DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

SEWER SYSTEM ANALYSIS FOR THE PACIFICA PROJECT IN THE CITY OF OCEANSIDE

June 20, 2023

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

SEWER SYSTEM ANALYSIS
FOR THE PACIFICA PROJECT
IN THE CITY OF OCEANSIDE

June 20, 2023

6-20-2023

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
(760) 438-4422

Job No. 1043-002

TABLE OF CONTENTS

PAGE NO.

APPENDICES

EXHIBIT

LIST OF TABLES

PAGE NO.

LIST OF FIGURES

PAGE NO.

DEXTER WILSON ENGINEERING, INC.

DEXTER S. WILSON, P.E.
ANDREW M. OVEN, P.E.
NATALIE J. FRASCHETTI, P.E.
STEVEN J. HENDERSON, P.E.
FERNANDO FREGOSO, P.E.
KATHLEEN L. HEITT, P.E.

June 20, 2023 1043-002

MLC Holdings, Inc.
5 Peters Canyon Road, Suite 310
Irvine, CA 92606

Attention: Johanna Crooker, Director of Forward Planning

Subject: Sewer System Analysis for the Pacifica Project in the City of Oceanside

Introduction and Purpose

The Pacifica project is located in the City of Oceanside southwest of Monica Circle/Macario Drive and west of Roja Drive. Access to the project is from Monica Circle/Macario Drive and Malaga Drive. Sewer service for the Pacifica project will be provided by the City of Oceanside.

The proposed Pacifica project is a residential development on an approximately 14.55-acre parcel (APN 157-070-42 and 122-190-19). It is situated within a previous elementary school site. The proposed project would develop 164 townhome residential units. Finished floor elevations within the project range from a low of 97 feet to a high of 105 feet in elevation.

The purpose of this letter-report is to analyze the existing and proposed sewer system for the Pacifica project and determine if there are any sewer system deficiencies created by the proposed development of this property.

A Vicinity Map for the project is shown on Figure 1 and a preliminary site plan for the project is included in Appendix A.

Sewer System Design Criteria

The design criteria used for the evaluation of the offsite sewerage system impacts by the Pacifica project are based on the City of Oceanside Water Utilities Department, Water, Sewer, and Reclaimed Water Design & Construction Manual, August 2017, Section 3, Sewer Systems Design Guidelines (Design & Construction Manual), and Sewer Master Plan, unless otherwise indicated. A copy of the pertinent sections in the City's Manual and Master Plan where the design criteria is located is attached as Appendix B.

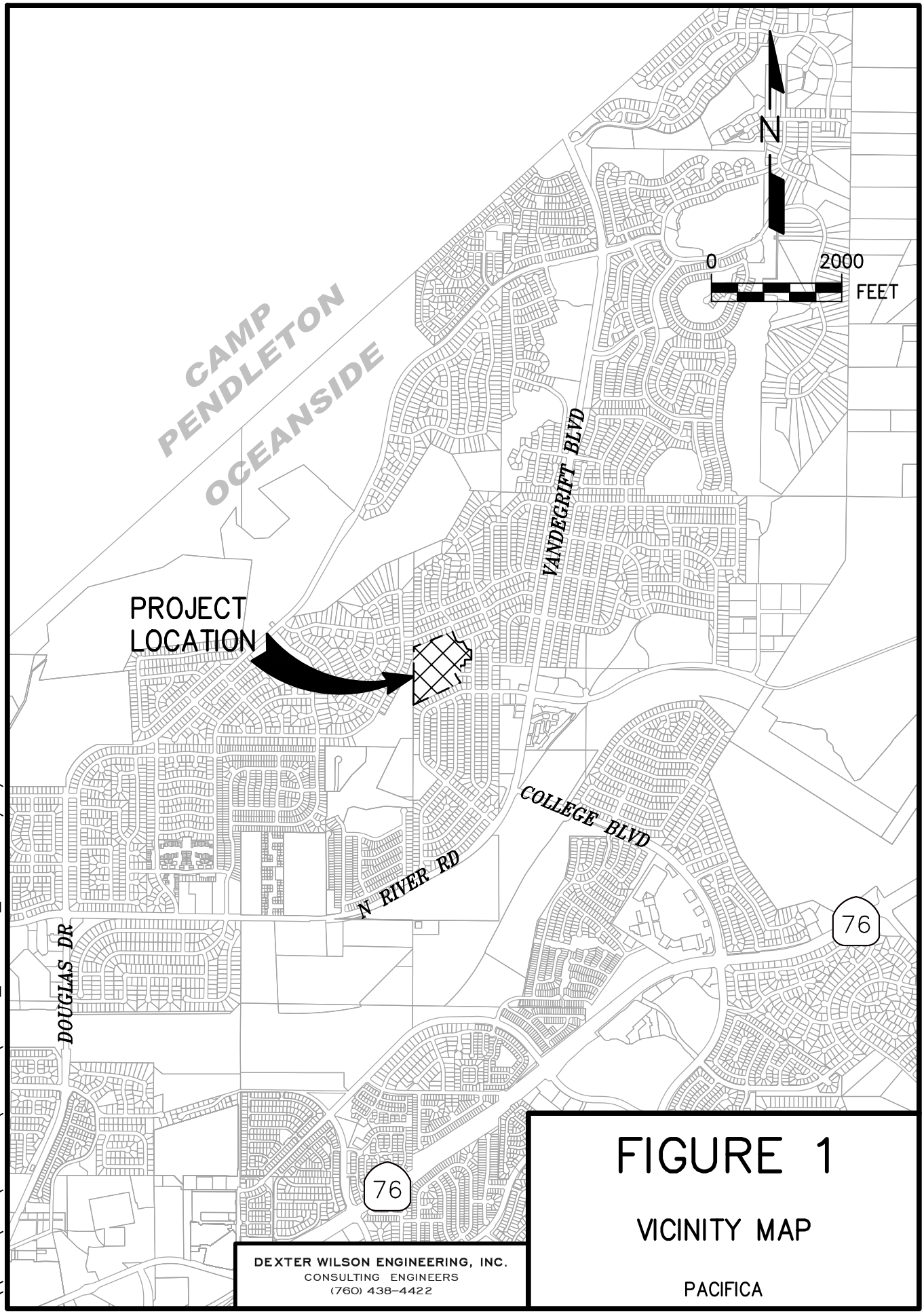
Sewer Generation Rates. The sewer generation rates for the project and surrounding area are presented as Table 1 below.

TABLE 1
PACIFICA PROJECT
CITY OF OCEANSIDE SEWER GENERATION RATES

Land Use	Generation Rate
Low-Density (Single-Family) Residential	170 gpd/DU
Mid-Density (Multi-Family) Residential	140 gpd/DU
Industrial & Commercial	1,000 gpd/ac
Hotels	100 gpd/room

Peaking Factors

The peaking factor for residential development is identified in the City of Oceanside Design & Construction Manual. To convert average dry weather flows to peak wet weather flows, the peaking factors in Table 2 were used.



\\ARTIC\DWG\1043002\REPORT\PWSSA_FIGURE-1_VM.DWG 3/17/2023 10:17:37 AM LAYOUT:8x11 USER:Donald

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

FIGURE 1

VICINITY MAP

PACIFICA

TABLE 2
CITY OF OCEANSIDE PEAKING FACTORS[1]

Population	Peak Factor
< 500	3.5
500-1000	2.75
1000-5000	2.50

[1] 70 gpd per person

The peaking factor for non-residential flow (i.e. industrial, commercial, hotels, etc.) is given as a formula in the Design & Construction Manual. The formula is stated: $Q_p = 1.84 \times Q_a^{0.92}$, where Q_p equals peak flow in cubic feet per second (cfs) and Q_a equals average flow in cfs.

Manning's "n"

The gravity sewer analyses are prepared using a computer spreadsheet calculation which uses the Manning Equation for all of its calculations. The Manning's "n" used by the computer spreadsheet calculation is held as a constant for all depths in a circular conduit. The value of Manning's "n" used for this study is 0.013 per the City's Design & Construction Manual and Master Plan.

Depth and Velocity of Flow in Gravity Sewers

Gravity sewer lines are designed to convey peak wet weather flow. New sewer pipelines 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. New sewer pipelines 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. Existing sewer pipelines are required to convey the peak wet with a maximum d/D ratio of 1.0.

Onsite Gravity Sewer Lines

For evaluation of the proposed onsite public and private gravity sewer lines, City standards akin to offsite public sewer lines were used. Minimum size and slope are 8-inch diameter and 0.4 percent respectively for all proposed onsite gravity sewer lines.

