APPENDIX M

Public Sewer System Analysis

DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

PUBLIC SEWER SYSTEM ANALYSIS FOR THE ALTA OCEANSIDE PROJECT IN THE CITY OF OCEANSIDE

September 3, 2019

2234 FARADAY AVENUE • CARLSBAD, CA • (760) 438-4422

PUBLIC SEWER SYSTEM ANALYSIS
FOR THE
ALTA OCEANSIDE PROJECT
IN THE CITY OF OCEANSIDE

September 3, 2019

REGISTERED PROFESSIONAL ENGINEER
ANDREW M. OVEN
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EXP. 03/31/2021
CIVIL
STATE OF CALIFORNIA

9-3-2019

Prepared by:

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Job No. 509-108

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September 3, 2019 509-108

Hunsaker & Associates San Diego, Inc.
9707 Waples Street
San Diego, CA 92121

Attention: Ray Martin, P.E., Vice President

Subject: Public Sewer Study for the Alta Oceanside project in the City of Oceanside

Introduction

This report provides a sewer system analysis for the Alta Oceanside project in the City of Oceanside. The Alta Oceanside project is located in the City of Oceanside on the southwest corner of Costa Pacifica Way and North Coast Highway, just south of the San Luis Rey River. The project is proposing a mixed-use development project that includes ground-level commercial/retail space adjacent to North Coast Highway, residential apartment units with associated parking, open space, and landscaping that incorporates and retains the permanent coastal access path previously granted to the public along Costa Pacifica Way. The site is 5.31 acres near the north end of Oceanside's Downtown District and proposes to construct a private sewer lift station in the southwest corner of the project site.

This property is being done as a density bonus project. It is designated by the City's Redevelopment Plan for commercial and visitor-serving uses (such as hotels), but residential is allowed as part of a mixed-use project. The commercial along North Coast Highway frontage is designed to meet the commercial component for mixed-use, and the residential otherwise allowed by the zoning is a maximum of 43 dwelling units per acre (228 units).

With the density bonus (allowed under both state and city regulations) the resulting density is 58.2 dwelling units per acre – with a total of 309 units. A vicinity map for the project is provided in Figure 1.

Sewer System Design Criteria

The design criteria used for the evaluation of the offsite sewerage system impacts by the Alta Oceanside project are based on Section 3 of the City of Oceanside Design and Construction Manual, revised August 1, 2017.

Sewer Generation Rates. Section 3 of the City of Oceanside Design and Construction Manual, revised August 1, 2017 and *Wastewater Engineering, 5th Edition* by Metcalf & Eddy were used to develop average sewer flow for the Alta Oceanside Project.

Daily sewer generation rates based on land use are identified in the City's Design and Construction Manual. These values will be used to analyze the impact of the project's wastewater generation. The sewer generation rates for the residential portion of the Alta Oceanside project and the surrounding area are presented in Table 1.

TABLE 1
CITY OF OCEANSIDE
SEWER GENERATION RATES

Land Use	Generation Rate
Low Density Residential	170 gpd/DU
Mid Density Residential	140 gpd/DU
Industrial	1,000 gpd/acre
Commercial	1,000 gpd/acre
Hotels	100 gpd/room

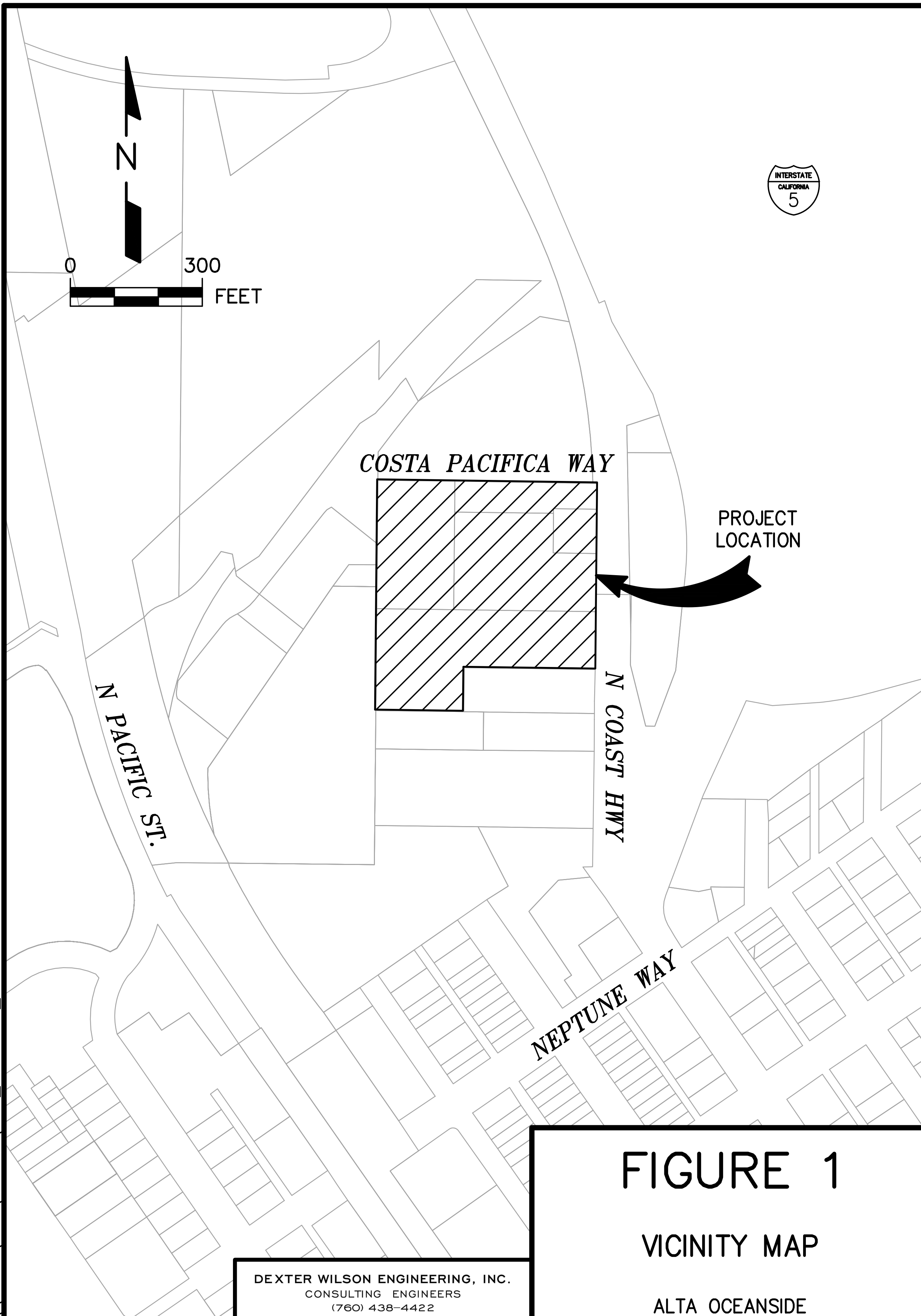

FIGURE 1

VICINITY MAP

ALTA OCEANSIDE

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\\ARTIC\DWG\509108\AOP_FIGURE-1_VICINITY MAP.DWG 05-16-19 16:05:05 LAYOUT: LAYOUT

Average sewer generation rates from *Wastewater Engineering, 5th Edition* by Metcalf & Eddy were used to estimate average sewer flow for the non-residential components of the Alta Oceanside project (Leasing/Mailroom, Yoga/Fitness Room, Club House, Library, Pool Deck, Retail, and Restaurant). Appendix A presents the average sewer generation rates excerpt from *Wastewater Engineering, 5th Edition* by Metcalf & Eddy for reference.

Peaking Factors. To convert average dry weather flow to peak wet weather flow, the peaking factor used for the Alta Oceanside project for this analysis is 4.0 and is found in *Wastewater Engineering, 5th Edition* by Metcalf & Eddy (see Appendix A the peaking factor excerpt). This peaking factor is higher than the maximum peaking factor of 3.5 identified in the City of Oceanside Design & Construction Manual. The higher peaking factor is used for the Alta Oceanside project in part to account for the pumped flow from the proposed project. All other flows influent to the sewer line being analyzed in North Coast Highway are peaked at the City of Oceanside standard peaking factor.

Manning's "n". The gravity sewer analyses are made using a computer program which uses the Manning Equation for all of its calculations. The Manning=s An@ used by the computer program is held as a constant for all depths in a circular conduit. The value of Manning=s An@ used for this study is 0.013 which corresponds with the recommended value in the City's design manual. For the 8-inch diameter VCP sections of gravity sewer in North Coast Highway an "n" value of 0.015 is used per a memorandum from the City's Water Utilities Department dated August 22, 2012. A copy of this memorandum is attached as Appendix B.

