



Northgate 6th and Main Street

WATER & SEWER STUDY

Prepared for:

Northgate Gonzales Real Estate

&







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Appendix A Fire Flow Results
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Abbreviations

AC Acre

ADD Average Day Demand
ADF Average Day Flow
City City of Corona

CFS Cubic Feet Per Second

FF Fire Flow

GPD/AC Gallons per Day per Acre
GPM Gallons per Minute
LDR Low Density Residential

L.F. Linear Feet

MDD Maximum Day Demand
PHD Peak Hour Demand
POC Point of Connection
PSI Pounds Per Square Inch

PZ Pressure Zone

RWIP Recycled Water Irrigation Plan

ROW Right of Way

Section 1 Introduction

1.1 Purpose

The purpose of this report is to document the results of our analysis of the existing and proposed water and sewer facilities which would serve the proposed Northgate 6th and Main Street project, and to determine and verify the adequacy of the existing and proposed facilities to accommodate the demands and flows generated by the proposed development.

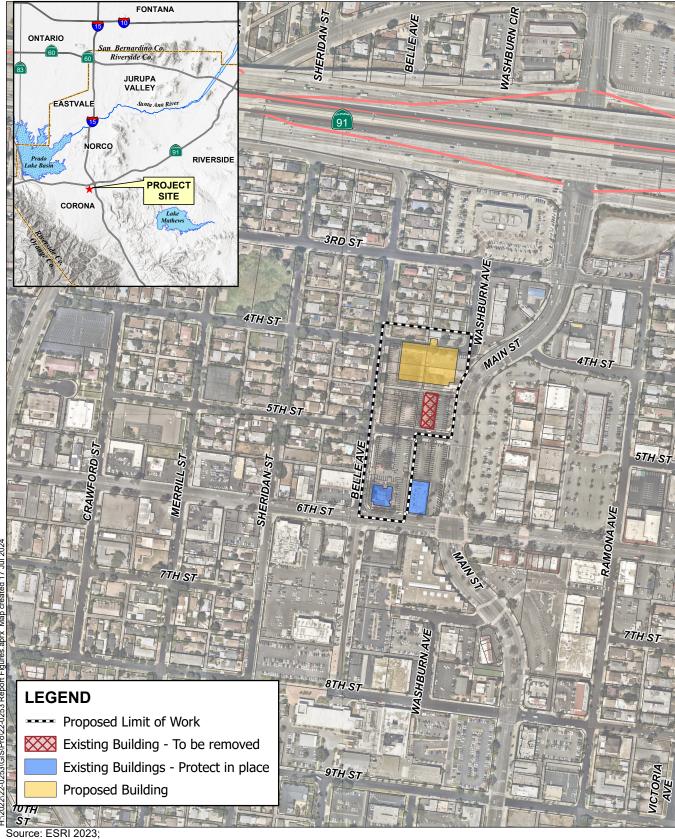
Both the water and sewer analysis were conducted using the City of Corona's (City) Department of Water and Power Design Policy and Master Plan reports as listed below:

- "City of Corona Department of Water and Power Design Policy" Dated November 2012
- "City of Corona Sewer Master Plan" Dated September 2005

1.2 Background

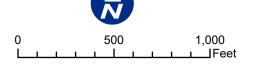
Northgate 6th and Main Street is located at the northwestern corner of 6th Street and Main Street as shown on **Figure 1-1**. The project area is bounded by 4th Street to the north, Main Street to the east, 6th Street to the south, and Belle Avenue to the west. The total project area is 4.9 acres and consists of Commercial zoning, with the exception of the northwestern parcel at the corner of 4th Street and Belle Avenue which is proposed to change from Low Density Residential to Commercial.

This project is proposing to remodel the existing building at the corner of 6th Street and Belle Avenue to be served as half restaurant and the other half a bank. Also being proposed is an approximate 40,000 square-foot market in the northern project area and removal of the existing strip mall building in the middle of the project area, as shown on **Figure 1-1**.



