existing trees and have over-sized planting pits to deal with compaction. The pits should be over-size in width, not depth. Maintenance recommendations will deal with protection of soil and root zones as well as proper training and pruning.

For preservation in place suitable surrounding trees should be surveyed since GPS is often inaccurate even when done with expensive surveying equipment.

Only trees that should clearly be removed were marked as such in the Matrix of Findings and below. Other trees that have low condition or safety ratings, below 5, should be considered for removal or intensive care. Older trees that are in poor condition do not improve quickly. It may take years for noticeable recovery. This determination is a matter for more consideration and discussion.

Construction is hard on trees, even landscape construction. Following good tree preservation procedures will lessen the impact, but not eliminate it. Dust alone can have serious impacts on trees. Even with fencing there will still be root loss and damage. Many trees on site have serious stress levels already, due to compaction and physical injuries. The additional stresses related to construction must be kept to a minimum to end up with worthwhile trees at the end.

Matrix of Recommendations

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
1	Tipuana tipu	Tipu tree	26	23	B	23	No	No
2	Callistemon citrinus	Lemon bottlebrush	8, 9, 5	10.5	B	11	No	No
3	Liquidambar styraciflua	American sweetgum	13.5	13	B	13	No	No
4	Liquidambar styraciflua	American sweetgum	9	9.5	C	9.5	No	No
5	Platanus x acerifolia	London plane	10	14	B	14	No	No
6	Platanus x acerifolia	London plane	3	3	C	3	No	No
7	Alnus rhombifolia	White alder	16	13.5	C-	16	No	?
8	Alnus rhombifolia	White alder	17	14	C-	17	No	?
9	Morus alba	White mulberry	17	20	B	20	No	No
10	Alnus rhombifolia	White alder	13	14	D	13	No	No
11	Platanus x acerifolia	London plane	12	13	C	13	No	No
12	Alnus rhombifolia	White alder	14	11	C-	14	No	?

ATTACHMENT NO. 7.3+

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
13	Morus alba	White mulberry	14	17	B	17	No	No
14	Platanus racemosa	California sycamore	17	15	B	15	No	No
15	Alnus rhombifolia	White alder	19	14	D	n/a	No	Yes
16	Platanus racemosa	California sycamore	20	13	B	15	No	No
17	Alnus rhombifolia	White alder	23	16	C	13	No	No
18	Pyrus kawakamii	Evergreen pear	13	12	C	13	No	No
19	Platanus x acerifolia	London plane	6	6	D	n/a	No	Yes
20	Platanus x acerifolia	London plane	8	8	C	8	No	No
21	Platanus x acerifolia	London plane	6.7	7	C	7	No	No
22	Platanus x acerifolia	London plane	6.5	9	D	n/a	No	Yes
23	Platanus x acerifolia	London plane	5, 6	7	D	7	No	No
24	Platanus x acerifolia	London plane	8	9	D	9	No	No
25	Platanus x acerifolia	London plane	9	9	D	9	No	No
26	Pyrus kawakamii	Evergreen pear	9, 9	11	C	13	No	No
27	Magnolia grandiflora	Southern magnolia	14	13	A	18	No	No
28	Pyrus kawakamii	Evergreen pear	6, 6	6	D	8	No	No
29	Liquidambar styraciflua	American sweetgum	11	10	B	10	No	No
30	Alnus rhombifolia	White alder	26 B	17	B	n/a	No	Yes
31	Alnus rhombifolia	White alder	16	14	C	14	No	No
32	Juniperus chinensis 'Torulosa'	Hollywood juniper	18 B	7	B	13	No	No
33	Juniperus chinensis 'Torulosa'	Hollywood juniper	14 B	7	B	10	No	No
34	Juniperus chinensis 'Torulosa'	Hollywood juniper	8 B	6	B	6	No	No
35	Lagerstroemia indica	Crape myrtle	7	9	B	9	Yes	No
36	Juniperus chinensis 'Torulosa'	Hollywood juniper	17	9	B	13	No	No
37	Prunus cerasifera 'Atropurpurea'	Purple leaf plum	5.5	6	C	6	No	No
38	Juniperus chinensis 'Torulosa'	Hollywood juniper	24 B	9	B	20	No	No
39	Podocarpus gracilior	Fern pine	14	13	A	13	No	No
40	Eucalyptus citriodora	Lemon-scented gum	19	17	C	19	No	No

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
41	Cupaniopsis anacardioides	Carrotwood	6, 5	9	B	9	No	No
42	Podocarpus gracilior	Fern pine	12	11	A	11	Yes	No
43	Cupaniopsis anacardioides	Carrotwood	4	4	D	n/a	No	Yes
44	Cupaniopsis anacardioides	Carrotwood	7, 7	10	C	10	No	No
45	Cupaniopsis anacardioides	Carrotwood	5, 4	6	C	6	No	No
46	Liquidambar styraciflua	American sweetgum	6	5	C	6	No	No
47	Cupaniopsis anacardioides	Carrotwood	17	16	B	16	No	PIN OR YES
48	Cupaniopsis anacardioides	Carrotwood	14	18	A	18	No	No
49	Cupaniopsis anacardioides	Carrotwood	11	11	A	11	No	No
50	Liquidambar styraciflua	American sweetgum	10	15	B	15	No	No
51	Liquidambar styraciflua	American sweetgum	18	19	B	19	No	No
52	Pyrus kawakamii	Evergreen pear	12	11	C	n/a	No	Yes
53	Alnus rhombifolia	White alder	17	14	C	14	No	No
54	Alnus rhombifolia	White alder	28 B	11	B	24	No	No
55	Lophostemon confertus	Brisbane box	6	4	D	n/a	No	Yes
56	Spathodea campanulata	African tulip tree	3	3	C	3	No	No
57	Spathodea campanulata	African tulip tree	2	2	C	2	No	No
58	Spathodea campanulata	African tulip tree	3	4	C-	4	No	No
59	Alnus rhombifolia	White alder	23	18	B	18	No	No
60	Melaleuca quinquenervia	Cajeput tree	27	14	B	34	No	No
61	Pyrus kawakamii	Evergreen pear	14	12	B	12	No	No
62	Quercus ilex	Holly oak	12	11	A	11	Yes	No
63	Liquidambar styraciflua	American sweetgum	10	10	C	10	No	No
64	Quercus ilex	Holly oak	11	8	A	8	Yes	No
65	Quercus ilex	Holly oak	8	10	B	10	No	No
66	Myoporum laetum	Ngaio	10, 10, 12	14	D	n/a	No	Yes
67	Agonis flexuosa	Peppermint tree	19	12	B	15	No	No

ATTACHMENT NO. 7-39

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
68	Agonis flexuosa	Peppermint tree	14	12	B	12	No	No
69	Agonis flexuosa	Peppermint tree	18, 18, 20	18	B	40	No	No
70	Agonis flexuosa	Peppermint tree	50	16	A	50	No	No
71	Eucalyptus camaldulensis	Red gum	20	14	B	20	No	No
72	Eucalyptus camaldulensis	Red gum	5	4	D	n/a	No	Yes
73	Schinus terebinthifolius	Brazilian pepper	18	15	B	15	No	No
74	Schinus terebinthifolius	Brazilian pepper	10	9	C-	10	No	No
75	Pinus thunbergiana	Japanese black pine	7	6	C	7	No	No
76	Schinus terebinthifolius	Brazilian pepper	13	13	C	13	No	No
77	Fraxinus uhdei	Shamel ash	16	24	B	24	No	No
78	Pinus canariensis	Canary Island pine	13	9	C	n/a	No	Yes
79	Lagunaria patersonii	Primrose tree	10	8	A	10	Yes	No
80	Myoporum laetum	Ngaio	26	10	C-	n/a	No	Yes
81	Schinus molle	California pepper	4, 5	9	B	9	No	No
82	Tipuana tipu	Tipu tree	23	19	B	19	No	No
83	Tipuana tipu	Tipu tree	26	25	C	26	No	No
84	Tipuana tipu	Tipu tree	22	18	B	18	No	No
85	Tipuana tipu	Tipu tree	20	18	B	18	No	No
86	Myoporum laetum	Ngaio	7, 10, 6	12	C	12	No	No
87	Pyrus kawakamii	Evergreen pear	20	15	B	15	No	No
88	Pyrus kawakamii	Evergreen pear	16	11	B	11	No	No
89	Schinus terebinthifolius	Brazilian pepper	26	21	B	22	No	No
90	Pyrus kawakamii	Evergreen pear	10	10	C	10	No	No
91	Eucalyptus sideroxylon	Red ironbark	7	8	B	7	No	No
92	Platanus racemosa	California sycamore	12	10	B	10	Yes	No
93	Metrosideros excelsus	New Zealand Christmas Tree	6, 6, 6, 6	14	A	12	No	No
94	Eucalyptus camaldulensis	Red gum	30	21	B	30	No	No

