



URBAN FORESTRY ASSOCIATES, INC.

**Creekwood Development
Tree Protection and Removal Plan**

Prepared for:

Doyle Heaton
DRG Builders Inc.

Prepared by:

Zach Vought
Urban Forestry Associates Inc.
209 San Anselmo Ave., San Anselmo, CA 94901

April 19, 2022

November 9, 2021

Mr. Doyle Heaton,

Enclosed is a report of my findings regarding trees within/near the Creekwood development project in at 270 & 280 Casa Grande Road in Petaluma. The project proposes to demolish one of the two existing homes onsite and to construct a new subdivision as well as a pedestrian bridge across Adobe Creek. This report describes the current health and condition of the trees, documents trees scheduled for removal, and provides tree preservation guidelines and specific comments on tree protection measures. Please note there is a supplementary map to accompany this report. The map indicates tree locations, trees slated for removal, and tree protection fencing locations.

I conducted a site visit on March 4 and October 14, 2021, and April 6, 2022 to evaluate trees in the development area, along the riparian zone near Adobe Creek, and trees on adjacent properties with driplines extending into the project area. Tree cover in the main development area is sparse. Most trees in are small, non-native ornamental varieties. The riparian zone is populated with a mixture of native tree and plant species most of which are in good health. The latest field work involved a survey of trees near the proposed pedestrian bridge which crosses Adobe Creek. Installation of fencing to establish tree protection zones will comprise the bulk of tree protection measures.

A total of fifteen 45 trees were included in the assessment. "Tree 16" is the riparian zone along Adobe Creek. Trees in this area were not individually assessed. Rather, a cursory assessment of the condition and species was included. "Tree 17" is a row of oak trees growing at 400 Casa Grande Rd. The trees are offsite but some of their canopies extend over the property line. Trees 18-45 are trees growing in the creek area near the proposed bridge.

18 trees are scheduled for removal for the project, 12 of which are native and require replacement.

Please let me know if you have questions regarding the contents of this report.

Regards,



Zachary Vought, Urban Forester
Registered Consulting Arborist #691
ISA Board Certified Master Arborist WE-9995B
ISA Qualified Tree Risk Assessor

Tree Protection and Removal Plan

Table of Contents

	Page
ASSIGNMENT/ PURPOSE _____	4
SUMMARY _____	4
METHODOLOGY _____	4
SPECIFIC AREAS OF CONCERN _____	4
INSPECTION SCHEDULE _____	6
TREE WORK STANDARDS AND QUALIFICATION _____	6
ARBORIST'S CHECKLIST _____	7
SOURCES _____	7
TREE CONDITION RATINGS _____	8
INVENTORY _____	9
TREE REPLACEMENT CALCULATIONS _____	13
TREE PROTECTION FENCING _____	14

ASSIGNMENT/ PURPOSE

DRG Builders Inc. asked me to evaluate trees on two parcels (017-040-016, 017-040-051) as a part of the proposed Creekwood housing development project in Petaluma. The purpose of my assessment and this report is to document the species and condition of the trees onsite, provide protection measures for leave trees, and provide a list of trees scheduled for removal. There is a supplementary map to accompany this report which includes tree locations and fencing locations.

SUMMARY

A total of eight 18 trees are slated for removal for the project. 10 of the trees scheduled for removal qualify as protected per the Petaluma Tree Ordinance. The remaining 35 trees are to be preserved and protected.

Two outfall locations will be placed in the riparian zone though their locations have not yet been staked, all efforts will be made to minimize impacts in these areas.

METHODOLOGY

Per Section 17.070 of the Petaluma Municipal Code, trees in/near the development area with a dbh¹ measuring four inches or larger were evaluated and identified with a metal numbered tags corresponding to the inventory. A cursory assessment was performed in the riparian zone along the eastern property boundary, and along the north property line near a row of English oak trees. The health, structure and form of the trees were assessed and adapted to conform with a numerical rating system which combines those ratings into a single condition rating. Condition ratings were assessed on a scale of 1-5, 1 being poor condition, 5 being good condition.

