Appendix K

Public Sewer System Analysis

DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

PUBLIC SEWER SYSTEM ANALYSIS FOR THE PASEO MONTRIL PROJECT IN THE CITY OF SAN DIEGO

January 6, 2021

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

PUBLIC SEWER SYSTEM ANALYSIS FOR THE PASEO MONTRIL PROJECT IN THE CITY OF SAN DIEGO

January 6, 2021

1-6-2020

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

Job No. 648-030

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DEXTER WILSON ENGINEERING, INC.

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

January 6, 2021 648-030

Pardee Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, CA 92128

Attention: Tiffany Finstad, Director of Project Management

Subject: Public Sewer System Analysis for the Paseo Montril Project in the City of San Diego

Introduction

This report provides a public sewer study for the Paseo Montril project in the City of San Diego. The project is located in the Rancho Penasquitos community at the eastern terminus of Paseo Montril approximately 600 feet east of Rancho Penasquitos Boulevard. Figure 1 provides a location map for the project.

The project encompasses approximately 15.2 gross acres (3.1 net acres) and the existing land is currently composed of open space. The project proposes to develop the site to incorporate 55 multi-family residential units.

Topography of the buildable portion of the site drains from northeast to southwest. The site will be designed to connect to the existing gravity sewer at the east end of the Paseo Montril cul-de-sac.

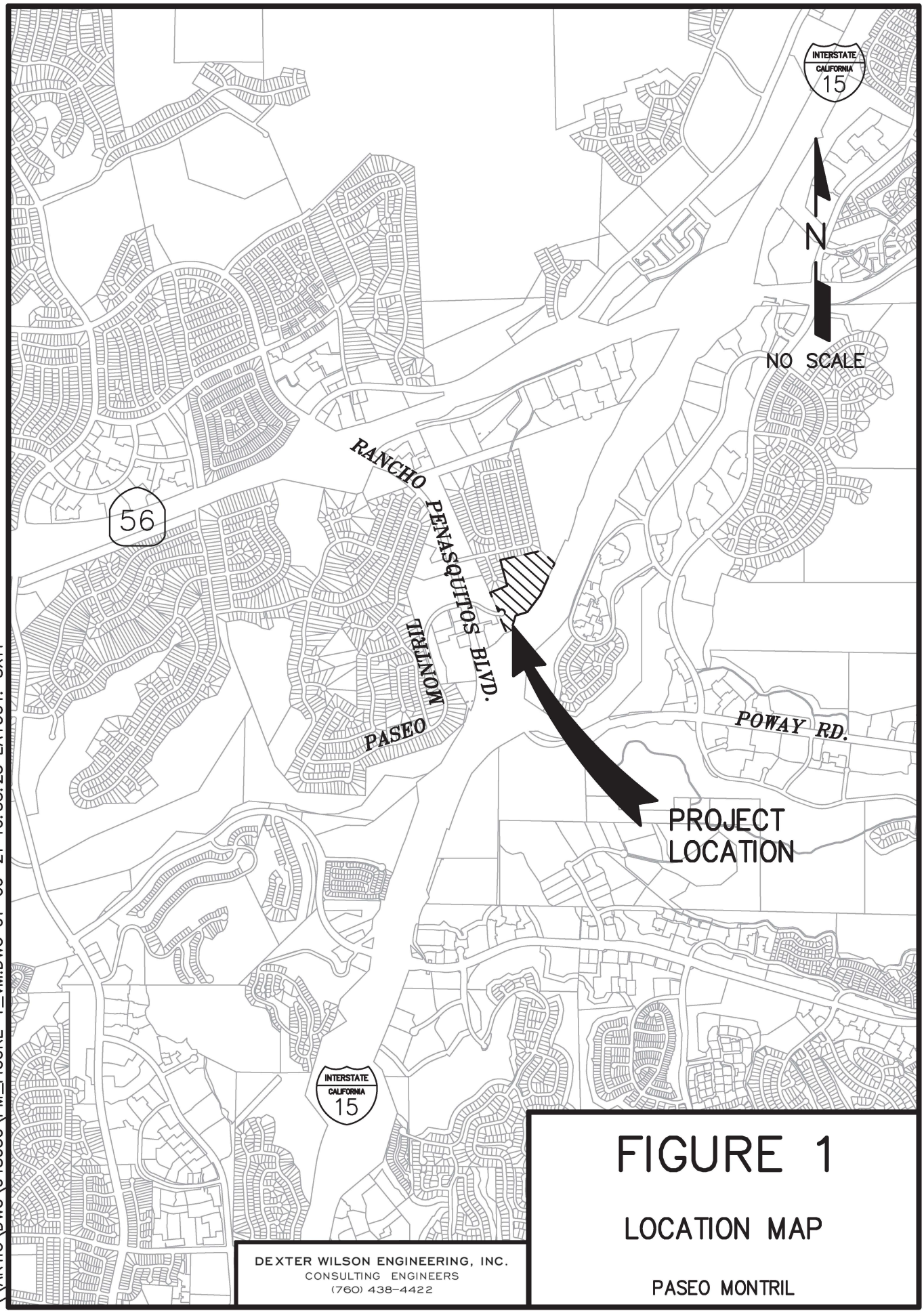

FIGURE 1

LOCATION MAP

PASEO MONTRIL

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CONSULTING ENGINEERS
(760) 438-4422

Purpose of Study

The purpose of this study is to analyze and determine if the existing public gravity sewer system is able to provide adequate capacity for the Paseo Montril 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 Paseo Montril project are proposed to be private. A preliminary analysis of the proposed onsite private sewer facilities is included in this study. A more detailed study regarding these private facilities will be completed separately.

Study Area

In general the study area for this sewer report is the sewer sub-basin boundary for City of San Diego Penasquitos Views Trunk Sewer as presented in Figure 2. The Penasquitos Views Trunk Sewer system collects the wastewater flow from the majority of the Rancho Penasquitos area in the City. Penasquitos Views is considered a major sub-basin of the Penasquitos Trunk Sewer, a large diameter (approximately 30-inch diameter to 42-inch diameter) trunk sewer line that conveys wastewater through the Penasquitos Creek canyon to Pump Station 64 in Sorrento Valley. The Penasquitos Trunk Sewer is not being analyzed in this study for the Paseo Montril due to the project size and relatively minor expected wastewater generation compared to the sewer service area and sub-basin as a whole.

The sewer from the Paseo Montril project will flow through an existing 10-inch diameter gravity sewer line and easement through the La Quinta Inn hotel parking lot before reaching an existing 12-inch diameter sewer line in Rancho Penasquitos Boulevard. At Rancho Penasquitos Boulevard the gravity sewer line runs through a combination of easements before coming back into the Paseo Montril right-of-way and ultimately reaching the 30-inch diameter Penasquitos Trunk Sewer after joining a 15-inch diameter Penasquitos Views Trunk Sewer gravity line in La Tortola. These existing public sewer facilities can be seen on Figure 2 as well. Sewer modeling data from the City regarding the Penasquitos Views Trunk Sewer is included as Appendix A.

\\ARTIC\DWG\648030\PM_SWR_FIGURE-2_EXSWR.DWG 01-06-21 10:54:26 LAYOUT: 11X17

LEGEND

PROJECT BOUNDARY

PENASQUITOS VIEWS
TRUNK SEWER SUB-BASIN

EXISTING PUBLIC GRAVITY SEWER LINE

ANAYLYZED PUBLIC GRAVITY SEWER LINE

FREEPORT RD.