ATTACHMENT NO 7.40

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
95	Pinus canariensis	Canary Island pine	7	6	C	6	No	No
96	Pinus canariensis	Canary Island pine	14	14	C	14	No	No
97	Eucalyptus camaldulensis	Red gum	25	19	C	25	No	No
98	Pinus canariensis	Canary Island pine	12	13	B	13	No	No
99	Pinus canariensis	Canary Island pine	14	8	B	8	No	No
100	Eucalyptus camaldulensis	Red gum	23	14	C	23	No	No
101	Myoporum laetum	Ngaio	4, 5, 5, 6	9	D	n/a	No	Yes
102	Myoporum laetum	Ngaio	5, 5, 6	10	D	n/a	No	Yes
103	Myoporum laetum	Ngaio	7, 7, 6	14	D	14	No	No
104	Myoporum laetum	Ngaio	4, 5, 5, 7	9	C	9	No	No
105	Myoporum laetum	Ngaio	4, 5, 5, 5	10	C-	10	No	No
106	Myoporum laetum	Ngaio	12	8	C-	8	No	No
107	Myoporum laetum	Ngaio	6, 6	10	D	n/a	No	Yes
108	Myoporum laetum	Ngaio	9, 10, 13	12	D	n/a	No	Yes
109	Myoporum laetum	Ngaio	6, 7	9	D	9	No	No
110	Myoporum laetum	Ngaio	5, 5, 7, 8	9	C-	9	No	No
111	Myoporum laetum	Ngaio	5, 5, 6, 6	9	C-	9	No	No
112	Myoporum laetum	Ngaio	5, 5, 4	8	F	n/a	No	Yes
113	Myoporum laetum	Ngaio	4, 4, 4	8	C	8	No	No
114	Myoporum laetum	Ngaio	6, 5, 4, 4	7	D	n/a	No	Yes
115	Myoporum laetum	Ngaio	8	6	D	6	No	No
116	Myoporum laetum	Ngaio	4, 5	5	D-	n/a	No	Yes
117	Myoporum laetum	Ngaio	5, 5, 6, 6	9	D-	n/a	No	Yes
118	Myoporum laetum	Ngaio	4, 4, 5	6	D-	n/a	No	Yes
119	Myoporum laetum	Ngaio	4	2	D-	n/a	No	Yes
120	Myoporum laetum	Ngaio	2, 2, 2, 3	3	D	n/a	No	Yes
121	Myoporum laetum	Ngaio	4	4	D	n/a	No	Yes
122	Myoporum laetum	Ngaio	3, 4, 4	5	D	n/a	No	Yes

ATTACHMENT NO 7.41

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
123	Myoporum laetum	Ngaio	3.5	5	C-	5	No	No
124	Feijoa sellowiana	Pineapple guava	5, 5, 5, 4	10	B	11	No	No
125	Feijoa sellowiana	Pineapple guava	9 B	6	C	8	No	No
126	Metrosideros excelsus	New Zealand Christmas Tree	6, 6, 6, 6	11	C-	14	No	No
127	Pinus canariensis	Canary Island pine	11	7	B	8	No	No
128	Eucalyptus camaldulensis	Red gum	23	33	C	33	No	No
129	Catalpa speciosa	Western catalpa	18	15	B	15	No	No
130	Catalpa speciosa	Western catalpa	19	18	B	18	No	No
131	Pinus pinea	Italian stone pine	6	6	A	6	No	No
132	Pinus pinea	Italian stone pine	6	6	B	6	No	No
133	Catalpa speciosa	Western catalpa	15	10	C	n/a	No	Yes
134	Pinus halepensis	Aleppo pine	18	11	B	13	No	No
135	Eucalyptus camaldulensis	Red gum	41	26	B	n/a	No	Yes
136	Pinus halepensis	Aleppo pine	26	16	B	20	No	No
137	Pinus halepensis	Aleppo pine	33	18	B	33	No	No
138	Pinus halepensis	Aleppo pine	32	19	B	32	No	No
139	Eucalyptus polyanthemos	Silver dollar gum	15	17	C	15	No	No
140	Pinus halepensis	Aleppo pine	21	16	B	n/a	No	Yes
141	Pinus halepensis	Aleppo pine	28, 13	14	A	30	No	No
142	Pinus halepensis	Aleppo pine	27	15	B	21	No	No
143	Eucalyptus lehmannii	Bushy yate	26	20	B	26	No	No
144	Eucalyptus camaldulensis	Red gum	22	14	D	26	No	No
145	Liquidambar styraciflua	American sweetgum	20	18	B	n/a	No	***Yes**
146	Celtis laevigata	Sugar Hackberry	9	10	B	10	No	No
147	Pyrus kawakamii	Evergreen pear	9	10	C	10	No	No
148	Eucalyptus sideroxylon	Red ironbark	13	8	B	13	No	No
149	Eucalyptus polyanthemos	Silver dollar gum	12	10	B	12	No	No
150	Eucalyptus sideroxylon	Red ironbark	18	16	B	18	No	No

ATTACHMENT NO. 4
42

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
151	Eucalyptus rudis	Desert gum	15	14	C	15	No	No
152	Eucalyptus polyanthemos	Silver dollar gum	11	11	C	11	No	No
153	Pyrus kawakamii	Evergreen pear	7	7	B	n/a	No	Yes
154	Catalpa speciosa	Western catalpa	15	12	C	n/a	No	Yes
155	Agonis flexuosa	Peppermint tree	28, 16, 16	18	A	40	No	No
156	Eucalyptus sideroxylon	Red ironbark	19	15	A	19	No	No
157	Eucalyptus sideroxylon	Red ironbark	22	14	B	22	No	No
158	Eucalyptus sideroxylon	Red ironbark	18	12	C	n/a	No	Yes
159	Eucalyptus sideroxylon	Red ironbark	22	12	B	n/a	No	Yes
160	Eucalyptus sideroxylon	Red ironbark	16	20	B	n/a	No	Yes
161	Eucalyptus sideroxylon	Red ironbark	18	21	C	n/a	No	Yes
162	Eucalyptus sideroxylon	Red ironbark	16	19	C-	n/a	No	Yes
163	Eucalyptus polyanthemos	Silver dollar gum	20	14	D	20	No	No
164	Fraxinus uhdei	Shamel ash	32	20	B	n/a	No	Yes
165	Fraxinus uhdei	Shamel ash	22	22	D	n/a	No	Yes
166	Fraxinus uhdei	Shamel ash	16	15	C	15	No	No
167	Fraxinus uhdei	Shamel ash	24	14	D	24	No	No
168	Cupaniopsis anacardioides	Carrotwood	9	10	C	10	No	No
169	Pyrus kawakamii	Evergreen pear	10	9	C	n/a	No	Yes
170	Pinus halepensis	Aleppo pine	26	20	B	20	No	?
171	Pyrus kawakamii	Evergreen pear	6	6	C	n/a	No	Yes
172	Pinus halepensis	Aleppo pine	20	14	C-	n/a	No	Yes
173	Pinus halepensis	Aleppo pine	12	14	B	n/a	No	Yes
174	Catalpa speciosa	Western catalpa	22	15	B	16	No	No
175	Pyrus kawakamii	Evergreen pear	7	6	C	n/a	No	Yes
176	Catalpa speciosa	Western catalpa	7, 11	15	C-	n/a	No	Yes
177	Sophora japonica	Chinese scholar tree	4	5	C	5	No	No

ATTACHMENT NO. 7

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
178	Sophora japonica	Chinese scholar tree	4	5	C	5	No	No
179	Sophora japonica	Chinese scholar tree	4	5	C-	n/a	No	Yes
180	Pinus pinea	Italian stone pine	24	16	B	18	No	No
181	Pinus pinea	Italian stone pine	37	16	B	37	No	No
182	Sophora japonica	Chinese scholar tree	4	5	D	n/a	No	Yes
183	Brachychiton populneus	Bottle tree	11	9	B	9	No	No
184	Brachychiton discolor	Pink flame tree	12	7	B	7	No	No
185	Brachychiton discolor	Pink flame tree	6.5	3	B	3	No	No
186	Brachychiton discolor	Pink flame tree	13	7	A	7	No	No
187	Brachychiton populneus	Bottle tree	8, 9	8	C-	10	No	No
188	Brachychiton populneus	Bottle tree	12	7	B	7	No	No
189	Brachychiton discolor	Pink flame tree	13	6	A	6	No	No
190	Brachychiton populneus	Bottle tree	11	9	B	9	No	No
191	Pinus thunbergiana	Japanese black pine	13	12	B	13	No	No
192	Brachychiton populneus	Bottle tree	9	6	B	6	No	No
193	Brachychiton populneus	Bottle tree	7.3	6	B	6	No	No
194	Brachychiton populneus	Bottle tree	4	3	C-	n/a	No	Yes
195	Melaleuca quinquenervia	Cajeput tree	17	13	B	21	No	No
196	Eucalyptus rudis	Desert gum	13	18	D	n/a	No	Yes
197	Liquidambar styraciflua	American sweetgum	6, 7	9	C	9	No	No
198	Eucalyptus polyanthemos	Silver dollar gum	26	19	B	27	No	No
199	Eucalyptus polyanthemos	Silver dollar gum	17	17	B	17	No	No
200	Eucalyptus cladocalyx	Sugar gum	20	15	B	20	No	No
201	Eucalyptus cladocalyx	Red gum	28	24	C	28	No	No
202	Platanus racemosa	California sycamore	23	14	C	18	No	No
203	Pinus eldarica	Afghan pine	11	7	B	8	No	No
204	Eucalyptus cladocalyx	Sugar gum	30	20	B	30	No	No
205	Eucalyptus cladocalyx	Sugar gum	24	22	B	24	No	No

