



California Tree and Landscape Consulting, Inc.

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November 30, 2023

Mila Muraff

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Via Email: milamuraff@gmail.com

PRE-DEVELOPMENT ARBORIST REPORT & TREE PROTECTION PLAN

RE: 116 Lost Oak Court, APN #456-160-023-000; City of Roseville Jurisdiction

Executive Summary:

Mila Muraff, on behalf of the property owner, contacted California Tree and Landscape Consulting, Inc. to inventory and evaluate the protected trees on the site or within 25' of development for purposes of evaluating the impacts to the trees from development¹. The property is within the jurisdiction of the City of Roseville. See Supporting Information Appendix A –Tree Location Map.

Tyler Thomson, ISA Certified Arborist #WE-12751A visited the site on September 5, 2023. A total of 13 trees were evaluated on this property, and 3 trees on the neighboring parcel, 108 Lost Oak Court, were noted. All trees evaluated are blue oaks, 15 of which are protected.

The development plans propose removal of 9 protected trees on the property. 3 of the trees proposed for removal, #37, 38, and 39, were included in several plan renditions to try to develop around them. Inadequate root and canopy protection prevented their retention and they are included as removals within this report. There are 3 offsite trees on the neighboring property in close proximity to the east property boundary and the proposed structure. All three of these trees were substantially impacted by the development of the house on the neighboring property. It is expected that these new impacts to these trees will cause additional decline and sufficient care during the construction process is recommended. See Recommendations and Tree Protection Plan.

Tree Species	Trees Inventoried	Trees located on the Parcel ²	Protected by Code	Proposed for Removal	Trees impacted by the proposed development and requiring special protection measures
Blue oak, <i>Quercus douglasii</i>	16	13	15	9	6
Total	16	13	15	9	6

See Appendices for specific information on each tree and preservation requirements and/or restrictions

¹ Development plans by AY Engineering, Inc. dated November 20, 2023.

² CalTLC is not a licensed land surveyor. Tree ownership was not determined. Conclusions within this report are based on existing fences or other landmarks which may not represent the actual property boundary.

METHODS

Appendix 2 in this report is the detailed inventory and recommendations for the trees. The following terms and Table A – Ratings Description will further explain our findings.

A Level 2 – Basic Visual Assessment was performed in accordance with the International Society of Arboriculture’s best management practices. This assessment level is limited to the observation of conditions and defects which are readily visible. Additional limiting factors, such as blackberries, poison oak, and/or debris piled at the base of a tree can inhibit the visual assessment.

Tree Location: The GPS location of each tree was collected using the ESRI’s ArcGIS collector application on an Apple iPhone or Samsung. The data was then processed in ESRI’s ArcMap to produce the tree location map.

Tree Measurements: DBH (diameter breast high) is normally measured at 4’6” (above the average ground height for “Urban Forestry”), but if that varies then the location where it is measured is noted. A Swedish caliper was used to measure the DBH for trees less than 23” in diameter and a steel diameter tape for trees greater than 23”. A Stanley laser distance meter was used to measure distances. Canopy radius measurements may also have been estimated due to obstructions.

Terms

Field Tag #	The pre-stamped tree number on the tag which is installed at approximately 6 feet above ground level on the north side of the tree.
City Tag #	The number listed on the City of Sacramento tree inventory in the ARC GIS system found online at: saccity.maps.arcgis.com
Species	The species of a tree is listed by our local and correct common name and botanical name by genus (capitalized) and species (lower case). Oaks frequently cross-pollinate and hybridize, but the identification is towards the strongest characteristics.
DBH	Diameter breast high' is normally measured at 4’6” (above the average ground height for “Urban Forestry”), but if that varies then the location where it is measured is noted in the next column “measured at”
Canopy radius and Protection Zone Area	The farthest extent of the crown composed of leaves and small twigs. Most trees are not evenly balanced. This measurement represents the longest extension from the trunk to the outer canopy. The dripline measurement is from the center point of the tree and is shown on the Tree Location Map as a circle. This measurement further defines the radius of the protection zone to be specified on any development plans unless otherwise indicated in the arborist recommendations, Appendix 2.
Critical Root Zone	The radius of the critical root zone is a circle equal to the trunk diameter inches converted to feet and factored by tree age, condition and health pursuant to the industry standard. Best Management Practices: Managing Trees During Construction, the companion publication to the Approved American National Standard, provides guidance regarding minimum tree root protection zones for long term survival. In instances where a tree is multi-stemmed the protected root zone is equal to the extrapolated diameter (sum of the area of each stem converted to a single stem) factored by tree age, condition and health.
Arborist Rating	Subjective to condition and is based on both the health and structure of the tree. All of the trees were rated for condition, per the recognized national standard as set up by the Council of Tree and Landscape Appraisers and the International Society of Arboriculture (ISA) on a numeric scale of 5 (being the highest) to 0 (the worst condition, dead) as in Chart A. The rating was done in the field at the time of the measuring and inspection.

