

11 PALOS VERDES ESTATES WEST

11.1 Watershed Hydrology Analysis

The Palos Verdes Estates North drainage area is part of the Santa Monica Bay watershed defined by County of Los Angeles DPW (Exhibit M). This area encompasses approximately 1,139 acres of land. Most of this drainage area is urbanized. It includes the Agua Amarga Canyon and Reserve. The tributary area to this Canyon consists of open space areas draining directly into the Canyon, and urbanized areas runoff collected by storm drain systems which discharge into the Canyon. The downstream portion of the Canyon is part of the City of Palos Verdes Estates (PVE) and it ultimately discharges into the ocean. The storm drain systems that do not discharge into Agua Amarga Canyon connect to the City of PVE. All the runoff generated by the City of RPV is collected in storm drain systems before it outlets the City's jurisdiction.

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

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

Palos Verdes North drainage area was divided into 183 subwatersheds and Table 11-1 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	CB1404	1.4	1.9	2.6	3.4
2A	CB1405	10.8	9	12.5	15.5
3B	CB1406	2.1	2	2.9	3.5
5B	CB1407	2.4	2.4	3.5	4.3
6B	CB1408	2.4	2.4	3.5	4.5
8B	CB1400	8.6	6.7	9.9	12
10B	CB1398	3.2	3.1	4.4	5.4
13B	CB1396	4.2	3.8	5.5	6.7
15B	CB2433	3.5	3.6	4.8	6
18B	CB1394	4.8	4.9	6.9	8.5
19B	CB1391	1.9	2.1	2.9	3.6
22B	CB1376	4.3	5.5	8.1	9.4
25B	CB1379	7.8	10.6	15.5	17.9
27B	CB1380	19.3	18	25.3	30.4
29B	CB1374	0.1	0.2	0.3	0.4
31B	CB1371	3.9	2.8	4.1	5.1
32B	CB1370	1.1	1.6	2.3	2.7
34B	CB1364	4.3	4.2	5.9	7.2
36B	CB1363	4.5	4	5.9	7.2
38B	CB1361	1.2	1.6	2.3	2.9
40B	CB1360	0.2	0.4	0.5	0.6
42B	CB1338	2.9	2.6	3.8	4.6
43D	CB1342	7.1	7.6	10.8	13.4
45D	CB1339	1.1	0.9	1.3	1.6
47D	CB1348	1.7	2.3	3.2	4.1

Table 11-1: PVW Hydrology Summary					
Hydrology ID	Structure ID	Subarea (acres)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)
49D	CB1347	2.9	2.8	4.2	5.1
51D	CB1355	3	3.1	4.6	5.7
53D	CB1356	4.6	4.7	6.6	8.2
55D	CB1354	5.7	4.6	6.6	8.3
58B	CB1294	1.9	2.6	3.6	4.6
59D	CB1293	12.7	11.4	16.6	20.2
62B	CB1242	19.5	10.8	16.3	20.9
63D	CB1231	3.5	3.4	4.8	5.9
64E	CB1232	5.8	5.9	8.3	9.9
66E	CB1230	4	3.9	5.5	6.7
67F	CB1233	1.2	2.2	3.1	3.6
70E	CB1234	1.4	2.6	3.6	4.2
72D	OS1239	27.9	16.5	24.7	31.1
75B	CB1108	3.5	3.5	5.2	6.5
76D	CB1440	4.3	3.9	5.4	6.8
77D	CB1439	12.4	8.9	12.6	15.6
78E	CB1449	5	3.9	5.6	7
79E	CB1448	4.7	3.9	5.6	7.1
80F	CB1447	30.3	25.3	35.6	42.4
82F	CB2197	6.3	6.1	8.5	10.2
84F	CB2720	1.4	1.4	2	2.5
86G	CB2728	3.8	4.3	6.2	7.2
87H	CB2729	2	1.9	2.7	3.4
89H	CB2724	4.1	4.6	6.6	8.3
90H	CB2723	2.1	2	3	3.7
94F	CB2189	9.3	7.8	11.2	14.1
97F	CB1444	12.8	9.2	13.4	16.7
98G	CB1445	2.6	2.5	3.7	4.6
100G	CB1442	3.1	3.7	5.4	6.8
101H	CB1441	1.8	2	2.9	3.6
104E	CB1429	3.7	4	5.6	7
105H	CB1428	5	5.7	8.1	9.9
107H	CB1430	2.3	2	2.9	3.8
109H	CB1424	5.7	5.5	7.8	9.6
110I	CB1420	9.8	10.5	14.9	18.5
113I	CB1422	2.8	2.6	3.8	4.7
115I	CB1423	2.2	2.6	3.7	4.4
118H	CB1431	0.3	0.4	0.5	0.7
121D	CB1218	31.5	18.7	27.8	34.7
123H	CB1220	5.6	4.7	6.7	8.2
124I	CB1222	1.3	2.2	3	3.9
126I	CB1217	1.1	1.3	1.8	2.3
128H	CB1215	3.9	5.1	6.9	8.5
130H	CB1216	1.2	1.8	2.5	2.9
132H	CB1213	1.4	2.8	3.5	4.7
134H	CB1104	24.7	17.6	25.4	31.6
135H	CB1103	2.6	2.1	3	3.7
136J	CB26915	2.1	2.5	3.6	4.6
137J	CB26916	2.8	3.3	4.9	5.7

