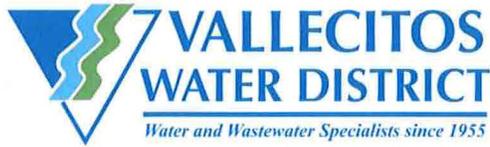


**Carkel San Marcos Commercial
Technical Appendices**

**Appendix L
Water/Sewer Study**



201 Vallecitos de Oro · San Marcos, California · 92069-1453 Telephone (760) 744-0460

October 30, 2020

Carkel San Marcos, LLC
 c/o CCI
 160 Industrial Street
 San Marcos, CA 92078
 Attn: Terry Mathew

**RE: DRIVE-THRU RESTAURANT
 FINAL WATER & SEWER STUDY
 VWD WO #236576
 PREPARED BY ROBERT SCHOLL, P.E. & EILEEN KOONCE**

The proposed Drive-Thru Restaurant (Project) is located on the southeast corner of San Marcos Boulevard and Bent Avenue in the City of San Marcos. The Project consists of one 0.55-acre parcel (APN 219-270-60) located within the Vallecitos Water District (VWD) and the VWD sewer service area.

WATER SYSTEM

The Project property is located within VWD’s 855 Pressure Zone as shown in Figures 1 and 2. The VWD 2018 Master Plan based its ultimate water demand planning on the approved Mixed-Use land use. The Project is proposing a drive-through restaurant on 0.55 acres. Water use data from a similar establishment was used for the purpose of this study. The proposed development will not increase water demand over the amount accounted for in VWD’s 2018 Master Plan as shown in Table 1.

Table 1 – Project Estimated Water Demands

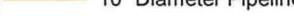
Land Use Type	Area (acres)	Residential Units	Duty Factor (gpd/ac)	Water Demand (gpd)
2018 Master Plan Land Use Demand				
Mixed Use	0.55		3,000	1,650
Total	0.55			1,650
Proposed Project Demand				
Restaurant	0.55			1,270
Total	0.55			1,270
Water Demand Increase				0

The San Marcos Fire Department has set fire flow requirements of 1,500 gpm for this project. Figures 1 & 2 show the Project'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. The proposed Project may connect to VWD's water system in either of two locations. They may connect to the 8-inch water main in Bent Avenue or the 8-inch main in San Marcos Boulevard. The 14-inch main in San Marcos Boulevard is a transmission main and is not available for service connections. A hydraulic analysis of the facilities in the direct vicinity of the Project did not show any system deficiencies under maximum day plus fire flow demand conditions resulting from connection at either location.

Legend:

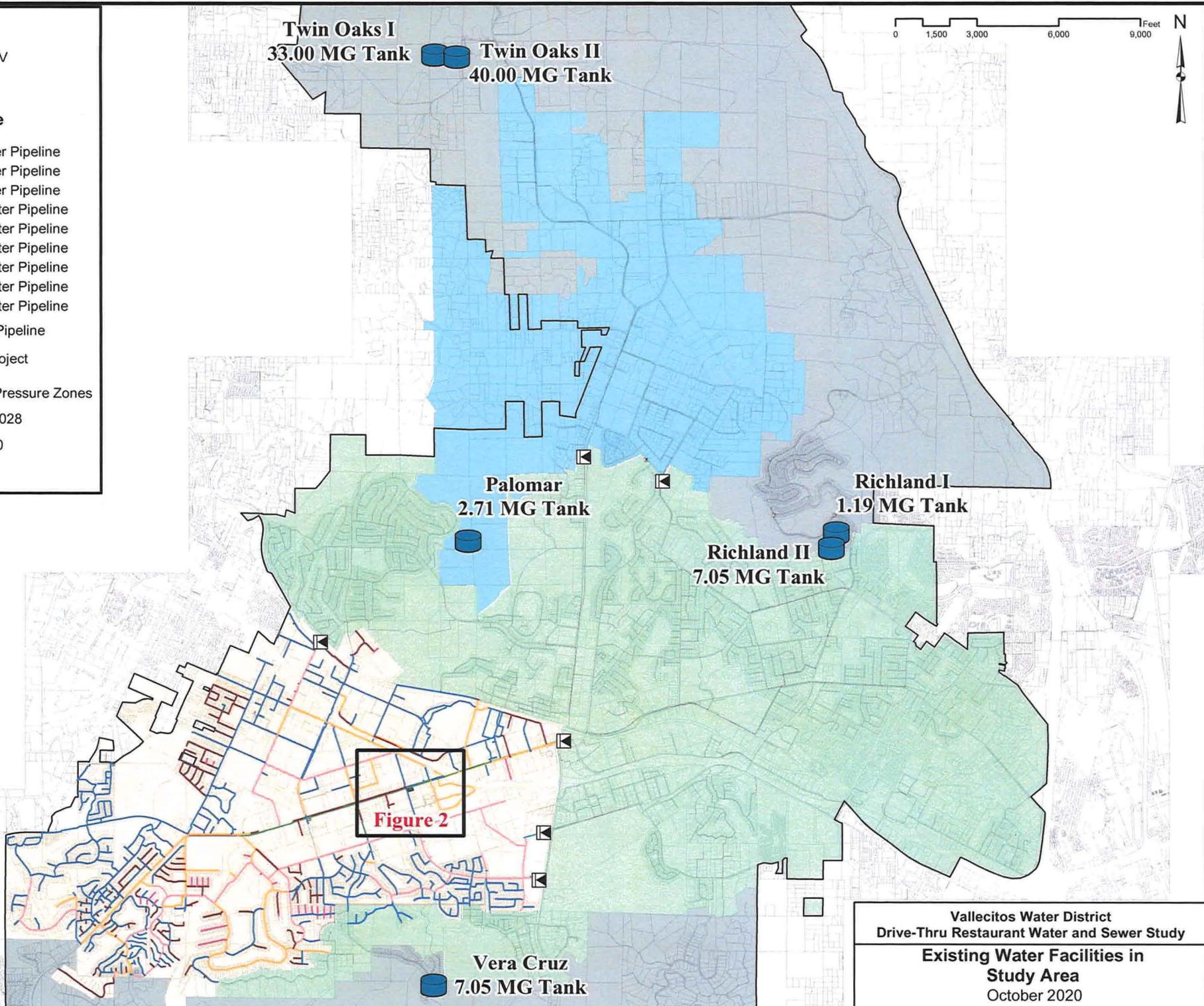
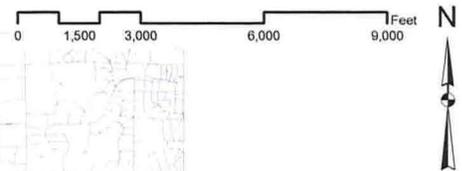
-  920 Zone PRV
-  Storage Tank