No problem(s)	Excellent	5	No problems found from a visual ground inspection. Structurally, these trees have properly spaced branches and near perfect
No apparent problem(s)	Good or Fair to Good	4	The tree is in good condition and there are no apparent problems that a Certified Arborist can see from a visual ground inspection. If potential structural or health problems are tended to at this stage future hazard can be reduced and more serious health problems can be averted.
Minor problem(s)	Fair	3	The tree is in fair condition. There are some minor structural or health problems that pose no immediate danger. When the recommended actions in an arborist report are completed correctly the defect(s) can be minimized or eliminated and/or health can be improved.
Major or uncorrectable problems (2)	Fair to Poor	2	The tree has major problems. If the option is taken to preserve the tree, additional evaluation to identify if health or structure can be improved with correct arboricultural work including, but not limited to: pruning, cabling, bracing, bolting, guying, spraying, mistletoe removal, vertical mulching, fertilization, etc. Additionally, risk should be evaluated as a tree rated 2 may have structural conditions which indicate there is a high likelihood of some type of failure. Tree rated 2 should be removed if these additional evaluations will not be performed.
Extreme problem(s)	Poor	1	The problems are extreme. This rating is assigned to a tree that has structural and/or health problems that no amount of work or effort can change. The issues may or may not be considered a dangerous situation.
Dead	Dead	0	This indicates the tree has no significant sign of life.

Notes: Provide notable details about each tree which are factors considered in the determination of the tree rating including: (a) condition of root crown and/or roots; (b) condition of trunk; (c) condition of limbs and structure; (d) growth history and twig condition; (e) leaf appearance; and (f) dripline environment. Notes also indicate if the standard tree evaluation procedure was not followed (for example - why dbh may have been measured at a location other than the standard 54"). Additionally, notes will list any evaluation limiting factors such as debris at the base of a tree.

Development Restrictions/Actions Recommended actions to increase health and longevity.

Development Impacts Projected development impacts are based solely on distance relationships between tree location and grading. Field inspections and findings during the project at the time of grading and trenching can change relative impacts. Closely followed guidelines and requirements can result in a higher chance of survival, while requirements that are overlooked can result in a dramatically lower chance of survival. Impacts are measured as follows:

Impact Term:	Long Term Result of Impact:
Negligible	Tree is unlikely to show any symptoms. Chance of survival post development is excellent. Impacts to the Protected Root Zone are less than 5%.

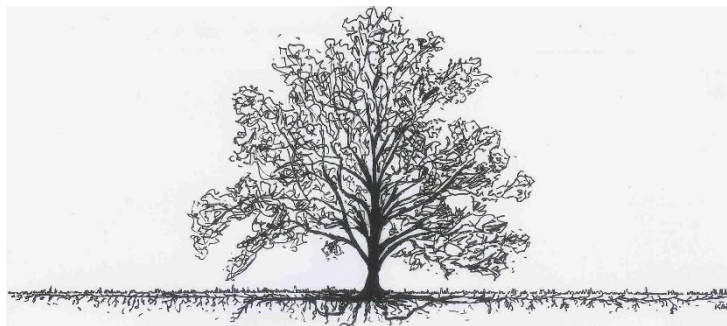
Minor	Tree is likely to show minor symptoms. Chance of survival post development is good. Impacts to the Protected Root Zone are less than 15% and species tolerance is good.
Moderate	Tree is likely to show moderate symptoms. Chance of survival post development is fair. Impacts to the Protected Root Zone are less than 35% and species tolerance is good or moderate.
Severe	Tree is likely to show moderate symptoms annually and a pattern of decline. Chance of long term survival post development is low. Impacts to the Protected Root Zone are up to 50% and species tolerance is moderate to poor.
Critical	Tree is likely to show moderate to severe symptoms annually and a pattern of decline. Chance of long term survival post development is negligible. Impacts to the Protected Root Zone are up to 80%.

Discussion

Trees need to be protected from normal construction practices if they are to remain healthy and viable on the site. Our recommendations are based on experience and the City ordinance requirements to enhance tree longevity. This requires their root zones remain intact and viable despite the use of heavy equipment to install foundations, driveways, underground utilities, and landscape irrigation systems. Simply walking and driving on soil can have serious consequences for tree health. Tree Protection measures should be incorporated into the site plans in order to protect the trees.

Root Structure

The majority of a tree's roots are contained in a radius from the main trunk outward approximately two to three times the canopy of the tree. These roots are located in the top 6" to 3' of soil. It is a common misconception that a tree underground resembles the canopy. The correct root structure of a tree is in the drawing below. All plants' roots need both water and air for survival. Poor canopy development or canopy decline in mature trees after development is often the result of inadequate root space and/or soil compaction.



The reality of where roots are generally located

Our native oak trees are easily damaged or killed by having the soil within the Protected Root Zone (PRZ) disturbed or compacted. All of the work initially performed around protected trees that will be saved should be done by people rather than by wheeled or track type tractors. Oaks are fragile giants that can take little change in soil grade, compaction, or warm season watering. Don't be fooled into believing that warm season watering has no adverse effects on native oaks. Decline and eventual death can take as long as 5-20 years with poor care and inappropriate watering. Oaks can live hundreds of years if treated properly during construction, as well as later with proper pruning, and the appropriate landscape/irrigation design.

Arborist Classifications

Arboriculture is a broad industry and there are different types of Arborists with different qualifications.