Depth and Velocity of Flow in Gravity Sewers. Gravity sewer lines are designed to convey peak wet weather flow. Pipes that are 10-inches in diameter and smaller are designed to convey this flow with a maximum depth-to-diameter (d/D) ratio of 0.50. Pipes that are 12-inches and larger in diameter are designed for a maximum d/D ratio of 0.67. Gravity sewer lines are designed to maintain a minimum velocity of 2.0 feet per second at peak flow to prevent the deposition of solids.

Estimated Sewer Flows for the Alta Oceanside Project

Based on the sewage generation factors presented in Table 1 and in the Metcalf and Eddy excerpts included in Appendix A, the estimated average sewer generation for the project is calculated in Table 2.

TABLE 2
ALTA OCEANSIDE
ESTIMATED AVERAGE SEWER FLOW

Land Use	Land Use Description	Sewer Generation Factor	Assumed Units	Average Sewer Flow, gpd
Residential	Mid Density	140 gpd/EDU[1]	309	43,260
Leasing/Mailroom	Office	12 gpd/employee[2]	4	48
Yoga/Fitness	Public Lavatory	3.8 gpd/user[2]	40	152
Club House	Public Lavatory	3.8 gpd/user[2]	20	76
Library	Office	12 gpd/employee[2]	3	36
Pool Deck	Public Lavatory	3.8 gpd/user[2]	20	76
Retail	Shopping Center	10 gpd/employee[2]	5	50
Restaurant	Restaurant Conventional	8 gpd/customer[2]	600	4,800
	Shopping Center	10 gpd/employee[2]	12	120
TOTAL				**48,618**

1. Source for Sewer Generation Factor - City of Oceanside Sewer Design Guidelines, 2017
2. Source for Sewer Generation Factor - Wastewater Engineering, 5th Edition, Metcalf & Eddy

As previously mentioned, a peaking factor of 4.0 is used for this analysis. Thus, the peak sewage flow for the Alta Oceanside project is 194,472 gpd (135 gpm).

Existing Sewer System and Sewer Service

Figure 2 presents a schematic of the existing public sewer system in the vicinity of the project. As shown on Figure 2, the existing public sewer system consists of two 8-inch diameter sewer lines in North Coast Highway along the property frontage: the West Sewer and the East Sewer.

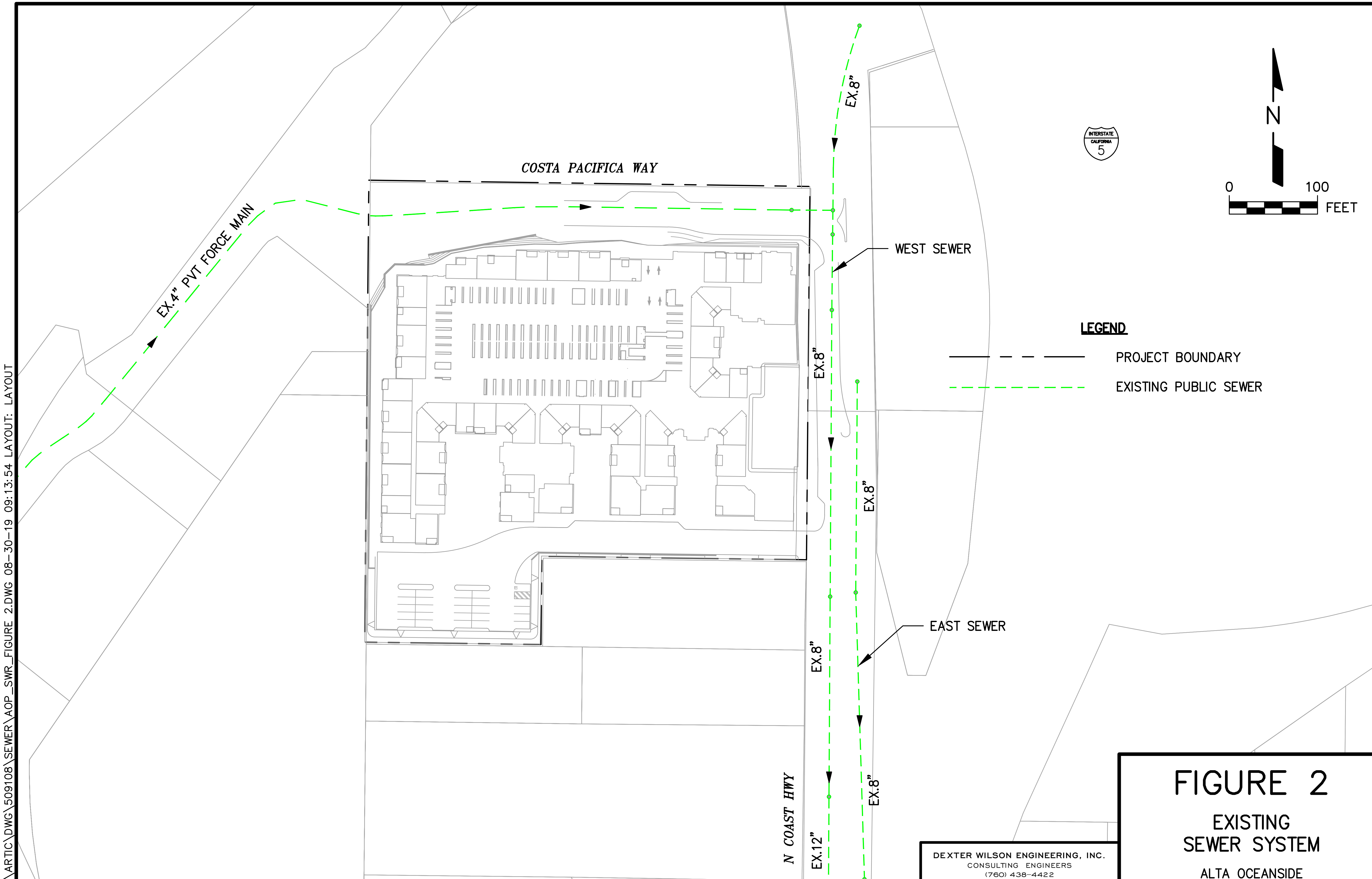

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FIGURE 2

EXISTING SEWER SYSTEM

ALTA OCEANSIDE

Both sewer lines convey flow south to Neptune Way where they join at a common manhole and continue west in a single sewer to Cleveland Street. Several sections of the West Sewer and the sewer line in Neptune Way were upsized to 12-inch with development of the Renaissance Terrace and Harbor View projects.

Preliminary calculations determined the East Sewer does not have sufficient capacity to serve the entire Alta Oceanside project. This study analyzes the West Sewer in North Coast Highway and the sewer line in Neptune Way to the manhole at the intersection of Cleveland Street and Neptune Way. Exhibit A at the back of this report identifies the existing sewer lines analyzed in this study.

Exhibit A also identifies the tributary boundary of the study area. To determine existing sewer flows from the study area, land use data for each of the outlined areas was obtained (quantity of residential units, quantity of hotel rooms, etc.) and converted to average projected sewage flows based on the sewer generation factors presented in Table 1. Appendix C provides a summary of the existing sewer flow projections for the study area.

Proposed Sewer Facilities

Figure 3 presents a schematic of the proposed sewer system for the Alta Oceanside project.

Proposed improvements to the existing public sewer system include constructing a new manhole near the southeast corner of the project and upgrading sections of 8-inch sewer to 12-inch sewer in North Coast Highway. In addition to these improvements, a new sewer lateral connection will be made to the existing 8-inch sewer in North Coast Highway to serve the proposed food service establishments onsite.

All onsite sewer facilities for the project are proposed to be private. As shown in Table 2, the projected average flow from the site will be 48,618 gpd and a projected peak flow of 194,472 gpd (135 gpm).

