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CONSULTING ENGINEERS

SEWER STUDY
FOR THE AMBIENT PROJECT
IN THE CITY OF SAN DIEGO

April 13, 2023

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4-13-2023

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Job No. 574-020

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Attention: Greg Lang, P.E., Principal

Subject: Sewer Study for the Ambient Project in the City of San Diego

Introduction

This report provides a public sewer study for the Ambient project in the City of San Diego. The project proposes 198 multi-family residential units. The 5.92 gross acre project site is located in the Palm City neighborhood of the City along the east side of Hollister Street approximately 1,000 feet north of Palm Avenue. The project site is presently undeveloped.

Topography of the buildable portion of the site is generally flat. The site will be designed to connect to the existing 8-inch gravity sewer line in Hollister Street west of the project site. Figure 1 provides a Vicinity Map for the project and a conceptual site plan is attached as Appendix A.

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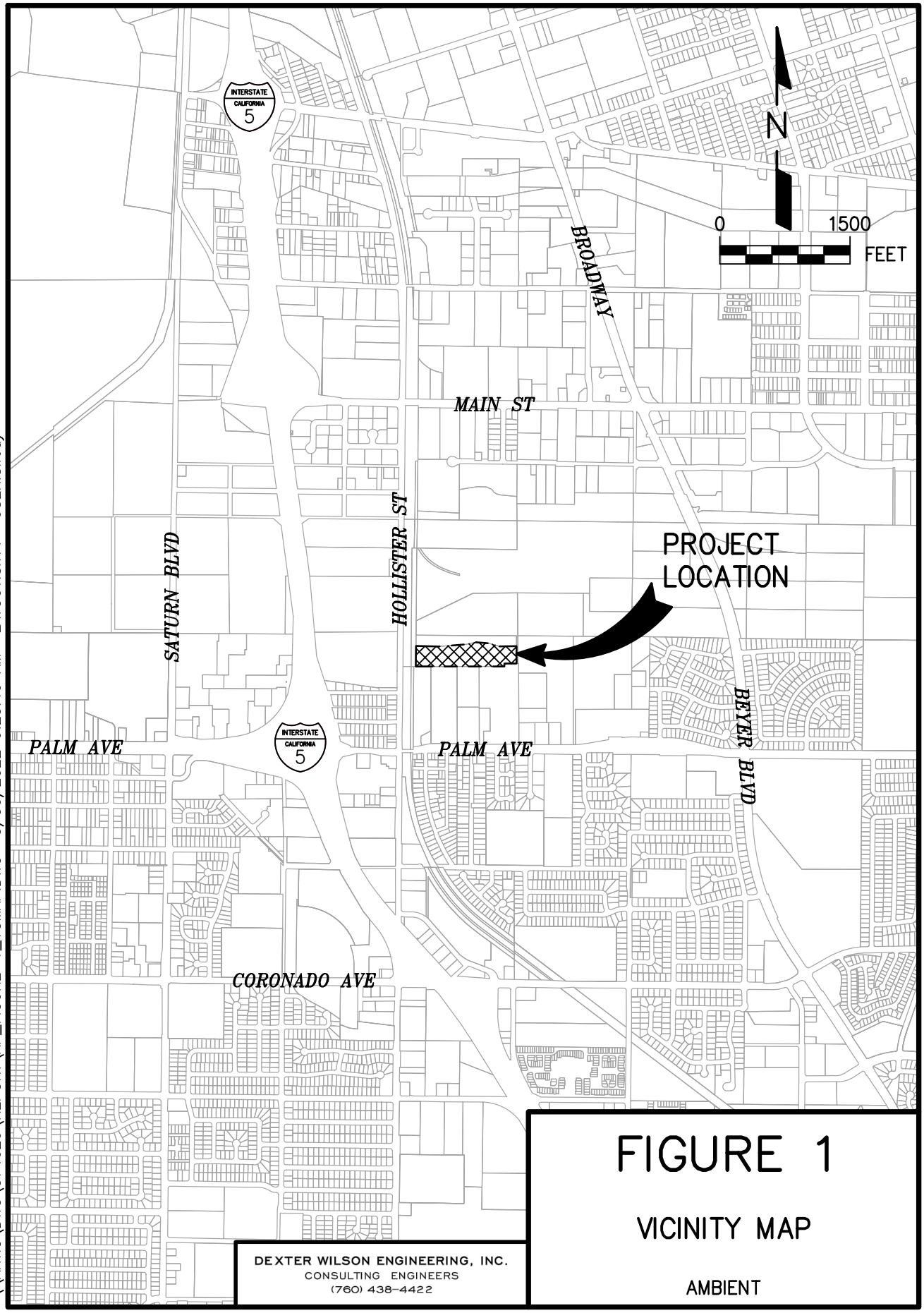

\\ARTIC\DWG\574020\REPORT\AP_FIGURE-1_VCMAP.DWG 3/30/2022 9:23:40 AM LAYOUT:8x11 USER:SirJay

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FIGURE 1

VICINITY MAP

AMBIENT

Purpose of Study

The purpose of this study is to determine if the existing public gravity sewer system is able to provide adequate capacity for the project. This report will address if any offsite (public) sewer system improvements are needed for the development of the project so that the offsite sewer system will be in conformance with the City of San Diego sewer system design standards.

The onsite sewer facilities for the project are proposed to be private. These facilities will be designed in accordance with the City's sewer system design standards.

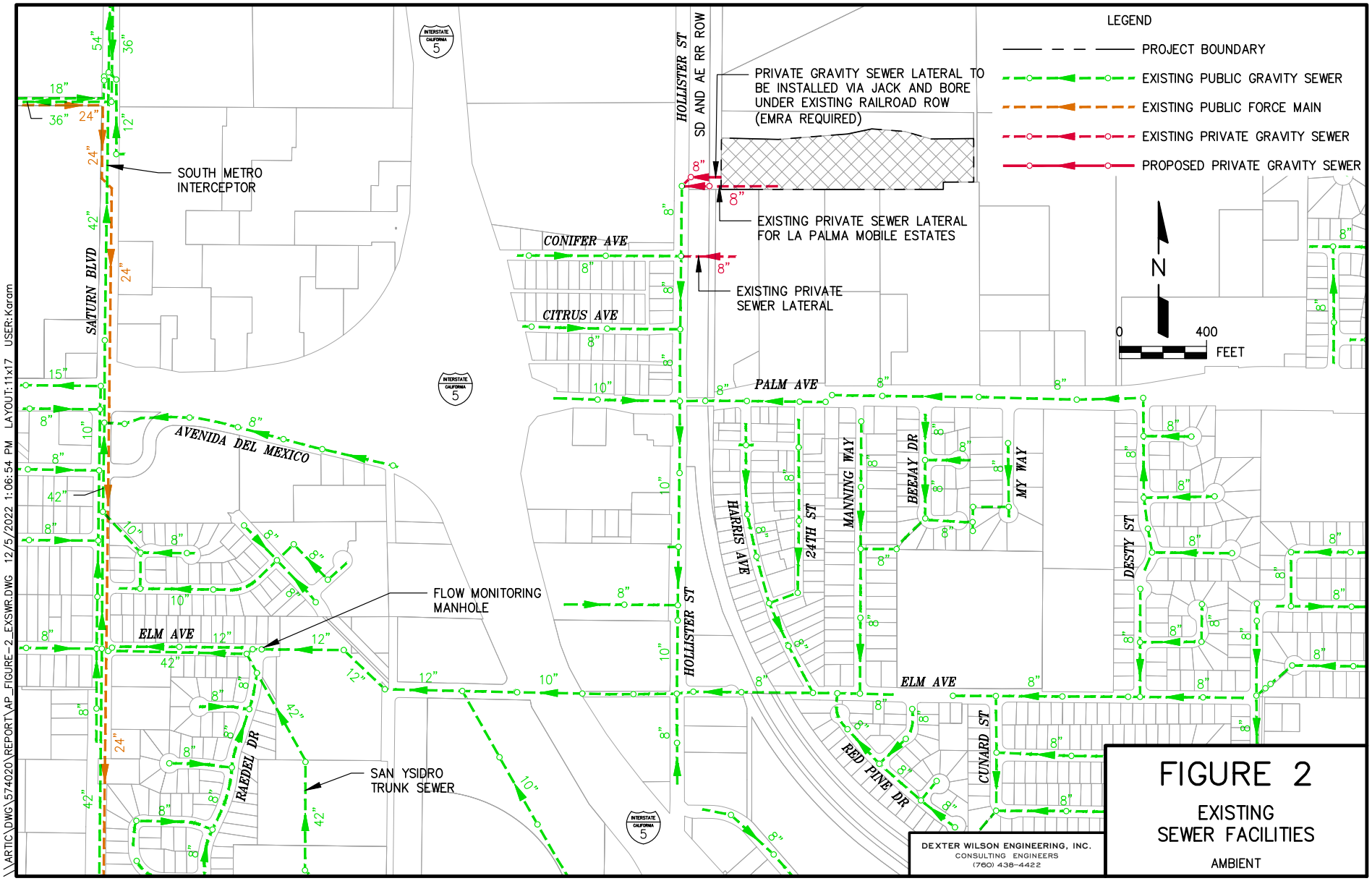
Study Area

In general, the study area for this sewer study are the sewer lines in the vicinity of the project that are tributary to the San Ysidro Trunk Sewer up to the 42-inch connection at the Elm Avenue and Raedel Drive intersection. From this point the San Ysidro Trunk Sewer conveys sewer westward to the South Metro Interceptor.

Proposed offsite sewer facilities for the Ambient project include private gravity sewer lines. Approximately 100 linear feet of private 8-inch gravity sewer line and a new sewer manhole needs to be constructed between Hollister Street and the project boundary to allow the new connection to the project's private sewer lateral. The project's private 8-inch diameter sewer lateral will be aligned under the existing railroad right-of-way between the project boundary and Hollister Street. The project will construct its lateral through jack and bore trenchless construction.

These existing and proposed offsite sewer facilities in the project area can be seen on Figure 2.

The flow capacity of the existing sewer within the study area was determined through temporary sewer flow monitoring. This temporary sewer flow monitoring is discussed later in this sewer study. The sewer flow monitoring report is included in Appendix C for reference.


LEGEND
PROJECT BOUNDARY
EXISTING PUBLIC GRAVITY SEWER
EXISTING PUBLIC FORCE MAIN
EXISTING PRIVATE GRAVITY SEWER
PROPOSED PRIVATE GRAVITY SEWER
PRIVATE GRAVITY SEWER LATERAL TO BE INSTALLED VIA JACK AND BORE UNDER EXISTING RAILROAD ROW (EMRA REQUIRED)
EXISTING PRIVATE SEWER LATERAL FOR LA PALMA MOBILE ESTATES
EXISTING PRIVATE SEWER LATERAL
SOUTH METRO INTERCEPTOR
FLOW MONITORING MANHOLE
SAN YSIDRO TRUNK SEWER
SD AND AE RR ROW
HOLLISTER ST
SATURN BLVD
CONIFER AVE
CITRUS AVE
PALM AVE
ELM AVE
AVENIDA DEL MEXICO
HARRIS AVE
24TH ST
MANNING WAY
BEEJAY DR
MY WAY
DESTY ST
CUNARD ST
RED PINE DR
RAEDEL DR
INTERSTATE CALIFORNIA 5
N
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400
FEET
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FIGURE 2
EXISTING SEWER FACILITIES
AMBIENT
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City of San Diego Sewer Design Criteria

Sewer system analyses criteria are based on the Sewer Design Guide, Revised May 2015, City of San Diego Public Utilities Department. This guideline is used for analysis and sizing of new gravity sewer lines and for analysis of existing gravity sewer lines. A summary of the design criteria from the Sewer Design Guide is presented in Table 1 below.

TABLE 1
CITY OF SAN DIEGO PUBLIC UTILITIES DEPARTMENT
SEWER SYSTEM DESIGN CRITERIA

Criterion	Design Requirement	Design Guide Reference
Sewage Flow Generation	80 gallons per capita	1.3.2.2
Industrial Sewage Flow Generation	5,000 gpd/net-acre	Table 1-1
Dry Weather Peaking Factor	Figure 1-1 based on population	1.3.2.2
Wet Weather Peaking Factor	Basin specific – determined by City	1.3.2.2
Gravity Flow Hydraulic Formula	Manning's Equation	1.3.3.1
Manning's 'n'	0.013	1.3.3.1
Desirable Gravity Flow Velocity	3 fps to 5 fps	1.3.3.1
Minimum Gravity Flow Velocity	2 fps	1.3.3.1
Where 2 fps is not achievable	Set min. slope at 1%	1.3.3.1
Maximum Gravity Flow Velocity	10 fps	1.3.3.1
Maximum Depth of Flow at Peak Wet Weather		
For 15" Pipe and Smaller	d/D = 0.50	1.3.3.3
For 18" and Larger	d/D = 0.75	1.3.3.3
Net Acreage	= 0.80 x Gross Acres	Table 1-1

Ambient Project Sewer Generation

The sewer generation for the project was developed in accordance with the City of San Diego Design Guidelines and Standards. Multi-family residential sewer generation is estimated based on dwelling unit density and a sewage generation of 80 gpd/person as presented in Table 1. The project proposes 198 residential units over 5.92 gross-acres. A gross acreage of 5.92 acres equates to 4.74 net acres which equals a net-density for Ambient of 42 units per acre. Table 1-1 in the City's Sewer Design Guide, attached as Appendix B, indicates that 42 units per net-acre falls in the range of 2.8 persons per dwelling unit (RM-2-6 Zoning). A dwelling unit density of 2.8 persons per dwelling unit and a unit sewage generation of 80 gpd/person results in a sewer generation rate of 224 gpd per multi-family dwelling unit for this project.

Table 2 presents the projected sewer generation for the project.