Tree Removal and/or Pruning Companies. These companies may be licensed by the State of California to do business, but they do not necessarily know any of the science of tree growth and response to pruning or root impacts.

Arborists. Arborist is a broad term. It is intended to mean someone with specialized knowledge of trees.

ISA Certified Arborist: An International Society of Arboriculture Certified Arborist is someone who has been trained and tested to have specialized knowledge of trees. You can look up certified arborists at the International Society of Arboriculture website: isa-arbor.org.

Consulting Arborist: An American Society of Consulting Arborists Registered Consulting Arborist is someone who has been trained and tested to have specialized knowledge of trees and trained and tested to provide high quality reports and documentation. You can look up registered consulting arborists at the American Society of Consulting Arborists website: <https://www.asca-consultants.org/>

The **project arborist** for your development project is a consulting arborist with experience in interpretation of the County ordinances and requirements, preparation of Tree Protection Plans, onsite supervision of mechanical equipment during grading near trees, and communications with the County regarding tree preservation issues. The project arborist is responsible for notification to the County of the anticipated impacts to the individual trees and woodlands, as well as, verification of the actual impacts at the end of the project. The project arborist will provide an unbiased professional opinion as to the likelihood of survival of the trees retained during development.

RECOMMENDATIONS: Summary of Tree Protection Measures for Site Planning

The Owner and/or Developer should ensure the project arborist's protection measures are incorporated into the site plans and followed. Tree specific protection measures can be found in Appendix 2 – Tree Information Data.

- **The stumps of the trees to be removed that are within the root zone of the any protected trees to remain on the site (#42) shall be removed using a backhoe or other piece of grading equipment only with supervision by the project arborist.** Roots from the other nearby trees may have intertwined and will be required to be severed and cut clean during the removal process. Pulling on the stumps with equipment will likely result in the lifting of the asphalt in the parking areas on the adjacent parcels.
- Clearance pruning should include removal of all the lower foliage that may interfere with equipment PRIOR to having grading or other equipment on site or in the access path. The Project Arborist should approve the extent of foliage elevation and oversee the pruning to be performed by a contractor who is an ISA Certified Arborist. Clearance pruning on the neighbors trees, #101, 102, and 103, if required, shall be approved by the tree owner.
- Keep all construction activities within the designated areas. Protection fencing shall not be relocated to accommodate development activities. Clearly designate an area on the site outside the drip line of all trees on the adjacent parcels where construction materials may be stored and parking can take place. No materials or parking shall take place within the root zones of trees to be retained.
- An access path shall be established under the project arborists supervision along the east side of the proposed structure to protect against soil compaction in the root zone of the offsite trees.
- Any and all trenching inside the root protection zone of trees to remain on the site, or the offsite trees 101, 102, and 103, shall be directly supervised by the project arborist. A hydraulic or air spade may be required for digging and placement of pipes underneath the roots, or boring of deeper trenches underneath the roots.
- Follow all of the General Development Guidelines, Appendix 3, for all trees not identified as requiring special preservation measures. See the Tree Removal and Protection plan, Appendix 1, for additional information.
- Monthly monitoring of the retained trees and the offsite trees by the project arborist is recommended.

Report Prepared by:



Caroline Nicholas
Arborist Assistant

Project Arborist:



Nicole Harrison
ISA Certified Arborist #WC-6500AM, TRAQ
ASCA Registered Consulting Arborist #719