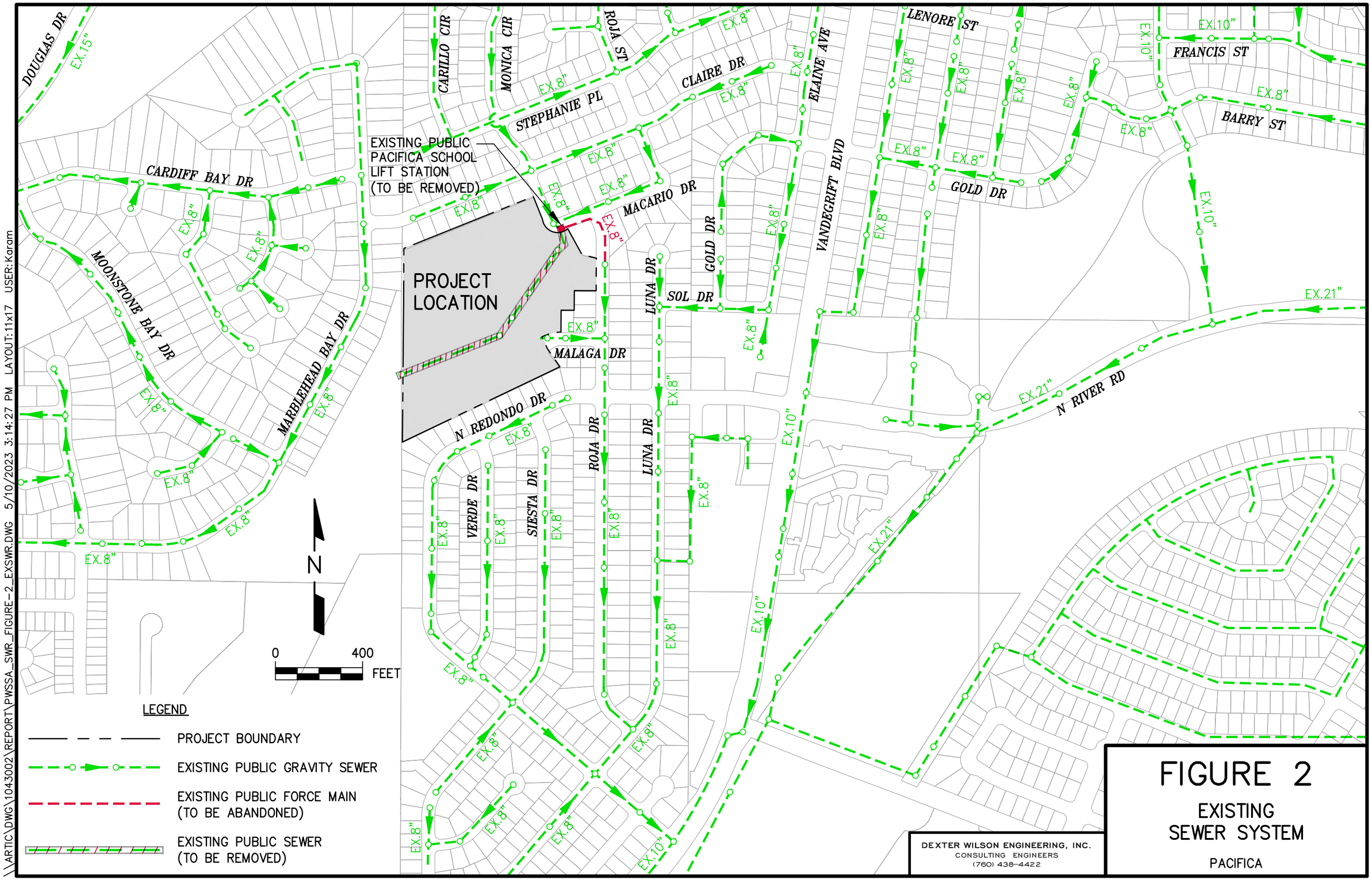
Existing Sewer System

There are two existing gravity sewer lines that are adjacent to the project site, of which, only one will be utilized to serve the project. The first adjacent sewer line is an 8-inch diameter gravity line that terminates at an existing public sewer lift station (Pacifica School Lift Station). This exiting sewer line and corresponding Pacifica School Lift Station will not be utilized by the project. The existing Pacifica School Lift Station will be removed and corresponding force main will be abandoned and both relocated to a new site within the project area.

The second adjacent sewer line is an 8-inch diameter line in Malaga Drive at the southeastern boundary of the project. This sewer line will be utilized by the project and conveys flow via Roja Drive, Luna Drive, and Redondo Drive southward and ultimately connects to the trunk sewer line in North River Road.

Figure 2 presents the existing public sewer facilities within the project area. Appendix B provides the City's 11" x 17" sewer base map for this area as well as the As-Built Drawings.

Existing Sewer Flows. The sewer system analysis for the Pacifica project will need to take into account sewage flows from existing development that is downstream of the project. The Pacifica project will be a relatively upstream development within this particular stretch of gravity sewer along Malaga Drive, Roja Drive, Luna Drive, and Redondo Drive. Table 3 summarizes the projected sewage flows from existing development.



\\ARTIC\DWG\1043002\REPORT\PWSSA_SWR_FIGURE-2_EXSWR.DWG 5/10/2023 3:14:27 PM LAYOUT:11x17 USER:Karam

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

FIGURE 2

EXISTING SEWER SYSTEM

PACIFICA

TABLE 3
EXISTING SEWER FLOWS ALONG MALAGA DRIVE, ROJA DRIVE, LUNA DRIVE, AND REDONDO DRIVE

Description	Quantity	Generation Factor	Average Sewage Flow
Malaga Drive	4 DUs	170 gpd/DU	680 gpd
Roja Drive	59 DUs	170 gpd/DU	10,030 gpd
Luna Drive	450 DUs	170 gpd/DU	76,500 gpd
Redondo Drive	242 DUs	170 gpd/DU	41,140 gpd
Total Average Flow			**128,350**
Total Peak Flow			**360,400**[1]

[1] Total peak flow includes a peaking factor of 2.5 and the additional 93 single family residences (15,810 gpd average flow) from Pacifica School L.S.

Proposed Sewer Facilities

The projected sewer flow from the Pacifica project is based on 164 townhome units and an average generation rate of 140 gpd per multi-family unit. Table 4 provides the summary of projected sewage flows for the project.

TABLE 4
PACIFICA PROJECTED SEWAGE FLOWS

Description	Quantity	Generation Factor	Average Sewage Flow	Peak Sewage Flow[1]
Multi-Family Residential	164 DUs	140 gpd/DU	22,960 gpd (16 gpm)	80,360 gpd (56 gpm)

[1] Total peak flow includes a peaking factor of 3.5

The project will construct a new public gravity sewer line as well as a private gravity collection system onsite that will all flow to a new sewer lift station to be located on the southwest corner of the site. The new public sewer lift station will pump eastward to the existing 8-inch public gravity sewer stub at Malaga Drive.

An additional offsite gravity sewer segment is proposed to be constructed by the Pacifica project at the Redondo Drive and North River Road intersection. Per City comment and direction, this new sewer segment is a realignment that will remove two 90-degree bends.

Onsite Sewer Lift Station. The new onsite sewer lift station will be designed and constructed as a public facility contingent when the existing public Pacifica School Lift Station is removed. The new onsite sewer lift station will be a public facility serving the proposed Pacifica project and existing upstream development that is currently being served by the Pacifica School Lift Station.

The design parameters of the new onsite public sewer lift station are shown in Table 5.

TABLE 5
PACIFICA PROPOSED PUBLIC SEWER LIFT STATION

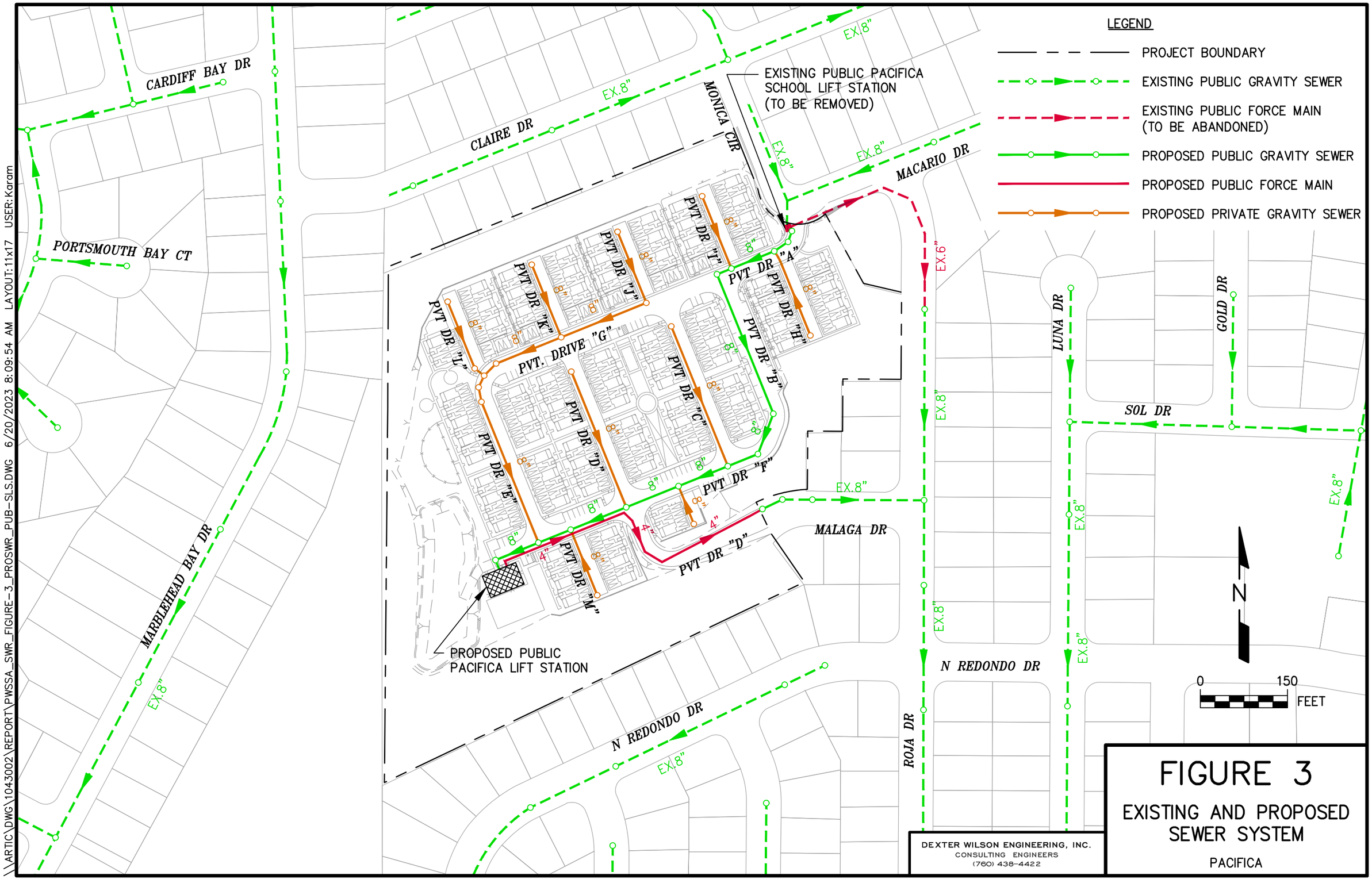
Description	Peak Flow Rate
Public Lift Station	95 gpm[1]

[1] Total peak flow includes the additional peak flow from Pacifica School L.S. tributary area

The lift station will be a duplex submersible pump station, each pump capable of handling the full flow from the project, with either precast concrete or fiberglass wet well, pump control panel, emergency storage basin, and odor control system (if needed).