Affected Pipeline

-  4" Diameter Pipeline
-  6" Diameter Pipeline
-  8" Diameter Pipeline
-  10" Diameter Pipeline
-  12" Diameter Pipeline
-  14" Diameter Pipeline
-  16" Diameter Pipeline
-  18" Diameter Pipeline
-  21" Diameter Pipeline
-  Unaffected Pipeline

Proposed Project

-  Proposed Project
-  Unaffected Pressure Zones
-  Twin Oaks 1028
-  Richland 920
-  855 Zone



Vallecitos Water District
 Drive-Thru Restaurant Water and Sewer Study
Existing Water Facilities in Study Area
 October 2020
Figure 1

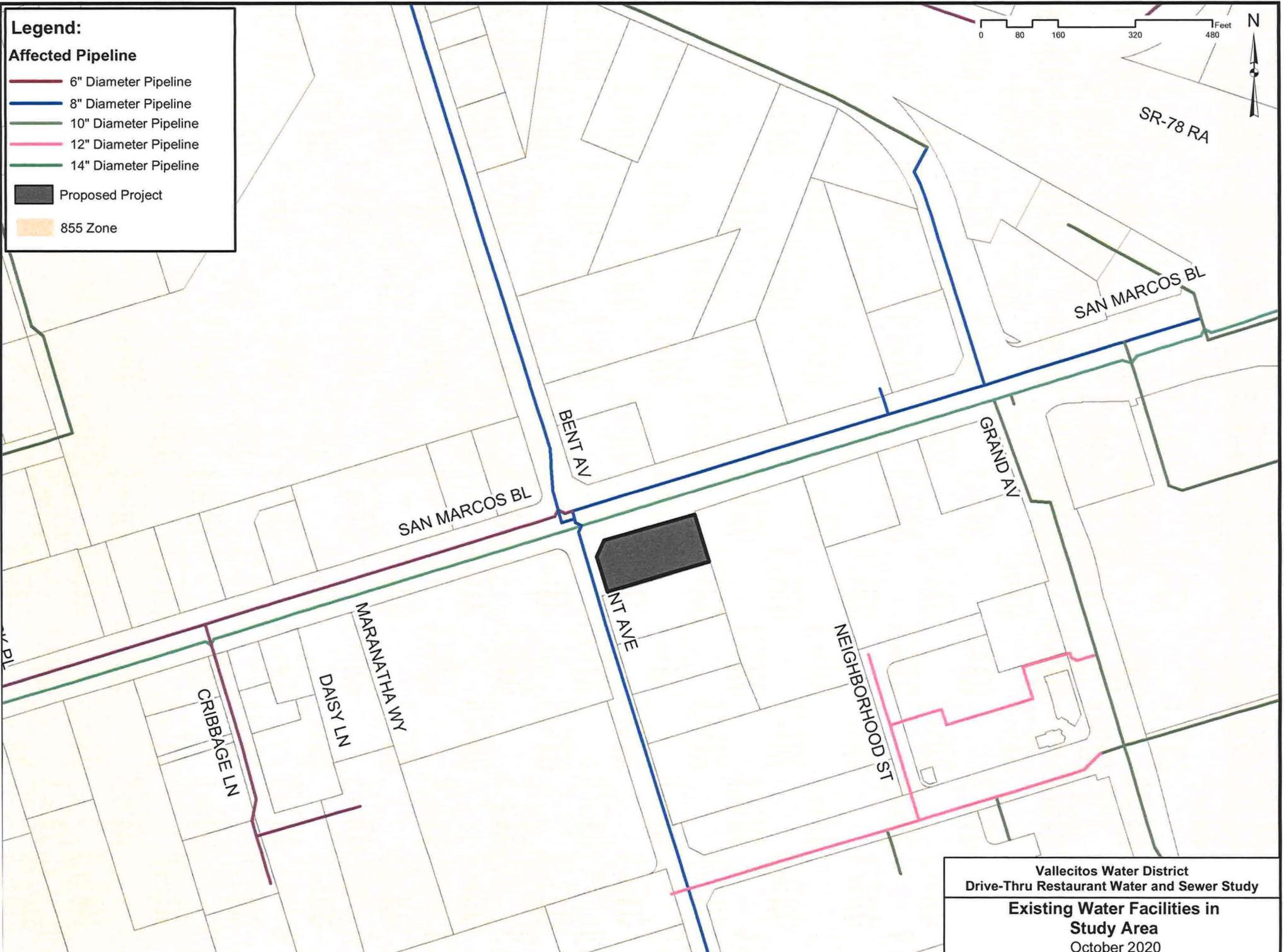
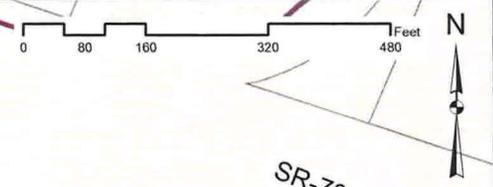
Legend:

Affected Pipeline

- 6" Diameter Pipeline
- 8" Diameter Pipeline
- 10" Diameter Pipeline
- 12" Diameter Pipeline
- 14" Diameter Pipeline

Proposed Project

855 Zone



Vallecitos Water District
 Drive-Thru Restaurant Water and Sewer Study
**Existing Water Facilities in
 Study Area**
 October 2020
Figure 2

WASTEWATER SYSTEM

The Project property is located entirely within VWD sewer shed 23C as shown in Figures 3 through 7.

The VWD 2018 Master Plan based its ultimate wastewater generation planning on the approved Mixed-Use land use. The Project is proposing a drive-thru restaurant on 0.55 acres. Water use data from a similar establishment was used for the purpose of this study. The typical return to sewer ratio for restaurants is 80% of the total water use. The proposed development will increase wastewater generation by 466 gallons per day over the amount accounted for in VWD’s 2018 Master Plan as shown in Table 2.

Table 2 – Project Estimated Wastewater Flows

Land Use Type	Area (acres)	Residential Units	Duty Factor (gpd/ac)	Wastewater Flow (gpd)
2018 Master Plan Land Use Flows				
Mixed Use	0.55		1,000	550
Total	0.55			550
Proposed Project Demand				
Restaurant	0.55			1,016
Total	0.55			1,016
Sewer Generation Increase				466

Wastewater Collection System Analysis

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 Lift Station No. 1 on or near San Marcos Boulevard that would be impacted by the Project flows (see Figures 3 through 7).

The modeling results showed that in Option 1 there are existing deficiencies in pipe segments in San Marcos Boulevard (SM-1 through SM-15) under peak wet weather flows during ultimate build-out conditions. Table 3 presents a summary of the modeling results from the analysis of Option 1.

VWD’s 2018 Master Plan has identified pipe segments SM-1 through SM-15 for upsizing from 8-inch to 12-inch as CIP #SP-33, a Phase 2 project. Phase 2 projects are planned for construction in the 2021-2025 timeframe.

Because of the significant deficiencies shown in Option 1, the District has also evaluated an alternate sewer flow alignment. In Option 2, the developer would be required to extend the sewer main in Bent Avenue approximately 300 feet to the property frontage. The modeling results showed that in Option 2 there are no deficiencies under peak wet weather flows during ultimate build-out conditions. Table 4 presents a summary of the modeling results from the analysis of Option 2.

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.

Table 3 - OPTION 1 -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
SM-1	330	8	0.004	265	0.66	12	0.35	267	0.67	12	0.36
SM-2	381	8	0.004	300	0.73	12	0.38	302	0.73	12	0.38
SM-3	385	8	0.004	314	0.76	12	0.39	316	0.76	12	0.39
SM-4	380	8	0.004	327	0.79	12	0.40	329	0.79	12	0.40
SM-5	385	8	0.004	336	0.81	12	0.40	338	0.81	12	0.40
SM-6	383	8	0.004	349	0.84	12	0.40	351	0.85	12	0.41
SM-7	382	8	0.004	357	0.87	12	0.42	359	0.87	12	0.42
SM-8	390	8	0.004	377	>1.0	12	0.43	379	>1.0	12	0.43
SM-9	380	8	0.004	387	>1.0	12	0.43	389	>1.0	12	0.43
SM-10	380	8	0.005	409	0.91	12	0.42	411	0.92	12	0.42
SM-11	382	8	0.007	413	0.75	12	0.39	415	0.76	12	0.39
SM-12	333	8	0.018	444	0.57	12	0.31	446	0.57	12	0.31
SM-13	170	8	0.034	459	0.48	12	0.27	461	0.48	12	0.27
SM-14	340	10	0.004	461	0.65	12	0.48	463	0.65	12	0.48
SM-15	10	10	0.190	463	0.23	12	0.18	465	0.23	12	0.18
SM-16	84	42	0.008	10405	0.35			10407	0.35		
SM-17	20	42	0.013	10407	0.31			10409	0.31		
SM-18	15	42	0.053	14092	0.25			14094	0.25		
SM-19	138	42	0.003	14094	0.55			14096	0.55		
SM-20	347	42	0.002	14106	0.62			14108	0.62		
SM-21	18	42	0.006	14112	0.45			14114	0.45		
SM-22	10	42	0.030	14114	0.29			14116	0.29		
SM-23	10	42	0.010	14302	0.39			14304	0.39		
SM-24	73	42	0.004	14880	0.52			14882	0.52		

CIP SP-33 (Phase 2)

