

SEWER STUDY

FOR

BREEZE LUXURY TOWNHOMES
CITY OF OCEANSIDE
D16-00016
T18-00009

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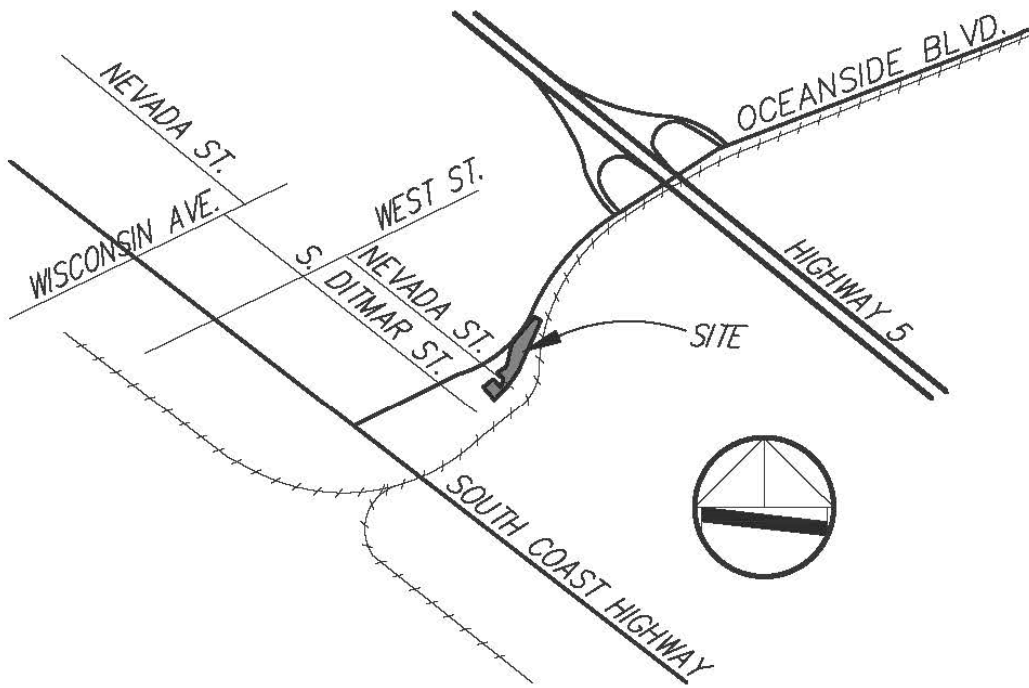
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CHAPTER 1
DISCUSSION



VICINITY MAP

NO SCALE

PURPOSE AND SCOPE

The purpose of this report is to publish the results of the analysis of existing sewer facilities downstream of the proposed Breeze Luxury Townhomes project, located in the City of Oceanside. The project proposes the development of 34 townhomes along a private road with associated improvements. The scope of this study is to analyze the existing and proposed sewer facilities in the vicinity during peak daily flows.

PROJECT DESCRIPTION

The Breeze Luxury Apartments project is located on the north and south sides of the cul-de-sac at the southeast end of Nevada Street. The site is currently vacant. The property is zoned for medium density residential (R-3). The total proposed project site consists of approximately 2.66 acres. Currently there is an existing sewer system at the southerly boundary of the project underneath Ditmar Street and Godfrey Street.

The existing sewer analyzed in this report runs from the southerly project boundary of Breeze Luxury Townhomes, underneath Godfrey Street and to the street intersection of Oceanside Boulevard and South Coast Highway. The sewer infrastructure information and existing peak flows were provided to BHA Inc. by the City of Oceanside Water Utilities Department from the City of Oceanside Wastewater Master Plan. Approximately 1,100 feet of sewer main is analyzed from the street intersection of Ditmar Street and Godfrey Street to the street intersection of Oceanside Boulevard and South Coast Highway. The existing sewer main consists of 8-inch VCP and 8-inch PVC pipe.

STUDY METHOD

The method of analysis was based on the Sewer System Design Guidelines of the *City of Oceanside Water, Sewer, and Reclaimed Water Design & Construction Manual*. The requirements for water, sewer and reclaimed water in the *City of Oceanside Engineer's Design and Processing Manual* are now superseded and void. The Manning Equation was used to calculate the normal depth in the sewer main. The following criteria were used to analyze the existing sewer facilities.