Based on the flow calculations presented above in Table 5, the peak dry weather flow to the lift station will be 95 gpm. It is recommended to utilize a 4-inch force main to enable adequate solids conveyance. A flow rate of 120 gpm will achieve a velocity of at least 3.0 fps. A 120 gpm design flow rate for the proposed public lift station is recommended to meet the velocity criteria of 3 to 8 fps for sewer forcemains.

The proposed sewer facilities for the Pacifica project are presented on Figure 3. The final configuration of emergency storage, in addition to specific pump, wet well design, odor control, and emergency power will be determined as part of the final design of the sewer lift station. A preliminary sewer lift station layout for Pacifica is shown on Figure 4.



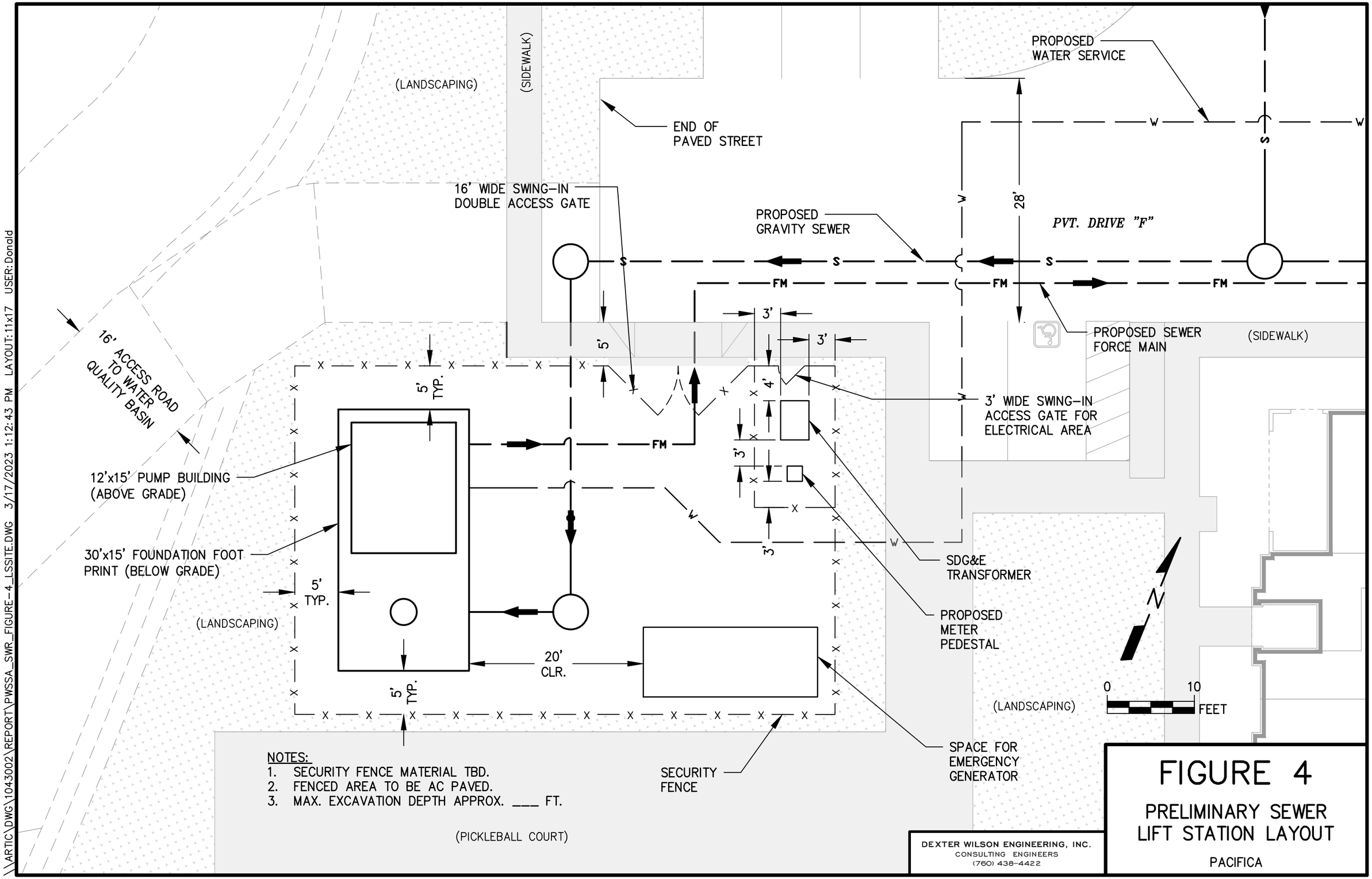
\\ARTIC\DWG\1043002\REPORT\PWSSA_SWR_FIGURE-3_PROSWR_PUB-SLS.DWG 6/20/2023 8:09:54 AM LAYOUT:11x17 USER:Karam

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

FIGURE 3

EXISTING AND PROPOSED SEWER SYSTEM

PACIFICA



\\ARTIC\DWG\1043002\REPORT\PWSSA_SWR_FIGURE-4_LSSITE.DWG 3/17/2023 1:12:43 PM LAYOUT:11x17 USER:Donald

FIGURE 4

PRELIMINARY SEWER LIFT STATION LAYOUT

PACIFICA

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

Sewer System Analysis

To analyze the impact of the Pacifica project on the existing sewer system, a hydraulic analysis was conducted up to the existing trunk sewer line in North River Road. Further analysis of the proposed offsite sewer improvement at the Redondo Drive and North River Road intersection and downstream impacts should be performed before the proposed offsite improvement is finalized. Collaboration with the City regarding existing upstream flows should be considered as part of the proposed offsite sewer improvement analysis.

Appendix C provides the hydraulic analysis output and Exhibit A provides the corresponding Sewer Manhole Diagram. To perform this analysis, we obtained As-Built Drawings of the existing sewer system so that the pipe sizes and slopes could be input into the spreadsheet. A key component of the hydraulic analysis is to estimate existing flows within the sewer lines that will be utilized to serve the Pacifica project. Table 3 provided the summary of existing flows from existing offsite downstream development.

Sewer System Analysis Results

Appendix C presents the results of the hydraulic analysis for the Pacifica project. The results indicate that the existing downstream system has adequate capacity to serve the project (less than 1.0 d/D ratio). With the additional sewer flow from the Pacifica project, all sections of the existing 8-inch sewer lines will flow at, or less than, a 0.64 d/D ratio during peak flow conditions.

A summary of the impacts to the existing downstream gravity sewer to the proposed Pacifica project is shown below in Table 6.

TABLE 6
PACIFICA PROJECT EXISTING DOWNSTREAM SEWER IMPACTS

Existing Downstream Sewer Section	Maximum d/D Ratio		Minimum Velocity, fps	
	Existing Flow	Existing plus Project Flow	Existing Flow	Existing plus Project Flow
8-inch Diameter	0.50	0.64	0.4	2.0

Conclusions and Recommendations

The following conclusions have been made related to providing sewer service to the Pacifica project.

1. The 164-unit Pacifica project can receive sewer service by connecting to a public 8-inch diameter gravity sewer stub in Malaga Drive and connecting to the existing system.

2. Figure 2 provides the existing sewer facilities surrounding the project area.

3. The development of the project is projected to result in an average sewage flow of 22,960 gpd.

4. The project will construct a new public gravity sewer line as well as a private sewer collection system onsite. The onsite collection system will also include a new public sewer lift station which will pump to the proposed connection point at Malaga Road. The new sewer lift station will be a relocation of the existing Pacifica School Lift Station. The new public gravity sewer line constructed onsite will convey flows from the removed existing Pacifica School Lift Station to the new sewer lift station.

5. A sewer system analysis was conducted (see Appendix C) and indicates that all existing downstream sewer lines up to North River Road have adequate capacity to convey peak flows from existing development plus the Pacifica project while maintaining the City required depth-to-diameter ratio of less than 1.0 for existing sewer pipelines. Exhibit A within Appendix C presents the existing tributary sewer system in the greater project vicinity.

