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MEMORANDUM

TO:	Jason Chou, PE (City of Mountain View)	DATE:	December 7, 2022
FROM:	Leif Coponen, PE: Brett Crews, EIT	JOB#:	MTNV.32.22:102
SUBJECT:	DRAFT 918 Rich Avenue – Utility Impact Study		

Executive Summary

The City of Mountain View has retained Schaaf & Wheeler to determine impacts from the 918 Rich Avenue residential development Project (Project) on the potable water and sanitary sewer systems. This memorandum and its findings will be used to assist the City of Mountain View (City) with planning efforts. The Project site is located along Rich Avenue, adjacent to El Camino Real. The Project proposes to construct 32 multi-family residential units on one property that currently is a zoned for medium density residential. The Project site encompasses a total area of 0.72 acres on one parcel, the Project site is shown on Figure 1.

This memo is a confirmation of existing studies and does not include a detailed impact study. The incremental difference in potable water demand and sanitary sewer flow is estimated for the proposed Project development and the impact of the incremental differences on the utility systems are evaluated for both an Existing and Future Cumulative Condition. Previous technical studies encompassing the Project area include: 2010 Water Master Plan (WMP), 2010 Sewer Master Plan (SMP), and 2030 General Plan Update Utility Impact Study (GPUUIS). Projected potable water demand and sanitary sewer flow generation for the proposed Project are based on updated duty factors determined as part of the North Bayshore Precise Plan Phase II (NBPPPII) Utility Impact Study (Schaaf & Wheeler, October 2016).

Based on the findings and recommendations of the previous studies, the Project does not contribute to additional deficiencies in the water system. There is an existing deficiency at the Project location causing fire flow demands of the Project and adjacent parcels to not be met. The existing deficiency is mitigated by water CIP P-15 outlined in the 2030 GPUUIS. The proposed Project increases the total base water demand for the site by 3,200 gpd under existing modeled conditions and by 306 gpd under future cumulative modeled conditions. The associated demands do not significantly impact the water system, but the water system does not provide adequate capacity to meet the Project required fire flow. The GPUUIS CIPs are adequate to support future cumulative demands and required fire flows at the Project site.

Based on the findings and recommendations of the previous studies, the Project does not contribute to additional deficiencies in the sewer system. There is an existing deficiency that is mitigated by sewer CIP P-18 outlined in the 2030 GPUUIS. The proposed Project increases the total base sewer generation for the site by 2,400 gpd under existing modeled conditions and by 1,097 gpd under future cumulative modeled conditions. The associated sewer flow generation does not significantly impact the sewer system. CIP-18 is adequate to convey future cumulative flows.

Introduction

The proposed Project proposes to construct a residential building development with 32 multi-family residential units. This study estimates the incremental difference in water demand and sewer flow resulting from Project development and evaluates impacts compared to previous study findings. The incremental difference is added to the City's existing models for Existing and Future Cumulative Conditions. The Existing Condition uses the City's models developed as part of the 2010 WMP and SMP. The Future Cumulative Condition model revises the 2030 GPUUIS models to include projects approved by the City since the 2030 GPU was adopted.

Water System Impact

Incremental Project Contribution

The incremental difference in Average Daily Demand (ADD) with the 918 Rich Avenue Project is 3,200 GPD greater than the Existing demand and 306 GPD greater than the Future Cumulative demand allocated in the models. The ADD is an estimated daily average demand based on totalized annual water use.

Table 1 shows the Project demand estimation using water unit duty factor from Table 2-2 in the NBPPPII UIS. This factor is used to remain consistent with the City-wide model. Table 2 presents the water demand in the City's hydraulic models for the Existing Condition, and Table 3 shows the water demand for the Future Cumulative Condition.