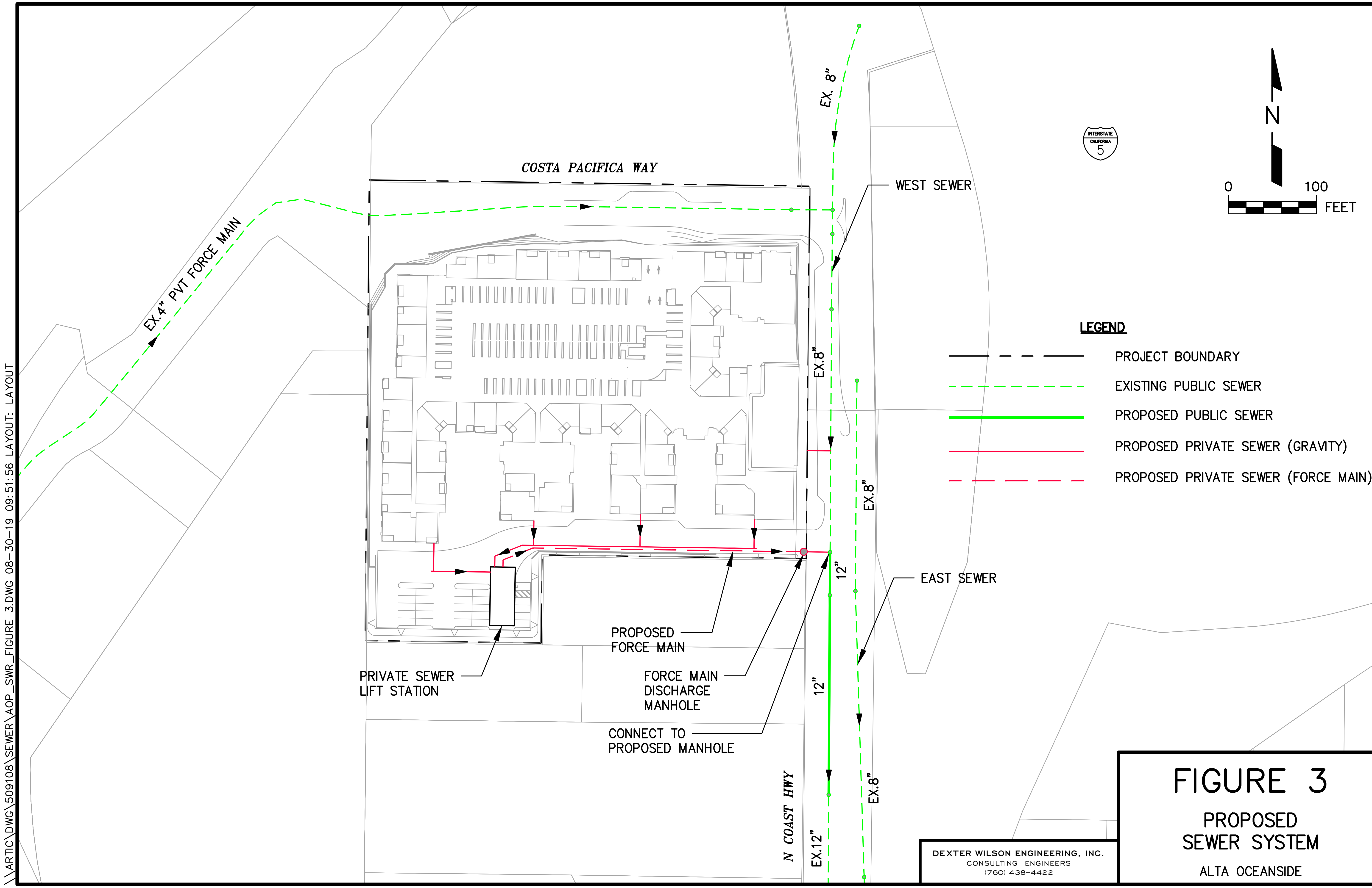
COSTA PACIFICA WAY
EX.4" PVT FORCE MAIN
EX. 8"
WEST SEWER
EX.8"
EX.8"
12"
12"
EAST SEWER
EX.8"
EX.12"
N COAST HWY
PROPOSED FORCE MAIN
FORCE MAIN DISCHARGE MANHOLE
CONNECT TO PROPOSED MANHOLE
PRIVATE SEWER LIFT STATION
N
0
100
FEET
LEGEND
PROJECT BOUNDARY
EXISTING PUBLIC SEWER
PROPOSED PUBLIC SEWER
PROPOSED PRIVATE SEWER (GRAVITY)
PROPOSED PRIVATE SEWER (FORCE MAIN)
\\ARTIC\DWG\509108\SEWER\AOP_SWR_FIGURE 3.DWG 08-30-19 09:51:56 LAYOUT: LAYOUT
DEXTER WILSON ENGINEERING, INC.
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FIGURE 3
PROPOSED SEWER SYSTEM
ALTA OCEANSIDE

A private onsite sewer lift station is proposed to convey flow to the West Sewer in North Coast Highway as shown in Figure 3. A safety factor of 1.25 was used to estimate the pumping capacity for the private lift station. This safety factor takes into account the loss of efficiency in the pump due to mechanical wear over time, and increases in force main friction loss due to the deposition of solids and grit. Applying a safety factor of 1.25 results in a pump capacity of 243,090 gpd or 169 gpm. This value was rounded up to 170 gpm for analysis purposes.

The private sewer lift station is proposed to be located at the south end of the project. The below-grade facilities such as the wet well, valve vault, and emergency storage vault will be located below the proposed parking area. The electrical power panel and pump control panel can be installed above ground behind the curb to the north of the handicapped parking stall at the northeast corner of the parking area.

Based on a pumping capacity of 170 gpm, a 4-inch private sewer force main is proposed to be extended east in the access driveway to a new force main discharge manhole within the property. From this new manhole will extend a gravity sewer lateral to be connected to a proposed manhole on the West Sewer near the southeast corner of the property as shown on Figure 3.

Detailed design calculations and improvement plans for the private lift station will be prepared for review and approval by the Water Utilities Department and Building Department as part of the building plan preparation process.

Sewer System Analysis

To analyze the impact of the Alta Oceanside project on the existing sewer system, a sewer system analysis was conducted. The system was analyzed under existing flow conditions and under existing flows plus the development of the project and private lift station. The existing flows were obtained from the projections in Appendix C and additional flows from the development of the property were based on a pumped flow of 170 gpm.

The analysis of the existing sewer system under existing flows is provided in Appendix D and the analysis for the existing sewer system under existing plus proposed flows is presented in Appendix E. Exhibit A presents the Manhole Diagram for the existing sewer analyses, the sub-basin locations and boundaries by manhole within the analyzed area, and the public sewer system downstream of the project.

The As-Builts included in Appendix F were utilized to determine the sizes and slopes of the sewer lines analyzed in this study. The City of Oceanside does not have complete record drawings of the sewer line in North Coast Highway, with the exception of the sections that were upgraded to 12-inch. Sewer slopes for other reaches of pipe were based on the memorandum from the City of Oceanside Water Utilities Department provided in Appendix B.

The results of the analysis indicate that the maximum depth-to-diameter (d/D) ratio downstream of the Alta Oceanside project is 0.33 under existing peak flow conditions. This occurs in an 8-inch sewer reach in North Coast Highway (Manhole 12 to Manhole 10 on Exhibit A). Under existing plus project flows, the maximum d/D ratio in the same sewer reach will increase to 0.73 which exceeds the maximum allowable depth-to-diameter ratio of 0.5 for an 8-inch sewer. Downstream of this sewer reach, the maximum d/D does not exceed City of Oceanside design criteria.

Improvements to the existing public sewer system will be required to accommodate proposed project flows. As previously mentioned, a new public manhole will be constructed in the West Sewer near the southeast corner of the project. Exhibit B presents the Manhole Diagram for the proposed sewer system. In order to accommodate project flows, a 12-inch sewer will be required from the new public manhole (Manhole 13 on Exhibit B) to Manhole 10.

Upsizing the 8-inch sewer reach from Manhole 13 to Manhole 10 to a 12-inch sewer will result in a maximum d/D of 0.38 in the proposed sewer at project buildout. Appendix G includes the analysis for existing plus proposed flows with the proposed public improvements. The length of the sewer reach to be upsized is approximately 275 linear feet.

Conclusions

The following conclusions have been made related to providing sewer service to the Alta Oceanside property.

1. The Alta Oceanside project will receive sewer service from the City of Oceanside.

2. The proposed sewer system for the Alta Oceanside project is presented in Figure 3.

3. The project will construct a private onsite sewer system that includes a private sewer lift station with a force main designed to convey an estimated pumped flow of 170 gpm.

4. The proposed force main will convey flow to a discharge manhole within the property limits. From this new manhole will extend a gravity sewer lateral to be connected to the proposed manhole on the West Sewer near the southeast corner of the property as shown on Figure 3.

5. Existing sewer system analyses were conducted (Appendix D and Appendix E) and the results indicate that the maximum depth-to-diameter ratio that is expected to occur in the existing 8-inch West Sewer is 0.73 during peak flow conditions including the pumped flow from the Alta Oceanside project which exceeds the maximum allowable depth-to-diameter ratio of 0.5 for an 8-inch sewer.

6. Approximately 275 linear feet of 8-inch sewer will need to be upsized to 12-inch sewer to accommodate the Alta Oceanside project. The results of the proposed sewer system analysis presented in Appendix G indicate that the maximum depth-to-diameter ratio that is expected to occur in the proposed 12-inch sewer is d/D = 0.38 for build-out flows from the sewer service area.

Thank you for the opportunity to provide assistance on this project. If you have any questions about the analysis or conclusions of this study, please let us know.

Dexter Wilson Engineering, Inc.

Andrew Oven, P.E.

