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Service since 1984

PRELIMINARY ARBORIST REPORT

Tree Inventory, Tree Descriptions and Preliminary Recommendations Relative to Proposed Construction

Red Morton Park YMCA & Senior Center

1455 Madison Avenue, Redwood City, California

Prepared for:

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OCTOBER 19, 2015

Report History: This is my first report for this project

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Cover photo: the northwest corner of the site, with **trees #1 – 5** labeled. **Tree #2** is a large dawn redwood; quite a nice specimen tree. All photos in this report were taken by D. Ellis on October 7, 2015.

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TREE MAP

Note that all tree numbers may not be visible due to the size of the map relative to the size of the tree and number symbols.

SUMMARY

THE PROJECT

Upgrades are planned for the YMCA and Senior Center at Red Morton Park. I have not reviewed any plans for the upgrade, but I was asked to evaluate and describe all trees on the project site as part of the planning and design process for the project. This report presents my findings and initial recommendations after my evaluation of the trees on October 7, 2015.

THE TREES

One-hundred and twelve (112) existing trees on the proposed project site were evaluated for this report. These trees are described briefly in the *Summary Tree Table* (Table 1) on pages 3 and 4 and in greater detail in the *Complete Tree Table* (Table 6) beginning on page 13. No tree *Action* recommendations (*e.g. Save, Remove or Debatable*) are provided in this report because construction plans have not yet been developed. The tree *Preservation Suitability* ratings and *Tree Root Protection Distances* will be helpful to the project architects however, in deciding which trees to retain and how far improvements should be located from these trees, during the design process. Trees in the various preservation suitability ratings have been grouped into separate Tables for quick reference, as listed below:

- **Fifty-one (51) trees are classified as having "Good" or "Fair/Good" preservation suitability.** These are the better trees on the site, and those that are most worthy of retaining or transplanting. They comprise 46% of the evaluated trees. These trees are listed in Table 2 on page 5.

- **Thirty-seven (37) trees are classified as having "Fair" preservation suitability.** These are "so-so" trees and I do not recommend going through too much trouble to retain them. They comprise 33% of the evaluated trees and are listed in Table 3 on page 6.

- **Twenty-three (23) trees are classified as having "Unacceptable", "Poor" or "Fair/Poor" preservation suitability.** They comprise 21% of the evaluated trees. I would not put any effort into retaining any of these trees, which are listed in Table 4 on page 7. Those trees listed as "Poor" and/ or "Unacceptable" should be removed. Trees listed as "Unacceptable" are dead.

- **Native tree species**: only three species are native to the vicinity of the project site; these are **trees #21 black walnut, #22 coast live oak** and **#48 California sycamore**.

As the construction plans for the project are developed I recommend that I review these plans and produce additional reports describing the expected impact of construction on those trees that will remain. I can also work with the architects to reduce construction impacts to trees where possible. I can eventually prepare a *Final Arborist Report* listing trees to remain, trees to be removed and *Tree Protection Specifications* for those trees that will remain.

TABLE 1 SUMMARY TREE TABLE

This Table is continued through page 4.

** Denotes tree species native to the area within the vicinity of the site. All other tree species are not native to the immediate area.*

Tree #	Common Name	Trunk Diam.	Preservation Suitability
1	Chinese hackberry	10	Fair/Good
2	dawn redwood	31	Good
3	Coast redwood (redwood)	17	Fair/Good
4	redwood	14	Fair/Good
5	redwood	39	Good
6	redwood	12	Good
7	redwood	6	Fair/Good
8	dawn redwood	32	Fair
9	redwood	25	Fair/Good
10	redwood	38	Good
11	redwood	26	Good
12	tulip tree	12	Poor
13	Raywood ash	19	Poor
14	Raywood ash	17	Fair
15	Raywood ash	23	Fair/Poor
16	tulip tree	21	Fair
17	redwood	27	Good
18	redwood	25	Poor

Tree #	Common Name	Trunk Diam.	Preservation Suitability
19	weeping bottlebrush	6,7,9	Fair
20	Burford holly	5,5,6	Fair/Poor
*21	Northern Calif. black walnut	4,5	Fair
*22	coast live oak	25 (4)	Good
23	black acacia	19	Fair/Poor
24	Modesto ash	14	Fair/Poor
25	London plane	10	Good
26	redwood	27	Good
27	London plane	10	Fair/Good
28	London plane	10	Good
29	tulip tree	12	Fair
30	redwood	26	Good
31	honeylocust	16	Fair
32	honeylocust	12	Fair
33	tulip tree	12	Uncertain
34	Raywood ash	24	Fair/Poor
35	redwood	21	Good
36	tulip tree	9	Fair

Tree #	Common Name	Trunk Diam.	Preservation Suitability
37	crape myrtle	5	Poor/Unacceptable
38	crape myrtle	5 (4)	Fair
39	crape myrtle	5	Fair/Good
40	crape myrtle	7	Good
41	tulip tree	12	Fair/Good
42	crape myrtle	5	Fair/Good
43	crape myrtle	4	Unacceptable
44	tulip tree	12	Unacceptable
45	Southern magnolia	19 (2)	Fair/Good
46	tulip tree	14	Fair
47	honeylocust	17	Fair
*48	California sycamore	18	Good
49	redwood	11	Good
50	Juniper	6,7	Fair/Poor
51	Eastern redbud	3	Fair/Good
52	redwood	22	Good
53	swamp myrtle	9	Good/Excellent
54	swamp myrtle	8	Good
55	Chinese hackberry	5	Fair

Tree #	Common Name	Trunk Diam.	Preservation Suitability
56	swamp myrtle	7	Good
57	swamp myrtle	4	Fair
58	swamp myrtle	5	Fair
59	swamp myrtle	6	Fair/Good
60	swamp myrtle	11	Good
61	Chinese hackberry	12	Fair/Good
62	carob tree	16	Fair
63	carob tree	9 (2.5)	Fair
64	carob tree	21	Fair
65	Chinese hackberry	9	Fair
66	Modesto ash	12 (3)	Fair/Poor
67	Monterey pine	10	Fair/Poor
68	Modesto ash	18	Fair
69	Chinese hackberry	8	Fair
70	Chinese hackberry	6	Poor
71	Chinese hackberry	8	Fair/Good
72	Chinese hackberry	9	Fair
73	Chinese hackberry	8	Fair
74	Chinese hackberry	7	Fair
75	Chinese hackberry	13	Fair
76	Chinese hackberry	13	Fair/Poor
77	Chinese hackberry	8	Fair/Poor
78	Chinese hackberry	8	Fair
79	Chinese hackberry	7	Fair/Poor
80	Chinese hackberry	11	Fair/Good
81	Chinese hackberry	9	Fair
82	Chinese hackberry	7	Fair
83	Chinese hackberry	8	Fair
84	Chinese hackberry	9	Fair/Good
85	Chinese hackberry	8	Fair/Good
86	Chinese hackberry	5	Fair/Poor
87	Chinese hackberry	7	Fair/Poor
88	Chinese hackberry	6	Fair
89	Modesto ash	19	Fair/Good
90	Modesto ash	14	Fair
91	Modesto ash	23	Fair
92	Japanese maple	2	Fair
93	crape myrtle	3,3,5,6,6	Fair/Good
94	hybrid elm	12	Good
95	redwood	18	Good
96	redwood	31	Good
97	redwood	20	Good/Excellent
98	Blue Atlas cedar	16	Fair/Poor
99	Cherry (fruiting)	11 (3)	Fair
100	redwood	34	Good/Excellent
101	fern pine	8,6	Fair
102	Japanese maple	8,6,6,5	Fair
103	redwood	19	Good
104	redwood	23	Good
105	redwood	19	Fair/Good
106	redwood	19	Good
107	redwood	22	Good
108	redwood	16	Good
109	redwood	39	Fair/Good
110	redwood	29	Poor
111	redwood	16	Fair/Poor
112	redwood	23	Fair