ATTACHMENT NO. 7 44

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
206	Eucalyptus cladocalyx	Sugar gum	40	25	C	45	No	No
207	Pinus pinea	Italian stone pine	17	13	B	14	No	No
208	Pinus pinea	Italian stone pine	18	19	B	19	No	No
209	Pinus pinea	Italian stone pine	40	19	B	40	No	No
210	Melaleuca quinquenervia	Cajeput tree	19	10	B	24	No	No
211	Olmediella betschlerana	Guatemalan holly	11	9	C	11	No	No
212	Olmediella betschlerana	Guatemalan holly	9	8	D	9	No	No
213	Myoporum laetum	Ngaio	15	9	C-	9	No	No
214	Platanus racemosa	California sycamore	18	17	B	17	No	No
215	Liquidambar styraciflua	American sweetgum	13	15	B	15	No	No
216	Liquidambar styraciflua	American sweetgum	14	15	B	15	No	No
217	Schinus terebinthifolius	Brazilian pepper	13	10	B	10	No	No
218	Cupaniopsis anacardioides	Carrotwood	16	16	B	16	No	No
219	Cupaniopsis anacardioides	Carrotwood	17	16	B	16	No	No
220	Pyrus kawakamii	Evergreen pear	8	10	C-	10	No	No
221	Pyrus kawakamii	Evergreen pear	13	12	C	13	No	No
222	Pyrus kawakamii	Evergreen pear	12	12	C	12	No	No
223	Pyrus kawakamii	Evergreen pear	10	10	B	10	No	No
224	Platanus x acerifolia	London plane	7	6	D	n/a	No	***Yes**
225	Platanus x acerifolia	London plane	6	8	D	n/a	No	Yes
226	Platanus x acerifolia	London plane	7	8	D	n/a	No	Yes
227	Platanus x acerifolia	London plane	7	9	C-	n/a	No	Yes
228	Platanus x acerifolia	London plane	10	10	C	n/a	No	Yes
229	Platanus x acerifolia	London plane	7	6	C-	n/a	No	Yes
230	Platanus x acerifolia	London plane	6	9	C-	n/a	No	Yes
231	Platanus x acerifolia	London plane	8	10	C-	n/a	No	Yes
232	Platanus x acerifolia	London plane	6	9	C-	n/a	No	Yes
233	Platanus x acerifolia	London plane	5	5	D	n/a	No	Yes

ATTACHMENT NO. 7.4

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
234	Platanus x acerifolia	London plane	7	10	C	n/a	No	Yes
235	Pyrus kawakamii	Evergreen pear	13	13	C	13	No	No
236	Pyrus kawakamii	Evergreen pear	11	11	C	11	No	No
237	Pyrus kawakamii	Evergreen pear	16	10	C	16	No	No
238	Ficus rubiginosa	Rusty leaf fig	18	12	B	13	Yes	No
239	Liquidambar styraciflua	American sweetgum	10	8	C	9	No	No
240	Eucalyptus citriodora	Lemon-scented gum	16	21	C	16	No	No
241	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	10	7	A	7	No	No
242	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	10	7	A	7	No	No
243	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	9	7	A	7	No	No
244	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	10	6	A	7	No	No
245	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	11	7	A	8	No	No
246	Platanus racemosa	California sycamore	11	15	B	15	No	No
247	Melaleuca quinquenervia	Cajeput tree	7, 9, 12	13	C	20	No	No
248	Lophostemon confertus	Brisbane box	5, 6, 6	11	C	12	No	No
249	Melaleuca quinquenervia	Cajeput tree	7, 8, 10	9	C	18	No	No
250	Melaleuca quinquenervia	Cajeput tree	9, 10, 10	9	B	20	No	No
251	Catalpa speciosa	Western catalpa	8, 8	17	C	17	No	No
252	Eucalyptus ficifolia	Red flowering gum	13	11	C	13	No	No
253	Melaleuca quinquenervia	Cajeput tree	11	9	C	14	No	No
254	Melaleuca quinquenervia	Cajeput tree	12	8	B	15	No	No
255	Melaleuca quinquenervia	Cajeput tree	15	9	C	20	No	No
256	Melaleuca quinquenervia	Cajeput tree	11	9	C-	14	No	No
257	Melaleuca quinquenervia	Cajeput tree	18	9	B	23	No	No
258	Agonis flexuosa	Peppermint tree	16 B	10	C	12	No	No
259	Ulmus parvifolia	Chinese elm	16	18	B	18	Yes	No
260	Eucalyptus citriodora	Lemon-scented gum	11	11	C	11	No	No
261	Lophostemon confertus	Brisbane box	11	10	B	11	No	No

ATTACHMENT NO. 7

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
262	Zelkova serrata	Sawtooth zelkova	14	17	A	17	Yes	No
263	Eucalyptus camaldulensis	Red gum	26	16	B	26	No	No
264	Eucalyptus camaldulensis	Red gum	15	20	C	20	No	No
265	Fraxinus uhdei	Shamel ash	22	17	A	17	No	No
266	Fraxinus uhdei	Shamel ash	15	16	C	16	No	No
267	Fraxinus uhdei	Shamel ash	13	16	B	16	No	No
268	Fraxinus uhdei	Shamel ash	8, 8	17	D	17	No	No
269	Fraxinus uhdei	Shamel ash	12	13	C	13	No	No
270	Fraxinus uhdei	Shamel ash	17	21	B	21	No	No
271	Fraxinus uhdei	Shamel ash	15	19	B	19	No	No
272	Liquidambar styraciflua	American sweetgum	14	17	B	17	No	No
273	Liquidambar styraciflua	American sweetgum	11 B	14	B	14	No	No
274	Liquidambar styraciflua	American sweetgum	13	18	B	18	No	No
275	Liquidambar styraciflua	American sweetgum	14	15	C	15	No	No
276	Olea europaea	Olive	18	18	B	18	No	No
277	Liquidambar styraciflua	American sweetgum	15	10	B	10	No	No
278	Metrosideros excelsus	New Zealand Christmas Tree	18	10	A	20	No	No
279	Platanus racemosa	California sycamore	17	16	B	16	No	No
280	Platanus racemosa	California sycamore	16	14	B	14	Yes	No
281	Platanus x acerifolia	London plane	19	15	B	15	No	No
282	Fraxinus uhdei	Shamel ash	18	17	B	17	No	No
283	Fraxinus uhdei	Shamel ash	23	16	B	16	No	No
284	Fraxinus uhdei	Shamel ash	19	18	B	18	No	No
285	Fraxinus uhdei	Shamel ash	17	17	C	n/a	No	Yes
286	Fraxinus uhdei	Shamel ash	17	15	B	15	No	No
287	Platanus racemosa	California sycamore	16, 18	20	B	22	No	No
288	Liquidambar styraciflua	American sweetgum	10	14	C	14	No	No
289	Liquidambar styraciflua	American sweetgum	10	13	B	n/a	No	Yes

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
290	Platanus racemosa	California sycamore	20	15	B	15	No	No
291	Lophostemon confertus	Brisbane box	9	10	C	9	No	No
292	Liquidambar styraciflua	American sweetgum	27	17	B	25	No	No
293	Pinus halepensis	Aleppo pine	28	19	C-	n/a	No	Yes
294	Liquidambar styraciflua	American sweetgum	16	15	B	15	No	No
295	Liquidambar styraciflua	American sweetgum	7	9	C	9	No	No
296	Pinus pinea	Italian stone pine	16	14	B	14	No	No
297	Pinus halepensis	Aleppo pine	39	30	B	39	No	No
298	Pinus halepensis	Aleppo pine	17	14	B	14	No	No
299	Eucalyptus citriodora	Lemon-scented gum	23	29	B	24	No	No
300	Eucalyptus citriodora	Lemon-scented gum	16	13	D	n/a	No	Yes
301	Platanus racemosa	California sycamore	34	18	A	34	No	No
302	Platanus racemosa	California sycamore	20	12	B	15	No	No
303	Liquidambar styraciflua	American sweetgum	14	17	B	17	No	No
304	Catalpa speciosa	Western catalpa	10, 11	18	C	18	No	No
305	Cupaniopsis anacardioides	Carrotwood	6, 7	10	C	10	No	No
306	Cupaniopsis anacardioides	Carrotwood	4.3	6	C-	n/a	No	Yes
307	Cupaniopsis anacardioides	Carrotwood	3.7	7	C-	7	No	No
308	Ficus rubiginosa	Rusty leaf fig	18	16	C-	16	No	No
309	Leptospermum laevigatum	Australian tea tree	17	8	C	n/a	No	Yes
310	Syagrus romanzoffianum	Queen palm		10	B	4	Yes	No
311	Syagrus romanzoffianum	Queen palm		8	B	4	No	No
312	Syagrus romanzoffianum	Queen palm		7	C-	4	No	No
313	Liquidambar styraciflua	American sweetgum	11	12	C	n/a	No	Yes
314	Howea forsteriana	Kentia palm		6	C	3	Yes	No
315	Eucalyptus citriodora	Lemon-scented gum	14	15	D	n/a	No	Yes
316	Eucalyptus citriodora	Lemon-scented gum	17	20	B	17	No	No
317	Washingtonia robusta	Mexican fan palm		5	A	3	No	No

ATTACHMENT NO. 7 48

Tag#	Botanic Name	Common Name	Caliper - DBH	Dripline radius	Health	Clearance radius	Transplant	Remove
318	Syagrus romanzoffianum	Queen palm		7	C-	4	No	No
319	Washingtonia robusta	Mexican fan palm		5	B	3	No	No

*Calipers with "B" indicated basal measurements below first scaffold limbs.

