

6 OCEAN WEST

6.1 Watershed Hydrology Analysis

The Ocean West drainage area is part of the Santa Monica Bay Watershed defined by County of Los Angeles DPW (Exhibit H). This drainage area consists mostly of single-family homes and a portion of the Los Verdes Golf Course. This drainage area includes several storm drain systems that collect the runoff from all the urbanized areas and discharge into the ocean. There are two concrete lined open channels within this drainage area. One located southeast of Calle Entradero at Palos Verdes Drive West, which collects runoff water and connects to a storm drain system downstream. The other is located west of Palos Verdes Drive West and south of Calle Viento, and discharges directly into the ocean.

The hydrology results for the 10-, 25- and 50-year storm events are provided in Appendix G-1.

6.1.1 Hydrology Results Summary 10-, 25-, 50-year storm events

Ocean West was divided into 99 subwatersheds and Table 6-1 summarizes the maximum 10-, 25-, and 50- year storm event discharge flow draining into each node.

Hydrology ID	Structure ID	Subarea (acres)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)
1A	IS1212	22.6	13	20.2	25.6
2B	CB1204	27.9	24.8	34.3	42.4
4A	CB1201	2	2.9	3.9	4.9
5C	CB1200	14.7	12	17.1	20.4
8B	CB1198	19.6	23.5	32.9	40.4
11B	CB1196	15.2	14.9	20.8	25
14B	CB1194	13.8	12.8	17.7	21.9
17B	CB1189	11.7	11.1	15.5	19.2
21B	CB46941	10.2	10.2	14.1	16.8
23A	IS3101	3.3	3.9	5.4	6.7
24B	CB1740	14.4	15.5	21.5	26.2
26C	CB1715	0.7	1	1.4	1.7
29E	CB1112	11.8	9.2	12.9	16
30F	CB1110	14.4	9.8	14.2	17.6
32F	CB1154	3.7	3.4	4.8	5.9
35F	CB1117	9.5	9.6	13.8	16.8
38F	CB52540	5.5	4.1	6.2	7.6
40E	CB2245	9.3	7.5	11.9	15.1
42F	CB1123	4.5	5.5	7.7	9.5
43G	IS1160	8.6	7.9	11.6	14.6
47H	CB1129	7.8	10.7	15.2	17.5
51H	CB1131	14.6	13.8	19.5	23.5
54H	CB1135	5.6	6.8	9.5	11.6
56H	CB1145	6	5.9	8.1	10.2
57I	CB1098	8.7	7.5	10.9	13.2
58J	CB18526	6.4	5.5	8	9.7
59K	CB18522	6.1	6.2	8.8	10.8
62K	CB46931	1.4	2	2.7	3.5

Table 6-1: OWW Hydrology Summary

Hydrology ID	Structure ID	Subarea (acres)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)
64K	CB3184	3	2.7	3.9	4.8
65L	CB3191	1.2	1.4	2.1	2.6
72K	CB20522	1.6	2.3	3.4	3.9
76K	CB20517	7.7	8.4	11.2	14
80K	CB1088	10.4	7.7	11.4	14.3
85J	CB1096	6.1	7.6	11	12.7
87J	CB3164	5.3	7.6	11	12.7
92J	CB1150	16.1	14.1	20.1	24.3
96I	CB1143	11.5	11.7	16.6	20.4
99H	CB2216	17.7	14.9	21.6	28.5
101I	CB1140	2.8	3.9	5.3	6.7
104I	CB1136	4.3	6.7	9.1	11.5
106H	IS2240	0.9	1.6	2.3	2.6
109E	CB1133	6	6.5	8.9	10.7
111H	CB3301	19.5	19.4	27	32.4
114D	IS0567	7.2	19.8	24.8	37.9
117D	CB1723	4.1	5.5	7.9	9.1
121C	CB1735	5.5	4.6	6.4	7.9
124D	CB1249	13.8	13.1	17.7	21.9
125D	CB3076	1.5	1.6	2.1	2.5
126E	IS3088	2.7	4.5	6.2	7.2
129E	CB3086	5	5.9	8.3	10.2
131H	CB3094	2.4	2	2.8	3.4
134E	CB3083	9.5	12	16	19.6
136E	CB3079	3.1	3.4	4.8	5.9
142O	CB0572	5.1	6.4	9	10.4
143D	IS18530	36.7	25.4	39.3	48.3
144D	IS3384	16.8	17.9	26.1	32
146D	CB0570	5.9	7.2	10.2	12.7
148D	CB20936	11.1	9.5	13	15.9
151D	CB1706	7.4	7.8	10.5	13
153D	CB20920	1.8	2	2.7	3.3
155D	CB1695	0.9	1.5	2.1	2.4
158E	IS1692	14.3	16.2	23.1	28.5
161E	CB1684	30.2	28.8	40.5	48.7
163E	CB1628	3.2	3.3	4.6	5.5
164F	CB0615	9.3	10.9	15.1	18.4
165H	CB51741	10.8	16.1	22.6	29.3
169I	CB0621	13.6	13.5	18.5	22.4
171H	IS3392	4.2	4.8	6.7	8.1
173J	CB0620	7.6	9.7	13.7	16.9
175J	CB0618	10.1	9.1	12.5	15.5
178H	CB0614	5.5	5	6.7	8.2
181H	CB1634	5.6	6.3	8.6	10.5
184H	CB1645	2.1	2.3	3.2	4
187F	CB1650	6.3	6.4	8.8	11.3
192D	CB1660	4.4	5.1	7.2	8.8
196D	CB0583	3.6	5.2	7.2	8.3
197E	CB2808	0.7	1.2	1.6	1.9