56

RANCHO PENAS QUITOS BLVD.

INTERSTATE CALIFORNIA 15

ORANGEBURG AVE.

LA TORTOLA

MONTRIL

PASEO

12"
10"
12"
12"
15"
18"
12"
18"
12"
12"
12"
12"
12"
12"
12"
12"
EX.27"
EX.27"
EX.27"
EX.27"
EX.30"
EX.30"
EX.30"

PASEO MONTRIL
PROJECT BOUNDARY

PENASQUITOS
TRUNK SEWER

N

0 700
FEET

FIGURE 2

EXISTING SEWER FACILITIES
(PENASQUITOS VIEWS TRUNK SEWER BASIN)

PASEO MONTRIL

DEXTER WILSON ENGINEERING, INC.
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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
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-inch Diameter Pipe and Smaller	d/D = 0.50	1.3.3.3
For 18-inch Diameter and Larger	d/D = 0.75	1.3.3.3
Minimum Acceptable Gravity Sewer Main Size		
For Residential Areas	8-inch diameter	1.3.3.4
For Commercial, Industrial, and High-Rise Bldgs.	10-inch diameter	1.3.3.4
Net Acreage	= 0.80 x Gross Acres	Table 1-1

Paseo Montril Project Sewer Generation

The sewer generation for the Paseo Montril project was developed in accordance with the City of San Diego Sewer Design Guide. Per a City plan check comment, the sewer generation for the multi-family residential units will be equal to the single-family EDU sewer generation factor of 280 gpd per EDU. The Paseo Montril project proposes 55 residential units over 2.0 net acres equaling 28 units per acre.

Table 2 presents the projected sewer generation for the Paseo Montril project.

TABLE 2
PASEO MONTRIL PROJECT
SEWER GENERATION

Land Use	Quantity	Generation Factor	Average Sewer Generation, gpd
Multi-Family Residential (28 DUs/net acre)	55 Units	280 gpd/DU	15,400
TOTAL			**15,400 = 10.7 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 4.0 based on the formula and table presented in the figure, resulting in an estimated peak dry weather flow of 61,600 gpd (43 gpm).

Per a plan check comment from the City, the peak wet weather flow to peak dry weather flow ratio is 1.0 resulting in an estimated peak wet weather flow of 61,600 gpd (43 gpm) which is equitable to the peak dry weather flow.

Appendix A and Appendix B of this report present the backup data for determining these peaking factors. For estimating the peaking factors, average flow was based on the project's average wastewater generation presented in Table 2.

Paseo Montril Offsite Sewer System Analysis

The offsite analysis completed for the Paseo Montril project is to calculate the new flows through the existing Penasquitos Views Trunk Sewer from the project connection to the junction with the 30-inch diameter Penasquitos Trunk Sewer. This offsite sewer calculation/analysis is presented in Appendix C for the 10-inch diameter line and is presented in the City's modeling data in Appendix A for the remaining portion (Penasquitos Views Trunk Sewer portion).

Analysis of Existing 10-inch Diameter Sewer. The computer spreadsheet output for the offsite sewer analysis for the existing 10-inch diameter sewer line is presented in Appendix C. The sewer line and manhole numbering is shown on the As-Built drawing for this existing sewer provided in Appendix C. As shown in the spreadsheet calculation in Appendix C, the increase of 55 units (~193 persons) does not have a significant impact on the existing 10-inch diameter gravity sewer line.

Currently there is only one small commercial center and a 120-room hotel flowing into this gravity sewer line. The maximum depth-to-diameter (d/D) ratio in this sewer line for existing flows is 0.12 d/D. Note that the upstream portion of this existing 10-inch diameter sewer line has no flow in it at this time. After adding the Paseo Montril project flow, the maximum d/D ratio in this existing gravity sewer line is 0.14 d/D. This depth of flow occurs in both the upstream-most section of the existing 10-inch diameter sewer line and in a lower section of the existing 10-inch diameter line where there is existing flow.

Under existing plus Paseo Montril project peak wet weather flow, maximum d/D for the 10-inch diameter sewer line is 0.14 which is less than the design criterion of 0.50 for 10-inch diameter sewer lines.

Analysis of Existing 12-inch Diameter and 18-inch Diameter Sewers. The increase in flow in the existing 12-inch diameter and 18-inch diameter offsite sewer segments (Penasquitos Views Trunk Sewer) due to the 55 additional Paseo Montril units is not significant as well. Appendix A presents the current sewer modeling data in this trunk sewer system and the current segments with the least amount of capacity left under peak wet weather flow are Segment No. 35888 and Segment No. 35889. These 12-inch diameter

segments at minimum slope (0.4 percent) are currently flowing at approximately a 0.32 d/D ratio and approximately 21 percent of maximum capacity.

As calculated from Table 2, the Paseo Montril project is expected to only generate a peak wet weather flow of 61,600 gpd or 0.062 mgd. When added to existing peak flows in the trunk sewer it would approximately equate to a d/D ratio of 0.34 and 26 percent of the maximum capacity in the critical line segments.

Paseo Montril Onsite Sewer System and Analysis

In addition to the offsite analysis, a preliminary onsite sewer analysis was completed utilizing the proposed manhole slopes/inverts throughout the project site. The onsite private sewer collection system will be sized based on the California Plumbing Code, Chapter 7, Sanitary Drainage. The total number of Drainage Fixture Units (DFUs) will be estimated for the project and used in combination with Table 703.2 in the Plumbing Code to determine the minimum sewer collection line size needed within the project site.

Appendix C includes a summary of the preliminary estimate DFUs for the 55 units. The DFUs for the 55 units is 1,040 DFUs. Exhibit A presents the manhole and pipe diagram for the proposed onsite sewer system. One particular onsite sewer segment (between MH 8 and MH 7) has a relatively steep slope (16% compared to 1% and 2%). This is necessary in order to convey sewer from the upper pad area to the lower pad area of the project and ultimately offsite to the connection to the existing public system. In this steep slope section, maximum velocities remain below the City design criteria of 10 fps.

There will be proposed modifications to the existing sewer system in the immediate vicinity of Paseo Montril as well. The existing private onsite gravity sewer will be abandoned and removed. The existing public offsite gravity sewer within the Paseo Montril right-of-way and corresponding easement south of the Paseo Montril cul-de-sac will be abandoned and kept in place per the City's Sewer Design Guide.

A proposed private gravity sewer line will be constructed onsite in order to adequately convey sewer at a one percent slope to the existing public manhole near the project boundary. An Encroachment Maintenance and Removal Agreement (EMRA) will be established for this sewer connection to the existing manhole/easement.

The abandoned segments as well as the rest of the proposed sewer system for Paseo Montril are graphically shown on Figure 3.

Conclusions and Recommendations

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

1. The Paseo Montril project consisting of 55 multi-family dwelling units will gravity sewer to the existing Penasquitos Views Trunk Sewer system.

2. Finished grade elevations on the Paseo Montril project allow it to gravity flow its wastewater to an existing 10-inch diameter gravity sewer line extending to the east end of Paseo Montril.