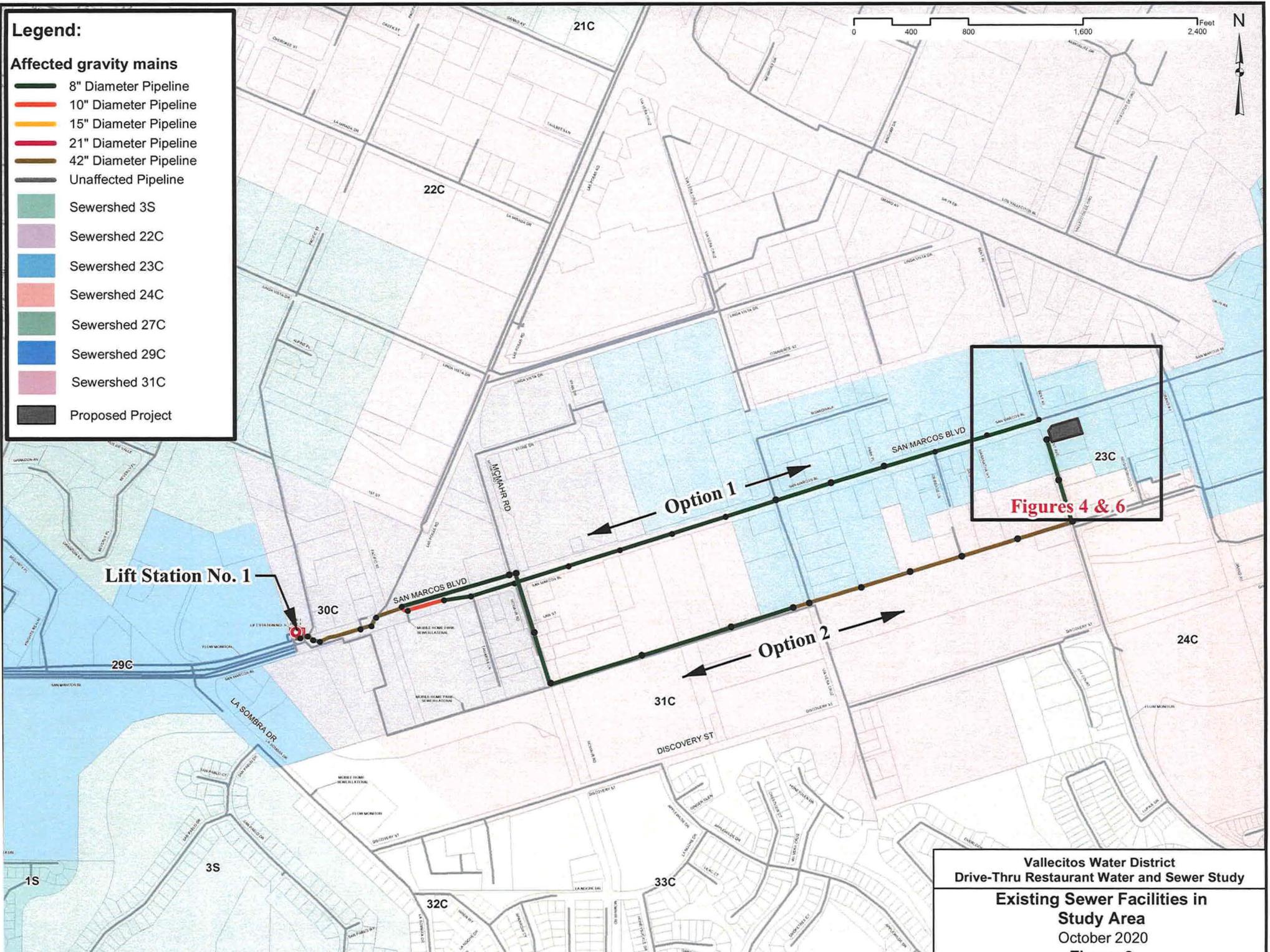
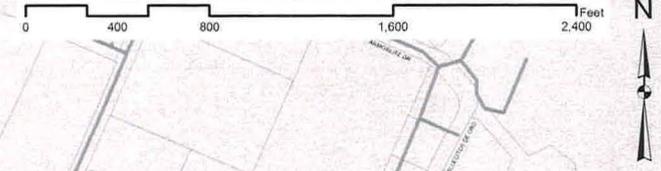
Table 4 - OPTION 2 - Wastewater Model Results and Recommended Gravity Main Improvements

				Wastewater Flows with Existing Density at Project Site				Wastewater Flows with Proposed Project Development			
Pipe ID Number	Length (ft)	Diameter (in)	Slope	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
SM-1A	300	8	0.004	0	0.00			2	0.05		
SM-2A	321	8	0.021	4	0.06			6	0.06		
SM-3A	404	42	0.006	9810	0.37			9812	0.37		
SM-4A	404	42	0.006	9817	0.37			9819	0.37		
SM-5A	368	42	0.003	9824	0.44			9826	0.44		
SM-6A	368	42	0.003	9829	0.44			9831	0.44		
SM-7A	368	42	0.003	9832	0.44			9834	0.44		
SM-8A	120	42	0.002	9858	0.50			9860	0.50		
SM-9A	457	42	0.004	9865	0.41			9867	0.41		
SM-10A	650	42	0.004	9876	0.41			9878	0.41		
SM-11A	677	42	0.004	9885	0.41			9887	0.41		
SM-12A	373	42	0.004	9895	0.41			9897	0.41		
SM-13A	420	42	0.004	9902	0.41			9904	0.41		
SM-14A	20	42	0.001	9905	0.62			9907	0.62		
SM-15A	486	42	0.004	9932	0.41			9934	0.41		
SM-16A	500	42	0.004	9937	0.41			9939	0.41		
SM-17A	84	42	0.008	10405	0.35			10407	0.35		
SM-18A	20	42	0.013	10407	0.31			10409	0.31		
SM-19A	15	42	0.053	14092	0.25			14094	0.25		
SM-20A	138	42	0.003	14094	0.55			14096	0.55		
SM-21A	347	42	0.002	14106	0.62			14108	0.62		
SM-22A	18	42	0.006	14112	0.45			14114	0.45		
SM-23A	10	42	0.030	14114	0.29			14116	0.29		
SM-24A	10	42	0.010	14302	0.39			14304	0.39		
SM-25A	73	42	0.004	14880	0.52			14882	0.52		