Clearances for Trees during Construction

Recommended clearance radii for trenching, paving or other activities that may weaken or kill trees are listed in the Matrix of Recommendations above. There are several methods of determining the space needed for tree protection. Drip line is most often used but you must be aware of the tree's lean or any other physical factors that force roots into a certain direction. The most important roots are opposite the lean of a tree. Following dripline alone would be just the wrong thing to do for leaning trees. Dripline based recommendations do not consider larger trees with narrow or upright habits. There are also significant species tolerance differences that should be considered. Drip line is not effective in these cases.

Dr. Clark, one of the authors of *Arboriculture*, uses a diameter method that allows six inches of radius for every inch of trunk diameter for trees up to 20 inches DBH. For trees that are over 20 inches allow nine inches for every inch of trunk diameter. Over mature trees will need a full foot for every diameter - inch. If the tree is known to be only moderately tolerant to damage, add 3 inches per diameter inch to these distances. If the tree has a poor tolerance, add 6 inches. If you take this to the maximum, you would allow 1.5 feet of radius for every inch of trunk diameter to be on the safe side. Using such a formula is my preferred method of forming a protection zone. See Trees and Development, ISA, by Matheny and Clark, page 74 and appendix.

I recommend 6-foot high chain link protective fencing around the protection zone. Before the fence goes up any weeds should be removed and any bare soil mulched to four inches deep with coarse tree chips.

ATTACHMENT NO. 7.4

Preservation of Trees to Remain

During tree removal operations it will be evident that some trees may have less than attractive, formerly shaded, sides exposed. If properly chosen and placed, new plantings should soon help fill in and improve this appearance. Temporary irrigation will probably be necessary during construction to maintain the health of existing trees (due to the shallow roots). A drip or mini-spray type system and domestic water would be best, considering the root spread and dictates of a construction site. Water trucks rarely provide sufficiently deep watering. Other species added to existing groupings should have similar watering requirements as the existing trees. However, for the first few years they will require more frequent irrigation within the watering basin, while they root in.

Deep cross-ripping (subsoiling) and amending of large areas where trees will be planted is essential. Recommendations for soil amendments and fertilization should come from an independent laboratory, after thorough testing.

- Install 6' high secure fencing around trees to be preserved. Equipment and foot traffic must be kept out from under all trees being preserved.
- To avoid tearing roots back into the protection zones, during deep ripping or grading in the vicinity of trees to remain, a trencher should cut around the perimeter outside the clearance radius. Roots over 1 inch in diameter should then be cut cleanly using loppers or a fine bladed saw. Do not apply a sealant. Keep in mind that any amount of root loss may increase the risk of toppling in the wind.
- When other excavations are dug, first use a trencher and re-cut the roots over one inch with loppers or a fine bladed saw. Equipment such as backhoes may tear roots excessively between the trench and trunk. Roots that are not cut cleanly will be more open to infection and will not resprout as well.
- No vehicles, equipment, materials, fuels, soil, excess concrete or other debris, liquid or solid, may be dumped or stored under or near the trees.
- Do not change the soil level or grade within the drip-line of any tree. If necessary, some accommodations can be made if approached on a tree-by-tree basis. Specific recommendations should be obtained from a registered consulting arborist.
- To reduce soil compaction below trees to remain, four radial trenches should be placed between the main lateral roots, as much as their position can be determined. Trenches should begin at four feet or more from the trunk and radiate out to the edge of the root zone. The soil in each trench should be amended as recommended by a soil lab.

ATTACHMENT NO. 7 - 58

- When larger roots are exposed in excavations, cover the ends with baggies and a rubber band or plastic sheeting and keep moist.
- Strong dust control measures should be observed and dusty foliage rinsed every Friday or as often as necessary.
- The soil surface under each tree to remain should be maintained in a moist condition to a minimum depth of 18 inches.
- After turf and ground cover are removed under trees, a layer of wood chips or coarse mulch should be maintained to a depth of four inches. The existing leaf and organic layer should be left in place as much as possible.
- If equipment access is necessary within the protection zone, steal plates on a layer of wood chips 8 inches deep should be installed on the surface under trees to reduce compaction.

Pest Management

Monitor trees to remain during construction and consult a licensed pest control advisor for recommendations to control pests encountered.

Tree Health Management

Tree health management should consider both the part you see and the equally important part underground. The below ground portions will involve soil chemical, biological and physical properties. Minimum levels of fertility are recommended to discourage excessive new growth, which is preferred by many pests. Recommendations dealing with the physical properties are as follows:

1. Trees that cannot be made safe by pruning or moving the "target" should be removed.
2. Trees protection zones should be mulched. Adding surface mulching to tree planting areas will reduce water evaporation from the soil surface, improve soil biotic life, improve water penetration, protect surface roots, and reduce the accumulation of salts in the soil surface. Try to use good quality, fully composted organic material from a reputable source (e.g. Aguinaga "Forest Floor ½ - 2") However, if constrained by budgets, even fresh tree chips from a tree service are better than no mulch.
3. Aerate lawn areas, vertical mulch or use radial trenching as described above.

The larger eucalypts, red gums and sugar gums surrounding improvements should receive the following care:

1. Do no pruning (root pruning or top pruning) except as needed for public safety.
2. Do not climb any tree, other than those being removed, using climbing gaffs.

ATTACHMENT NO. 7.51

3. Do not cultivate the soil under construction affected trees, except lightly as needed to apply gypsum or other recommended amendments. Under no circumstances should a roto-tiller be used under affected trees.
4. Do not trench, dig, or install new plantings under or near trees to remain. Radial trenching between primary roots to reduce compaction may be used under the guidance of a registered consulting arborist.
5. Irrigation in the area of affected trees should be adjusted to less frequent, but longer cycles, according to the reduced needs of the trees once the turf is removed.
6. The new irrigation system should have separate valves for tree masses. New irrigation lines among tree masses should be run outside the clearance radii, but when necessary can be run radial to trunks or surface mounted flex tubing below mulch.
7. Do not plant any new eucalypts from containers larger than 5 gallon size.

Long Term Maintenance Recommendations

- To the degree possible, trees to remain should have turf removed within the dripline and replaced with mulch beds and occasional sparse plantings of drought tolerant shrubs or ground covers. New trees should have no turf within three feet of their trunks. The irrigation for the trees should be separated from the turf and scheduled according to their specific needs.
- All future pruning should be guided by ANSI A-300 standards – there should be no topping, no lion-tailing, no flush cuts, no over-lifting and no over thinning. All pruning should be supervised by an ISA certified arborist. Pruning specifications should guide outside contract tree service work.
- Staking of new trees should be carefully monitored to avoid stake rub and tree tie girdling. Trees shall be tied only as high as necessary to keep the tree vertical. All excess stake length above the highest tie shall be cut and removed. Stakes should be removed as soon as trees can stand without them.
- Trees that are over picnic areas, walkways, and other public use areas must be kept to high standards of soundness and safety. Large codominant specimens, trees with large end-heavy scaffolds, trees with extensive decay, trees that have large limbs with included bark and other trees that have uncorrectable defects should be removed or the uses below them should be removed.
- Establish and enforce policies to keep all vehicles in the park, including county maintenance vehicles, on paved surfaces and away from trees.
- After construction the trees should be inspected again for hazardous conditions that may have come about during this time or perhaps caused by construction.