NearMap Imagery, 2024.

Figure 1-1 Vicinity Map and Project Location Northgate - 6th & Main Street





Section 2 Water Facilities

2.1 Existing Water Facilities

Northgate 6th and Main Street project site will be served by the Zone 2 pressure zone (PZ). There are existing 10-inch diameter waterlines fronting the project to the east and south in Main Street and 6th Street, as well as 8-inch diameter waterlines in Belle Avenue and 4th Street to the west and north (see **Figure 2-1**).

2.2 Proposed Water Demand

Provided in **Table 2-1** is a summary of the estimated potable water demands for the project which were based on the recommendations found in the *City of Corona Department of Water and Power Design Policy*.

Fire flow requirements for the project are assumed to be 3,000 gpm for duration of 3 hours while maintaining a minimum residual pressure of 20 psi based on the *Fire Flow and Hydrant Spacing Guideline per 2022 California Fire Code and Corona Municipal Code* (see **Appendix A**).

Table 2-1 Water Demand Estimate

Land Use Zoning		Demand Rates* (gpd/ac)			MDD** (gpd)		PHD (gpm)
Commercial	4.9	1720	8,428	5.9	15,170	10.5	21.1

^{*}Based on Water Unit Flow Factor table per City of Corona Department of Water and Power Design Policy dated November 2012.

2.3 Proposed Pipeline Improvements

With the removal of the existing strip mall building in the middle of the project, the existing 8-inch waterline and hydrants that service the building in 5th Street are planned to be removed or abandoned. The large market building is being proposed over the existing 8-inch diameter waterline in 4th Street and part of the 2-inch waterline through the alleyway that continues north. As such, this project is proposing to remove and replace the 8-inch diameter waterline further north, where it will not be under the proposed building, see **Figure 2-1**.

Domestic water will be supplied to the project through two points of connection (POC) to the existing 8-inch diameter waterline in Belle Avenue for the existing building being remodeled, with one connection serving the restaurant, and the serving the bank. Domestic water for the proposed market building will be through a POC to the existing 8-inch diameter waterline in Belle Avenue near the existing 8-inch diameter waterline that is to be relocated.

Other on-site water pipeline improvements include a 12-inch diameter private fire waterline loop with two options for the points of connection (POCs). The preferred option would be to connect to the existing 10-inch diameter waterlines in 6th Street and Main Street (see **Figure 2-1**).

^{**}Peak Factor based on City of Corona Department of Water and Power Design Policy dated November 2012.



Source: NearMap Imagery, 2024; ESRI, 2023; City of Corona GIS, 2022.

Figure 2-1 Water Facilities





An alternative option is to have the POCs at 6th Street and 4th Street (see **Figure 2-2**), which is proposed only if upsizing of the Main Street waterline is required for the first option. For planning purposes, it was assumed that 10-inch diameter double check detector assemblies (DCDA) will be installed at each point of connection for fire service.

2.4 Hydraulic Analysis

A hydraulic analysis was conducted with the use of the Fire Flow model results provided by the City on 7/3/2024 (see **Appendix A**). The model was run using Innovyze's[®] InfoWater Pro[®] software version 2025.0, which was prepared and analyzed using the simulated flow and residual pressure provided on the Fire Flow Report.

2.5 Model Results

Model results are provided graphically in **Appendix B**. Shown in **Figure B1** is a nodal map of the junctions for the preferred first option, which were all elevated using Google Earth elevation data. **Figure B2** represents the model results of the existing condition with Northgate 6th and Main Street proposed improvements during the MDD plus fire condition tested at a high point on-site off of the proposed fire waterline loop. Similarly, **Figures B3** and **B4** show the nodal map and model results of the second option under the same criteria and assumptions.

