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Exhibit D- Zone Map

0 160 320 640 Feet

CAMERON WOODS UNITS MAP (OVERALL SUBDIVISION)



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EXHIBIT I



EXHIBIT J



EXHIBIT K



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EXHIBIT L





Dykstra Enterprises, Inc.

Arborist's Report

March 20, 2014

Lupine Ridge, CA LP 15 South Fairmont Avenue Lodi, CA 95240

Work location Cameron Woods #9 Virada Road Cameron Park, CA 95682

Canopy preservation plan for proposed subdivision

Prepared by: Chad Dykstra, Consulting Arborist

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EXHIBIT M

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Arborist Disclosure Statement

Arborists are tree specialists who use their education, knowledge, training and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines, disputes between neighbors, and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk.

Foothill Tree Service Chad Dykstra, Consulting Arborist

<u>Assignment</u>

The subject site is proposed for development as a project called Cameron Woods #9. The client contacted our office and requested we provide confirmation of the oak canopy cover, and verify the calculations to meet the County of El Dorado's Oak Tree requirements under the General Plan Policy 7.4.4.4 for Forest and Oak Woodland Resources. This report is the result of several onsite inspections performed between May 28, 2013 and March 1, 2014 and the use of aerial photographs overlaid with the CAD footprint as well as field verification of the oak canopy by a team of certified arborists.

Assignment limits

All the trees were observed while standing on the ground. Data collected is limited to a visual ground inspection. An aerial survey was used to obtain canopy coverage information and field verified to approximate actual site conditions. Ground inspections and measurements were used to insure the accuracy of the aerial survey canopy area and proposed planting areas.

Current Existing Tree Status (general)

These trees are located in a fairly undisturbed area. Some of the trees have experienced negative impacts due to human activities and livestock grazing in the past. The trees' were found to be in a general health range from good to fair to poor, and are comparable to the conditions expected of unmanaged trees growing in natural areas.

Technical Recommendations

It is recommended that all tree care follow specifications written in accordance with ANSI A-300 standards and BMPs. Removing significant portions from a tree's crown may have negative effects. When root pruning, the cuts should be performed with sharp handsaws, loppers, or chainsaws appropriate for the size of the root being cut. The roots should be exposed by excavating prior to cutting. Roots should be pruned prior to root removal within the tree protection area to limit damage or tearing. Root pruning should be overseen by a qualified arborist.

General Tree Care and Maintenance

The following information is given so that an onsite landscape manager can properly take care of the remaining protected trees, and newly planted trees. Established native oak trees in this vicinity do not like to have their roots or the surrounding soil disturbed or tampered with. Applying or having unintentional landscape water in the root zone can cause catastrophic and negative affects to most species of native oak trees. It is, therefore, recommended that a landscape be designed using drought tolerant plants that will require little to no watering after establishment. Irrigation should be delivered using an on-surface drip type system. The plants should be spaced at least 6 feet from the trunk of the trees, and the drainage from irrigation should be managed so water does not flow to the trunks of the trees. Trees that are growing in highly used areas should be inspected by a qualified arborist on a routine basis, depending on use and tree risk. For other considerations about the native trees during changes to the site use, please contact a qualified arborist.

Foothill Tree Service Chad Dykstra, Consulting Arborist The allowable removable canopy is shown on the following chart based on El Dorado County General Plan Policy 7.4.4.4 (Option A):

Option A

Percent Existing Canopy Cover	Canopy Cover to be Retained
80-100	60% of existing canopy
60-79	70% of existing canopy
40-59	80% of existing canopy
20-39	85% of existing canopy
10-19	90% of existing canopy
1-9**	90% of existing canopy

The total project site area is 3,284,654.5 square feet or 75.41 acres. The existing oak canopy cover is 979,670.8 square feet, or 22.49 acres, and 29.8% existing canopy. This falls into the 20 to 39 percent existing canopy cover and allows up to 15% total oak canopy removal on the site. The proposed plan includes the removal of 107,788 square feet or 2.47 acres of oak canopy equaling 11.0% canopy removal, which is within the allowable 15%. The required mitigation planting is 105,581 square feet or 2.42 acres, and can be planted on site. The available mitigation planting area on the site is 133,930.5 square feet, 3.07 acres, and exceeds the 2.42 acres proposed for removal.