ATTACHMENT NO. 7.52

Transplanting Budget Estimates

Box and Store (no replanting)

60" box	$1,200
72" box	$1,800
84" box	$2,500
96" box	$3,000
108" box	$4,000

Box & Replant Costs

60" box	$1,500
72" box	$2,000
84" box	$3,000
96" box	$4,200
108" box	$5,500

ATTACHMENT NO 7.63

Tree Preservation Specifications

1. Protection Barrier: A protection barrier shall be installed around the trees to be preserved. The barrier shall be constructed of chain-link fencing at least six feet high. The barrier shall be placed as far from the base of the tree(s) as possible, preferably at the drip-line to protect lower limbs. The fencing shall be maintained in good repair throughout the duration of the project, and shall not be removed, relocated, or encroached upon without permission of the arborist involved.
2. Storage of Materials: There shall be NO storage of materials or supplies of any kind within the area of the protection barriers. Concrete and cement materials, block, stone, sand and soil shall not be placed within the drip-line of the tree.
3. Fuel Storage: Fuel storage shall NOT be permitted within 150 feet of any tree to be preserved. Refueling, servicing and maintenance of equipment and machinery shall NOT be permitted within 150 feet of protected trees.
4. Debris and Waste Materials: Debris and waste from construction or other activities shall NOT be permitted within protected areas. Wash down of concrete or cement handling equipment, in particular, shall NOT be permitted within 150 feet of protected trees.
5. Grade Changes: Grade changes can be particularly damaging to trees. Even as little as two inches of fill can cause the death of a tree. Lowering the grade can destroy major portions of a root system. Any grade changes proposed should be approved by a Registered Consulting Arborist prior to construction, and precautions taken to mitigate potential injuries.
6. Damages: Any damages or injuries should be reported to the project arborist as soon as possible. Severed roots shall be pruned cleanly to healthy tissue, using proper pruning tools. Broken branches or limbs shall be pruned according to International Society of Arboriculture Pruning Guidelines and ANSI A-300 Pruning Standards.
7. Preventive Measures: Before construction begins, fertilization of the affected trees intended to remain is recommended to improve tree vigor and health. Follow a soil laboratory's recommendations for fertilization with the appropriate fertilizer products. Pruning of the tree canopies and branches should be done at the direction of the project arborist to remove any dead or broken branches, and to provide the necessary clearances for the construction equipment when necessary.

ATTACHMENT 4

Contingent and Limited Conditions

The earlier inventory could not be used for direct comparison, since there was no tree map or tags to coordinate the numbers.

Proper transplanting, planting and maintenance will be essential to good growth and performance of any future planting and the maintenance of the existing trees.

Transplanting of larger mature trees always involves increased risk of death and/or toppling.

The soil conditions of this site may not be uniform and conditions may be encountered that are still unknown.

A detailed hazard analysis was not requested. No testing was done for internal decay.

No guarantee of stability is made by this report. Existing stability may be compromised by the future work of others.

Small numbers of trees do not yield reliable conclusions as to their site suitability.

Tree dripline radii were measured using a laser range finder at an approximate average location around the trees.

Measurements were taken according to ANSI Z-60, using a Biltmore stick and calipers for smaller trees.

ATTACHMENT NO. 7.55

Conclusion

Preservation

I recommended that 64 trees be removed due to their safety, poor health or condition. I make no apology for so many removal recommendations. These trees have been poorly taken care of. Many of these were myoporums dying due to the Teuchothrip infestation. Others were recommended for removal due to decay at the base started by lawn mower injuries, trunk defects such as seriously included bark between codominant leaders, and other untreatable defects or conditions. This is the best time to clean out weak and unstable trees.

For the trees that will remain, serious protection measures are needed and justified. Large trees are a great asset to a park. Many unplanned things can happen on construction sites. Good fencing is the best insurance that desirable trees will remain so. Monitoring of work around trees is essential.

Planting

Diversity is good insurance against serious future pest outbreaks. Do not plant more than ten percent of even the most successful species. *Eucalyptus rudis*, flooded gum and E. camaldulensis, red gum were adequate choices originally, but after the introduction of the redgum lerp psyllid many were lost.

The root environment is just as important as the above ground environment. Many of the trees recommended for removal became injured or unstable because the root environment was not protected and shallow roots resulted, the shallow roots were then injured by lawn mowers and in some decay resulted. This is an opportunity to improve that environment.

ATTACHMENT NO. 7 56

Disclaimer

Good, current information on tree preservation has been applied. However, even when every tree is inspected, inspection involves sampling, therefore some areas of decay or weakness may be missed. A complete tree hazard evaluation was not requested or performed. Weather, winds and the magnitude and direction of storms are not predictable and some failures may still occur despite the best application of high professional standards. Future tree maintenance will also affect the trees health and stability and is not under the supervision or scrutiny of this consultant. Continuing construction activity such as trenching will also affect the health and safety, but are unknown and unsupervised by this consultant. Trees are living, dynamic organisms and their future status cannot be predicted with complete certainty by any expert. This consultant does not assume liability for any tree failures involved with this property.

ATTACHMENT NO. 7.57

Certification

I, Gregory W. Applegate, certify to the best of my knowledge and belief:

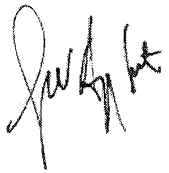
That the statements of fact contained in this report are true and correct. That the report analysis, opinions, and conclusions are limited only the reported assumptions and limiting conditions, and are my personal unbiased professional analysis, opinions and conclusions.

That I have no present or prospective interest in the vegetation that is the subject of this report, and I have no personal interest or bias with respect to the parties involved.

That my compensation is not contingent upon a reporting the attainment of stipulated result, or the occurrence of a subsequent event.

That my analysis, opinions, and conclusions were developed, and this report has been prepared, in conformity with the standards of arboricultural practice.

That I have made a personal inspection of the plants that are the subject of this report. No one provided significant professional assistance to the person signing this report.



Arborgate Consulting, Inc
Gregory W. Applegate, CEO _____ Date _____
Registered Consulting Arborist #365

ATTACHMENT NO. 4
58

Appendix

A. Resume

B. Botanical Name / Common Name Cross-reference

C. Glossary

D. Area map

E. Eucalyptus Hazard Charts

F. Transplanting Specifications

ATTACHMENT NO. 7.59

RESUME: GREGORY W. APPLEGATE, ASCA, ASLA

PROFESSIONAL REGISTRATIONS:

American Society of Consulting Arborists #365
International Society of Arboriculture, Certified Arborist Number WC-180
International Society of Arboriculture, Certified Tree Risk Assessor PNC-444

EXPERIENCE:

Mr. Applegate is an independent consulting arborist, CEO of Arborgate Consulting, Inc. He has been in the horticulture industry since 1963, providing professional arboricultural consulting since 1984 within both private and public sectors. His expertise includes appraisal, tree preservation, diagnosis of tree and palm problems, construction impact mitigation, environmental assessment, forensic consulting and testimony, hazard evaluation, pruning programs, species selection and tree health monitoring.

Mr. Applegate has consulted for insurance companies, major developers, theme parks, homeowners, homeowners' associations, landscape architects, landscape contractors, property managers, attorneys and governmental bodies.

Notable projects on which he has consulted are: Disneyland, Disneyland Hotel, DisneySeas-Tokyo, Disney's Wild Animal Kingdom, the New Tomorrowland, Disney's California Adventure, Disney Hong Kong project, Knott's Berry Farm, Tustin Ranch, Newport Coast, Crystal Court, Newport Fashion Island Palms, Loyola-Marymount campus, Bixby Ranch Country Club, Playa Vista, MTA Expo Line, MWD-California Lakes, Paseo Westpark Palms, Cal State Long Beach, Pierce College, The Irvine Concourse, UCI, USC, UCLA, LA City College, Crafton Hills College, MTA various projects, and the State of California review of the Landscape Architecture License exam (plant materials portion)

EDUCATION:

Bachelor of Science in Landscape Architecture,
California State Polytechnic University, Pomona 1973
Arboricultural Consulting Academy (by ASCA)
Arbor-Day Farm, Kansas City 1995
Continuing Education Courses in Arboriculture
required to maintain Certified Arborist status and for ASCA membership

PROFESSIONAL AFFILIATIONS:

American Society of Landscape Architects (ASLA), Full Member
American Society of Consulting Arborists (ASCA), Full Member
International Society of Arboriculture (ISA), Regular Member
California Tree Failure Report Program, UC Davis, Participant
Street Tree Seminar (STS), Member

COMMUNITY AFFILIATIONS:

The Tree Society of Orange County (1990 until present)
Landscape Architecture License Exam, Reviewer, Cal Poly Pomona (1986-90)
American Institute of Landscape Architects (L.A.) Board of Directors (1980-82)
California Landscape Architect Student Scholarship Fund - Chairman (1985)
International Society of Arboriculture - Examiner-tree worker certification (1990)
Guest lecturer at UCLA, Cal Poly, Saddleback College, & Palomar Junior College

B. Botanical Name / Common Name Cross-reference

Botanic name	Common name
Agonis flexuosa	Peppermint tree
Alnus rhombifolia	White alder
Brachychiton discolor	Pink flame tree
Brachychiton populneus	Bottle tree
Callistemon citrinus	Bottle brush tree
Catalpa speciosa	Western catalpa
Celtis laevigata	Sugar hackberry
Cupaniopsis anacardioides	Carrotwood tree
Eucalyptus camaldulensis	Red gum
Eucalyptus citriodora	Lemon gum
Eucalyptus cladocalyx	Sugar gum
Eucalyptus ficifolia	Red flowering gum
Eucalyptus lehmannii	Bushy yate
Eucalyptus polyanthemos	Silver dollar gum
Eucalyptus rudis	Flooded gum
Eucalyptus sideroxylon	Red ironbark
Feijoa sellowiana	Pineapple guava
Ficus rubiginosa	Rusty leaf fig
Fraxinus uhdei	Shamel ash
Howea forsteriana	Kentia palm
Juniperus chinensis 'Torulosa'	Hollywood juniper
Lagerstroemia indica	Crape myrtle
Lagunaria patersonii	Primrose tree
Leptospermum laevigatum	Australian tea tree
Liquidambar styraciflua	American sweet gum
Lophostemon confertus	Brisbane box
Magnolia grandiflora	Southern magnolia
Melaleuca quinquenervia	Cajeput tree