For the preferred option with the POC off Main Street, high velocities near the northeast corner of the project are primarily due to the hydraulic model configuration, which uses a fixed-head reservoir based on the fire flow test at the hydrant location nearby. As a result, this analysis overemphasizes flow near the Main Street connection and does not fully represent real-world conditions where the entire City network would help distribute flows more evenly. Therefore, velocities in the nearby waterlines are assumed to be lower during the max day plus fire flow condition than those shown in the hydraulic model results.

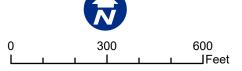
In response to the City's request, **Figures B5** and **B6** show the model results for the two previously mentioned options, but with the fixed head reservoir connected to the junction at the intersection of 6th Street and Main Street. It is important to note that the HGL provided in the official fire flow test from the City was not measured at this location. Therefore, these figures are intended for reference purposes only, as this approach does not align with standard hydraulic analysis practices.

It was determined through the hydraulic analysis that the existing system can meet the City's pressure and velocity constraints with Northgate 6th and Main Street demands added to the system.



Source: NearMap Imagery, 2024; ESRI, 2023; City of Corona GIS, 2022.

Figure 2-2 Water Facilities





2.6 Water Summary and Recommendations

With the proposed facilities outlined in this section of the report, Northgate 6th and Main Street is expected to have adequate pressure during the demand conditions analyzed and still meet City minimum pressure and maximum velocity constraints.

Based on the results of the analysis, it is recommended that the City authorize the developer to proceed to the next phase of designing the proposed waterline improvements outlined in this report. Design connections, DCDA sizing, and valving details to be validated during the plan check review process.

Section 3 Sewer Facilities

3.1 Existing Sewer Facilities

Within the middle of the subject project, parallel to Belle Avenue, is an existing 6-inch diameter gravity sewer line which will serve as the project's POC to the City's existing sewer collection system. This sewer line flows south to north and continues southwest through an existing 10-inch diameter sewer line in 3rd Street and Belle Avenue, as shown on **Figure 3-1**.

3.2 Proposed Sewer Facilities

The existing building being remodeled proposes to connect to the existing 6-inch diameter sewer line through a proposed 6-inch private sewer lateral that exits on the east side of the building and continues north parallel to the existing sewer until tying into the existing sewer in 5th Street. From there, the existing sewer that continues north will be removed/abandoned and instead a proposed 6-inch diameter public sewer line will be directed northeast and tie into the existing 10-inch diameter sewer in Main Street. For the proposed market building, a 6-inch diameter private sewer lateral is proposed at the northeast corner which will tie into the existing 6-inch diameter sewer at the norther project boundary. Connection details, alignments, and sizes of proposed sewer facilities will be validated during the plan check review process.

3.3 Estimated Sewer Flows

Estimated peak flows for Northgate 6th and Main Street are provided in the following table along with the assumed sewer generation rates.

Table 3-1 Projected Wastewater Flows

		Gen. Rates					Peak	Peak
	Property			(gpd/ac) or	ADF	ADF	Flow**	Flow
Descript.	Zoning	Acres	DU	(gpd/DU)*	(gpd)	(cfs)	(cfs)	(gpm)
Project	Commercial	4.9	-	1000	4,900	0.008	0.022	9.8
O' - T ''	Commercial	3.5	-	1000	3,500	0.005	0.016	7.2
6in Trib	Quasi Public	1.6	-	700	1,120	0.002	0.006	2.5
	Commercial	5.8	-	1000	5,760	0.009	0.025	11.4
Upper 10in Trib	Quasi Public	13.9		700	9,730	0.015	0.041	18.4
	Low Density Residential	-	216	270	58,320	0.090	0.213	95.7
	School	5.6		800	4,480	0.007	0.020	9.0
12in Trib	Commercial	16.7	-	1000	16,700	0.026	0.068	30.3
Lower 10in Trib	Commercial	0.9	-	1000	850	0.001	0.004	2.0
	Low Density Residential	-	11	270	2,970	0.005	0.014	6.2
Total:					108,330	0.168	0.377	169.2

^{*}Based on Sewer Flow Factor table per City of Corona Department of Water and Power Design Policy dated November 2012.