Table 11-1: PVW Hydrology Summary					
Hydrology ID	Structure ID	Subarea (acres)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)
138K	CB27321	8.1	7.6	10.4	13
140J	MH27323	33.1	24.4	35.2	44.5
141K	CB24957	6.3	6.7	9.8	11.4
146L	IS24954	8.4	7.7	10.9	14.3
147M	CB1415	1.7	1.8	2.6	3.1
148M	CB1416	9.5	9.5	13.1	15.9
149N	CB2048	16.2	21.3	28.4	35.1
151N	CB24944	35.3	28.4	39.5	48.8
154N	CB24946	8.8	6.9	9.7	12.1
159M	CB24970	15.7	11.6	17	21.6
164L	CB47333	16.7	13.1	18.6	23.4
167K	CB18515	1.3	1.5	2.1	2.6
168K	CB18516	0.8	1	1.4	1.8
169L	CB18517	2.6	3.6	4.9	6.3
170L	CB18518	2.7	3	4.4	5.5
172L	CB27324	2.4	2.4	3.5	4.5
173M	CB27325	6.6	5.7	8.2	10.5
176J	IS1105	29.4	20	28.6	35.4
178J	CB1228	2.1	1.9	2.7	3.3
179J	CB1227	14.6	8.1	12.1	15.1
180J	OS1229	81.5	59.7	83.2	101.7
183R	CB3066	5.6	7.4	13.1	12.3
184J	CB3059	11.5	11.1	15.5	18.6
185K	CB3055	8.5	15.7	13	15.7
186M	CB3054	3.4	3.5	4.8	5.8
193J	CB3060	7.4	9.8	13.4	16.2
196J	CB3061	7.1	9.4	12.2	14.7
199J	CB1584	9.6	11.7	15.8	18.9
201J	CB2918	2.1	2.4	3.3	4
202K	CB2917	1.2	1.3	1.8	2.2
205J	CB2919	3	3.3	4.4	5.2
207J	CB2902	6.5	6.3	9.4	11.5
209H	CB1583	5	4.6	6.2	7.4
210J	CB2904	5.6	4.5	6.5	8.2
211J	CB2903	7.3	5.7	8.1	10.2
213J	CB3033	1.8	1.8	2.5	3
215J	CB1580	1.1	1.6	2.2	2.7
216K	CB3032	10.8	9.7	13.6	17
219J	CB3035	2.2	2.2	3.2	3.9
220K	CB3036	0.3	0.4	0.6	0.7
223S	CB1257	13.8	14.8	27.2	26
224J	CB1256	3	2.9	4.3	5.3
225K	CB1263	6.4	5.7	8	10.2
226K	CB1262	0.1	0.2	0.2	0.3
227M	CB1268	3.8	3.5	5	6.4
228M	CB1267	3.3	3	4.1	5.3
229N	CB3026	7.1	6.1	8.9	10.8
230N	CB3027	5.6	6.7	9.1	11.3
231N	CB3028	4.7	3.7	5.2	6.6