ATTACHMENT 19.6

Botanic name	Common name
Metrosideros excelsus	New Zealand Christmas tree
Morus alba	White mulberry
Myoporum laetum	Ngaio
Olea europaea	Olive
Olmediella betschlerana	Guatemalan holly
Pinus canariensis	Canary Island pine
Pinus eldarica	Afghan pine
Pinus halepensis	Aleppo pine
Pinus pinea	Italian stone pine
Pinus thunbergiana	Japanese black pine
Platanus racemosa	California sycamore
Platanus x acerifolia	London plane
Podocarpus gracilior	Fern pine
Prunus cerasifera 'Atropurpurea'	Red leaf plum
Pyrus kawakamii	Evergreen pear
Quercus ilex	Holly oak
Schinus molle	California pepper
Schinus terebinthifolius	Brazil pepper
Sophora japonica	Chinese scholar tree
Spathodea campanulata	African tulip tree
Syagrus romanzoffianum	Queen palm
Tipuana tipu	Tipu tree
Ulmus parvifolia	Chinese elm
Washingtonia robusta	Mexican fan palm
Zelkova serrata	Sawtooth zelkova

ATTACHMENT NO. 2

Glossary

Apical dominance	Relative strength of the central leader compared to lateral branches.
Arboricultural	Pertaining to the awareness, care, evaluation, identification, growing, maintenance, management, planting, selection, treatment, understanding, valuation and so forth of trees and other woody plants and their growing environments, particularly in shade and ornamental (non-crop/commodity) settings.
Arborist	A person possessing the technical competence through experience and related training to provide for or supervise the management of trees or other woody plants in a landscape setting.
Bark	Tissue on the outside of the vascular cambium. Bark is usually divided into inner bark - active phloem and aging and dead crushed phloem - and outer bark.
Biltmore stick	The Biltmore stick or cruiser stick can determine tree diameter and height along with volumes of wood on standing trees and logs.
Biotic	Pertaining to living organisms.
Branch collar	Trunk tissue that forms around the base of a branch between the main stem and the branch, or between a main branch and a lateral branch. As a branch decreases in vigor or begins to die, the collar usually becomes more pronounced an more completely encircles the branch.
Calcareous soil	A soil containing calcium carbonate (lime), or a soil alkaline in reaction because of the presence of calcium carbonate.
Caliper	A measurement of the trunk diameter for nursery-grown or small size trees; taken at 6 inches above ground level for trees less than 6 inches diameter, and at 12 inches above ground level for trees 6 inches to 12 inches diameter. Trees larger than 12 inches diameter are measured at 54 inches (4.5 feet) above the ground level.
Canopy	The live, foliage-bearing part of a tree.
Cavity	An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.
Central leader	The main stem of the tree.
Chlorotic	Also Chlorosis. A condition of the plant marked by yellowing of normally green foliage, often indicating nutrient deficiency or plant dysfunction.

ATTACHMENT NO. 4.3

Codominant	Leaders equal in size and relative importance, developed from 2 apical buds at the top of a stem. Each codominant stem is an extension of the stem below it. There are no branch collars or trunk collars at the bases of codominant stems.
Compaction	(Soil Compaction) The compression of soil, causing a reduction of pore space and an increase in the bulk density of the soil. Tree roots cannot grow in compacted soil.
Compartmentalize	To seal off decay. The ability of the tree to restrict the spread of invasive organisms, such as decay fungi, by means of internal changes in cell structure and chemistry.
Crotch	The union of two or more branches; the axillary zone between branches.
Crown	The upper portions of a tree or shrub, including the main limbs, branches, and twigs.
Cultivar	A cultivated variety. Maybe a field selection or a horticultural variety that has originated and persisted under cultivation. Usually enclosed in single quotes after the genus and species names.
Decay	Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.
Decline	Progressive reduction of health or vigor of a plant.
Dieback	Progressive death of buds, twigs and branch tissues, on individual limbs, or throughout the canopy.
Dripline	A projected line on the ground that corresponds to the spread of branches in the canopy; the farthest spread of branches.
Evergreen	retains its leaves throughout the year.
Excurrent	Referring to crowns having a strong central leader
Fertilization	The process of adding nutrients to a tree or plant; usually done by incorporating the nutrients into the soil, but sometimes by foliar application or injection directly into living tissues.
Flush cut	Pruning technique in which both branch and stem tissue are removed, generally considered poor practice
Foliage	The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.
Gall	An abnormal or disorganized growth of plant tissues, caused by parasitic or infectious organisms such as insects, fungi, bacteria, or viruses.
Grading	Also Regrading. Intentional altering of topography and soil levels, using machinery.

ATTACHMENT NO. 7

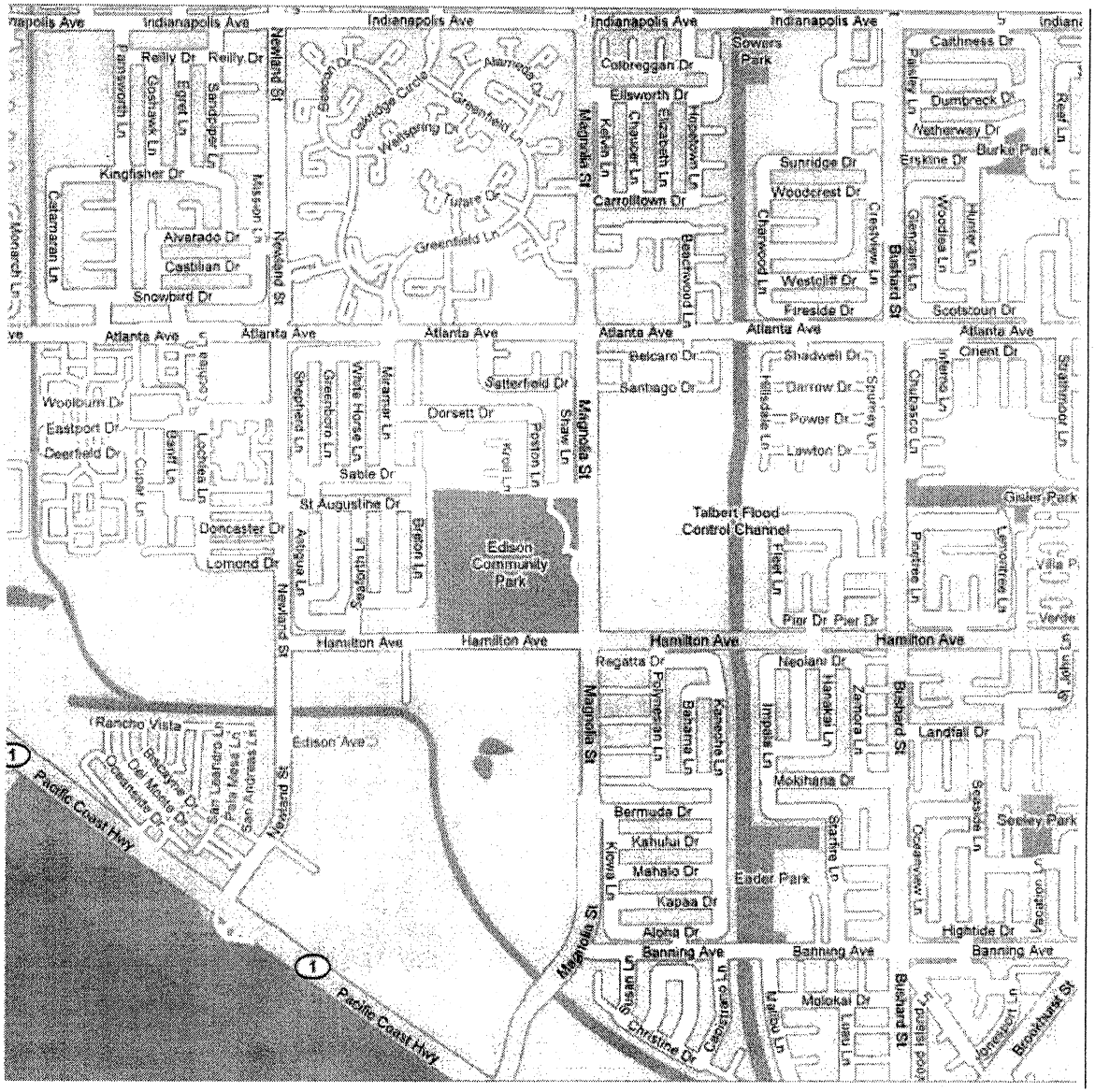
Ground cover	Plants, usually herbaceous, used to spread, stay low and cover ground. They are usually not suited for foot traffic and do not usually need to be mowed and as such are distinguished from lawns
Included bark	Bark or cortex tissue that is included or trapped between close-growing branches. Usually found in narrow or tight crotches.
Leader	A main stem or branch of a tree that is (usually) codominant with other main stems.
Lifted	A shrub or a tree that has had lower branches and foliage removed, often to reveal the lower trunks or branch-work or for improved visibility as in many street trees.
Limb	A large lateral branch growing from the main trunk.
Lion-tailing	Pruning technique where internal foliage and branches are removed, leaving the latter concentrated at branch ends.
Perennial	plants that live several to many years.
Resistograph	An instrument used to detect and measure the extent of decay in trees and wood. The Resistograph drills a 3 mm hole into the trunk and produces a graph of the resistance encountered.
Root crown	Area at the base of a tree where the roots and stem merge (synonym - root collar)
Root system	The portion of the tree containing the root organs, including buttress roots, transport roots, and fine absorbing roots; all underground parts of the tree.
Root zone	The area and volume of soil around the tree in which roots are normally found. May extend to three or more times the branch spread of the tree, or several times the height of the tree.
Scaffold limb	Primary structural branch of the crown.
Shrub	A relatively low woody plant with several stems arising near the ground.
Soil profile	The characteristics of a soil as regards to relative depth; the changes in soil texture and composition that occur with depth.
Sprout	Also water sprout or epicormic shoot. A shoot or stem that grows from the bark of a tree; adventitious or secondary growth.
Systemic	Affecting the whole plant or organism. A systemic compound is carried throughout the entire plant to all parts.
Taper	Relative change I diameter with length - reflects ability of stem or branch to evenly distribute stress.
Target	Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.