Legend:

Affected gravity mains

-  8" Diameter Pipeline
-  10" Diameter Pipeline
-  15" Diameter Pipeline
-  21" Diameter Pipeline
-  42" Diameter Pipeline
-  Unaffected Pipeline
-  Sewershed 3S
-  Sewershed 22C
-  Sewershed 23C
-  Sewershed 24C
-  Sewershed 27C
-  Sewershed 29C
-  Sewershed 31C
-  Proposed Project



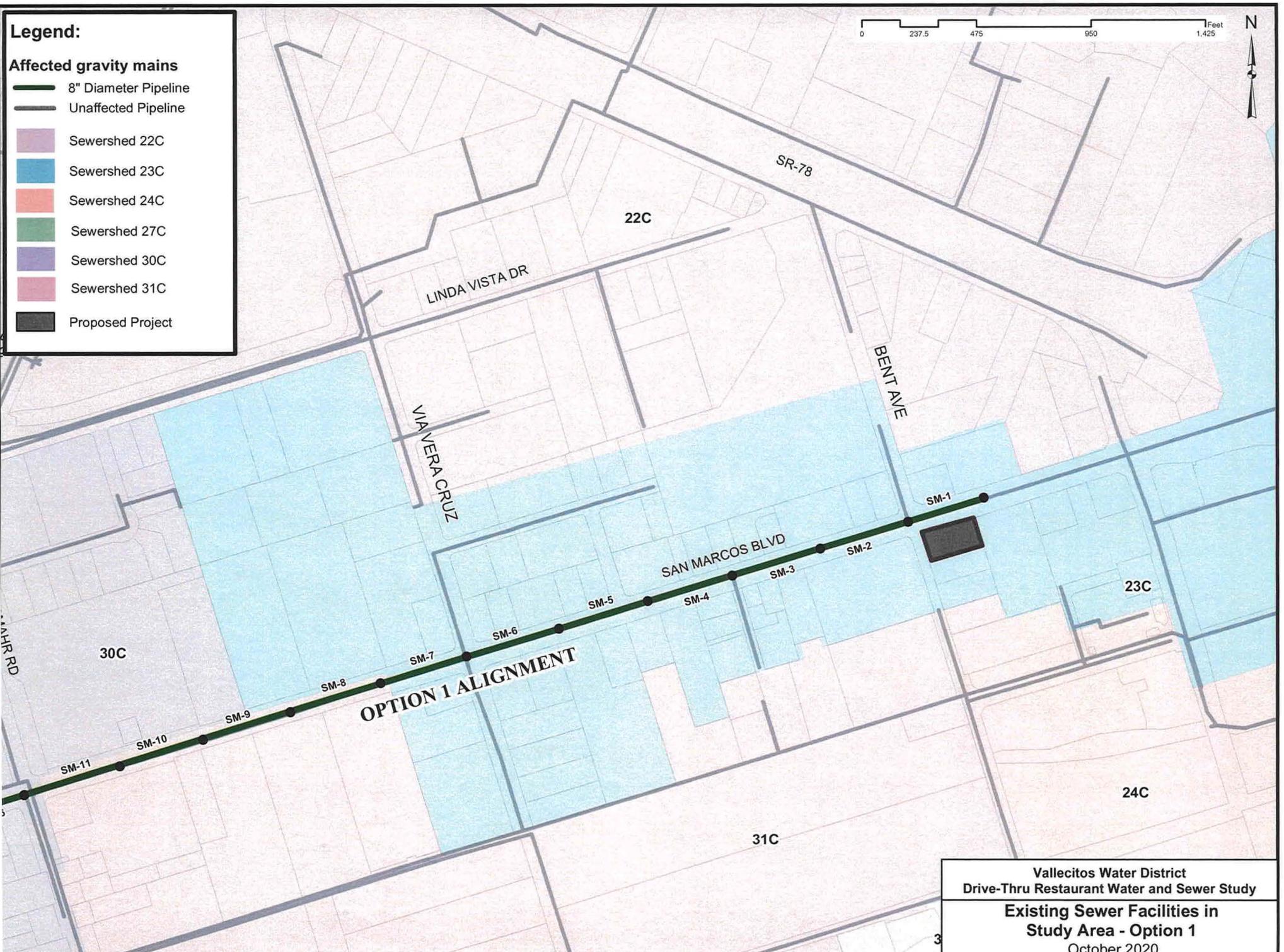
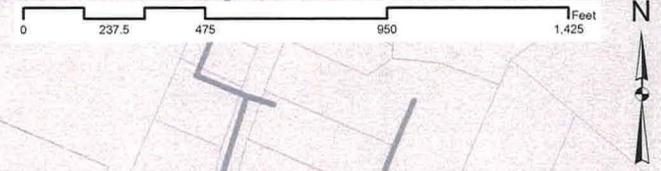
Figures 4 & 6