AO:FF:sc

Attachments

APPENDIX A

SEWER GENERATION FACTORS AND PEAKING FACTORS FROM *WASTEWATER ENGINEERING, 5TH EDITION* BY METCALF AND EDDY

Table 3-3

Typical wastewater flowrates from commercial sources in the United States[a]

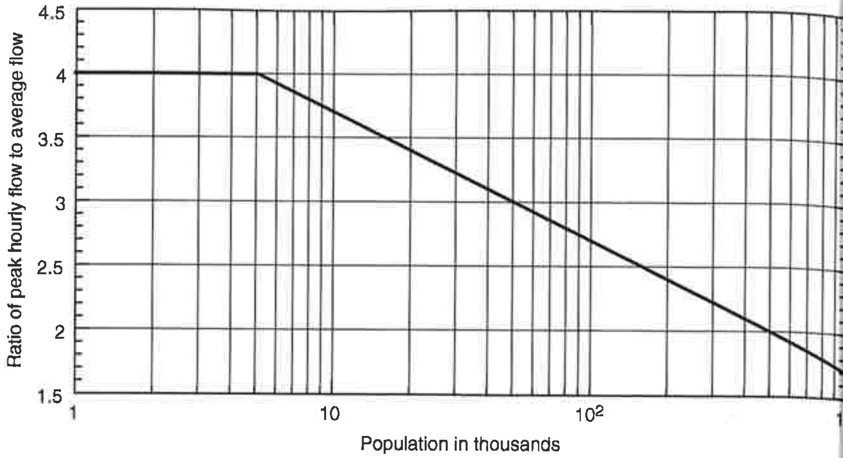
Source	Unit	Flowrate, gal/unit·d		Flowrate, L/un	
		Range	Typical	Range	T
Airport	Passenger	2.4–3.8	3	9–14	
Apartment	Person	32–45	38	120–170	
Automobile service station	Vehicle served	6–11	8	23–42	
	Employee	7–11	10	26–42	
Bar/cocktail lounge	Seat	8–15	11	30–57	
	Employee	8–12	10	30–45	
Boarding house	Person	20–45	30	76–170	
Conference center	Person	5–8	6	20–30	
Department store	Toilet room	280–450	300	1000–1700	
	Employee	6–11	8	23–42	
Hotel	Guest	52–56	53	200–215	
	Employee	6–11	8	23–42	
Industrial building (sanitary waste only)	Employee	12–26	15	45–98	
Laundry (self-service)	Machine	320–413	338	1210–1560	
	Load	36–41	38	136–155	
Mobile home park	Unit	100–113	105	380–430	
Motel (with kitchen)	Guest	36–60	38	135–230	
Motel (without kitchen)	Guest	32–53	34	120–200	
Office	Employee	6–12	10	23–45	
Public lavatory	User	2.4–3.8	3	9–14	
Restaurant:					
Conventional	Customer	6–8	6	23–30	
With bar/cocktail lounge	Customer	6–9	7	23–34	
Shopping center	Employee	6–10	8	23–38	
	Parking space	0.8–2.3	1.5	3–9	
Theater (Indoor)	Seat	1.6–3	2.3	6–11	

[a] Adapted in part from Tchobanoglous et al. (2003).

about conservation have installed such devices on their own as a means of reducin consumption. New designs in front-loading clothes washers also offer significant tions in water use, on the order of 50 to 75 percent of older models. A compar residential interior water use (and resulting per capita wastewater flows) is g Table 3–9 for homes with the current levels of conservation and with extensive conserving appliances and fixtures. The potential savings of employing selected efficient devices is illustrated in Example 3–1.

Figure 3-18

Peaking factor curve (ratio of peak hourly to average daily flow).



have long detention times or ample storage. Peaking factors may be developed rate records or based on published curves or data from similar communities.

If flow measurement records are inadequate to establish peaking factors information may be used. Many sources for peaking factor data are availabl state agencies, cities, and special districts that provide wastewater collection an services, and professional publications from national organizations such as the ronment Federation and the American Society of Civil Engineers. (An exam factor curve is given on Fig. 3–18, and it may be used for estimating peak hour from domestic sources.) The curve given on Fig. 3–18 was developed from an records of numerous communities throughout the United States. The curve average residential flowrates, exclusive of infiltration/inflow, and includes sm of commercial flows and industrial wastes.

In developing factors for peak hourly flowrates, the characteristics of th system serving the wastewater treatment plant must be considered carefull ments to or rehabilitation of the collection system may also increase or decreas ing factors. For pumped flows where reliable metering data are not available, f considered include

- Interviews with operators regarding observations of operating conditions
- Review of pumping records (historical data on number of pumps in service a time, if available)
- Operating speed of pumps
- Condition of pumps from maintenance records (unit output will be lower i are worn)

Field testing at pumping stations can also be performed to measure the comb of a simulated historical high flow event. Assistance in performing pump te available from the local energy service provider.

Where flow to the treatment plant is by gravity, the peak flowrate can b based on the following:

- Capacity of the influent sewers
- Investigation of upstream access ports (i.e., manholes) to determine if a high is visible
- Interviews with operating staff and review of any documented field records

APPENDIX B

CITY OF OCEANSIDE WATER UTILITIES DEPARTMENT MEMORANDUM FROM AUGUST 22, 2012

City of Oceanside
Water Utilities Department

MEMORANDUM

DATE: August 22, 2012

TO: Jason Daffom, Acting Water Administration Manager

FROM: Sabrina Dolezal, Assistant Engineer

RE: Sewer Impact Report for Concordia Condominium Project (Hyatt Place Hotel and Condominiums)

BACKGROUND:

The report titled, "Sewer System Analysis for the Concordia Condominium Project" dated June 19, 2012, was submitted to the Water Utilities Department for review and comment on July 12, 2012. This analysis was performed by Dexter Wilson Engineering.

The report was reviewed by the Water Utilities Department and a summary of the findings are shown below.

ANALYSIS:

This sewer study analyzed the collection system from the proposed connection point on North Coast Highway south to the intersection of North Coast Highway and Neptune way and then west along Neptune Way to the intersection of Neptune Way and Cleveland Street. This study evaluated the existing 8-inch VCP sewer main until the transition to 12-inch PVC within Cleveland Street. Below is a list of issues concerning the submitted sewer study that must be corrected before this study is approved.

Review of Sewer Impact Report

1. The acceptable sewer flow rate for a high-rise, multi-family development is 183 gpd/unit. This flow factor was taken from the Cities' Wastewater Master Plan which stipulates 73 gpcd and the average occupancy of multi-family residences is 2.5.

2. With consideration to the age of the infrastructure, a Manning's "n" value should be between to 0.015 or 0.017 for VCP. This pipe has been in service within the City for over 85 years and is considered to be in "fair" condition. The "n" value was pulled from the Wastewater Engineering Collection and Pumping of Wastewater book by Metcalf and Eddy, Inc., Table 2-1.

3. Sewer segments from manholes 10-6 have been upsized with the Renaissance Terrace (now Sea Cliff) development to 12-inch PVC. This information can be found on Improvement Plan R-13837-008. I have enclosed this as-built for your information.

4. Sewer Segment from manhole 4-2 has been upsized with the Harbor View development to 12-inch PVC. This information can be found on Improvement Plan R-13680-008. I have enclosed this as-built for your information.

5. The assumed slopes for the 8-inch VCP sewer main along North Coast Highway are incorrect. From field observation and surveying the following slopes were obtained.

Pipe Section by Mnahole	Main Size (inch)	Slope
16-15*	8	0.0037
15*-~~14~~ 13	8	0.0037
13 ~~14~~-12	8	0.0026
12-10	8	0.0029

*15 was added with Renaissance Terrace

6. The City has never received a copy of the Hyatt Place Condominiums (Hotel and Condo I portion) study dated December 2007 for Guest House Inn. This study is not considered accepted by the City.

7. For this case, both this study and the December 2007 study should be combined and submitted as an entire package, since the City is reviewing the Planning submittal as one complete package.

   a. The development has been required to combine the two private pump stations into one public pump station. This will require a revision to the connection point and the lift station capacity.

   b. Please verify that a 4-inch force main will work with this new scarino.

CONCLUSIONS:

The preliminary findings of this report demonstrate that several segments (segments 14-10) of the existing 8-inch VCP sewer main along North Coast Highway exceed the Cities' d/D limit of 0.5 for mains 10-inch and smaller.

This report must be revised and resubmitted addressing the parameters listed above.