TABLE 2
AMBIENT SEWER GENERATION

Land Use	Quantity	Generation Factor	Average Sewer Generation, gpd
Multi-Family Residential (42 DUs/net acre)	198 Units	224 gpd/unit	44,352
TOTAL			**44,352 = 31 gpm**

From the City of San Diego's Sewer Design Guide, Figure 1-1, the peak dry weather flow to average flow ratio is approximately 2.70 based on the formula presented in the figure, resulting in an estimated peak dry weather flow of 119,579 gpd (83 gpm). A peaking factor for wet weather flow is assumed to be 1.0.

Appendix B presents the backup data for determining the peaking factors. For estimating the peak flows, average flow was based on the project's average sewer generation presented in Table 2.

Temporary Sewer Flow Monitoring

Temporary sewer flow monitoring was performed to better asses the sewer generation of the existing non-residential land use downstream of the proposed project. Sewer flow monitoring was conducted every five minutes for two weeks between February 4, 2022 to February 21, 2022. The monitoring manhole is located along the existing 12-inch diameter sewer at the Raedel Drive and Elm Avenue intersection. Appendix C contains a copy of the sewer flow monitoring report and corresponding flow summary graphs.

Results from the temporary sewer flow monitoring measured an average flow of 156,000 gpd and a peak flow of 310,000 gpd at the Elm Avenue and Raedel Drive intersection.

Ambient Offsite Sewer System Analysis

The offsite analysis completed for the project calculated the measured and projected sewer flows through the existing gravity sewer lines downstream from the project connection in Hollister Street and Elm Avenue up to the connection with the existing 42-inch diameter San Ysidro Trunk Sewer. Based on City reference information, the existing gravity sewer lines from MH 96 to MH 11 (Hollister St. and Elm Ave.) are lined. This lining results in a reduced pipe diameter by 1-inch. This reduced diameter is accounted for in the offsite analysis.

These offsite sewer calculations/analyses are presented in Appendix D along with an estimation of existing offsite sewage flows based on the temporary sewer flow monitoring that was conducted. Exhibit A in the back of this report presents the corresponding manhole number diagram.

The sewer system analysis for the Ambient project will need to take into account sewage flows from existing development that is downstream of the project site. The Ambient project will be an upstream development along this particular stretch of gravity sewer leading up to the 42-inch diameter San Ysidro Trunk Sewer in Elm Avenue. Table 3 summarizes the parameters of the existing development and its corresponding sewer flow. Existing sewer flow from the existing land use were taken from the temporary sewer flow monitoring described earlier in this study and then distributed accordingly based on downstream EDUs.

TABLE 3
EXISTING SEWER FLOWS BETWEEN AMBIENT PROJECT AND SAN YSIDRO TRUNK SEWER

Sub-Area	Description	Portion of Sub-Total Tributary Sub-Area	Measured Avg. Flow, gpd
92	76 Res. Units	7%	10,920
96	24 Res. Units	2%	3,120
97	34 Res. Units	3%	4,680
94	50 Res. Units & 10 Acres Park (139 EDUs)	13%	20,280
111	242 Res. Units	23%	35,880
172	60 Res. Units	6%	9,360
177	180 Res. Units	17%	26,520
12	48 Res. Units	5%	7,800
3	125 Res. Units & 11 Acres Commercial (263 EDUs)	24%	37,440
TOTAL	**1,066 EDUs**	**100%**	**156,000**

A peaking factor of 1.99 is calculated from the temporary sewer flow monitoring at the Elm Avenue and Raedel Drive intersection (156,000 gpd average; 310,000 gpd peak). For comparison, the City's peak dry weather flow factor is 2.28 for an average flow of 156,000 gpd. To be conservative in the offsite analysis, the City's peak dry weather flow factor formula was used in lieu of the measured peaking factor.

Record ("As-Built") drawings were obtained from the City to accurately model the existing gravity sewer infrastructure (size, slope, location etc.). These are included in Appendix E.

As shown in Model 1 of the spreadsheet calculations in Appendix D, the existing sewer flow within the study area is shown to be below half full in the existing 8-inch, 10-inch, and 12-inch diameter gravity sewer lines with a maximum d/D ratio of 0.40.

Existing Sewage Flow Plus Project Flow. Model 2 of the spreadsheet calculations in Appendix D presents the results of the offsite sewer system analyses when including the estimated flows from the project. The project is proposing to sewer all 198 of its multi-family residential units to the existing 8-inch diameter gravity sewer line running in Hollister Street to the west of the project site. Existing gravity sewer lines were analyzed up to the 42-inch San Ysidro Trunk Sewer.

The maximum d/D ratio increases from 0.40 to 0.49 when the proposed project is added to the existing 8-inch, 10-inch, and 12-inch diameter gravity sewer lines downstream of the project. These depths for the existing 8-inch, 10-inch, and 12-inch diameter gravity sewer lines are below the City design criteria of 0.50 d/D.

Existing Sewage Flow Plus Most Intense Land Use Flow. Model 3 of the spreadsheet calculations in Appendix D presents the results of the offsite sewer system analyses when including the estimated flows from the project under its proposed most intense land use (206 units).

The proposed project requires an amendment to the Otay Mesa-Nestor Community Plan to change the existing land use designation from Open Space to Residential Medium-High Density (20-35 du/nra) and a Rezone to change the existing zone from AR-1-2, RM-1-1, and RS-1-5 to RM-2-6. A Rezone requires the proposed project analyze the most intense use permitted under the new zone. Under the proposed RM-2-6 zone, the project site could be developed to construct up to 206 dwelling units. This equates to an additional eight dwelling units compared to the proposed project, which plans to construct a total of 198 dwelling units. Adding eight dwelling units would not affect the downstream sewer in a significant fashion as compared to Model 2 described above (all downstream sewer lines remain below the City design criteria of 0.50 d/D).

Conclusions and Recommendations

The following conclusions and recommendations are summarized based on the sewer system analysis prepared for the proposed Ambient project.

1. The proposed project consisting of 198 multi-family dwelling units will gravity sewer to the existing 8-inch diameter gravity sewer line located in Hollister Street.

2. The development of the project is projected to result in average sewage flow of 44,352 gpd.

3. Temporary sewer flow monitoring was performed to better asses the sewer generation of the existing land use downstream of the proposed project. Results from the temporary sewer flow monitoring showed an average flow of 156,000 gpd at the Elm Avenue and Raedel Drive intersection. These measured existing flows were utilized in assessing the capacity of the existing sewer collection system downstream of the Ambient project. Appendix C contains a copy of the sewer flow monitoring report and condition assessment of the monitored manholes/sewer lines.

4. Existing gravity sewer lines are currently calculated to have a d/D of approximately 0.40 in the 8-inch, 10-inch, and 12-inch diameter segments. The addition of the project's sewage flow would increase the d/D to 0.49. These depths are below the City design criteria of 0.50 d/D for the 8-inch, 10-inch, and 12-inch diameter segments.

5. Figure 2 presents the existing and proposed sewer system in the immediate project vicinity. A private 8-inch sewer lateral from the project will connect to an existing manhole in Hollister Street. No public sewer improvements are required for the Ambient Project.

6. The sewer system analysis conducted indicates that the existing 8-inch, 10-inch, and 12-inch public gravity sewer lines downstream of the project site up to the 42-inch diameter San Ysidro Trunk Sewer connection can accommodate both existing sewer flow and the sewer flows of the proposed project.

The proposed private onsite gravity sewer system will be designed according to City of San Diego Sewer Design Guide to comply with all design criteria (depth, velocity, minimum slope, etc.).

If you have any questions regarding the information or conclusions and recommendations presented in this report, please do not hesitate to contact the undersigned.

Dexter Wilson Engineering, Inc.

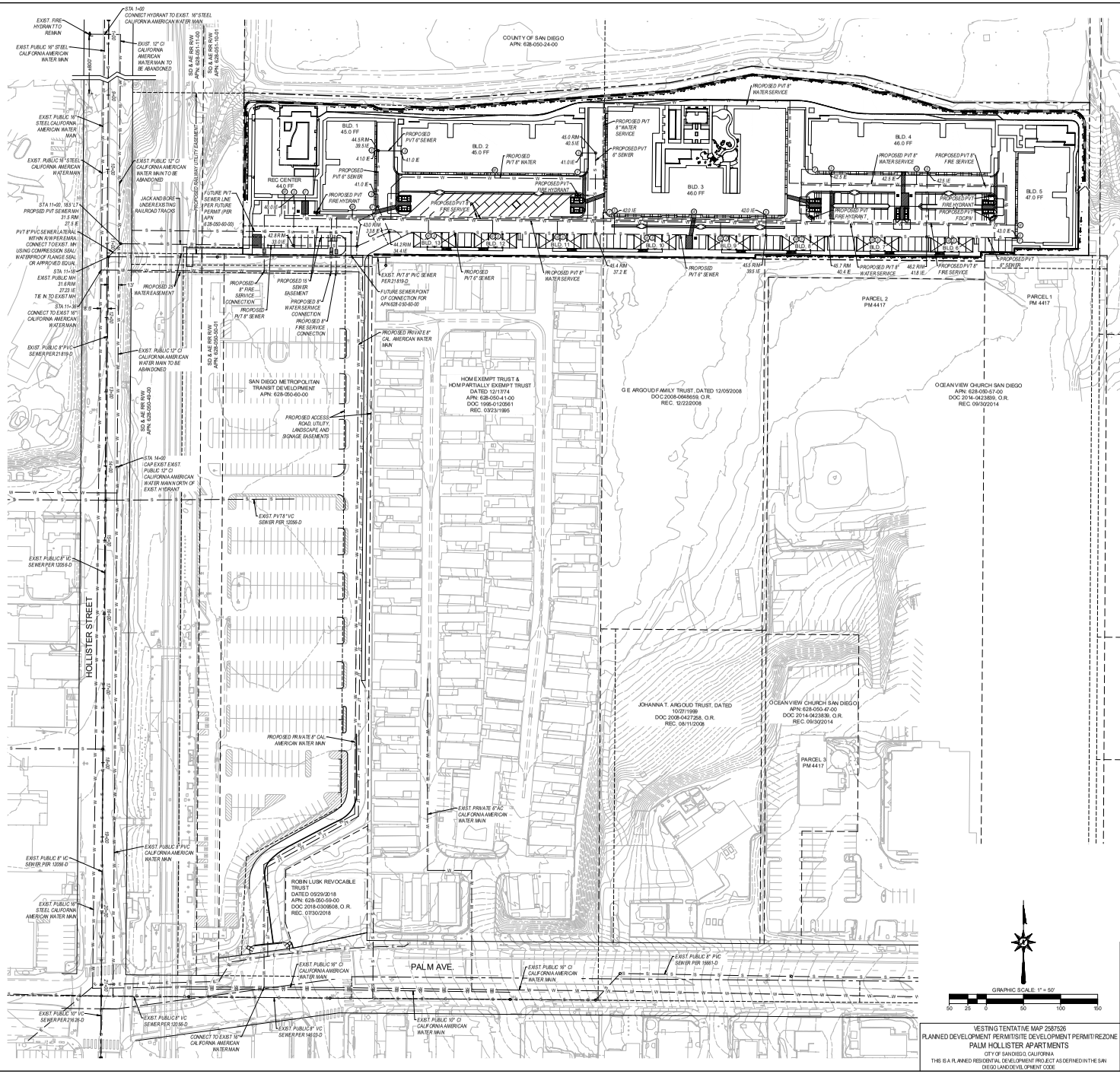
Andrew Oven, P.E.

AO:SH:ck

Attachments

APPENDIX A

PRELIMINARY SITE PLAN



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- PROPOSED EASEMENT LINE
- ADJACENT PARCEL LINE
- ROADWAY CENTERLINE
- EXISTING INDEX CONTOUR
- EXISTING SEWER MANHOLE / MAIN
- EXISTING PUBLIC SANITARY SEWER MAIN
- EXISTING PUBLIC WATER MAIN
- PROPOSED 6" PCC CURB
- PROPOSED 6" PCC CURB & GUTTER
- PROPOSED SEWER MANHOLE (SMH)
- PROPOSED PRIVATE FIRE MAIN
- PROPOSED PRIVATE WATER MAIN
- PROPOSED PRIVATE SANITARY SEWER MAIN
- PROPOSED DRY UTILITY JOINT TRENCH
- BUILDING FIRE SERVICE
- BUILDING WATER SERVICE
- BUILDING SEWER SERVICE
- PROPOSED RETAINING WALL
- PROPOSED PRIVATE FIRE HYDRANT
- PROPOSED PRIVATE FDC/PIV
- PROPOSED DOMESTIC WATER METER AND BACKFLOW
- PROPOSED FIRE SERVICE BACKFLOW

GENERAL UTILITY NOTES

WATER SYSTEM*

1. ALL PRIMARY FIRE DISTRIBUTION LINES WILL BE 8 INCHES IN DIAMETER UNLESS OTHERWISE NOTED.
2. THE OWNER SHALL DESIGN AND CONSTRUCT ALL PUBLIC WATER FACILITIES, BOTH POTABLE AND RECLAIMED, AS REQUIRED AND NECESSARY TO SERVE THIS DEVELOPMENT. WATER FACILITIES, AS SHOWN ON THE APPROVED VESTING TENTATIVE MAP MAY REQUIRE MODIFICATION BASED ON FINAL ENGINEERING.
3. THE OWNER SHALL INSTALL FIRE HYDRANTS AT LOCATION SATISFACTORY TO THE FIRE DEPARTMENT AND THE CITY ENGINEER. IF MORE THAN TWO (2) FIRE HYDRANTS ARE LOCATED ON A DEAD END MAIN THEN THE OWNER SHALL INSTALL A REDUNDANT WATER SYSTEM SATISFACTORY TO THE WATER DEPARTMENT DIRECTOR. FIRE HYDRANTS WILL BE INSTALLED SO THAT ALL BUILDINGS HAVE ACCESS WITHIN 300 FEET TO AT LEAST ONE HYDRANT, UNLESS OTHERWISE APPROVED BY THE FIRE MARSHALL.
4. THE OWNER SHALL GRANT ADEQUATE WATER EASEMENTS INCLUDING VEHICULAR ACCESS TO EACH APPURTENANCE (METERS, BLOW OFFS, VALVES, FIRE HYDRANTS, ETC.), FOR ALL PUBLIC WATER FACILITIES THAT ARE NOT LOCATED IN THE PUBLIC RIGHT-OF-WAY, SATISFACTORY TO THE WATER DEPARTMENT DIRECTOR.
5. THE OWNER SHALL PROCESS ENCROACHMENT MAINTENANCE AND REMOVAL AGREEMENT (EMRA) FOR ALL ACCEPTABLE ENCROACHMENTS, INCLUDING BUT NOT LIMITED TO STRUCTURES, ENHANCED PAVING, OR LANDSCAPING, INTO ANY EASEMENT CONTAINING PUBLIC WATER FACILITIES. NO STRUCTURES OR LANDSCAPING OF ANY KIND SHALL BE INSTALLED IN OR OVER ANY VEHICULAR ACCESS ROADWAY.
6. THE OWNER SHALL DESIGN AND CONSTRUCT ALL IRRIGATION SYSTEMS TO UTILIZE RECLAIMED WATER IN A MANNER SATISFACTORY TO THE WATER DEPARTMENT DIRECTOR.
7. THE OWNER AGREES TO DESIGN AND CONSTRUCT ALL PROPOSED PUBLIC WATER METER FACILITIES INCLUDING BUT NOT LIMITED TO SERVICES, METERS, AND EASEMENT, IN ACCORDANCE WITH ESTABLISHED CRITERIA IN THE MOST CURRENT EDITION OF THE CITY OF SAN DIEGO WATER FACILITY DESIGN GUIDELINES AND THE CITY REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO. WATER FACILITIES SHALL BE MODIFIED AT FINAL ENGINEERING TO COMPLY WITH STANDARDS.