Table 11-1: PVW Hydrology Summary					
Hydrology ID	Structure ID	Subarea (acres)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)
232O	CB1289	4.7	3.8	5.4	6.8
233O	CB1288	3.3	3	4.1	5.3
235O	CB1287	3.2	2.9	4	5.1
237O	CB1286	2.6	2.6	3.7	4.6
239O	CB1283	1.5	1.6	2.3	2.8
241O	CB1284	2.3	2.1	3	3.7
243O	CB1281	1.5	2	2.8	3.6
245O	CB1279	5.5	4.6	6.6	8.4
246O	CB1280	5.1	4.3	6.1	7.7
248O	CB1276	2.1	2.4	3.2	4
249O	CB1275	2.3	2.5	3.5	4.3
251O	CB1272	9.1	8.9	12.5	15.3
252O	CB1271	2.3	2.1	3	3.7
253P	CB1252	5.4	6.5	9.4	10.9
254P	CB1251	3.4	3.5	5.2	6.4
255Q	CB1274	4.6	4.1	5.7	7.3
256Q	CB1273	3.9	3.5	4.9	6.2
260O	CB1269	0.6	1	1.4	1.6
261P	CB1270	0.3	0.6	0.7	0.9
264N	CB1264	0.9	1.3	1.9	2.4
267M	CB1255	2.4	2.7	3.9	4.9
271J	CB1254	5.6	5.2	7.3	8.9
273J	CB1253	5.4	4.4	6.2	7.9
275T	CB2713	3.4	3.5	32.1	6
276U	CB3350	14.2	10.5	47.3	19.2
277J	CB3352	3	3.2	4.6	5.7
278J	CB3355	8.9	5	7.5	9.6
280J	CB1586	4.7	4.2	5.9	7.5
281K	CB1585	2.2	2.4	3.4	4.1
283K	CB3338	0.6	1	1.4	1.6
285K	CB3351	3.7	4.2	6.2	7.9
286K	CB3339	2.5	2.5	3.6	4.4
288K	CB3340	18.4	12.5	18.5	23.2
290V	CB1308	16.2	11.3	22.3	20.4
291K	CB1337	2.1	2.2	3.2	4
292M	CB1335	2	1.9	2.7	3.5
294M	CB1334	1.8	1.9	2.7	3.4
296M	CB1372	6.3	4.8	6.7	8.1
297M	CB1333	2.4	2.6	3.7	4.5
299M	CB1332	3	3.1	4.3	5.3
301M	CB1330	1.9	2.1	3.1	3.8
303M	CB1329	1.5	1.6	2.3	2.8
305M	CB1326	3.1	3.9	5.9	6.8
307M	CB1325	0.9	1.1	1.7	2
309M	CB1324	1.4	2.1	2.9	3.4
311M	CB1323	0.8	1	1.5	1.8
313M	CB1321	8	7.5	10.4	12.7
315M	CB1320	1.6	1.7	2.4	3
317M	CB1318	2.1	2.1	3	3.7

Table 11-1: PVW Hydrology Summary					
Hydrology ID	Structure ID	Subarea (acres)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)
319M	CB1317	3.1	3	4.2	5.5
321M	CB1314	2.7	2.7	3.9	4.8
322M	CB1313	3.3	3.4	4.8	5.9
324M	CB1307	3.3	3	4.3	5.3
326M	CB1306	4.8	4.7	6.6	8.5
328M	CB1305	4.8	4.2	6	7.3
330W	CB1302	2.7	2.5	25.8	4.3
331K	CB1299	4.6	4.5	6.3	7.7
332K	CB1300	3.2	3.5	4.8	5.8
333N	CB1301	21.5	29	39.3	49.3
336X	CB18514	11.5	8.7	38.2	15.5

11.2 Hydraulic Analysis

11.2.1 Existing Condition

No significant modeling assumptions were made for the hydraulic analysis. Appendix L-2 provides the existing condition hydraulic analysis for the 10-, 25- and 50-year storm events.

11.2.1.1 Results

Table 11-2 provides a list of the storm drain structures that were flooded in the 10- and 50-year hydraulic analysis.

Table 11-2: PVW Flooded Storm Drain Structures		
Storm Drain Structure ID	Floods in 50-Year Storm Event	Floods in 10-Year Storm Event
PC1250	X	X
CB24944	X	
CB1583	X	X
MH1582	X	
CB1586	X	
GB2107	X	
CB2917	X	X
MH2924	X	X
JS2925	X	X

11.2.2 Recommended Improvements

Table 11-3 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 11-1). The proposed condition hydraulic analysis results are included in Appendix L-3.