Attachments: R-13680-008
R-13837-008

APPENDIX C

EXISTING FLOW PROJECTIONS

TRIBUTARY BOUNDARY EXISTING SEWER FLOW PROJECTIONS					
Tributary Area	**Discharge Location (M.H. Number)**	**Land Use**	**Quantity (DUs, acres, rooms)**	**Generation Factor**	**Average Sewage Flow GPD**
1	6	Residential	184	140 gpd/DU	25,760
SUBTOTAL AREA 1					**25,760 GPD**
2	6	Commercial	0.3	1,000 gpd/Ac	300
		Hotel	126	100 gpd/room	12,600
		Residential	12	140 gpd/DU	1,680
SUBTOTAL AREA 2					**14,580 GPD**
3[1]	16	Hotel	117	100 gpd/room	11,700
		Commercial	0.1	1,000 gpd/Ac	100
SUBTOTAL AREA 3					**11,800 GPD**
4	13	Commercial	1.4	1,000 gpd/Ac	1,400
SUBTOTAL AREA 4					**1,400 GPD**
5	12	Commercial	1.9	1,000 gpd/Ac	1,900
		Hotel	38	100 gpd/room	3,800
SUBTOTAL AREA 5					**5,700 GPD**
6	10	Hotel	133	100 gpd/unit	13,300
		Residential	11	140 gpd/DU	1,540
SUBTOTAL AREA 6					**14,840 GPD**
7	15	Residential	96	140 gpd/DU	13,440
SUBTOTAL AREA 7					**13,440 GPD**
8	2	Residential	28	140 gpd/DU	3920
SUBTOTAL AREA 8					**3,920 GPD**
9	4	Residential	10	140 gpd/DU	1400
SUBTOTAL AREA 9					**1,400 GPD**
10	8	Hotel	25	100 gpd/room	2,500
	6	Hotel	25	100 gpd/room	2,500
	4	Hotel	11	100 gpd/room	1,100
		Commercial	0.6	1,000 gpd/Ac	600
SUBTOTAL AREA 10					**6,700 GPD**
11	2	Residential	171	140 gpd/DU	23,940
SUBTOTAL AREA 11					**23,940 GPD**
12	14	Commercial	0.5	1,000 gpd/Ac	500
	6	Commercial	1	1,000 gpd/Ac	1,000
SUBTOTAL AREA 12					**1,500 GPD**

1. A new hotel project has been approved for Area 3. Flows reflect proposed development.

APPENDIX D

SEWER SYSTEM ANALYSIS
EXISTING FLOWS ONLY
EXISTING SEWER SYSTEM

9/3/2019 DATE: 8/30/2019

SEWER STUDY SUMMARY

Alta Oceanside - Existing Flows Only, Existing System

Dexter Wilson Engineering, Inc.

JOB NUMBER: 509-108

SHT 1 OF 1

REFER TO PLAN SHEET:

FROM	TO	IN-LINE COM. ACRES	CUMULATIVE COM. ACRES	IN-LINE HOTEL ROOMS	CUMULATIVE HOTEL ROOMS	IN-LINE RES. EDUs	CUMULATIVE RES EDUs	AVG. COMBINED DRY WEATHER FLOW (gpd)	RESIDENTIAL PEAKING FACTOR	RESIDENTIAL PEAK FLOW (gpd)	COMMERCIAL & HOTEL PEAKING FACTOR	COMMERCIAL & HOTEL PEAK FLOW (gpd)	COMBINED PEAK FLOW (DESIGN FLOW) M.G.D.	COMBINED PEAK FLOW (DESIGN FLOW) C.F.S.	LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
17	16	0.1	0.1	117	117	0	0	11,800	3.50	0	2.53	29,908	0.030	0.046	8	0.37	0.033646	0.12000	0.18	0.0961	1.08
16	15	0.0	0.1	0	117	96	96	25,240	3.50	47,040	2.53	29,908	0.077	0.119	8	0.37	0.086566	0.19333	0.29	0.1890	1.42
15	14	0.5	0.6	0	117	0	96	25,740	3.50	47,040	2.53	31,072	0.078	0.121	8	0.37	0.087875	0.20000	0.30	0.1982	1.37
14	12	1.4	2.0	0	117	0	96	27,140	2.75	36,960	2.50	34,311	0.071	0.110	8	0.26	0.095649	0.20667	0.31	0.2074	1.20
12	10	1.9	3.9	38	155	0	96	32,840	2.75	36,960	2.44	47,253	0.084	0.130	8	0.29	0.107012	0.22000	0.33	0.2260	1.30
10	8	0.0	3.9	133	288	11	107	47,680	2.50	37,450	2.34	76,390	0.114	0.176	12	0.05	0.102409	0.32000	0.32	0.2167	0.81
8	6	0.0	3.9	25	313	0	107	50,180	2.50	37,450	2.32	81,747	0.119	0.184	12	0.30	0.043776	0.21000	0.21	0.1199	1.54
6	4	1.3	5.2	151	464	196	303	94,020	2.50	106,050	2.25	116,222	0.222	0.344	8	2.10	0.090966	0.20000	0.30	0.1982	3.90
4	2	0.6	5.8	11	475	10	313	97,120	2.50	109,550	2.25	119,740	0.229	0.355	12	0.73	0.053982	0.23000	0.23	0.1365	2.60

Min Slope
0.05

Max dn/D
0.33

RES. = Residential

COM. = Commercial

Note: 1 Residential Unit = 140 gpd

1 Commercial Acre = 1,000 gpd

1 Hotel Room = 100 gpd

1 K' based on n = 0.013 for M.H. 10-2, and n = 0.015 for M.H. 16-10

2 dn/D using K' in Brater King Table 7-14

3 From Brater King Table 7-4 based on dn/D

APPENDIX E

SEWER SYSTEM ANALYSIS
EXISTING PLUS PROPOSED FLOWS
EXISTING SEWER SYSTEM

9/3/2019 DATE: 8/30/2019

SEWER STUDY SUMMARY

Alta Oceanside - Existing plus Project Flows, Existing System

Dexter Wilson Engineering, Inc.

JOB NUMBER: 509-108

SHT 1 OF 1

REFER TO PLAN SHEET:

FROM	TO	IN-LINE COM. ACRES	CUMULATIVE COM. ACRES	IN-LINE HOTEL ROOMS	CUMULATIVE HOTEL ROOMS	IN-LINE RES. EDUs	CUMULATIVE RES EDUs	AVG. COMBINED DRY WEATHER FLOW (gpd)	RESIDENTIAL		COMMERCIAL & HOTEL		COMBINED PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
									PEAKING FACTOR	PEAK FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	M.G.D.	C.F.S.							
17	16	0.1	0.1	117	117	0	0	11,800	3.50	0	2.53	29,908	0.030	0.046	8	0.37	0.033646	0.12000	0.18	0.0961	1.08
16	15	0.0	0.1	0	117	96	96	25,240	3.50	47,040	2.53	29,908	0.077	0.119	8	0.37	0.086566	0.19333	0.29	0.1890	1.42
15	14	0.5	0.6	0	117	0	96	25,740	3.50	47,040	2.53	31,072	0.078	0.121	8	0.37	0.087875	0.20000	0.30	0.1982	1.37
14	12	0.0	0.6	0	117	0	96	25,740	2.75	36,960	2.53	31,072	0.068	0.105	8	0.26	0.091301	0.20000	0.30	0.1982	1.20
12 *	10	0.0	0.6	38	155	0	96	29,540	2.75	281,760	2.47	39,804	0.322	0.498	8	0.29	0.408622	0.48667	0.73	0.6140	1.82
10	8	0.0	0.6	133	288	11	107	44,380	2.50	282,250	2.36	69,268	0.352	0.544	12	0.05	0.316221	0.61000	0.61	0.5020	1.08
8	6	0.0	0.6	25	313	0	107	46,880	2.50	282,250	2.34	74,669	0.357	0.552	12	0.30	0.131080	0.36000	0.36	0.2546	2.17
6	4	1.3	1.9	151	464	196	303	90,720	2.50	350,850	2.26	109,366	0.460	0.712	8	2.10	0.188346	0.29333	0.44	0.3328	4.81
4	2	0.6	2.5	11	475	10	313	93,820	2.50	354,350	2.26	112,902	0.467	0.723	12	0.73	0.110006	0.33000	0.33	0.2260	3.20

Min Slope
0.05

Max dn/D
0.73

RES. = Residential

COM. = Commercial

Note: 1 Residential Unit = 140 gpd

1 Commercial Acre = 1,000 gpd

1 Hotel Room = 100 gpd

* Proposed Discharge Manhole (170 gpm pump capacity or 244,800 gpd)