PRIVATE SANITARY SEWER*

1. PRIVATE SEWER FACILITIES THAT SERVICE MORE THAN ONE LOT WILL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE MOST CURRENT CITY OF SAN DIEGO SEWER DESIGN GUIDE. ACCORDINGLY, A SEWER STUDY, IMPROVEMENT DRAWINGS, AND INSPECTION BY THE FIELD ENGINEERING DIVISION WILL BE REQUIRED. ALL SEWERAGE FACILITIES ARE PRIVATELY OWNED AND MAINTAINED. THE CC&RS FOR THIS DEVELOPMENT WILL OUTLINE RESPONSIBILITY AND MAINTENANCE REQUIREMENTS FOR THE ON-SITE PRIVATE SEWER SYSTEM FOR THIS PROJECT.
2. NO LANDSCAPING WILL BE PERMITTED THAT OBSTRUCTS VEHICULAR ACCESS TO THE SEWER MAINS. NO TREES OR SHRUBS EXCEEDING THREE FEET IN HEIGHT AT MATURITY SHALL BE INSTALLED WITHIN 10 FEET OF ANY SEWER FACILITY OR LATERALS.
3. ALL UTILITIES (PUBLIC OR PRIVATE) ARE REQUIRED TO MEET THE CITY'S DESIGN STANDARDS FOR SEPARATION. THE SEWER MAINS MUST BE 5' EDGE-TO-EDGE FROM STORM DRAIN AND 10' EDGE-TO-EDGE FROM ALL OTHER UTILITIES OR IMPROVEMENTS.
4. PRIOR TO THE ISSUANCE OF ANY BUILDING PERMITS, THE DEVELOPER SHALL ASSURE, BY PERMIT AND BOND, THE DESIGN AND CONSTRUCTION OF ALL SEWER FACILITIES NECESSARY TO SERVE THIS DEVELOPMENT.

FIRE NOTES

1. POST INDICATOR VALVES, FIRE DEPARTMENT CONNECTIONS, AND ALARM BELLS ARE TO BE LOCATED ON THE ADDRESS/ACCESS SIDE OF THE STRUCTURE.
2. PROVIDE BUILDING ADDRESS NUMBERS, VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY PER FHPS POLICY P-00-6.

UTILITY EASEMENTS

1. NEW UTILITY EASEMENTS WILL BE DEDICATED PER THE FINAL MAP BASED ON THE FINAL ENGINEERING AND DESIGN OF THE PUBLIC FACILITIES.

*ALL ON-SITE WATER AND SEWER SYSTEMS ARE PRIVATE.

BACKFLOW PREVENTION

ALL WATER SERVICES TO THE SITE, INCLUDING DOMESTIC, IRRIGATION AND FIRE, WILL REQUIRE PRIVATE, ABOVE GROUND BACK FLOW PREVENTION DEVICES (BFPDS). BFPDS SHALL BE LOCATED ON PRIVATE PROPERTY, IN LINE WITH THE SERVICE AND IMMEDIATELY ADJACENT TO THE RIGHT-OF-WAY. THE REQUIRED BFPDS TO BE LOCATED BELOW GRADE OR WITHIN THE STRUCTURE.

EMRA NOTE

PRIVATE SEWER LATERAL ENCROACHING INTO THE PUBLIC RIGHT OF WAY WILL REQUIRE AN ENCROACHMENT, MAINTENANCE AND REMOVAL AGREEMENT (EMRA).

APPROVAL NUMBERS:

VESTING TENTATIVE MAP APPROVAL NO. 2587526
SDP APPROVAL NO. 2587528
NDP APPROVAL NO. 2586225
REZONE NO. 2587530

VESTING TENTATIVE MAP 2587526
PLANNED DEVELOPMENT PERMIT/SITE DEVELOPMENT PERMIT/REZONE
PALM HOLLISTER APARTMENTS
CITY OF SAN DIEGO, CALIFORNIA
THIS IS A PLANNED RESIDENTIAL DEVELOPMENT PROJECT AS DEFINED IN THE SAN DIEGO LAND DEVELOPMENT CODE

PROJECT ADDRESS:
555 HOLLISTER STREET
SAN DIEGO, CA 92154

SHEET No. / TITLE:
SITE UTILITIES
SHEET C006

PREPARED BY:
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Phone 858.259.8212 | www.plsengineering.com

REGISTERED PROFESSIONAL ENGINEER GREGORY W. CANFIELD EXP. 09-30-23 CIVIL STATE OF CALIFORNIA

PROJECT NO: 698277

REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3: 12/02/22
REVISION 2: 07/06/22
REVISION 1: 03/22/22

ORIGINAL DATE: 11/11/21

APPENDIX B

CITY OF SAN DIEGO SEWER DESIGN CRITERIA

street alignments) and all potential points of entry of sewage from surrounding lands.

1.3.1.3 Depth of Mains

The planning study shall clearly identify all existing and/or proposed facilities which will exceed standard depths for sewer mains as defined in Subsection 2.2.1.5. In cases where proposed sewers will exceed 15 feet in depth, a request for design deviation (ATTACHMENT 2) must be submitted to the Water and Sewer Development Review Senior Civil Engineer with the Sewer Planning Study. A design deviation will only be approved in exceptional cases and when adequate justification is provided. Mains more than 20 feet deep shall also require approval from the Wastewater Collection Division Senior Civil Engineer.

1.3.1.4 Existing Studies

The City of San Diego maintains an extensive library of sewer planning studies which were prepared for lands throughout the City. These studies are available for review at the Water and Sewer Development Section, Public Utilities Department. All studies are catalogued by subdivision or trunk sewer name. Logs of sewer flow study analyses for recently monitored trunk sewers and a map of sewers which meet the Regional Water Quality Control Board (RWQCB) criteria for being critical or sub-critical may also be viewed. In addition, information regarding proposed CIP projects within the vicinity of a given project may be requested. In many cases, an addendum or reference to one of the existing planning studies may be acceptable in lieu of an independent study. Concurrent with the preparation of planning studies for sewers proposed to connect to existing canyon sewer mains, a study of flow redirection per Council Policy 400-13 and a cost-benefit analysis per Council Policy 400-14 shall be prepared (Refer to ATTACHMENT 1). An existing analysis of redirection of flows and a cost-benefit analysis, as required by Council Policies 400-13 and 400-14 respectively, may be available for reference for various existing canyon sewers.

1.3.2 Flow Estimation

1.3.2.1 Land Use

Present or future allowable land use, whichever results in higher equivalent population, shall be used to generate potential sewage flows.

1.3.2.2 Flow Determination

Flow definitions and calculation procedures are listed below. All calculations shall be tabulated for each sewer main section (manhole to manhole) in the

format shown on Figure 1-2.

Equivalent Population: The equivalent population shall be calculated from zoning information (Ref. Section 1.6). For major new facilities such as high rise apartment buildings, flow rates (assuming one lateral) shall be checked based on the most current, adopted edition of the Uniform Plumbing Code. The most conservative flow rate shall govern.

Daily Per Capita Sewer Flow: The sewer flow for the equivalent population shall be 80 gallons per capita per day (gpcd).

Average Dry Weather Flow (ADWF): Equivalent populations shall be used to calculate the average dry weather flow. The average dry weather flow for each sewer main reach (manhole to manhole) shall be determined by multiplying the total accumulated equivalent population contributing to that reach by 80 gallons per capita per day:

Average Dry Weather Flow = (80 gpcpd) x (Equivalent Population)

Peaking Factor for Dry Weather Flow (PFDWF): The peaking factor is the ratio of peak dry weather flow to average dry weather flow. It is dependent upon the equivalent population within a tributary area. The tributary area is the area upstream of, and including, the current reach for the total flow in each reach of pipe. Figure 1-1, consisting of the table prepared by Holmes and Narver in 1960, shall be used to determine peaking factors for each tributary area. In no instance shall the dry weather flow peaking factor be less than 1.5.

Peak Dry Weather Flow (PDWF): The peak dry weather flow for each sewer main reach shall be determined by multiplying the average dry weather flow by the appropriate peaking factor (Note that peak dry weather flows are not algebraically cumulative as routed through the sewer system, i.e. the peak dry weather flow at any point shall be based on the equivalent population in the basin to that point (Ref. Figure 1-2).

Peak Dry Weather Flow = (Average Dry Weather Flow) x (Dry Weather Flow Peaking Factor)

Peaking Factor for Wet Weather Flow (PFWWF): The peaking factor for wet weather flow is the ratio of peak wet weather flow to peak dry weather flow. It is basin-specific and shall be based on essential information available at the time of the planning study. Information such as historical rainfall/sewage flow data, land use, soil data, pipe/manhole age, materials and conditions, groundwater elevations (post development), inflow and infiltration (I/I) studies, size, slope and densities of the drainage basin, etc., should be utilized in the wet weather analysis to estimate the peaking factor for wet weather. Upward adjustments shall be made in areas with expected high inflow and

infiltration (i.e. high ground water or in areas with lush landscaping schemes). Flow meters are installed throughout the City's sewer system. Flow data collected from these meters are available upon request. The objective of this analysis is to quantify the magnitude of peak wet weather flow with a 10-year return period on a statistical basis.

The Senior Civil Engineer overseeing the preparation of the planning study shall coordinate with the City Sewer Modeling Group for approval of the peaking factors to be used for design.

Peak Wet Weather Flow (PWWF): The peak wet weather flow (or design flow) for a gravity sewer main reach shall be determined by multiplying the peak dry weather flow (ref. Figure 1-2) by the appropriate wet weather peaking factor. The peak wet weather flow is the design flow for a gravity sewer main. It is determined at any point in the system based on the associated upstream average dry weather flow in the basis to that point times the peaking factor for wet weather.

Peak Wet Weather Flow = (Peak Dry Weather Flow) x (Wet Weather Peaking Factor)

1.3.3 Pipe Sizing Criteria

1.3.3.1 Hydraulic Requirements

Manning's formula for open-channel flows shall be used to calculate flows in gravity sewer mains. Manning's coefficient of roughness "n" shall be assumed to be 0.013 for all types of sewer pipe. Sewer grades shall be designed for velocities of 3 to 5 feet per second (fps) where possible. This is extremely important in areas where peak flow will not be achieved for many years. The minimum allowable velocity is 2 fps at calculated peak dry weather flow, excluding infiltration. Sewer mains that do not sustain 2 fps at peak flows shall be designed to have a minimum slope of 1 percent. Additional slope may be required by the Senior Civil Engineer where fill of varied depth is placed below the pipe in order to provide adequate slope after expected settlement occurs. The maximum allowable velocity shall be 10 fps and shall be avoided by adjusting slopes, by increasing the pipe diameter, or by utilizing a vertical curve transition to lower velocities per subsections 2.2.4 and 2.2.9.4. If the Senior Civil Engineer approves a velocity greater than 10 fps, the pipe shall be upgraded to SDR 18 PVC (standard dimension ratio polyvinyl chloride), concrete-encased VC (vitrified clay), or PVC sheet-lined reinforced concrete pipe.

TABLE 1-1
CITY OF SAN DIEGO SEWER DESIGN GUIDE
DENSITY CONVERSIONS

Zone	Maximum Density (DU/Net Ac)	Population per DU	Equivalent Population (Pop/Net Ac)
AR-1-1, RE-1-1	0.1	3.5	0.4
RE-1-2	0.2	3.5	0.7
AR-1-2, RE-1-3	1	3.5	3.5
RS-1-1, RS-1-8	1	3.5	3.5
RS-1-2, RS-1-9	2	3.5	7.0
RS-1-3, RS-1-10	3	3.5	10.5
RS-1-4, RS-1-11	4	3.5	14.0
RS-1-5, RS-1-12	5	3.5	17.5
RS-1-6, RS-1-13	7	3.5	24.5
RS-1-7, RS-1-14	9	3.5	31.5
RX-1-1	11	3.4	37.4
RT-1-1	12	3.3	39.6
RX-1-2, RT-1-2, RU-1-1	14	3.2	44.8
RT-1-3, RM-1-2	17	3.1	52.7
RT-1-4	20	3.0	60.0
RM-1-3	22	3.0	66.0
RM-2-4	25	3.0	75.0
RM-2-5	29	3.0	87.0
RM-2-6	35	2.8	98.0
RM-3-7, RM-5-12	43	2.6	111.8
RM-3-8	54	2.4	129.6
RM-3-9	73	2.2	160.6
RM-4-10	109	1.8	196.2
RM-4-11	218	1.5	327.0

TABLE 1-1
CITY OF SAN DIEGO SEWER DESIGN GUIDE
DENSITY CONVERSIONS (Continued)

Zone	Maximum Density (DU / Net Ac)	Population Per DU	Equivalent Population (Pop/Net Ac)
Schools/Public	8.9	3.5	31.2
Offices	10.9	3.5	38.2*
Commercial/Hotels	12.5	3.5	43.7*
Industrial	17.9	3.5	62.5*
Hospital	42.9	3.5	150.0*

Figures with asterisk (*) represent equivalent population per floor of the building.

