

**Diamond Street Industrial  
Technical Appendices**

**Appendix  
Water/Sewer Study**

**VALLECITOS WATER DISTRICT**  
*MELROSE INDUSTRIAL WATER AND SEWER STUDY*  
*WORK ORDER # 235371*

FINAL TECHNICAL MEMORANDUM

November 10, 2020

Prepared By: Robert Scholl, P.E. and Lisa Whitesell

---

**INTRODUCTION**

The proposed Melrose Industrial (Project) is on 22.912 acres on Melrose Drive and Diamond Street in the City of San Marcos (APN 223-341-03 through 14 & 16).

The Project property is located within VWD's boundaries for water and wastewater service. Both water and wastewater services can be provided by the Vallecitos Water District (VWD).

All new projects undergo evaluation by VWD to determine if the current water and sewer infrastructure is sufficient to accommodate the proposed water demands and sewage generation.

This study projects water demand and sewage generation increases due to the Project densification. It analyzes the following aspects of VWD's infrastructure and makes recommendations for capital improvements for impacts that are created due to the land use change:

- Water distribution system, including the need to upsize pipelines, install new pipelines, or install flow control facilities
- Water storage, including the need for additional storage and the adequacy of existing storage tanks and reservoirs to serve the proposed development
- Water pump stations, including the need to install new pump stations or upsize existing pump stations to serve the proposed development
- Wastewater collection system, including the need to upsize pipelines and manholes, or the need to install new pipelines and manholes
- Wastewater lift stations, including the need to install new lift stations or upsize existing lift stations to serve the proposed development
- Wastewater land outfall, including the need to construct a parallel land outfall to serve this and other proposed developments
- Wastewater treatment facilities, including the need for obtaining additional capacity at the Encina Water Pollution Control Facility (EWPCF) or for expanding the Meadowlark Water Reclamation Facility (MRF)

**WATER SYSTEM ANALYSIS**

The proposed 22.912-acre Project lies completely within VWD’s 622 Pressure Zone. Figures 1 and 2 show the development’s location in relation to pressure zone boundaries, identify pipelines within the vicinity of the development, and identify storage reservoirs that supply the development area.

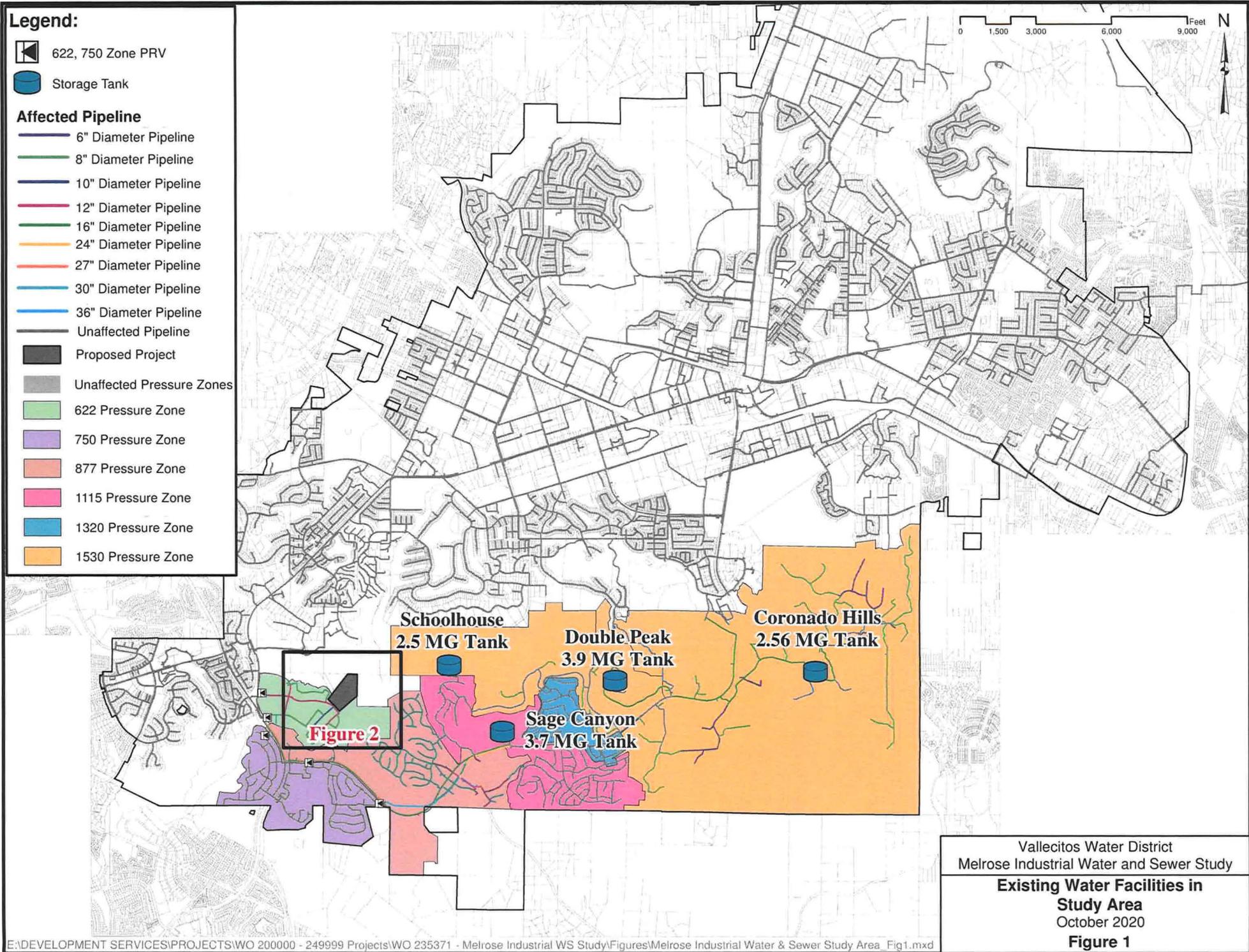
***Water Demand Projections***

The Project property’s City of San Marcos approved land use designation for the proposed Project is Light Industrial. The 2018 Master Plan based its ultimate water demand planning on this approved land use. The Project proposes to develop within the existing land use density.