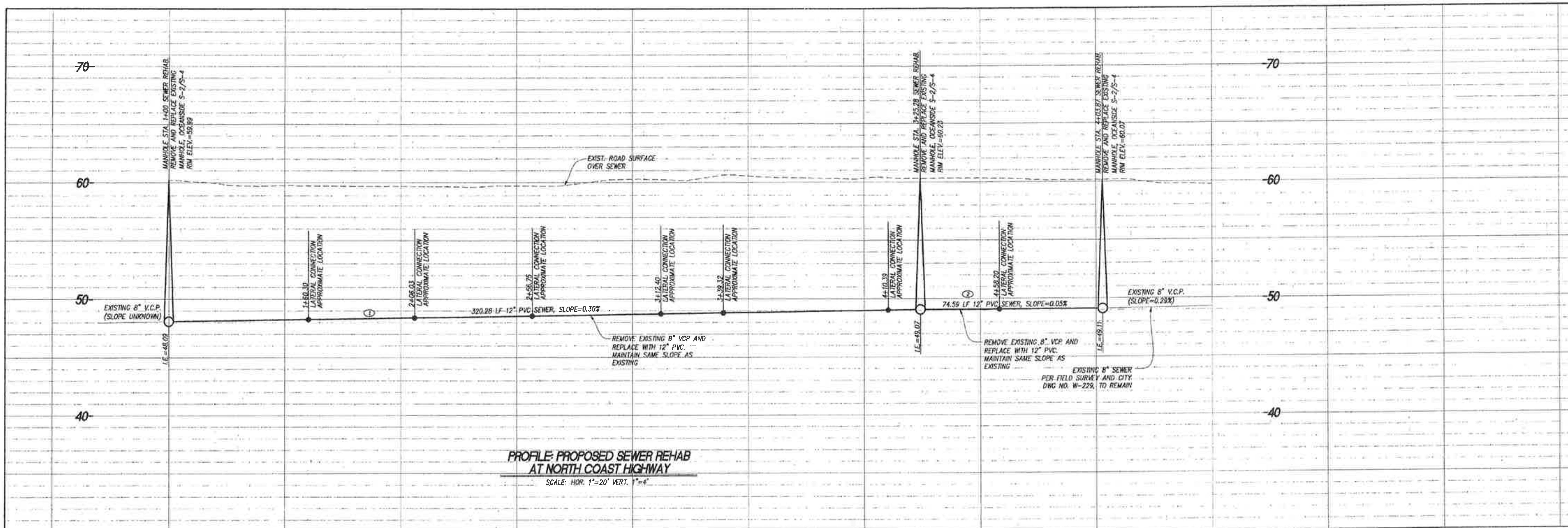
1 K' based on n = 0.013 for M.H. 10-2, and n = 0.015 for M.H. 16-10

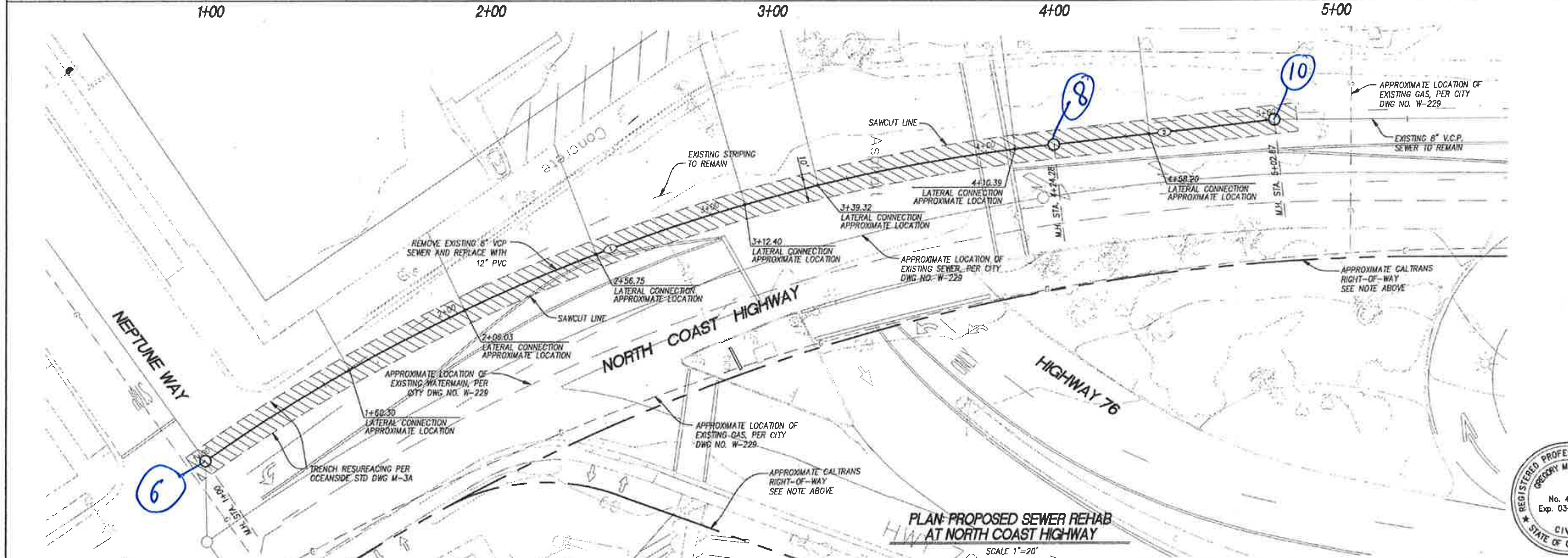
2 dn/D using K' in Brater King Table 7-14

3 From Brater King Table 7-4 based on dn/D

APPENDIX F

AS-BUILT DRAWINGS EXISTING





SEWER DATA – PVC SDR-36 (non-IPS)				
NO.	DELTA OR BRG.	RADIUS(ft)	LENGTH(ft)	REMARKS
1	28°20'54"	647.33	320.28	12" PVC
2	N06°12'44"W	------	74.59	12" PVC

NOTES:

1. TEMPORARY SEWER BYPASS PLAN TO BE SUBMITTED BY CONTRACTOR AND APPROVED BY WATER UTILITIES DEPARTMENT PRIOR TO COMMENCEMENT OF SEWER WORK.
2. LOCATION OF CALTRANS RIGHT-OF-WAY HAS BEEN APPROXIMATED FROM CALTRANS RIGHT-OF-WAY MAP NO. LO 37971.
3. EXISTING SEWER LATERALS TO BE RECONNECTED TO PROPOSED SEWER MAIN, LOCATIONS SHOWN ARE APPROXIMATE.
4. TRAFFIC SIGNAL LOOP DETECTORS TO BE REPAIRED OR REPLACED UPON COMPLETION OF WORK.

WARNING!!
EXISTING HIGH PRESSURE GAS MAIN TO REMAIN IN PLACE

ANY WORK IN SDG&E GAS EASEMENT SHALL BE PER SDG&E NOTES IN GENERAL NOTES (SEE SHEET 2)

0 10 20 40 60
GRAPHICAL SCALE

FILE # T-200-01(1)

REGISTERED PROFESSIONAL ENGINEER GREGORY M. SHIELDS No. 42951 Exp. 03-31-08 CIVIL STATE OF CALIFORNIA

CONSTRUCTION CHANGES:

NO.	DESCRIPTION	APPV'D	DATE
	AS-BUILT K.P. L.C.	SK	7-8-09

BENCHMARK:

Description: CITY OF OCEANSIDE BENCHMARK #F-52
Location: SET BRASS CAP STAMPED "COS BM-F-52" ON TOP OF CURB, WESTERLY P.C. NORTHWESTERLY CURB RETURN OF N. COAST HIGHWAY (HILL STREET) & NEPTUNE WAY (8TH STREET).
Record From:
Elev: 59.172' (1984 ADJUSTED) Datum: M.S.L.

SHEET 8 — CITY OF OCEANSIDE ENGINEERING DEPARTMENT — 14 SHEETS

PUBLIC IMPROVEMENT PLAN FOR:

RENAISSANCE TERRACE

NORTH COAST SEWER REHAB

APPROVED
Peter Weiss 5-3-06
PETER WEISS R.C.E. 43161 DIRECTOR OF PUBLIC WORKS

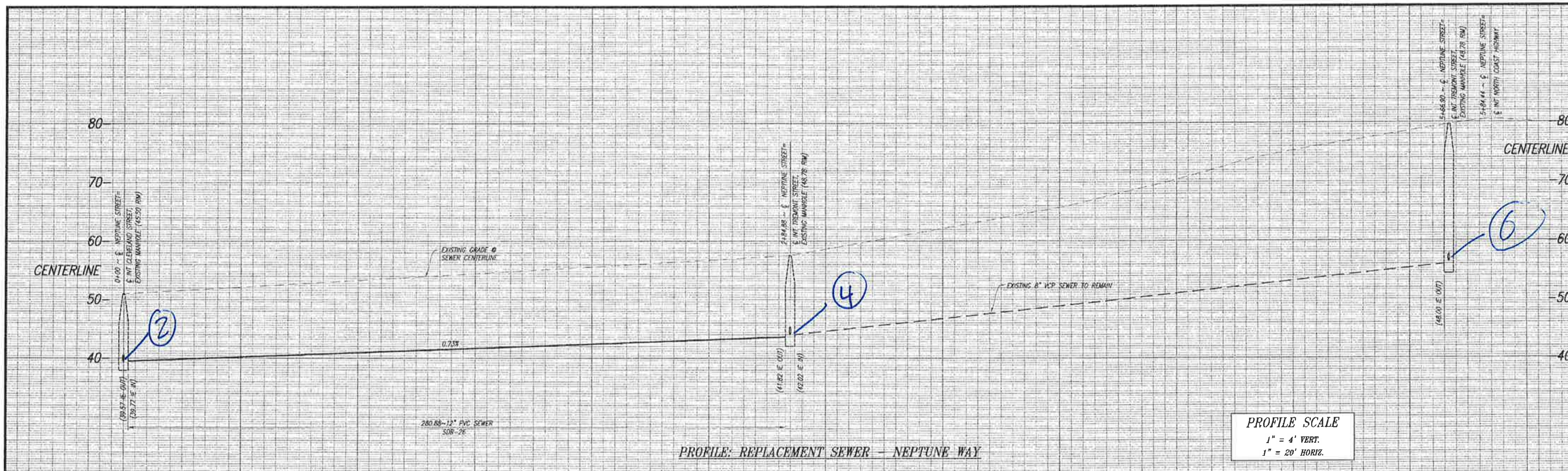
ENGINEER OF WORK
Greg Shields 5-1-06
GREGORY M. SHIELDS R.C.E. 42951