6. An additional offsite gravity sewer segment is proposed to be constructed by the Pacifica project at the Redondo Drive and North River Road intersection. Per City comment and direction, this new sewer segment is a realignment that will remove two 90-degree bends. Further analysis of this connection and downstream impacts should be performed before this offsite improvement is finalized. Collaboration with the City regarding existing upstream flows should be considered as part of the analysis.

7. Figure 3 presents the proposed sewer system in the immediate project vicinity.

8. The proposed private onsite gravity sewer system will be designed according to the California Plumbing Code and/or City of Oceanside design standards to comply with all design criteria (depth, velocity, minimum slope, etc.). Proposed sewer lines for the project are recommended to be SDR-35 PVC.

Thank you for the opportunity to assist you with the sewer system planning for the Pacifica project. If you have any questions regarding the information and conclusions presented in this report, please do not hesitate to call.

Dexter Wilson Engineering, Inc.

Steven Henderson, P.E.

Attachments

SH:NF:ru:ah

APPENDIX A

PRELIMINARY SITE PLAN

MONICA CIR.
MACARIO DR.
ROJA DRIVE
ROJA DRIVE
MALAGA DRIVE
SEWER & SD CROSSINGS
PVT. DRIVE "A"
PROJECT BOUNDARY

APPENDIX B

CITY OF OCEANSIDE DESIGN CRITERIA, BASE MAPS, AND AS-BUILT DRAWINGS

SECTION 3 - SEWER SYSTEMS DESIGN GUIDELINES

3.1 GENERAL

A. All sewer system construction shall conform to the most recent edition of the City of Oceanside's Water, Sewer, and Reclaimed Water Design & Construction Manual.

B. If a conflict arises between the requirements in this manual, the order of precedence shall take place:

1. Sections 1-4, Required Notes, & Appendix
2. Standard Drawings
3. Standard Specifications

C. If the standard that is sought does not appear in this Manual, then the following standards shall be utilized in the order listed:

1. State of California Department of Health Services
2. American Water Works Association (AWWA) Standards
3. San Diego County Regional Standard Drawings
4. Standard Specifications for Public Works Construction (SSPWC or "Greenbook"), latest Edition.

Exceptions to this and all other guidelines appearing in this manual may be allowed only upon the approval of the Water Utilities Director.

B. The sewer facilities listed below will require telemetry and control equipment to be incorporated into the design of the facility. The Water Utilities Department will provide specific design requirements when improvement plans are submitted for Plan Check.

1. Treatment Facilities
2. Sewer Lift Stations and force mains
3. Metering Stations

3.2 MAINS

A. Minimum size shall be 8 inches.

B. All mains not meeting the minimum main diameter and material shall be replaced to meet current design requirements. This is applicable for all new commercial, industrial, institutional, and residential developments of four (4) units or more. Where the full replacement length(s) from manhole to manhole along the property frontage length impacts more than one main and significantly exceeds the developed

property(ies) or is deemed in excess of the overall project cost, the developer may pay an in-lieu fee upon the approval of the Water Utilities Director.

C. Slip-lining or replacement of sewer mains 8-inch or larger may be required if the main is determined to be in poor condition per CCTV report.

D. For diameters 10 inches and smaller, maximum depth of flow shall not exceed ½ the diameter. For diameters 12 inches and larger, depth of flow shall not exceed 2/3 the diameter.

E. No vertical or horizontal curves shall be permitted, unless otherwise approved by the Water Utilities Director.

F. The maximum slope of sewer line shall be 14% unless otherwise approved by the Water Utilities Director.

G. If the main and/or lateral is at a depth of 20 feet or more than the type of pipe material must be approved by the Water Utilities Department. Calculations must be provided to the Water Utilities Department to verify that the pipe material will accommodate the design depths.

H. Locations:

1. Alley: Mains shall be offset a minimum of 3 feet from the centerline to clear alley gutter. Separation from waterlines shall be per Oceanside Standard Drawing S-1 and S-1a.

2. Street: Sewer main locations shall be located in center of the street. A minimum 10-foot separation outside of pipe to outside of pipe from waterlines shall be maintained.

3. Streets with 84 feet of right-of-way or more may require special location as approved by the Water Utilities Director.

4. Minimum cover for sewer mains shall be 6 feet below the finished grade, unless otherwise approved by the Water Utilities Director.

I. Minimum Slopes:

A minimum velocity of 2 FPS shall be maintained at peak flow. Where 2 FPS is not attainable, a minimum slope of 1.6% shall be used. When velocities are 2.0 FPS or greater the following design criteria will govern:

Pipe Diameter	Minimum Slope
8 Inch	0.50%
10 Inch and larger	0.40%

J. Demands:

1. Average daily sewer generation rates shall be:

LAND USE	LAND USE CATEGORY	UNITS

Low Density Residential	EA-R, EB-R, SDF-R	170 gpd/EDU
Mid Density Residential	MDA-R, MDB-R, MDC-R, HD-R, UHD-R	140 gpd/EDU
Industrial	LI	1,000 gpd/acre
Commercial	CC, NC, GC, SC, PC, GI, RP-I, CI, PI	1,000 gpd/acre
Hotels		100 gpd/room

Peak daily flows for residential developments, shall be based on a ratio of peak to average flow as shown below:

Population	Ratio of Peak to Average Flow
Less than 500	3.5
500 to 1,000	2.75
1,000 to 5,000	2.50
Greater than 5,000	2.00

3. Peak daily flows for all other uses shall be based on the following formula:

$$Qp = 1.84\ Qa^{.92}$$

Where Qp = Peak Flow in CFS
Qa = Average Flow in CFS

I. Residential area easements shall be constructed by the developer. They shall be fenced on both sides parallel to the easement with a gate at the entrance and the exit. Easements shall be dedicated to the City and maintained by Property Owner with a lock feature.

J. All sewer mains not located within the public right-of-way shall be provided with a minimum 20-foot wide sewer easement. In some special cases, a wider easement may be required; the Water Utilities Director shall determine size. All easements shall be easily accessible to City maintenance equipment with all weather roadways. An access road will be built for trucks and as approved by the Water Utilities Department.

K. All utility easements that contain sewer mains, which will be publicly maintained, shall demonstrate that the largest vehicle within the Sewer Collections Fleet can transverse the streets without damage to both public and private property. The turning radius of this vehicle will be made available upon request.

L. Where water and sewer mains are located within the same easement, the minimum easement size shall be 30 feet wide. All easements shall be easily accessible to the City's maintenance equipment with all-weather access roadways. No trees or structures or building overhang are allowed within the City easements. When easements are located on private properties, the property owner shall keep the easement free and clear of weeds and debris.

M. 3-inch minimum width color coded detector tape marked "SEWER" in 1-½ inch black letters shall be placed on the compacted and graded bedding material one foot above and centered over the sewer main prior to backfilling the trench.

PLANNING AND EVALUATION CRITERIA

The City's sanitary sewer collection system was modeled and evaluated based on the planning criteria defined in this chapter. The planning criteria address the collection system capacity, acceptable gravity sewer pipe slopes, maximum allowable depth of flow, design velocities, and changes in pipe size.

6.1 GRAVITY SEWERS

Gravity sewer pipe capacities are dependent on many factors. The factors include roughness of the pipe, the chosen maximum allowable depth of downstream flow conditions, and limiting velocity and slope. The following sections describe the factors that account for the determination of existing and future pipeline capacities in the City's collection system.

6.1.1 Manning Coefficient (n)

The manning coefficient 'n' is a friction coefficient that varies with respect to pipe material, size of pipe, depth of flow, smoothness of joints, root intrusion, and other factors. For sewer pipes, the manning coefficient typically ranges between 0.011 and 0.017, with 0.013 being a representative value used for system planning purposes. Due to unknown conditions of existing pipelines, a conservative manning "n" factor of 0.013 was initially used for the evaluation of all existing collection system pipelines. Pipe roughness values were adjusted within the stated typical range during calibration. The evaluation of all proposed pipelines used a manning "n" factor of 0.013.

6.1.2 Flow Depth Criteria (d/D)

The primary criterion used to identify capacity deficient sewers or to size new sewer improvements is the maximum flow depth to pipe diameter ratio (d/D). The d/D value is defined as the depth of flow (d) in a pipe during peak (design) flow conditions divided by the pipe's diameter (D). Based on Carollo's experience, City staff input, and industry standards, the criteria listed in Table 6.1 were used. The following paragraphs explain these criteria in more detail.

6.1.2.1 Flow Depth for Existing Sewers

Maximum flow depth criteria for existing sanitary sewers are established based on a number of factors, including the acceptable risk tolerance of the utility, local standards and codes, and other factors. Using a conservative d/D ratio when evaluating existing sewers may lead to unnecessary replacement of existing pipelines. Conversely, lenient flow depth criteria could increase the risk of sanitary sewer overflows (SSOs). Ultimately, the maximum allowable flow depth criteria should be established to be as cost effective as

possible while at the same time reducing the risk of SSOs to the greatest extent possible. For Oceanside, pipelines were flagged if the d/D exceeded 1.0 (i.e., pipelines that surcharged were flagged).

Table 6.1 Maximum Flow Depth Criteria
Sewer System Master Plan Update
City of Oceanside

Maximum Flow Depth for Existing Sewers	
Peak Wet Weather Flow:	Maximum d/D = 1.0
Maximum d/D for New Sewers	
Pipe Diameter (inches)(1)	Maximum d/D Ratio (during Peak Flows)(1)
10 and smaller	0.50
12 and larger	0.67

Note:
(1) Obtained from City of Oceanside's Design and Construction Manual: Section 3- Sewer Systems; http://www.ci.oceanside.ca.us/gov/water/admin/manual.asp

A capacity deficient sewer (i.e., system bottleneck) raises the hydraulic grade line of upstream sewers, leading to backwater conditions. The greater the capacity deficiency, the higher water levels will surcharge upstream of the bottleneck pipeline (or pipelines). The hydraulic model is used to determine "backwater" pipelines in order to specify which specific pipelines are the actual root causes of the capacity deficiency. Capital projects are proposed to provide greater flow capacity for the deficient sewers, which eliminates the backwater conditions that cause surcharging.