Table 1 provides the average water demand generated both under the density planned for the 2018 Master Plan and with the proposed Project. The table shows that the Melrose Industrial project will not increase the projected average water demand.

**Table 1 – Project Estimated Water Demands**

Land Use Type	Area (acres)	Duty Factor (gpd/ac)	Water Demand (gpd)
<b>2018 Master Plan Land Use Demand</b>			
Light Industrial	22.91	1,500	34,365
<b>Total</b>	<b>22.91</b>		<b>34,368</b>
<b>Proposed Project Demand</b>			
Light Industrial	22.91	1,500	34,368
<b>Total</b>	<b>22.91</b>		<b>34,368</b>
<b>Water Demand Increase</b>			<b>0</b>



**Legend:**

**Affected Pipeline**

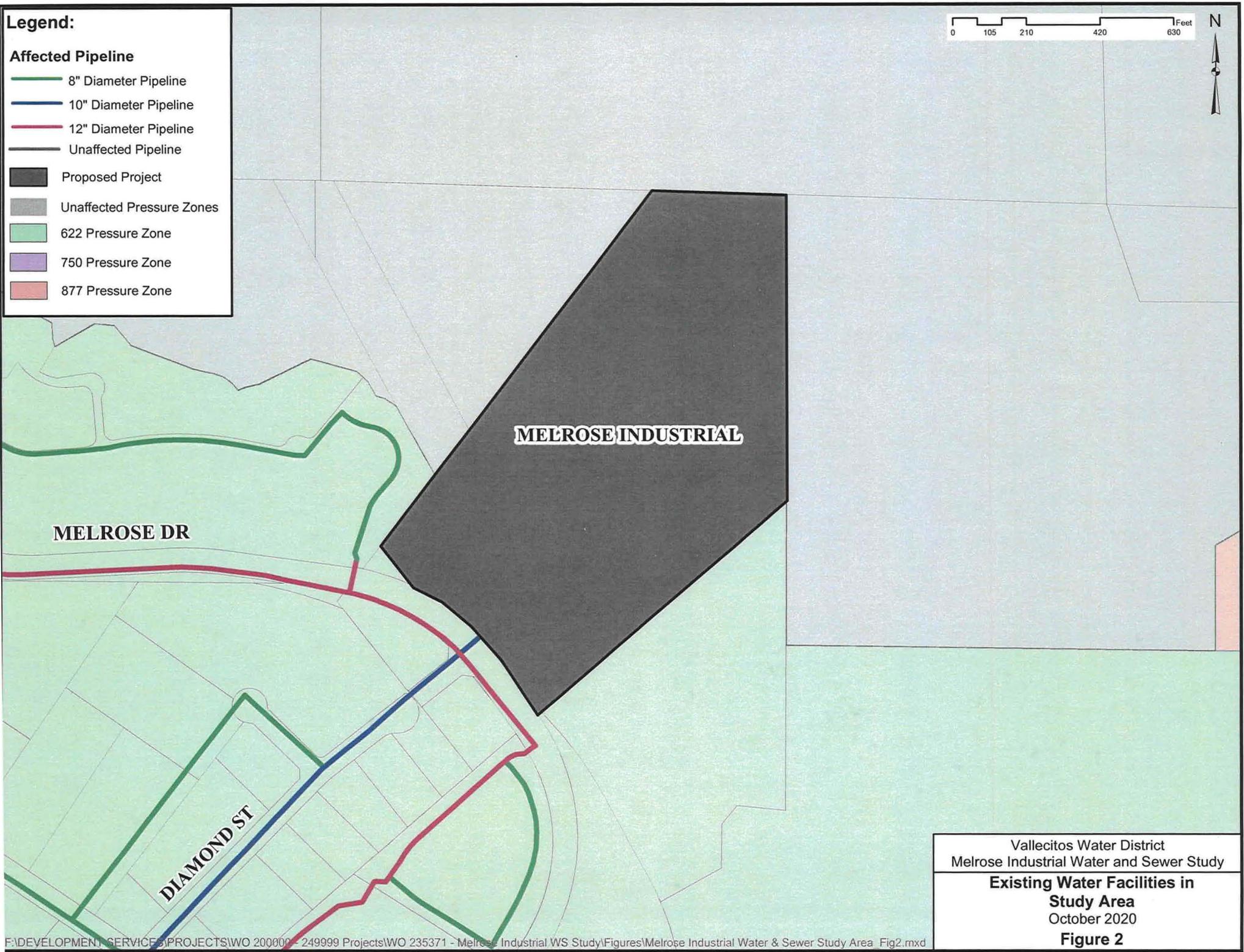
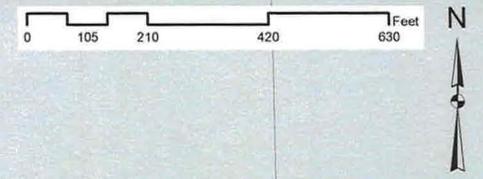
- 8" Diameter Pipeline
- 10" Diameter Pipeline
- 12" Diameter Pipeline
- Unaffected Pipeline