End of Table

TABLE 2 "FAIR/GOOD" TO "EXCELLENT" PRESERVATION SUITABILITY

Tree #	Common Name	Trunk Diam.	Preservation Suitability
1	Chinese hackberry	10	Fair/Good
2	dawn redwood	31	Good
3	Coast redwood (redwood)	17	Fair/Good
4	redwood	14	Fair/Good
5	redwood	39	Good
6	redwood	12	Good
7	redwood	6	Fair/Good
9	redwood	25	Fair/Good
10	redwood	38	Good
11	redwood	26	Good
17	redwood	27	Good
22	coast live oak	25 (4)	Good
25	London plane	10	Good
26	redwood	27	Good
27	London plane	10	Fair/Good
28	London plane	10	Good
30	redwood	26	Good
35	redwood	21	Good
39	crape myrtle	5	Fair/Good
40	crape myrtle	7	Good
41	tulip tree	12	Fair/Good
42	crape myrtle	5	Fair/Good
45	Southern magnolia	19 (2)	Fair/Good
48	California sycamore	18	Good
49	redwood	11	Good
51	Eastern redbud	3	Fair/Good
52	redwood	22	Good
53	swamp myrtle	9	Good/Excellent
54	swamp myrtle	8	Good
56	swamp myrtle	7	Good
59	swamp myrtle	6	Fair/Good
60	swamp myrtle	11	Good
61	Chinese hackberry	12	Fair/Good
71	Chinese hackberry	8	Fair/Good
84	Chinese hackberry	9	Fair/Good
85	Chinese hackberry	8	Fair/Good
89	Modesto ash	19	Fair/Good
93	crape myrtle	3,3,5,6,6	Fair/Good
94	hybrid elm	12	Good
95	redwood	18	Good
96	redwood	31	Good
97	redwood	20	Good/Excellent
100	redwood	34	Good/Excellent
103	redwood	19	Good
104	redwood	23	Good
105	redwood	19	Fair/Good
106	redwood	19	Good
107	redwood	22	Good
108	redwood	16	Good
109	redwood	39	Fair/Good

End of Table
51 trees

TABLE 3 TREES WITH "FAIR" PRESERVATION SUITABILITY

Tree #	Common Name	Trunk Diam.
8	dawn redwood	32
14	Raywood ash	17
16	tulip tree	21
19	weeping bottlebrush	6,7,9
21	Northern Calif. black walnut	4,5
29	tulip tree	12
31	honeylocust	16
32	honeylocust	12
36	tulip tree	9
38	crape myrtle	5 (4)
46	tulip tree	14
47	honeylocust	17
55	Chinese hackberry	5
57	swamp myrtle	4
58	swamp myrtle	5
62	carob tree	16
63	carob tree	9 (2.5)
64	carob tree	21
65	Chinese hackberry	9
68	Modesto ash	18
69	Chinese hackberry	8
72	Chinese hackberry	9
73	Chinese hackberry	8
74	Chinese hackberry	7
75	Chinese hackberry	13
78	Chinese hackberry	8
81	Chinese hackberry	9
82	Chinese hackberry	7
83	Chinese hackberry	8
88	Chinese hackberry	6
90	Modesto ash	14
91	Modesto ash	23
92	Japanese maple	2
99	Cherry (fruiting)	11 (3)
101	fern pine	8,6
102	Japanese maple	8,6,6,5
112	redwood	23

End of Table
37 trees

TABLE 4 TREES WITH "FAIR/POOR", "POOR" OR "UNCERTAIN" PRESERVATION SUITABILITY

Tree #	Common Name	Trunk Diam.	Preservation Suitability
12	tulip tree	12	Poor
13	Raywood ash	19	Poor
15	Raywood ash	23	Fair/Poor
18	redwood	25	Poor
20	Burford holly	5,5,6	Fair/Poor
23	black acacia	19	Fair/Poor
24	Modesto ash	14	Fair/Poor
33	tulip tree	12	Uncertain
34	Raywood ash	24	Fair/Poor
37	crape myrtle	5	Poor/Unacceptable
43	crape myrtle	4	Unacceptable
44	tulip tree	12	Unacceptable
50	Juniper	6,7	Fair/Poor

Tree #	Common Name	Trunk Diam.	Preservation Suitability
66	Modesto ash	12 (3)	Fair/Poor
67	Monterey pine	10	Fair/Poor
70	Chinese hackberry	6	Poor
76	Chinese hackberry	13	Fair/Poor
77	Chinese hackberry	8	Fair/Poor
79	Chinese hackberry	7	Fair/Poor
80	Chinese hackberry	11	Fair/Good
86	Chinese hackberry	5	Fair/Poor
87	Chinese hackberry	7	Fair/Poor
98	Blue Atlas cedar	16	Fair/Poor
110	redwood	29	Poor
111	redwood	16	Fair/Poor

End of Table
23 trees

RECOMMENDATIONS

1) **Which trees to retain?** Try to design around and retain as many of trees as possible with "Fair/Good" to "Excellent" preservation suitability ratings. Trees with "Fair" preservation suitability should be saved when possible, but I don't recommend making a significant effort to save them. No effort should be made to retain trees with "Fair/Poor" or "Poor" preservation suitability. Trees recommended for further evaluation by the arborist should be evaluated in greater detail if they may remain. If no further evaluation will be performed on these trees then it is probably best to remove these them for reasons of safety.

2) **Existing trees should be numbered** on all site-based plans to match the tree tag numbers that are used in this arborist report.

3) **Do not remove or prune to remove** more than 25% of the live branches of any protected tree until a valid tree removal permit has been obtained from the City of Redwood City.

4) **Custom Tree Protection Specifications should be prepared** for any existing trees on this site that will be saved. I have not prepared such specifications at this time because it is too early in the planning process and we do not know which trees will be saved.

5) **As a part of the design process, try to keep improvements (and any additional over-excavation or work area beyond the improvement) as far from tree trunks and canopies as possible.** *6xDBH*[1] or the dripline of the tree, whichever is greater, should be used as the minimum distance for any soil disturbance to the edge of the trunk. 3xDBH should be considered the absolute minimum distance from any disturbance to the tree trunk on one side of the trunk only, for root protection. Farther is better, of course. For disturbances on multiple sides of the trunk, then 6xDBH or greater should be used, and farther is also better here. Tree canopies must also be taken into consideration when designing around trees. Don't forget the minimum necessary working margin around improvements as you locate those improvements. Disturbance usually comes much closer to trees than the lines shown on the plans!

6) **Construction or landscaping work done underneath the dripline[2] of existing trees should preferably be done by hand**, taking care to preserve existing roots in undamaged condition as much as possible and cutting roots cleanly by hand when first encountered, when those roots must be removed. A qualified consulting arborist (the project arborist) should be hired to monitor tree protection and supervise all work underneath the dripline of trees. This also applies to trees on neighboring properties whose canopies overhang the work site.

[1] See page 23 for an explanation of tree protection root distances.
[2] Terms highlighted at their first occurrence are explained in the Glossary on pages 31 through 33.