Definitions:
DU = Dwelling Units
Ac = Acreage
Pop = Population

Net Acreage is the developable lot area excluding areas that are dedicated as public streets in acres. Gross Area is the entire area in acres of the drainage basin, including lots, streets, etc.

For undeveloped areas, assume Net Acreage = 0.8 x Gross Area in Acres

For developed areas, calculate actual Net Acreage.

Tabulated figures are for general case. The tabulated figures shall not be used if more accurate figures are available.

Population is based on actual equivalent dwelling units (EDU) or the maximum estimate obtained from zoning.

Conversion of Fixture Units to Equivalent Dwelling Units (EDU): The Water Meter Data Card, maintained by the Development Services Department, contains a table of plumbing fixtures that should be used for determining the equivalent dwelling units (EDU's) for the purpose of estimating the rate of wastewater generation in residential, commercial, or industrial areas. Currently, the basis for conversion is: 20 fixtures = 1 EDU and 1 EDU = 280 gallons of wastewater per day.

In high rise building areas, flow rates shall be based on the most current, adopted edition of the applicable Plumbing Code, assuming one lateral per area. The most conservative flow rate shall govern.

PUBLIC UTILITIES DEPARTMENT

PEAKING FACTOR FOR SEWER FLOWS
(Dry Weather)

Ratio of Peak to Average Flow*
Versus Tributary Population

Population	Ratio of Peak to Average Flow	Population	Ratio of Peak to Average Flow
200	4.00	4,800	2.01
500	3.00	5,000	2.00
800	2.75	5,200	1.99
900	2.60	5,500	1.97
1,000	2.50	6,000	1.95
1,100	2.47	6,200	1.94
1,200	2.45	6,400	1.93
1,300	2.43	6,900	1.91
1,400	2.40	7,300	1.90
1,500	2.38	7,500	1.89
1,600	2.36	8,100	1.87
1,700	2.34	8,400	1.86
1,750	2.33	9,100	1.84
1,800	2.32	9,600	1.83
1,850	2.31	10,000	1.82
1,900	2.30	11,500	1.80
2,000	2.29	13,000	1.78
2,150	2.27	14,500	1.76
2,225	2.25	15,000	1.75
2,300	2.24	16,000	1.74
2,375	2.23	16,700	1.73
2,425	2.22	17,400	1.72
2,500	2.21	18,000	1.71
2,600	2.20	18,900	1.70
2,625	2.19	19,800	1.69
2,675	2.18	21,500	1.68
2,775	2.17	22,600	1.67
2,850	2.16	25,000	1.65
3,000	2.14	26,500	1.64
3,100	2.13	28,000	1.63
3,200	2.12	32,000	1.61
3,500	2.10	36,000	1.59
3,600	2.09	38,000	1.58
3,700	2.08	42,000	1.57
3,800	2.07	49,000	1.55
3,900	2.06	54,000	1.54
4,000	2.05	60,000	1.53
4,200	2.04	70,000	1.52
4,400	2.03	90,000	1.51
4,600	2.02	100,000+	1.50

***Based on formula:** Peak Factor = $6.2945 \times (pop)^{-0.1342}$
(Holmes & Narver, 1960)

FIGURE 1-1

APPENDIX C

TEMPORARY SEWER FLOW MONITORING REPORT

Flow Monitor Location Report

IEC Crew: EB/DP

Project Name: Hollister

Site Name:	Elm	Monitor Type	ISCO 2150	Monitor S/N:	26	Manhole #:	36
Address / Location:	2006 Elm Ave			GPS Coordinates North		NA	
				GPS Coordinates West		NA	
Access:	Drive	Type of System:	Sanitary	Pipe Height		~~18.125"~~	11.89"
				Pipe Width		~~18.125"~~	11.89"

Investigation Data			Manhole Data		
Date/Time of Investigation:	February 4, 2022		Manhole Depth:	7'	
Site Hydraulics:	Smooth, consistent flow		Manhole Material / Condition:	Concrete	Fair
			Active Connections	No	
Upstream Input: (L/S, P/S)	NA		Pipe Material / Condition:	Vitrified Clay Pipe	Fair
Downstream Manhole:	NA		**Communication Data**		
Depth of Flow (Wet Dof):	+/-		IP Address	NA	
Range (Air Dof):	+/-		Wireless Carrier	NA	
Peak Velocity:	fps		Modem Type	NA	
Silt:	No	Inches	Communication Type	Serial	

Installation Data		Backup	Yes	No	Cause	Distance
Installation Type:	Standard Ring and Crank Installation	Trunk		X		
Sensors / Devices:	ISCO AV	Lift/Pump Station		X		
Surcharge	No	WWTP		X		
Rain Gauge	No	Other		X		

Additional Site Information / Comments:

Flow Monitor Location Report

IEC Crew: EB/DP
Project Name: Hollister

Site Name:	Hollister & Elm	Monitor Type	ISCO 2150	Monitor S/N:	23	Manhole #:	177
Address / Location:	Intersection of Hollister St. & Elm Ave.			GPS Coordinates North		NA	
				GPS Coordinates West		NA"	
Access:	Drive	Type of System:	Sanitary	Pipe Height		9.5	
				Pipe Width		9.5"	

Investigation Data

Date/Time of Investigation:	February 4, 2022	
Site Hydraulics:	Slow, consistant flow	
Upstream Input: (L/S, P/S)	NA	
Downstream Manhole:	NA	
Depth of Flow (Wet Dof):	+/-	
Range (Air Dof):	+/-	
Peak Velocity:	fps	
Silt:	No	Inches

Manhole Data

Manhole Depth:	18'		
Manhole Material / Condition:	Concrete		Fair
Active Connections	Yes		3:00 & 9:00
Pipe Material / Condition:	Vitrified Clay Pipe		Fair

Communication Data

IP Address	NA
Wireless Carrier	NA
Modem Type	NA
Communication Type	Serial

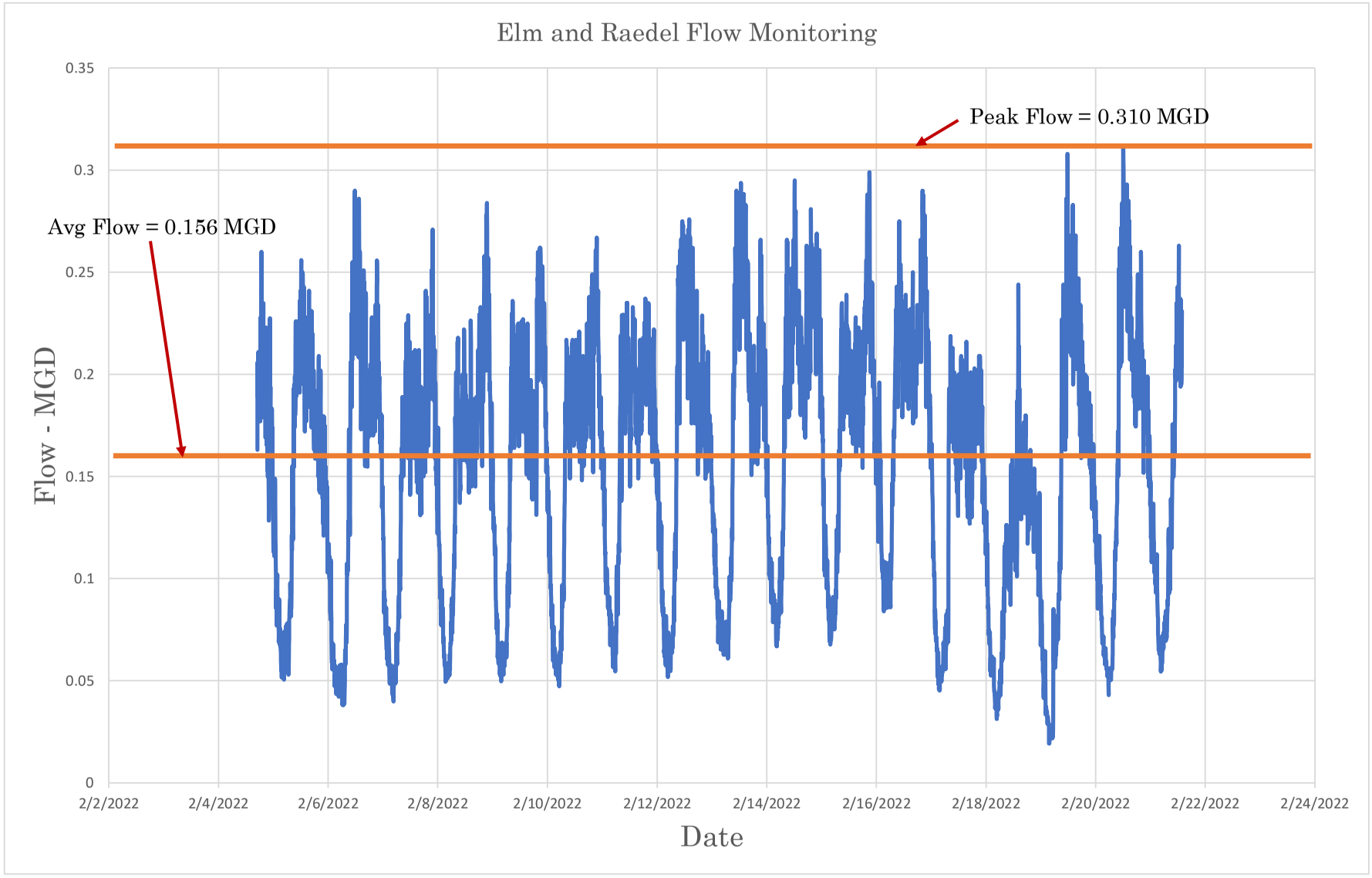
Installation Data

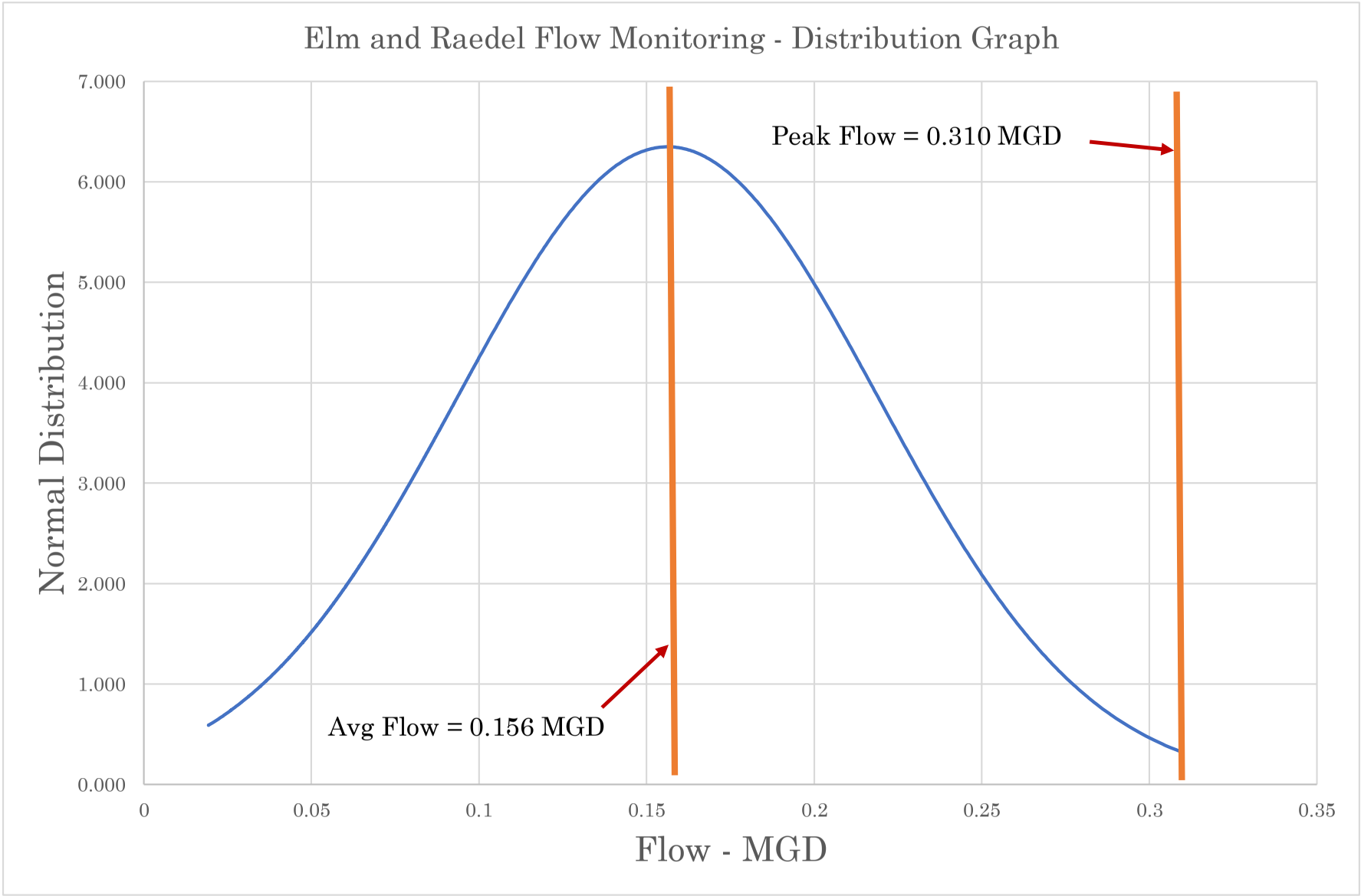
Installation Type:	Standard Ring and Crank Installation
Sensors / Devices:	ISCO AV
Surcharge	No
Rain Gauge	No