Appendix 1 – Tree Removal and Protection Plan

Appendix 2 – Tree Data

Appendix 3 – General Development Guidelines

Appendix 4 – Site Photographs

Bibliography

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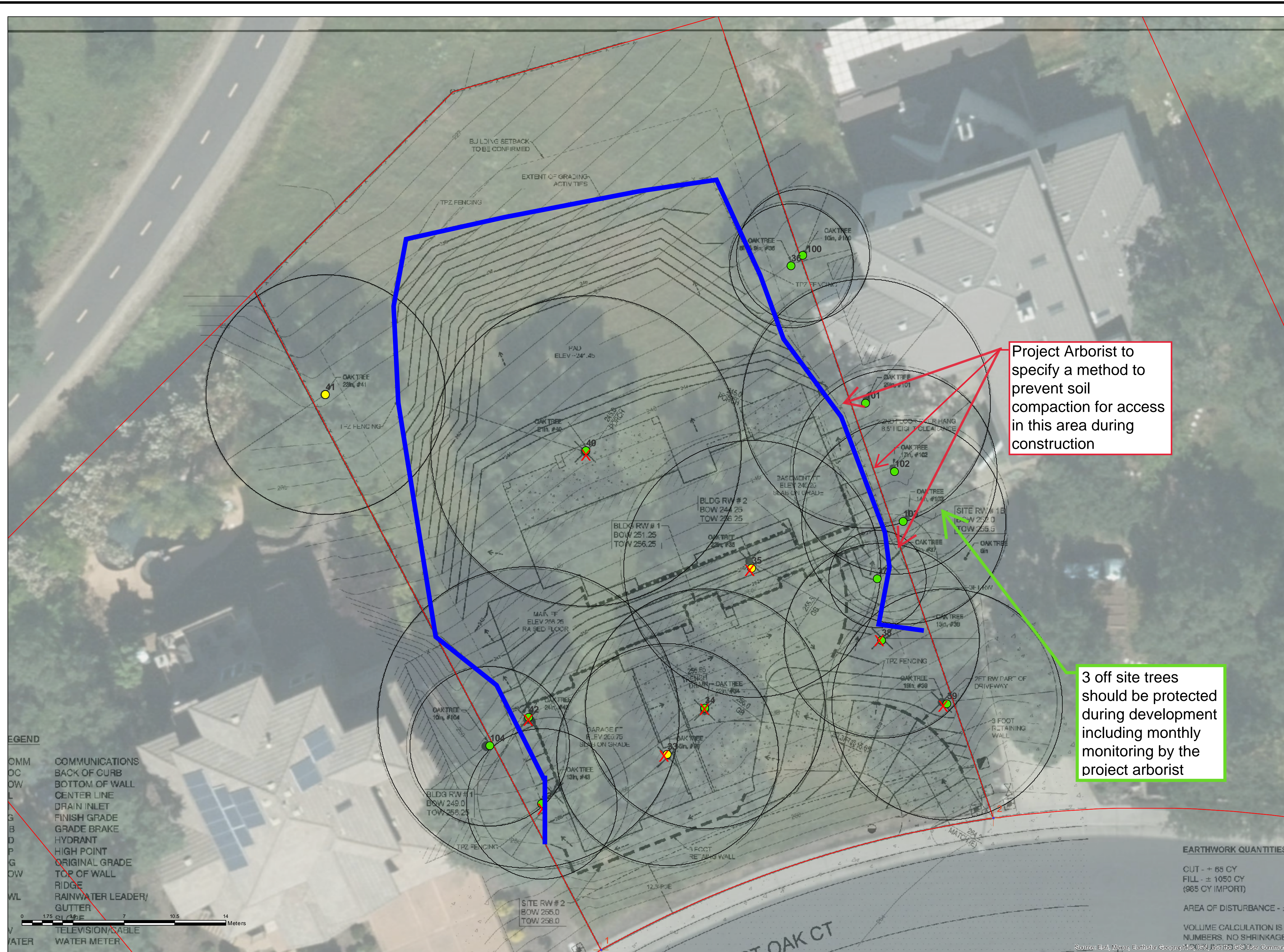


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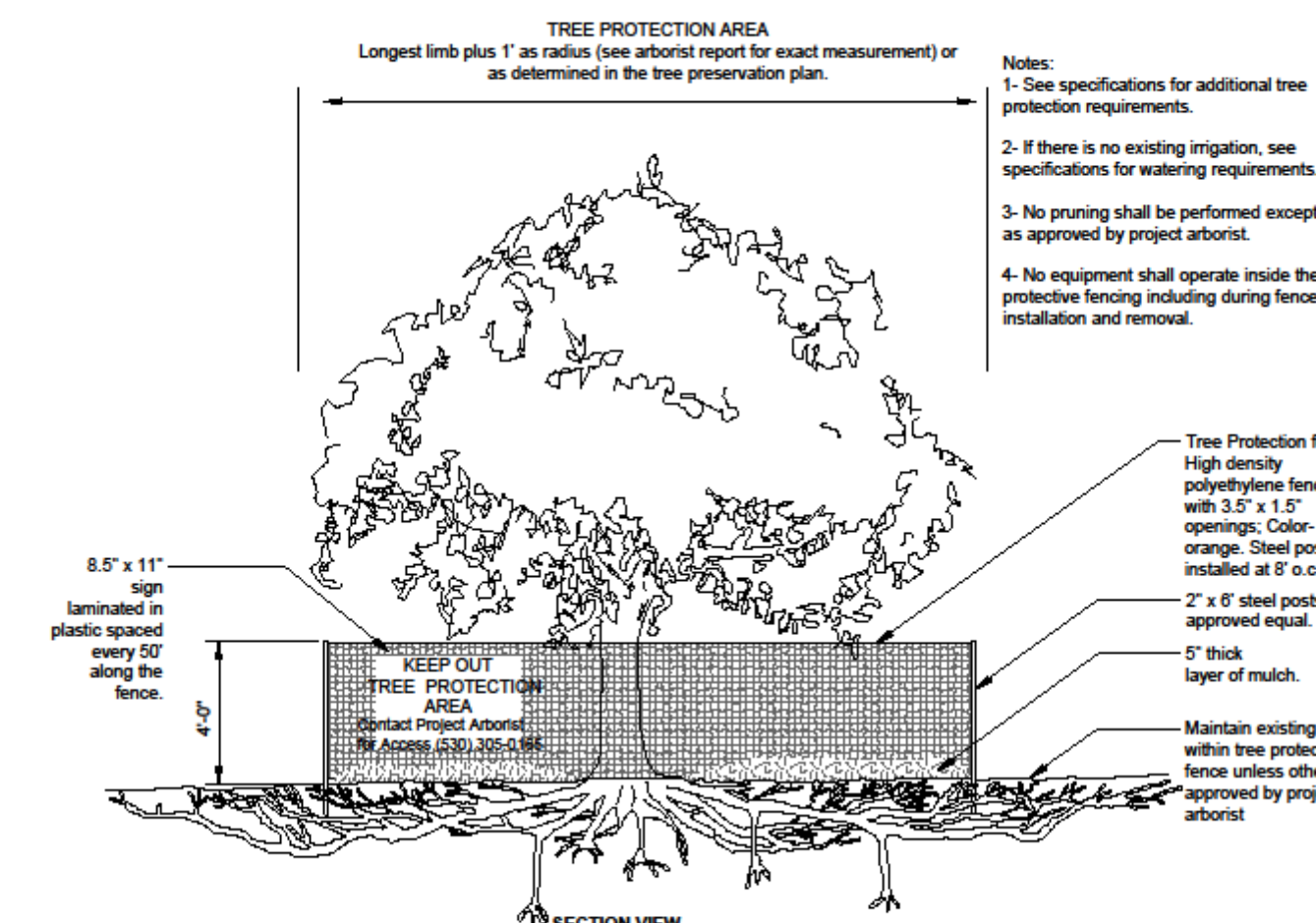
TREE PROTECTION GENERAL REQUIREMENTS