The criteria summarized in Table 6.1 was used to evaluate existing sewers in the collection system as part of this Master Plan. However, should a development project be considered that proposes a change to the current zoning or land use density, a more conservative criteria will be used by the City to conduct the evaluation of available capacity. Should a zoning change be proposed by a development project, the criteria established below for the sizing of new sewers will be used. The City will use the more conservative criteria to provide reserve capacity due to the uncertainly inherent with flow estimations during the planning phases of development projects.

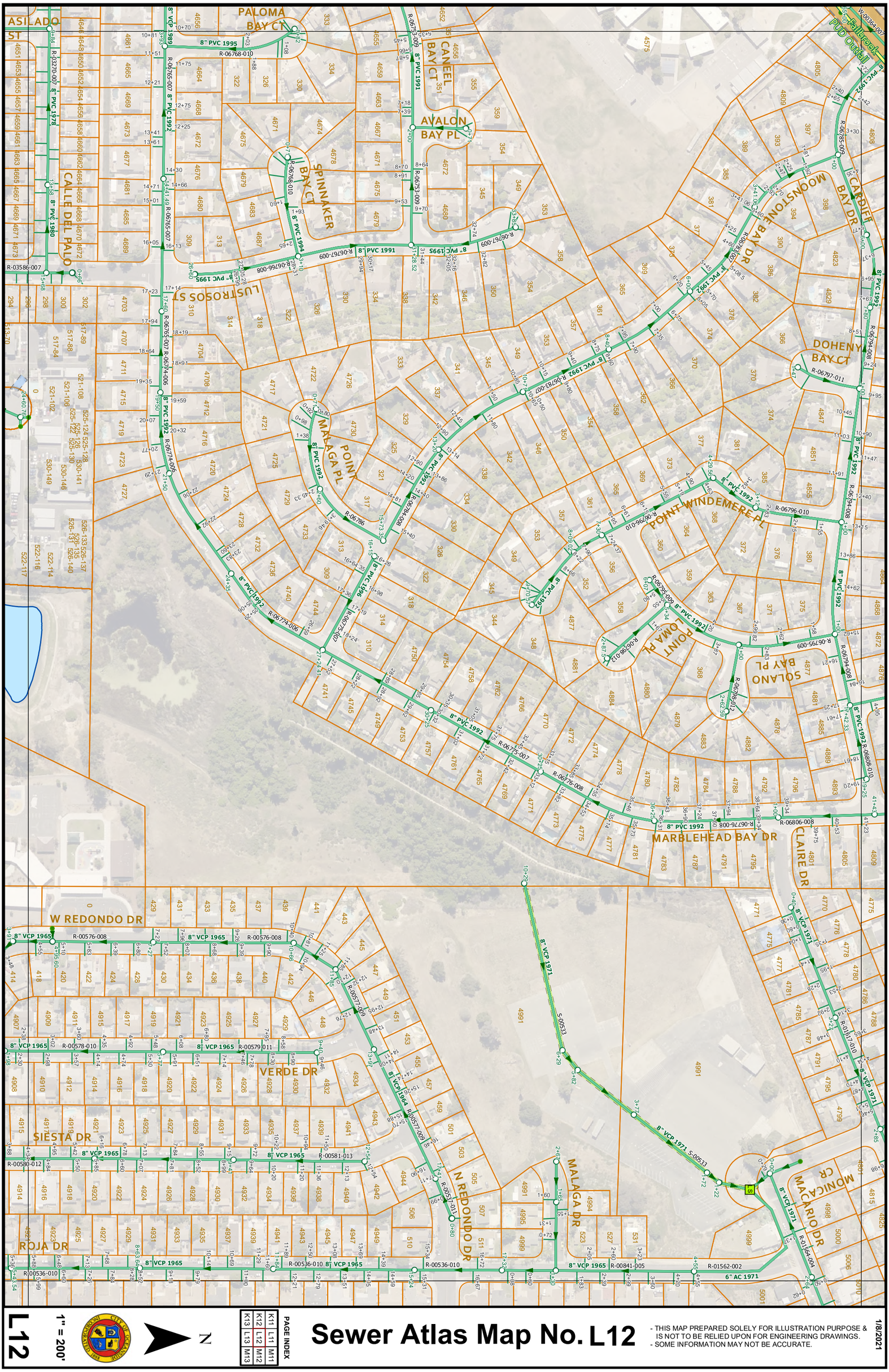
6.1.2.2 Flow Depth for New Sewers

When designing sewer pipelines, it is common practice to adopt different flow depth criteria for various pipe sizes. Design d/D ratios typically range from 0.5 to 0.92, with the lower values typically used for smaller pipes, which may experience flow peaks greater than design flow or blockages from debris, paper, or rags. The City's Water Utilities Department standards for the evaluation of existing sewers and sizing new trunk lines are summarized in Table 6.1. For pipelines 10 inches and smaller in diameter, the max d/D value is 0.5 or

6.2 LIFT STATIONS AND FORCE MAINS

Industry standard practice is to require that sewage lift stations have sufficient capacity to pump peak flows with the largest pump out of service (firm capacity).

Force main piping should be sized to provide a minimum velocity of 3 ft/s at the design flow rate of the lift station and no more than 8 ft/s. For the determination of head loss, the Hazen Williams Equation is used with a C-factor of 120. These factors are typical for sewer system master planning purposes.



L12

1" = 200'

N

K11	L11	M11
K12	L12	M12
K13	L13	M13

PAGE INDEX

Sewer Atlas Map No. L12

- THIS MAP PREPARED SOLELY FOR ILLUSTRATION PURPOSE & IS NOT TO BE RELIED UPON FOR ENGINEERING DRAWINGS.
- SOME INFORMATION MAY NOT BE ACCURATE.

1/8/2021

REVISED DEC. 15th 1964 BY ROY L. KLEMA, ENGINEERS, INC.
Δ ADD M.H. No 6 & 102.15' - 8" V.C.P. TO MALAGA DRIVE.
REVISION APPROVED Alton L. Ruden DATE: 12-16-1964
CITY ENGINEER

BENCH MARK:
Monument @ N.E. corner Section 4, T-11-S, R-4-W.
Elev. 112.721 U.S.G.S.

PLANS APPROVED BY:

CITY ENGINEER DATE

PLANS SUBMITTED BY:
Paul A. Moote 4/20/64
PAUL A. MOOTE R.C.E. 13706 DATE

MOOTE, KEMPA & GALLOWAY, INC.
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS
SANTA ANA CALIFORNIA

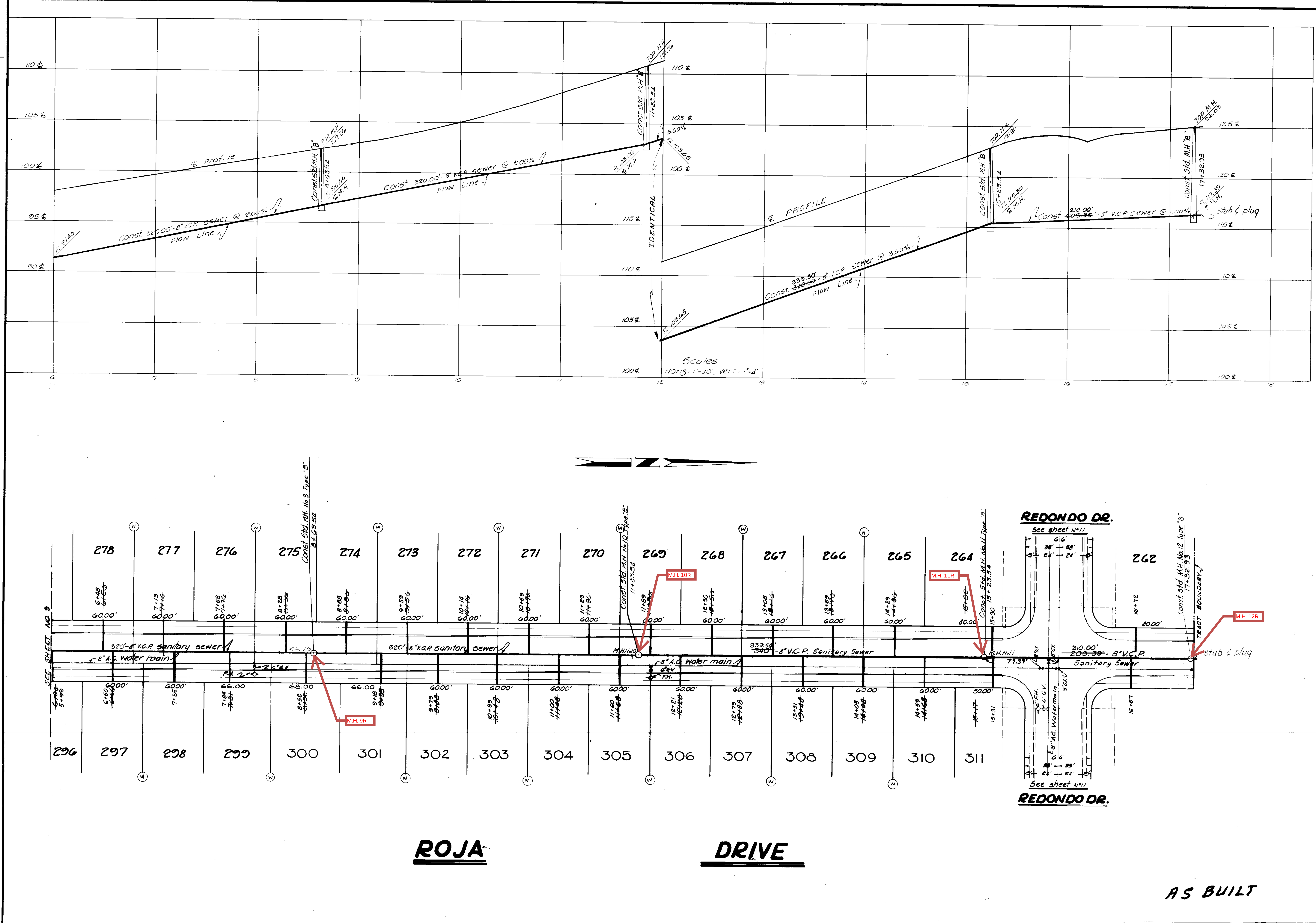
CITY OF OCEANSIDE
PLAN & PROFILES
FOR SEWER & WATER IMPROVEMENTS IN
MISSION VALLEY ESTATES UNIT NO. 4