Vallecitos Water District
Drive-Thru Restaurant Water and Sewer Study
Existing Sewer Facilities in
Study Area
October 2020
Figure 3

Legend:

Affected gravity mains

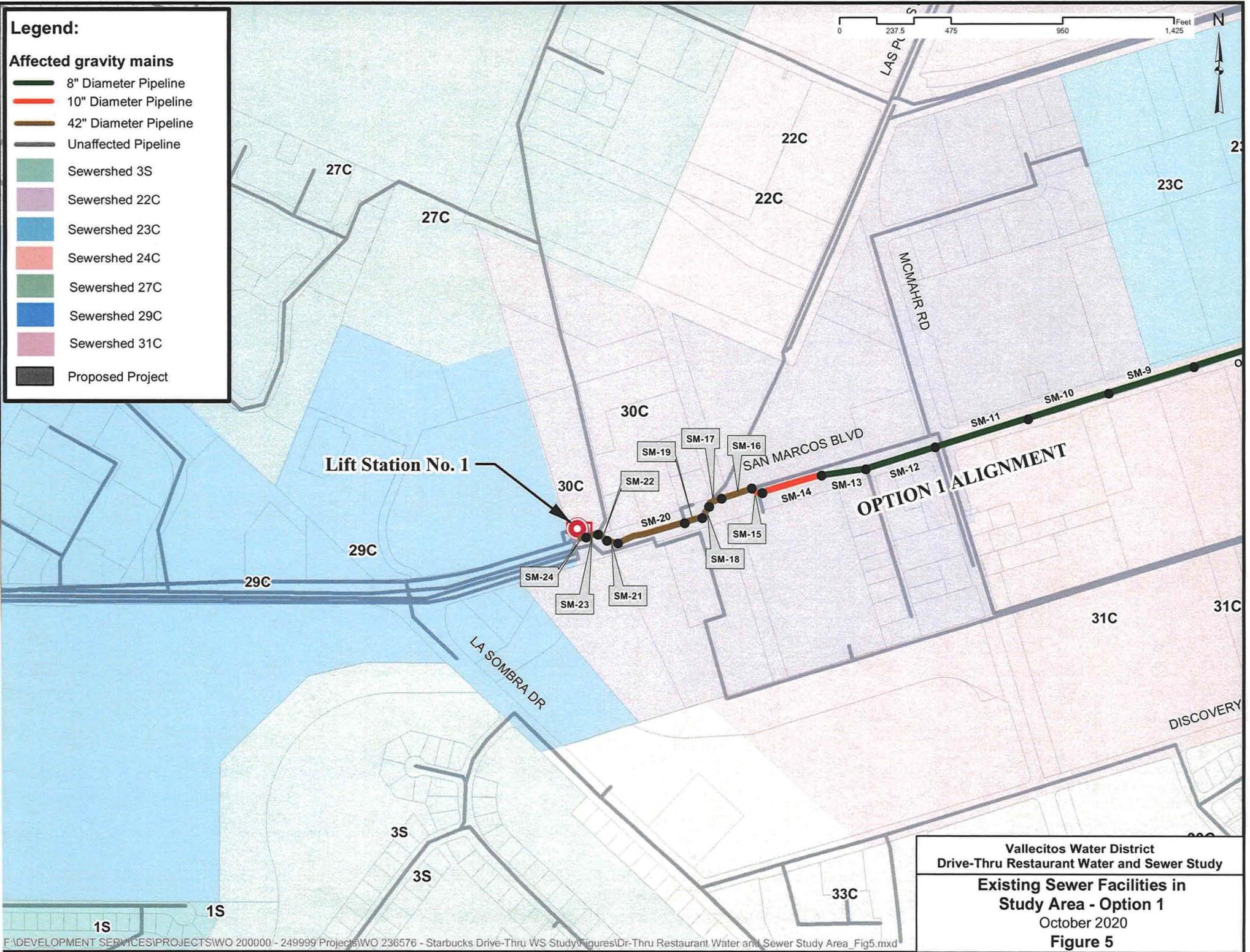
-  8" Diameter Pipeline
-  Unaffected Pipeline
-  Sewershed 22C
-  Sewershed 23C
-  Sewershed 24C
-  Sewershed 27C
-  Sewershed 30C
-  Sewershed 31C
-  Proposed Project



Vallecitos Water District
Drive-Thru Restaurant Water and Sewer Study
**Existing Sewer Facilities in
Study Area - Option 1**
October 2020
Figure 4

Legend:

- 8" Diameter Pipeline
- 10" Diameter Pipeline
- 42" Diameter Pipeline
- Unaffected Pipeline
- Sewershed 3S
- Sewershed 22C
- Sewershed 23C
- Sewershed 24C
- Sewershed 27C
- Sewershed 29C
- Sewershed 31C
- Proposed Project