7) **Landscaping:**

a) New landscaping and irrigation can be as much or more damaging to existing trees than any other type of construction. The same tree root protection distances recommended for general construction should also be observed for new landscaping. Within the root protection zone it is usually best to limit landscape changes to a 3 to 4-inch depth of coarse organic mulch such as wood or bark chips or tree trimming chippings spread over the soil surface. The environment around existing trees should be changed very carefully or not at all – please consult with me regarding changes in the landscape around existing trees and/or have me review the landscape and irrigation plans for this project.

b) This site contains one oaks that is native to the immediate area (**coast live oak #22**). This tree species fares best with no irrigation during the normal dry months of the year. Oak #22 does have some irrigated lawn around it, although the irrigation does not seem to come too close to the trunk. The best treatment of the ground beneath the canopies of native oaks is nothing but their own natural leaf and twig litter mulch. Exceptions to irrigation restriction include during the winter in extended drought periods, as temporary compensation for root loss due to construction, and for newly planted trees during their 2 to 3 year establishment period after installation. Native oak species are often killed due to inappropriate landscaping that is installed around them; mostly commonly landscaping that requires frequent irrigation such as lawns or other high water-use plants. Large drought tolerant trees such as native oaks can become dangerous when exposed to frequent irrigation, especially close to their trunks. California native oaks that are treated in this manner may contract root rot diseases and fall over at the roots; often causing great damage and personal injury I there are targets in their vicinity such as homes, cars and people. It is important to landscape correctly around our native oaks; e.g. summer dry. I have attached a publication entitled *Keeping Native California Oaks Healthy* to assist in best managing the oaks on the property, as well as the directions to follow in item `c' below.

c) Around the native oaks: there shall be no planting or irrigation (including drip irrigation) within a minimum radius of 10 feet from the trunks of the oaks or the inner half of the dripline of the tree, whichever is greater. Farther is better. Within this 10-foot (or greater) radius around the trunk a 3 to 4-inch depth of coarse organic mulch such as wood or bark chips or tree trimming chippings shall be spread over the soil surface. Shredded redwood bark is not allowed. Keep the mulch off the root collar of the trees. Beyond this 10-foot (or greater) protective, mulched area only drought-tolerant, summer-dry plant species, preferably plant species that are native to the immediate area and grow commonly in association with the native oaks, may be planted. Only summer-dry tolerant plants are allowed within the outer half of the dripline of the tree or 20 feet from the trunk, whichever is greater. Such plants may be planted from no larger than 1-gallon cans in holes that are hand-dug manually with a shovel (no power equipment such as augers allowed). These plants must be spaced sparsely (e.g. planted no closer than 4 feet apart) and watered with drip irrigation. The planting zone around these plants shall be mulched in the same manner previously described. The drip irrigation for these plants should preferably be abandoned after a 2 to 3 year establishment period.

8) **Trees to remain after adjacent trees are removed** should be re-evaluated by me or the project arborist after the surrounding trees have been taken out.

9) **General Tree Maintenance:** Do no unnecessary pruning, fertilization or other tree work. Pre-construction pruning should be limited to the absolute minimum required for construction clearance. A qualified tree service should be hired to provide such pruning.

INTRODUCTION

PURPOSE & USE OF REPORT

This survey and report was required by the City of Redwood City as a part of the building permit process for this project. The purpose of the report is to identify and describe the existing trees on or adjacent to the project site that are within or close to proposed construction - - their size, condition and suitability for preservation. All trees on the project site were evaluated, except for some small fruit trees in the Community Garden area. The audience for this report are the project planners, architects and City of Redwood City authorities concerned with tree preservation and tree removal. The goal of this report is to preserve existing trees on the project site that are in acceptable condition, good species for the area and will fit in well with the proposed new use of the site.

METHODOLOGY

I performed a brief evaluation of the subject trees from the ground on October 7, 2015. Tree characteristics such as form, weight distribution, foliage color and density, wounds and indicators of decay were noted. Surrounding site conditions were also observed. Evaluation procedures were taken from:

- American National Standard A-300 (Part 5) – 2012 for *Tree Care Operations – Tree, Shrub & Other Woody Plant Management – Standard Practices (Management of Trees, & Shrubs During Site Planning, Site Development and Construction*).
- International Society of Arboriculture, *Best Management Practices:*
  - *Managing Trees during Construction*. 2008
  - *Tree Inventories*. 2013

The above references serve as industry professional standards for tree evaluation and written findings and recommendations for trees on construction sites prior, during and after site development.

Each of the trees was tagged in the field with metal number tags that correspond with the tree numbers referenced in this report and on the Tree Map. I measured the trunk diameter of each tree with a diameter tape at 4.5 feet above the ground (DBH), which is also the required trunk diameter measurement height of the City of Redwood City. DBH is used calculate tree protection distances and other tree-related factors. Trunk diameter was rounded to the nearest inch. I estimated the tree's height and canopy spread. Tree *Condition* (structure and vigor) was evaluated and I also recorded additional notes for trees when significant. Tree species and condition considered in combination with the current or (if applicable) proposed use of the site yields the *Tree Preservation Suitability* rating. The more significant trees (or groups of trees) were photographed with a digital camera. Some of these photos are included in this report, but all photos are available from me by email if requested.

OBSERVATIONS

SITE CONDITIONS

The project includes several buildings, sport fields, a swimming pool complex, parking lots and landscaping that is typical for the area. Site topography is mainly level. Sun exposure for the trees varies from full to partly shaded, depending upon proximity to existing buildings and to other trees. Landscape maintenance is of a moderate level and most of the trees and other plants are in fair too good condition. Most landscape areas appear to be irrigated.

Most of the **coast redwood trees** are generally in good condition, which is somewhat surprising given the current drought. Coast redwoods have a high water requirement and many of these trees are declining in the San Francisco Bay area due to the prolonged drought and landscape irrigation reduction. Redwood City does tend to have a relatively high water table, which may be helping the trees. I have listed the preservation suitability of many of the redwoods as "Fair/Good" or "Good", but this is based upon the assumption that they will continue to receive enough irrigation water to maintain their present condition. If the drought continues and landscape irrigation is reduced, these trees will decline. If this is the case then perhaps the preservation suitability of these trees should be lower than listed in this report. If recycled water may be introduced to the site for irrigation, the redwoods may decline significantly and/or die over a period of several years, based upon the salinity of the water. Redwoods are quite sensitive to the higher salt content of most recycled waters.

Other moderate to high water requirement trees species on the site may decline or die as well, if the drought continues or recycled water is used for irrigation. The tulip trees and Raywood ash are generally struggling on the site at this time, and this may be due to lack of sufficient water.