^{**}From City of Corona Peak Flow Formula in 2005 Sewer Master Plan (Qpeak(cfs)=1.95*Qave(cfs)0.92)



Source: NearMap Imagery, 2024; ESRI, 2023; City of Corona GIS, 2022.

Figure 3-1 Sewer Facilities





3.4 Sewer Capacity Analysis

Governing sewer line pipe reaches were identified with the use of available City GIS data for the existing sewer system. These governing sewer lines are those that are expected to have the least available excess capacity based on the pipe segment in a reach with the flattest slope, of the same diameter, and without a branch line in-between the reach that could introduce more flow. A total of 4 governing sewer line segments were identified for analysis, as shown on **Figure 3-2.** The analysis results of the governing sewer line segments are provided in the following tables.

Table 3-2 Sewer Capacity Results for Governing Pipe Segments

Governing Pipe Segment	Upstream Tributary Areas	Dia. (in)	Slope*** (ft/ft)	ADF* (gpd)	ADF (cfs)	Peak Flow** (cfs)	Peak Flow (gpm)		
1	6in Trib	6	0.0262	4,620	0.007	0.021	9		
Exist. offsite sewer line capacity = 0.455cfs *** (Est. d/D in exist. system = 0.11)									
2	Project + 6in Trib + Upper 10in Trib	10	0.0032	87,810	0.136	0.311	139		
Exist. offsite sewer line capacity = 0.621 cfs *** (Est. d/D with proposed project added to exist. system = 0.34)									
3	Project + 6in Trib + Upper 10in Trib + 12in Trib	12	0.0096	104,510	0.162	0.365	164		
Exist. offsite sewer line capacity of 1.750 cfs*** (Est. d/D with proposed project added to proposed sewer line = 0.22)									
4	Project + 6in Trib + Upper 10in Trib + 12in Trib + Lower 10 in Trib	10	0.0041	108,330	0.168	0.377	169		
Exist. offsite sewer line capacity = 0.703 cfs *** (Est. d/D with proposed project added to exist. system = 0.35)									

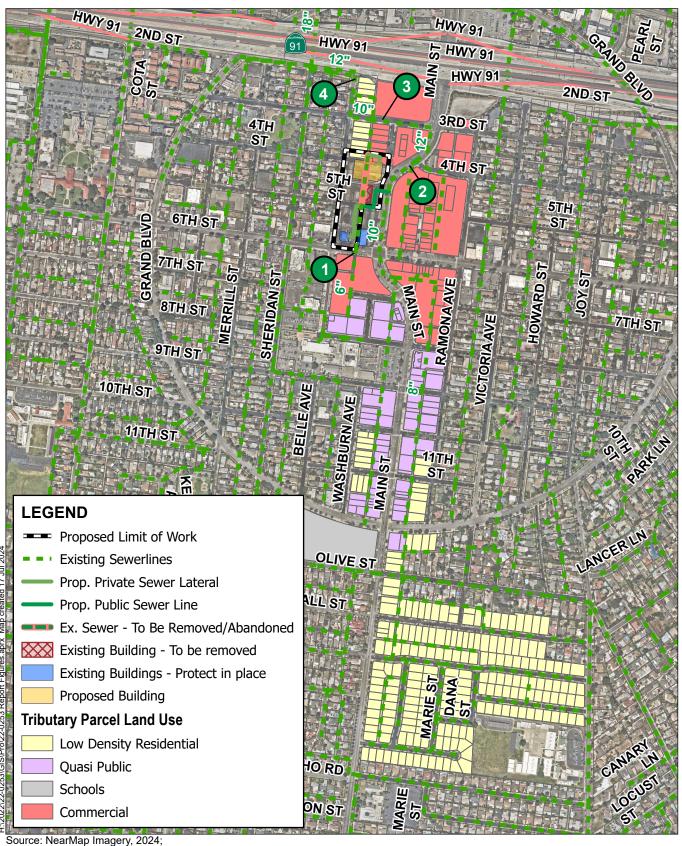
^{*}Based on Sewer Flow Factor table per City of Corona Department of Water and Power Design Policy dated November 2012.

