-1 Detail
Proposed Hotel Sewer Capacity Analysis
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The projected wastewater flows for the Project, based on the assumptions outlined above, are higher than what was planned in the 2017 Master Plan Update. Based on the 2017 Master Plan Update, the estimated wastewater flow generation for the Specific Plan Downtown land use type (800 gpd/acre) is 2,336 gpd (ADF), which is significantly lower than the projected flows for the proposed Project (17,100 gpd ADF). The wastewater flow factors presented in the 2017 Master Plan Update are an average and it is expected that some areas within each land use type will generate higher flows, while other areas generate lower flows. Detailed flow calculations for the proposed Project were possible for this evaluation due to the finer definition of the development, and thus vary from the average flow factors. The Capital Improvements identified in the 2017 Master Plan Update did not account for a large point source at this proposed location, however, as discussed in Section 3.0, the City's existing collection system has sufficient capacity to serve the proposed Project.

2.0 EVALUATION CRITERIA

The City's hydraulic model was modified to incorporate the increased flows associated with the proposed Project. The evaluation criteria in the City's 2017 Master Plan Update were used to determine if the proposed Project impacts the existing collection system. The criteria are summarized in Table 1. The main criteria used to evaluate the impact of the proposed development is the maximum flow depth under PWWF conditions (less than 3 feet below manhole rim).

3.0 CAPACITY EVALUATION

The City's hydraulic model was evaluated under several PWWF conditions to determine the impact of the proposed Project:

- Existing System (with Project P-1): This scenario assumes the proposed Project ties into the existing system as-is and assumes construction of project P-1 from the 2017 Master Plan Update has been completed. This scenario was evaluated with and without the additional flows from the proposed Project.

- Future System: This scenario assumes that all recommended improvements from the 2017 Master Plan Update are constructed and includes all long-term future flows as well as flows from the proposed Project.

Table 1 Planning Criteria Summary
Proposed Hotel Sewer Capacity Analysis
City of Cotati

Minimum Slopes for New Sewers

Pipe Size (inches)	Minimum Slope[1] (ft./ft.)	Calculated Flow at Maximum d/D	
		d/D	Maximum Flow (mgd)
8	0.005[2]	0.50	0.276
10	0.0025	0.50	0.353
12	0.0019	0.67	0.796
15	0.0014	0.67	1.243
18	0.0011	0.67	1.791
21	0.0009	0.75	2.835
24	0.0008	0.75	3.703
27	0.0007	0.75	4.687
30	0.0006	0.75	5.786

Notes:
(1) Recommended minimum slope for flows at a velocity greater than or equal to 2 feet/second Manning's n =0.013.
(2) The City's Standard Details and Specifications specify a minimum slope for 8-in. sewer mains of 0.5%, which is slightly greater than required to maintain a minimum velocity of 2 fps with a d/D of 0.5.

Maximum Flow Depth, d/D

The following flow depth criteria was used in the analysis:

Maximum d/D for Existing Sewers

Peak Wet Weather Flow: Pipes will be allowed to surcharge 3 feet below manhole rim

Maximum d/D for Planning New Sewers

Pipe Diameter (inches)	Maximum d/D Ratio (during Peak Flows)
Less than 12	0.50
12 to 18	0.67
Larger than 18	0.75

Headloss in Existing Pipes

Headloss in existing sewer pipes shall be calculated based on the following:

Gravity Pipes	Manning's n = 0.013
Pressure Pipes	Hazen Willam's C = 120

Changes in Pipe Size

When a smaller sewer joins a larger one, sewer crowns were matched.

3.1 Existing System (with Project P-1)

The existing collection system was evaluated to determine the impact of the projected flows from the proposed Project. It is assumed that construction of project P-1 will be completed prior to construction of the proposed Project. Evaluation of the existing system shows that the additional flows from the proposed Project has minimal impact on the existing collection system and does not result in deficiencies or require additional improvements.