Table 6-1: OWW Hydrology Summary

Hydrology ID	Structure ID	Subarea (acres)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)
199E	IS2843	20.3	19.2	27.4	33.2
200F	CB2844	1.5	2	2.9	3.6
205F	IS2830	11	11.9	16.7	20.6
206H	CB2832	1.4	2.2	3.1	4
208H	CB2837	2.1	3.3	4.7	6
209J	CB2833	2.3	4.1	5.8	6.7
219E	CB2742	4.6	7.3	9.6	11
222E	IS2746	2.2	3.7	5.1	5.9
224D	IS1675	7.4	6.6	9.4	11.9
225E	CB20923	12	14.9	20.1	24.1
228F	CB3305	8.9	8.9	12.6	15.2
229F	CB3306	3	3.5	4.6	5.5
234P	IS0561	7.4	9.7	13.6	16
235E	CB36921	2.2	3.1	4.4	4.9
239D	CB0564	27.9	22.2	30.9	37.7
240D	IS3601	2.4	4	5.5	6.8
243D	IS3605	6.1	5.9	8.7	10.7
246M	CB3128	2.4	4	5.5	6.3
247E	CB3132	6.9	9.4	12.5	15.4
250D	CB1243	3.4	5.9	8	10.3
251D	CB1244	1.1	1.8	2.3	2.9
253N	CB0736	13.7	11	15.6	19.5

6.2 Hydraulic Analysis

6.2.1 Existing Condition

Table 6-2 provides important modeling assumptions used for the hydraulic analysis and Appendix G-2 provides the existing condition hydraulic analysis for the 10-, 25- and 50-year storm events. Two main lines located in the Los Verdes Golf course were not accessible during the field visits and during the 2015 CCTV only a small portion was accessible. During the CCTV inspection, the pipe was found to be broken. However, for the hydraulic analysis it was assumed this storm drain system is functional.

Table 6-2: OWW Hydraulic Model Assumptions

System	Upstream Structure ID	Downstream Structure ID	Pipe ID	Street	Assumption
1	GB31719	MH31720	SD31135	Los Verdes Drive	The invert elevations were revised.
	MH31720	GB31721	SD31137		
	GB31721	MH1120	SD31136		
2	GB3308	GB3309	SD2293	Rue La Fleur	The invert elevations were revised. (As-built 10055.pdf)
	GB3309	GB3310	SD2284		
	GB3310	JS3303	SD2294		
3	GB1097	CB1100	SD0709	Hawthorne Boulevard	The invert elevations were revised. (As-built 10022.pdf)
	CB1100	MH2679	SD3418		
4	CB1096	JS48132	SD46762		
	JS48132	MH1101	SD2802		