3.5 Sewer Summary and Recommendations

It was assumed that the existing and proposed sewer lines evaluated will not exceed the design capacity with the addition of the Northgate 6th and Main Street project (to be verified by the City with the use of their sewer model). It is recommended that the City authorize the developer to proceed to the next phase of designing the proposed sewer improvements outlined in this report. Connection details will be validated during the plan check review process.

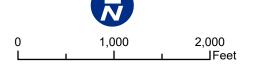
^{**}From City of Corona Peak Flow Formula in 2005 Sewer Master Plan (Qpeak(cfs)=1.95*Qave(cfs)0.92)

^{***}Assumed Manning "n" = 0.013, slopes taken from City of Corona public GIS sewer data



Source: NearMap Imagery, 2024; ESRI, 2023; City of Corona GIS, 2022.

Figure 3-2 Sewer Tributary Map





Appendix A

Fire Flow Results



FIRE FLOW REPORT HYDRAULIC MODEL CITY OF CORONA

Project Number
DWPF2024-0025
Date Issued
7/3/2024

APPLICANT INFORMATION

Name: TIANA MUNDELL Phone: (909)848-3741

Address: 3788 McCray St Riverside CA 92506 Email: tiana.mundell@webbassociates.com

GENERAL INFORMATION

Site Address: Site Location: Within City Limits

Type: Commercial Notes: Other

TEST INFORMATION

Test Date: **7/3/2024**Flow Hydrant No: **2940**

Main Size (in): 8

20 psi Residual Flow (gpm): **8202** Simulated Flow (gpm): **3500**

Static Pressure (psi): **106**

Residual Pressure for Simulated Flow (psi): **86**

ADDITIONAL INFORMATION FOR RIVERSIDE COUNTY UNINCORPORATED AREA

Hydrant Type:

Hydrant Make & Model:

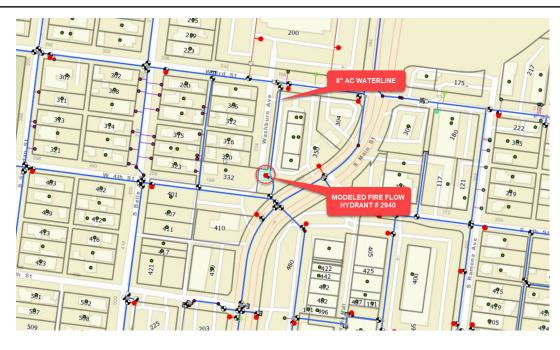
Distance to Hydrant (ft):

Nozzel Count:

Nozzel Size (in):

Can the water system provide at least 1,000 gpm at a 20 psi residual

pressure?



Fee:Account: 570 50000 31903

Approved by:

For inquiries concerning this report, please call (951) 279 - 3592

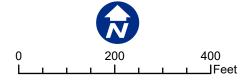
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Appendix B

