



**URBAN FORESTRY ASSOCIATES, INC.**

**Creekwood Development  
Tree Protection and Removal Plan**

***Prepared for:***

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DRG Builders Inc.

***Prepared by:***

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December 19, 2023

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Mr. Doyle Heaton,

Enclosed is a report of my findings regarding trees within/near the Creekwood development project at 270 & 280 Casa Grande Road in Petaluma. The project proposes demolishing one of the two existing homes on site and constructing a new subdivision and 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. See SPAR Landscape Plan sheet L-5, L-5.1 & L-5.2, Tree Removal, Protection, and Replacement Plan.

I conducted a site visit on March 4 and October 14, 2021, April 6, 2022, and May 17 & October 25, 2023, 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 are small, non-native ornamental varieties. The riparian zone contains a mixture of native tree and plant species, most of which are healthy. The latest fieldwork involved a more involved survey of trees one inch in diameter or larger near the proposed pedestrian bridge that crosses Adobe Creek and proposed outfall locations. Fencing installation to establish tree protection zones will comprise the bulk of tree protection measures.

Seventy-two (72) trees were included in the assessment. I inventoried trees within a 25-foot radius of the bridge alignment. "Tree 17" is a row of oak trees growing at 400 Casa Grande Rd. The trees are offsite, but some canopies extend over the property line. Trees 18-72 grow in or near the creek near the proposed bridge and storm drainage outfalls.

Thirty one (31) trees are scheduled for removal for the project, Twenty-four (24) of which are native and require replacement. A comprehensive tree replacement plan is provided in this report.

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

Regards,



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

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## ASSIGNMENT/ PURPOSE

DRG Builders Inc. asked me to evaluate trees on two parcels (017-040-016 and 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 leaving trees, and provide a list of trees scheduled for removal. Sheets L-5, L-5.1 & L-5.2, the Tree Removal and Protection and Replacement Plan, is to accompany this report and include tree and fencing locations.

## SUMMARY

The project proposes to remove thirty-one (31) trees. Twenty-four (24) trees scheduled for removal qualify as protected per the Petaluma Tree Ordinance. The remaining 41 trees are to be preserved and protected.

The Tree Impact Summary on Pages 6 & 7 lists trees scheduled to be removed or pruned.

## METHODOLOGY

Per Section 17.070 of the Petaluma Municipal Code, I evaluated trees in/near the development area with a dbh<sup>1</sup> measuring four inches or larger and identified with metal numbered tags corresponding to the inventory. My assessment includes trees one inch in diameter or larger in the creek near the proposed pedestrian bridge and storm drainage outfalls. I conducted a cursory evaluation of the riparian zone along the eastern property boundary and the north property line near a row of English oak trees. Tree health, structure, and form were assessed and adapted to conform with a numerical rating system that combines those ratings into a single condition rating. Condition ratings were evaluated on a scale of 1-5, 1 being poor and 5 being good conditions.

## SITE

The project site is on two adjacent parcels, which are relatively flat. Tree cover in the development footprint is sparse and composed of primarily small non-native ornamental species and fruit trees. The Casa Grande Senior Apartments stands north of the project site. A row of established English oak (*Quercus robur* 'Fastigiata') trees is 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 in the inventory are at 270 Casa Grande Rd. The Malnati home at 270 Casa Grande Rd. will be preserved. The largest trees on site 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 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*). Generally, the riparian area's trees exhibit good health and are well outside the development zone.

## SPECIFIC AREAS OF CONCERN

### Storm drain outfalls

Two storm drain outfalls are proposed in/near the riparian zone, one near the property's northeast portion and another at the southeast corner. The location of these outfalls has been tentatively determined, and trees near the outfalls were located and identified in the tree inventory. One tree is scheduled for removal to accommodate the southern SD outfall. If excavation is required, ideally, it will be performed by hand when it occurs within ten feet of any tree. 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.

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<sup>1</sup> Trunk diameter measured at 4.5' above grade.