SITE

The project site is on two adjacent parcels which are relatively flat. Tree cover in the development footprint is sparse and composed of mostly small non-native ornamental species and fruit trees. The Casa Grande Senior Apartments stands north of the project site. There is a row of established English oak (*Quercus robur* 'Fastigiata') trees on the senior living property. There are two existing homes onsite. I understand the home and vegetation at 280 Casa Grande Rd. will be demolished. Most of the trees included in the inventory are at 270 Casa Grande Rd. The Malnati home at 270 Casa Grande Rd. will be preserved. The largest trees onsite are mature Coast redwood (*Sequoia sempervirens*), all of which will be preserved and are well outside the development area. Along Adobe Creek to the east, there is a riparian zone composed of native trees and vegetation. The native tree species include Willow (*Salix spp.*); Buckeye (*Aesculus californica*); Coast live oak (*Quercus agrifolia*); Valley oak (*Quercus lobata*); Oregon ash (*Fraxinus latifolia*) and Toyon (*Heteromeles arbutifolia*). In general, the trees in the riparian area exhibit good health and are well outside the development zone.

SPECIFIC AREAS OF CONCERN

Storm drain outfalls

Two storm drain outfalls are proposed in the riparian zone (#16 in inventory); one in near the northeast portion of the property, and another at the southeast corner of the property. The location of these outfalls has not yet been solidified in the field. I recommend a site visit between myself and the project team/contractor to place these outfalls as far from trees as possible. If excavation is required, ideally it will be performed by hand. If the use of heavy equipment is necessary, mitigation measures should be employed to minimize soil compaction/damage to tree trunks. Additional fencing or trunk protection may be required in these areas when the work is being performed. I understand the goal is to remove no trees in the riparian zone.

¹ Trunk diameter measured at 4.5' above grade.

English oak trees

The row of oaks on the senior living property was in leaf-off condition at the time of my assessment. However, the trees appear to be in good health and structural condition. There is an existing fence that separates this row of trees from the project area. Only small branches from these trees extend over the property line which may require some minor pruning for the project, but nothing significant. For the most part these trees are not expected to be negatively impacted by development. This cultivar of English oak has upright/columnar form and can be pruned to maintain clearance from structures over the long term.

Pedestrian Bridge

Trees located in the footprint of the bridge will be removed. Trees 30 & 31 will have to be pruned to create clearance from the new bridge. Tree-20, a healthy coast live oak tree stands less than two feet from the edge of the concrete walkway on the east side of the creek. Two feet is less than ideal clearance to allow for future tree growth and integrity of the walkway. A possible design alternation could involve a pier supported raised wooden walkway that would span the root system.

A number of trees will have fill soil placed over their root systems near the east and west entrances to the bridge. Of note is Tree-43, a large healthy coast live oak tree. The design should incorporate measures to keep fill at least three feet from any tree trunk.

Tree Protection Zones

The tree protection zones (TPZ) indicated on the Arborist's map were determined by the trees' trunk diameter, canopy spread and distribution, topography around the tree and access needs. It is not a work exclusion zone, but a zone where the roots need to be protected from soil compaction and grading. Installation of fencing where the bridge is proposed may be difficult unless significant brush clearance is performed. At minimum the trunks of trees near areas of construction should be protected with 2x4's strapped to the trunk. Heavy equipment usage should be limited as much as possible within ten feet of any tree. Wood chip mulch may be used liberally where equipment use is expected to mitigate soil compaction.

Please see the Arborist's map for location of tree protection fencing (See Page 13 for specifications).

Mulch

To promote tree health wood chips may be installed to a depth of 3 inches within the tree protection fencing area, but not directly against the trunk.