Table 6-2: OWW Hydraulic Model Assumptions					
System	Upstream Structure ID	Downstream Structure ID	Pipe ID	Street	Assumption
5	MH1092	JS46929	SD0272	Crest Road	As-Built 10236.pdf is outdated. The upstream storm drain system was used as reference for pipe size and invert elevations.
	JS46929	MH46928	SD45142		
	MH46928	GB3180	SD2175		
	GB3180	MH1082	SD45141		
	MH1082	MH1084	SD0254		
	MH1084	JS20516	SD0244		
	JS20516	MH1085	SD45139		

6.2.1.1 Results

Table 6-3 provides the velocities at inlet structure IS0567, which connects upstream to a concrete lined trapezoidal open channel. IS0567 is located southeast of Palos Verdes Drive West at Calle Entradero. The upstream channel receives runoff water from approximately 234 acres. Two storm drain systems outlet directly into this channel, and it connects downstream to a 60-inch pipe that ultimately drains into the ocean.

Table 6-3: Calle Entradero Channel Velocity Summary							
Upstream Structure ID	Downstream Structure ID	Pipe ID	Hydrology ID	10-year Velocity (ft/s)	25-year Velocity (ft/s)	50-year Velocity (ft/s)	Street
OS1169	JS3303	OC0832	-	32.9	36.9	39.2	Palos Verdes at Calle Entradero
JS3303	GB1980	OC0833	-	32.9	36.7	38.6	
GB1980	IS0567	OC0834	114D	23.2	26.2	26.8	

Table 6-4 lists the storm drain structures that were found to be flooded for the 10- and 50-year storm event hydraulic analysis.

Table 6-4: OWW Flooded Storm Drain Structures		
Storm Drain Structure ID	Floods in 50-Year Storm Event	Floods in 10-Year Storm Event
GB1207	X	
MH1190	X	
CB1189	X	
JS1186	X	
CB46941	X	X
JS3515	X	
GB2310	X	
GB2311	X	
GB3310	X	
MH1185	X	X

6.2.2 Recommended Improvements

Table 6-5 provides the storm drain systems within this drainage area that were found to be deficient following Section 2.4.4 criteria, and improvements are recommended. The recommended improvement maps (atlas map) are attached at the end of this chapter (Figure 6-1). The proposed condition hydraulic analysis results are included in Appendix G-3.