### English oak trees

During my assessment, the row of oaks on the senior living property was in leaf-off condition. However, the trees appear to be in good health and structural condition. An existing fence 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. Mostly, these trees are not expected to be negatively impacted by development. This cultivar of English oak has an upright/columnar form and can be pruned to maintain clearance from structures over the long term.

### Pedestrian Bridge

Twenty-three (23) trees near the bridge will be removed. The remaining trees in this area will be preserved and protected. Pruning will be necessary for a few of the preserved trees in this area. The project arborist should meet with the contractor before bridge construction to discuss the potential for additional pruning to minimize the chances of tree damage, especially if a crane is used. Generally, the bridge and pedestrian paths proposed in this area are expected to have a low impact on the trees. Tree 49 is a small red willow scheduled to be preserved. It is very close to the bridge alignment but leans heavily away from the bridge and is growing near ground level, so there is a good chance it can be preserved.

### Tree Protection Zones

The tree protection zones (TPZ) indicated on the L-5 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 must 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 a minimum, the trunks of trees near construction areas should be protected with 2x4s 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 where equipment is expected to mitigate soil compaction.

Trees located within the riparian zone will be protected using yellow rope strung between posts to create the non-intrusion zone (NIZ). The NIZ shall be defined by the project arborist prior to construction. Construction activities and foot traffic are not permitted in the NIZ without the oversight of the project arborist.

Please see sheets L-5, L-5.1 & L-5.2 for the location and type of tree protection (See Page 22 for fencing specifications).

### Mulch

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

### Replacement Trees (See Page 19-21)

Mitigation for the trees removed within the area will conform to the City of Petaluma Tree Preservation Ordinance (Chapter 17 IZO). The mitigation ratio for healthy trees will be at a 1:1 ratio, and trees with poor health scores of 2 or less will be replaced at 2:1. The Mitigation will intend to replace the removed trees with an in-kind native species. Willows to be removed will either be replaced with another willow or Western redbud. Replacement of the red willow will prioritize Mitigation within the riparian corridor adjacent to the site if there is adequate room. Willows grow within the creek, and the intent will be to provide 1-2" willow stakes where possible within the riparian corridor, using branches from existing willows, if possible. Red willow is a fast-growing, short-lived, and decay-prone species, so it should not be planted adjacent to the bridge alignment due to potential safety concerns. Arroyo willow is a better option as it tends to stay smaller and more manageable compared to red willow. If space runs out, the remaining will be Mitigation of the willows using the Western Redbuds on the upland portion of the site adjacent to the creek. All other trees to be mitigated will be replaced using native oaks and California buckeye within the upland areas adjacent to the creek.