Backup	Yes	No	Cause	Distance
Trunk		X		
Lift/Pump Station		X		
WWTP		X		
Other		X		

Additional Site Information / Comments:

1	Site Name	Elm_Raedel	Elm_Raedel	Elm_Raedel	Elm_Raedel
2	Isco Quantity	Level	Velocity	Temperature	Flow Rate
3	Label	Level	Velocity	Temperature	Flow Rate
4	Units	in	ft/s	°F	mgd
5	Resolution	0.1	0.1	0.1	0.1
6	Significant Digits	0	0	0	0
4850	2/21/2022 12:30	3.49	1.56	72.7	0.217
4851	2/21/2022 12:35	3.58	1.65	73.2	0.237
4852	2/21/2022 12:40	3.59	1.58	73.54	0.227
4853	2/21/2022 12:45	3.54	1.58	73.69	0.223
4854	2/21/2022 12:50	3.48	1.53	73.13	0.212
4855	2/21/2022 12:55	3.48	1.64	72.84	0.226
4856	2/21/2022 13:00	3.66	1.6	73.11	0.237
4857	2/21/2022 13:05	3.58	1.64	73	0.235
4858	2/21/2022 13:10	3.49	1.4	72.88	0.194
4859	2/21/2022 13:15	3.49	1.61	72.77	0.223
4860	2/21/2022 13:20	3.5	1.7	72.55	0.236
4861	2/21/2022 13:25	3.36	1.56	72.79	0.205
4862	2/21/2022 13:30	3.36	1.48	72.7	0.195
4863	2/21/2022 13:35	3.35	1.55	72.91	0.203
4864	2/21/2022 13:40	3.38	1.54	72.68	0.204
4865	2/21/2022 13:45	3.5	1.66	72.8	0.231
4866					
4867	AVERAGE	3.0	1.3	72.6	0.156
4868	MAX	4.1	1.9	75.9	0.310
4869	MIN	1.7	0.0	68.8	0.019
4870					
4871					


Elm and Raedel Flow Monitoring
Peak Flow = 0.310 MGD
Avg Flow = 0.156 MGD
Flow - MGD
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2/2/2022
2/4/2022
2/6/2022
2/8/2022
2/10/2022
2/12/2022
2/14/2022
2/16/2022
2/18/2022
2/20/2022
2/22/2022
2/24/2022
Date


Elm and Raedel Flow Monitoring - Distribution Graph
Normal Distribution
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
Flow - MGD
Peak Flow = 0.310 MGD
Avg Flow = 0.156 MGD

APPENDIX D

OFFSITE SEWER ANALYSIS

The following conditions were modeled for The Ambient Project:

1. Existing Flows
2. Existing Plus Project Flows (198 units)
3. Existing Plus Project Flows (206 units)

- Reference Exhibit A for Manhole Diagram

DATE: 12/2/2022

SEWER STUDY SUMMARY

FOR: Ambient Project City of San Diego Offsite Analysis up to Ex. 42 in. San Ysidro Trunk Sewer (Existing Flows Only) FLOW MONITORING

SHT 1 OF 3

JOB NUMBER: 574-020

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

REMARKS (TRIBUTARY AREAS)	FROM	TO	IN-LINE FLOW* (gpd)	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAK DWF FACTOR	PEAK DWF (gpd)	PEAK WWF FACTOR	PEAK WWF (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	EST. SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D (2)	C_a for Velocity (3)	VELOCITY (f.p.s.)
				IN-LINE	TOTAL							M.G.D.	C.F.S.							
76 Mobile Homes	92	96	10,920	136.5	136.5	80	10,920	3.25	35,534	1.00	35,534	0.036	0.055	8	0.40	0.033321	0.12667	0.19	0.1039	1.19
24 EDUs (lined section)	96	97	3,120	39.0	175.5	80	14,040	3.15	44,172	1.00	44,172	0.044	0.068	7	0.40	0.059138	0.14583	0.25	0.1535	1.31
34 EDUs (lined section)	97	94	4,680	58.5	234.0	80	18,720	3.03	56,665	1.00	56,665	0.057	0.088	7	0.40	0.075864	0.16333	0.28	0.1800	1.43
50 EDUs & 10 acres public (lined section)	94	111	20,280	253.5	487.5	80	39,000	2.74	106,979	1.00	106,979	0.107	0.166	9	0.30	0.084613	0.21750	0.29	0.1890	1.56
242 Apartments (Pacific Point) (lined section)	111	117	35,880	448.5	936.0	80	74,880	2.51	188,184	1.00	188,184	0.188	0.291	9	0.32	0.144114	0.29250	0.39	0.2836	1.83
(lined section)	117	172	0	0.0	936.0	80	74,880	2.51	188,184	1.00	188,184	0.188	0.291	9	0.34	0.139811	0.28500	0.38	0.2739	1.89
60 Condos (lined section)	172	174	9,360	117.0	1053.0	80	84,240	2.47	208,387	1.00	208,387	0.208	0.322	9	0.36	0.150458	0.30000	0.40	0.2934	1.95
(lined section)	174	177	0	0.0	1053.0	80	84,240	2.47	208,387	1.00	208,387	0.208	0.322	9	0.36	0.150458	0.30000	0.40	0.2934	1.95
180 EDUs (lined section)	177	175	26,520	331.5	1384.5	80	110,760	2.38	264,109	1.00	264,109	0.264	0.409	9	0.67	0.139779	0.28500	0.38	0.2739	2.65
(lined section)	175	12	0	0.0	1384.5	80	110,760	2.38	264,109	1.00	264,109	0.264	0.409	9	0.67	0.139779	0.28500	0.38	0.2739	2.65
48 Mobile Homes (lined section)	12	2	7,800	97.5	1482.0	80	118,560	2.36	280,138	1.00	280,138	0.280	0.433	9	0.67	0.148263	0.29250	0.39	0.2836	2.72
	2	3	0	0.0	1482.0	80	118,560	2.36	280,138	1.00	280,138	0.280	0.433	10	0.69	0.110313	0.28333	0.34	0.2355	2.65
125 Mobile Homes & 11 Acres Commercial	3	1	37,440	468.0	1950.0	80	156,000	2.28	355,274	1.00	355,274	0.355	0.550	11.8	0.25	0.149481	0.39333	0.40	0.2934	1.94
	1	5	0	0.0	1950.0	80	156,000	2.28	355,274	1.00	355,274	0.355	0.550	11.8	0.25	0.149481	0.39333	0.40	0.2934	1.94
	5	36	0	0.0	1950.0	80	156,000	2.28	355,274	1.00	355,274	0.355	0.550	11.8	0.25	0.149481	0.39333	0.40	0.2934	1.94
	36	34	0	0.0	1950.0	80	156,000	2.28	355,274	1.00	355,274	0.355	0.550	11.8	0.25	0.149481	0.39333	0.40	0.2934	1.94
	34	33	0	0.0	1950.0	80	156,000	2.28	355,274	1.00	355,274	0.355	0.550	11.8	0.25	0.149481	0.39333	0.40	0.2934	1.94

	Total Pop.	Min Slope	Max dn/D	Min Vel.
	1,950	0.25	0.40	1.31

Max Vel.
1.95

LU = Land Use Area

* Average Flow Based on Temporary Flow Monitoring

1 K' based on n = 0.013

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

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

DATE: 12/2/2022

SEWER STUDY SUMMARY

FOR: Ambient Project City of San Diego Offsite Analysis up to Ex. 42 in. San Ysidro Trunk Sewer (Existing plus Project Flows, 198 units) FLOW MONITORING

SHT 2 OF 3

JOB NUMBER: 574-020

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

REMARKS (TRIBUTARY AREAS)	FROM	TO	IN-LINE FLOW* (gpd)	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAK DWF FACTOR	PEAK DWF (gpd)	PEAK WWF FACTOR	PEAK WWF (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	EST. SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D (2)	C_a for Velocity (3)	VELOCITY (f.p.s.)
				IN-LINE	TOTAL							M.G.D.	C.F.S.							
PRO. PROJECT (pro. pvt. sewer lateral)	201	91	44,352	554.4	554.4	80	44,352	2.70	119,579	1.00	119,579	0.120	0.185	8	0.60	0.091555	0.20667	0.31	0.2074	2.01
Pro. Public Sewer Section	91	92	0	0.0	554.4	80	44,352	2.70	119,579	1.00	119,579	0.120	0.185	8	0.60	0.091555	0.20667	0.31	0.2074	2.01
76 Mobile Homes	92	96	10,920	136.5	690.9	80	55,272	2.62	144,683	1.00	144,683	0.145	0.224	8	0.40	0.135672	0.25333	0.38	0.2739	1.84
24 EDUs (lined section)	96	97	3,120	39.0	729.9	80	58,392	2.60	151,728	1.00	151,728	0.152	0.235	7	0.40	0.203135	0.27417	0.47	0.3627	1.90
34 EDUs (lined section)	97	94	4,680	58.5	788.4	80	63,072	2.57	162,201	1.00	162,201	0.162	0.251	7	0.40	0.217157	0.28583	0.49	0.3827	1.93
50 EDUs & 10 acres public (lined section)	94	111	20,280	253.5	1041.9	80	83,352	2.48	206,483	1.00	206,483	0.206	0.319	9	0.30	0.163314	0.31500	0.42	0.3130	1.81
242 Apartments (Pacific Point) (lined section)	111	117	35,880	448.5	1490.4	80	119,232	2.36	281,512	1.00	281,512	0.282	0.436	9	0.32	0.215586	0.36000	0.48	0.3727	2.08
(lined section)	117	172	0	0.0	1490.4	80	119,232	2.36	281,512	1.00	281,512	0.282	0.436	9	0.34	0.209149	0.36000	0.48	0.3727	2.08
60 Condos (lined section)	172	174	9,360	117.0	1607.4	80	128,592	2.34	300,548	1.00	300,548	0.301	0.465	9	0.36	0.217000	0.36750	0.49	0.3827	2.16
(lined section)	174	177	0	0.0	1607.4	80	128,592	2.34	300,548	1.00	300,548	0.301	0.465	9	0.36	0.217000	0.36750	0.49	0.3827	2.16
180 EDUs (lined section)	177	175	26,520	331.5	1938.9	80	155,112	2.28	353,522	1.00	353,522	0.354	0.547	9	0.67	0.187102	0.33750	0.45	0.3428	2.84
(lined section)	175	12	0	0.0	1938.9	80	155,112	2.28	353,522	1.00	353,522	0.354	0.547	9	0.67	0.187102	0.33750	0.45	0.3428	2.84
48 Mobile Homes (lined section)	12	2	7,800	97.5	2036.4	80	162,912	2.26	368,863	1.00	368,863	0.369	0.571	9	0.67	0.195221	0.34500	0.46	0.3527	2.88
	2	3	0	0.0	2036.4	80	162,912	2.26	368,863	1.00	368,863	0.369	0.571	10	0.69	0.145251	0.32500	0.39	0.2836	2.90
125 Mobile Homes & 11 Acres Commercial	3	1	37,440	468.0	2504.4	80	200,352	2.20	441,214	1.00	441,214	0.441	0.683	11.8	0.25	0.185640	0.44250	0.45	0.3428	2.06
	1	5	0	0.0	2504.4	80	200,352	2.20	441,214	1.00	441,214	0.441	0.683	11.8	0.25	0.185640	0.44250	0.45	0.3428	2.06
	5	36	0	0.0	2504.4	80	200,352	2.20	441,214	1.00	441,214	0.441	0.683	11.8	0.25	0.185640	0.44250	0.45	0.3428	2.06
	36	34	0	0.0	2504.4	80	200,352	2.20	441,214	1.00	441,214	0.441	0.683	11.8	0.25	0.185640	0.44250	0.45	0.3428	2.06
	34	33	0	0.0	2504.4	80	200,352	2.20	441,214	1.00	441,214	0.441	0.683	11.8	0.25	0.185640	0.44250	0.45	0.3428	2.06

	Total Pop.	Min Slope	Max dn/D	Min Vel.
	2,504	0.25	0.49	1.81

Max Vel. 2.16

LU = Land Use Area

* Average Flow Based on Temporary Flow Monitoring

1 K' based on n = 0.013

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

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

DATE: 12/2/2022

SEWER STUDY SUMMARY

FOR: Ambient Project City of San Diego Offsite Analysis up to Ex. 42 in. San Ysidro Trunk Sewer (Existing plus Project Flows, 206 units) FLOW MONITORING

