

# Fire Flow Analysis

## Technical Memorandum

<b>Subject</b>	Fire Flow Analysis – Fenway N. Hwy. 101
<b>Client</b>	San Dieguito Water District
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<b>Reviewed By</b>	Shyamala Raveendran, P.E
<b>Date - FINAL</b>	April 15, 2021

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## PURPOSE

Infrastructure Engineering Corporation (IEC) performed a fire flow analysis for a proposed property development located at 1900 and 1950 North Coast Highway in Encinitas, California in the San Dieguito Water District's (District) service area.

The Development site is located north of the intersection of North Coast Highway 101 and Moorgate Road, with assessor's parcel numbers (APNs) of 216-041-06-00, 216-041-20 & 21. The proposed project consists of multi-family apartments under the R-30 Hosing Element Overlay Zone. 1950 North Coast Highway is a mix of residential and non-residential uses, consisting of 84 dwelling units, 18,270 square feet of a 30 room hotel and 10,774 square feet of a commercial development on a 3-acre project site. 1900 North Coast Highway includes the construction of a mixed-use development with ten dwelling units and 7,488 square feet of commercial space. The proposed site shown in Figure 1 consists of 8-inch piping that connects to the existing system via a 6-inch line to the north west and via a 12-inch line to the south east of the site. The site also includes three proposed fire hydrants. The property is located in the 240 Pressure Zone and is fed from two pressure reducing stations (PRS). The setting and location of the PRS are listed in Table 1.

The applicant provided an estimated maximum daily demand of 81,498 gallons per day (gpd) for the project. Two sets of fire flow test simulations were performed using the District's existing hydraulic model at two different hydrant pairs as shown in Table 2 under a steady-state Maximum Day demand condition with District reservoirs at 50% level. Model results were compared against District planning criteria of a total fire flow of 2,500 gallons per minute (gpm) across two hydrants at a minimum pressure of 20 psi and with maximum pipe velocity of 15 feet per second (ft/s).

## Conclusion

Model results show that each hydrant pair can meet the required fire flows of 2,500 gpm, at residual pressures of 20 psi and pipe velocities under 15 ft/s with 8-inch on-site piping.