- A. The Manning's roughness coefficient of $n=0.013$ will be used for PVC & VCP pipe.
- B. The ratio of normal depth to diameter of sewer main (D_n/D) shall not exceed $\frac{1}{2}$ the diameter for a 10-inch main or smaller.
- C. The peak daily flow for residential developments shall be based on a ratio of peak to average flow. For the nature of this study, all residential developments are assumed with a population less than 500. Therefore the ratio of peak to average flow is 3.5 per the Sewer System Design Guidelines (see References).

D. Peak daily flows for all other uses shall be based using the following formula:

$$Q_p = 1.84Q_a^{0.92}$$

Where Q_p = Peak Flow (cfs)

Q_a = Average Flow (cfs)

E. Wastewater entering the sewer system from individual lots confluence with the main sewer flow at the nearest downstream manhole.

The Offsite Sewer Exhibit shows the offsite areas, existing sewer system, and nodal points. See summary of downstream sewer analysis in Chapter 3 of this report for minimum ratio of normal depth to diameter of sewer main and slopes.

CONCLUSIONS

The table below summarizes the percent increase in peak flow at the existing sewer main.

TABLE 1 — Summary of Results

Change in Peak Flow		
Total effluent from project site (cfs)	Total effluent in sewer main at MH 6 (cfs)	Percent Increase
0.0360	0.0790	46%

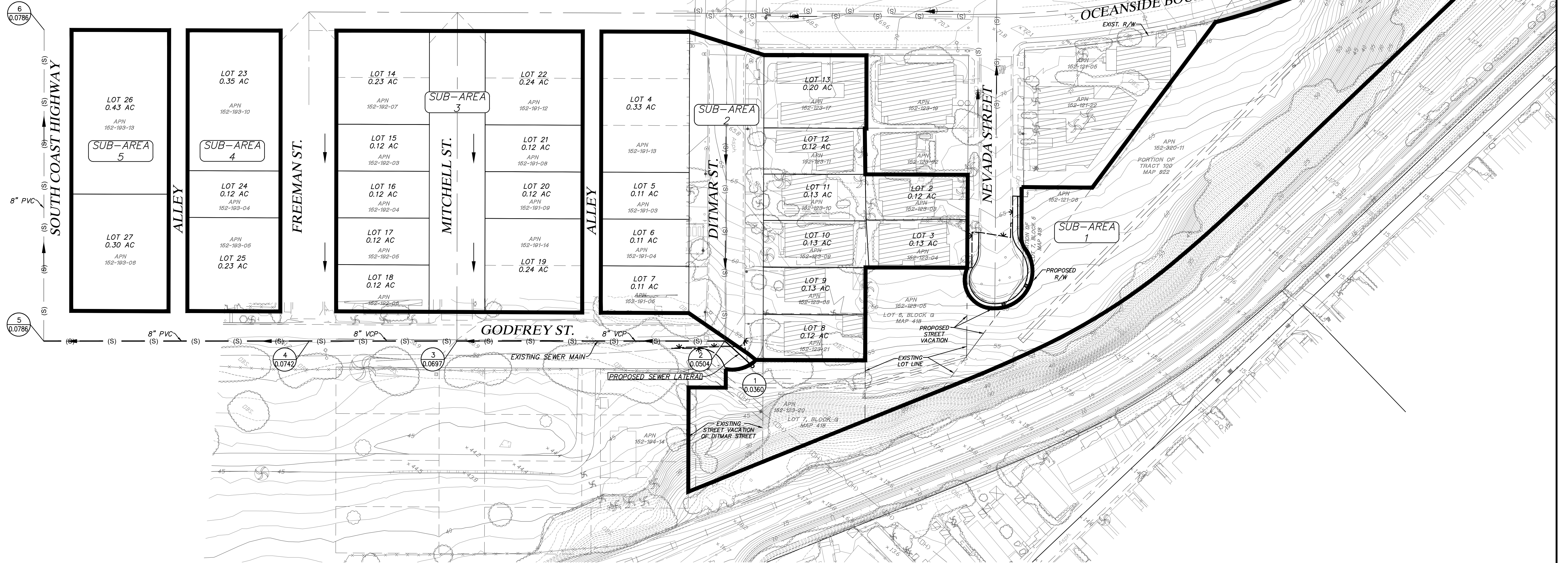
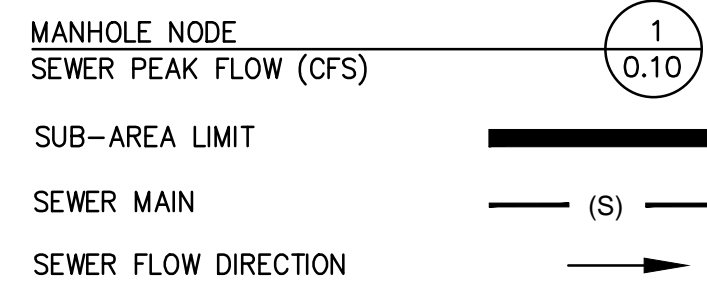
As shown in the table above, the development of the Breeze Luxury Apartments will account for 46% of the total effluent in the existing sewer main at Manhole 6.