**TREE IMPACT SUMMARY**

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status
<b>Trees to be removed <u>outside</u> riparian habitat preservation area</b>					
2	Apple	<i>Malus domestica</i>	6	4	Unprotected
3	Plum sp.	<i>Prunus sp.</i>	14.5	4	Unprotected
4	Plum sp.	<i>Prunus sp.</i>	11.5	3	Unprotected
13	Sweetgum	<i>Liquidambar styraciflua</i>	14	4	Unprotected
14	Photinia	<i>Photinia fraseri</i>	7, 5, 4	4	Unprotected
15	Crape Myrtle	<i>Lagerstroemia sp.</i>	6	4	Unprotected
71	Fruiting pear	<i>Pyrus spp.</i>	3	2	Unprotected
<b>Trees to be removed <u>in</u> the riparian habitat preservation area</b>					
24	Coast live oak	<i>Quercus agrifolia</i>	8.5, 7.5	5	Protected
25	Coast live oak	<i>Quercus agrifolia</i>	12.5	5	Protected
27	Valley oak	<i>Quercus lobata</i>	6	5	Protected
29	Valley oak	<i>Quercus lobata</i>	10	4	Protected
33	Northern CA. walnut	<i>Juglans hindsii</i>	6	5	Protected
34	Oregon Ash	<i>Fraxinus latifolia</i>	6	5	Protected
36	red willow	<i>Salix laevigata</i>	9.5	1	Protected
37	red willow	<i>Salix laevigata</i>	8	3	Protected
38	red willow	<i>Salix laevigata</i>	11	4	Protected
39	California Buckeye	<i>Aesculus californica</i>	6, 6, 5	4	Protected
44	red willow	<i>Salix laevigata</i>	17.5	2	Protected
45	valley oak	<i>Quercus lobata</i>	7	5	Protected
46	Oregon Ash	<i>Fraxinus latifolia</i>	1.5	4	Protected
47	red willow	<i>Salix laevigata</i>	3	2	Protected
48	red willow	<i>Salix laevigata</i>	3	4	Protected
50	red willow	<i>Salix laevigata</i>	5, 3.5, 3	2	Protected
51	red willow	<i>Salix laevigata</i>	3.5	3	Protected
52	California Buckeye	<i>Aesculus californica</i>	1.5	4	Protected
54	red willow	<i>Salix laevigata</i>	3	3	Protected
55	California Buckeye	<i>Aesculus californica</i>	3.5	4	Protected
56	California Buckeye	<i>Aesculus californica</i>	3, 2.5, 2.5	4	Protected

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status
57	California Buckeye	<i>Aesculus californica</i>	5, 2.5	2	Protected
59	Toyon	<i>Heteromeles arbutifolia</i>	3, 1.5	4	Protected
68	California Buckeye	<i>Aesculus californica</i>	4	4	Protected
<b>Trees scheduled for pruning</b>					
30	California Buckeye	<i>Aesculus californica</i>	6, 6, 4	4	Protected
31	red willow	<i>Salix laevigata</i>	13.5, 10.5, 7.5	4	Protected
53	red willow	<i>Salix laevigata</i>	3	3	Protected
64	California Buckeye	<i>Aesculus californica</i>	10 stems 4-8"	4	Protected
72	Oregon Ash	<i>Fraxinus latifolia</i>	8, 8, 7, 6	4	Protected

## **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 and/or property fencing 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, and planting, shall be performed using industry standards as established by the International Society of Arboriculture. Contractors 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 and/or yellow ropes supported by posts 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 the 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 covered by mulch/plywood.
- Heavy equipment use should be limited around trees and roots. No equipment within the root zone may be transported or used on bare ground. A 3" 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.
- The project arborist shall oversee any trenching within 10 feet of any tree. Any trenching within the Non-intrusion zone (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 no unmitigated damage and 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 3/4/21; 10/14/21; 4/6/22; 5/17/23.
- Site plan and site survey provided by Steven J Lafranchi & Associates Inc.

Rating category	Condition components		
	Health	Structure	Form
Excellent <b>5</b>	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 <b>4</b>	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 <b>3</b>	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 <b>2</b>	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 <b>1</b>	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. Tree Condition Ratings Sourced from The Guide for Plant Appraisal, 10th Edition**

**Table 2. Tree 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 and protect with fencing.
7	Edible Fig	<i>Ficus carica</i>	10	5	Unprotected	Outside footprint of development.	Preserve and protect with fencing.
8	Coast Redwood	<i>Sequoia sempervirens</i>	37	5	Protected	Outside footprint of development.	Preserve and protect with fencing.

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
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 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.

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
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. The predominant tree species are: Willow ( <i>Salix spp.</i> ); Buckeye ( <i>Aesculus californica</i> ); Coast live oak ( <i>Quercus agrifolia</i> ); Toyon ( <i>Heteromeles arbutifolia</i> ). 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.
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.
20	Coast live oak	<i>Quercus agrifolia</i>	21.5	4	Protected		Preserve and protect. Consider building a pedestrian bridge on piers to span the root system of this tree and provide space for future growth.