**Proposed Project**

- Proposed Project

**Unaffected Pressure Zones**

- Unaffected Pressure Zones
- 622 Pressure Zone
- 750 Pressure Zone
- 877 Pressure Zone



Vallecitos Water District  
 Melrose Industrial Water and Sewer Study  
**Existing Water Facilities in  
 Study Area**  
 October 2020  
**Figure 2**

### ***Water Distribution System Analysis***

The 2018 Master Plan water system distribution and pressure criteria are as follows:

#### *Water Distribution Infrastructure Criteria*

The water service pressure criteria to be met by this development are as follows:

- Minimum allowable pressure at peak hour demand: 40 psi
- Minimum allowable pressure at max day plus fire demand: 20 psi
- Maximum allowable pressure: 150 psi

The City of San Marcos Fire Marshall has set the required fire demand at 1,500 gpm for the Project.

To avoid excessive velocity and headloss within the distribution system, the following pipeline design criteria was also utilized:

- Maximum allowable velocity: 7 feet per second
- Maximum allowable headloss gradient: 15 feet per 1,000 feet
- Hazen-Williams C-factor: 130

#### *Water Model Scenarios*

The following scenarios were modeled to identify system impacts that may be created by the proposed water demands, and to recommend any improvements required to provide service to the Project:

- Average Day Demand with existing demands at the Project site
- Average Day Demand with the proposed Project
- Maximum Day Demand with existing demands at the Project site
- Maximum Day Demand with the proposed Project
- Peak Hour Demand with existing demands at the Project site
- Peak Hour Demand with the proposed Project
- Maximum Day Demand plus Fire Flow with existing demands at the Project site
- Maximum Day Demand plus Fire Flow with the proposed Project

Per the 2018 Master Plan, maximum day demands for this project are 300% those of average day demands, and peak hour demands are 620% those of average day demands.

#### *Water Model Results*

Modeling focused on the infrastructure in the direct vicinity of the Project. The model found that the Project did not create any distribution system deficiencies under average day demand or maximum day plus fire flow demand conditions.

**Water Storage Analysis**

The 2018 Master Plan outlines VWD’s potable water storage reservoirs for each pressure zone as follows:

1.5 times ADD (operational storage) + 3.0 times ADD (emergency storage) + fire flow demand = 4.5 times ADD + fire flow demand

OR

5.0 times ADD, whichever is greater.

The project is located entirely within the VWD 622 pressure zone as shown in Figure 1. Water storage for this zone is located within the 877 Sage Canyon, 1115 Schoolhouse, 1530 Double Peak and 1530 Coronado Hills pressure zones. Table 2 shows the required storage in the 622, 877, 815, 1115, 1320 and 1530 pressure zones for existing and ultimate build-out (Master Plan) relative to the existing storage provided within each zone.

**Table 2 – Existing Reservoir Storage Capacity and Requirements**

Pressure Zone	Existing ADD (MGD)	Existing Storage Requirement (MG)	Ultimate ADD (MGD)	Ultimate Storage Requirement (MG)	Existing Storage Available (MG)
622 La Costa	0.25	1.43	0.37	1.97	
877 Sage Canyon	0.53	2.69	0.72	3.60	3.70
815 Meadowlark	0.23	1.34	0.71	3.55	
1115 Schoolhouse	0.60	3.00	0.66	3.30	2.50
1320	0.24	1.38	0.21	1.25	
1530 Coronado Hills	0.17	1.07	2.09	10.45	2.56
1530 Double Peak	0.10	0.75	0.40	2.10	3.90
<b>Total</b>	<b>2.12</b>	<b>11.66</b>	<b>3.73</b>	<b>26.22</b>	<b>12.66</b>

The Project will not increase the projected average water demand. The analysis finds that water storage capacity is currently available to serve the Project. Master Plan projects address and accommodate the ultimate build-out storage deficiency and Water Capital Facility Fees paid by this project will be used to fund the projects that will mitigate this deficiency.

**Water Pump Station Analysis**

Since the proposed Project is located in a pressure zone that is not served by pumping, there are no impacts to existing or proposed pump stations by this Project.

## WASTEWATER SYSTEM ANALYSIS

The proposed 22.912-acre Project lies completely within VWD sewer shed 6S. Figures 3 through 5 show the development's location in relation to sewer shed boundaries, identify wastewater infrastructure within the vicinity of the development, and identify the downstream collection infrastructure that will be impacted by the development

### *Wastewater Flow Projections*

The Project property's City of San Marcos approved land use designation for the proposed Project is Light Industrial. The 2018 Master Plan based its ultimate wastewater generation planning on this approved land use. The Project proposes to develop within the existing land use density.

Table 3 provides the average wastewater flow generated both under the density planned for the 2018 Master Plan and with the proposed Project. The table shows that the Melrose Industrial project will not increase the projected average wastewater generation from the 2018 Master Plan use.