Peak flow rates listed above were generated based on criteria set forth in the *City of Oceanside Water, Sewer, and Reclaimed Water Design & Construction Manual* (methodology presented in Chapter 4 of this report). Manning's equation output is located in Chapter 3. The hydraulic calculations show that the existing sewer facilities can sufficiently convey the anticipated peak flows without any adverse effects. The existing sewer main has a D_n/D ratio less than 0.50. Based on this conclusion, runoff released from the proposed project site will be unlikely to cause any adverse impact to downstream sewer system.

CHAPTER 2
OFFSITE SEWER EXHIBIT

OFFSITE SEWER STUDY BREEZE (LUXURY TOWNHOMES) OCEANSIDE P 16-0000 & T 18-0009

LEGEND

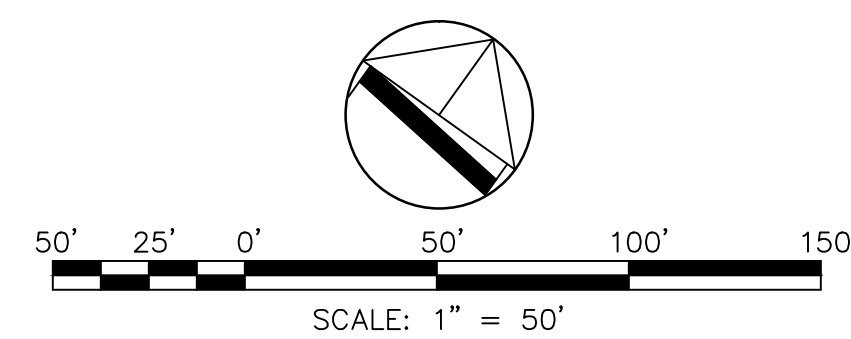


EXISTING PIPE DEPTH AND VELOCITY CALCULATIONS

FROM MH NODE	TO MH NODE	EX. PEAK FLOW (CFS)	PIPE DIA. (IN)	PIPE MATERIAL	MANNING'S "N"	SLOPE (%)	VELOCITY (FPS)	DEPTH NORMAL D _N (IN)	D _N /D
1	2	0.0000	8	PVC	0.013	1.60	-	-	-
2	3	0.0143	8	VCP	0.013	0.44	0.88	0.75	0.093
3	4	0.0337	8	VCP	0.013	0.44	1.14	1.12	0.140
4	5	0.0381	8	PVC	0.013	0.44	1.18	1.19	0.148
5	6	0.0426	8	PVC	0.013	0.40	1.18	1.28	0.160

PROPOSED PIPE DEPTH AND VELOCITY CALCULATIONS

FROM MH NODE	TO MH NODE	PROP. PEAK FLOW (CFS)	PIPE DIA. (IN)	PIPE MATERIAL	MANNING'S "N"	SLOPE (%)	VELOCITY (FPS)	DEPTH NORMAL D _N (IN)	D _N /D
1	2	0.0360	8	PVC	0.013	1.60	1.82	0.85	0.106
2	3	0.0504	8	VCP	0.013	0.44	1.28	1.36	0.170
3	4	0.0697	8	VCP	0.013	0.44	1.41	1.59	0.199
4	5	0.0742	8	PVC	0.013	0.44	1.44	1.64	0.206
5	6	0.0786	8	PVC	0.013	0.40	1.41	1.73	0.217