SHT 3 OF 3

JOB NUMBER: 574-020

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

REMARKS (TRIBUTARY AREAS)	FROM	TO	IN-LINE FLOW* (gpd)	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAK DWF FACTOR	PEAK DWF (gpd)	PEAK WWF FACTOR	PEAK WWF (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	EST. SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D (2)	C_a for Velocity (3)	VELOCITY (f.p.s.)
				IN-LINE	TOTAL							M.G.D.	C.F.S.							
PRO. PROJECT (pro. pvt. sewer lateral)	201	91	46,144	576.8	576.8	80	46,144	2.68	123,750	1.00	123,750	0.124	0.191	8	0.60	0.094749	0.20667	0.31	0.2074	2.08
Pro. Public Sewer Section	91	92	0	0.0	576.8	80	46,144	2.68	123,750	1.00	123,750	0.124	0.191	8	0.60	0.094749	0.20667	0.31	0.2074	2.08
76 Mobile Homes	92	96	10,920	136.5	713.3	80	57,064	2.61	148,735	1.00	148,735	0.149	0.230	8	0.40	0.139473	0.25333	0.38	0.2739	1.89
24 EDUs (lined section)	96	97	3,120	39.0	752.3	80	60,184	2.59	155,751	1.00	155,751	0.156	0.241	7	0.40	0.208521	0.28000	0.48	0.3727	1.90
34 EDUs (lined section)	97	94	4,680	58.5	810.8	80	64,864	2.56	166,184	1.00	166,184	0.166	0.257	7	0.40	0.222489	0.28583	0.49	0.3827	1.97
50 EDUs & 10 acres public (lined section)	94	111	20,280	253.5	1064.3	80	85,144	2.47	210,321	1.00	210,321	0.210	0.325	9	0.30	0.166349	0.31500	0.42	0.3130	1.85
242 Apartments (Pacific Point) (lined section)	111	117	35,880	448.5	1512.8	80	121,024	2.36	285,171	1.00	285,171	0.285	0.441	9	0.32	0.218388	0.36750	0.49	0.3827	2.05
(lined section)	117	172	0	0.0	1512.8	80	121,024	2.36	285,171	1.00	285,171	0.285	0.441	9	0.34	0.211868	0.36000	0.48	0.3727	2.10
60 Condos (lined section)	172	174	9,360	117.0	1629.8	80	130,384	2.33	304,171	1.00	304,171	0.304	0.471	9	0.36	0.219616	0.36750	0.49	0.3827	2.19
(lined section)	174	177	0	0.0	1629.8	80	130,384	2.33	304,171	1.00	304,171	0.304	0.471	9	0.36	0.219616	0.36750	0.49	0.3827	2.19
180 EDUs (lined section)	177	175	26,520	331.5	1961.3	80	156,904	2.28	357,056	1.00	357,056	0.357	0.552	9	0.67	0.188972	0.33750	0.45	0.3428	2.87
(lined section)	175	12	0	0.0	1961.3	80	156,904	2.28	357,056	1.00	357,056	0.357	0.552	9	0.67	0.188972	0.33750	0.45	0.3428	2.87
48 Mobile Homes (lined section)	12	2	7,800	97.5	2058.8	80	164,704	2.26	372,373	1.00	372,373	0.372	0.576	9	0.67	0.197078	0.34500	0.46	0.3527	2.90
	2	3	0	0.0	2058.8	80	164,704	2.26	372,373	1.00	372,373	0.372	0.576	10	0.69	0.146633	0.32500	0.39	0.2836	2.93
125 Mobile Homes & 11 Acres Commercial	3	1	37,440	468.0	2526.8	80	202,144	2.20	444,628	1.00	444,628	0.445	0.688	11.8	0.25	0.187077	0.44250	0.45	0.3428	2.08
	1	5	0	0.0	2526.8	80	202,144	2.20	444,628	1.00	444,628	0.445	0.688	11.8	0.25	0.187077	0.44250	0.45	0.3428	2.08
	5	36	0	0.0	2526.8	80	202,144	2.20	444,628	1.00	444,628	0.445	0.688	11.8	0.25	0.187077	0.44250	0.45	0.3428	2.08
	36	34	0	0.0	2526.8	80	202,144	2.20	444,628	1.00	444,628	0.445	0.688	11.8	0.25	0.187077	0.44250	0.45	0.3428	2.08
	34	33	0	0.0	2526.8	80	202,144	2.20	444,628	1.00	444,628	0.445	0.688	11.8	0.25	0.187077	0.44250	0.45	0.3428	2.08

	Total Pop.	Min Slope	Max dn/D	Min Vel.
	2,527	0.25	0.49	1.85

Max Vel. 2.19

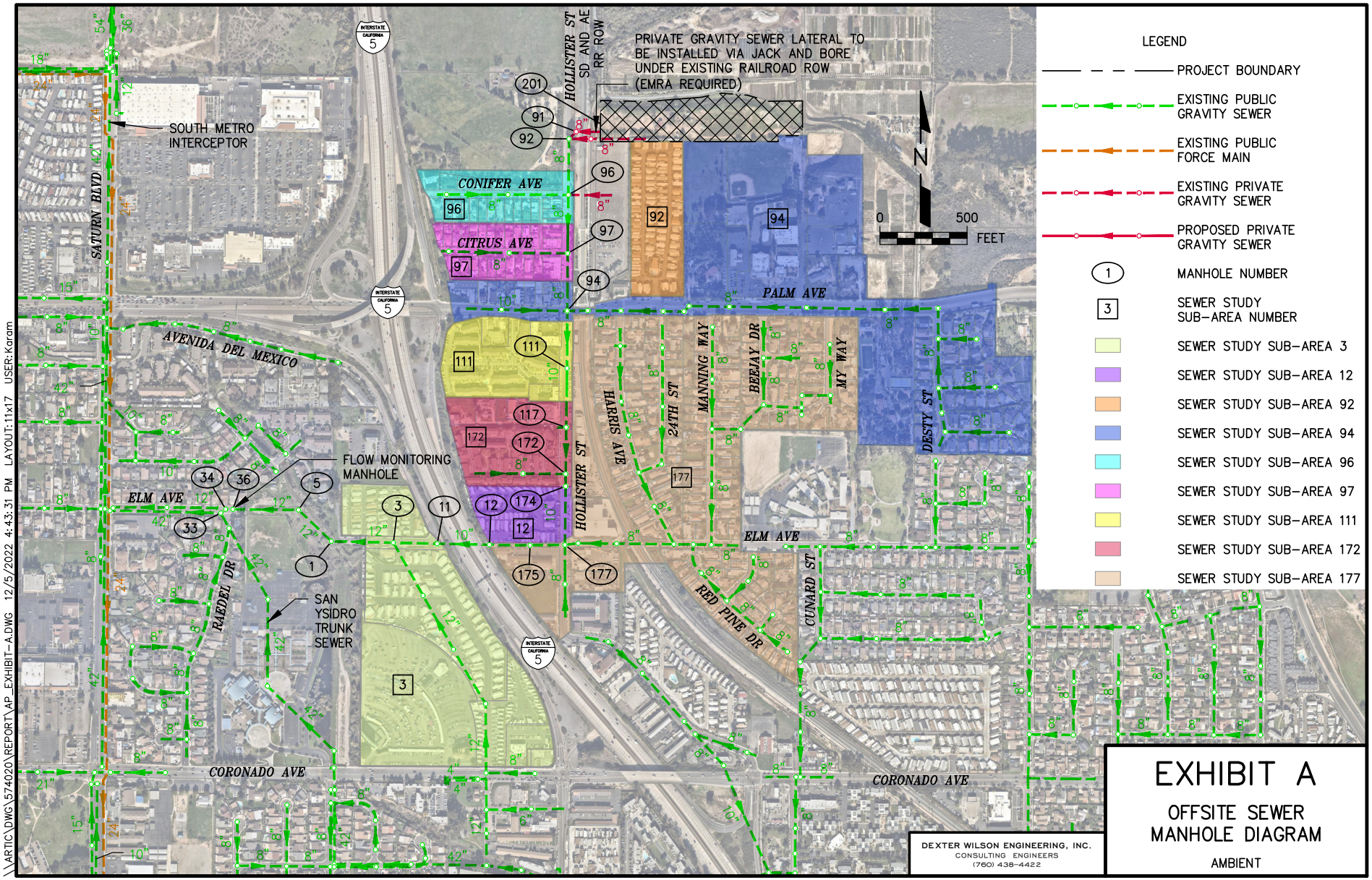
LU = Land Use Area

* Average Flow Based on Temporary Flow Monitoring

1 K' based on n = 0.013

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

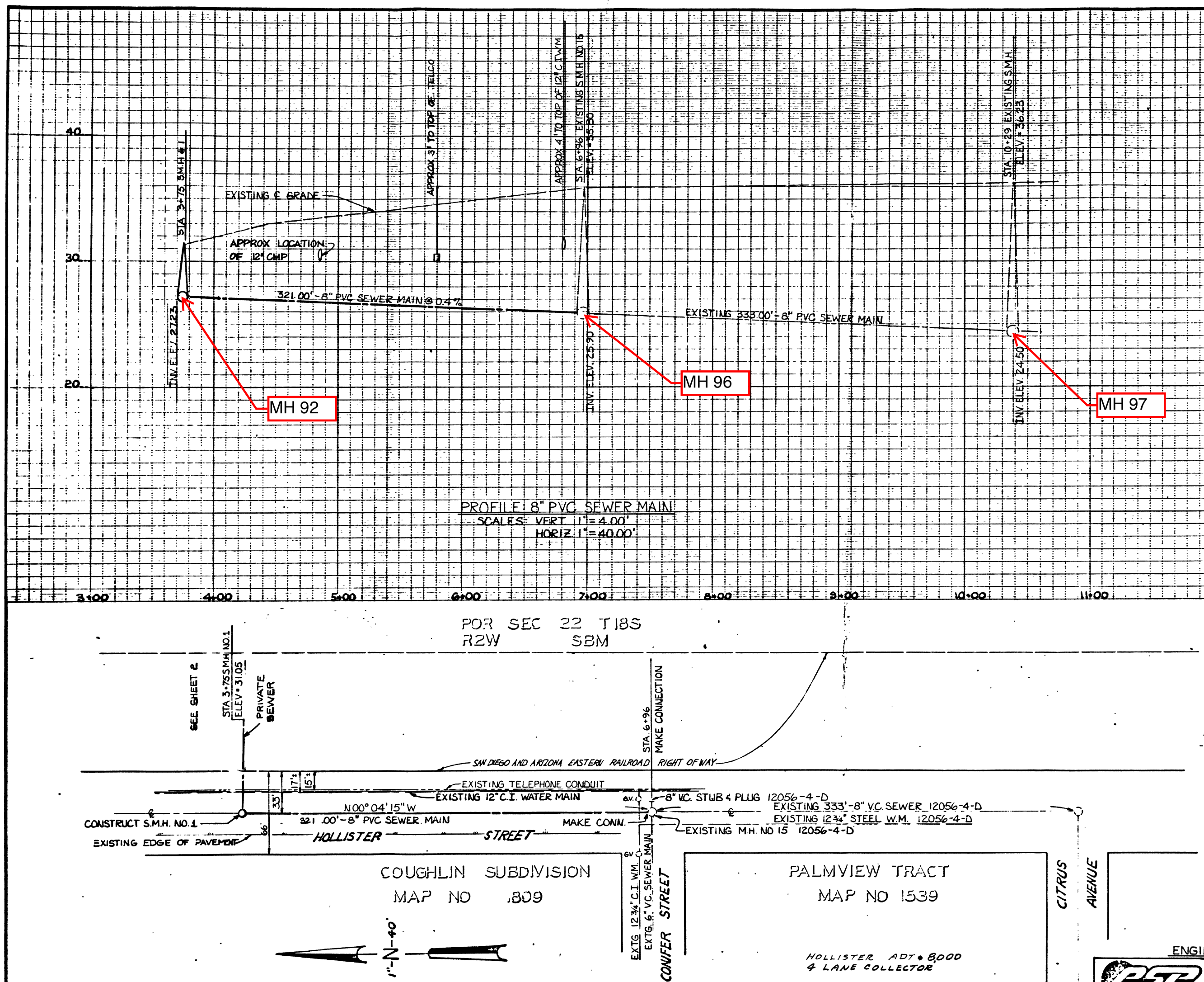
3 From Brater King Table 7-4 based on dn/D



\\ARTIC\DWG\574020\REPORT\AP_EXHIBIT-A.DWG 12/5/2022 4:43:31 PM LAYOUT:11x17 USER:Karam

APPENDIX E

AS-BUILT DRAWINGS



WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND THE SPECIFICATIONS AND STANDARD DRAWINGS OF THE CITY OF SAN DIEGO.

STANDARD SPECIFICATIONS

1. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (1982 EDITION),
2. STANDARD SPECIAL PROVISIONS, AND
3. CITY OF SAN DIEGO STANDARD SPECIAL PROVISIONS, DOCUMENT NO. 768688, FILED MAY 5, 1983.
4. STANDARD SPECIAL PROVISIONS ADDENDUM PERTAINING TO STREET LIGHTING, DOCUMENT NO 768664, FILED APRIL 6, 1983,
5. CALIFORNIA DEPARTMENT OF TRANSPORTATION, "MANUAL OF TRAFFIC CONTROLS, FOR CONSTRUCTION AND MAINTENANCE WORK ZONES," (1985 EDITION), DOCUMENT NO. 769159, FILED APRIL 16, 1985.

STANDARD DRAWINGS

1. SAN DIEGO REGIONAL STANDARD DRAWINGS (1982 EDITION), AND
2. CITY OF SAN DIEGO STANDARD DRAWINGS, DOCUMENT NO 768710, FILED JUNE 22, 1983.

LEGEND

	ITEM	STD. DWG.	SYMBOL
SIMPSON	8" P.V.C. SEWER	S4.1	8" PVC SEWER
	SEWER MANOLE	S-17.1	O
	TRENCH RESURFACING	SDG. 105, 107	

NOTES

1. THERE WILL BE NO SITE DEVELOPMENT AS PART OF THIS PROJECT. SHOULD SITE DEVELOPMENT BE REQUIRED AT A LATER DATE, A SEPARATE LAND DEVELOPMENT PERMIT WILL BE OBTAINED.
2. ALL UTILITY AGENCIES SHALL BE NOTIFIED BY THE CONTRACTOR PRIOR TO BEGINNING CONSTRUCTION ON THIS PROJECT.