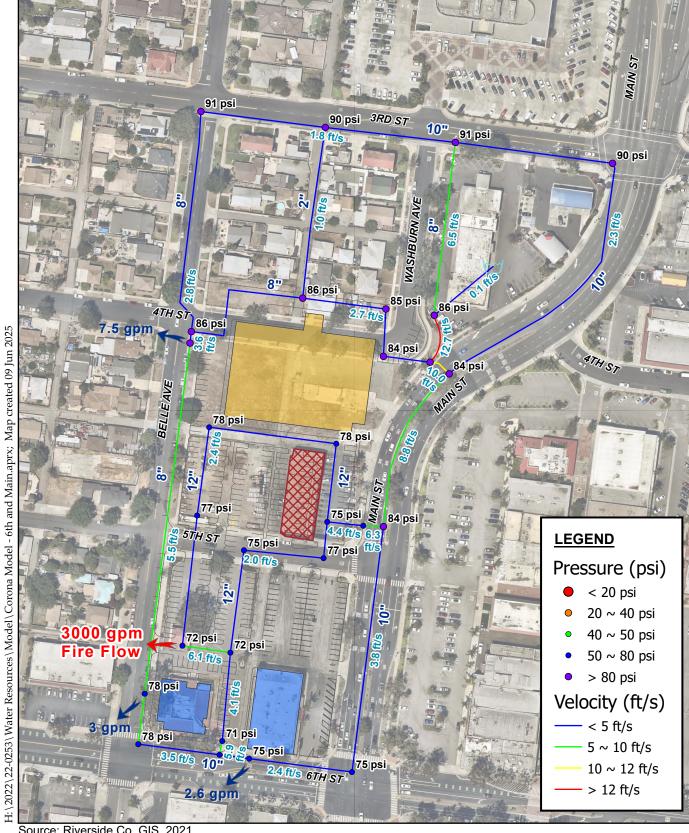
Hydraulic Analysis



Figure B1 - Nodal Map Northgate - 6th & Main Street







Source: Riverside Co. GIS, 2021.

Figure B2 - MDD + FF Northgate - 6th & Main Street

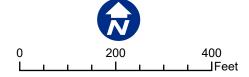
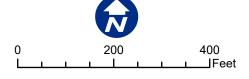






Figure B3 - Nodal Map Northgate - 6th & Main Street





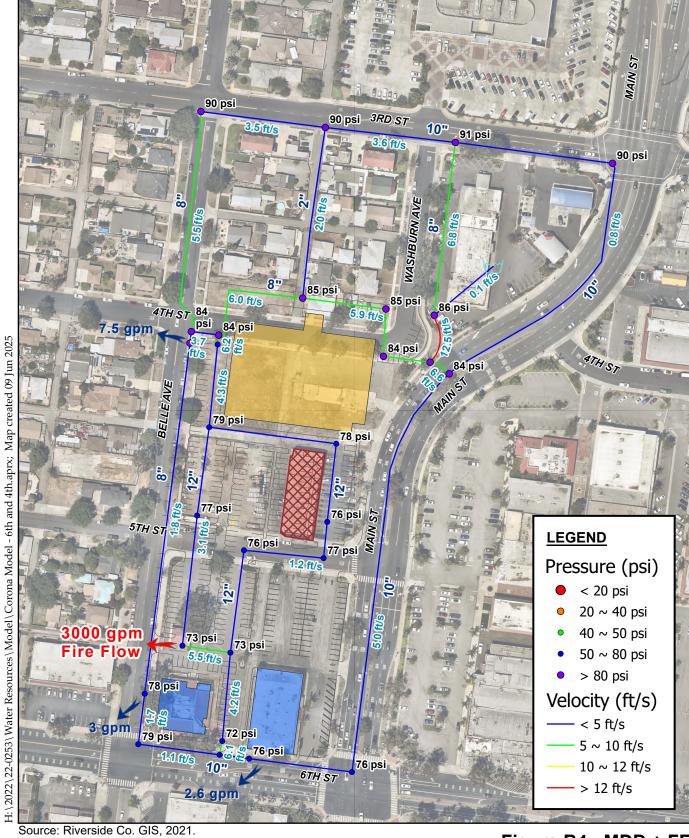
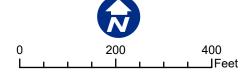