SPECIES COMPOSITION & NUMBER

There are 26 species of trees growing on the site, as indicated in Table 5 below:

Table 5 Tree Species Number & Composition

Species	Total number of Trees	Percentage of total
coast redwood	29	25.9%
Chinese hackberry	24	21.4%
swamp myrtle	8	7.1%
tulip tree	8	7.1%
crape myrtle	7	6.3%
Modesto ash	6	5.4%
Raywood ash	4	3.6%
honeylocust	3	2.7%
London plane	3	2.7%
carob tree	2	1.8%
dawn redwood	2	1.8%
Japanese maple	2	1.8%
*All other species, one tree each	14	12.5%
Total Trees	**112**	

*Tree Species with one tree each:

black acacia
black walnut
blue Atlas cedar
California sycamore
cherry (fruiting)
coast live oak
Eastern redbud
fern pine
hybrid elm
juniper
Monterey pine
Southern magnolia
weeping bottlebrush

APPENDIX

TABLE 6 COMPLETE TREE TABLE

This Table is continued through page 20. Data fields in the Table are explained on pages 20 to 22.
** Denotes tree species native to the area within the vicinity of the site. All other tree species are not native to the immediate area.*

Tree #	*Species* & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
1	*Celtis sinensis*, Chinese hackberry	10	22*25	60	60	Fair/Good		5	5	8
2	*Metasequoia glyptostroboidies*, dawn redwood	31	60*35	70	80	Good		8	16	39
3	*Sequoia sempervirens*, Coast redwood (redwood)	17	35*25	80	70	Fair/Good		4	9	9
4	redwood	14	35*22	80	70	Fair/Good		4	7	7
5	redwood	39	50*38	80	75	Good		10	20	39
6	redwood	12	30*18	80	80	Good		5	6	6
7	redwood	6	20*9	75	75	Fair/Good		5	5	5
8	dawn redwood	32	50*25	60	50	Fair	Asymmetric canopy.	8	16	40
9	redwood	25	40*25	80	60	Fair/Good		6	13	19
10	redwood	38	60*28	85	80	Good		10	19	38
11	redwood	26	45*25	80	70	Good		6	13	20

Tree #	Species & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
12	*Liriodendron tulipifera*, tulip tree	12	28*20	40	40	Poor	Many dead branches. This tree species is deciduous and most of the tulip trees on this site have begun to shed their leaves to some in preparation for winter dormancy – some more than others. Some of this defoliation appears to be early and without normal Fall coloration beforehand – thus is probably induced by drought stress. If these trees remain their condition can be more accurately assessed in early Summer after full leaf-out and before heat and water stress kicks in. Bottom line however, is that things are not looking good for this species on this site. Tulip tree is generally a problematic species, for it is commonly infested with tulip tree scale, a difficult to control insect that causes sticky material to drip from trees. Heavily infected trees decline and sometimes die.	5	6	9
13	*Fraxinus angustifolia* \`Raywood', Raywood ash	19	40*35	40	40	Poor	Many dead branches. Suspicious cracks on trunk may not be growth cracks but may instead be the bark or underlying wood dying. None of the Raywood ash on this site are doing well and this is probably caused by drought stress and possibly also aggravated by *Verticillium* wilt disease, which is common on this species.	5	10	19
14	Raywood ash	17	45*40	50	50	Fair	Similar to the previous Raywood ash but not as bad	4	9	17
15	Raywood ash	23	50*40	50	50	Fair/Poor	Similar to the previous Raywood ash	6	12	23
16	tulip tree	21	40*47	85	50	Fair	Trunk exudation from several spots (not good).	5	11	21
17	redwood	27	50*25	85	80	Good		7	14	20
18	redwood	25	60*22	40	40	Poor	Many dead branches.	6	13	19
19	*Callistemon vinimalis*, weeping bottlebrush	6,7,9	20*20	80	50	Fair	Canopy is flat against the adjacent building.	4	8	24
20	*Ilex cornuta* \`Burfordii' Burford holly	5,5,6	15*17	60	40	Fair/Poor	Shaded and distorted by overstory trees. A large, old shrub.	5	6	11

Tree #	*Species* & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
***21**	*Juglans californica hindsii*, Northern Calif. black walnut	4,5	20*18	80	60	Fair		5	5	7
***22**	*Quercus agrifolia*, coast live oak	25 (4)	35*40	90	60	Good		6	12	19
23	*Acacia melanoxylon*, black acacia	19	50*35	85	40	Fair/Poor		5	10	19
24	*Fraxinus velutina* `Modesto', Modesto ash	14	25+22	70	40	Fair/Poor		4	7	11
25	*Platanus x hispanica*, London plane	10	30*22	80	80	Good		5	5	5
26	redwood	27	45*30	85	70	Good		7	14	20
27	London plane	10	40*30	80	60	Fair/Good		5	5	5
28	London plane	10	35+30	80	80	Good		5	5	5
29	tulip tree	12	40*35	80	60	Fair		5	6	9
30	redwood	26	50*30	85	80	Good		6	13	20
31	*Gleditsia triacanthos*, honeylocust	16	28*30	60	60	Fair		4	8	20
32	honeylocust	12	20*25	60	60	Fair		5	6	15

Tree #	*Species* & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
33	tulip tree	12	40*30	40	40	Uncertain	Few live leaves on the tree although this could be early defoliation. I can see some obviously dead branches, however. As previously mentioned the condition of this species can be more accurately assessed in early Summer.	5	6	9
34	Raywood ash	24	50*35	50	50	Fair/Poor	Some dead branches.	6	12	24
35	redwood	21	50*25	85	85	Good		5	11	16
36	tulip tree	9	40*25	60	60	Fair	Mostly defoliated.	5	5	7
37	*Lagerstroemia hybrid,* crape myrtle	5	17*9	20	20	Poor/Unacceptable	Sunscald cankers on much of the trunk, and also dead branches.	5	5	5
38	crape myrtle	5 (4)	18*17	70	60	Fair	Sunscald cankers on trunk and branches.	5	5	5
39	crape myrtle	5	18*15	75	60	Fair/Good		5	5	5
40	crape myrtle	7	20*18	80	70	Good		5	5	5
41	tulip tree	12	45*25	75	60	Fair/Good		5	6	9
42	crape myrtle	5	20*18	70	60	Fair/Good		5	5	5
43	crape myrtle	4	20*10	10	10	Unacceptable	Severe sunscald cankers, and tree is nearly dead.	5	5	5
44	tulip tree	12	40*22	0	0	Unacceptable		5	6	9
45	*Magnolia grandiflora,* Southern magnolia	19 (2)	25*25	70	80	Fair/Good	The raised concrete planter around this tree is cracked; probably due to the tree's roots.	5	9	5
46	tulip tree	14	50*30	60	60	Fair	Partially defoliated. A potentially girdling root.	4	7	11
47	honeylocust	17	18*30	60	60	Fair		4	9	13
***48**	*Platanus racemosa,* California sycamore	18	60*40	80	70	Good		4	9	18
49	redwood	11	30*18	85	80	Good		5	6	6

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Tree #	*Species* & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
50	*Juniperus species*, Juniper	6,7	20*28	80	50	Fair/Poor		5	5	13
51	*Cercis canadensis*, Eastern redbud	3	16*14	80	60	Fair/Good		5	5	5
52	redwood	22	58*35	80	70	Good		6	11	17
53	*Tristaniopsis laurina*, swamp myrtle	9	22*22	85	88	Good/Excellent		5	5	7
54	swamp myrtle	8	22*28	80	70	Good		5	5	6
55	Chinese hackberry	5	18*16	60	50	Fair		5	5	5
56	swamp myrtle	7	20*18	80	60	Good		5	5	5
57	swamp myrtle	4	17**7	80	50	Fair	Leans significantly over parking lot.	5	5	5
58	swamp myrtle	5	20*15	85	50	Fair		5	5	5
59	swamp myrtle	6	22*18	85	60	Fair/Good		5	5	5
60	swamp myrtle	11	30*22	90	60	Good		5	6	8
61	Chinese hackberry	12	30*38	90	60	Fair/Good		5	6	9
62	*Ceratonia siliqua*, carob tree	16	35*30	100	60	Fair		4	8	16
63	carob tree	9 (2.5)	20*20	90	68	Fair		5	5	8
64	carob tree	21	20*25	100	80	Fair	Roots causing large rifts in the parking lot pavement.	5	11	26
65	Chinese hackberry	9	16*15	60	60	Fair		5	5	7
66	Modesto ash	12 (3)	30*35	60	50	Fair/Poor	Trunk and large branch decay.	5	6	9
67	*Pinus radiata*, Monterey pine	10	25*15	70	60	Fair/Poor	Hidden between 2 trees.	5	5	8
68	Modesto ash	18	35*40	80	50	Fair	Side clearance pruning away from overhead electric wires.	4	9	18