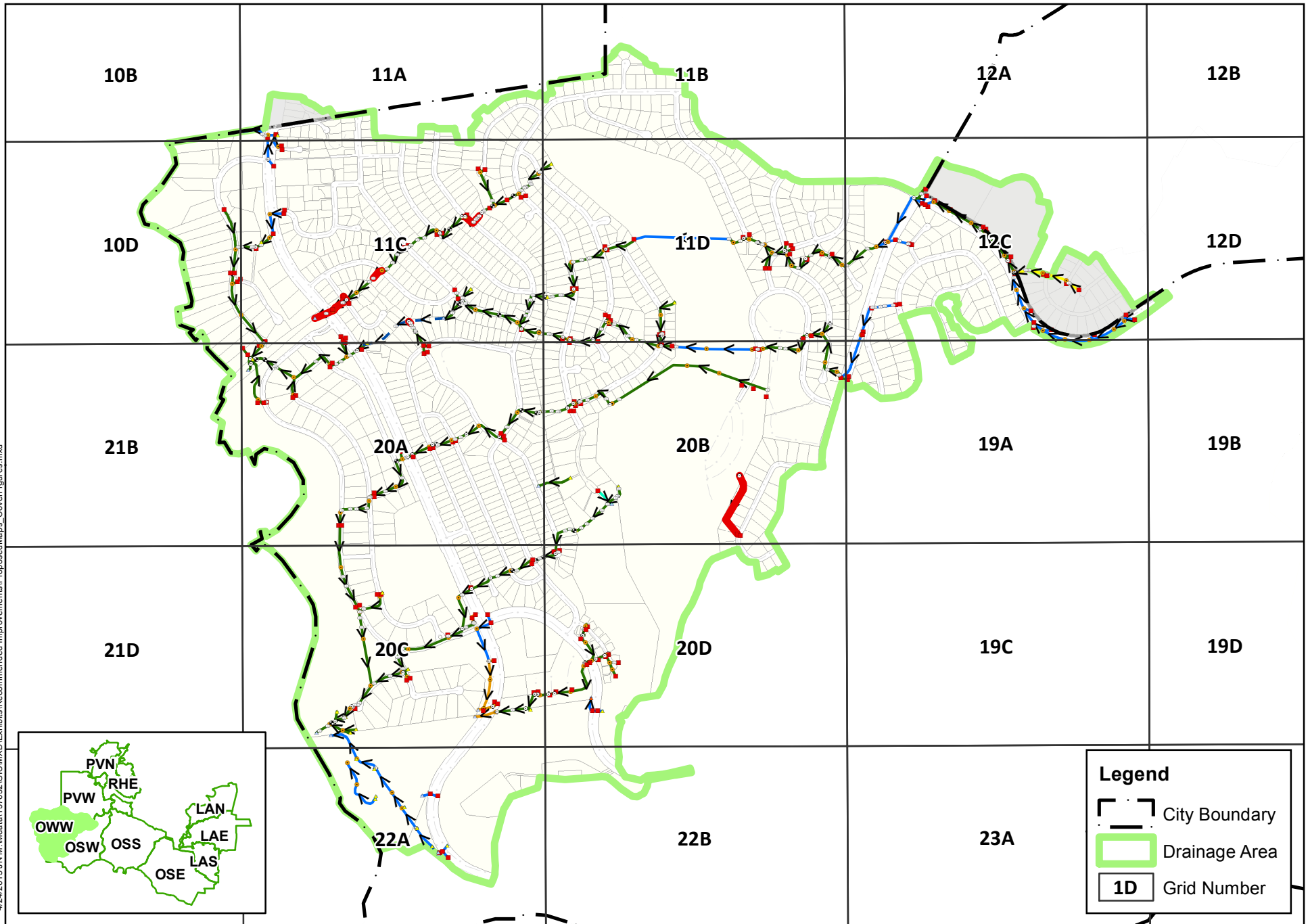
Table 6-5: OWW Pipes to be Improved								
System	Owner	Upstream Structure ID	Downstream Structure ID	Pipe ID	Atlas Map	Existing Size (in)	Proposed Size (in)	Street
1	LAC	GB2310	GB1207	SD1236	11C	21	30	Via Borica
		GB1207	GB2309	SD1235		21	30	
		GB2309	GB2308	SD1234		21	30	
		GB2308	MH2306	SD1233		30	42	
2	LAC	MH1191	GB32121	SD31535	11C	36	42	Berry Hill Drive
3	LAC	CB1189	JS1186	SD0291	11C	18	36	Via Cambron
4	LAC	JS2675	GB46942	SD45156	11C	39	48	Via Cambron Palos Verdes Drive West
		GB46942	MH1185	SD0301		39	48	
		MH1185	GB46943	SD45157		30	48	
		GB46943	OS1184	SD0305		30	54	
5	LAC	GB3310	JS3303	SD2294	11C	18	24	Rue La Fleur
6	LAC	IS0632	CB0735	SD0362	20B	24	36	Alta Vista Drive

6.2.3 Cost Estimates

Table 6-6 provides an estimate of the construction cost of recommended improvements for this drainage area. Appendix B-4 includes the cost estimates for each recommended improvement map.

Table 6-6: OWW Total Cost Estimate	
Atlas Map	Total Project Cost
11C	\$542,000
20B	\$473,000
Total	\$1,015,000

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Source:

-  Catch Basin
-  Inlet
-  Outlet
-  Parkway
Outlet
-  Manhole
-  Junction
-  Transition
-  Grade Break
-  Storm Filter
and Storm
Gate
-  Proposed
Pipe
-  30" Proposed
Size
-  Open
Watercourse
-  Rancho
Palos Verdes
-  Rolling Hills
Estates
-  Palos Verdes
Estates
-  Private
-  City of LA
-  County of LA
-  Unknown

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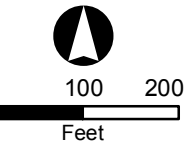


Michael Baker
INTERNATIONAL

Storm Water
Recommended
Improvements

- Catch Basin
- Inlet
- Outlet
- Parkway
Outlet
- Manhole
- Junction
- Transition
- Grade Break
- Storm Filter
and Storm
Gate
- Proposed
Pipe
- Proposed
Size
- Open
Watercourse
- Rancho
Palos Verdes
- Rolling Hills
Estates
- Palos Verdes
Estates
- Private
- City of LA
- County of LA
- Unknown

City
Boundary



11C	11D	12C
20A	20B	19A
20C	20D	19C