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
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 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	Northern CA. walnut	<i>Juglans hindsii</i>	6	5	Protected		Remove tree.
34	Oregon Ash	<i>Fraxinus latifolia</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
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	1	Protected	Significant canopy dieback.	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. Retain fill soil at least three feet from the trunk of this tree.
44	red willow	<i>Salix laevigata</i>	17.5	2	Protected		Remove tree.
45	valley oak	<i>Quercus lobata</i>	7	5	Protected		Remove tree.
46	Oregon Ash	<i>Fraxinus latifolia</i>	1.5	4	Protected		Remove tree.
47	red willow	<i>Salix laevigata</i>	3	2	Protected	Heavy lean over creek bank. Poorly anchored on bank.	Remove tree.
48	red willow	<i>Salix laevigata</i>	3	4	Protected		Remove tree.

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
49	red willow	<i>Salix laevigata</i>	4	3	Protected	Strong lean away from bridge alignment.	Preserve and Protect.
50	red willow	<i>Salix laevigata</i>	5, 3.5, 3	2	Protected	Poor health. Major deadwood in the canopy.	Remove tree.
51	red willow	<i>Salix laevigata</i>	3.5	3	Protected	Poor form. Strong lean southeast away from bridge.	Remove tree.
52	California Buckeye	<i>Aesculus californica</i>	1.5	4	Protected		Remove tree.
53	red willow	<i>Salix laevigata</i>	3	3	Protected	Leggy form and lean toward the bridge alignment.	Preserve and protect. Prune to create clearance for bridge.
54	red willow	<i>Salix laevigata</i>	3	3	Protected	Lean northwest toward bridge alignment.	Remove tree.
55	California Buckeye	<i>Aesculus californica</i>	3.5	4	Protected	Lean away from the bridge. Suppressed and intertwined with adjacent trees.	Remove tree.
56	California Buckeye	<i>Aesculus californica</i>	3, 2.5, 2.5	4	Protected	Five stems total.	Remove tree.
57	California Buckeye	<i>Aesculus californica</i>	5, 2.5	2	Protected	Poor form. Large necrotic area on trunk.	Remove tree.
58	California Buckeye	<i>Aesculus californica</i>	2.5, 2.5, 1.5	4	Protected		Preserve and Protect.
59	Toyon	<i>Heteromeles arbutifolia</i>	3, 1.5	4	Protected	Growing through fence.	Remove tree.
<b>South Storm Drainage outfall</b>							
60	Coast live oak	<i>Quercus agrifolia</i>	2.5	4	Unprotected.	Outside of existing chainlink fence.	Preserve and Protect.



Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
61	Coast live oak	<i>Quercus agrifolia</i>	2	4	Protected		Preserve and Protect.
62	Coast live oak	<i>Quercus agrifolia</i>	2.5, 1	4	Unprotected.	Outside of existing chainlink fence.	Preserve and Protect.
63	California Buckeye	<i>Aesculus californica</i>	6	4	Protected	Trunk lean NW	Preserve and Protect.
64	California Buckeye	<i>Aesculus californica</i>	10 stems 4-8"	4	Protected	The tree is composed of approximately 10 stems all arising from ground level.	Preserve and Protect. Prune for drainage outfall clearance.
65	California Buckeye	<i>Aesculus californica</i>	6, 3	4	Protected	Trunk lean NE	Preserve and Protect.
66	California Buckeye	<i>Aesculus californica</i>	2	3	Protected	Trunk lean NE	Preserve and Protect.
67	California Buckeye	<i>Aesculus californica</i>	6, 3	4	Protected	Trunk lean NE	Preserve and Protect.
68	California Buckeye	<i>Aesculus californica</i>	4	4	Protected	In footprint of drainage outfall as shown on plans but could potentially be preserved.	Remove tree.
<b>Northern Storm Drainage Outfall/Pedestrian path trees</b>							
69	Coast live oak	<i>Quercus agrifolia</i>	4	4	Protected	Tree has been regularly sheared over its life and has taken on a shrub form. The tree stands near the proposed pedestrian path. At least four feet of clearance should be provided between the trunk and path.	Preserve and Protect.