Tree #	*Species* & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
69	Chinese hackberry	8	18*18	70	50	Fair		5	5	6
70	Chinese hackberry	6	20*16	40	40	Poor	Many dead branches.	5	5	5
71	Chinese hackberry	8	18*20	80	70	Fair/Good		5	5	6
72	Chinese hackberry	9	16*14	60	60	Fair		5	5	7
73	Chinese hackberry	8	20*18	60	60	Fair		5	5	6
74	Chinese hackberry	7	18*16	60	58	Fair	Large branch tear wound down the trunk.	5	5	5
75	Chinese hackberry	13	30*25	60	60	Fair		3	7	10
76	Chinese hackberry	13	25*25	60	40	Fair/Poor		3	7	10
77	Chinese hackberry	8	22*20	50	40	Fair/Poor		5	5	6
78	Chinese hackberry	8	20*18	60	60	Fair		5	5	6
79	Chinese hackberry	7	18*16	50	50	Fair/Poor		5	5	5
80	Chinese hackberry	11	20*25	80	60	Fair/Good		5	6	8
81	Chinese hackberry	9	20*20	75	50	Fair		5	5	7
82	Chinese hackberry	7	20*20	70	60	Fair		5	5	5
83	Chinese hackberry	8	18*20	70	50	Fair		5	5	6
84	Chinese hackberry	9	18*20	85	70	Fair/Good		5	5	7
85	Chinese hackberry	8	20*20	80	60	Fair/Good		5	5	6
86	Chinese hackberry	5	16*10	60	40	Fair/Poor	Large trunk canker.	5	5	5
87	Chinese hackberry	7	20*15	60	40	Fair/Poor	Large sunscald trunk canker.	5	5	5
88	Chinese hackberry	6	15*18	70	50	Fair	Trunk canker.	5	5	5
89	Modesto ash	19	45*35	85	60	Fair/Good		5	10	19
90	Modesto ash	14	50*40	80	50	Fair		4	7	11
91	Modesto ash	23	40+45	75	40	Fair	Bolt installed through trunk and a large cracked scaffold branch.	6	12	23

Tree #	*Species* & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
92	*Acer palmatum,* Japanese maple	2	13*9	60	50	Fair	Shaded.	5	5	5
93	crape myrtle	3,3,5,6,6	22*30	75	60	Fair/Good	Stump sprout.	4	8	8
94	*Ulmus* hybrid, hybrid elm	12	40*40	90	70	Good		5	6	9
95	redwood	18	40*25	90	80	Good		4	9	14
96	redwood	31	70*30	90	60	Good	Co-dominant leader at 40 feet.	8	16	31
97	redwood	20	45*25	90	90	Good/Excellent		5	10	15
98	*Cedrus atlantica* `Glauca', Blue Atlas cedar	16	40*30	50	50	Fair/Poor	Leans significantly, some dead branches.	4	8	16
99	*Prunus species*, Cherry (fruiting)	11 (3)	25*22	70	60	Fair	Partially defoliated but can also see some dead twigs.	5	5	13
100	redwood	34	70*30	90	90	Good/Excellent		8	17	34
101	*Afrocarpus elongatus* (Syn. *Podocarpus gracilior*) fern pine	8,6	16*18	90	50	Fair	Growth obstructed by building eve.	5	6	11
102	Japanese maple	8,6,6,5	30*35	70	50	Fair	Some basal trunk decay due to previous trunk removals.	5	9	13
103	redwood	19	40*22	90	80	Good		5	10	14
104	redwood	23	40*22	90	80	Good		6	12	17
105	redwood	19	50*20	70	80	Fair/Good		5	10	14
106	redwood	19	40*22	85	80	Good		5	10	14
107	redwood	22	45*25	85	80	Good		6	11	17

Tree #	*Species* & Common Name	Trunk Diam.	Size	CONDITION		Preservation Suitability	Notes	TREE ROOT PROTECTION DISTANCES		
				Vigor	Structure			3xDBH	6xDBH	OTPZ
108	redwood	16	40*22	80	80	Good		4	8	8
109	redwood	39	80*30	70	75	Fair/Good		10	20	39
110	redwood	29	80*30	40	50	Poor	Sparse canopy, looks drought stressed.	7	15	22
111	redwood	16	50*18	50	50	Fair/Poor		4	8	8
112	redwood	23	50*22	60	70	Fair		6	12	17

End of Table

EXPLANATION OF TREE TABLE DATA COLUMNS:

1) **Tree Number** (the field tag number of the existing tree). Each existing tree in the field is tagged with a 1.25 inch round aluminum number tag that corresponds to its tree number referenced in the arborist report, Tree Map, Tree Protection Specifications and any other project plans where existing trees must be shown and referenced.

2) **Tree Name and Type:**
Species: The *Genus* and *species* of each tree. This is the unique scientific name of the plant, for example *Quercus agrifolia* where *Quercus* is the Genus and *agrifolia* is the species. The scientific names of plants can be changed from time to time, but those used in this report are from the most current edition of the *Sunset Western Garden Book* (2012) Sunset Publishing Corporation. The scientific name is presented at its first occurrence in the Tree Table, along with the regional common name. After that only the common name is used.

3) **Trunk DBH**. Tree trunk diameter in inches “at breast height” (measured at 4.5 feet above ground level). This is the forestry and arboricultural standard measurement height that is also used in many tree-related calculations. It is also the trunk diameter measurement height required by the City of Redwood City. For multi-trunk trees, trunk diameter is measured for the largest trunk and estimated for all smaller trunks. Trunk diameter is measured when possible, and estimated when it is not possible or safe to physically measure. A number in parentheses (3) after the trunk diameter(s) indicates

that it was not possible to measure the trunk at 4.5 feet (due to tree architecture) and so the diameter was measured at this alternate height (in feet), which reflects a more realistic trunk diameter for the tree.

> *<u>Examples</u>: an "18" in the Diameter column means that the tree has a diameter of 18 inches at 4.5feet above the ground. An "18 (3)" means that trunk diameter was 18 inches measured at 3 feet above the ground. "18, 7, 5" means that this is a multi-trunk tree with trunk diameters of 18, 7 and 5 inches at 4.5 feet above the ground.*

4) **Size**: tree size is listed as height x width in feet, estimated and approximate and intended for comparison purposes.

5) **Condition Ratings**: Trees are rated for their *condition* on a scale of *zero to 100* with zero being a dead tree and 100 being a perfect tree (which is rare – like a supermodel in human terms). A 60 is "average" (not great but not terrible either). There are two components to tree condition – ***vigor*** and ***structure***, and each component is rated separately. Averaging the two components is not useful because a very low rating for either one could be a valid reason to remove a tree from a site -- even if the other component has a high rating. Numerically speaking for each separate component:

> **100** is equivalent to *Excellent* (an `A' academic grade), **80** is *Good* (B), **60** is *Fair* (C), **40** is *Poor* (D), **20** is *Unacceptable* (F) and **0** is *Dead*.

- <u>Relative to the scope of work for this report, tree *Condition*</u> has been rated but not explained in detail and recommendations for the management of tree condition have not been included. The tree owner may contact Deborah Ellis for additional information on tree condition and specific recommendations for the general care of individual trees relative to their condition.