Total square feet of the project area: 3,284,654.5 sq ft, 75.41 acres Total square feet of oak canopy: 979,670.8 sq ft, 22.49 acres, 29.8% Total square feet of oak canopy to be removed: 107,788 sq ft, 2.47 acres, 11.0%

Total square feet of oak canopy to be removed. 107,766 sq ft, 2.47 acres, 11.0% Total square feet of oak canopy required to be replaced: 105,580.50 sq ft, 2.42 acres, 10.78% Total current available replanting location size: 133,930.50 sq ft, 3.07 acres, 13.67%

The proposed tree removal and on-site mitigation planting for the project is in compliance with the above table and EDC 7.4.4.4

Mitigation and Replanting

Under Option A, the project applicant shall also replace woodland habitat canopy removed at a 1:1 canopy cover acreage ratio. Woodland replacement shall be based on the formula, developed by the County, that accounts for the number of trees and acreage affected, per El Dorado County's *"GENERAL PLAN POLICIES RELATED TO OAK WOODLANDS"* document. Using the formula of 200 seedlings or one gallon trees per acre, it has been determined that 484 trees will need to be planted for project acceptance, and prior to receiving a final on the property's building permit. The mitigation plan is to install (485) oak trees with the following species mix: 162 blue oaks, *Quercus Douglasii,* and 323 interior live oaks, *Quercus wislizenii.* The trees will be at least Deepot cells GP352, 2-1/2,

Foothill Tree Service Chad Dykstra, Consulting Arborist March 20, 2014

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Lupine Ridge, Cameron Woods #9 Canopy Preservation Plan Inch diameter by 10 inches deep or #4 tee-pot size, grown from local acorn sources, within 40 miles of El Dorado Hills, CA.

The Arborist shall have the authority to examine site conditions and substitute #5 and/or #15 size nursery container stock trees in the re-planting area(s) as deemed appropriate, as granted in Policy 7.4.4.4. If this increase in size is decided, any number of trees up to 285 trees would be increased in nursery stock size to accomplish earlier screening of selected areas of the site. The available and proposed planting locations of these new trees are shown on the attached site map titled, Oak Tree Canopy Retention Plan, dated March 20th and March 26th.

The mitigation planting is required to be 100% survival of the 200 trees per acre after 10 years. The proposed mitigation plan will be broken into two planting efforts to achieve the mitigation as the site is developed. The developer will mitigate for the construction of roads, which requires the removal of 1.19 acres of canopy. The individual property owners and builders will need to mitigate for their individual property construction prior to occupancy. The proposed oak canopy removal for home construction is 1.26 acres, accounting for the full 2.47 acres of project oak tree canopy removal. All of the oak mitigation planting will be performed in the 3.07 available project planting mitigation area.

The proposed mitigation tree planting for the road construction will cover 1.20 acres to mitigate the 1.19 acres. The proposed mitigation planting for the home construction will be completed as the properties are developed and the tree canopy is removed. All individual home mitigation planting will have to be planted prior to receiving occupancy permission.

The proposed tree planting will be performed to the project tree planting specifications and details included in this report. The tree planting will install 200 trees per acre, irrigated by a temporary irrigation system connected to on-site water. The site will be prepared to clear space for the trees, perform planting in tubes for Deepot stock, and add mulch.

The site will be monitored quarterly in the first year to assure irrigation is appropriate and track survival. During years two and three, monitoring will be performed semi-annually. During years 4 through 10, monitoring will occur annually. Annual reports confirming survival rate will be completed. If site circumstances require, more frequent monitoring will be performed.

The estimated price for trees planted in 2014 is \$16,500 per acre. The per acre price includes preparation, purchase of trees and supplies, planting the trees, irrigating with an on-site water source, and the monitoring schedule above. The estimated price per acre will increase 5% each subsequent year into the future should the planting be performed after 2014.

If on-site irrigation is not available and water has to be provided by a water truck, the cost per acre will increase by \$30,000 to \$50,000 depending on the source, method, and number of times required for the provision of providing irrigation water. Installation of a permanent drip irrigation system is recommended and could reduce the cost of irrigation and fertilization.