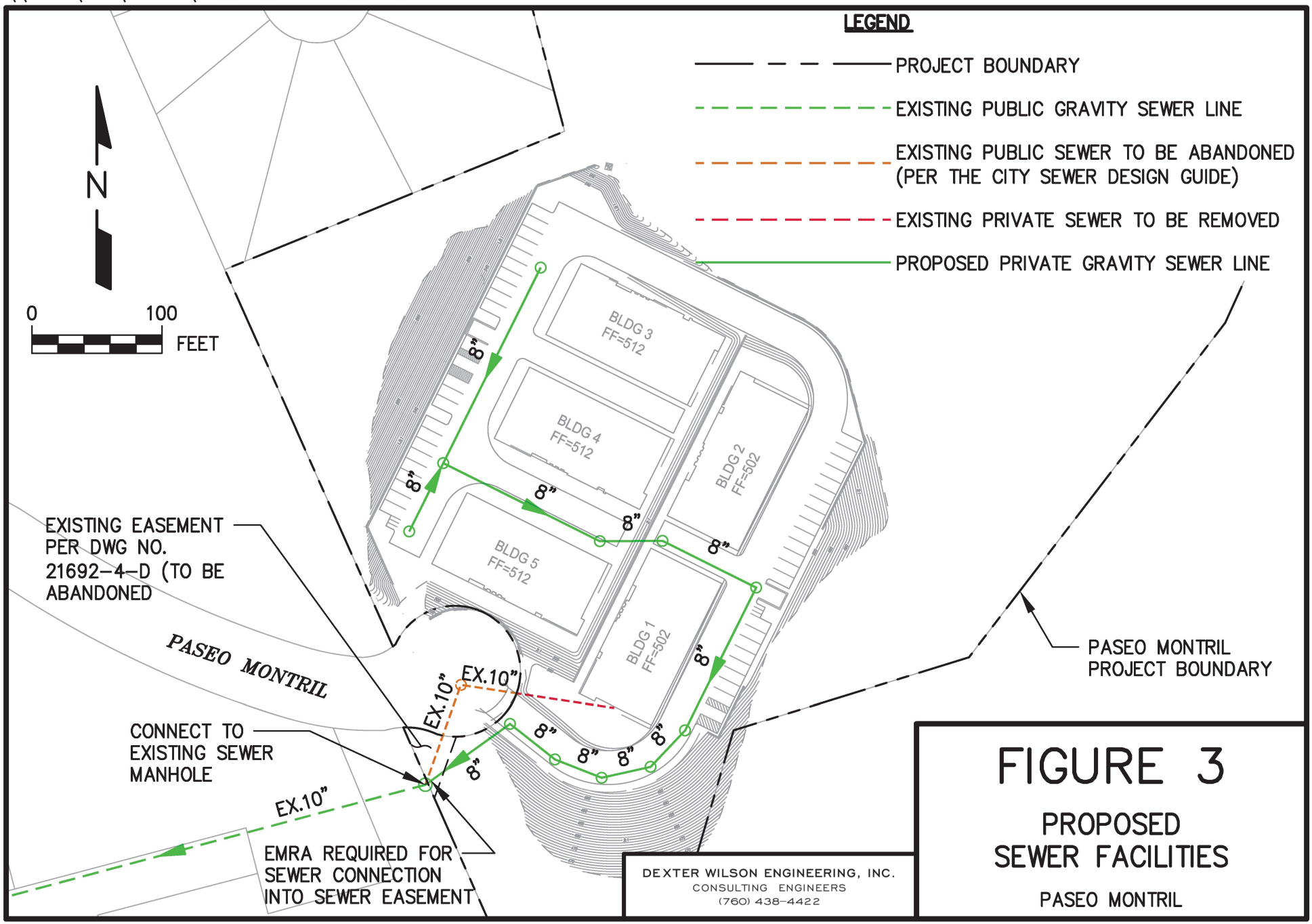
3. The development of the Paseo Montril project is projected to result in average sewage flow of 15,400 gpd.

4. Proposed sewer facilities and sewer modifications for Paseo Montril are graphically shown on Figure 3.

5. No offsite gravity sewer improvements are needed to provide sewer service to the proposed Paseo Montril project.

6. The sewer system analysis conducted indicates that the existing public gravity sewer lines downstream of the project site can accommodate the wastewater flows for the Paseo Montril project.

\\ARTIC\DWG\648030\PM_SWR_FIGURE-3_PROSWR.DWG 01-06-21 11:00:43 LAYOUT: 8X11



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CONSULTING ENGINEERS
(760) 438-4422

FIGURE 3

PROPOSED SEWER FACILITIES

PASEO MONTRIL

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.

Steven Henderson, P.E.

SH:ah

Attachments

APPENDIX A

CITY OF SAN DIEGO SEWER MODELING DATA
(PENASQUITOS VIEWS TRUNK SEWER)