- The *Condition* of the tree is considered relative to the tree species and present or future intended use of the site to provide an opinion on the tree's Preservation Suitability Rating (i.e. "Is this tree worth keeping on this site, in this location, as explained in <u>Table 7</u> below and on the next page. This is based upon the scenario that the tree is given enough above and below-ground space to survive and live a long life on the site. Ratings such as "Fair/Good" and "Fair/Poor" are intermediate in nature. The Preservation Suitability rating is not always the same as the Condition Rating because (for example) some trees with poor condition or structure can be significantly improved with just a small amount of work – and it would be worthwhile to keep the tree if this were done.

<u>Table 7</u> Preservation Suitability Rating Explanation (continued on the next page)

Excellent	Such trees are rare but they have unusually good health and structure and provide multiple functional and aesthetic benefits to the environment and the users of the site. These are great trees with a minimum rating of "Good" for both vigor and structure. Equivalent to academic grade `A'.
Good	These trees may have some minor to moderate structural or condition flaws that can be improved with treatment. They are not perfect but they are in relatively good condition and provide at least one significant functional or aesthetic benefit to the environment and the users of the site. These are better than average trees equivalent to academic grade `B'.

Table 7 **Preservation Suitability Rating Explanation** *(continued from the previous page)*

Fair	These trees have moderate or greater health and/or structural defects that it may or may not be possible to improve with treatment. These are "average" trees – not great but not so terrible that they absolutely should be removed. The majority of trees on most sites tend to fall into this category. These trees will require more intensive management and monitoring, and may also have shorter life spans than trees in the "Good" category. Retention of trees with moderate suitability for preservation depends upon the degree of proposed site changes. Equivalent to academic grade `C'.
Poor	These trees have significant structural defects or poor health that cannot be reasonably improved with treatment. These trees can be expected to decline regardless of management. The tree species themselves may have characteristics that are undesirable in landscape settings or may be unsuitable for high use areas. I do not recommend retention of trees with low suitability for preservation in areas where people or property will be present. Equivalent to academic grade `D'.
None	These trees are dead and/or are not suitable for retention in their location due to risk or other issues. In certain settings however, (such as wilderness areas, dead trees are beneficial as food and shelter for certain animals and plants including decomposers. Equivalent to academic grade `F'.

6) **Notes:** This may include any other information that would be helpful to the client and their architects and contractors within the scope of work for this report, such as a more detailed explanation of tree condition or expected construction impact.

7) **Tree Protection Distances:**

a) Root Protection: see page 23 for a detailed explanation.

b) Canopy Protection: Additional space beyond root zone protection distances may be necessary for canopy protection.

c) I have increased a few of the calculated tree protection distances for certain individual trees based upon my professional judgment and relative to site constraints. For example the minimum root protection distance I will list for any tree is 5 feet.

TREE ROOT PROTECTION DISTANCES

No one can estimate and predict with absolute certainty how far a soil disturbance such as an excavation must be from the edge of the trunk of an individual tree to effect tree stability or health at a low, moderate or severe degree -- there are simply too many variable involved that we cannot see or anticipate. **3xDBH** however, is a reasonable "rule of thumb" minimum distance (in feet) any soil disturbance should be from the edge of the trunk on one side of the trunk. This is supported by several separate research studies including (Smiley, Fraedrich, & Hendrickson 2002, Bartlett Tree Research Laboratories). DBH is trunk "diameter at breast height" (4.5 feet above the ground). This distance is often used during the design and planning phases of a construction project in order to estimate root damage to a tree due to the proposed construction. It tends to correlate reasonably well with the *zone of rapid taper*, which is the area in which the large buttress roots (main support roots close to the trunk) rapidly decrease in diameter with increasing distance from the trunk. For example, using the 3X DBH guideline an excavation should be no closer than 4.5 feet from the trunk of an 18-inch DBH tree. For trees with multiple trunks, an adjusted DBH is often calculated using 100% of the largest trunk plus 50% of the remaining smaller trunks. Such distances are guidelines only, and should be increased for trees with heavy canopies, significant leans, decay, structural problems, etc. I will generally not recommend a root protection distance of less than 5 feet for any tree, even very small trees. It is also important to understand that in actual field conditions we often find that much less root damage occurs than was anticipated by the guidelines. 3xDBH may be more of an aid in preserving tree stability and not necessarily long-term tree health.

6 to 18 X DBH is the minimum distance which is recommended in the *ANSI (American National Standard) A300 (Part 5)-2012 Management of Trees & Shrubs During Site Planning, Site Development, & Construction*, and also in the companion publication from the International Society of Arboriculture, *Best Management Practices, Managing Trees During Construction*, 2008. When the 6 to 18 x DBH distance cannot be met, "appropriate mitigation or determination that the work will not impact tree health and stability shall be performed", according to the ANSI Standard. ANSI A300 (Part 8) – 2013 Root Management, states: "When roots are damaged within 6 times the trunk diameter (DBH) mitigation shall be recommended." For practical purposes I use the 6 x DBH distance as the minimal distance acceptable (in most circumstances) in order to maintain good tree health and structural stability. The 6 x DBH distance or greater should definitely be used when there are soil disturbances on more than one side of the trunk.

OTPZ (Optimum Tree Protection Zone): OTPZ is the distance in feet from the trunk of the tree, all around the tree, that construction or other disturbance should not encroach within. If this zone is respected, then chances of the tree surviving construction disturbance are very good. This method takes into account tree age and the particular species tolerance to root disturbance. Although there are no scientifically based methods to determine the minimum distance for construction (for example, root severance) from trees to assure their survival and stability, there are some guidelines that are often used in the arboricultural industry. The most current guideline comes from the text, *Trees & Development*, Matheny et al., International Society of Arboriculture, 1998. Due to the crowded, constrained nature of many building sites it is often not be possible to maintain the OPTZ distance recommended for many of the trees -- therefore I have also listed alternate distances of 3 and 6X DBH.

TREE PHOTOS

Upper photo: northeast perimeter of the site along Madison Avenue. **Coast redwoods #5, 6 and 7** and **dawn redwood #8**.

Lower photo: corner of Nevada Street and Madison Avenue. **Redwoods #9-11, tulip tree #12** and **Raywood ash #13 – 15**.

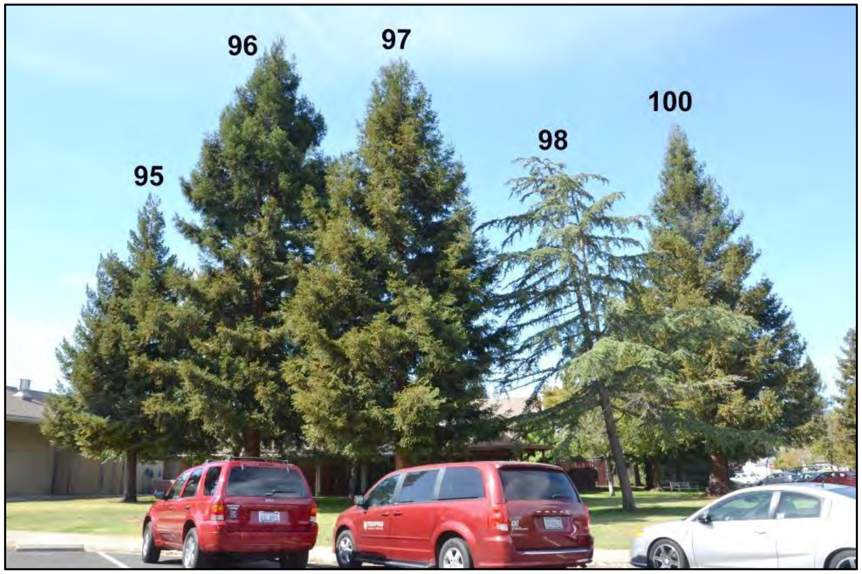
Sandwiched between playing fields lose to Madison Avenue, **coast live oak #22** and **black acacia #23**.