1. The project arborist for this project is California Tree & Landscape Consulting. The primary contact information is Nicole Harrison (530) 305-0165. The project arborist may continue to provide expertise and make additional recommendations during the construction process if and when additional impacts occur or tree response is poor. Monitoring and construction oversight by the project arborist is recommended for all projects and required when a final letter of assessment is required by the jurisdiction.
2. The project arborist should inspect the exclusionary root protection fencing installed by the contractors prior to any grading and/or grubbing for compliance with the recommended protection zones. Additionally, the project arborist shall inspect the fencing at the onset of each phase of construction. The root protection zone for trees is specified as the 'canopy radius' in Appendix 2 in the arborist report unless otherwise specified by the arborist. Note 'dripline' is not an acceptable location for installation of tree protection fencing.
3. The project arborist should directly supervise any clearance pruning, irrigation, fertilization, placement of mulch and/or chemical treatments. If clearance pruning is required, the Project Arborist should approve the extent of foliage elevation and oversee the pruning to be performed by a contractor who is an ISA Certified Arborist. Clearance pruning should include removal of all the lower foliage that may interfere with equipment PRIOR to having grading or other equipment on site.
4. No trunk within the root protection zone of any trees shall be removed using a backhoe or other piece of grading equipment.
5. Clearly designate an area on the site that is outside of the protection area of all trees where construction materials may be stored, and parking can take place. No materials or parking shall take place within the protection zones of any trees on or off the site.
6. Any and all work to be performed inside the protected root zone fencing, including all grading and utility trenching, shall be approved and/or supervised by the project arborist.
7. Trenching, if required, inside the protected root zone shall be approved and/or supervised by the project arborist and may be required to be performed by hand, by a hydraulic or air spade, or other method which will place pipes underneath the roots without damage to the roots.
8. The root protection zone for trees is specified as the 'canopy radius' in Appendix 2 in the arborist report unless otherwise specified by the arborist. Note 'dripline' is not an acceptable location for installation of tree protection fencing.



Project Arborist to specify a method to prevent soil compaction for access in this area during construction

3 off site trees should be protected during development including monthly monitoring by the project arborist



TX TREE PROTECTION

TREE REMOVAL AND PROTECTION PLAN

>Tree locations are approximate and were collected using apple ISO products.
>Property line information was downloaded from Sacramento County on 09/15/2023.
>Development plans provided by AY Engineering, Inc. dated 11/21/2023.

Symbol	Property Line	Arborist Rating
Red line	Property Line	0 Dead
Black circle	Measured Tree Canopy	1 Extreme Structure or Health Problems
Blue line	Tree Protection Fencing	2 Major Structure or Health Problems
Yellow circle		3 Fair - Minor Problems
Green circle		4 Good - No Apparent Problems
Blue circle		5 Excellent