Table 1: Project Estimated Water Demand

Address	Individual Use	Units/Square Feet	Generation Factor (gpd/unit or gpd/1000 sq ft)	Water Demand (gpd)
918 Rich Avenue	Multi-Family Residential	32	100	3,200
Total				**3,200**

Table 2: Existing Model Water Demand

Address	2010 WMP Land Use	Modeled Water Demand (gpd)
189-33-028	Vacant	0

Table 3: Future Cumulative Model Water Demand

Address	2030 GPU Land Use	Modeled Water Demand (gpd)
189-33-028	High Density Residential	2,894

Fire Flow Requirement

The required planning-level fire flow at the Project site in the 2010 WMP is 0 gpm. The required fire flow for the Project site in the 2030 GPUUIS model is 2,500 gpm based on the 2030 GPU land use. The Project required fire flow is 1,750 gpm based on building size and construction type as defined in the California Building Code. The Project fire flow assumes a reduction of 50% of the fire flow requirement when the building is equipped with an approved automatic sprinkler system. The actual fire flow requirement may

change as the planning process continues and project-specific requirements are determined by the City Fire Marshal.

Adjacent parcels to the Project have a planning-level required fire flow of 2,500 gpm at the same model node. The modeled fire flow was therefore not modified from 2,500 gpm to ensure adjacent parcels requirements were met for planning purposes.

Model Results

The water system is evaluated under Peak Hour Demand (PHD) to ensure a minimum pressure of 40 psi can be maintained per the City's design performance criteria. A peaking factor of 2.79, taken from the 2010 WMP, is applied to the average daily water demand. There are no existing hydraulic deficiencies per the minimum pressure requirements near the Project site in either the Existing or Future Cumulative condition. The system has capacity for the increased Project demand while meeting PHD performance criteria and does not affect previous study findings.

The water system is also evaluated to ensure adequate capacity is available to convey fire flows under Maximum-Day Demand (MDD) conditions while maintaining a minimum pressure of 20 psi in the system. A peaking factor of 1.71, taken from the 2010 WMP, is applied to the average daily demand to represent MDD conditions for which the fire flow analysis is conducted. From the previous studies, the planning-level fire flow requirement is not met at the Project site in the Existing Conditions as shown in Figure 2. While the Project-specific required fire flow is less, the Project-specific fire flow is also not met in the Existing Condition. In the Existing Conditions, pre- and post-project available fire flow is 1,626 gpm. The Capital Improvement Projects (CIPs) outlined in the 2030 GPUUIS to address existing deficiencies and to accommodate new developments anticipated in the GPU outline water CIP P-15 to upsize the existing 6-inch diameter pipe in Rich Avenue to a new 8-inch pipe. CIP P-15 is sufficient to increase fire flows in Rich Avenue to meet the Project-specific fire flow and the planning-level fire flow requirements for adjacent parcels in the Existing Condition.

The Future Cumulative Conditions planning-level and Project-specific fire flow requirements are met at the Project site assuming all CIPs, including P-15, outlined in the GPUUIS, are constructed.

Project Contribution to Existing Deficiencies

There is an existing deficiency at the Project location. The Project-specific fire flow of 1,750 gpm and the planning-level fire flow for the adjacent parcels of 2,500 gpm are not met. The Project incremental increase does not significantly impact the available fire flow at this location. Water CIP P-15 outlined in the GPUUIS recommends upgrading the existing 6-inch diameter pipe in Rich Avenue to a new 8-inch pipe. This CIP is sufficient to mitigate the deficiency and provide adequate fire flow. The CIP improvement implementation may be necessary prior to Project approval and occupancy.

Sewer System Impact

Incremental Project Contribution

The incremental difference in Base Wastewater Flow (BWF) with the Project is 2,400 GPD greater than the Existing flow and 1,097 GPD greater than the 2030 GPUUIS flow estimate in the computer models. Base wastewater flow (BWF) is from residential, commercial, institutional, office and industrial sources and represents a daily average for wastewater flows and is used to model City-wide demands.