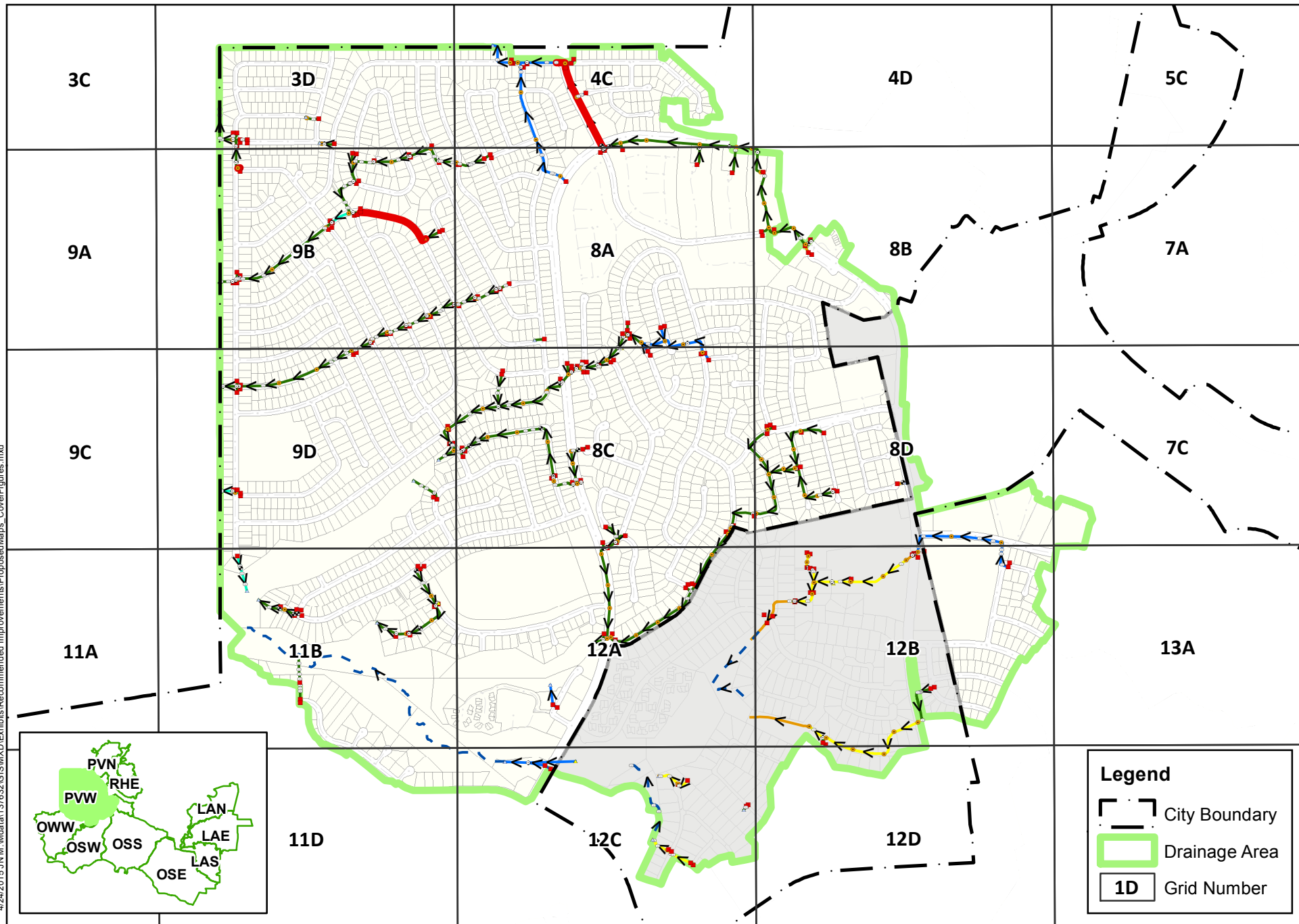
Table 11-3: PVW Pipes to be Improved								
System	Owner	Upstream Structure ID	Downstream Structure ID	Pipe ID	Atlas Map	Existing Size (in)	Proposed Size (in)	Street
1	RPV	PC1250	Node2106	SD-108*	9B		18	Eddinghill Drive
		Node2106	CB1273	ST-03*			18	
2	RPV	TS2931	MH1582	SD2682	4C	30	42	Granvia Altamira at Monero Drive
		MH1582	MH1583	SD2673		30	36	
		MH1583	MH2907	SD2671		30	36	
		MH2907	GB3037	SD3410		30	36	
Notes:								
*New storm drain								

11.2.3 Cost Estimates

Table 11-4 provides an estimate of the construction cost of recommended improvements for this drainage area. The recommended improvements are shown in the attached atlas maps. Appendix B-8 includes the cost estimates for each recommended improvement map.