Checked By: ARC
Approval Date:

PLAN NUMBER R13837

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey
701 B Street, Suite 800 San Diego, CA 92101 619.235.6471 Tel 619.234.0349 Fax

P:\3129\ENGR\3129_PLANS\IMP_PUB\3129-P108 (NCH SWR).dwg 5/1/2006 12:14:29 PM PDT

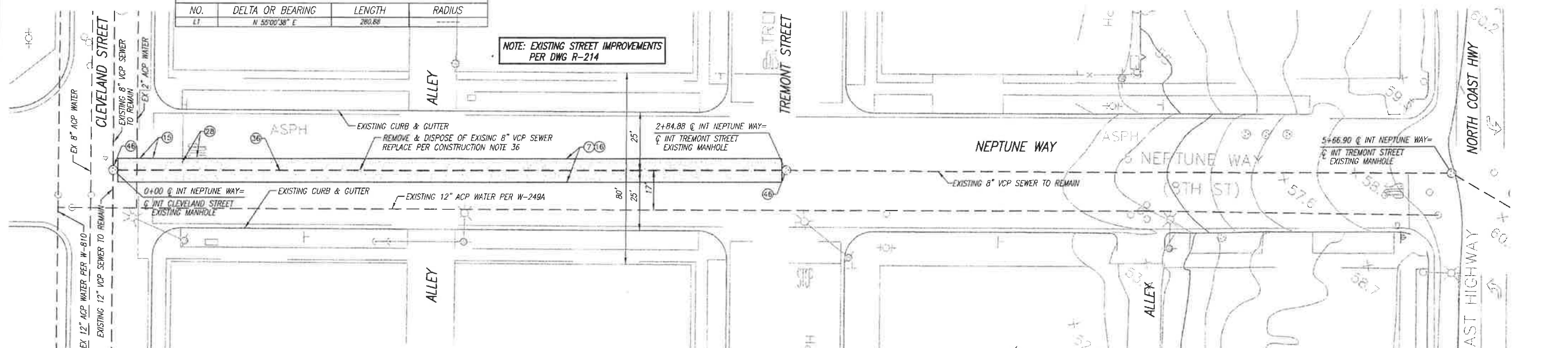


PROFILE SCALE
1" = 4' VERT.
1" = 20' HORIZ.

PROFILE: REPLACEMENT SEWER – NEPTUNE WAY

LINE TABLE			
NO.	DELTA OR BEARING	LENGTH	RADIUS
L1	N 55°00'38" E	280.88	-----

NOTE: EXISTING STREET IMPROVEMENTS PER DWG R-214



PLAN: REPLACEMENT SEWER – NEPTUNE WAY

SCALE: 1"=20'

NOTES:

1. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN AND OBTAIN APPROVAL FROM THE CITY OF OCEANSIDE ENGINEERING DEPARTMENT PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY.
2. THE CONTRACTOR SHALL SUBMIT A TEMPORARY SEWER BY-PASS PLAN AND OBTAIN APPROVAL FROM THE CITY OF OCEANSIDE WATER UTILITIES DEPARTMENT PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY.
3. THE CONTRACTOR SHALL LOCATE ALL EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION. ALL EXISTING IMPROVEMENTS SHALL BE PROTECTED IN PLACE. DAMAGE CAUSED TO EXISTING IMPROVEMENTS BY CONSTRUCTION ACTIVITY SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR, TO THE SATISFACTION OF THE CITY ENGINEER.

SEWER
CONSTRUCTION NOTES

- (7)–SAWCUT & REMOVE EXISTING AC PAVEMENT
- (15)–REMOVE/REPLACE EXISTING PCC CROSS-GUTTER, EQUAL TO EXISTING OR AS APP'D BY THE CITY ENGINEER
- (16)–TRENCH BACKFILL & RESURFACING PER CITY STD M-3A, M-3B & M-3C AS APP'D BY THE CITY ENGINEER
- (28)–REPAIR/REPLACE STRIPING EQUAL TO EXISTING MARK-OUT
- (36)–CONSTRUCT 12" PVC SEWER MAIN, SDR-26
- (46)–BREAK-OUT & REPLACE/RE-CHANNEL NEW MANHOLE BASE FOR 12" PVC SEWER TO SATISFACTION OF CITY INSPECTOR

APPROVED BY WATER UTILITIES DEPARTMENT
[signature] 9/14/04
WATER UTILITIES DIRECTOR DATE

PREPARED IN THE OFFICE OF
BUCCOLA ENGINEERING, inc 760/721-2000
3142 Vista Way, Suite 301, Oceanside, CA 92056

APPROVED CHANGES

No	Description	Approved By	Date
	AS BUILT L.C. K.P.	SK	2-16-10

BENCH MARK
Description: BRASS CAP STAMPED "COS BM F-49" NORTHEASTERLY CORNER BRIDGE AT BACK OF WALK.
Location: 8TH STREET AND I-5 OVERPASS.
PER CITY DATUM BOOK 162-13, EL= 126.365 FEET
Record From: CITY OF OCEANSIDE
Elev: 1984 ADJ EL 126.171 FEET Datum: MSL

REGISTERED PROFESSIONAL ENGINEER PHILIP D. BUCCOLA No 27732 Exp 3-31-06 CIVIL STATE OF CALIFORNIA

T-10-02 D-17-02

SHEET 8 | CITY OF OCEANSIDE ENGINEERING DEPARTMENT | 8 SHEETS

SEWER MAIN REPLACEMENT PLAN
FOR
NEPTUNE WAY FROM TREMONT ST TO CLEVELAND ST

[signature] Approved 9/15/04
MARLA M. DOYLE RCE 35086 DATE City Engineer

ENGINEER OF WORK EXP 3-31-06
[signature] 9-14-04
PHILIP D. BUCCOLA RCE 27732
Checked by
Approval date
R-13680

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APPENDIX G

SEWER SYSTEM ANALYSIS
EXISTING PLUS PROPOSED FLOWS
PROPOSED SEWER SYSTEM

9/3/2019 DATE: 8/30/2019

SEWER STUDY SUMMARY

Alta Oceanside - Existing plus Project Flows, Proposed System

Dexter Wilson Engineering, Inc.

JOB NUMBER: 509-108

SHT 1 OF 1

REFER TO PLAN SHEET:

FROM	TO	IN-LINE COM. ACRES	CUMULATIVE COM. ACRES	IN-LINE HOTEL ROOMS	CUMULATIVE HOTEL ROOMS	IN-LINE RES. EDUs	CUMULATIVE RES EDUs	AVG. COMBINED DRY WEATHER FLOW (gpd)	RESIDENTIAL		COMMERCIAL & HOTEL		COMBINED PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
									PEAKING FACTOR	PEAK FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	M.G.D.	C.F.S.							
17	16	0.1	0.1	117	117	0	0	11,800	3.50	0	2.53	29,908	0.030	0.046	8	0.37	0.033646	0.12000	0.18	0.0961	1.08
16	15	0.0	0.1	0	117	96	96	25,240	3.50	47,040	2.53	29,908	0.077	0.119	8	0.37	0.086566	0.19333	0.29	0.1890	1.42
15	14	0.5	0.6	0	117	0	96	25,740	3.50	47,040	2.53	31,072	0.078	0.121	8	0.37	0.087875	0.20000	0.30	0.1982	1.37
14	13	0.0	0.6	0	117	0	96	25,740	2.75	36,960	2.53	31,072	0.068	0.105	8	0.26	0.091301	0.20000	0.30	0.1982	1.20
13 **	12	0.0	0.6	0	117	0	96	25,740	2.75	281,760	2.53	31,072	0.313	0.484	12	0.26	0.142397	0.38000	0.38	0.2739	1.77
12	10	0.0	0.6	38	155	0	96	29,540	2.75	281,760	2.47	39,804	0.322	0.498	12	0.29	0.138594	0.38000	0.38	0.2739	1.82
10	8	0.0	0.6	133	288	11	107	44,380	2.50	282,250	2.36	69,268	0.352	0.544	12	0.05	0.316221	0.61000	0.61	0.5020	1.08
8	6	0.0	0.6	25	313	0	107	46,880	2.50	282,250	2.34	74,669	0.357	0.552	12	0.30	0.131080	0.36000	0.36	0.2546	2.17
6	4	1.3	1.9	151	464	196	303	90,720	2.50	350,850	2.26	109,366	0.460	0.712	8	2.10	0.188346	0.29333	0.44	0.3328	4.81
4	2	0.6	2.5	11	475	10	313	93,820	2.50	354,350	2.26	112,902	0.467	0.723	12	0.73	0.110006	0.33000	0.33	0.2260	3.20