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Sheet No.
TPP 1.0

116 Lost Oak Court

Prepared For: Mila Muraff

Prepared by: Nicole Harrison, ISA Cert #WE-6500AM

Date: 11/30/2023

APPENDIX 2 – TREE DATA

Tag #	Old Tag #	Protected By Code	Off-site	Species Common Name	Species Botanical Name	DBH (in.)	DBH Multi Stem (in.)	Measured At (in.)	Canopy Radius (ft.)	Arborist Rating	Development Status	Notes
33	2612	Yes		Blue oak	<i>Quercus douglasii</i>	15		54	25	2-Major Structure or health problems	Proposed removal	fair base. 12 inch lateral to ground east. severely unbalanced top east. poor overall structure. healthy foliage.
34	2611	Yes		Blue oak	<i>Quercus douglasii</i>	22		54	27	3-Minor Problems	Proposed removal	good base, structure and vigor. codominant at 11 and 15 feet.
35	2608	Yes		Blue oak	<i>Quercus douglasii</i>	22		54	29	2-Major Structure or health problems	Proposed removal	fair base. swollen/unbalanced codominant union at 8 feet, open cavities west. moderate amount of dead medium sized stubs on stems. bark canker throughout tree, crumbling bark. overextended large lateral branch south. fair/low vigor.
36	2094	Yes		Blue oak	<i>Quercus douglasii</i>	17	9, 8	54	14	3-Minor Problems	Impacted - Reduce Grading Area to less than 25%	fair base. codominant at 1 foot. minor/moderate small branch die-back. slightly sparse foliage. fair overall structure and vigor.
37		No		Blue oak	<i>Quercus douglasii</i>	5		54	11	3-Minor Problems	Proposed removal	fair base, structure and vigor. moderately unbalanced canopy branches south.
38		Yes		Blue oak	<i>Quercus douglasii</i>	13		54	22	3-Minor Problems	Proposed removal	good base, structure and vigor. codominant at 6 feet. leans slightly east.
39		Yes		Blue oak	<i>Quercus douglasii</i>	19		40	26	3-Minor Problems	Proposed removal	good base. open cavity north with rams horn shaped wound wood response growth around entrance. low canopy south. well balanced crown. fair vigor.
40	2616	Yes		Blue oak	<i>Quercus douglasii</i>	21		36	35	3-Minor Problems	Proposed removal	good base. fair structure, long/low lateral limbs, broad canopy. healthy foliage. good vigor.
41		Yes		Blue oak	<i>Quercus douglasii</i>	23		36	27	2-Major Structure or health problems	Impacted - Reduce Grading Area to less than 25%	slightly swollen base with 20% dead bark, staining, and bark canker. bark canker and defects throughout tree. moderate branch die-back in upper canopy. fair/low vigor. old tag absorbed into trunk.
42	2615	Yes		Blue oak	<i>Quercus douglasii</i>	24		54	34	3-Minor Problems	Proposed removal	good base, structure and vigor.

Tag #	Old Tag #	Protected By Code	Off-site	Species Common Name	Species Botanical Name	DBH (in.)	DBH Multi Stem (in.)	Measured At (in.)	Canopy Radius (ft.)	Arborist Rating	Development Status	Notes
43		Yes		Blue oak	<i>Quercus douglasii</i>	13		54	17	3-Minor Problems	Proposed removal	fair base, structure and vigor. one sided southwest.
100		Yes	Yes	Blue oak	<i>Quercus douglasii</i>	10		54	15	3-Minor Problems	Impacted - Reduce Grading Area to less than 25%	fair base, structure and vigor. base roughly 3 feet from property line. canopy branches overlap property line by roughly 2 feet.
101	5095	Yes		Blue oak	<i>Quercus douglasii</i>	29		18	28	3-Minor Problems	<3' to proposed grade. Need minimum of 7' at closest, 10' for the rest.	good base, roughly 2 feet east of property line. codominant at 4 feet. good structure and vigor. canopy overlaps property line by roughly 25 feet.
102	5096	Yes	Yes	Blue oak	<i>Quercus douglasii</i>	17		54	23	3-Minor Problems	8' to edge of proposed grade at 5' from structure. All 8' must be protected.	good base, roughly 4 feet east of property line. codominant at 4 feet. fair structure and vigor. canopy overlaps property line by roughly 15 feet.
103	5097	Yes	Yes	Blue oak	<i>Quercus douglasii</i>	14		54	23	3-Minor Problems	7' to edge of proposed grade. Continue protection around tree #37.	good base, roughly 4 feet east of property line. codominant at 4 feet. fair structure and vigor. canopy overlaps property line by roughly 18 feet.
104		Yes		Blue oak	<i>Quercus douglasii</i>	10		54	18	3-Minor Problems	Ok	fair base. small branch die-back on trunk. moderately unbalanced canopy top. healthy foliage. minor visible bark defects.

APPENDIX 3 – GENERAL PRACTICES FOR TREE PROTECTION

Definitions

Root zone: The roots of trees grow fairly close to the surface of the soil, and spread out in a radial direction from the trunk of tree. A general rule of thumb is that they spread 2 to 3 times the radius of the canopy, or 1 to 1 ½ times the height of the tree. It is generally accepted that disturbance to root zones should be kept as far as possible from the trunk of a tree.

Inner Bark: The bark on large valley oaks and coast live oaks is quite thick, usually 1” to 2”. If the bark is knocked off a tree, the inner bark, or cambial region, is exposed or removed. The cambial zone is the area of tissue responsible for adding new layers to the tree each year, so by removing it, the tree can only grow new tissue from the edges of the wound. In addition, the wood of the tree is exposed to decay fungi, so the trunk present at the time of the injury becomes susceptible to decay. Tree protection measures require that no activities occur which can knock the bark off the trees.

Methods Used in Tree Protection:

No matter how detailed Tree Protection Measures are in the initial Arborist Report, they will not accomplish their stated purpose unless they are applied to individual trees and a Project Arborist is hired to oversee the construction. The Project Arborist should have the ability to enforce the Protection Measures. The Project Arborist should be hired as soon as possible to assist in design and to become familiar with the project. He must be able to read and understand the project drawings and interpret the specifications. He should also have the ability to cooperate with the contractor, incorporating the contractor’s ideas on how to accomplish the protection measures, wherever possible. It is advisable for the Project Arborist to be present at the Pre-Bid tour of the site, to answer questions the contractors may have about Tree Protection Measures. This also lets the contractors know how important tree preservation is to the developer.