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 88 - PEÑASQUITOS VIEWS
2012 DWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
40976	J01N110.1	J01N112	424.64	423.65	428.65	0.004	12	248	1.16	2.29	19.1	423.84	423.86	4.81	0.04	0.078	1.46	5.4
40975	J01N112.1	J01N111	423.65	422.79	432.79	0.004	12	215	1.50	2.28	19.0	422.98	423.02	9.81	0.05	0.101	1.46	6.9
40974	J01N111.1	J01N133	422.79	422.50	431.45	0.004	12	72	1.62	2.16	18.0	422.68	422.72	8.77	0.05	0.101	1.46	6.9
41017	J01N133.1	J01S1	422.50	422.12	430.89	0.005	12	75	1.50	2.28	19.0	422.31	422.35	8.58	0.05	0.101	1.64	6.1
41018	J01S1.1	J01S3	422.12	421.47	433.57	0.004	12	160	1.49	2.29	19.1	421.66	421.70	11.91	0.05	0.101	1.47	6.9
41020	J01S3.1	J01S4	421.47	420.44	429.20	0.004	12	258	1.50	2.28	19.0	420.63	420.66	8.57	0.05	0.101	1.46	6.9
41021	J01S4.1	J01S7	420.44	419.44	425.00	0.004	12	249	1.74	2.05	17.1	419.61	419.66	5.39	0.05	0.101	1.46	6.9
41025	J01S7.1	J01S8	419.44	418.92	425.50	0.007	12	72	1.20	2.68	22.3	419.14	419.17	6.36	0.05	0.101	1.96	5.1
41054	J01S8.1	J01S9	418.92	418.32	423.50	0.004	12	150	1.76	2.66	22.2	418.54	418.59	4.96	0.08	0.148	1.45	10.2
41026	J01S9.1	J01S10	418.32	417.24	423.20	0.004	12	270	1.75	2.66	22.2	417.46	417.51	5.74	0.08	0.148	1.46	10.1
35940	J01S10.1	I01S102	417.24	416.41	428.40	0.004	12	208	1.76	2.66	22.2	416.63	416.68	11.77	0.08	0.148	1.45	10.2
35939	I01S102.1	I01S101	416.41	415.64	423.60	0.004	12	192	1.76	2.66	22.2	415.86	415.91	7.74	0.08	0.147	1.46	10.1
35938	I01S101.1	I01S100	415.64	414.42	424.40	0.004	12	305	1.78	2.64	22.0	414.64	414.69	9.76	0.08	0.147	1.46	10.1
35936	I01S100.1	I01S99	414.42	413.93	421.90	0.004	12	117	1.76	2.66	22.2	414.15	414.20	7.75	0.08	0.147	1.49	9.9
35935	I01S99.1	I01S97	413.93	413.59	425.60	0.004	12	84	1.75	2.66	22.2	413.81	413.86	11.79	0.08	0.147	1.47	10.0
35933	I01S97.1	I01S96	413.59	413.21	419.20	0.004	12	95	1.75	2.68	22.3	413.43	413.48	5.77	0.08	0.147	1.46	10.1
35932	I01S96.1	I01S94	413.21	412.82	423.80	0.004	12	99	1.76	2.66	22.2	413.04	413.09	10.76	0.08	0.147	1.45	10.2
35931	I01S94.1	I01S93	412.82	412.10	419.10	0.004	12	179	1.75	2.68	22.3	412.32	412.37	6.78	0.08	0.147	1.46	10.1
35930	I01S93.1	I01S92	412.10	411.51	425.50	0.004	12	149	1.98	2.45	20.4	411.71	411.77	13.79	0.08	0.147	1.45	10.1
36014	I01S92.1	I01S86	411.51	410.63	426.60	0.007	12	131	2.03	2.41	20.1	410.83	410.89	15.77	0.08	0.147	1.89	7.8
35922	I01S86.1	I01S87	410.63	384.43	393.40	0.088	12	298	2.42	2.21	18.4	384.61	384.71	8.79	0.09	0.155	6.83	2.3
35923	I01S87.1	I01S88	384.43	380.94	388.90	0.017	12	206	2.34	2.26	18.8	381.13	381.21	7.77	0.09	0.155	3.00	5.2
35924	I01S88.1	I01S89	380.94	379.78	387.80	0.010	12	116	2.34	2.26	18.8	379.97	380.05	7.83	0.09	0.155	2.30	6.7
35925	I01S89.1	I01S90	379.78	374.08	382.10	0.035	12	163	2.98	1.94	16.2	374.24	374.38	7.86	0.09	0.159	4.31	3.7
35926	I01S90.1	I01S51	374.08	334.18	342.20	0.114	12	350	3.58	1.72	14.3	334.32	334.52	7.88	0.09	0.159	7.78	2.0
35885	I01S51.1	I01S50	334.18	319.65	325.70	0.088	12	165	1.73	2.84	23.7	319.89	319.93	5.81	0.09	0.159	6.83	2.3
35886	I01S50.1	I01S52	319.65	318.22	329.20	0.004	12	357	1.55	3.20	26.7	318.49	318.52	10.71	0.09	0.169	1.46	11.5
35888	I01S52.1	I01S53	318.22	317.94	329.20	0.004	12	70	1.88	3.26	27.2	318.21	318.27	10.99	0.12	0.210	1.46	14.4
35889	I01S53.1	I01S43	317.94	317.48	332.50	0.004	12	115	2.25	2.96	24.7	317.73	317.81	14.77	0.12	0.219	1.46	15.0
35890	I01S43.1	I01S44	317.48	302.54	311.50	0.373	12	40	3.39	2.22	18.5	302.73	302.90	8.77	0.12	0.219	14.06	1.6
5627086	I01S44.1	I01S262	302.54	300.77	310.40	0.033	12	54	3.39	2.22	18.5	300.96	301.13	9.44	0.12	0.219	4.17	5.2
5627067	I01S262.1	I01S263	300.19	290.97	302.44	0.066	18	140	6.13	3.25	18.1	291.24	291.82	11.20	0.47	0.860	17.41	4.9
5627069	I01S263.1	I01S264	290.76	286.31	303.01	0.016	18	277	4.25	4.20	23.3	286.66	286.94	16.35	0.47	0.860	8.61	10.0
5627071	I01S264.1	I01S265	286.22	286.10	303.01	0.020	18	6	4.52	4.02	22.3	286.44	286.75	16.58	0.47	0.860	9.52	9.0
5627076	I01S265.1	I01S266	286.01	277.46	287.05	0.022	18	390	4.65	3.95	21.9	277.79	278.12	9.26	0.47	0.860	10.05	8.6
5627077	I01S266.1	I01S267	277.36	276.37	286.63	0.018	18	56	4.39	4.10	22.8	276.71	277.01	9.92	0.47	0.860	9.07	9.5
5627079	I01S267.1	I01S268	276.28	271.42	283.80	0.018	18	273	4.39	4.10	22.8	271.76	272.06	12.04	0.47	0.860	9.07	9.5
5627081	I01S268.1	I01S269	271.34	270.81	280.68	0.014	18	38	4.07	4.33	24.1	271.17	271.43	9.51	0.47	0.860	8.07	10.7
5627083	I01S269.1	I01S116	270.75	269.50	286.40	0.010	18	125	3.97	4.40	24.5	269.87	270.11	16.53	0.47	0.860	6.79	12.7