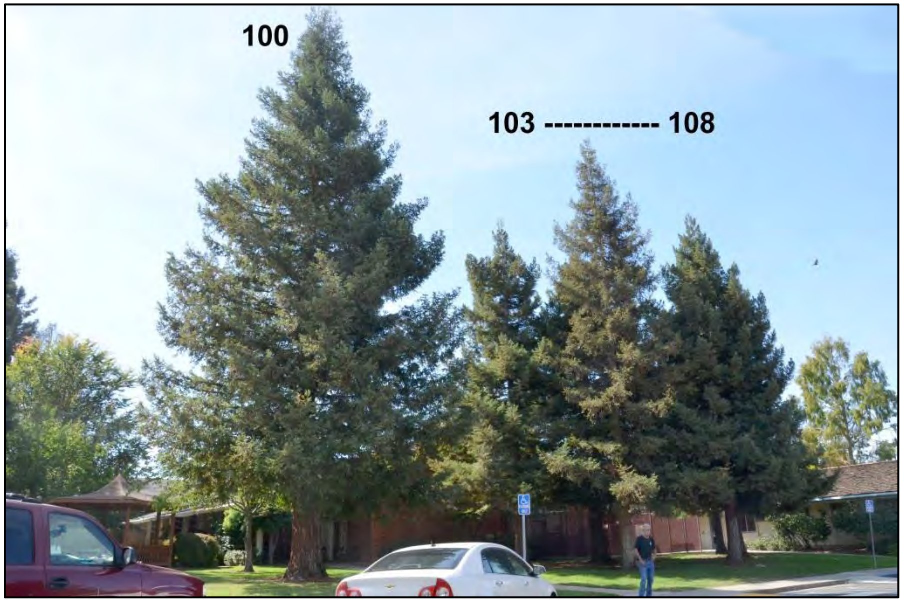
Looking toward the south perimeter of the site with **London planes #27 and 28,** and **Modesto ash #89 – 92** behind a building.

Upper left photo: southeast perimeter of the site. **Tulip trees #33, 41 and 44** are labeled. Tree #44 is dead.

Upper right: south corner of the site. **Honeylocust #47, California sycamore #48, redwood #49** and **juniper #50** are labeled.

Lower left: southwest perimeter of site, entrance to parking area. **Modesto ash #66** and **68** with **Monterey pine #67** hidden between.





Upper left: southeast perimeter parking area. **Redwood #109** and **Chinese hackberry #79 – 87** are labeled.

Upper right: east side of the main building with **redwoods #95 – 97 and 100,** and **blue Atlas cedar #98**.

Lower left: north side of the main building with **redwoods #100 and 103 – 108**.

Redwoods #109 – 112 on the south side of the main building. The condition of these redwoods is not as good as for the previous redwoods. These trees look drought stressed and it appears that the lawn area in which the trees are located is no longer being irrigated. Redwood #109 is the largest tree and in the best condition, probably because its root system is more shaded by the building and its larger canopy.

ASSUMPTIONS & LIMITATIONS

1. **Tree locations** were not provided to us on an existing topographic survey map. In lieu of a topographic map we have provided approximate tree trunk locations on an aerial map with a handheld GPS device. As project plans are developed, the numbered trees should be surveyed and accurate trunk locations and tree driplines included on all site-based plans.
2. **A Level 2 Basic Evaluation** of the subject trees described in this report was performed on August 5, 2015 for the purpose of this report. This is a brief visual evaluation of the tree from the ground, without climbing into the tree or performing detailed tests such as extensive digging, boring or removing samples. The tree is viewed by walking all around it, unless this is not possible. This type of evaluation is an initial screening of the tree after which the evaluator may recommend that additional, more detailed examination(s) be performed if deemed necessary. An assessment of tree risk was not performed during the evaluation.
3. **Any information and descriptions provided to me for the purpose of my investigation in this case and the preparation of this report are assumed to be correct**. Any titles and ownerships to any property are assumed to be good and marketable. I assume no responsibility for legal matters in character nor do I render any opinion as to the quality of any title.
4. **The information contained in this report covers only those items that were examined** and reflects the condition of those items at the time of inspection.
5. **Loss or removal of any part of this report** invalidates the entire report.
6. **Possession of this report, or any copy thereof, does not imply right of publication** for use for any purpose by any person other than to whom this report is addressed without my written consent beforehand.
7. **This report and the ratings or values represented herein represent my opinion**. My fee is in no way contingent upon the reporting of a specified value or upon any finding or recommendation reported.
8. **This report has been prepared in conformity with generally acceptable appraisal/diagnostic/reporting methods and procedures** and is consistent with practices recommended by the International Society of Arboriculture and the American Society of Consulting Arborists.
9. **My evaluation of the trees that are the subject of this report is limited to visual examination of accessible items without dissection, excavation, probing or coring**. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.
10. **I take no responsibility for any defects in any tree's structure**. No tree described in this report has been climbed and examined from above the ground, and as such, structural defects that could only have been discovered have not been reported, unless otherwise stated. Structural defects may also be hidden within a tree, in any portion of a tree. Likewise, root collar excavations and evaluations have not been performed unless otherwise stated.
11. **The measures noted within this report are designed to assist in the protection and preservation of the trees mentioned herein**, should some or all of those trees remain, and to help in their short and long term health and longevity. This is not however; a guarantee that any of these trees may not suddenly or eventually decline, fail, or die, for whatever reason. Because a significant portion of a

tree's roots are usually far beyond its dripline, even trees that are well protected during construction often decline, fail or die. Because there may be hidden defects within the root system, trunk or branches of trees, it is possible that trees with no obvious defects can be subject to failure without warning. The current state of arboricultural science does not guarantee the accurate detection and prediction of tree defects and the risks associated with trees. There will always be some level of risk associated with trees, particularly large trees. It is impossible to guarantee the safety of any tree. Trees are unpredictable.

****

I certify that the information contained in this report is correct to the best of my knowledge, and that this report was prepared in good faith. Thank you for the opportunity to provide service again. Please call me if you have questions or if I can be of further assistance.

Sincerely,

Deborah Ellis

Deborah Ellis, MS.
Consulting Arborist & Horticulturist
Certified Professional Horticulturist #30022
ASCA Registered Consulting Arborist #305
I.S.A. Board Certified Master Arborist WE-457B
I.S.A. Tree Risk Assessment Qualified

Deborah Ellis
asca
AMERICAN SOCIETY of CONSULTING ARBORISTS
Registered Consulting Arborist # 305

ENCLOSURES:

- *Keeping Native Calif. Oaks Healthy*. Hagen. June 1990. California Department of Forestry & Fire Protection. Tree Notes #7.

REFERENCES:

- American National Standard A300 (Part 5)-2012 for Tree Care Operations – Tree, Shrub & Other Woody Plant Management – Standard Practices:
    - (Part 5) – 2012 -- Management of Trees & Shrubs During Site Planning, Site Development, & Construction.
    - (Part 8) – 2013. Root Management.
    - (Part 9) – 2011. Tree Risk Assessment. Tree Structure Assessment.
- Best Management Practices, International Society of Arboriculture:
    - Managing Trees during Construction. *2008*
    - Tree Inventories. 2013.
- The Guide for Plant Appraisal, 9th edition, 2000, edited by the Council of Tree & Landscape Appraisers and published by the International Society of Arboriculture.
- Species Classification & Group Assignment. Western Chapter of the International Society of Arboriculture. 2004.