Project generated sewer flow is estimated from the number of residential units provided in the plans dated October 31, 2022. The multi-family residential sewer duty factor is used from Table 4-2 in the NBPPPII Utility Impact Study to estimate sewer flow. Table 4 provides the estimated Project sewer flow. Table 5 presents the sewer generation in the City's hydraulic models for the Existing Condition, and Table 6 shows the sewer generation for the Future Cumulative Condition. The Project Plan Set shows one proposed sewer system connection to the existing 8-inch SS line within Rich Avenue.

Table 4: Project Estimated Sewer Flow

Address	Individual Use	Units/Square Feet	Generation Factor (gpd/unit or gpd/1000 sq ft)	Sewer Flow (gpd)
918 Rich Avenue	Multi-Family Residential	32	75	2,400
Total				**2,400**

Table 5: Existing Model Sewer Flow

Address	2010 SMP Land Use	Modeled Sewer Generation (gpd)
189-33-028	Vacant	0

Table 6: Future Cumulative Model Sewer Flow

Address	2030 GPU Land Use	Modeled Sewer Generation (gpd)
189-33-028	High Density Residential	1,302

Model Results

The affected area of the gravity system evaluated for the Project impact begins at Rich Avenue and flows west along West El Camino Real, north along Escuela, across Central Expressway, north along Sierra Vista Avenue, west on Plymouth Street, north on N Rengstorff Avenue, west on Leghorn, and north on Independence to the Shoreline Sewage Pump Station. The Project sewer conveyance pathway is highlighted in Figure 3. Sewer capacity is analyzed under Peak Wet Weather Flow (PWWF) and Average Dry Weather Flow (ADWF). PWWF is used to determine hydraulic deficiencies according to the performance criteria in Table 7, and ADWF is used to determine Project flow contribution to the sewer system.

Table 7: Sewer System Performance Criteria

Criteria	Pipe Diameter ≤ 12 inch	Pipe Diameter > 12 inch
Maximum Flow Depth/Pipe Diameter (d/D)	0.50	0.75

The PWWF scenario applies diurnal peaking curves for residential and non-residential flows and simulates system response as rainfall enters the system. The diurnal peaking curves are adopted from the City's 2010 SMP. Groundwater Infiltration (GWI) and rainfall-dependent infiltration (RDI/I) are included but are not peaked. The ADWF scenario is developed in the model by adding BWF and groundwater GWI. GWI is modeled as a constant inflow and includes base infiltration (BI) and pumped groundwater discharged to the sewer system. Since the ADWF scenario models average daily flows, BWF and GWI are not peaked.

The Project conveyance pathway consists of several pipes with existing conveyance deficiencies that are resolved by recommended Capital Improvement Projects (CIPs) outlined in the 2030 GPUUIS to accommodate new developments anticipated in the GPUUIS. The related sewer CIP is P-18 and includes upgrading the existing 8- and 12-inch diameter pipes in Escuela Avenue to new 12- and 15-inch pipes between Gamel Way and Villa Street. The increased Project flow does not generate additional deficiencies beyond what is already identified, and the CIPs outlined in the 2030 GPUUIS are adequately sized to convey anticipated flows.

Project Contribution to Deficiencies

Under Existing Conditions, Pre-Project and Post-Project scenarios have several deficient pipes based on the City's d/D performance criteria. These deficiencies are mitigated by the CIPs outlined in the 2030 GPUUIS along Escuela Avenue between Gamel Way and Villa Street (CIP P-18). The deficient sewer pipe segments are shown in Figure 3. In the Existing Condition, these sewer pipe segments exceed the City's d/D performance criteria, but the pipes are flowing at less than 70% full at PWWF conditions. The CIP improvement implementation should be evaluated by the City to determine the most appropriate timing for the improvements based on Project schedule and other redevelopment in the tributary area of the needed improvements.

Under Future Cumulative Conditions, Pre-Project and Post-Project scenarios do not result in deficient pipes assuming CIP P-18 is constructed as shown in Figure 3. The Project sewer flows represent less than 1% of the total ADWF in pipe segments identified as requiring capital improvement projects.