Replacement Trees

The number of replacement trees was determined following § 17.065 *Tree Mitigation and Replacement* of the Petaluma Municipal Code. Replacement was calculated using a 1:1 trunk diameter replacement using 24-inch box trees. The Ordinance assumes 2 inches of trunk diameter per 24-inch box tree. For example, a 10" dbh tree will be replaced with 5, 24-inch box trees. The calculated diameter of multiple stem trees was determined by adding the largest stem and half of the next two largest stems. Using this methodology, the total estimated number of replacement trees is 58, 24-box trees. See tree replacement calculations sheet on Page 11. There is insufficient space on the project site and especially the riparian area to plant 58 trees, and in my opinion this is an exorbitant number of replacement trees if 24" box trees are required.

The cost to purchase and plant one 24" box tree is approximately \$500. This would equate to \$29,000 (58x\$500) in in-lieu of fees. In my opinion a more reasonable replacement requirement would be 1:1. Since there are 12 native trees slated for removal this would equal 12, 24" box trees.

INSPECTION SCHEDULE

Inspection of site: Prior to Equipment and Materials Move In, Site Work, Demolition and Tree Removal: The Project Arborist will meet with the General Contractor, Architect / Engineer, and Owner or their representative to review tree preservation measures, designate tree removals, delineate the location of tree protection / non-intrusion zone fencing, specify equipment access routes and materials storage areas, review the existing condition of trees and provide any necessary recommendations.

Inspection of site: After installation of NIZ fencing: Inspect site for the adequate installation of tree preservation measures. Review any requests by contractor for access, soil disturbance or excavation areas within root zones of protected trees. Assess any changes in the health of trees since last inspection.

Inspection of site: During excavation or any activities that could affect trees: Inspect site during any activity within the Non-Intrusion Zones of preserved trees and any recommendations implemented. Assess any changes in the health of trees since last inspection.

Final Inspection of Site: Inspection of site following completion of construction: Inspect for tree health and make any necessary recommendations.

SCOPE OF WORK / LIMITATIONS

Information regarding property boundaries, land ownership, and tree ownership was evident from a land survey, property fencing and/or provided by the client. UFA has no personal or monetary interest in the outcome of this matter. All determinations reflected in this report are objective and to the best of our ability. All observations regarding the sites and trees were made by UFA personnel, independently, based on our education and experience. Determinations of the health and hazard potential of the subject trees are through visual inspection only and of our best professional judgment.

The health and hazard assessments in this report are limited by the visual nature of the assessment. Defects may be obscured by soil, brush, vines, aerial foliage, branches, multiple trunks or other trees. None of the subject trees were examined using invasive techniques such as increment coring or Resistograph® tests. The probability of tree failure is dependent on a number of factors including topography, geology, soil characteristics, wind patterns, species characteristics (both visually evident and concealed), structural defects, and the characteristics of a specific storm. Structurally sound, healthy trees fail during severe storms. Consequently, a conclusion that a tree does not require corrective surgery or removal is not a guarantee of no risk, hazard, or sound health.

TREE WORK STANDARDS AND QUALIFICATION

All tree work, removal, pruning, planting, shall be performed using industry standards as established by the International Society of Arboriculture. Contractor must have a State of California Contractors License for Tree Service (C61-D49) or Landscaping (C-27) with general liability, worker's compensation, and commercial auto/equipment insurance.

Contractor standards of workmanship shall adhere to current Best Management Practices of the International Society of Arboriculture (ISA) and the American National Standards Institute (ANSI) for tree pruning, fertilization and safety (ANSI A300 and Z133.1).