GLOSSARY

1. **Canker**: an area of dead bark. A localized lesion on a stem or branch, often sunken in appearance, commonly associated with a wound, decay or death of internal tissues. Cankers often extend beyond the extent of an original infection or wound, killing surrounding previously healthy tissue. If decay is present and spreads into the wood, a very weak area is created because both the inner and outer growth rings are affected. Internal decay can sometimes spread outward killing bark and new wood tissue – this is called a *canker rot*.
2. **Deciduous**: a plant that sheds all its leaves at a specific time of the year, usually during the winter when the weather is cold. As opposed to “evergreen” which are plants that retain their leaves in living condition all year long, never dropping all their leaves at once.
3. **Dripline**: the area under the total branch spread of the tree, all around the tree. Although tree roots may extend out 2 to 3 times the radius of the dripline, a great concentration of active roots is often in the soil directly beneath this area. The dripline is often used as an arbitrary “tree protection zone”.
4. **Girdling roots** are roots that grow circularly around the trunk (rather than away from the trunk) and compress the trunk or other roots, constricting the growth of these parts. Circling roots grow similarly, but they do not (or have not yet) restricted growth. Girdling roots can inhibit the flow of water and nutrients by “choking” vascular elements in the trunk or other roots, and they can also cause whole-tree failures at the root collar.

5. **Grove**: is a group of trees that located close together that shelter each other from wind and the elements, having "knit" canopies. If of the same species, there is usually root grafting between trees, which lends support from the ground, as well as water and mineral sharing. Removal of one or some grove members could cause remaining members to be unstable due to a reduction of previous shelter. Grove trees often have asymmetrical canopies when viewed as individuals.
6. **Growth cracks** are not defects in themselves; they are normal cracks in the bark that occur as a tree expands in girth. Normal growth cracks do not extend deep down into the underlying wood, cracking it open and exposing it.
7. **Leader**: the primary terminal shoot or trunk of a tree.
8. **Project Arborist. The arborist who is appointed to be in charge of arborist services for the project.** That arborist shall also be a *qualified consulting arborist* (either an International Society of Arboriculture (ISA) Board-Certified Master Arborist or an American Society of Consulting Arborists (ASCA) Registered Consulting Arborist) that has sufficient knowledge and experience to perform the specific work required. For most construction projects that work will include inspection and documentation of tree protection fencing and other tree protection procedures, and being available to assist with tree-related issues that come up during the project.
9. **Qualified Consulting Arborist:** must be either an International Society of Arboriculture (ISA) Board-Certified Master Arborist or an American Society of Consulting Arborists (ASCA) Registered Consulting Arborist that has sufficient knowledge and experience to perform the specific work required.
10. **Qualified Tree Service**: A tree service with a supervising arborist who has the minimum certification level of ISA (International Society of Arboriculture) Certified Arborist for at least 5 years, in a supervisory position on the job site during execution of the tree work. The tree service shall have a State of California Contractor's license for Tree Service (C61-D49) and provide proof of Workman's Compensation and General Liability Insurance. The person(s) performing the tree work must understand and adhere to the most current of the following arboricultural industry tree care standards:
    - Best Management Practices, Tree Pruning. International Society of Arboriculture, PO Box 3129, Champaign, IL 61826-3129. 217-355-9411
    - ANSI A300 Pruning Standards. Ibid. (Covers tree care methodology).
    - ANSI Z133.1 Safety Requirements for Arboricultural Operations. Ibid. (Covers safety).
11. **Root collar & root collar excavation and examination**: The *root collar* (junction between trunk and roots) is critical to whole-tree health and stability. A root collar excavation carefully uncovers this area (with hand digging tools, water or pressurized air). The area is then examined to assess its health and structural stability. Buttress roots may be traced outward from the trunk several feet. Decay assessment of the large roots close to the trunk (buttress roots) involves additional testing such as drilling to extract interior wood with a regular drill, or the use of a resistance-recording drill to check for changes in wood density within the root; as would be caused by decay or cavities. It is important to note that root decay often begins on the underside of roots, which is not detectable in a root collar excavation unless the entire circumference of the root is excavated and visible. Drill tests may detect such hidden decay. Note that it is not possible to uncover and evaluate the entire portion of the root system that is responsible for whole-tree stability. Decayed roots that are inaccessible (e.g. underneath the trunk) can be degraded to the extent that the whole tree may fail even though uncovered and examined roots in accessible locations appear to be sound.
12. **Root rot disease** is caused by wet, poorly aerated soil conditions. Degradation of roots (root rot) and sometimes the lower trunk (crown rot) ensues on weakened, susceptible plant species not adapted to such a soil environment. Opportunistic plant root pathogens (such as watermold

fungi) are often the secondary cause of the problem. Root rot is a particular problem among drought tolerant plants that are not adapted to frequent irrigation during our normally rain-free months, such as many of our California native plants. The problem is often worsened in fine-textured heavy clay soils that retain water more than do the coarser, fast-draining soils such as occur in the natural environment of many of our native plants.

13. **Scaffold branch**: a primary structural branch arising from the trunk of a tree. Usually the largest and often the lowest branches of the tree.
14. **Stump sprout trees** are the result of a tree trunk being cut down to a short stump close to the ground. If the tree survives, it sends out many small shoots (suckers) from around the cut stump. Some of these suckers may survive and grow to become significant trunks. These trunks are spaced very close together and usually have included bark between them, which reduces the strength of their union. Such trunks are prone to failure. Stump sprout trees can be very structurally unsound, particularly as they become large and old. There is often a great deal of decay associated with the mother stump, which can also reduce mechanical stability.
15. **Summer Dry**: Our native oak species are adapted to our "summer dry" climate. When the soil in their root system is kept moist during our normally dry months, these oaks are predisposed to attack by fungal root rot pathogens that are usually present in our soils. Therefore it is important to keep irrigation as far from the tree trunk (preferably beyond the mature dripline) as possible. The best landscape treatment underneath native oaks is non-compacted soil covered with a 3 to 4-inch depth of oak wood, leaf and twig litter (the tree's natural litter). Keep this mulch 6 to 12 inches away from the root collar (junction of trunk and roots). An exception to the no summer water rule would be newly planted oaks (for the first 2 to 3 years after planting, until they are "established") and also during droughts that occur during the normal rainy season.
16. **Sunscald** is the death of bark, and sometimes the underlying wood, due to the heat of the sun. This often occurs when over-pruning removes a large amount of foliage, newly exposing previously sheltered tissue.
17. ***Verticillium* wilt** is a vascular disease caused by a common soil-borne fungus that infects and plugs the water conducting system of plants. Plants infected with *Verticillium* do not necessarily die, but branches or sections of the plant may die. Plants often recover as they grow new water conducting tissue in new places. This fungus commonly infects maples, ash and certain other plants including some vegetables. The best management in landscape situations is generally to maintain good plant vigor by providing good growing conditions, and to avoid moving contaminated soil to pathogen-free areas. *Verticillium* wilt tends to be more serious in cooler areas – the fungus dies out in the branches of some woody hosts during hot summer weather. Soil solarization has been used with some success in reducing *Verticillium* inoculum in the soil (especially for annual crops like vegetables), but moist soil must be covered with black plastic for 3 months during the hottest part of summer (usually June – September) in order to be effective. If there are existing plant roots in the area, these plants could be damaged by the increase in soil temperatures.