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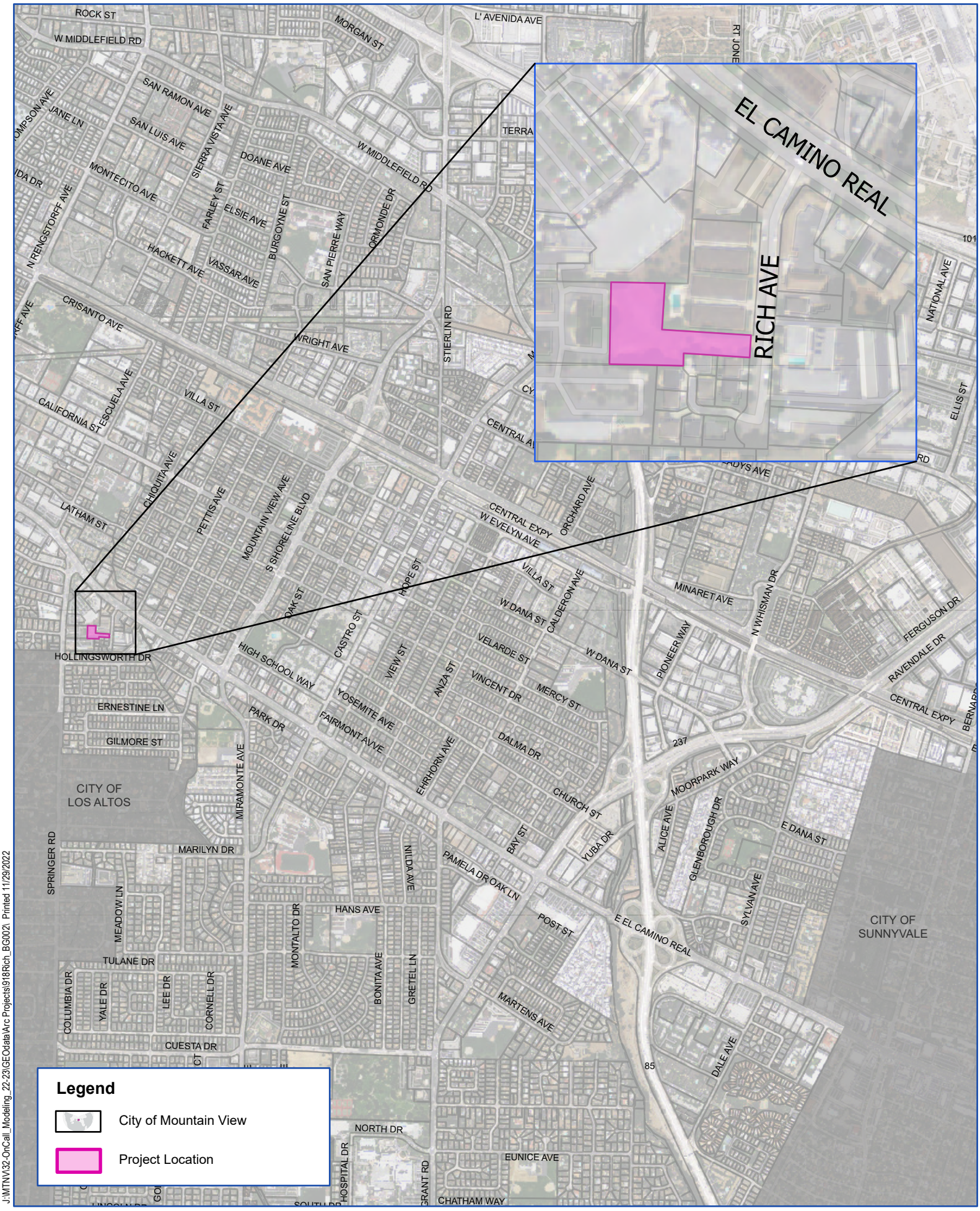