**Table 3 – Project Estimated Wastewater Flows**

Land Use Type	Area (acres)	Duty Factor (gpd/acre)	Water Demand (gpd)
<b>2018 Master Plan Land Use Flows</b>			
Light Industrial	22.91	1,300	29,786
<b>Total</b>	<b>22.91</b>		<b>29,786</b>
<b>Proposed Project Demand</b>			
Light Industrial	22.91	1,300	29,786
<b>Total</b>	<b>22.91</b>		<b>29,786</b>
<b>Sewer Generation Increase</b>			<b>0</b>

**Legend**

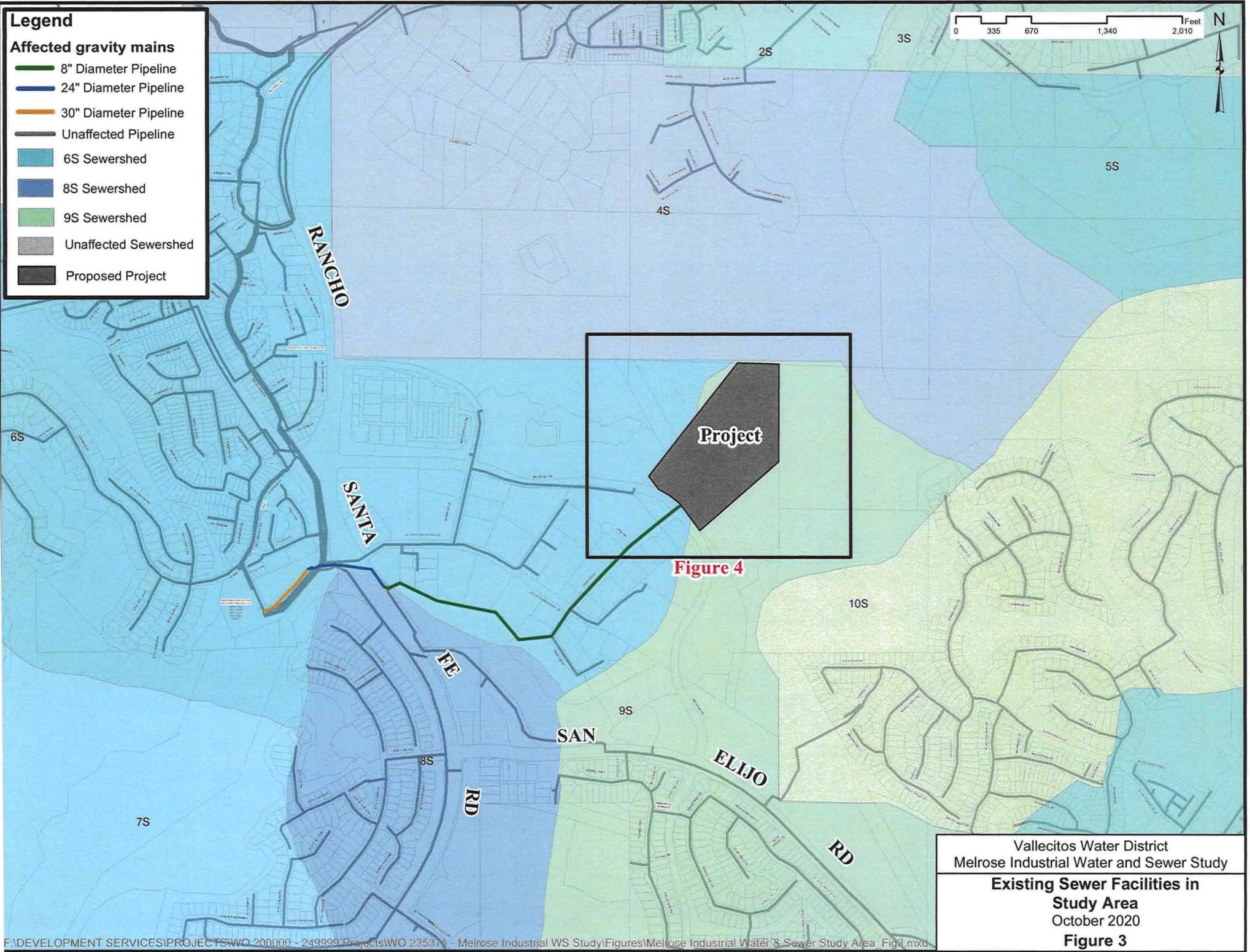
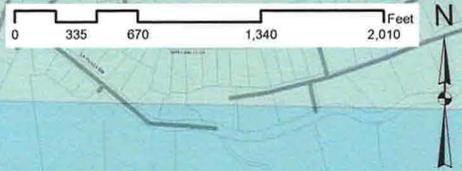
**Affected gravity mains**

- 8" Diameter Pipeline
- 24" Diameter Pipeline
- 30" Diameter Pipeline
- Unaffected Pipeline