ARBORIST'S CHECKLIST

- An urban forester, certified or consulting arborist shall establish the Tree Protection Zone (TPZ) prior to starting the demolition work. Four-foot-high metal wire deer fencing will be erected by the contractor and inspected by the arborist to limit access to the TPZ. This will protect the trunk and root zone throughout construction.
- The Arborist shall have a pre-demolition meeting with contractor or responsible party and all other foremen or crew managers on site prior to any work to review all work procedures, access and haul routes, and tree protection. The contractor must notify the Arborist if roots are exposed or if trunk or branches are wounded.
- Any trunk and root crown that is not protected by a TPZ where heavy equipment operation is likely to wound the trunk, install a barrel stave-like trunk wrap out of 2 X 4 studs connected together with metal straps, attached to the 2 X 4's with driver screws or 1" nails.
- Storage of equipment shall be as far away from protected trees as possible and optimally on asphalt or ground protected by mulch / plywood.
- Heavy equipment use should be limited around trees and the roots. No equipment may be transported or used on bare ground within the root zone. A 6" layer of mulch and plywood must be placed under the path for access and egress. The protective "bridge" shall be maintained by the contractor and inspected by the arborist when on site.
- Any damage to trees due to demolition or construction activities shall be reported to the arborist within 6 hours, so that remedial action can be taken.
- All trenching within the NIZ shall be done pneumatically or by hand, being careful not to damage any of the bark of any root encountered.
- An arborist shall inspect all grading, trenching, tunneling or other excavation within the root zones of trees prior to backfill.
- No chemicals or other waste materials shall be dumped within 20' of the base of any tree. There shall be no material storage in the NIZ.
- Any tree pruning will be done in accordance with the latest version of ISA or ANSI best management practices/ standards. All pruning will be inspected by the arborist.
- The arborist must perform a final inspection to ensure that no unmitigated damage has occurred and to specify any pest, disease or other health care. The arborist shall specify and oversee any necessary restorative actions.
- Any suspected omissions or conflict between various elements of the plan shall be brought to the attention of the arborist and resolved before proceeding with the work.

SOURCES

- Field data collected by Urban Forestry Associates on March 4 and October 14, 2021.
- Site plan and site survey provided by Steven J Lafranchi & Associates Inc.

TREE CONDITION RATINGS

Rating category	Condition components		
	Health	Structure	Form
Excellent	High vigor and nearly perfect health with little or no twig dieback, discoloration, or defoliation	Nearly ideal and free of defects.	Nearly ideal for the species. Generally symmetric. Consistent with the intended use.
Good	Vigor is normal for the species. No significant damage due to diseases or pests. Any twig dieback, defoliation, or discoloration is minor.	Well-developed structure. Defects are minor and can be corrected.	Minor asymmetries/deviations from species norm. Mostly consistent with the intended use. Function and aesthetics are not compromised.
Fair	Reduced vigor. Damage due to insects or diseases may be significant and associated with defoliation but is not likely to be fatal. Twig dieback, defoliation, discoloration, and/or dead branches may comprise up to 50% of the crown.	A single defect of a significant nature or multiple moderate defects. Defects are not practical to correct or would require multiple treatments over several years.	Major asymmetries/deviations from species norm and/or intended use. Function and/or aesthetics are compromised.
Poor	Unhealthy and declining in appearance. Poor vigor. Low foliage density and poor foliage color are present. Potentially fatal pest infestation. Extensive twig and/or branch dieback.	A single serious defect or multiple significant defects. Recent change in tree orientation. Observed structural problems cannot be corrected. Failure may occur at any time.	Largely asymmetric/abnormal. Detracts from intended use and/or aesthetics to a significant degree.
Very poor	Poor vigor. Appears to be dying and in the last stages of life. Little live foliage.	Single or multiple severe defects. Failure is probable or imminent.	Visually unappealing. Provides little or no function in the landscape.
Dead			