Root Protection Zone (RPZ): Since in most construction projects it is not possible to protect the entire root zone of a tree, a Root Protection Zone is established for each tree to be preserved. The minimum Root Protection Zone is the area underneath the tree’s canopy (out to the dripline, or edge of the canopy), plus 10’. The Project Arborist must approve work within the RPZ.

Irrigate, Fertilize, Mulch: Prior to grading on the site near any tree, the area within the Tree Protection fence should be fertilized with 4 pounds of nitrogen per 1000 square feet, and the fertilizer irrigated in. The irrigation should percolate at least 24 inches into the soil. This should be done no less than 2 weeks prior to grading or other root disturbing activities. After irrigating, cover the RPZ with at least 12” of leaf and twig mulch. Such mulch can be obtained from chipping or grinding the limbs of any trees removed on the site. Acceptable mulches can be obtained from nurseries or other commercial sources. Fibrous or shredded redwood or cedar bark mulch shall not be used anywhere on site.

Fence: Fence around the Root Protection Zone and restrict activity therein to prevent soil compaction by vehicles, foot traffic or material storage. The fenced area shall be off limits to all construction equipment, unless there is express written notification provided by the Project Arborist, and impacts are discussed and mitigated prior to work commencing.

No storage or cleaning of equipment or materials, or parking of any equipment can take place within the fenced off area, known as the RPZ.

The fence should be highly visible, and stout enough to keep vehicles and other equipment out. I recommend the fence be made of orange plastic protective fencing, kept in place by t-posts set no farther apart than 6’.

In areas of intense impact, a 6’ chain link fence is preferred.

In areas with many trees, the RPZ can be fenced as one unit, rather than separately for each tree.

Where tree trunks are within 3’ of the construction area, place 2” by 4” boards vertically against the tree trunks, even if fenced off. Hold the boards in place with wire. Do not nail them directly to the tree. The purpose of the boards is to protect the trunk, should any equipment stray into the RPZ.

Elevate Foliage: Where indicated, remove lower foliage from a tree to prevent limb breakage by equipment. Low foliage can usually be removed without harming the tree, unless more than 25% of the foliage is removed. Branches need to be removed at the anatomically correct location in order to prevent decay organisms from entering the trunk. For this reason, a contractor who is an ISA Certified Arborist should perform all pruning on protected trees.³

Expose and Cut Roots: Breaking roots with a backhoe, or crushing them with a grader, causes significant injury, which may subject the roots to decay. Ripping roots may cause them to splinter toward the base of the tree, creating much more injury than a clean cut would make. At any location where the root zone of a tree will be impacted by a trench or a cut (including a cut required for a fill and compaction), the roots shall be exposed with either a backhoe digging radially to the trunk, by hand digging, or by a hydraulic air spade, and then cut cleanly with a sharp instrument, such as chainsaw with a carbide chain. Once the roots are severed, the area behind the cut should be moistened and mulched. A root protection fence should also be erected to protect the remaining roots, if it is not already in place. Further grading or backhoe work required outside the established RPZ can then continue without further protection measures.

Protect Roots in Deeper Trenches: The location of utilities on the site can be very detrimental to trees. Design the project to use as few trenches as possible, and to keep them away from the major trees to be protected. Wherever possible, in areas where trenches will be very deep, consider boring under the roots of the trees, rather than digging the trench through the roots. This technique can be quite useful for utility trenches and pipelines.

Protect Roots in Small Trenches: After all construction is complete on a site, it is not unusual for the landscape contractor to come in and sever a large number of “preserved” roots during the installation of irrigation systems. The Project Arborist must therefore approve the landscape and irrigation plans. The irrigation system needs to be designed so the main lines are located outside the root zone of major trees, and the secondary lines are either laid on the surface (drip systems), or carefully dug with a hydraulic or air spade, and the flexible pipe fed underneath the major roots.

Design the irrigation system so it can slowly apply water (no more than ¼” to ½” of water per hour) over a longer period of time. This allows deep soaking of root zones. The system also needs to accommodate infrequent irrigation settings of once or twice a month, rather than several times a week.

Monitoring Tree Health During and After Construction: The Project Arborist should visit the site at least twice a month during construction to be certain the tree protection measures are being followed, to monitor the

³ International Society of Arboriculture (ISA), maintains a program of Certifying individuals. Each Certified Arborist has a number and must maintain continuing education credits to remain Certified.

health of impacted trees, and make recommendations as to irrigation or other needs. After construction is complete, the arborist should monitor the site monthly for one year and make recommendations for care where needed. If longer term monitoring is required, the arborist should report this to the developer and the planning agency overseeing the project.