**Sewershed**

- 6S Sewershed
- 8S Sewershed
- 9S Sewershed
- Unaffected Sewershed

Proposed Project



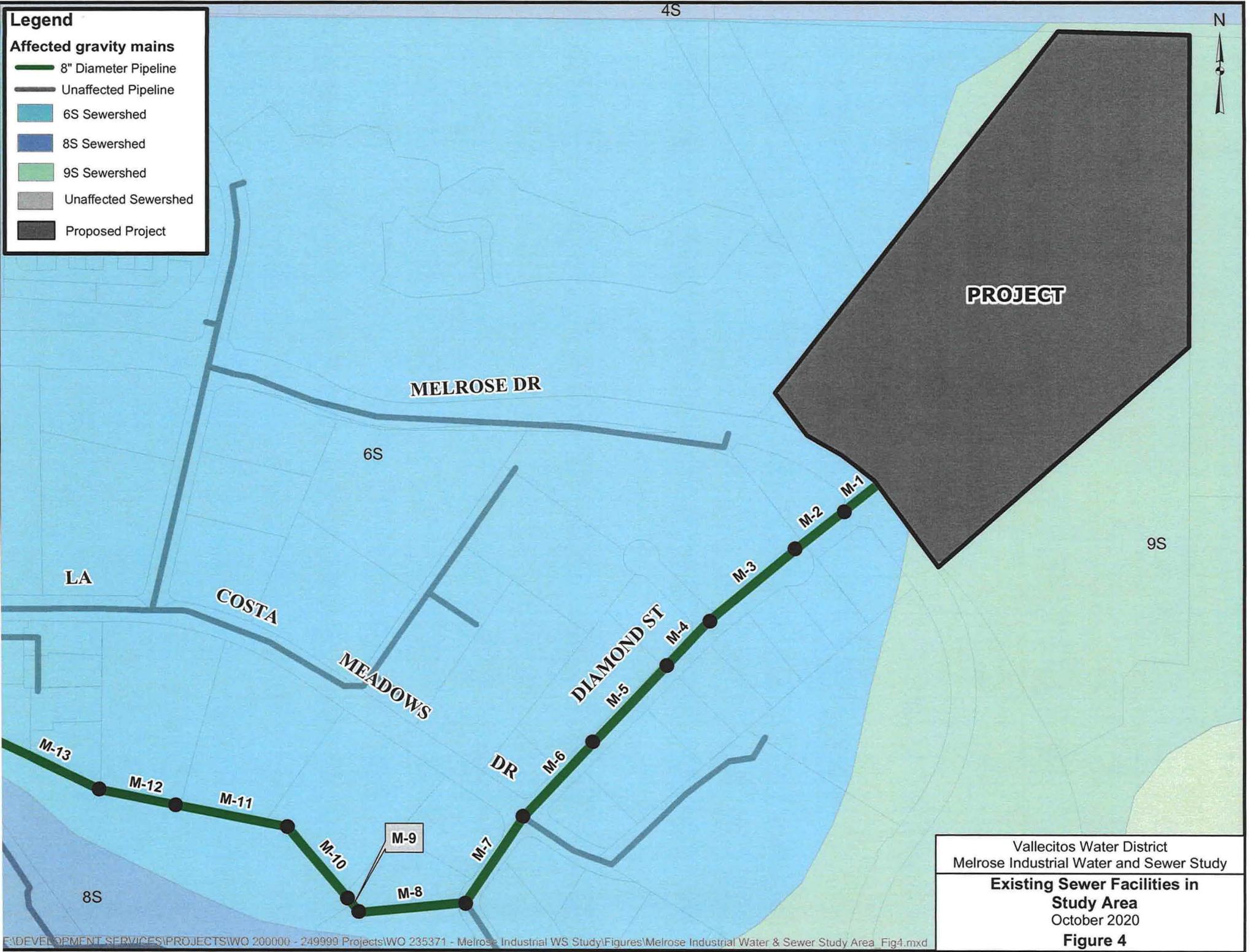
**Figure 4**

Vallecitos Water District  
 Melrose Industrial Water and Sewer Study  
**Existing Sewer Facilities in  
 Study Area**  
 October 2020  
**Figure 3**

**Legend**

**Affected gravity mains**

- 8" Diameter Pipeline
- Unaffected Pipeline
- 6S Sewershed
- 8S Sewershed
- 9S Sewershed
- Unaffected Sewershed
- Proposed Project