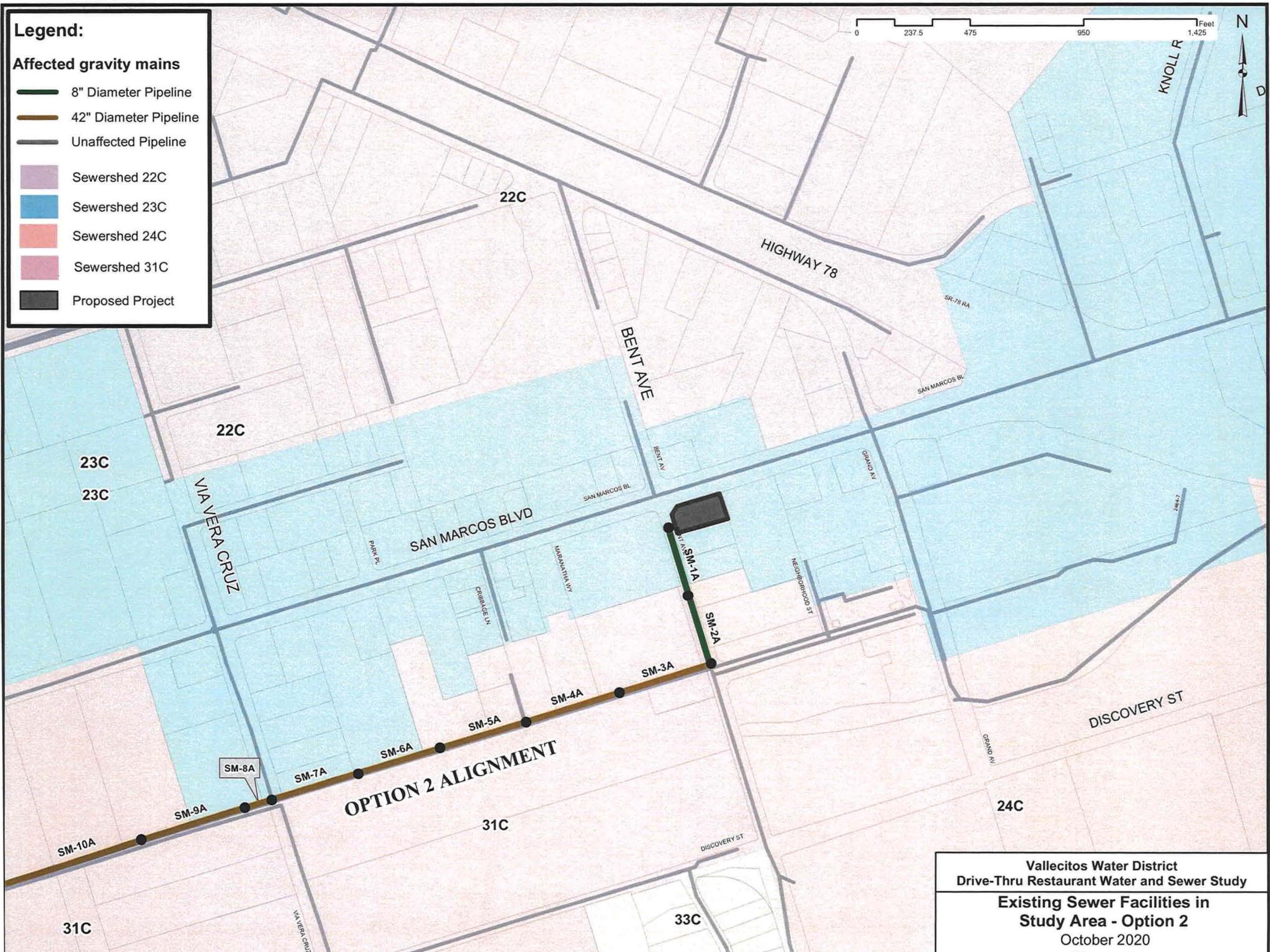
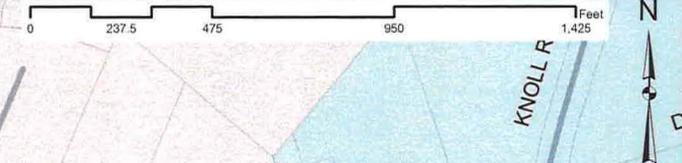


Vallecitos Water District
 Drive-Thru Restaurant Water and Sewer Study
**Existing Sewer Facilities in
 Study Area - Option 1**
 October 2020
Figure 5

Legend:

Affected gravity mains

-  8" Diameter Pipeline
-  42" Diameter Pipeline
-  Unaffected Pipeline
-  Sewershed 22C
-  Sewershed 23C
-  Sewershed 24C
-  Sewershed 31C
-  Proposed Project