Table 11-4: PVW Total Cost Estimate	
Atlas Map	Total Project Cost
4C	\$744,000
9B	\$286,000
Total	\$1,030,000

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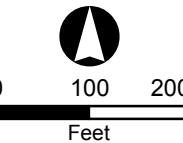


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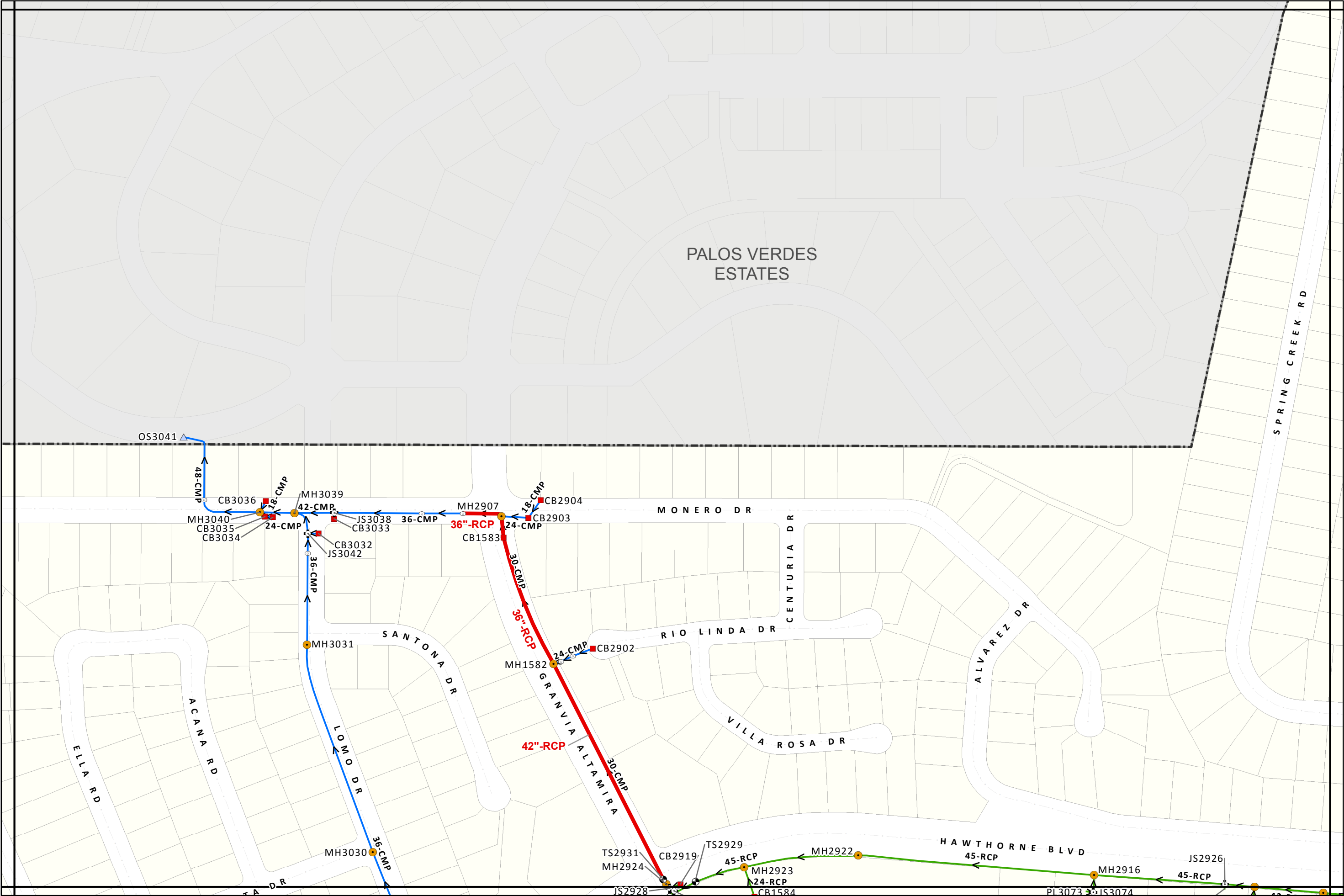
Storm Water
Recommended
Improvements

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

City
Boundary



3B	4A	4B
3D	4C	4D
9B	8A	8B





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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



0 100 200
Feet

3C	3D	4C
9A	9B	8A
9C	9D	8C