CITY ENGINEER ALTON L. RUDEN R.E. 10163

Designed R.J.G.	FILE	Date 1-20-64
Checked		Sheet No. 5 OF 6
Approved Alton L. Ruden		No. R-841

SA 2048

DRAWING NUMBER R-841
DRAWING NUMBER R-841
DRAWING NUMBER R-841
DRAWING NUMBER R-841



MISSION VALLEY ESTATES No 3

PART OF N/2 N.E. 1/4 SEC. 6, T.11S. R.4W. S.B.B.&M.

CITY OF OCEANSIDE CALIFORNIA

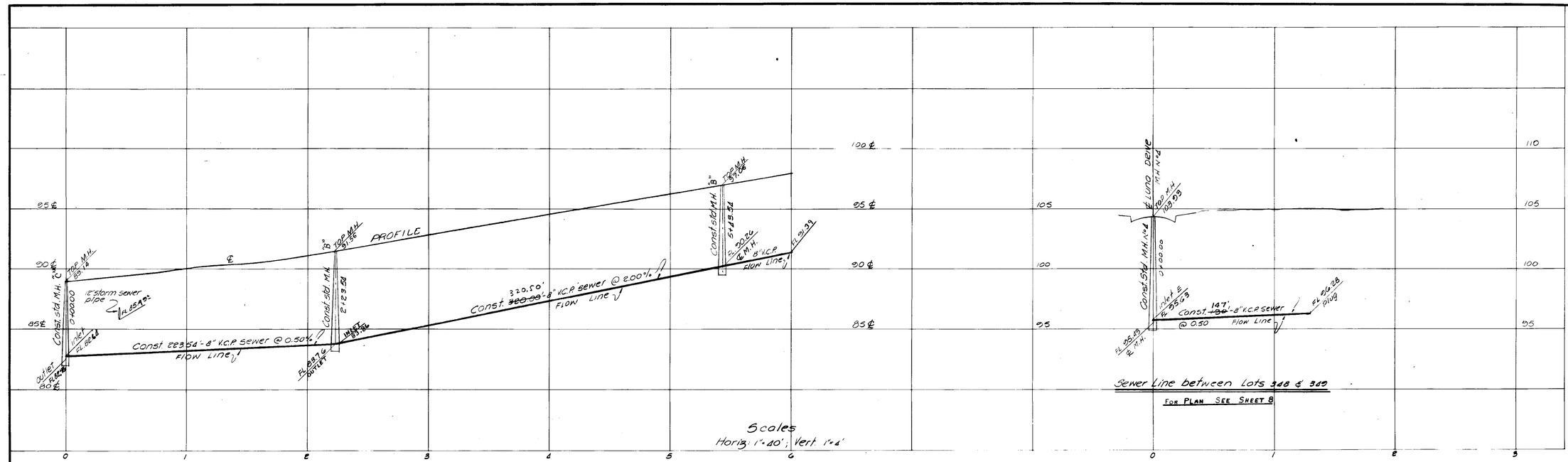
PREPARED FOR BORDUL DEVELOPMENT CO.

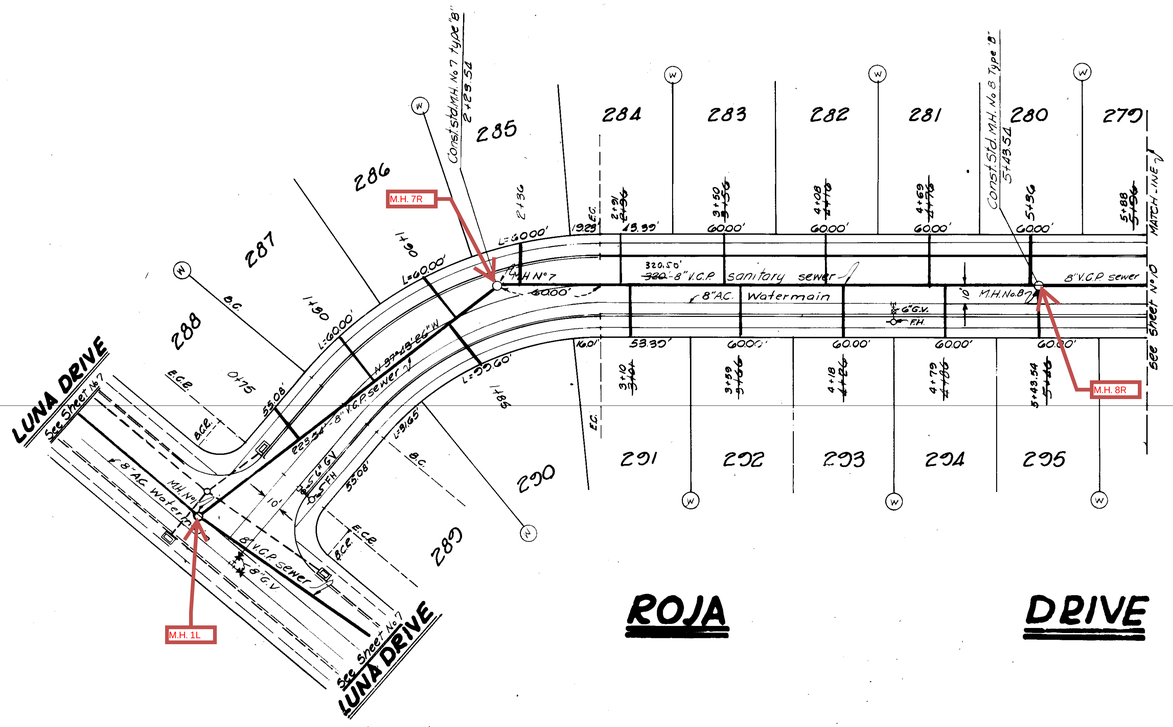
SEWER & WATER MAIN

R. G. KEMPA & ASSOCIATES, INC.
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS

DATE	4-5-63
H. SCALE	1"=40'
V. SCALE	1"=4'
REVISIONS	Revised per R.E.L. 10-21-63; REV AS-BUILT 10-8-64
JOB NO.	2047
SHEET	10
OF	11

R-636





AS BUILT

MISSION VALLEY ESTATES No 3

PART OF W½ N.E.¼ SEC. 1, T.11S. R.4W. S.B.B. & M.
CITY OF OCEANSIDE CALIFORNIA.

PREPARED FOR: S. PROUL DEVELOPMENT CO.