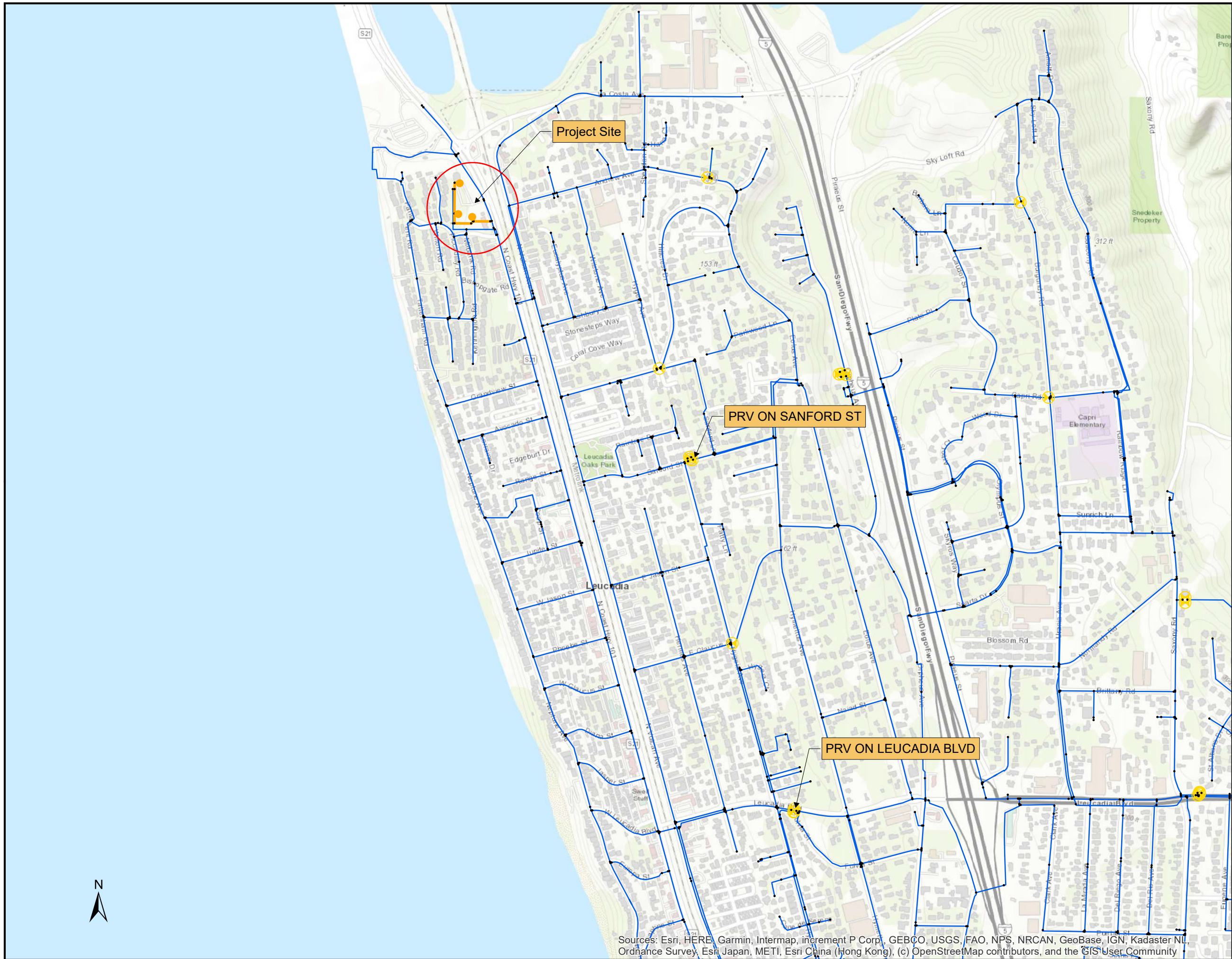
**Table 1. PRS Setting**

PRS Location	# of Valves	Size	Setting
Sanford St. & Hygeia Ave	2	8	55
		3	62
Leucadia Blvd & Fulvia St.	3	8	47
		4	62
		3	52

**Table 2. Results Summary**

		Hydrant Combination			
		1 & 2		2 & 3	
Hydrant No.	Static Pressure	FF (GPM)	Residual Pressure (PSI)	FF (GPM)	Residual Pressure (PSI)
1	63.01	628.5	37.63	x	x
2	63.01	2028.5	36.79	528.5	46.52
3	72.11	x	x	2000	53.96
<b>Total</b>		2657		2528.5	





### Legend

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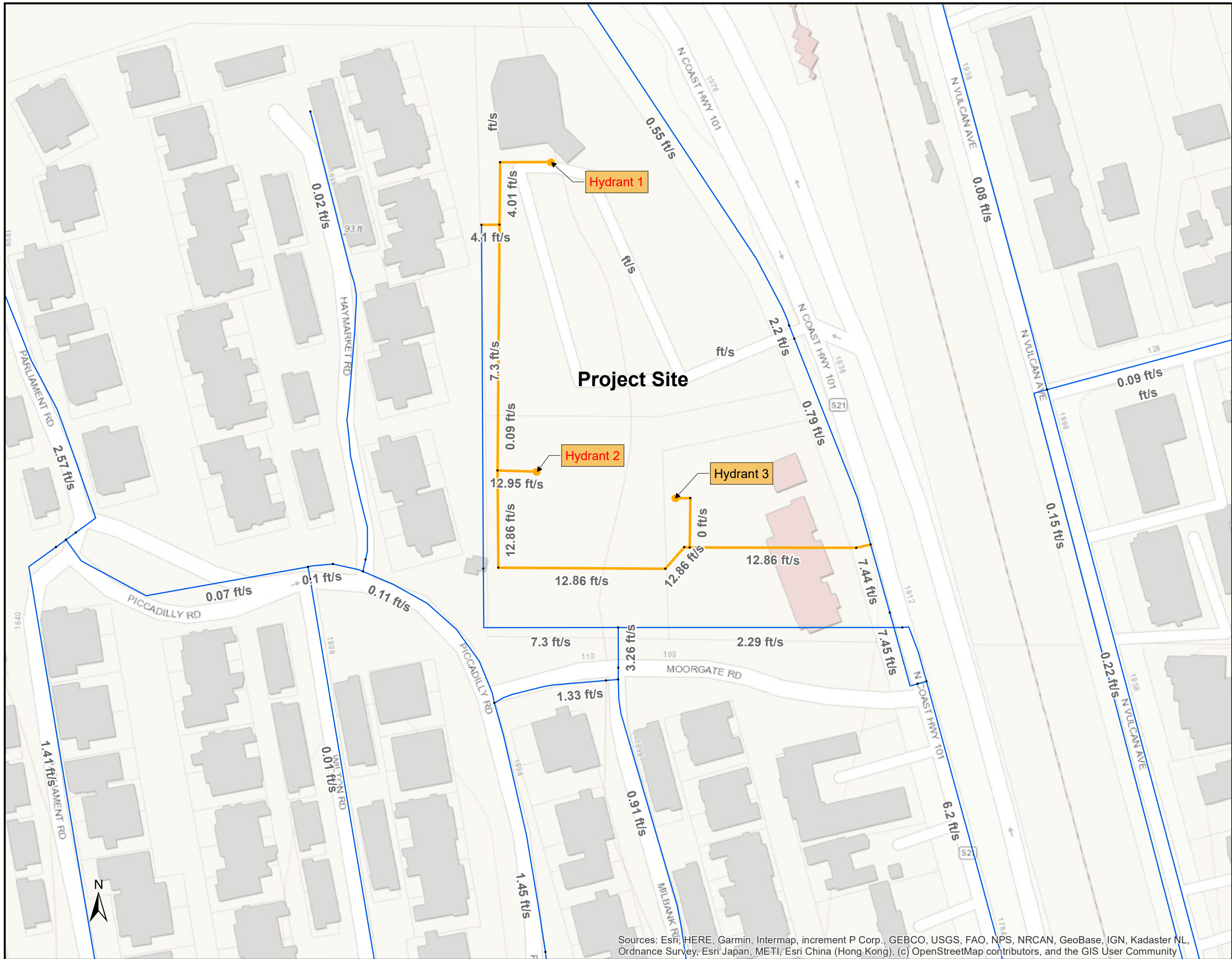
### Pipe