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health & Structure (1-5)	Protected Status	Comments	Construction Status/Recom'd
70	Coast live oak	<i>Quercus agrifolia</i>	7	4	Protected	Tree has been regularly sheared over its life and has taken on a shrub form. The tree stands near the proposed pedestrian path. At least four feet of clearance should be provided between the trunk and path.	Preserve and Protect.
71	Fruiting pear	<i>Pyrus spp.</i>	3	2	Unprotected	The tree exhibits poor health as indicated by the number of dead branches in the canopy.	Remove tree.
72	Oregon Ash	<i>Fraxinus latifolia</i>	8, 8, 7, 6	4	Protected	The tree is on the stream bank outside the existing wire fence.	Preserve and Protect. Prune to raise the canopy for outfall construction clearance.

## TREE REPLACEMENT CALCULATIONS

### Tree Replacement Calculations (1:1 Mitigation Replacement Ratio with select 2:1 Mitigation)

Tree #	Common Name	Botanical Name	Trunk Diameter(s) (Inches)	Health Condition	Calculated Dbh	Mitigation Ratio	Number of Replacement Trees
24	Coast Live Oak	<i>Quercus agrifolia</i>	8.5, 7.5	5	12.3	1 to 1	6.1
25	Coast Live Oak	<i>Quercus agrifolia</i>	12.5	5	12.5	1 to 1	6.3
27	Valley Oak	<i>Quercus lobata</i>	6	5	6.0	1 to 1	3.0
29	Valley Oak	<i>Quercus lobata</i>	10	4	10.0	1 to 1	5.0
33	California Walnut	<i>Juglans hindsii</i>	6	5	6.0	1 to 1	3.0
34	Oregon Ash	<i>Fraxinus latifolia</i>	6	5	6.0	1 to 1	3.0
36	Red Willow	<i>Salix laevigata</i>	9.5	4	9.5	1 to 1	4.8
37	Red Willow	<i>Salix laevigata</i>	8	3	8.0	1 to 1	4.0
38	Red Willow	<i>Salix laevigata</i>	11	4	11.0	1 to 1	5.5
39	California Buckeye	<i>Aesculus californica</i>	6, 6, 5	4	11.5	1 to 1	5.8
*44	Red Willow	<i>Salix laevigata</i>	17.5	2	17.5	2 to 1	4.4
45	Valley Oak	<i>Quercus lobata</i>	7	5	7	1 to 1	3.5
46	Oregon Ash	<i>Fraxinus latifolia</i>	1.5	4	1.5	1 to 1	0.8
*47	Red Willow	<i>Salix laevigata</i>	3	2	3.0	2 to 1	0.8
48	Red Willow	<i>Salix laevigata</i>	3	4	3.0	1 to 1	1.5
*50	Red Willow	<i>Salix laevigata</i>	5, 3.5, 3	2	8.0	2 to 1	2.0
51	Red Willow	<i>Salix laevigata</i>	3.5	3	3.5	1 to 1	1.8
52	California Buckeye	<i>Aesculus californica</i>	1.5	4	1.5	1 to 1	0.8
54	Red Willow	<i>Salix laevigata</i>	3	3	3.0	1 to 1	1.5
55	California Buckeye	<i>Aesculus californica</i>	3.5	4	3.5	1 to 1	1.8
56	California Buckeye	<i>Aesculus californica</i>	3, 2.5, 2.5	4	5.0	1 to 1	2.5
*57	California Buckeye	<i>Aesculus californica</i>	5, 2.5	2	6.0	2 to 1	1.5
59	Toyon	<i>Heteromeles arbutifolia</i>	3, 1.5	4	4.0	1 to 1	2.0
68	California Buckeye	<i>Aesculus californica</i>	4	4	4.0	1 to 1	2.0