R. G. KEMPA & ASSOCIATES, INC.
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS
SANTA ANA CALIFORNIA

SEWER & WATER MAIN

DATE	1-5-65
DRN.	H.Bowlin
CHD.	
APPD.	
H. SCALE	1"=40'
V. SCALE	1"=4'
F. BOOK	
DR. FILE	

REVISIONS
REV. AS-BUILT 10-6-65

JOB NO. SA 2047

SHEET 9 OF 11

R-535

R-535

LUNA DRIVE

AS BUILT

MISSION VALLEY ESTATES No 3

SEWER & WATER MAIN

R. G. KEMPA & ASSOCIATES, INC.

REV AS-BUILT 10-8-64

JOB SA 2047

7

11

R-533

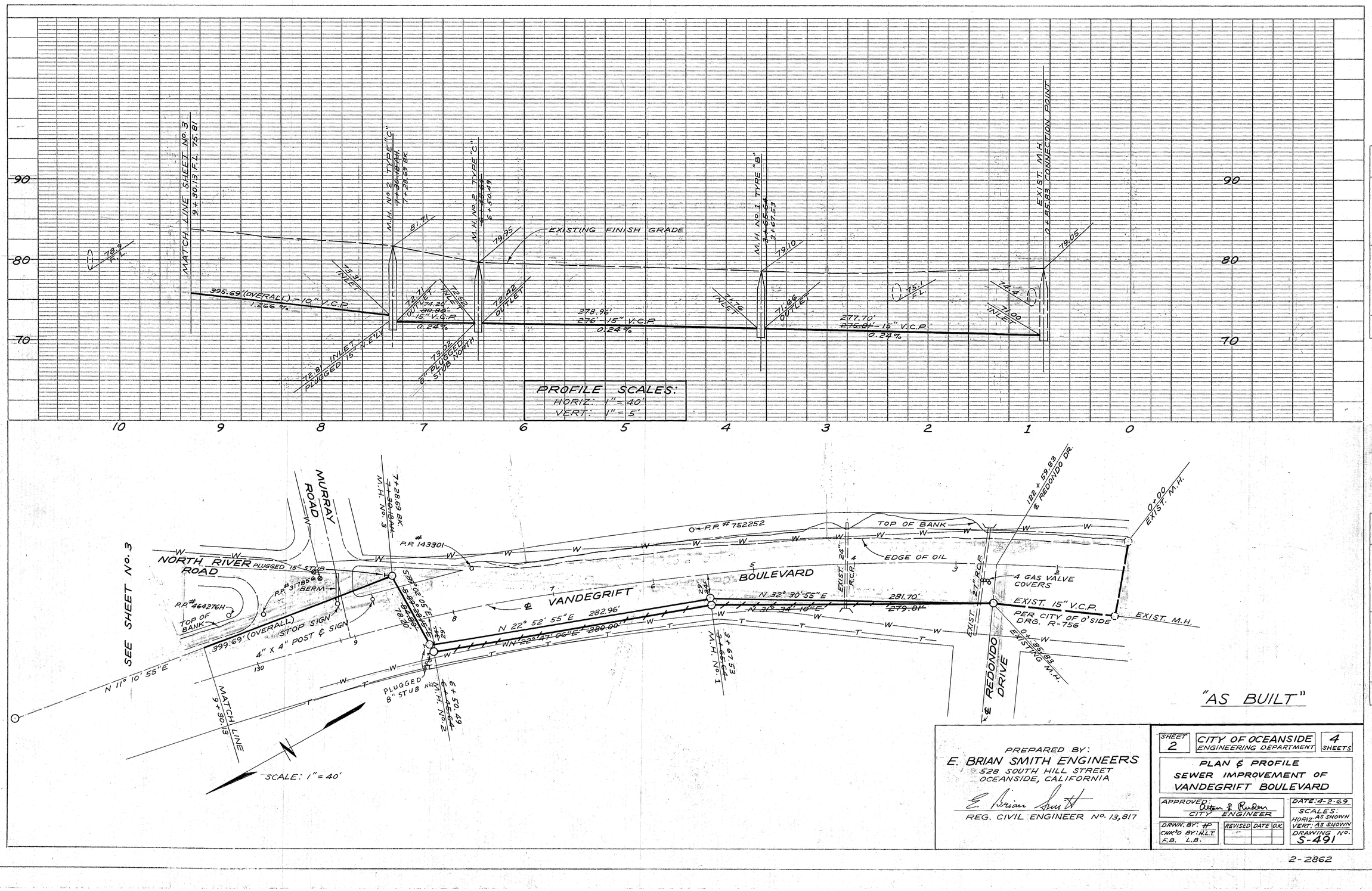
R-533

R-533

R-533

Note: Conc. Block Vault was not built. Redwood used instead.
PLAN VAULT
SECTION A-A
Note: Cla-Val Model 90 (or equal)
Size 8"
Class 250
Max. Flow 1900 g.p.m.
MISSION VALLEY No. 2
Contract 1714-A
Place M.H.-Stub N,E & W
Limit of Contract 1714-A
NOTE:
@ Water Services shown E of Redondo place 2"x2" stake marking 1"x¾" tee, plug
Existing Pavement
Existing 14" Water Main
SIESTA DR.
SEE SH. No. 7
LUNA DR.
SEE SH. No. 9
TACAYME DR.
SEE SH. No. 8
SEE SH. No. 10
TACAYME PL.
NORTH RIVER RD.
bulkhead in accordance w/ City Stds & Specs
C-1714-A
Plug Sewer
C-1714-A
Place F.H.
Contract 1714-A
Place 8x6" Cross, 2-6" G.V., 1-8" G.V.
Plug & Block
M.H. 3R
M.H. 2R
M.H. 1R
Sewer Main
8" A.C. Water Main
REDONDO DRIVE
Approved by A. L. Ruden City Engineer date Jan 30, 1963
FINISH GRADE @ ℄
CONST. 8" V.C.P. SEWER
Const. 15" V.C.P. Sewer
135.0'
254.50'
255.0'
270.00'
186.50'
120.00'
AS BUILT 2-4-64
SEWER & WATER PLAN-PROFILE
MISSION VALLEY ESTATES
Part of W½ NE¼ Section 4, T.11S. R.4W. S.B.B. & M.
CITY OF OCEANSIDE, CALIFORNIA.
CLIENT: SPROUL HOMES INC.
DATE 12-17-62
DRN JS
CHK. RMG
SCALE V: 1" = 5' H: 1" = 50'
SHEET 11 of 12
FILE 3-1
JOB NO. C1714
R.G. KEMPA & ASSOCIATES.
CIVIL ENGINEERS AND LAND SURVEYORS
COSTA MESA, CALIFORNIA.
REVISIONS
2-3-64 Rev. P/City Eng.
As Built per City
3. Out Fall Sewer
2. Water Service & elev
1. Per City, Jan. 8, 1963
DRAWING NUMBER R-756
R-756

PLATE 1—PLAN PROFILE E. P. S. STANDARD
THE FREDERICK POST CO., CHICAGO



PREPARED BY:
E. BRIAN SMITH ENGINEERS
528 SOUTH HILL STREET
OCEANSIDE, CALIFORNIA

E. Brian Smith
REG. CIVIL ENGINEER No. 13,817

SHEET 2	CITY OF OCEANSIDE ENGINEERING DEPARTMENT	4 SHEETS

PLAN & PROFILE
SEWER IMPROVEMENT OF
VANDEGRIFT BOULEVARD

APPROVED: Otten J. Rudow
CITY ENGINEER

DATE: 4-2-69
SCALES:
HORIZ: AS SHOWN
VERT: AS SHOWN
DRAWING No. S-491

DRWN. BY: HP
CHK'D BY: H.L.T. E.B. L.B.

REVISED	DATE	O.K.

2-2862

PROFILE SCALE
HORIZ. 1"= 100'
VERT. 1"= 5'
CONST. ROCK BEDDING
MATCH LINE 80+86.17
83+66.17 CONST. 5' M.H. (TYPE B)
87+67.17 CONST. 5' M.H. (TYPE B)
92+17.60 CONST. 5' M.H. (TYPE B)
96+18.22 EX. 5' M.H. (TYPE C)
99+66.78 CONST. 5' M.H. (TYPE B)
104+80.62 5' M.H. (TYPE C)
105+89.62 EX. TYPE 'B' M.H.
EX. GROUND LINE ABOVE SEWER
EX. STREET ℄ GRADE
CONST. TIE
CONST. 6" C.I. CHIMNEY TO BE FIELD LOCATED
EX. 6" C.I. CHIMNEY PIPE TYPE B
CONST. 277.50 L.F. 27" V.C.P.
CONST. 396.00 L.F. 27" V.C.P.
CONST. 445.43 L.F. 27" V.C.P.
CONST. 206.80 L.F. 27" V.C.P.
CONST. 168.38 L.F. 27" V.C.P.
CONST. 508.84 L.F. 27" V.C.P.
CONST. 104.50 L.F. 21" V.C.P.
S=0.003
S=0.00295
S=0.0045
S=0.00292
BY STUCKEY
EXISTING
℄ CURVE DATA
Δ = 52° 30'
R = 2000'
T = 986.29'
L = 1832.60'
CONST. 40 ± L.F. 10" C.I. CLASS 22, USA STD. A21.6 & RECONSTRUCT CONC. INV. OF EX. M.H. TO TYPE 'C'
1/4 SEC. LINE N 0° 50' 15" W
1/4 SEC. LINE S 0° 13' 20" E
N 62° 41' 00" E 280'
N 65° 51' 23" E 401'
N 52° 20' 32" E 450.43'
N 38° 12' 05" E 209.30'
N 34° 18' 29" E 170.88'
N 30° 37' 50" E 513.84'
N 2° 49' 41" W 109' 21" V.C.P.
VANDEGRIFT BLVD.
NORTH RIVER ROAD
REDONDO DR.
MURRAY RD.
24" V.C.P. "B" LINE SEE SHT. 8
NOT A PART OF THIS CONTRACT
SCALE 1"= 100'
NORTH RIVER ROAD
AS BUILT 6-75
SCHEDULE - I
CITY OF OCEANSIDE
NORTH VALLEY SEWER I.D.
PLAN & PROFILE
"A" LINE
CITY ENGINEER LOWELL A. RATHBUN R.E. 11972
DESIGNED J.R.C. L.W.H.
DRAWN P.J.P.
DATE 1-16-74
CHECKED J.B.G.
APPROVED 1-18-74
SHT. 5 OF 17
S-617
DRAWING NUMBER
S-617

C.Y. EXC.	163	194	113	146	126	147	73	90	100	119	78	22
C.Y. EMB.	55	91	80	129	372	418	451	609	553	256	115	36

MINIMUM DIMENSIONS

PIPE SIZE	A	B	C	D	E
18"	9"	2"	1'-9"	4'-0"	3'-0"
24"	9½"	2½"	2'-6"	6'-1½"	4'-0"

CITY OF OCEANSIDE	
PLAN OF: GRADING AND PAVING VANDEGRIFT BLVD. AT MURRAY ROAD	
CITY ENGINEER ALTON L. RUDEN, R.E. 10163	
Designed: L.J.L. / Checked: / Approved: Alton L. Ruden	File / Date: NOV. 12, 1963 / Sheet 2 of 4 / R-716