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0 800 1,600 Feet

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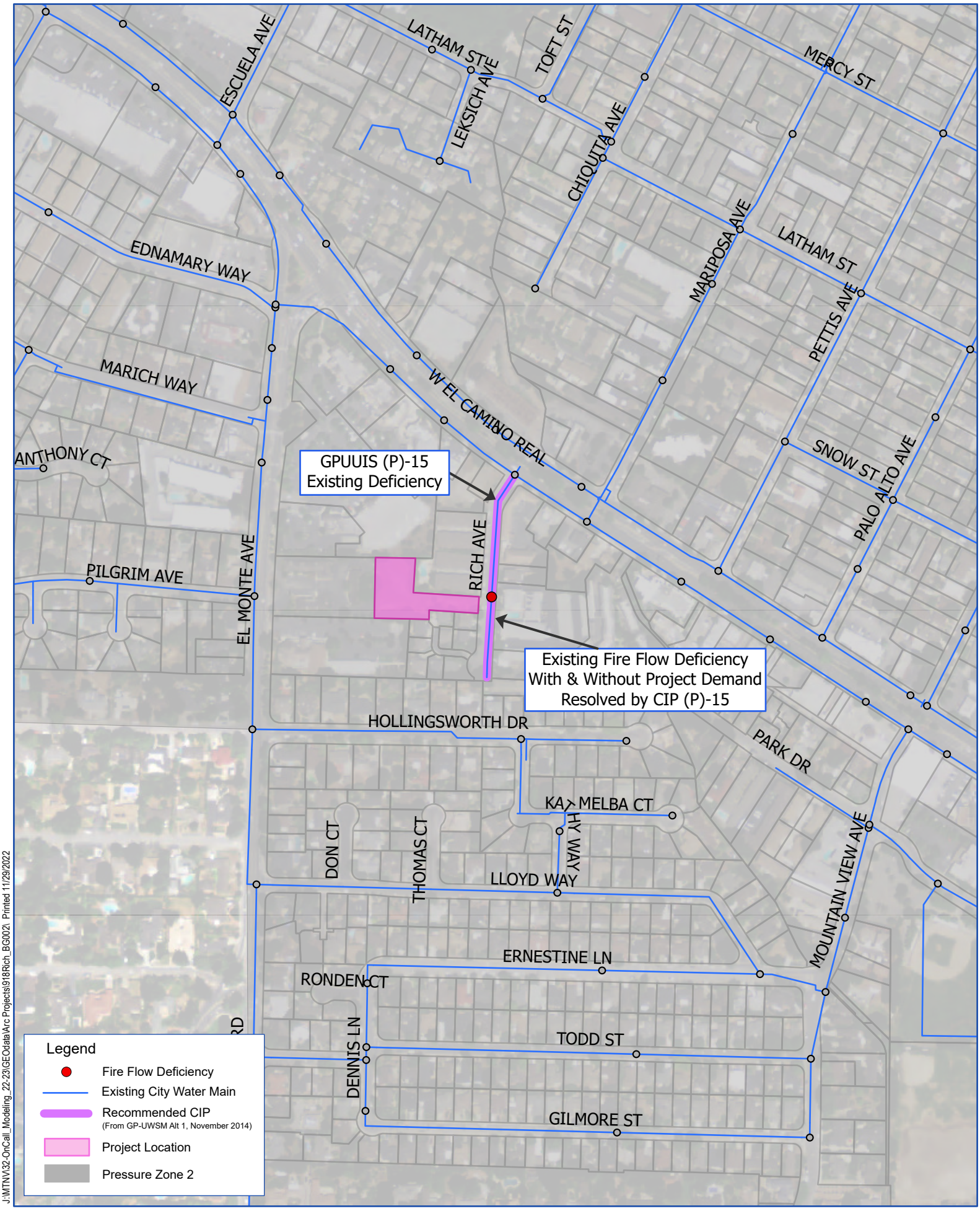
FIGURE 1: **Project Location**