TOTAL LENGTH (MILES):	1.24	LENGTH OF PIPE - d/D < 50% (MILES):	1.24	LENGTH OF PIPE - Q/CAP < 50% (MILES):	1.24
LENGTH WEIGHTED Q/CAP:	7.9	LENGTH OF PIPE - d/D 50 - 75% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	0.00
LENGTH WEIGHTED d/D:	20.9	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.00
LENGTH WEIGHTED HGL BELOW RIM (FT):	9.42	LENGTH OF PIPE - d/D > 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 88 - PEÑASQUITOS VIEWS
2012 WWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
40976	J01N110.1	J01N112	424.64	423.65	428.65	0.004	12	248	1.33	2.60	21.7	423.87	423.89	4.78	0.06	0.108	1.46	7.4
40975	J01N112.1	J01N111	423.65	422.79	432.79	0.004	12	215	1.72	2.60	21.7	423.01	423.05	9.78	0.07	0.140	1.46	9.6
40974	J01N111.1	J01N133	422.79	422.50	431.45	0.004	12	72	1.83	2.50	20.8	422.71	422.76	8.74	0.07	0.140	1.46	9.6
41017	J01N133.1	J01S1	422.50	422.12	430.89	0.005	12	75	1.72	2.60	21.7	422.34	422.38	8.55	0.07	0.140	1.64	8.5
41018	J01S1.1	J01S3	422.12	421.47	433.57	0.004	12	160	1.71	2.60	21.7	421.69	421.73	11.88	0.07	0.139	1.47	9.5
41020	J01S3.1	J01S4	421.47	420.44	429.20	0.004	12	258	1.72	2.60	21.7	420.66	420.70	8.54	0.07	0.139	1.46	9.5
41021	J01S4.1	J01S7	420.44	419.44	425.00	0.004	12	249	1.94	2.39	19.9	419.64	419.70	5.36	0.07	0.139	1.46	9.5
41025	J01S7.1	J01S8	419.44	418.92	425.50	0.007	12	72	1.30	3.17	26.4	419.18	419.21	6.32	0.07	0.139	1.96	7.1
41054	J01S8.1	J01S9	418.92	418.32	423.50	0.004	12	150	1.92	3.16	26.3	418.58	418.64	4.92	0.11	0.205	1.45	14.1
41026	J01S9.1	J01S10	418.32	417.24	423.20	0.004	12	270	1.92	3.16	26.3	417.50	417.56	5.70	0.11	0.205	1.46	14.0
35940	J01S10.1	I01S102	417.24	416.41	428.40	0.004	12	208	1.92	3.16	26.3	416.67	416.73	11.73	0.11	0.205	1.45	14.1
35939	I01S102.1	I01S101	416.41	415.64	423.60	0.004	12	192	1.92	3.16	26.3	415.90	415.96	7.70	0.11	0.205	1.46	14.0
35938	I01S101.1	I01S100	415.64	414.42	424.40	0.004	12	305	1.95	3.12	26.0	414.68	414.74	9.72	0.11	0.204	1.46	14.0
35936	I01S100.1	I01S99	414.42	413.93	421.90	0.004	12	117	1.93	3.14	26.2	414.19	414.25	7.71	0.11	0.204	1.49	13.7
35935	I01S99.1	I01S97	413.93	413.59	425.60	0.004	12	84	1.92	3.16	26.3	413.85	413.91	11.75	0.11	0.204	1.47	13.9
35933	I01S97.1	I01S96	413.59	413.21	419.20	0.004	12	95	1.91	3.17	26.4	413.47	413.53	5.73	0.11	0.204	1.46	14.0
35932	I01S96.1	I01S94	413.21	412.82	423.80	0.004	12	99	1.92	3.14	26.2	413.08	413.14	10.72	0.11	0.204	1.45	14.1
35931	I01S94.1	I01S93	412.82	412.10	419.10	0.004	12	179	1.91	3.16	26.3	412.36	412.42	6.74	0.11	0.204	1.46	14.0
35930	I01S93.1	I01S92	412.10	411.51	425.50	0.004	12	149	2.20	2.86	23.8	411.75	411.82	13.75	0.11	0.204	1.45	14.0
36014	I01S92.1	I01S86	411.51	410.63	426.60	0.007	12	131	2.33	2.75	22.9	410.86	410.94	15.74	0.11	0.204	1.89	10.8
35922	I01S86.1	I01S87	410.63	384.43	393.40	0.088	12	298	2.83	2.48	20.7	384.64	384.76	8.76	0.11	0.215	6.83	3.1
35923	I01S87.1	I01S88	384.43	380.94	388.90	0.017	12	206	2.68	2.58	21.5	381.16	381.27	7.75	0.11	0.215	3.00	7.2
35924	I01S88.1	I01S89	380.94	379.78	387.80	0.010	12	116	2.68	2.58	21.5	380.00	380.11	7.81	0.11	0.215	2.30	9.3
35925	I01S89.1	I01S90	379.78	374.08	382.10	0.035	12	163	3.47	2.20	18.3	374.26	374.45	7.84	0.12	0.220	4.31	5.1
35926	I01S90.1	I01S51	374.08	334.18	342.20	0.114	12	350	4.39	1.86	15.5	334.34	334.64	7.87	0.12	0.220	7.78	2.8
35885	I01S51.1	I01S50	334.18	319.65	325.70	0.088	12	165	1.90	3.35	27.9	319.93	319.99	5.77	0.12	0.220	6.83	3.2
35886	I01S50.1	I01S52	319.65	318.22	329.20	0.004	12	357	1.75	3.71	30.9	318.53	318.58	10.67	0.12	0.233	1.46	16.0
35888	I01S52.1	I01S53	318.22	317.94	329.20	0.004	12	70	2.11	3.79	31.6	318.26	318.33	10.94	0.16	0.290	1.46	19.9
35889	I01S53.1	I01S43	317.94	317.48	332.50	0.004	12	115	2.49	3.47	28.9	317.77	317.87	14.73	0.16	0.303	1.46	20.7
35890	I01S43.1	I01S44	317.48	302.54	311.50	0.373	12	40	3.97	2.50	20.8	302.75	302.99	8.75	0.16	0.303	14.06	2.2
5627086	I01S44.1	I01S262	302.54	300.77	310.40	0.033	12	54	3.97	2.50	20.8	300.98	301.22	9.42	0.16	0.303	4.17	7.3
5627067	I01S262.1	I01S263	300.19	290.97	302.44	0.066	18	140	7.12	3.66	20.3	291.28	292.06	11.17	0.62	1.184	17.41	6.8
5627069	I01S263.1	I01S264	290.76	286.31	303.01	0.016	18	277	4.73	4.88	27.1	286.72	287.06	16.29	0.62	1.183	8.61	13.7
5627071	I01S264.1	I01S265	286.22	286.10	303.01	0.020	18	6	5.04	4.67	25.9	286.49	286.88	16.52	0.62	1.183	9.52	12.4
5627076	I01S265.1	I01S266	286.01	277.46	287.05	0.022	18	390	5.22	4.55	25.3	277.84	278.26	9.21	0.62	1.183	10.05	11.8
5627077	I01S266.1	I01S267	277.36	276.37	286.63	0.018	18	56	4.88	4.78	26.5	276.77	277.14	9.86	0.62	1.183	9.07	13.0
5627079	I01S267.1	I01S268	276.28	271.42	283.80	0.018	18	273	4.88	4.78	26.5	271.82	272.19	11.98	0.62	1.183	9.07	13.0
5627081	I01S268.1	I01S269	271.34	270.81	280.68	0.014	18	38	4.56	5.00	27.8	271.23	271.55	9.45	0.62	1.183	8.07	14.7
5627083	I01S269.1	I01S116	270.75	269.50	286.40	0.010	18	125	4.39	5.15	28.6	269.93	270.23	16.47	0.62	1.183	6.79	17.4

TOTAL LENGTH (MILES):	1.24	LENGTH OF PIPE - d/D < 50% (MILES):	1.24	LENGTH OF PIPE - Q/CAP < 50% (MILES):	1.24
LENGTH WEIGHTED Q/CAP:	10.9	LENGTH OF PIPE - d/D 50 - 75% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	0.00
LENGTH WEIGHTED d/D:	24.1	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.00
LENGTH WEIGHTED HGL BELOW RIM (FT):	9.39	LENGTH OF PIPE - d/D > 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00

Penasquitos Views Trunk Sewer - Part 1

Penasquitos Views Trunk Sewer - Part 2

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

OFFSITE SEWER ANALYSIS
10-INCH DIAMTER SEWER LINE
RUNNING THROUGH EXISTING EASEMENT
ADJACENT TO PROJECT
AND
AS-BUILT DRAWING
AND
PRELIMINARY ONSITE PRIVATE SEWER ANALYSIS

DATE: 11/23/2020

SEWER STUDY SUMMARY

FOR: Paseo Montril Apartments City of San Diego Existing Flows in 10-Inch Line (Easement)
(End of Paseo Montril Cul-De-Sac to Rancho Penasquitos Blvd.)

SHT 1 OF 1
MODEL 1 2

FROM	TO	IN-LINE POPULATION (POP)	SEWAGE PER POP/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR (PEAK DRY WEATHER)	PEAKING FACTOR (PEAK WET WEATHER)	PEAK FLOW [4] (gpd)	COMBINED PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)
								M.G.D.	C.F.S.							
Ex .M.H. 3	Ex. Vert. Curve	0.0	80	0	4.00	1.0	0	0.000	0.000	10	63.50	0.000000	0.00000	0.00	0.0000	#DIV/0!
Ex. Vert. Curve	Ex. M.H. 1	197.0	80	15,760	4.00	1.0	63,040	0.063	0.098	10	4.40	0.009830	0.10000	0.12	0.0534	2.63
Ex. M.H. 1	Ex. M.H. 20	0.0	80	15,760	4.00	1.0	63,040	0.063	0.098	10	9.00	0.006873	0.08333	0.10	0.0409	3.43

FOR: Paseo Montril Apartments City of San Diego Existing Flows Plus Project Flows in 10-Inch Line (Easement)
& *Onsite Reference Only (End of Paseo Montril Cul-De-Sac to Rancho Penasquitos Blvd.)