\* 2:1 Mitigation ratio used for trees with poor health condition

<b>Mitigation Requirements:</b>	<b>DBH (in) total required mitigation</b>	<b>163.3</b>	<b>Total Replacement Trees (Required)</b>	<b>73</b>
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**Proposed Replacement Breakdown by Species**

<b>Mitigated Tree Species (specie removed per plan)</b>	<b>Replacement Ratio</b>	<b>Required Replacement Tree Quantities</b>	<b>Replacement Tree Specie</b>
<i>Coast Live Oak</i>	1 to 1	12	<i>24" box Oak or CA Buckeye</i>
<i>Valley Oak</i>	1 to 1	12	<i>24" box Oak or CA Buckeye</i>
<i>Red Willow</i>	1 to 1	19	<i>2" diameter Red Willow stakes and/or 15 gal Western Red Bud</i>
<i>Red Willow</i>	2 to 1 (trees with a health score of 2)	7	<i>2" diameter Red Willow stakes and/or 15 gal Western Red Bud</i>
<i>Oregon Ash Trees</i>	1 to 1	4	<i>24" box Oak or CA Buckeye</i>
<i>California Buckeye</i>	1 to 1	13	<i>24" box Oak or CA Buckeye</i>
<i>California Buckeye</i>	2 to 1 (trees with health score of 2)	1	<i>24" box Oak or CA Buckeye</i>
<i>Northern CA Walnut</i>	1 to 1	3	<i>24" box Oak or CA Buckeye</i>
<i>Toyon</i>	1 to 1	2	<i>Proposed 15 gal Western Redbud Replacement Trees</i>