Table 1. Sourced from *The Guide for Plant Appraisal, 10th Edition*

INVENTORY

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
1	Edible Fig	<i>Ficus carica</i>	7, 6.4, 6.2	5	Unprotected		Preserve and protect with fencing.
2	Apple	<i>Malus domestica</i>	6	4	Unprotected	Sun burn and associated necrosis on main trunk. In footprint of development.	Remove tree.
3	Plum sp.	<i>Prunus sp.</i>	14.5	4	Unprotected	Near footprint of development.	Remove tree.
4	Plum sp.	<i>Prunus sp.</i>	11.5	3	Unprotected	Near footprint of development.	Remove tree.
5	English Walnut	<i>Juglans regia</i>	8.5, 7.5, 5.5	5	Unprotected	Near footprint of development.	Preserve and protect with fencing.
6	Edible Fig	<i>Ficus carica</i>	8, 6.5	5	Unprotected	Outside footprint of development.	Preserve.
7	Edible Fig	<i>Ficus carica</i>	10	5	Unprotected	Outside footprint of development.	Preserve.
8	Coast Redwood	<i>Sequoia sempervirens</i>	37	5	Protected	Outside footprint of development.	Preserve.
9	Coast Redwood	<i>Sequoia sempervirens</i>	38	4	Protected	The tree bifurcates at approximately 25 feet above grade. The stems are codominant and there is bark pressed between the two stems. Outside footprint of development.	Preserve and protect with fencing.
10	Coast Redwood	<i>Sequoia sempervirens</i>	33	4	Protected	Outside footprint of development.	Preserve and protect with fencing.
11	Olive	<i>Olea europaea</i>	6, 6, 4	5	Unprotected	In footprint of development.	Remove tree. To be transplanted onto designated

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
							remainder parcel.
12	English Walnut	<i>Juglans regia</i>	7	5	Unprotected	In footprint of development.	Remove tree. To be transplanted onto designated remainder parcel.
13	Sweetgum	<i>Liquidambar styraciflua</i>	14	4	Unprotected	In footprint of development.	Remove tree.
14	Photinia	<i>Photinia fraseri</i>	7, 5, 4	4	Unprotected	In footprint of development.	Remove tree.
15	Crape Myrtle	<i>Lagerstroemia sp.</i>	6	4	Unprotected	In footprint of development.	Remove tree.
16	Riparian zone	Various native species		4	Protected	The riparian zone is populated with native tree and plant species. In general trees are in good health and the vast majority will not be impacted by development. Two outfall locations (See map) will be installed within the riparian zone, which will require project arborist involvement.	Preserve and protect with fencing. Consult project arborist for input on best outfall locations.
17	Row of Upright English oaks	<i>Quercus robur "Fastigiata"</i>	4 to 12	5	Unprotected	Outside footprint of development. Small diameter limbs extend over property line.	Preserve. Existing fence is sufficient protection.
18	Coast live oak	<i>Quercus agrifolia</i>	19.5	5	Protected		Preserve and Protect with trunk armor.
19	Valley oak	<i>Quercus lobata</i>	7.5	4	Protected	Leggy.	Preserve and Protect with trunk armor.

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
20	Coast live oak	<i>Quercus agrifolia</i>	21.5	4	Protected		Preserve and protect with fencing.
21	Coast live oak	<i>Quercus agrifolia</i>	17	5	Protected		Preserve and protect with fencing.
22	Coast live oak	<i>Quercus agrifolia</i>	16, 6.5	5	Protected	Lean southeast.	Preserve and Protect with trunk armor.
23	Coast live oak	<i>Quercus agrifolia</i>	12.5	5	Protected	Trunk lean south.	Preserve and Protect with trunk armor.
24	Coast live oak	<i>Quercus agrifolia</i>	8.5, 7.5	5	Protected		Remove tree.
25	Coast live oak	<i>Quercus agrifolia</i>	12.5	5	Protected		Remove tree.
26	Valley oak	<i>Quercus lobata</i>	9	4	Protected		Preserve and Protect with trunk armor.
27	Valley oak	<i>Quercus lobata</i>	6	5	Protected		Remove tree.
28	Coast live oak	<i>Quercus agrifolia</i>	12.5	5	Protected		Preserve and Protect with trunk armor.
29	Valley oak	<i>Quercus lobata</i>	10	4	Protected		Remove tree.
30	California Buckeye	<i>Aesculus californica</i>	6, 6, 4	4	Protected	Leans towards footprint of proposed bridge. May need to be pruned for bridge clearance.	Preserve and protect. Prune to create clearance for new bridge.
31	red willow	<i>Salix laevigata</i>	13.5, 10.5, 7.5	4	Protected	Smallest stem leans toward proposed bridge. This stem may have to be removed for bridge clearance.	Preserve and protect. Prune to create clearance for bridge.
32	Oregon Ash	<i>Fraxinus latifolia</i>	7.5	5	Protected		Preserve and Protect.
33	red willow	<i>Salix laevigata</i>	6	5	Protected		Remove tree.