SHT 1 OF 1
MODEL 2 2

FROM	TO	IN-LINE POPULATION (POP)	SEWAGE PER POP/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR (PEAK DRY WEATHER)	PEAKING FACTOR (PEAK WET WEATHER)	PEAK FLOW [4] (gpd)	COMBINED PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' [1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)
								M.G.D.	C.F.S.							
M.H. 11	M.H. 9	38.5	80	3,080	4.00	1.0	12,320	0.012	0.019	8	1.00	0.007307	0.06000	0.09	0.0350	1.23
M.H. 10	M.H. 9	38.5	80	3,080	4.00	1.0	12,320	0.012	0.019	8	1.00	0.007307	0.06000	0.09	0.0350	1.23
M.H. 9	M.H. 8	38.5	80	9,240	4.00	1.0	36,960	0.037	0.057	8	2.00	0.015500	0.08667	0.13	0.0600	2.14
M.H. 8	M.H. 7	0.0	80	9,240	4.00	1.0	36,960	0.037	0.057	8	16.00	0.005480	0.05333	0.08	0.0294	4.38
M.H. 7	M.H. 6	38.5	80	12,320	4.00	1.0	49,280	0.049	0.076	8	1.00	0.029226	0.11333	0.17	0.0885	1.94
M.H. 6	M.H. 5	38.5	80	15,400	4.00	1.0	61,600	0.062	0.095	8	1.00	0.036533	0.12667	0.19	0.1039	2.06
M.H. 5	M.H. 4	0.0	80	15,400	4.00	1.0	61,600	0.062	0.095	8	1.00	0.036533	0.12667	0.19	0.1039	2.06
M.H. 4	M.H. 3	0.0	80	15,400	4.00	1.0	61,600	0.062	0.095	8	1.00	0.036533	0.12667	0.19	0.1039	2.06
M.H. 3	M.H. 2	0.0	80	15,400	4.00	1.0	61,600	0.062	0.095	8	1.00	0.036533	0.12667	0.19	0.1039	2.06
M.H. 2	M.H. 1	0.0	80	15,400	4.00	1.0	61,600	0.062	0.095	8	1.00	0.036533	0.12667	0.19	0.1039	2.06
M.H. 1	Ex. M.H. 3	0.0	80	15,400	4.00	1.0	61,600	0.062	0.095	8	1.00	0.036533	0.12667	0.19	0.1039	2.06
Ex. M.H. 3	Vert. Curve	0.0	80	15,400	4.00	1.0	61,600	0.062	0.095	10	63.50	0.002529	0.04167	0.05	0.0147	9.34
Vert. Curve	Ex. M.H. 1	197.0	80	31,160	4.00	1.0	124,640	0.125	0.193	10	4.40	0.019436	0.11667	0.14	0.0668	4.16
Ex. M.H. 1	Ex. M.H. 20	0.0	80	31,160	4.00	1.0	124,640	0.125	0.193	10	9.00	0.013590	0.10000	0.12	0.0534	5.20

Note: 1 EDU = 280 gpd

197 Population = Equivalent population of commercial center in sewer easement (approximately 4.5 net acres x 43.7 pop/net acre for commercial and hotel land use)

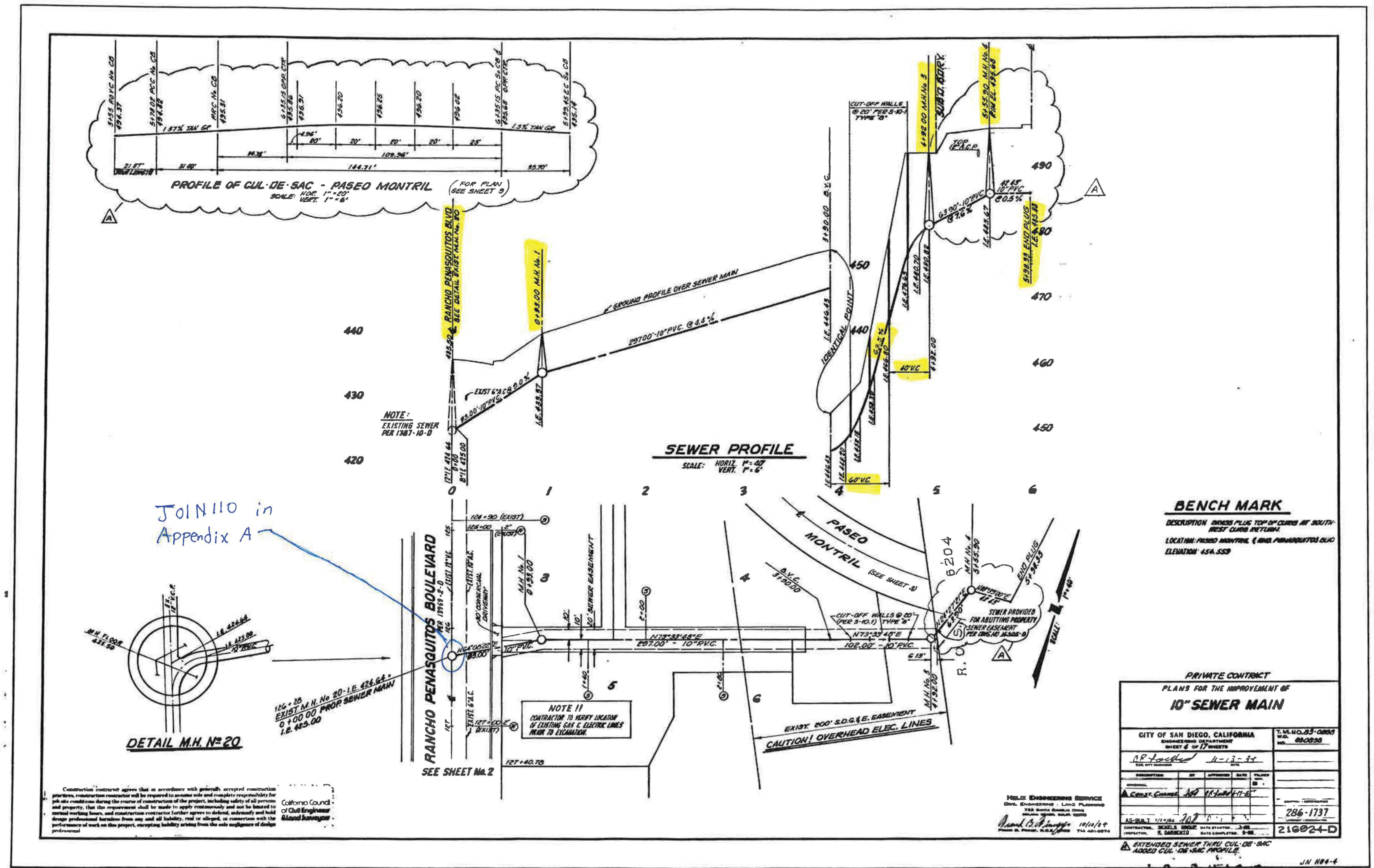
38.5 Population = Equivalent population of a single proposed onsite building (11 units x 280 gpd/unit = 3,080 gpd per building OR 38.5 persons per building)