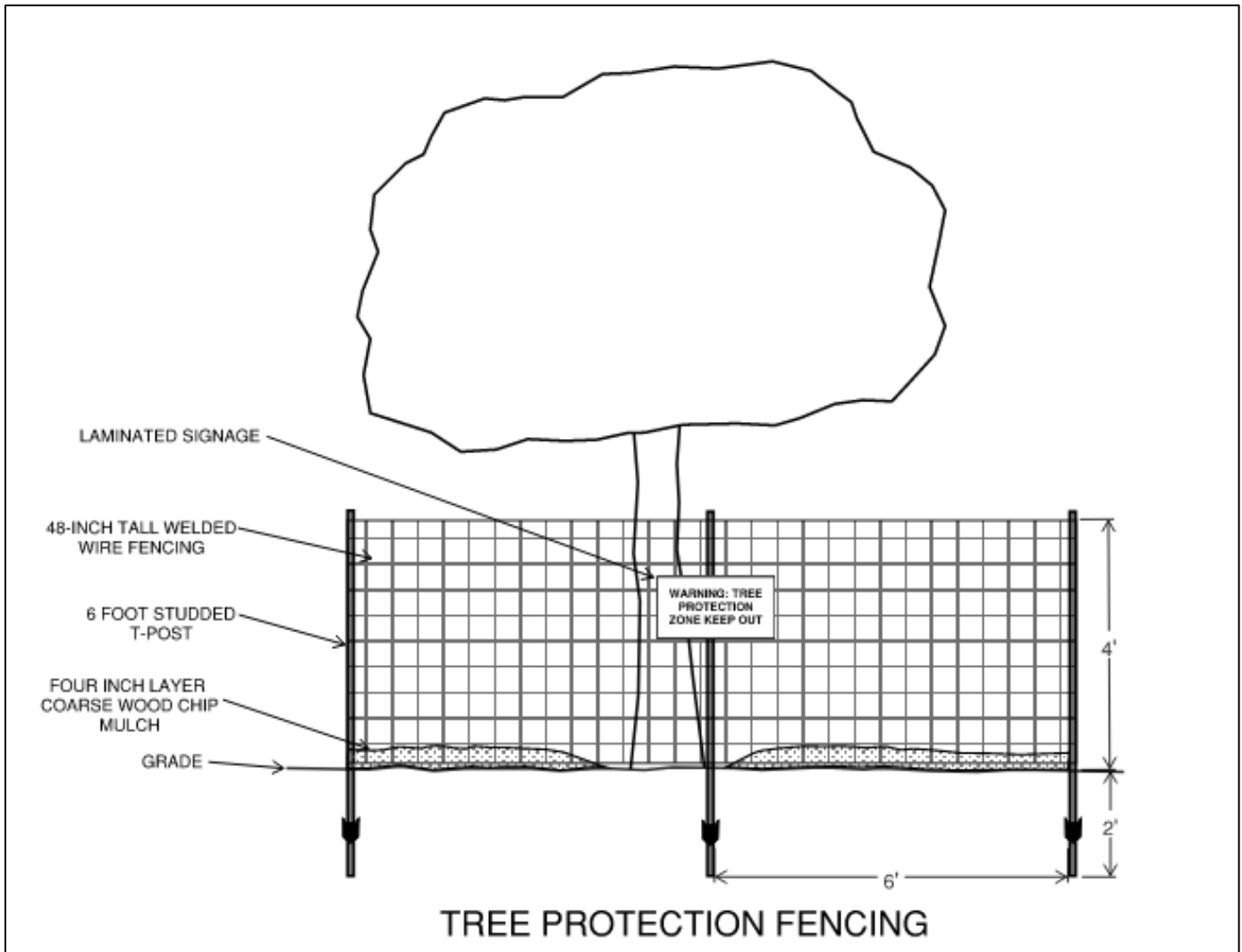
**Proposed Replacement Totals**

Proposed Replacement Trees Quantity	Proposed Replacement Tree Species/Sizes
45	<i>Proposed 24" box Oak or CA Buckeye Replacement Trees</i>
26	<i>2" diameter Red Willow stakes and/or 15 gal Western Red Bud</i>
2	<i>Proposed 15 gal Western Redbud Replacement Trees</i>
73	<b>Required Replacement Trees</b>
73	<b>Proposed Mitigation Trees</b>
0	<i>Remaining Replacement Trees Needed</i>

In Lieu fee Calcs		
24" box tree Qty	Approximate Price per Tree	Total In- Lieu Fees
0.0	\$750	<b>\$0</b>

## TREE PROTECTION FENCING

4-foot-tall wire deer fencing shall be used to create the **tree protection zones**, as shown on sheets L-5, L-5.1 & L-5.2. Fencing shall be supported with 6' metal t-stakes and installed 6-foot on center. Laminated signage shall be attached to the 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.



## **CEQA RESPONSES**

As the project arborist, I have reviewed and approved the following tree protection measures that SJLA and I developed to protect trees during the project.

### **Trees**

Expand the tree inventory with mitigation measures within Adobe Creek in conjunction with the proposed pedestrian bridge construction and storm drainage outfall locations. This process includes but is limited to:

1. A site inspection by Urban Forestry to identify and tag all trees (1 inch or greater) together with the canopy diameters within a 25-foot radius of the proposed bridge alignment and storm drainage outfall locations.
2. Survey the positions of all trees.
3. Prepare an updated tree inventory.
4. Identify trees to be saved, removed, or pruned.
5. Identify short-term (bridge construction) and long-term impacts on trees.
6. Provide updated mitigation measures (species, number, locations) with a replacement ratio basis.

### **Tree Survey and Assessment**

The project arborist and surveyor conducted a field visit where trees 1" and above were tagged within 25 radius of the bridge alignment. Surveyors mapped the trees on the plans, and the Arborist has updated their inventory to reflect the expanded area of impact. (See attached Arborist Tree Inventory by Urban Forestry). Existing tree canopies showing the edges of the tree canopy masses have been provided on our plans from recent field surveys on site, but individual tree canopies are not shown as the tree canopies overlap and are mostly irregular in form due to the densely crowded growth of the trees within the riparian area. See L-5 Tree Removal Preservation and Replacement Plan for the graphic exhibit showing existing tree dripline edges.