Min Slope
0.05

Max dn/D
0.61

RES. = Residential

COM. = Commercial

Note: 1 Residential Unit = 140 gpd

1 Commercial Acre = 1,000 gpd

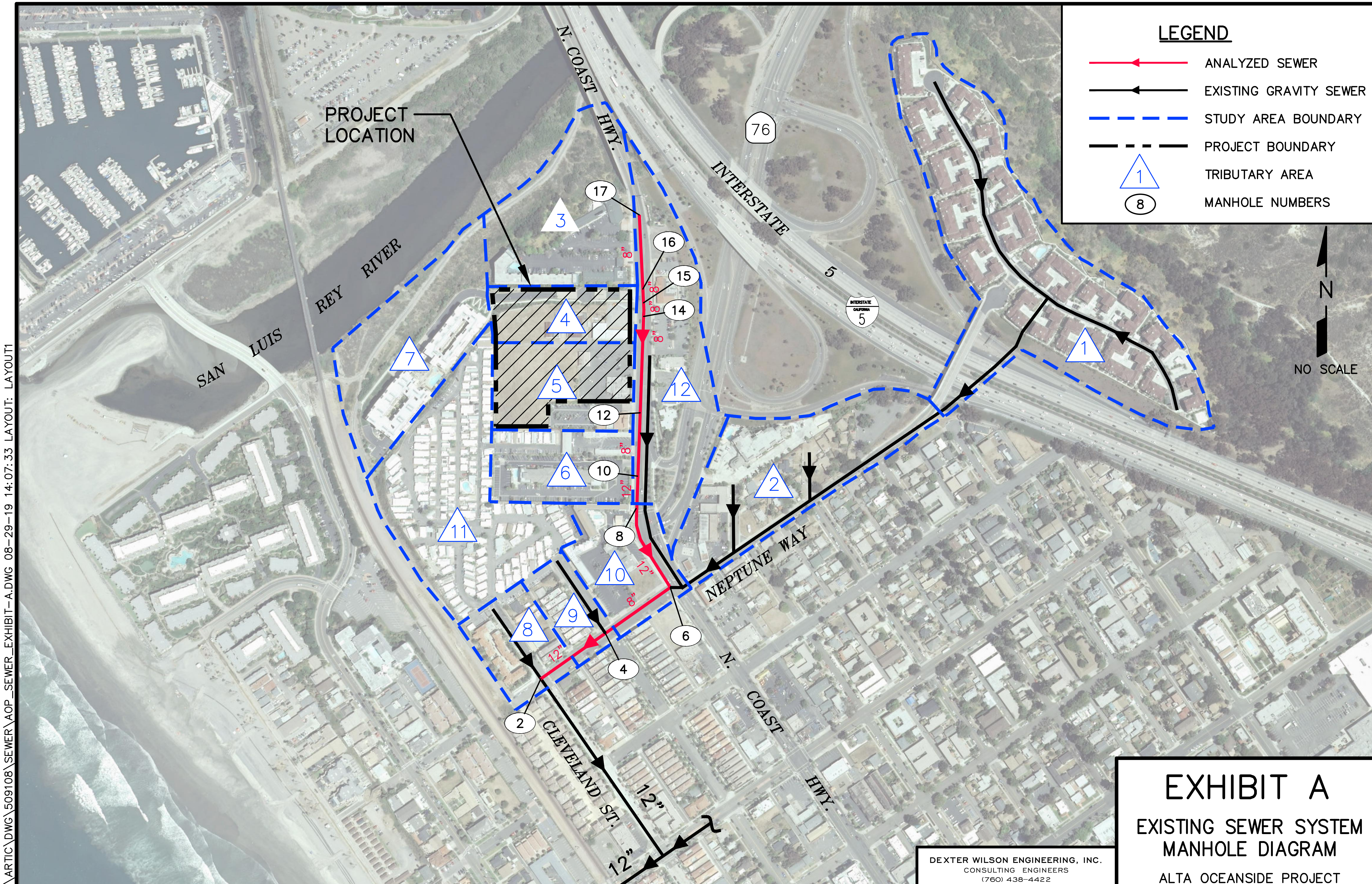
1 Hotel Room = 100 gpd

* Proposed Discharge Manhole (170 gpm pump capacity or 244,800 gpd)

1 K' based on n = 0.013 for M.H. 10-2, and n = 0.015 for M.H. 16-10

2 dn/D using K' in Brater King Table 7-14

3 From Brater King Table 7-4 based on dn/D



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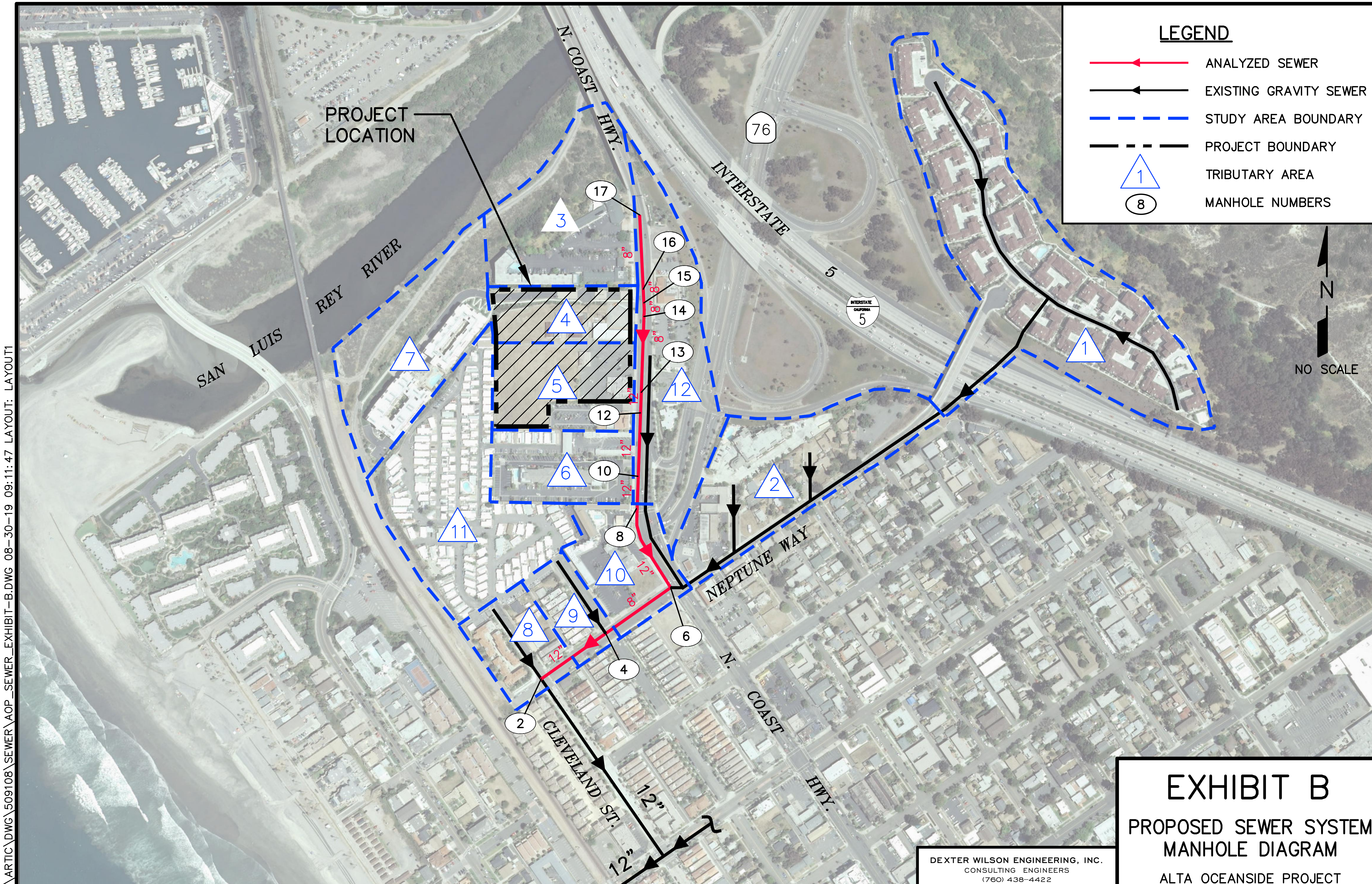

EXHIBIT B

PROPOSED SEWER SYSTEM MANHOLE DIAGRAM

ALTA OCEANSIDE PROJECT

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422

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