Figure B4 - MDD + FF Northgate - 6th & Main Street





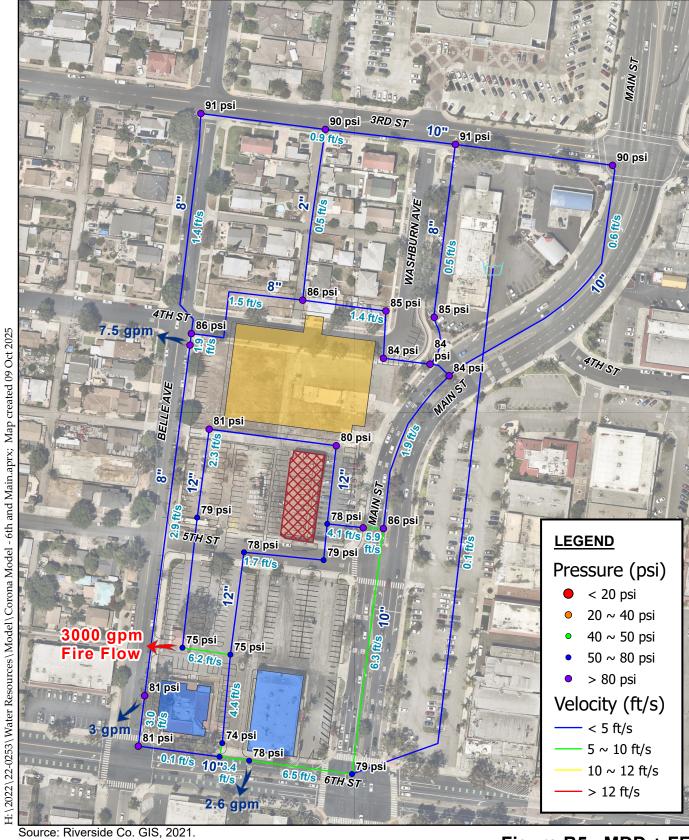
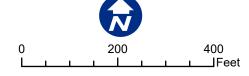


Figure B5 - MDD + FF Northgate - 6th & Main Street





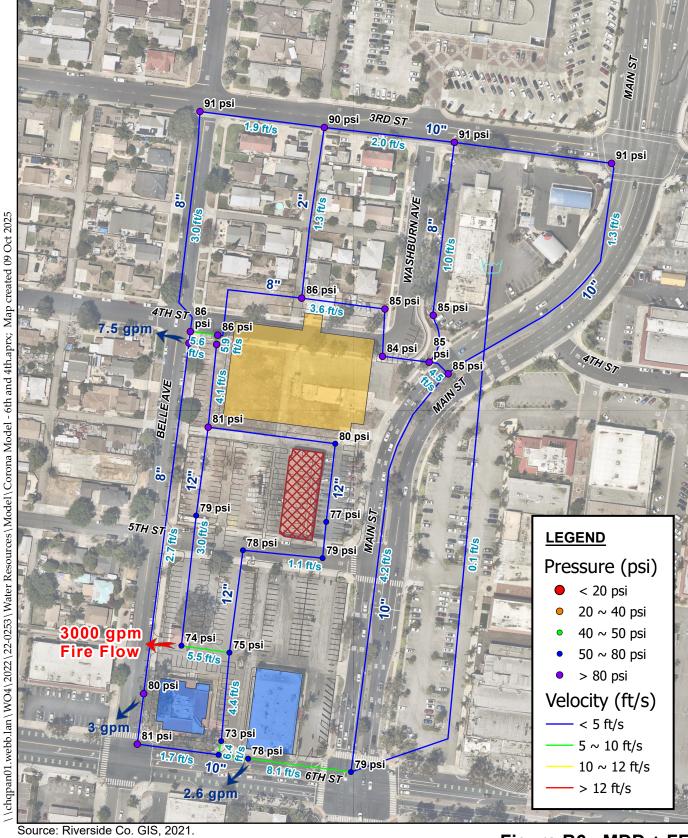


Figure B6 - MDD + FF Northgate - 6th & Main Street