CONTACT:
- UNDERGROUND SERVICE ALERT (800) 422-4133
- WATER AND SEWER 236-5650
- COMMUNICATIONS DIVISION 236-5505
- BUILDING AND IRRIGATION 236-5500
- CABLE T.V. (COX) 262-1122

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

JERRY A. HELMS — R.C.E. 26548 DATE 10-24-84
1927 ADAMS AVENUE—SAN DIEGO, CA. 92116 ~ (619) 295-4107

REFERENCE DRAWINGS

4459-I-D, 12403-D-D

BENCH MARK
PALM AVE. AND HOLLISTER ST. SW.B.P.
ELEV = 40.452

LOCATION & KEY MAP
NO SCALE

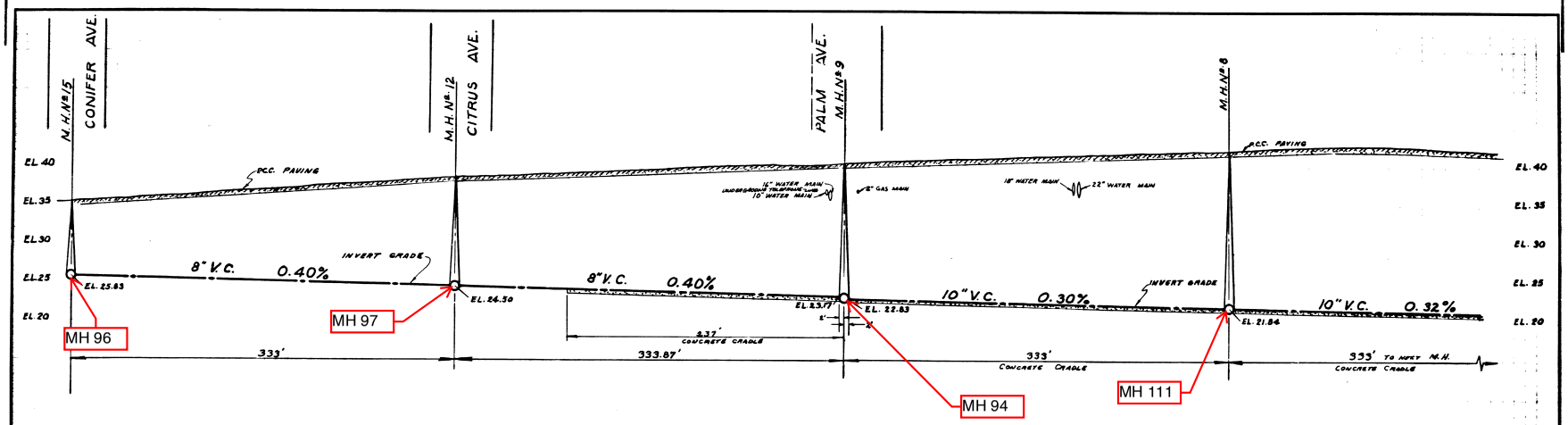
ENGINEER OF WORK
PACIFIC-SOUTHWEST ENGINEERING
1927 Adams Avenue San Diego, CA 92116 (714) 295-4107
JERRY A. HELMS R.C.E. 26548 10-24-84 DATE

PRIVATE CONTRACT ENGINEERING PERMIT NO W-30335
IMPROVEMENT PLAN FOR THE INSTALLATION OF THE 8" P.V.C. SEWER IN HOLLISTER ST. AND A PORTION OF SEC. 22 T. 18S R2W SBM

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 1 OF 2 SHEETS
W.O. NO. 700655
4-5-85
"AS BUILT"
152-1743
CONTRACTOR VIEWLAND DATE STARTED 11-4-85
INSPECTOR D. HARRIS DATE COMPLETED 2-27-86
21819-I-D

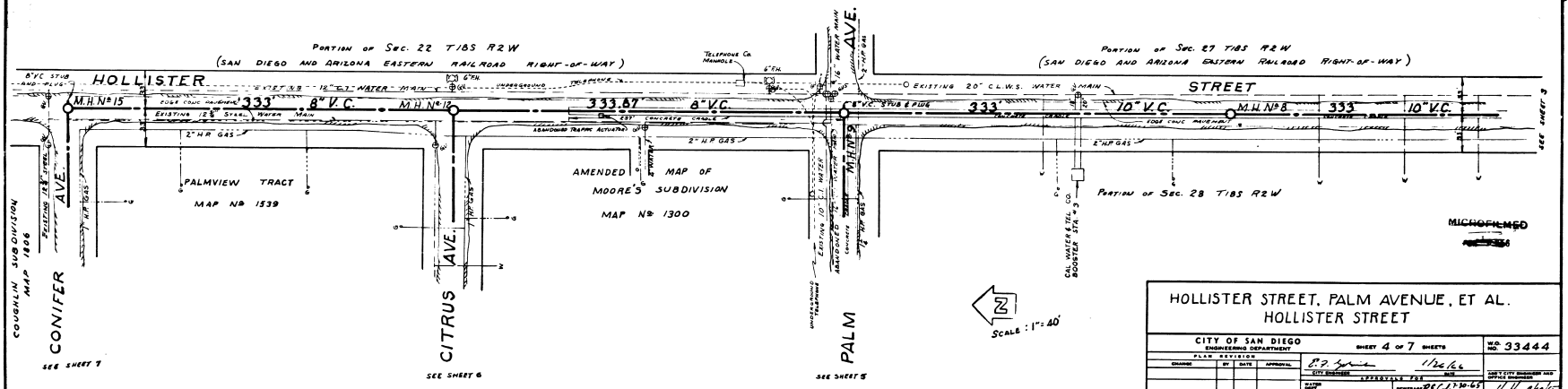
AS BUILT

W-30335
W.O. # 700655 8" P.V.C. SEWER HOLLISTER ST. AS-BUILTS
SEE W/CHANGES (AS BUILT IN FIELD CHANGES)



PROFILE OF SEWER MAIN

SCALE: HORIZONTAL 1" = 40'
VERTICAL 1" = 6'



MICROFILMED

HOLLISTER STREET, PALM AVENUE, ET AL.
HOLLISTER STREET

CITY OF SAN DIEGO
ENGINEERING DEPARTMENT
SHEET 4 OF 7 SHEETS
W.O. NO. 33444

PLAN REVISION

CHANGE	BY	DATE	APPROVAL

CITY ENGINEER 12/26/66

APPROVALS FOR

WATER DIST.		REVISIONS	RE 1-30-67
PLANNING		DRAINAGE	
ELECTRICAL		HIGHWAY	
STRUCTURAL		BRIDGE	
TRAFFIC		CONTROL	
MONUMENTS			

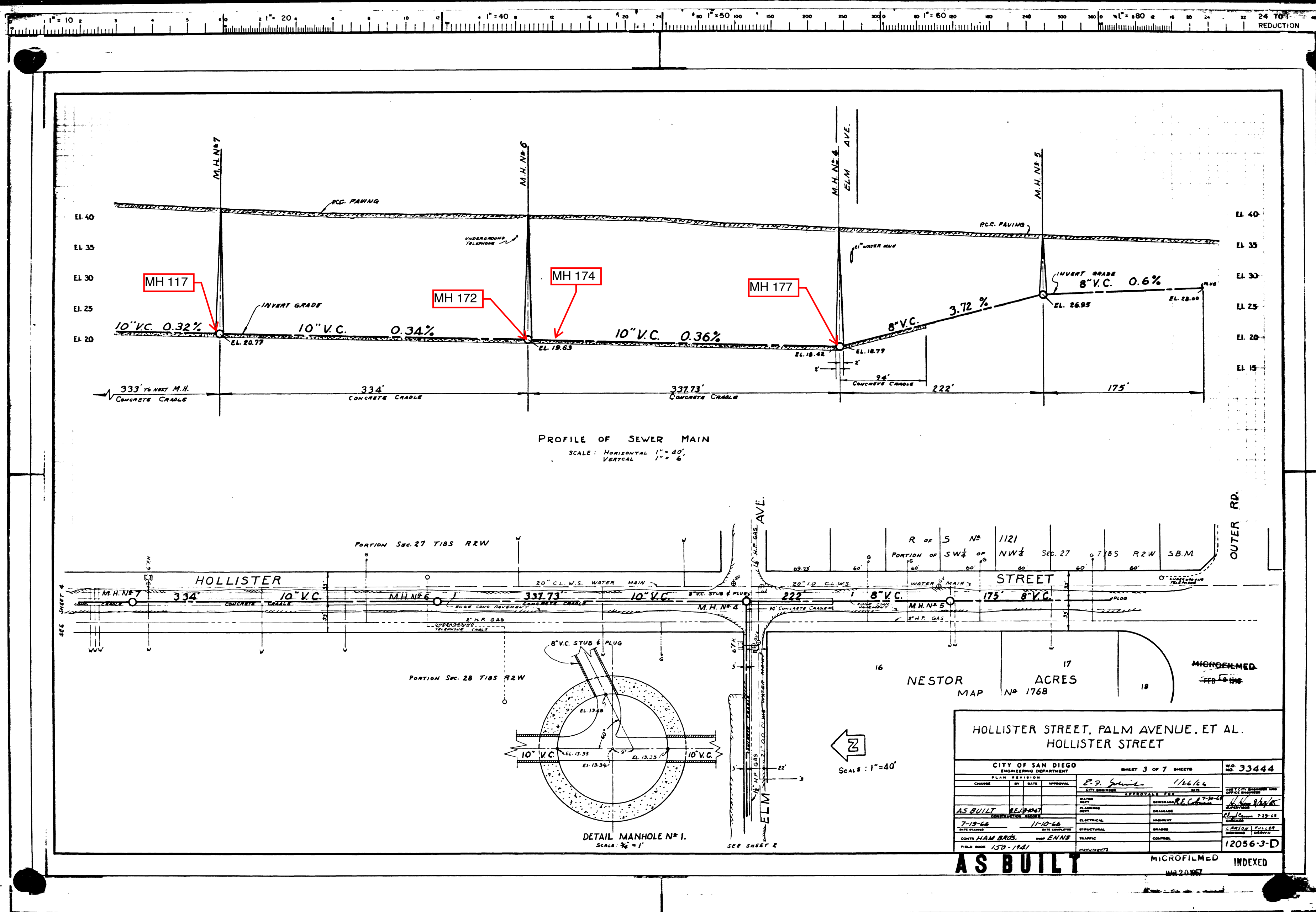
AS BUILT 12-13-66
CONSTRUCTION RECORD
T-18-66 DATE STARTED
11-10-66 DATE COMPLETED
CONTR. HAM BROS. INSP. ENNS
FIELD BOOK 150 - 1741