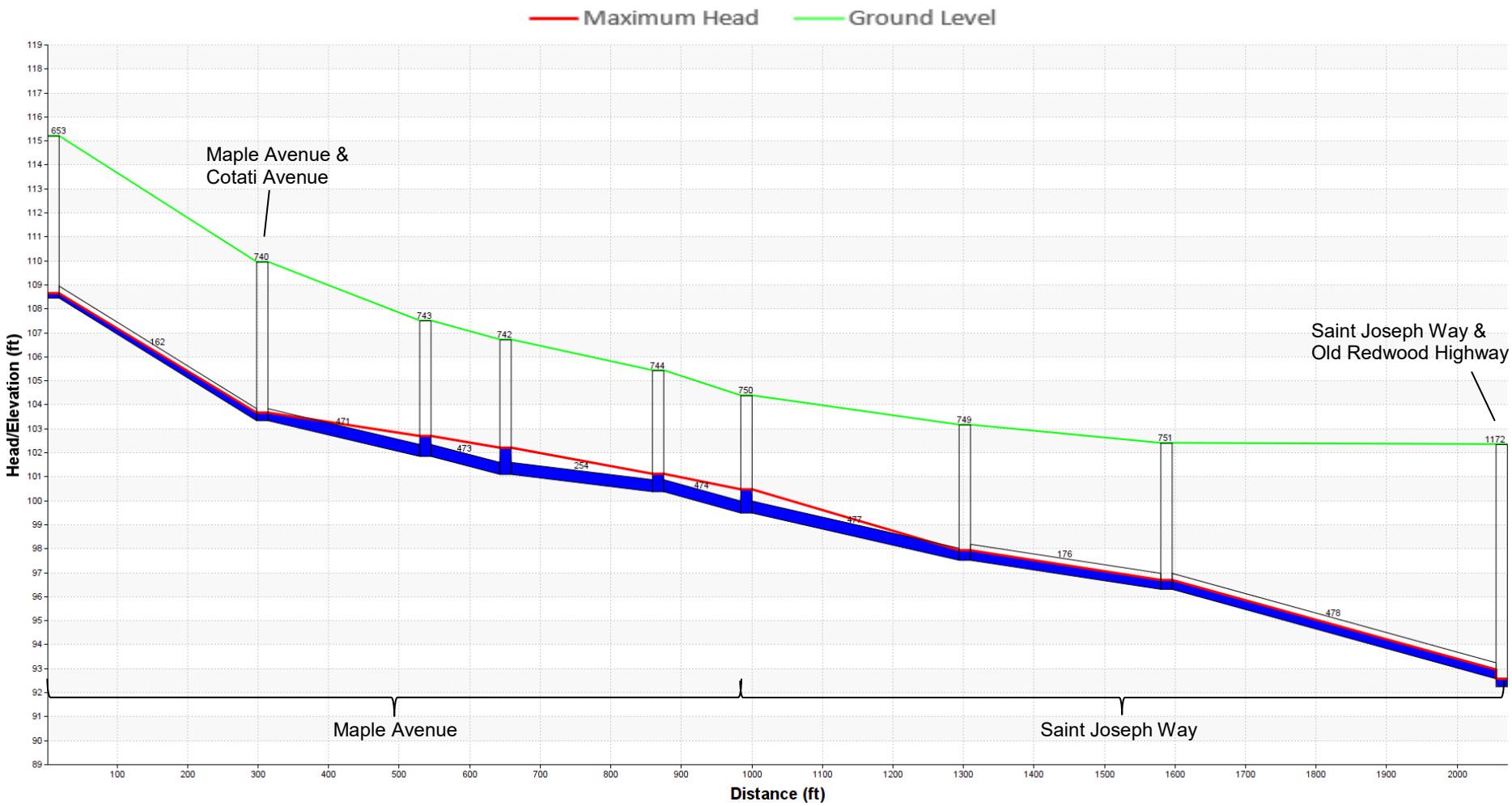
3.2 Future System

The future system was also updated to include the additional flows from the proposed Project and evaluated to determine any impacts to the collection system and/or recommended improvements from the 2017 Master Plan Update. The future system was evaluated assuming all recommended improvements from the Master Plan Update were constructed. Figure 3 shows the HGL profile for the 8-inch and 6-inch diameter pipeline along Saint Joseph Way. As shown on Figure 3, the pipeline on Saint Joseph Way meets the City's maximum flow depth criteria under future PWWF conditions. The additional flows from the proposed Project do not trigger additional capacity deficiencies or improvements. There are no recommended changes to the proposed improvements provided in the 2017 Master Plan Update.

4.0 SUMMARY OF FINDINGS

The objectives of this study were to determine the impact of the proposed Project on the existing and future sewer collection system. The following list highlights the findings of this study:

- The 2017 Master Plan Update showed that flows in the existing 8–inch and 6-inch gravity pipeline along Saint Joseph Way have sufficient capacity to convey existing PWWF.
- The additional flow from the proposed Project does not impact the collection system under existing PWWF conditions, assuming project P-1 is constructed and online.
- Under future PWWF conditions, assuming all of the recommended improvement projects from the 2017 Master Plan Update are constructed, the additional flows from the proposed Project did not trigger additional capacity deficiencies or improvements.
- There are no recommended changes to the proposed improvements provided in the 2017 Master Plan Update.



FUTURE HGL PROFILE

FIGURE 3

CITY OF COTATI
PROPOSED HOTEL SEWER CAPACITY ANALYSIS