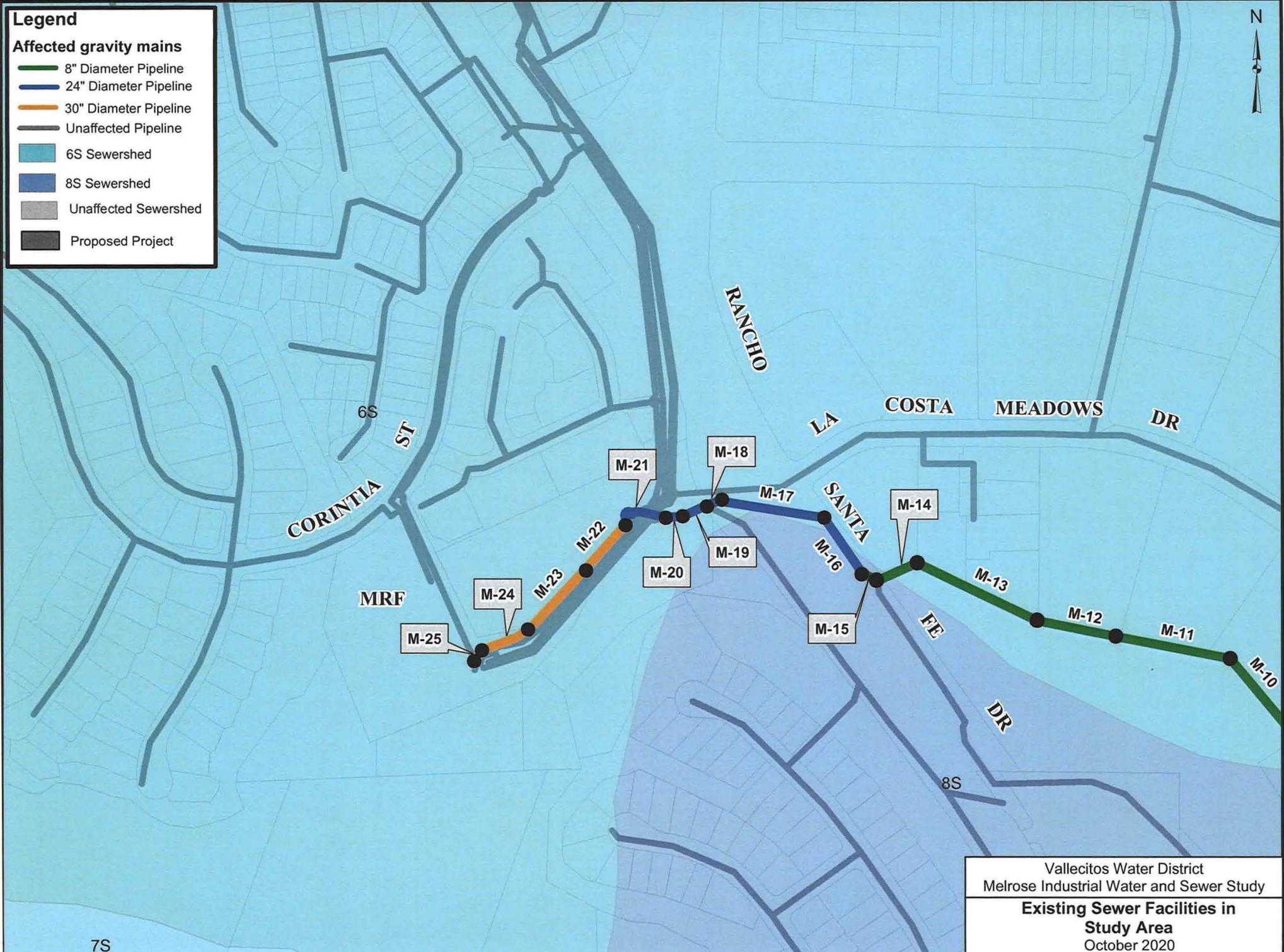


Vallecitos Water District  
 Melrose Industrial Water and Sewer Study  
**Existing Sewer Facilities in  
 Study Area**  
 October 2020  
**Figure 4**

**Legend**

**Affected gravity mains**

- 8" Diameter Pipeline
- 24" Diameter Pipeline
- 30" Diameter Pipeline
- Unaffected Pipeline
- 6S Sewershed
- 8S Sewershed
- Unaffected Sewershed
- Proposed Project



Vallecitos Water District  
 Melrose Industrial Water and Sewer Study  
**Existing Sewer Facilities in  
 Study Area**  
 October 2020  
**Figure 5**

### ***Wastewater Collection System Analysis***

The 2018 Master Plan outlines VWD's wastewater system design criteria which are as follows:

#### *Wastewater Collection Infrastructure Criteria*

The wastewater pipeline criteria to be met both within and downstream of the development are as follows:

- Pipes 12 inches in diameter and smaller: ½ full maximum at peak flow
- Pipes over 12 inches in diameter: ¾ full maximum at peak flow
- Minimum velocity: 2 feet per second
- Maximum velocity: 10 feet per second
- Manning's n for gravity pipes: .013
- Hazen-Williams C-factor for force mains/siphons: 120
- Slope for pipes 12 inches in diameter and smaller: 0.4% minimum
- Slope for pipes over 12 inches in diameter: to be determined by VWD

When flow depth in gravity pipes exceeds maximum levels as stated above, a pipe upsize will be specified.

#### *Wastewater Model Scenarios*

The following scenarios were modeled to identify system impacts that may be created by the proposed sewer generation, and to recommend any improvements required to provide service to the Project:

- Average Dry Weather Flow with existing flows at the Project site
- Average Dry Weather Flow with the proposed Project
- Peak Dry Weather Flow with existing flows at the Project site
- Peak Dry Weather Flow with the proposed Project
- Peak Wet Weather Flow with existing flows at the Project site
- Peak Wet Weather Flow with the proposed Project

The peak dry weather curve is:

$$\text{Peak Dry Weather Factor} = 2.16 \times (\text{Average Dry Weather Flow Rate})^{-0.1618}$$

The wet weather peak curve is:

$$\text{Peak Wet Weather Factor} = 2.78 \times (\text{Average Dry Weather Flow Rate})^{-0.087}$$

*Wastewater Model Results*

Modeling focused not only on the sewer collection infrastructure in the direct vicinity of the Project, but also on all downstream infrastructure from the development to Meadowlark Reclamation Facility near Melrose Drive on Corintia Street (see Figures 3-5).

The modeling results show that the wastewater flow from the proposed Project does not create any system deficiencies under the peak wet weather flows during ultimate build-out conditions as shown in Table 4.

**Table 4 - Wastewater Model Results and Recommended Gravity Main Improvements**

Pipe ID Number	Length (ft)	Diameter (in)	Slope	Wastewater Flows with Existing Density at Project Site				Wastewater Flows with Proposed Project Development			
				Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio	Peak Wet Weather Flow (gpm)	PWWF Depth-to-Diameter Ratio	Replacement Diameter (in)	Replacement PWWF Depth-to-Diameter Ratio
MI-1	115	8	0.015	0	0.00			0	0.00		
MI-2	164	8	0.088	20	0.08			20	0.08		
MI-3	320	8	0.050	22	0.10			22	0.10		
MI-4	165	8	0.036	26	0.11			26	0.11		
MI-5	300	8	0.033	27	0.12			27	0.12		
MI-6	281	8	0.032	29	0.12			29	0.12		
MI-7	214	8	0.055	51	0.14			51	0.14		
MI-8	277	8	0.012	66	0.23			66	0.23		
MI-9	35	8	0.006	66	0.27			66	0.27		
MI-10	296	8	0.015	66	0.22			66	0.22		
MI-11	235	8	0.005	69	0.29			69	0.29		
MI-12	300	8	0.005	73	0.30			73	0.30		
MI-13	362	8	0.005	77	0.31			77	0.31		
MI-14	113	8	0.043	77	0.18			77	0.18		
MI-15	50	8	0.044	77	0.18			77	0.18		
MI-16	192	24	0.003	1295	0.33			1295	0.33		
MI-17	300	24	0.002	1298	0.37			1298	0.37		
MI-18	48	24	0.004	1299	0.31			1299	0.31		
MI-19	49	24	0.002	1382	0.38			1382	0.38		
MI-20	36	24	0.003	1383	0.34			1383	0.34		
MI-21	98	24	0.001	1385	0.46			1385	0.46		
MI-22	164	30	0.002	2011	0.34			2011	0.34		
MI-23	214	30	0.002	2014	0.34			2014	0.34		
MI-24	164	30	0.003	2017	0.31			2017	0.31		
MI-25	6	30	0.033	2019	0.17			2019	0.17		