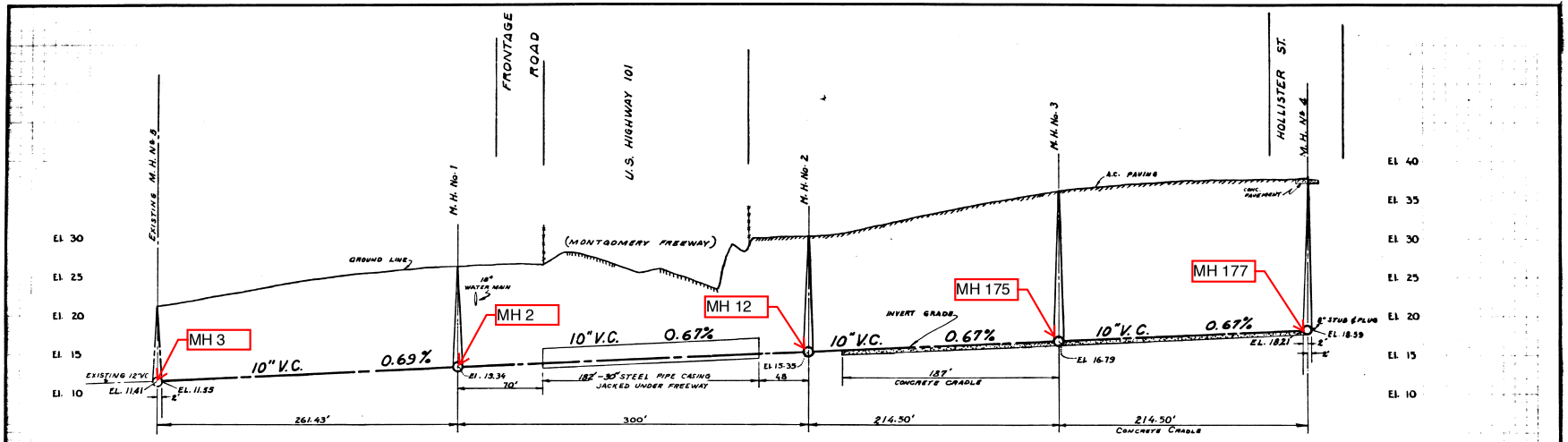
CARSON FULLER
DESIGNED DRAWN
12056-4-D

AS BUILT

MICROFILMED
MAR 20 1967

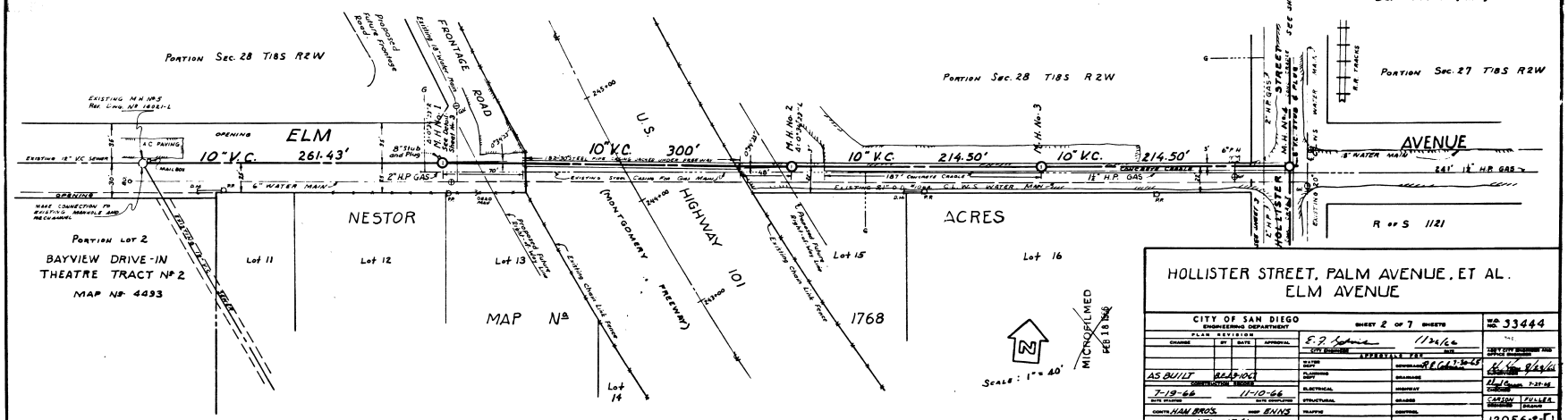
INDEXED


MH 117
MH 172
MH 174
MH 177
M.H. № 7
M.H. № 6
M.H. № 4
ELM AVE.
M.H. № 5
R.C. PAVING
INVERT GRADE
10" V.C. 0.32%
10" V.C. 0.34%
10" V.C. 0.36%
8" V.C. 3.72 %
8" V.C. 0.6%
EL. 20.77
EL. 19.63
EL. 18.42
EL. 18.77
EL. 26.95
EL. 28.00
333' TO NEXT M.H.
CONCRETE CRADLE
334'
337.73'
94'
222'
175'
PROFILE OF SEWER MAIN
SCALE: HORIZONTAL 1" = 40'
VERTICAL 1" = 6'
HOLLISTER
STREET
AVE.
ELM
OUTER RD.
20" C.L.W.S. WATER MAIN
PORTION SEC. 27 T18S R2W
PORTION SEC. 28 T18S R2W
R OF S № 1121
PORTION OF SW¼ OF NW¼ SEC. 27 T18S R2W S.B.M.
8" V.C. STUB & PLUG
16
17
18
NESTOR ACRES
MAP № 1768
SCALE: 1" = 40'
DETAIL MANHOLE № 1.
SCALE: 3/8" = 1'
SEE SHEET 2
SEE SHEET 4
MICROFILMED
HOLLISTER STREET, PALM AVENUE, ET AL.
HOLLISTER STREET
CITY OF SAN DIEGO
ENGINEERING DEPARTMENT
SHEET 3 OF 7 SHEETS
W.O. NO. 33444
AS BUILT
7-19-66
11-10-66
HAM BROS.
ENNS
150-1941
12056-3-D
AS BUILT
MICROFILMED
INDEXED
24 TO 1 REDUCTION



PROFILE OF SEWER MAIN
SCALE: HORIZONTAL 1" = 40'
VERTICAL 1" = 6'

BENCH MARK: U.S.C.&G.S. Mon. 40' N'LY & PALM AND 70' E'LY of MAIN TRACK S.D. & A.E.R.R. EL. = 44.35 (M.S.L.)

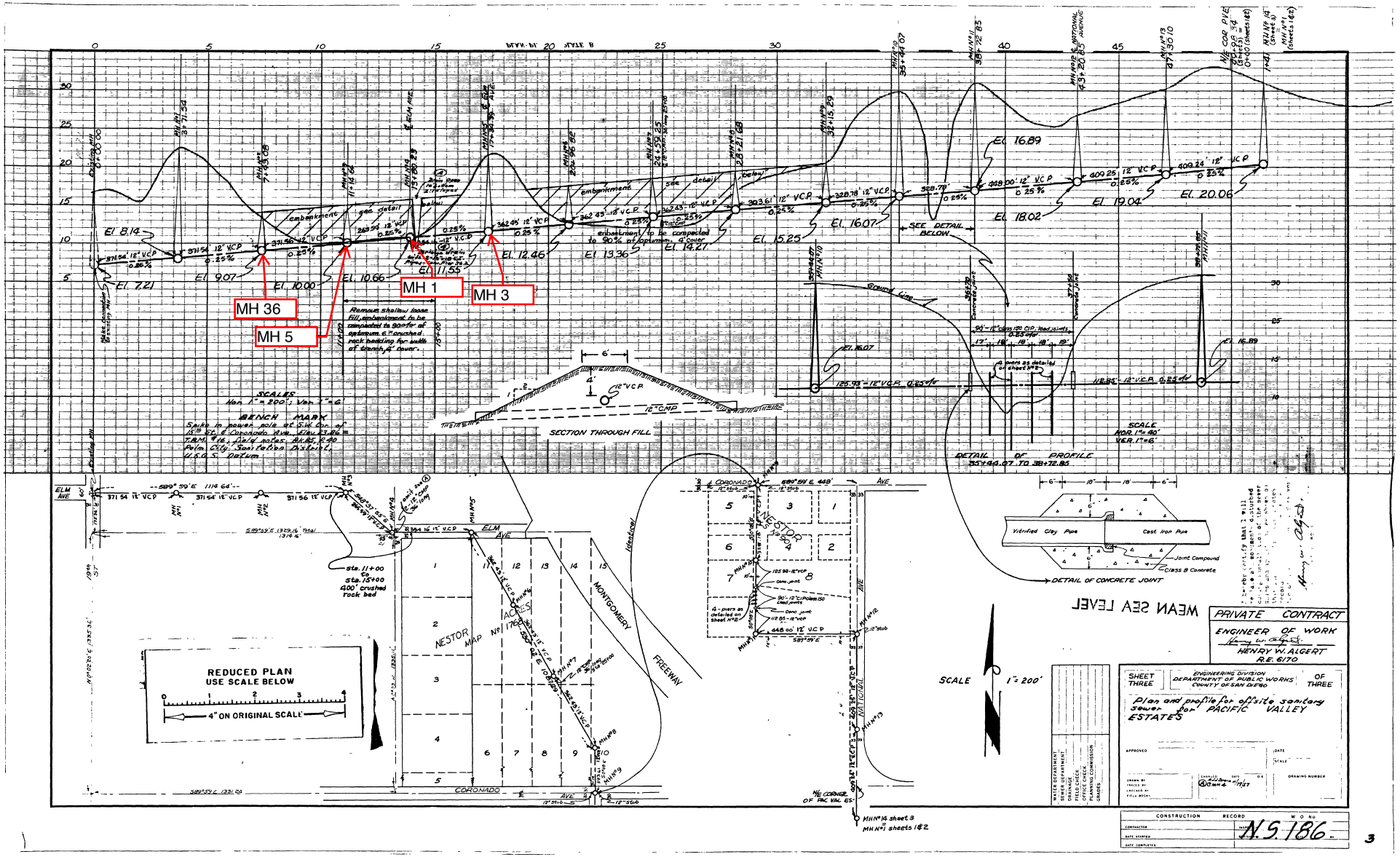


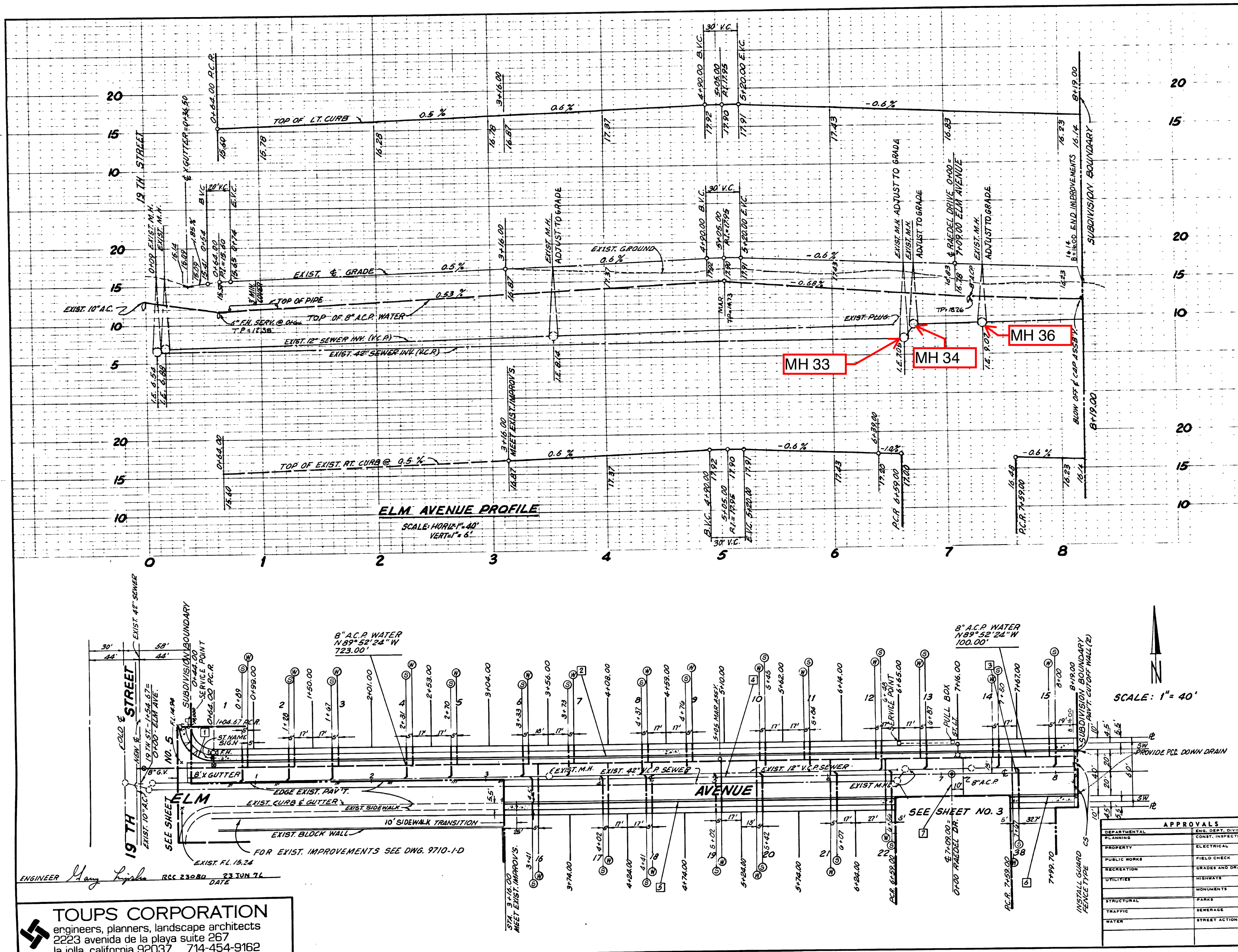
HOLLISTER STREET, PALM AVENUE, ET AL.
ELM AVENUE

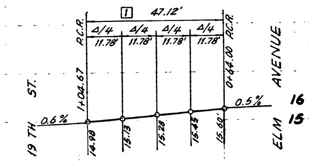
CITY OF SAN DIEGO
ENGINEERING DEPARTMENT
SHEET 2 OF 7 SHEETS
W.O. No. 33444
12056-2-D

AS BUILT

MICROFILMED
MICROFILMED INDEXED


MH 36
MH 5
MH 1
MH 3
SCALES
Hor. 1"=200'; Ver. 1"=6'
BENCH MARK
SECTION THROUGH FILL
DETAIL OF PROFILE
35+44.07 TO 38+72.85
SCALE
HOR. 1"= 40'
VER. 1"=6'
DETAIL OF CONCRETE JOINT
Vitrified Clay Pipe
Cast Iron Pipe
Joint Compound
Class B Concrete
MEAN SEA LEVEL
REDUCED PLAN
USE SCALE BELOW
4" ON ORIGINAL SCALE
NESTOR MAP No 1700
ELM AVE
CORONADO AVE
MONTGOMERY
FREEWAY
NATIONAL
SCALE 1" = 200'
PRIVATE CONTRACT
ENGINEER OF WORK
HENRY W. ALGERT
R.E. 6170
SHEET THREE
ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
COUNTY OF SAN DIEGO
OF THREE
Plan and profile for offsite sanitary sewer for PACIFIC VALLEY ESTATES
CONSTRUCTION RECORD
W.O. No
N.S. 186





CURB RETURN PROFILE

SCALE: 1"= 20' HORIZ.
1"= 3' VERTICAL

BENCH MARK:
SE COR. CORONADO AVE.
& 19 TH ST. BRASS PLUG
EL. 43.526 M.S.L.

TABULATION OF ℄ AND CURB

	NO.	BEARING					Δ			R	T	L
RT. CB.	1						90	00	00	30'		47.12
RT. CB.	2	N	89°	52'	24"	W						755.00
℄	3	N	89	52	24	W						110.00
LT. CB.	4	N	89	52	24	W						393.00
LT. CB.	5	N	89	52	24	W						343.00
LT. CB.	6	N	89	52	24	W						60.00
LT. CB.	7	N	0	07	36	E						18.50

THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION UNTIL THE NOTICE TO PROCEED OR A BONDED SUBDIVISION PERMIT HAS BEEN ISSUED BY THE CITY ENGINEER.

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF

ELM AVENUE

IN CORONADO HIGHLANDS UNIT 1 RESUBDIVISION

CITY OF SAN DIEGO, CALIFORNIA
SHEET 2 OF 9 SHEETS

W.O. 70543
T.M. 75-158

AS-BUILT

T.M. ENGINEER

150-1739

CONTRACTOR LARWIN DATE STARTED
INSPECTOR DATE COMPLETED 9-15-78

16898-2-D

APPROVALS	
DEPARTMENTAL	ENG. DEPT. DIVISION OR SECTION
PLANNING	CONST. INSPECTION
PROPERTY	ELECTRICAL
PUBLIC WORKS	FIELD CHECK
RECREATION	GRADES AND DRAINS
UTILITIES	HIGHWAYS
	MONUMENTS
STRUCTURAL	PARKS
TRAFFIC	SEWERAGE
WATER	STREET ACTIONS

ENGINEER Gary Lipska RCE 23080 23 JUN 76 DATE

TOUPS CORPORATION
engineers, planners, landscape architects
2223 avenida de la playa suite 267
la jolla, california 92037 714-454-9162