### **Tree Removal and Pruning**

The Project Arborist will be onsite during the bridge's construction to oversee potential impacts to the creek vegetation and direct construction away from sensitive/protected areas as much as possible. During the most recent field survey of the existing trees, the Project Arborist deemed specific trees to be removed due to the construction of the proposed bridge. These trees are within the footprint of the bridge or within 10' of the bridge itself where the impacts of the bridge construction would be too devastating. Trees outside of the 10' impact area are to be monitored during construction for Arborist guided selective, minimal pruning, as needed to allow for construction clearance if necessary. With the removal of the trees within the footprint of the bridge and within the 10' offset clear area. Tree canopies that would otherwise be conflicting with the bridge construction will also be reduced as a result of the tree removals. Ultimately, tree removal and pruning will be under the supervision of the project arborist during construction.

### **Tree Protection Mitigation for Short-Term Impacts**

Bridge construction will be done during the dry season, and incorporating some temporary irrigation will be strongly considered for the trees within 25' of the bridge alignment since there will be some new sun exposure to areas of the riparian corridor floor that have been otherwise shaded. Irrigation would remain through the dry season and the Project Arborist and biologist would monitor the trees to determine when the irrigation could be removed. Detailed within the arborist report, tree protection fencing will be required at the edge of the driplines or tree protection zones, significantly reducing potential impacts from construction. Other means of protecting trees from construction would include trunk protection of existing trees to reduce potential impacts from construction equipment. The project arborist will work together with the biologist to provide the least impactful tree protection measures within the riparian zone. This could be in the form of 2x4 lumber strapped to the trunks or the installation of yellow rope. Plywood laid out over the riparian floor would be considered where tree

protection zones/critical root zones exist and where equipment may be used, to help disperse weight of equipment and reduce soil erosion and root compaction. Areas where soil is exposed may also receive 3" deep of arbor mulch to help retain moisture and to mitigate against soil compaction within the tree

protection zone. The contractor will have to use the least impactful method of excavation if in close proximity to existing tree roots. If construction creates a lot of dust on existing vegetation, it will be recommended that the contractor wash down vegetation that has thick layers of dust.

### **Tree Mitigation and Replacement**

Mitigation for the trees removed within the area will conform to the City of Petaluma Tree Preservation Ordinance (Chapter 17 IZO). The mitigation ratio for healthy trees will be at a 1:1 ratio and trees with poor health scores of 2 or less will be replaced at 2:1. The intent of the Mitigation will be to replace the removed trees with an in-kind native species. Willows to be removed will either be replaced with another willow or Western Redbud. Replacement of the red willows will prioritize Mitigation within the riparian corridor, adjacent to the site if there is adequate room. Willows grow within the creek and the intent will be to provide 1-2" willow stakes where possible within the riparian corridor, using branches from existing willows. If space runs out, the remaining will be Mitigation of the willows using the Western Redbuds on the upland portion of the site, adjacent to the creek. All other trees to be mitigated will be replaced, using native oaks and California Buckeye within the upland areas adjacent to the creek.

### **Inspection of Protection and Preservation Measures (High-Level Action Plan)**

Prior to the mobilization of construction, the Arborist will meet with the contractor to review tree protection/preservation measures, designate tree removals, delineate the location of tree protection/non-intrusion zone fencing, specify equipment access routes and materials storage areas, and review the existing condition of trees to provide any additional necessary recommendations. After installation of the NIZ fencing, the Arborist will inspect for adequate installation of tree protection measures review any contractor request for access, soil disturbance or excavation areas within root zones of protected trees. Assess any changes in the health of trees since the last inspection.

During excavation/construction activities near the trees, an arborist will inspect activity within the non-intrusion zones of the preserved trees and any recommendations implemented. Assess any changes in the health of trees since the last inspection.

At the final inspection, the Arborist will inspect tree health and make any necessary recommendations.