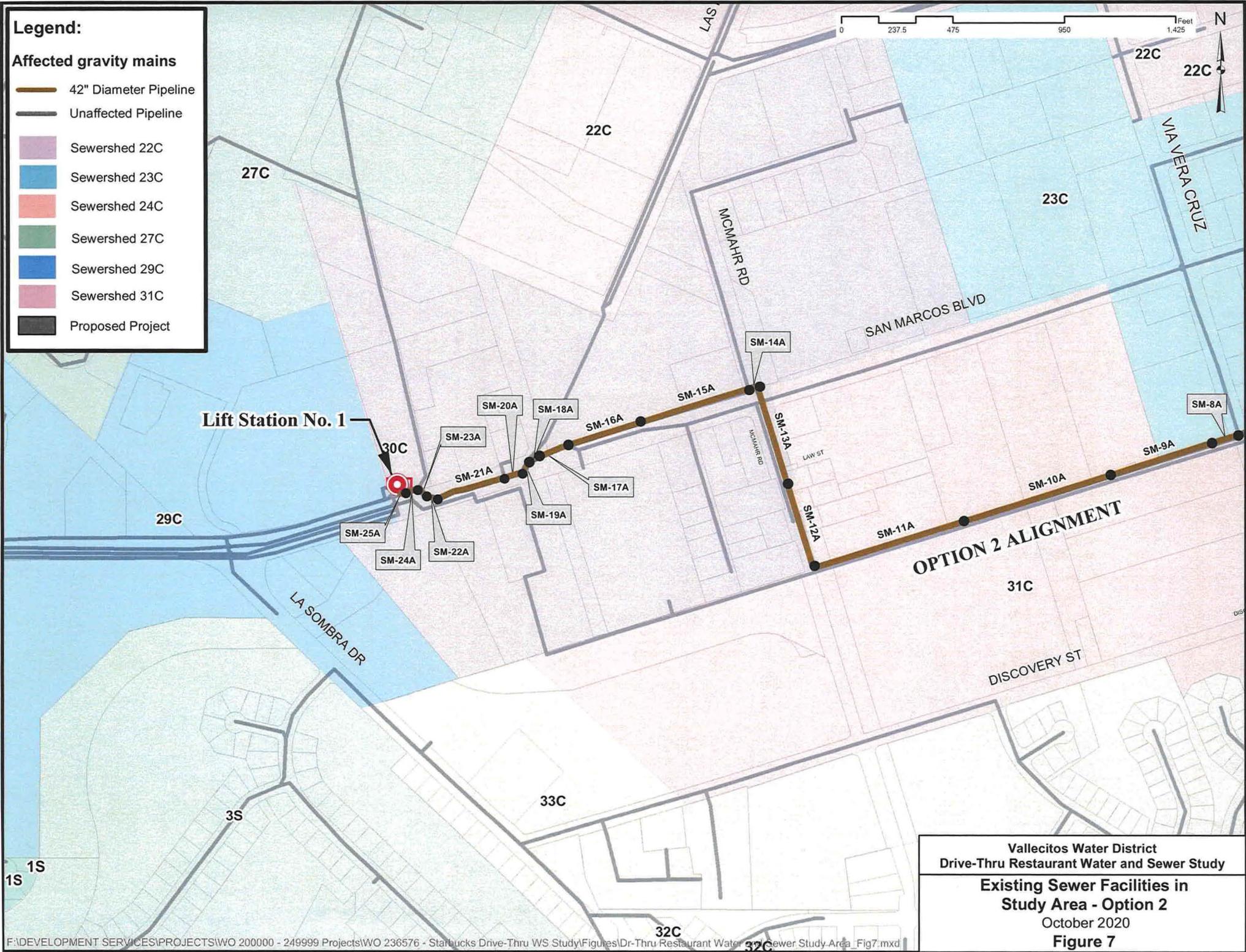
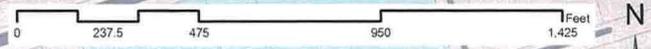


Vallecitos Water District
Drive-Thru Restaurant Water and Sewer Study
Existing Sewer Facilities in
Study Area - Option 2
October 2020
Figure 6

Legend:

Affected gravity mains

-  42" Diameter Pipeline
-  Unaffected Pipeline
-  Sewershed 22C
-  Sewershed 23C
-  Sewershed 24C
-  Sewershed 27C
-  Sewershed 29C
-  Sewershed 31C
-  Proposed Project



Vallecitos Water District
Drive-Thru Restaurant Water and Sewer Study
**Existing Sewer Facilities in
Study Area - Option 2**
October 2020
Figure 7

CONCLUSIONS AND CONDITIONS

The proposed Drive-Thru Restaurant project is not expected to increase average daily water demands over the ultimate demands projected in the 2018 Master Plan. The Project is expected to increase wastewater flow over the ultimate flows projected in the 2018 Master Plan by 466 gallons per day.

The Study concludes that there are deficiencies in the existing sewer facilities under peak wet weather flows during ultimate build-out conditions in the Option 1 alignment. The additional flows from the Project will increase those deficiencies. The following improvements are needed to mitigate those deficiencies:

- Approximately 4,661 feet of existing 8-inch sewer main in San Marcos Boulevard must be replaced with 12-inch main (SM-1 through SM-13).
- Approximately 350 feet of existing 10-inch sewer main in San Marcos Boulevard must be replaced with 12-inch pipe (SM-14 & SM-15).

VWD's 2018 Master Plan has identified pipe segments SM-1 through SM-15 for upsizing from 8-inch to 12-inch as CIP #SP-33. CIP # SP-33 is a Phase 2 project. Phase 2 projects are planned for construction in the 2021-2025 timeframe.

The Study also concludes that there are no deficiencies under peak wet weather flows during ultimate build-out conditions in the Option 2 alignment.

In addition to remedying the above deficiencies, 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 and off-site water and sewer facilities.

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 annexations and 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.

October 30, 2020
Drive-Thru Restaurant
FINAL Water & Sewer Study
Page 15 of 15

Please contact the District with any comments.

Sincerely,

VALLECITOS WATER DISTRICT

A handwritten signature in blue ink, appearing to read "Eileen Koonce". The signature is fluid and cursive, with a long horizontal stroke at the end.

Eileen Koonce
Development Services Coordinator

cc: Robert Scholl, Development Services Senior Engineer
Project File