ATTACHMENT No. 7.6

Topping	The practice of cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees, and promotes decay in the canopy.
Trees	An arborescent woody plant, with a single or few trunks near the base.
Vertical mulching	Ventilation of soil by auguring holes in a regular pattern. Usually the holes are backfilled with amended soil, but small holes may be left open.
Vigor	Active, healthy growth of plants: ability to respond to stress factors.

ATTACHMENT NO. 7

D. Area Map



ATTACHMENT No. 7

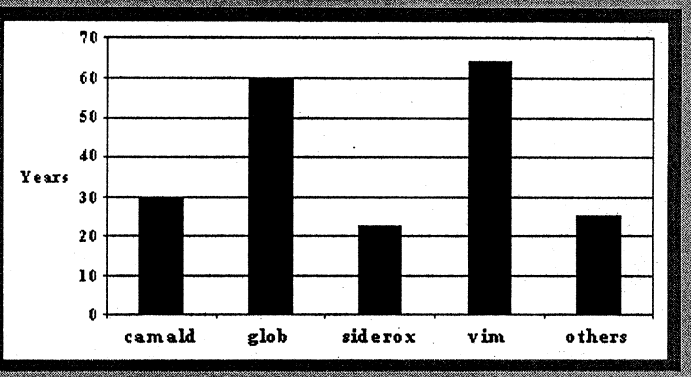
E .Eucalyptus Hazard Charts

The following charts are taken from a recent presentation of information of the California Tree Failure Database. Information is submitted by arborist participants throughout California.

E. camaldulensis - Summary

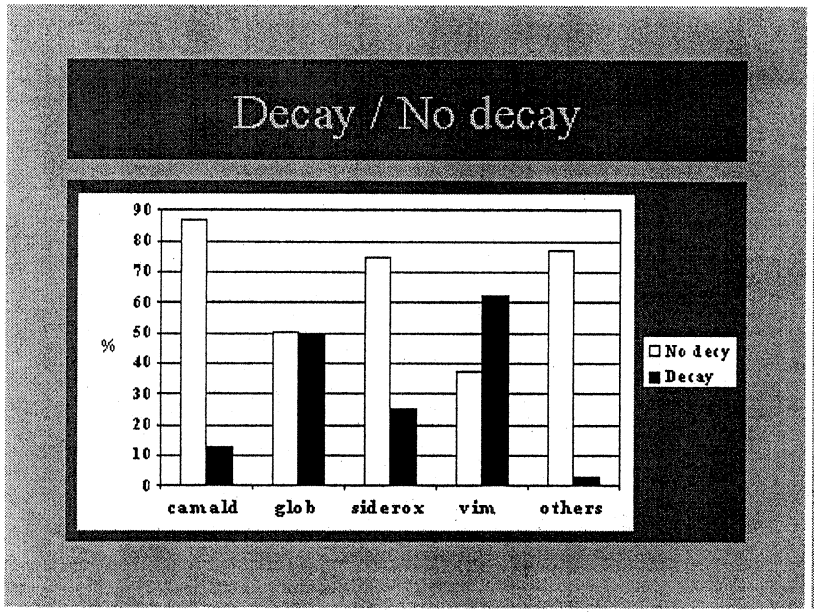
- High branch failure rate
  - Multiple trunks / codominant stems
  - Heavy lateral limbs
- Young population in database
- Lower incidence of decay
- Strong association with high wind

Estimated Eucalyptus age

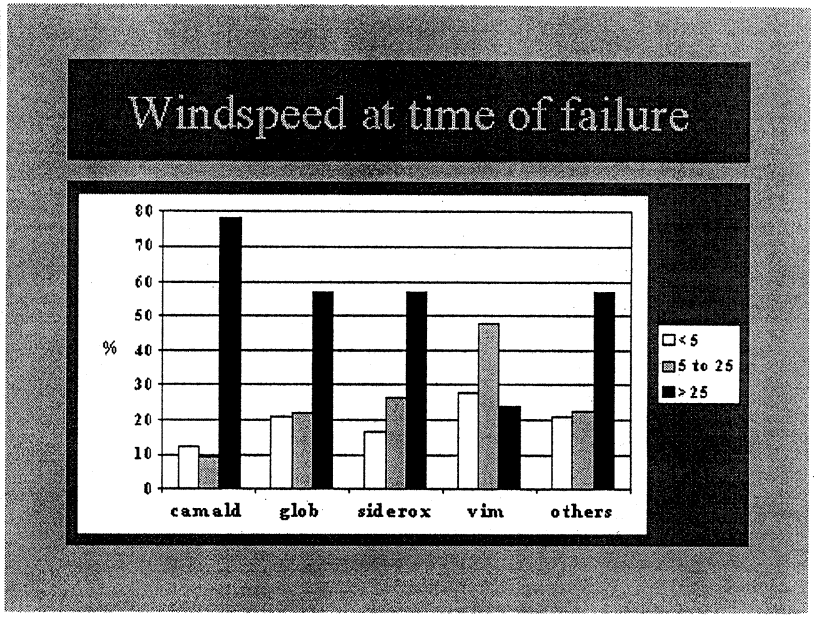


camald = Eucalyptus camaldulensis	Red gum
golb = Eucalyptus globulus	Blue gum
siderox = Eucalyptus sideroxylon	Ironbark
vim = Eucalyptus viminalis	Manna gum

ATTACHMENT NO. 7-68

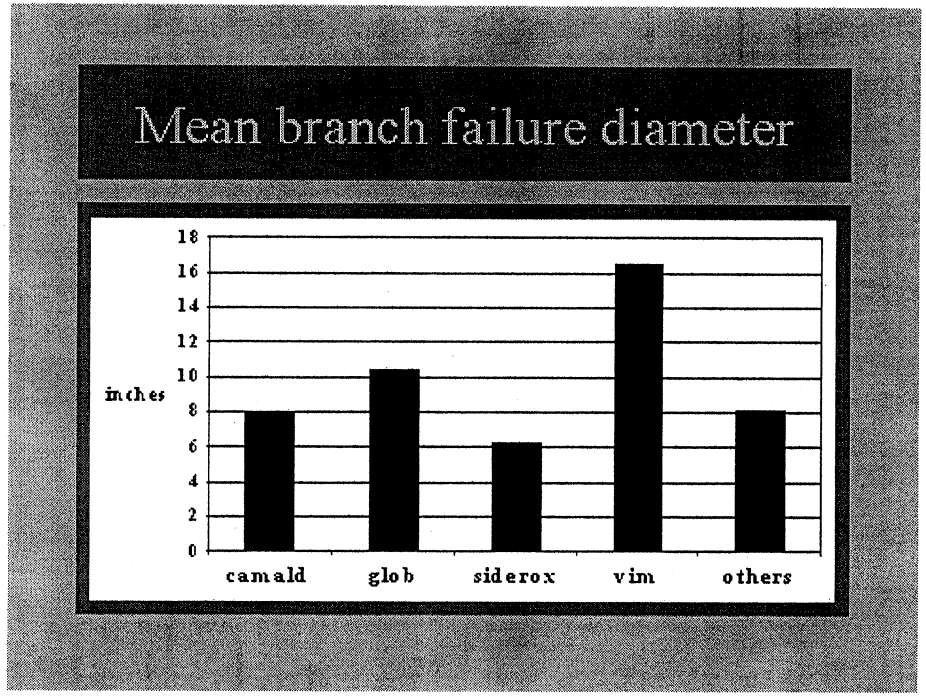


Decay is involved in limb drop to a species specific degree.



While high winds are often a cause of limb failure, ten percent or more failures are on near still days.

ATTACHMENT NO. 7.64



Even 4 inch diameter limbs can be deadly, but these figures represent means not the range of size.

ATTACHMENT NO. 7

F. Transplanting Specifications

1.00 Introduction - The specifications are presented as working guidelines, recognizing that trees are individually unique and that their transplanting may not always fit strict rules. Successful transplanting of trees is a skill obtained by practice in the field. Only contractors who can present evidence of successful similar projects are invited to bid.