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

4 Peak Flow = Avg. Dry Weather Flow x Peaking Factor (Dry Weather) x Peaking Factor (Wet Weather)


PROFILE OF CUL-DE-SAC - PASEO MONTRIL
SCALE: HOR. 1" = 20' VERT. 1" = 6'
(FOR PLAN SEE SHEET 3)
1.57% TAN GR
1.5% TAN GR
144.71'
109.36'
35.70'
SEWER PROFILE
SCALE: HORIZ. 1" = 40' VERT. 1" = 6'
RANCHO PENASQUITOS BLVD SEE DETAIL EXIST M.H. No. 20
0+93.00 M.H. No. 1
GROUND PROFILE OVER SEWER MAIN
297.00' - 10" PVC. @ 4.4%
93.00' - 10" PVC.
EXIST 6" A.C. @ 9.0%
I.E. 433.57
NOTE: EXISTING SEWER PER 1387-10-D
12" I.E. 424.64
0+00
8" I.E. 425.00
3+90.00 B.V.C.
IDENTICAL POINT
I.E. 446.43
60' V.C.
40' V.C.
G 3.5%
4+92.00
4+92.00 M.H. No 3
SUBD. BDRY.
CUT-OFF WALLS @ 20' PER S-10-1 TYPE "B"
63.90' - 10" PVC. @ 7.6%
42.43' 10" PVC @ 0.5%
5+55.90 M.H. No 4 RIM EL. 495.68
5+98.33 END PLUG I.E. 485.88
I.E. 485.67
I.E. 480.70
I.E. 480.82
I.E. 476.63
TOP OF A.C.P.
DETAIL M.H. No 20
M.H. FLOOR 425.50
EX. 12" V.C.P.
I.E. 424.64
I.E. 425.00
10" PVC
126+28 EXIST M.H. No 20 - I.E. 424.64 = 0+00.00 PROP. SEWER MAIN I.E. 425.00
JOIN110 in Appendix A
RANCHO PENASQUITOS BOULEVARD PER 13969-2-D
SEE SHEET No. 2
124+90 (EXIST)
126+00 2" (EXIST)
127+00 2" (EXIST)
127+40.78
EXIST. 12" V.C.
EXIST. 10" A.C.
EXIST. 6" A.C.
30' COMMERCIAL DRIVEWAY
M.H. No. 1 0+93.00
20' SEWER EASEMENT
N73°33'48"E 297.00' - 10" PVC.
N73°33'48"E 102.00' - 10" PVC.
B.V.C. 3+90.00
CUT-OFF WALLS @ 20' (PER S-10.1) TYPE "B"
PASEO MONTRIL (SEE SHEET 3)
M.H. No. 3 4+92.00
M.H. No. 4 5+55.90
END PLUG 5+98.33
N24°27'21"E 63.90'
SEWER PROVIDED FOR ABUTTING PROPERTY SEWER EASEMENT PER DWG. NO. 16308-D
NOTE !! CONTRACTOR TO VERIFY LOCATION OF EXISTING GAS & ELECTRIC LINES PRIOR TO EXCAVATION.
EXIST. 200' S.D.G.&E. EASEMENT
CAUTION! OVERHEAD ELEC. LINES
SCALE: 1" = 40'
6204
BENCH MARK
DESCRIPTION: BRASS PLUG TOP OF CURB AT SOUTHWEST CURB RETURN.
LOCATION: PASEO MONTRIL & RANCHO PENASQUITOS BLVD
ELEVATION: 454.559
PRIVATE CONTRACT
PLANS FOR THE IMPROVEMENT OF
10" SEWER MAIN
CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 6 OF 17 SHEETS
T.M. NO. 83-0858
W.O. NO. 680858
286-1737
216024-D
HELIX ENGINEERING SERVICE
CIVIL ENGINEERING - LAND PLANNING
10/10/84
CONST. CHANGE
AS-BUILT
EXTENDED SEWER THRU CUL-DE-SAC ADDED CUL-DE-SAC PROFILE
JN H84-4
California Council of Civil Engineers & Land Surveyors
AS BUILT

Maximum drainage fixture units for a fixture trap and trap arm loadings for sizes up to 4 inches (100 mm) shall be in accordance with Table 702.2(1).

702.2 Intermittent Flow. Drainage fixture units for intermittent flow into the drainage system shall be computed on the rated discharge capacity in gallons per minute (gpm) (L/s) in accordance with Table 702.2(2).

702.3 Continuous Flow. For a continuous flow into a drainage system, such as from a pump, sump ejector, air conditioning equipment, or similar device, 2 fixture units shall be equal to each gallon per minute (gpm) (L/s) of flow.

TABLE 702.2(1)
MAXIMUM DRAINAGE FIXTURE UNITS FOR A TRAP AND TRAP ARM*

SIZE OF TRAP AND TRAP ARM (inches)	DRAINAGE FIXTURE UNIT VALUES (DFU)
1¼	1 unit
1½	3 units
2	4 units
3	6 units
4	8 units

For SI Units: 1 inch = 25 mm

* **Exception:** On self-service laundries.

TABLE 702.2(2)
DISCHARGE CAPACITY IN GALLONS PER MINUTE FOR INTERMITTENT FLOW ONLY*

GPM	FIXTURE UNITS
Up to 7½	Equals 1 Fixture Unit
Greater than 7½ to 15	Equals 2 Fixture Units
Greater than 15 to 30	Equals 4 Fixture Units
Greater than 30 to 50	Equals 6 Fixture Units

For SI units: 1 gallon per minute = 0.06 L/s

* Discharge capacity exceeding 50 gallons per minute (3.15 L/s) shall be determined by the Authority Having Jurisdiction.

703.0 Size of Drainage Piping.

703.1 Minimum Size. The minimum sizes of vertical, horizontal, or both drainage piping shall be determined from the total of fixture units connected thereto, and additionally, in the case of vertical drainage pipes, in accordance with their length.

703.2 Maximum Number of Fixture Units. Table 703.2 shows the maximum number of fixture units allowed on a vertical or horizontal drainage pipe, building drain, or building sewer of a given size; the maximum number of fixture units allowed on a branch interval of a given size; and the maximum length (in feet and meters) of a vertical drainage pipe of a given size.

703.3 Sizing per Appendix C. For alternate method of sizing drainage piping, see Appendix C.

704.0 Fixture Connections (Drainage).

704.1 Inlet Fittings. Drainage piping shall be provided with approved inlet fittings for fixture connections, correctly located according to the size and type of fixture proposed to be connected.

704.2 Single Vertical Drainage Pipe. Two fixtures set back-to-back, or side-by-side, within the distance allowed between a trap and its vent shall be permitted to be served by a single vertical drainage pipe provided that each fixture wastes separately into an approved double-fixture fitting having inlet openings at the same level.