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OFFSITE SEWER STUDY
BREEZE
(LUXURY TOWNHOMES)

CITY OF OCEANSIDE, CALIFORNIA

SHEET 1 OF 1

CHAPTER 3

CALCULATIONS

Downstream Sewer System Analysis for Breeze Luxury Apartments

Downstream Sewer System Analysis for Breeze Luxury Townhomes

KEY ASSUMPTIONS

- 1.) Multi-family developments in R-3 Zone areas are assumed to have a base density allowance of 29 dwelling units per acre.
- 2.) Single-family developments in R-3 Zone areas are calculated based on current dwelling units on site.

Average Daily Sewer Generation Rates:

LAND USE CATEGORY	GALLONS PER DAY/PER ACRE
Single Family Res. (1-2 DU/ac)	500
Single Family Res. (2-4 DU/ac)	700
Single Family Res. (4-8 DU/ac)	1,500
Single Family Res. (8-12 DU/ac)	1,800
Single Family Res. (12-15 DU/ac)	2,100
Single Family Res. (15-20 DU/ac)	2,500
Single Family Res. (20-30 DU/ac)	4,000
Industrial Acres	900
Commercial Acres	1,500
Institutional Acres	800

Peak Daily Flow for Residential Developments:

<u>Population</u>	<u>Ratio of Peak to Average Flow</u>
Less than 500	3.5

Peak Daily Flow for All Other Uses:

$$Q_p = 1.84Q_a^{0.92}$$

Where Q_p = Peak Flow (cfs)

Q_a = Average Flow (cfs)

PEAK FLOW CALCULATIONS

Sub-Area 1					
Lot	Area (ac)	Single/Multi/Comm	GPD/Ac	Avg Daily Flow (cfs)	Peak Flow (cfs)
1	2.66	Multi	2,500	0.01029	0.03601
Totals	2.66			0.01029	0.03601

Sub-Area 2					
Lot	Area (ac)	Single/Multi/Comm	GPD/Ac	Avg Daily Flow (cfs)	Peak Flow (cfs)
2	0.12	Multi	4,000	0.00074	0.00260
3	0.13	Multi	4,000	0.00080	0.00282
4	0.33	Comm	1,500	0.00077	0.00202
5	0.11	Single	500	0.00009	0.00030
6	0.11	Single	500	0.00009	0.00030
7	0.11	Single	500	0.00009	0.00030
8	0.12	Single	500	0.00009	0.00032
9	0.13	Single	500	0.00010	0.00035
10	0.13	Single	500	0.00010	0.00035
11	0.13	Single	500	0.00010	0.00035
12	0.12	Single	500	0.00009	0.00032
13	0.20	Multi	4,000	0.00124	0.00433
Totals	1.74			0.00429	0.01436

Sub-Area 3					
Lot	Area (ac)	Single/Multi/Comm	GPD/Ac	Avg Daily Flow (cfs)	Peak Flow (cfs)
14	0.23	Comm	1,500	0.00053	0.00143
15	0.12	Multi	4,000	0.00074	0.00260
16	0.12	Multi	4,000	0.00074	0.00260
17	0.12	Multi	4,000	0.00074	0.00260
18	0.12	Multi	4,000	0.00074	0.00260
19	0.24	Multi	4,000	0.00149	0.00520
20	0.12	Single	500	0.00009	0.00032
21	0.12	Single	700	0.00013	0.00045
22	0.24	Comm	1,500	0.00056	0.00149
Totals	1.43			0.00577	0.01930

Sub-Area 4					
23	0.35	Comm	1,500	0.00081	0.00213
24	0.12	Single	700	0.00013	0.00045
25	0.23	Multi	1,500	0.00053	0.00187
Totals	0.70			0.00148	0.00446

Sub-Area 5					
Lot	Area (ac)	Single/Multi/Comm	GPD/Ac	Avg Daily Flow (cfs)	Peak Flow (cfs)
26	0.43	Comm	1,500	0.00100	0.00259
27	0.30	Comm	1,500	0.00070	0.00184
Totals	0.73			0.00169	0.00444

CHAPTER 4
REFERENCE