APPENDIX 4 – SITE PHOTOGRAPHS by Tyler Thomson, September 5, 2023



Photo #1, Shows a general overview of the site

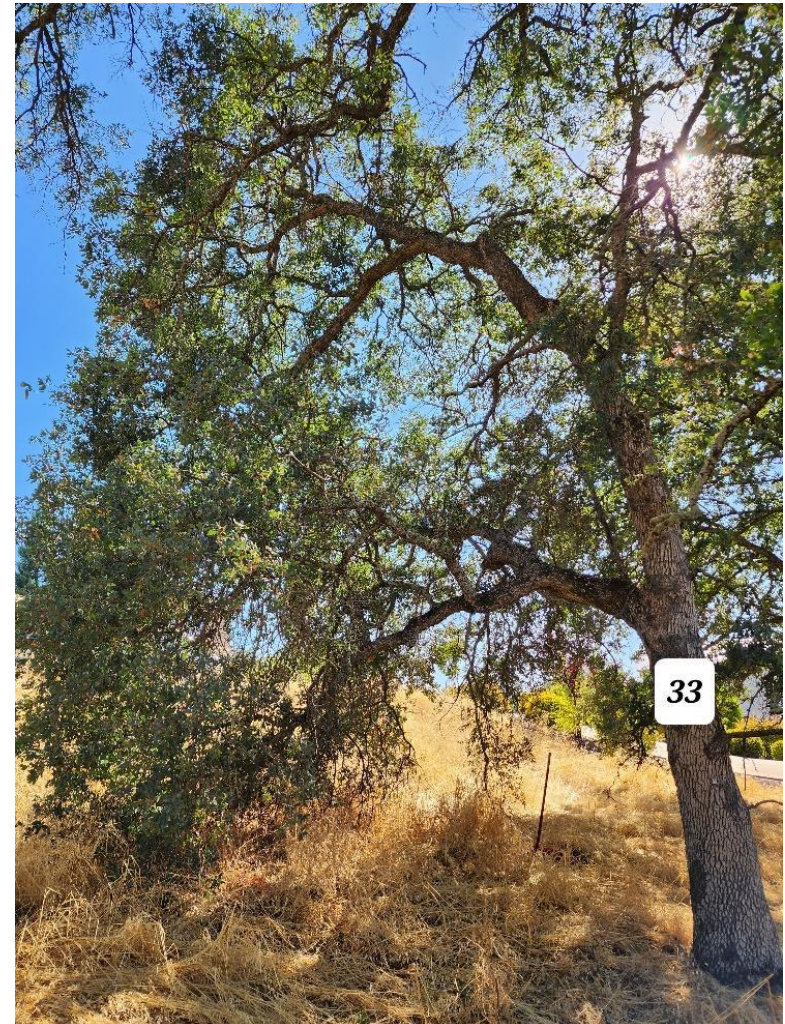


Photo #2, Shows Tree #33



Photo #3, Shows Trees #34 & #35 (from left to right)



Photo #4, Shows Trees #101, #102 & #103 (from left to right)

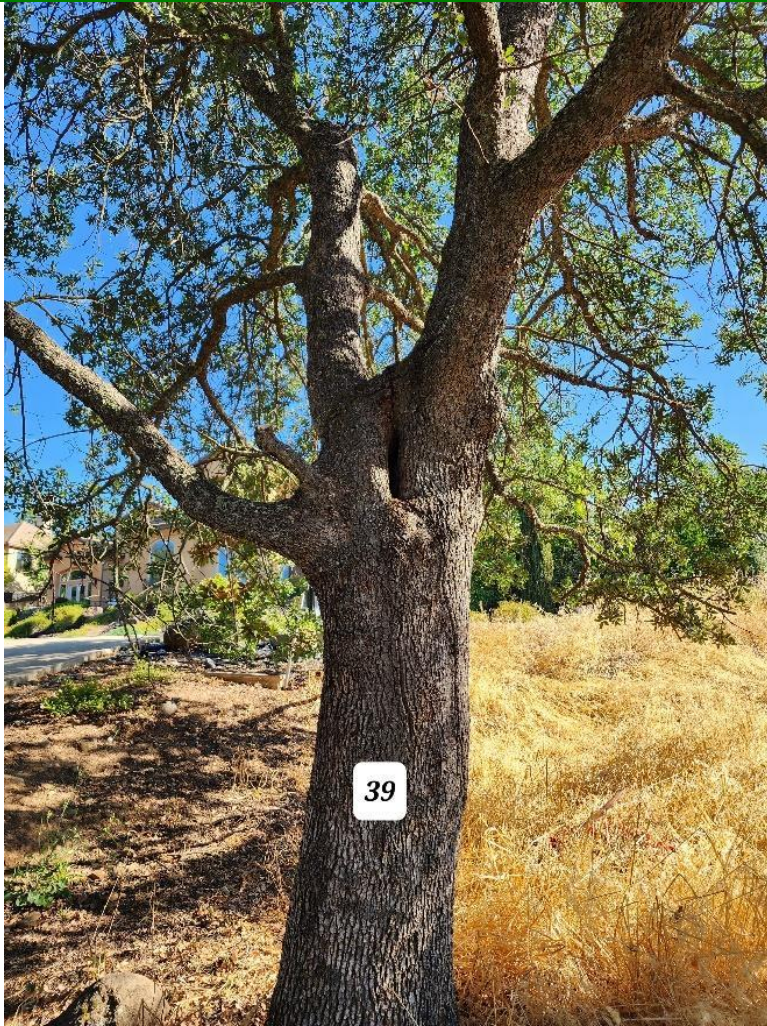


Photo #5, Shows Tree #39



Photo #6, Shows Tree #41



Photo #7, Shows Tree #42