704.3 Commercial Sinks. Pot sinks, scullery sinks, dishwashing sinks, silverware sinks, and other similar fixtures shall be connected directly to the drainage system. A floor drain shall be provided adjacent to the fixture, and the fixture shall be connected on the sewer side of the floor drain trap, provided that no other drainage line is connected between the floor drain waste connection and the fixture drain. The fixture and floor drain shall be trapped and vented in accordance with this code.

705.0 Joints and Connections.

705.1 ABS and ABS Co-Extruded Plastic Pipe and Joints. Joining methods for ABS plastic pipe and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 705.1.1 through Section 705.1.3.

705.1.1 Mechanical Joints. Mechanical joints shall be designed to provide a permanent seal and shall be of the mechanical or push-on joint. The push-on joint shall include an elastomeric gasket in accordance with ASTM D3212 and shall provide a compressive force against the spigot and socket after assembly to provide a permanent seal.

705.1.2 Solvent Cement Joints. Solvent cement joints for ABS pipe and fittings shall be clean from dirt and moisture. Pipe shall be cut square and shall be deburred. Where surfaces to be joined are cleaned and free of dirt, moisture, oil, and other foreign material, solvent cement in accordance with ASTM D2235 shall be applied to all joint surfaces. Joints shall be made while both the inside socket surface and outside surface of pipe are wet with solvent cement. Hold joint in place and undisturbed for 1 minute after assembly. ***[HCD 1 & HCD 2]*** *Plastic pipe and fittings joined with solvent cement shall utilize Low VOC primer(s), if a primer is required, and Low VOC cement(s) as defined in Section 214.0.*

705.1.3 Threaded Joints. Threads shall comply with ASME B1.20.1. A minimum of Schedule 80 shall be permitted to be threaded. Molded threads on adapter fittings for transition to threaded joints shall be permitted. Thread sealant compound shall be applied to male threads, insoluble in water, and nontoxic. The joint between the pipe and transition fitting shall be of the solvent cement type. Caution shall be used during assembly to prevent over tightening of the ABS components once the thread sealant compound has been applied.

705.2 Cast-Iron Pipe and Joints. Joining methods for cast-iron pipe and fittings shall be installed in accordance with

TABLE 703.2
MAXIMUM UNIT LOADING AND MAXIMUM LENGTH OF DRAINAGE AND VENT PIPING

SIZE OF PIPE (inches)	1¼	1½	2	3	4	5	6	8	10	12
Maximum Units										
Drainage Piping[1]										
Vertical	1	2[2]	16[3]	48[4]	256	600	1380	3600	5600	8400
Horizontal	1	1	8[3]	35[4]	216[5]	428[5]	720[5]	2640[5]	4680[5]	8200[5]
Maximum Length										
Drainage Piping										
Vertical, (feet)	45	65	85	212	300	390	510	750	—	—
Horizontal (unlimited)										
Vent Piping										
Horizontal and Vertical[6]										
Maximum Units	1	8[3]	24	84	256	600	1380	3600	—	—
Maximum Lengths, (feet)	45	60	120	212	300	390	510	750		

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm

Notes:

1 Excluding trap arm.

2 Except sinks, urinals, and dishwashers – exceeding 1 fixture unit.

3 Except six-unit traps or water closets.

4 Only four water closets or six-unit traps allowed on a vertical pipe or stack; and not to exceed three water closets or six-unit traps on a horizontal branch or drain.

5 Based on ¼ inch per foot (20.8 mm/m) slope. For ⅛ of an inch per foot (10.4 mm/m) slope, multiply horizontal fixture units by a factor of 0.8.

6 The diameter of an individual vent shall be not less than 1¼ inches (32 mm) nor less than one-half the diameter of the drain to which it is connected. Fixture unit load values for drainage and vent piping shall be computed from Table 702.1 and Table 702.2(2). Not to exceed one-third of the total permitted length of a vent shall be permitted to be installed in a horizontal position. Where vents are increased one pipe size for their entire length, the maximum length limitations specified in this table do not apply. This table is in accordance with the requirements of Section 901.3.

the manufacturer's installation instructions and shall comply with Section 705.2.1 or Section 705.2.2.

705.2.1 Caulked Joints. Caulked joints shall be firmly packed with oakum or hemp and filled with molten lead to a depth of not less than 1 inch (25.4 mm) in one continuous pour. The lead shall be caulked thoroughly at the inside and outside edges of the joint. After caulking, the finished joint shall not exceed ⅛ of an inch (3.2 mm) below the rim of the hub. No paint, varnish, or other coatings shall be permitted on the joining material until after the joint has been tested and approved.

705.2.2 Mechanical Joints and Compression Joints. Mechanical joints for cast-iron pipe and fittings shall be of the elastomeric compression type or mechanical joint couplings. Compression type joints with an elastomeric gasket for cast-iron hub and spigot pipe shall comply with ASTM C564 and be tested in accordance with ASTM C1563. Hub and spigot shall be clean and free of dirt, mud, sand, and foreign materials. Cut pipe shall be free from sharp edges. Fold and insert gasket into hub. Lubricate the joint following manufacturer's instructions. Insert spigot into hub until the spigot end of the pipe bottom out in the hub. Use the same procedure for the installation of fittings.

A mechanical joint shielded coupling type for hubless cast-iron pipe and fittings shall have a metallic shield in accordance with ASTM A1056, ASTM C1277, ASTM C1540, or CISPI 310. The elastomeric gasket shall comply with ASTM C564. Hubless cast-iron pipe and fittings shall be clean and free of dirt, mud, sand, and foreign materials. Cut pipe shall be free from sharp edges. Gasket shall be placed on the end of the pipe or fitting and the stainless steel shield and clamp assembly on the end of the other pipe or fitting. Pipe or fittings shall be seated against the center stop inside the elastomeric sleeve. Slide the stainless steel shield and clamp assembly into position centered over the gasket and tighten. Bands shall be tightened using an approved calibrated torque wrench specifically set by the manufacturer of the couplings.

705.3 Copper or Copper Alloy Pipe (DWV) and Joints. Joining methods for copper or copper alloy pipe and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 705.3.1 through Section 705.3.4.

705.3.1 Brazed Joints. Brazed joints between copper or copper alloy pipe and fittings shall be made with brazing alloys having a liquid temperature above 1000°F (538°C). The joint surfaces to be brazed shall be cleaned bright by either manual or mechanical means. Piping shall be cut square and reamed to full inside diameter. Brazing flux shall be applied to the joint surfaces where required by manufacturer's recommendation. Brazing filler metal in accordance with AWS A5.8 shall be applied at the point where the pipe or tubing enters the socket of the fitting.

PAEO MONTRIL PROJECT PRELIMINARY DRAINAGE FIXTURE UNIT COUNT FOR SANITARY SEWER
PER CPC TABLE 702.1 AND 703.2
55 TOWNHOME UNITS

FIXTURE	QUANTITY	FU	SUB-TOTAL
BATHTUB/SHOWER	100	2	200
CLOTHES WASHER	55	3	165
DISHWASHER	55	2	110
LAVATORY	155	1	155
KITCHEN SINK	55	2	110
TOILET	100	3	300
			1040

PER TABLE 703.2, 6" SS CAPACITY OF 576 DFU @ 1/8" (1%) PER FT SLOPE
PER TABLE 703.2, 8" SS CAPACITY OF 2112 DFU @ 1/8" (1%) PER FT SLOPE