### ***Wastewater Lift Station Analysis***

Lift stations are sized for peak wet weather flow with manufacturer’s recommended cycling times for pumping equipment. Since the proposed Project is not located in a sewer shed that is served by a lift station, there are no lift station upgrade requirements for this project.

### ***Parallel Land Outfall Analysis***

VWD’s existing land outfall is shown in Figure 6. The outfall is approximately 8 miles in length and consists of 4 gravity pipeline sections and 3 siphon sections varying in diameter from 20 inches to 54 inches. VWD maintains the entire pipeline from Lift Station No. 1 to the Encina Water Pollution Control Facility (EWPCF). From Lift Station No. 1 to El Camino Real, VWD is the sole user of this pipeline. From El Camino Real to the EWPCF, the ownership capacity is as shown in Table 5 below:

**Table 5 – Land Outfall Capacity Ownership by Agency**

Agency	Ownership Percentage	Capacity (MGD)
Carlsbad	23.98%	5.00
Vista	17.99%	3.75
VWD	58.03%	12.10
<b>Totals</b>	<b>100.00%</b>	<b>20.85</b>

The Meadowlark Water Reclamation Facility (MRF) has a capacity of 5.0 MGD with a peak wet weather capacity of 8.0 MGD. Therefore, VWD has a combined peak wet weather wastewater collection capacity of 20.10 MGD (12.10 MGD + 8.0 MGD).

VWD’s 2014 average daily wastewater flow through the land outfall was 7.5 MGD. This corresponds to a peak wet weather flow of 17.5 MGD, which falls within VWD’s combined peak wet weather collection capacity.

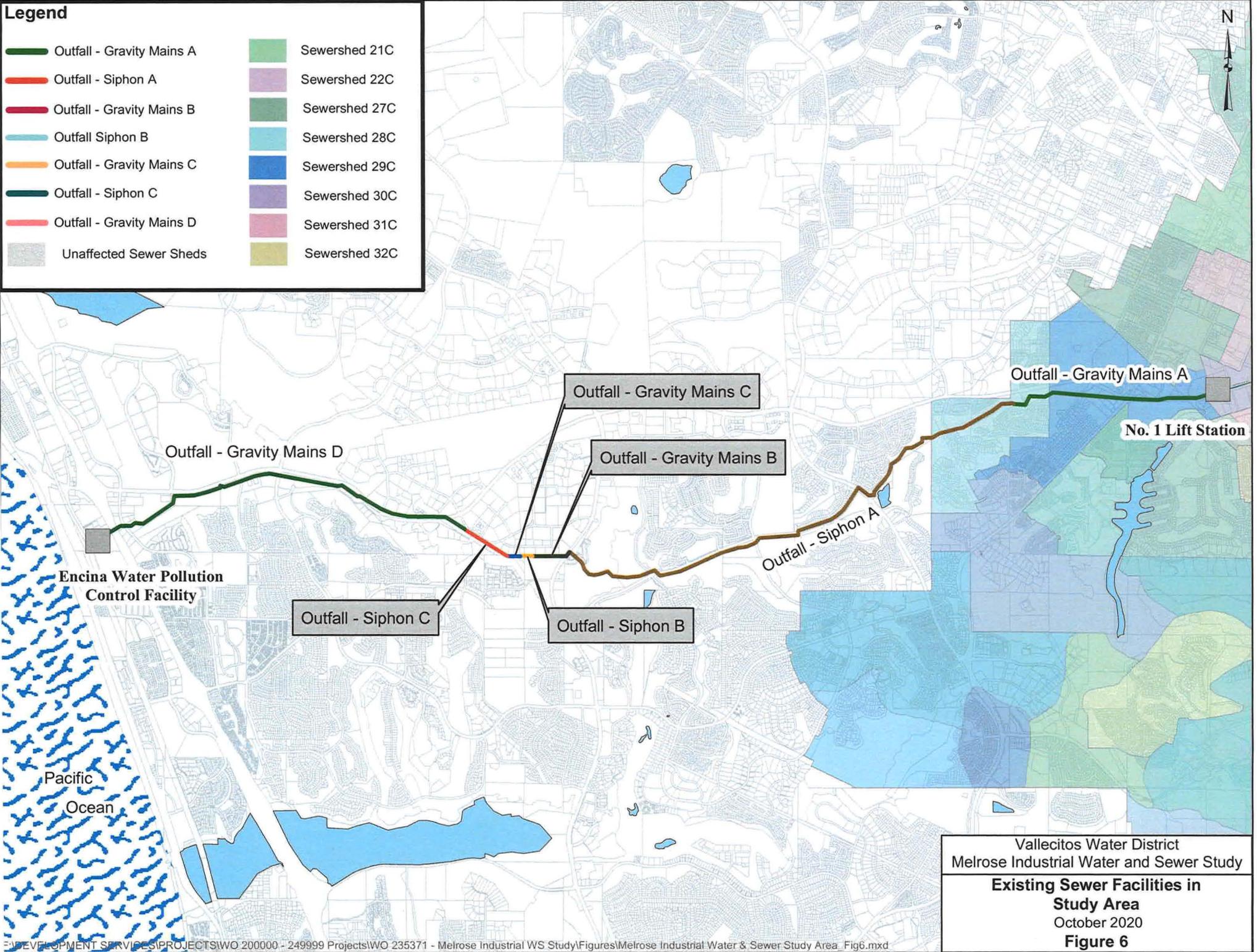
The 2018 Master Plan estimated that, under approved land uses, VWD has an ultimate build-out average dry weather flow of 14.4 MGD. This corresponds to a peak wet weather flow of 31.7 MGD, which exceeds VWD’s combined peak wet weather collection capacity. To accommodate additional wastewater flows from planned development, the 2018 Master Plan recommended conveyance of peak flows to the EWPCF through a parallel land outfall.