Typically, planting and maintenance contractors are responsible for tree survival related to sporadic dieback of well-maintained trees, or for mistakes in the planting, irrigation, or maintenance. If the site is impacted by vandalism, significant freeze, fire, or other catastrophic event that the contractor has

Foothill Tree Service Chad Dykstra, Consulting Arborist Lupine Ridge, Cameron Woods #9 Canopy Preservation Plan March 20, 2014 no control over, the restoration or replacement of the site will be performed through additional work contracts or agreements.

Please contact me if there are questions regarding this report.

<u>Disclaimer:</u> I, Chad Dykstra, have analyzed the situation, applied the proper method(s) utilized within my profession, and performed a reasonableness test to assess my decisions. The following report is my opinion. I, Chad Dykstra, nor the employees of Foothill Tree Service may be held liable for the misuse or misinterpretation of this report; as the author of this report, I do hereby certify that all the statements of fact in this report are true, complete, and correct to the best of my knowledge and belief, and that they are made in good faith.

Regards,

Chad Dykstra ISA Certified Arborist WC-5893A T.R.A.Q. Member of The American Society of Consulting Arborists

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Appendix A Tree Planting Specifications

Trees shall be free of major injury such as scrapes that remove greater than 20% of the bark circumference, a broken central leader, or constrictions from staking or support. The graft, if present, shall be consistent for the production of the cultivar or species. The trunk flare shall be at grade, not buried by soil, and adventitious roots shall not be growing from above the trunk flare.

The tree shall not be root bound in the container, and the trunk diameter relative to the container sizes, within the limits of American National Standards Institute (ANSI) Z-60 Nursery Standards.

Prior to acceptance, upon delivery, trees may be pulled from the container, so the rootball can be inspected for compliance with the specifications. An agreed upon maximum percent of trees may be checked for compliance. The nursery should provide post delivery care specifications to keep the trees in optimum condition until planting.

Tree Planting

1.0 INSPECT THE TREE

- 1.1 Carefully remove the soil at the top of the container to locate the trunk flare. Check for girdling roots and damage to the root system and lower trunk.
- 1.2 Until a relationship is established with the supplying nursery, randomly select an acceptable sample for the delivery. Inspect the root system by taking the rootball out of the container, and remove all the soil from the root system. Inspect the inner roots to verify that the roots were properly pruned when moved from the initial container to the next larger size. Keep the root system moist during the check. If the roots were properly pruned during container transfer, and the roots have been kept moist, the tree can be planted as a bare root tree.
- 1.3 If the trees are acceptable, each tree shall be removed from the container prior to digging the hole, and the depth of the rootball from the trunk flare to the bottom of the rootball shall be measured. This measurement, less 1" is the depth the pedestal in the center of the planting hole shall be excavated to.

2.0 DIG THE HOLE

- 2.1 Shave and discard grass and weeds from the planting site.
- 2.2 The hole should be a minimum 3 times the diameter of the container diameter.
- 2.2.1 Square containers shall be dug with a circular hole 3 times the container measurement.
- 2.3 Dig the hole, leaving an undisturbed pedestal in the center that the root ball will be set on.
- 2.4 The pedestal shall be excavated to the depth measurement determined above

3.0 ROOT BALL PREPARATION

- 3.1 Loosen and straighten outside and bottom roots prior to placing the rootball on the pedestal. The trunk flare (the point where the trunk meets the roots) should be 1" above ground level.
- 3.2 Winding and girdling roots shall be pruned to either the point they are perpendicular to the root ball, or a point where they can be straightened and placed perpendicular to the rootball.
- 3.3 Keep the roots moist during this process so they do not dry out.

4.0 BACKFILL

- 4.1 Hold the tree so the trunk and central leader are in a straight upright position.
- 4.2 Backfill soil with the soil you removed around the base of the pedestal and rootball no higher than 2/3, so the tree stands in the upright position
- 4.3 Tamp the soil to remove air gaps, or fill with water and allow soil to settle and drain. Continue to fill the entire hole with existing soil in layers and tamping, up to finished grade. Backfill soil shall not be placed on top of the rootball.
- 4.4 Build a berm at the outside edge of the rootball. The berm shall be a minimum 3 inches high and wide.
- 4.5 Cover the remainder of the backfill soil outside the berm with a set level of mulch (2 to 4 inches deep).