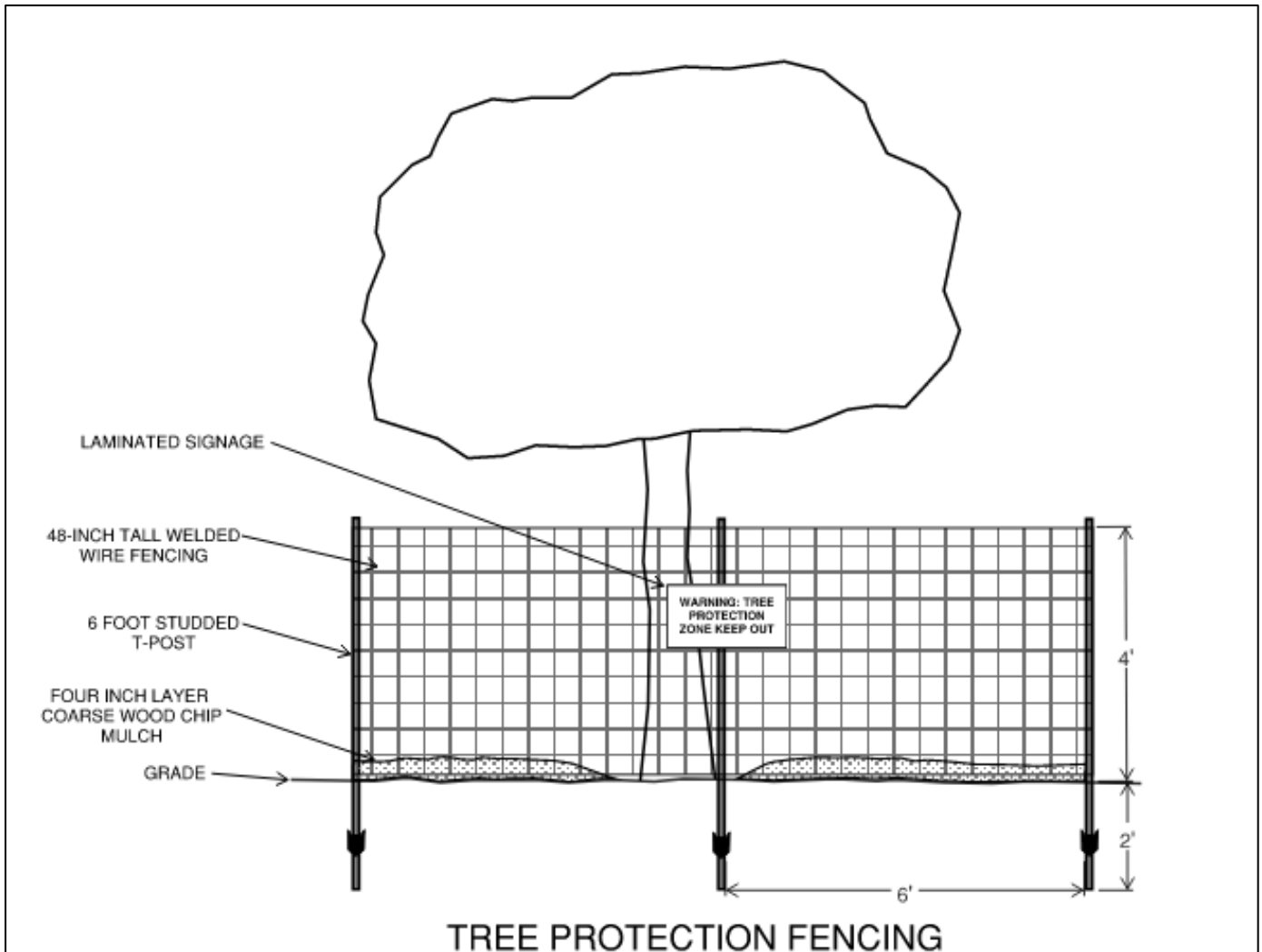
Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
34	Oregon Ash	<i>Fraxinus latifolia</i>	6	5	Protected		Remove tree.
35	red willow	<i>Salix laevigata</i>	8.5	4	Protected	Moderate amount of deadwood in canopy. Trunk leans north.	Preserve and Protect with trunk armor.
36	red willow	<i>Salix laevigata</i>	9.5	4	Protected		Remove tree.
37	red willow	<i>Salix laevigata</i>	8	3	Protected	Strong trunk lean southwest.	Remove tree.
38	red willow	<i>Salix laevigata</i>	11	4	Protected	Moderate amount of deadwood in canopy.	Remove tree.
39	California Buckeye	<i>Aesculus californica</i>	6, 6, 5	4	Protected	Low spreading canopy.	Remove tree.
40	Valley oak	<i>Quercus lobata</i>	15	5	Protected		Preserve and Protect with trunk armor.
41	red willow	<i>Salix laevigata</i>	12.5	5	Protected		Preserve and Protect with trunk armor.
42	red willow	<i>Salix laevigata</i>	13	4	Protected	Leans away from proposed path/bridge.	Preserve and Protect with trunk armor.
43	Coast live oak	<i>Quercus agrifolia</i>	23	5	Protected	Fill soil to be installed near this tree.	Preserve and Protect. If possible retain fill soil at least three feet from the trunk of this tree.
44	red willow	<i>Salix laevigata</i>	17.5	2	Protected	Large deadwood in upper canopy.	Remove tree.
45	valley oak	<i>Quercus lobata</i>	7	5	Protected		Remove tree.