- Active
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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

San Dieguito Water District  
Fenway N Hwy 101  
**Site Map**  
**Figure 1**





### Legend

- PUMP

### Pipe

- Active
- MDD+ FF

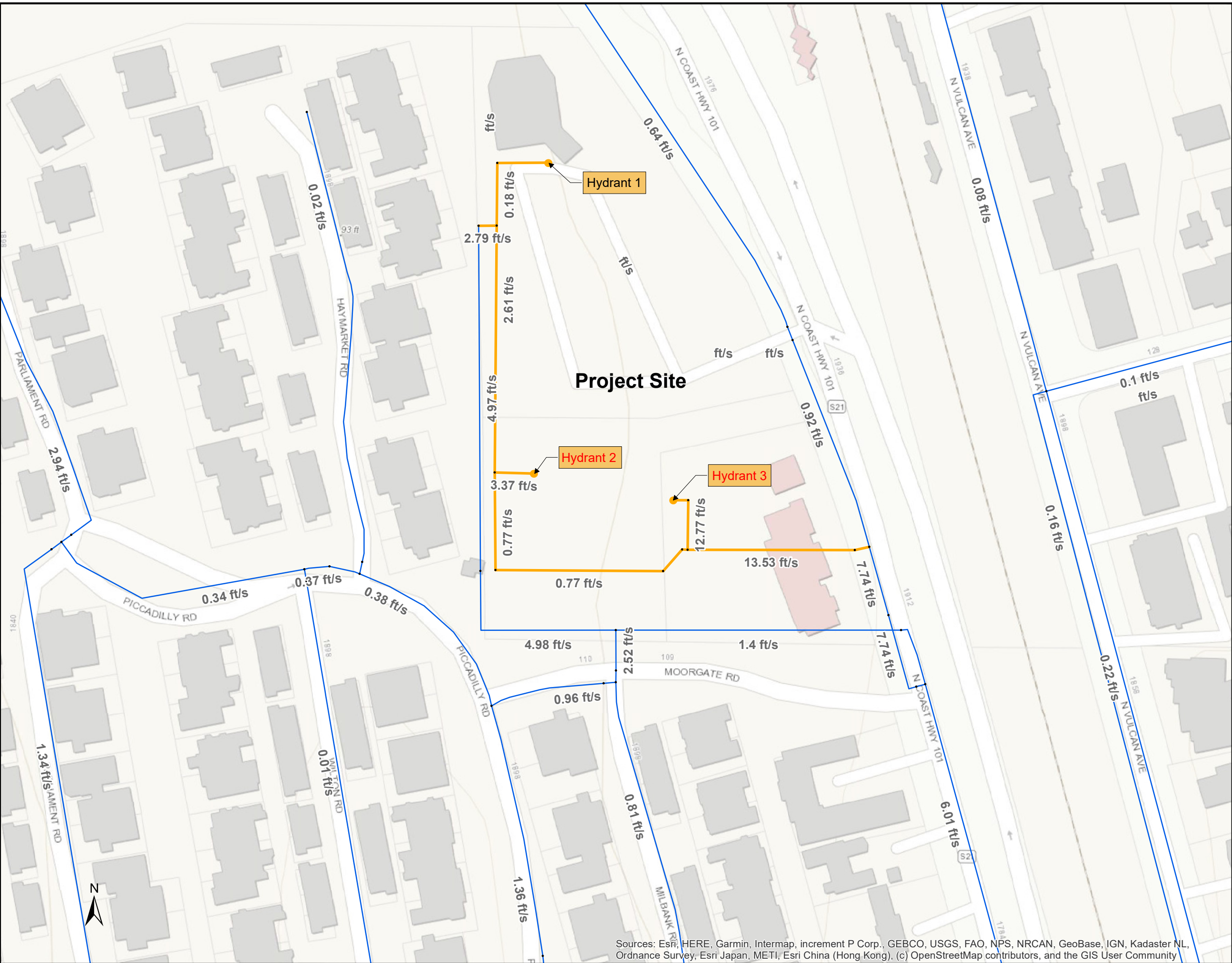

San Dieguito Water District  
 Fenway N Hwy 101  
**Velocities under MDD+ FF  
 with Hydrant 1 and 2**  
**Figure 2**

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



### Legend

- Proposed Hydrant
- Pipe
  - Active
  - Proposed Pipe

San Dieguito Water District  
Fenway N Hwy 101

### Velocities under MDD+ FF with Hydrant 2 and 3

Figure 3

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community