The Project does not propose to generate additional wastewater flow that was not accounted for in the Land Outfall’s capacity studied in the 2018 Master Plan.

The analysis finds that outfall capacity is currently available to serve the Project’s proposed wastewater generation. Wastewater Capital Facility Fees paid by this Project will be used toward design and construction of a parallel land outfall to be sized to accommodate ultimate build-out wastewater flows.

**Legend**

 Outfall - Gravity Mains A	 Sewershed 21C
 Outfall - Siphon A	 Sewershed 22C
 Outfall - Gravity Mains B	 Sewershed 27C
 Outfall Siphon B	 Sewershed 28C
 Outfall - Gravity Mains C	 Sewershed 29C
 Outfall - Siphon C	 Sewershed 30C
 Outfall - Gravity Mains D	 Sewershed 31C
 Unaffected Sewer Sheds	 Sewershed 32C



Vallecitos Water District  
 Melrose Industrial Water and Sewer Study  
**Existing Sewer Facilities in  
 Study Area**  
 October 2020  
**Figure 6**

### ***Wastewater Treatment Facility Analysis***

VWD utilizes two wastewater treatment facilities to treat wastewater collected within its sewer service area.

- The Meadowlark Reclamation Facility (MRF) has liquids treatment capacity of up to 5.0 MGD with a peak wet weather capacity of 8.0 MGD. MRF does not have solids treatment capacity, and therefore all solids are treated at the Encina Water Pollution Control Facility (EWPCF).
- The EWPCF is located in the City of Carlsbad. This is a regional facility with treatment capacity of up to 40.51 MGD. VWD's current ownership capacity is noted below.

#### *Solids Treatment Capacity*

VWD currently owns 10.47 MGD of solids treatment capacity at EWPCF. VWD's 2014 average daily wastewater flow was 7.5 MGD. Therefore, the analysis finds that adequate solids treatment capacity exists at this time to serve the Project.

The ultimate average wastewater flow identified in the 2018 Master Plan is 14.4 MGD, resulting in a projected solids treatment capacity deficiency of 3.93 MGD.

#### *Liquids Treatment Capacity*

VWD currently owns 7.67 MGD of liquids treatment capacity at the EWPCF in addition to the liquids treatment capacity of 5.0 MGD at MRF for a total of 12.67 MGD of liquids treatment capacity. VWD's 2014 average daily wastewater flow was 7.5 MGD. Therefore, the analysis finds that adequate liquids treatment capacity exists at this time to serve the Project.

The ultimate average wastewater flow identified in the 2018 Master Plan is 14.4 MGD, resulting in a projected liquids treatment capacity deficiency of 1.73 MGD.

#### *Ocean Disposal Capacity*

VWD currently owns 10.47 MGD of ocean disposal capacity at the EWPCF. VWD's 2014 average daily wastewater flow was 7.5 MGD. Therefore, the analysis finds that adequate ocean disposal capacity exists at this time to serve the Project.

The ultimate average wastewater flow identified in the 2018 Master Plan is 14.4 MGD, resulting in an ocean disposal deficiency of 3.93 MGD.

The District has determined that adequate wastewater treatment and disposal capacity exists for the proposed Project at this time subject to the qualifications referenced in the Conclusions and Conditions.

## **CONCLUSION AND CONDITIONS**

The proposed Melrose Industrial Project is not expected to increase average daily water demands and is not expected to increase wastewater flow over ultimate flows projected in the 2018 Master Plan.

The Study concludes that there are no deficiencies in the existing sewer facilities under peak wet weather flows during ultimate build-out conditions for the proposed Project.

The following items are required for providing service to the proposed Project:

- Payment of all applicable Water and Wastewater Capital Facility fees in affect at the time service is committed in accordance with District rules and regulations.
- Construction and acceptance of all on-site water and sewer facilities prior to service.

The District currently has water and sewer capacity available to serve the Project as proposed. However, the ability to provide water and sewer service in the future depends upon ultimate build-out of the Project and could change depending upon the timing of the build-out, as well as build-outs of other development projects, continued reliable water supplies from the San Diego County Water Authority, the District's treatment capacity at the EWPCF and other factors affecting growth in the District which may change over time.

This Study is based on the current adopted land use utilized in VWD's 2018 Master Plan. The study addresses the incremental facility impacts of this Project only and does not include or consider any additional projects within VWD's service area that have deviated from adopted Master Plan land uses. Any land use changes upstream and/or downstream of the Study area may necessitate a revision of any onsite and offsite studies. VWD shall determine if and when revisions to the Study are necessary. Costs for revising this Study shall be borne by the Developer.