TREE REPLACEMENT CALCULATIONS

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Calculated Dbh	24" box Replacement Tree Quantities
24	Coast live oak	<i>Quercus agrifolia</i>	8.5, 7.5	5	12.3	6.1
25	Coast live oak	<i>Quercus agrifolia</i>	12.5	5	12.5	6.3
27	Valley oak	<i>Quercus lobata</i>	6	5	6.0	3.0
29	Valley oak	<i>Quercus lobata</i>	10	4	10.0	5.0
33	red willow	<i>Salix laevigata</i>	6	5	6.0	3.0
34	Oregon Ash	<i>Fraxinus latifolia</i>	6	5	6.0	3.0
36	red willow	<i>Salix laevigata</i>	9.5	4	9.5	4.8
37	red willow	<i>Salix laevigata</i>	8	3	8.0	4.0
38	red willow	<i>Salix laevigata</i>	11	4	11.0	5.5
39	California Buckeye	<i>Aesculus californica</i>	6, 6, 5	4	11.5	5.8
44	red willow	<i>Salix laevigata</i>	17.5	2	17.5	8.8
45	valley oak	<i>Quercus lobata</i>	7	5	7	3.5
					Total	58.6
					Total Required Mitigation=	(58) 24" box trees

TREE PROTECTION FENCING

4-foot-tall wire deer fencing shall be used to create the **tree protection zones**, installed as shown on the Arborist's Map. Fencing shall be supported with 6' metal t-stakes and installed 6-foot on center. Laminated signage shall be attached to fencing and read "Warning Tree Protection Zone Keep Out". Signage shall be kept visible and intact throughout the project. Failure to comply with the tree protection plan may result in a stop work order.



TREE PROTECTION FENCING

1. Four foot tall welded wire fencing shall be used to create the Tree Protection Zone (TPZ) as shown on the Arborist's Map. Orange Plastic construction fencing may be placed on the outside of the wire fencing but is not a substitute for the wire fencing.
2. Fencing shall be supported by six foot tall studded metal t-posts installed six feet on center.
3. Material storage is not permitted within the TPZ.
4. Laminated signs shall be attached to fencing and read "Warning: Tree Protection Zone Keep Out" in English and Spanish. Signs shall be kept visible throughout the project. Failure to comply with the tree protection plan may result in a Stop Work order.