DRAWING NUMBER R-716

APPENDIX C

SEWER ANALYSIS RESULTS

The following conditions were modeled for the Pacifica Project:

1. Existing Flows

2. Existing Plus Project Flows

- Exhibit A – Manhole Diagram

DATE: 6/19/2023

SEWER STUDY SUMMARY

FOR: Pacifica in the City of Oceanside - Existing Flows

SHT 1 OF 2

JOB NUMBER: 1043-002

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

FROM	TO	IN-LINE LOW DEN RES. EDUs	IN-LINE MID DEN RES. EDUs	AVG. RES DRY WEATHER FLOW (gpd)	PEAKING FACTOR RES.	PEAK FLOW RES. (gpd)	IN-LINE COM/IND ACRES	TOTAL COM/IND ACRES	AVG. COM/IND DRY WEATHER FLOW (gpd)	PEAKING FACTOR COM/IND	PEAK FLOW COM/IND (gpd)	COMBINED PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	AS-BUILT SLOPE (%)	DEPTH K' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	COMMENTS
												M.G.D.	C.F.S.								
6M	3M	2	0	340	3.50	1,190	0.0	0.0	0	0.00	0	0.001	0.002	8	0.40	0.001116	0.02667	0.04	0.0105	0.39	
3M	1R	2	0	680	3.50	2,380	0.0	0.0	0	0.00	0	0.002	0.004	8	0.40	0.002232	0.03333	0.05	0.0147	0.56	
1R	12R	9	0	18,020	3.50	63,070	0.0	0.0	0	0.00	0	0.063	0.098	8	0.40	0.059142	0.16000	0.24	0.1449	1.52	Pacifica L.S. Connection Point
12R	11R	4	0	18,700	3.50	65,450	0.0	0.0	0	0.00	0	0.065	0.101	8	1.00	0.038816	0.13333	0.20	0.1118	2.04	
11R	10R	13	0	20,910	3.50	73,185	0.0	0.0	0	0.00	0	0.073	0.113	8	3.60	0.022876	0.10000	0.15	0.0739	3.45	
10R	9R	10	0	22,610	3.50	79,135	0.0	0.0	0	0.00	0	0.079	0.122	8	2.00	0.033186	0.12000	0.18	0.0961	2.87	
9R	8R	8	0	23,970	3.50	83,895	0.0	0.0	0	0.00	0	0.084	0.130	8	2.00	0.035182	0.12667	0.19	0.1039	2.81	
8R	7R	11	0	25,840	3.50	90,440	0.0	0.0	0	0.00	0	0.090	0.140	8	2.00	0.037927	0.12667	0.19	0.1039	3.03	
7R	1L	4	0	26,520	3.50	92,820	0.0	0.0	0	0.00	0	0.093	0.144	8	0.50	0.077850	0.18667	0.28	0.1800	1.80	
1L	3R	450	0	103,020	2.50	257,550	5.7	5.7	5,700	2.69	15,313	0.273	0.422	8	0.50	0.228857	0.33333	0.50	0.3930	2.42	Luna Drive Connection
3R	2R	133	0	125,630	2.50	314,075	10.4	16.1	16,100	2.47	39,804	0.354	0.548	8	2.69	0.127963	0.24000	0.36	0.2546	4.84	Redondo Drive Connection
2R	1R	109	0	144,160	2.50	360,400	0.0	16.1	16,100	2.47	39,804	0.400	0.619	8	1.50	0.193794	0.30000	0.45	0.3428	4.06	Connection to N. River Road Trunk Sewer

Total Res. Units
755

Total Com/Ind
16.1

Min Slope
0.40

Max Slope
3.60

Min dn/D
0.04

Max dn/D
0.50

Min Vel
0.39

Max Vel
4.84

RES. = Residential
COM. = Commercial
IND. = Industrial
Note: 1 Low Density Res. = 170 gpd
1 Mid Density Res. = 140 gpd
1 Commercial/Industrial Acre = 1,000 gpd

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: 6/19/2023

SEWER STUDY SUMMARY

FOR: Pacifica in the City of Oceanside - Existing plus Proposed Flows

SHT 2 OF 2

JOB NUMBER: 1043-002

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET: Exhibit A

FROM	TO	IN-LINE LOW DEN RES. EDUs	IN-LINE MID DEN RES. EDUs	AVG. RES DRY WEATHER FLOW (gpd)	PEAKING FACTOR RES.	PEAK FLOW RES. (gpd)	IN-LINE COM/IND ACRES	TOTAL COM/IND ACRES	AVG. COM/IND DRY WEATHER FLOW (gpd)	PEAKING FACTOR COM/IND	PEAK FLOW COM/IND (gpd)	COMBINED PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	AS-BUILT SLOPE (%)	DEPTH K' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)	COMMENTS
												M.G.D.	C.F.S.								
6M	3M	2	164	340	N/A	173,395	0.0	0.0	0	0.00	0	0.173	0.268	8	0.40	0.162597	0.27333	0.41	0.3032	1.99	Proposed Project and L.S. Point of Connection (120 gpm, 172,800 gpd peak flow)
3M	1R	2	0	680	3.50	175,180	0.0	0.0	0	0.00	0	0.175	0.271	8	0.40	0.164270	0.27333	0.41	0.3032	2.01	
1R	12R	9	0	2,210	3.50	180,535	0.0	0.0	0	0.00	0	0.181	0.279	8	0.40	0.169292	0.28000	0.42	0.3130	2.01	
12R	11R	4	0	2,890	3.50	182,915	0.0	0.0	0	0.00	0	0.183	0.283	8	1.00	0.108481	0.22000	0.33	0.2260	2.82	
11R	10R	13	0	5,100	3.50	190,650	0.0	0.0	0	0.00	0	0.191	0.295	8	3.60	0.059592	0.16000	0.24	0.1449	4.58	
10R	9R	10	0	6,800	3.50	196,600	0.0	0.0	0	0.00	0	0.197	0.304	8	2.00	0.082447	0.19333	0.29	0.1890	3.62	
9R	8R	8	0	8,160	3.50	201,360	0.0	0.0	0	0.00	0	0.201	0.312	8	2.00	0.084443	0.19333	0.29	0.1890	3.71	
8R	7R	11	0	10,030	3.50	207,905	0.0	0.0	0	0.00	0	0.208	0.322	8	2.00	0.087188	0.19333	0.29	0.1890	3.83	
7R	1L	4	0	10,710	3.50	210,285	0.0	0.0	0	0.00	0	0.210	0.325	8	0.50	0.176371	0.28667	0.43	0.3229	2.27	
1L	3R	450	0	87,210	2.50	390,825	5.7	5.7	5,700	2.69	15,313	0.406	0.628	8	0.50	0.340638	0.42667	0.64	0.5310	2.66	Luna Drive Connection
3R	2R	133	0	109,820	2.50	447,350	10.4	16.1	16,100	2.47	39,804	0.487	0.754	8	2.69	0.176155	0.28667	0.43	0.3229	5.25	Redondo Drive Connection
2R	1R	109	0	128,350	2.50	493,675	0.0	16.1	16,100	2.47	39,804	0.533	0.825	8	1.50	0.258331	0.35333	0.53	0.4230	4.39	Connection to N. River Road Trunk Sewer

Total Res. Units
919

Total Com/Ind
16.1

Min Slope
0.40

Max Slope
3.60

Min dn/D
0.24

Max dn/D
0.64

Min Vel
1.99

Max Vel
5.25

RES. = Residential
COM. = Commercial
IND. = Industrial
Note: 1 Low Density Res. = 170 gpd
1 Mid Density Res. = 140 gpd
1 Commercial/Industrial Acre = 1,000 gpd

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\1043002\REPORT\PWSSA_SWR_EXHIBIT-A_MH.DWG 6/20/2023 10:34:44 AM LAYOUT:11x17_P USER:Karam

LEGEND

PROJECT BOUNDARY

EXISTING PUBLIC GRAVITY SEWER

EXISTING PUBLIC FORCE MAIN (TO BE ABANDONED)

PROPOSED PUBLIC GRAVITY SEWER

ANALYZED EXISTING PUBLIC GRAVITY SEWER

ANALYZED SEWER SUB BASIN AREA

(1) COMPUTER MODEL MANHOLE NUMBER

N

0 500 FEET

EXISTING PUBLIC PACIFICA SCHOOL LIFT STATION (TO BE REMOVED)

PROJECT LOCATION

EX.8"

EX.8"

EX.8"

EX.8"

EX.8"

EX.15"

EX.27"

EX.10"

EX.27"

3M

6M

1R

12R

11R

10R

9R

8R

7R

1L

3R

2R

5N

OFFSITE GRAVITY SEWER IMPROVEMENT

CONCHO PL

ANN ST

PARKER ST

MICHAEL ST

ARTHUR AVE

CHARLES DR

FLORA DR

LENORE ST

FRANCIS ST

CARILLO CIR

MONICA CIR

ROJA ST

CLAIRE DR

ELAINE AVE

GOLD DR

CARDIFF BAY DR

MACARIO DR

GOLD DR

VANDEGRIFT BLVD

MARBLEHEAD BAY DR

SOL DR

LUNA DR

MALAGA DR

N RIVER RD

MOONSTONE BAY DR

N REDONDO DR

VERDE DR

SIESTA DR

ROJA DR

LUNA DR

EXHIBIT A

SEWER MANHOLE DIAGRAM

PACIFICA

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