1.01 Overview of Specifications - Any tree transplanting performed on a tree under this contract must be done according these specifications.

1.10 General Requirements - The following requirements are for use only during any contracted transplanting of trees at Edison Park, and may not be used for other projects by the City or others.

a. Transplanting trees, including boxing and cleating, to maximize tree health and survival. Transplant trees, as indicated by the City, as specified herein, and provide all materials and labor necessary for a complete and proper installation. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor, subject to approval by the designated City representative.

a. Transport boxed trees to designated holding area on site.

c. Build watering basins within the box using clean washed sand free from noxious weeds and/or seeds, stones or other foreign matter.

d. Watering, using water that is suitable for irrigation and free from ingredients harmful to plant life. Water may be available via quick-coupler near some transplanted trees. Contractor is responsible to supply water as needed.

ATTACHMENT NO. 7.1

Prior to starting, the Contractor must schedule and attend a pre-contract meeting at Edison Park, 22301 Magnolia Blvd., Huntington Beach, California. At this meeting, schedules, procedures, and any other questions pertaining to the project, as specified in the tree work, shall be discussed and any clarifications addressed by City's representative. Contractor will be responsible to contact Underground Service Alert (800-422-4133) prior to commencing work.

1.11 Consulting Arborist - Shall be notified one week prior to the start of work to set up site meeting. Greg Applegate may be reached at 714-731-6240.

1.12 Transplanting Specifications - Box sizes recommended by the Consulting Arborist shall be listed on the bid sheet and/or plans. Trees shall be transplanted from various locations on site and transported to a designated location for stabilizing before planting:

a. 36 inch box trees - minimum two and one half inch (2 ½") caliper to three and one half inch (3 ½") measured at six inches (6") above ground level. Tree height shall be comparable with what is commonly available in the nursery trade, as solely determined by the Consulting Arborist.

b. 48 inch box trees - minimum three and one half inch (3 ½") caliper to four and one half inch (4 ½") measured at six inches (6") above ground level. Tree height shall be comparable with what is commonly available in the nursery trade, as solely determined by the Consulting Arborist.

c. 60 inch box trees – minimum four and one half inch (4. ½") caliper to six and one half inch (6 ½") measured at six inches (6") above ground level. Tree height shall be comparable with what is commonly available in the nursery trade, as solely determined by the Consulting Arborist

d. Trees larger than 6 ½" caliper will be individually sized by the Consulting Arborist and labeled in the field.

1.13 Procedure - All trees to be transplanted shall be located and watered to moisten the soil to a depth of three and a half feet two days before boxing. The root ball of each tree must be kept moist and held intact during transplanting. The initial trenching of the rootball may be performed using a trencher. However the final fitting of the rootball to the box shall be performed using sharpened

ATTACHMENT NO. 12

spades. All root ends must be cut cleanly. After rough cutting the rootball shape, two opposite sides of the box should be staked in place and used as a template to form the remaining rootball. After obtaining a tight fit, nail and band the box sides in place. Padded 2 x 4's, 2 x 6's or 2 x 8's (depending on box size) shall be nailed in place as cleats around the trunk before installing bottom. If the soil has sufficient clay content to hold together, the bottom may be installed by pulling over the box, by the box and shaving the bottom flush, then nailing on the bottom. If the soil at the bottom is concave, nail one or two boards on at a time and pack the soil behind them as the bottom is formed. The bottom shall be nailed in place and banded over the cleats before moving. Trees shall not be moved or pulled over by their trunks. Cables, straps or chains may only contact or be attached to the tree box. The trees shall be moved to a holding area where a sand watering basin will be formed at the box edge. Water the tree immediately after forming the basin. A final inspection of all boxed trees will be performed at the designated holding area.

1.14 Transplanting Materials - Boxing materials shall be approved by the Consulting Arborist prior to transplanting the trees. Materials to be approved are:

a. Sand - Clean washed sand, suitable for horticultural use, free from noxious weeds and/or seeds, stones or other foreign matter.

b. Tree Boxes - The tree boxes shall be delivered as new disassembled sides, complete with bottoms, and cleats in the sizes specified.

c. Bands - Bands shall be new steel, one inch bands and clamps, with appropriate crimping device.

d. Topsoil, where necessary to backfill holes created by transplanting trees, composed of pulverized top soil free from subsoil, noxious weeds and/or seeds, stones or other foreign matter.

Transplanting materials shall be inspected by the Consulting Arborist prior to boxing. Payment for boxes, bands, sand, and other supplies needed for complete and proper transplanting shall be included in the bid. Contractor shall pay for any returns necessary.

ATTACHMENT NO. 7.23

1.15 Tree Location - The location of all trees to be transplanted will be marked in the field by the City representative and/or Consulting Arborist. Marking is usually done with a ribbon and Sharpie. No work shall be done if there is a discrepancy, until approval has been given by City.

1.20 Specific Transplanting Specifications

All trees to be transplanted shall be located and watered to moisten the soil to a depth of three to three and a half feet, two days before boxing.

a. The root ball of each tree must be kept moist and held intact during transplanting.

b. The initial trenching of the rootball may be performed using a trencher. However the final fitting of the rootball to the box shall be performed using sharpened spades.

c. All root ends must be cut cleanly.

d. After rough cutting the rootball shape, two opposite sides of the box should be staked in place and used as a template to form the rootball.

e. After obtaining a tight fit, nail and band the box sides in place.

f. Soil at natural grade must fill box to within two to three inches of the top. Soil may not be placed on top to achieve level.

g. Padded 2 x 4's, 2 x 6's or 2 x 8's shall be nailed in place as cleats around the trunk, and the side bands before installing bottom.

ATTACHMENT NO. 7

h. Bottom shall be nailed in place and banded over the cleats before moving.

i. The trees shall be transplanted to a holding area on site where a sand watering basin will be formed at the box edge. Avoid windy areas and exposed asphalt areas. Water should be readily available. Trees may need guying to prevent toppling in the wind.

j. Water immediately and thoroughly after forming the basin. The basin should hold at least two inches of water and should be filled twice at this time.

k. A final inspection by a City representative of all boxed trees will be performed at the designated holding area.

l. Trees shall not be transplanted if the soil is dry or in a muddy condition.

m. All trees shall be kept in a moist condition until final acceptance. Several light irrigations per day may be needed during hot, dry or Santa Ana conditions.

1.21 Tree Pruning - Only broken or dead limbs , and approved as such, shall be pruned. All pruning cuts should be made per ANSI A-300. Lower limbs in the way of cleats may be removed. All other limbs in the way of boxing shall be tied up rather than removed. Any trees improperly pruned will be subject to removal by the Contractor and replaced by the Contractor at no additional cost to the City.

1.22 Tree guarantee and replacement - All transplanted trees shall be guaranteed to be properly transplanted for at least one (1) month after transplanting or until one month after the final acceptance, whichever occurs later. Trees that die or are damaged as a result of vandalism or lack of care by the City are exempt from this condition. All replacement trees shall likewise be guaranteed to be in excellent health and condition until at least one (1) month after receipt.

ATTACHMENT NO. 7.75

1.23 Tree Watering - Trees shall be watered by Contractor during boxing operations and thereafter, until acceptance of the work. Immediately after boxing and building a water basin, apply water to each tree by means of a hose or drip/trickle system. Apply water in a moderate stream in the basin until the soil is completely and evenly saturated to the bottom of the box.

The watering shall be in sufficient quantities and as often as seasonal conditions require to keep the soil moist, but not waterlogged, at all times.

1.24 Tree Establishment and Acceptance - The establishment period is hereby defined as starting with completion of transplanting operations and acceptance by City, and continuing for 30 calendar days thereafter. Acceptance by City must be in writing in order for the establishment period to begin. At completion of the establishment period, trees shall not show evidence of tip die-back, wilt, or bark cracking. Where landscape dies or shows evidence of decline, weakness or damage due to neglect or transplanting using an unapproved method, the Contractor shall promptly replace with new, vigorous and healthy pines at no additional cost to the City.

When the Contractor believes he has completed the tree establishment period and all the trees are ready for acceptance, he shall request inspection. A City representative will inspect the trees for acceptance in a timely manner. Acceptance shall occur only upon written acceptance of the project by the City.

During the contract period the Contractor will maintain water basins in good condition and provide all watering and weeding necessary to keep the trees in a healthy growing condition. The Contractor shall conduct all operations in such a manner as to minimize inconvenience to the City and the general public. The Contractor shall provide a level of maintenance which presents a pleasing and desirable appearance at all times. Final payment to the Contractor will not be made until the end of the establishment period by the City, and upon final acceptance by City and completion of the Notice of Completion process. All pest control chemicals or other materials used by the Contractor in carrying out work related to this project must be approved by the City prior to its use.

Where trees die or show evidence of decline, weakness or damage due to neglect or transplanting in an unapproved method, the Contractor shall promptly replace with new, vigorous and healthy selections at no additional cost to the City. At the end of the establishment period all pines shall be in a healthy condition as determined by the City. The Contractor shall obtain written approval and release from the City before ending maintenance obligations.

ATTACHMENT NO. 7.76