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0 175 350 Feet

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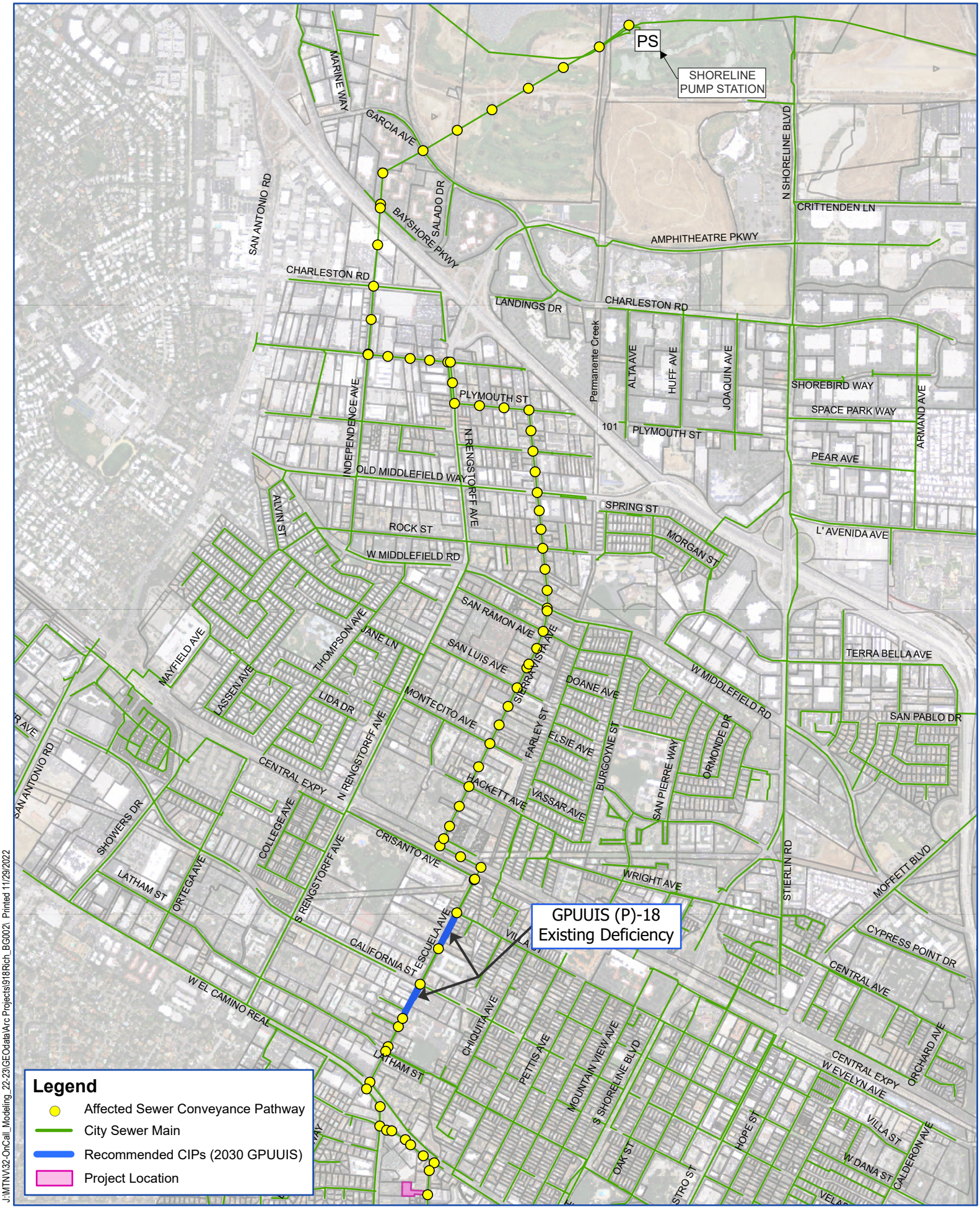
FIGURE 2:

Fire Flow Analysis
Water System Model



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0 750 1,500 Feet

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FIGURE 3: **Peak Wet Weather Flow**
Sewer System Model