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5.0 STAKING

- 5.1 Remove the nursery stake (the thin stake tied to the trunk) that is secured to the tree.
- 5.2 Install the appropriate number of stakes for example, two stakes on the windward and leeward side of the tree, set at least 2 feet into the native soil outside the rootball.
- 5.2.1If the area is exceptionally windy, high traffic, or when specified, install 3 or 4 stakes spaced evenly around the circumference, outside the rootball.
- 5.3 One tie per stake shall be placed at the lowest point on the trunk where the tree crown stands upright. Ties shall be placed using a "figure 8" crossing pattern wrapped around the trunk and firmly tied or attached to the stake.
- 5.3.1 Ties shall be loose enough so the tree crown moves up to 3 times the trunk diameter in the wind, and taut enough that the trunk does not rub the stakes during movement.
- 5.4 The stakes shall be cut off above the tie point so branches do not rub the stake above the tie point.
- 5.5 Check the stakes and ties periodically, removing them when the tree is able to stand on its own.
- 5.6 If a leader that should be vertical is drooping, the leader may be temporarily straightened using a bamboo or small diameter wood splint approximately 25% longer than the drooping section of stem, tied to the stem at the top and bottom of the splint to hold the stem vertical. The splint shall be removed prior to girdling or constricting the stem, and may be re-installed as necessary.

6.0 MULCH

- 6.1 Apply a set depth (2 to 4 inches) of wood chips or other organic mulch over the planting hole excavated soil.
- 6.2 Mulch may be placed inside the berm and shall be kept at least 4" away from the trunk flare.
- 6.3 The soil area of the planting hole shall be kept clear of grass and landscape plantings.

7.0 WATER/IRRIGATION

- 7.1 Apply water using a low pressure application, i.e.: trickle from a hose, soaker hose, or bubbler.
- 7.2 Use low water volume to apply the water. Add water long enough to saturate the rootball and planting area.
- 7.2.1 Lawn sprinklers shall not be considered an acceptable method of applying irrigation to newly planted trees.
- 7.3 The initial watering frequency shall be checked by monitoring the soil moisture. Based on the temperature and humidity, learn how long the soil retains the moisture.
- 7.4 After the soil is below field capacity, and before it dries out, repeat the watering process, every so determined days.
- 7.4.1 As the weather and seasons change, the irrigation frequency may change. This will be evaluated by checking soil moisture following water application.
- 7.4.1.1 For example: you may learn irrigation should be applied twice a week during the fall, except in cool or rainy weather. Irrigation may need to be applied every two days during hot dry summer periods.
- 7.5 Irrigation shall be continued for the first three years after planting.
- 7.5.1 Avoiding drying out the rootball and adjacent soil is critcal for tree growth and establishment.

8.0 PROTECT THE TRUNK

- 8.1 Avoid damage from mowers and string trimmers to the tender bark of the young tree.
- 8.2 Maintain a clear area free of vegetation around the trunk in the berm or basin area.
- 8.3 Keep the set depth of mulch (2 to 4 inches) coverage of the area around the tree.
- 8.4 Retain temporary low branches along the trunk to shade and feed the trunk.

9.0 PRUNING NEWLY PLANTED TREES

- 9.1 Broken and dead branches shall be pruned.
- 9.2 A central leader shall be identified and retained if present. If co-dominant leaders are present, they shall be pruned to be shorter than the central leader by 20%.
- 9.3 All low temporary branches on the lower trunk shall be retained, and if needed shortened for clearance.

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10. FUTURE CARE

10.1 During subsequent years, the berm should be enlarged or removed to in order to provide water to the increasing root growth. The watering area should target new root growth and projected root growth.
10.2 Pruning should retain a dominant central leader; and retain low temporary branches until trunk bark hardens or

remove before branch diameter becomes too large.

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Appendix B

Nursery Stock and Tree Planting

Nursery Stock purchase

Trees purchased for the subject project shall be the Genus, species, and cultivar specified in the purchase documents. Trees shall be grown to be free of bound root systems caused by winding roots or kinked roots from a previous smaller container. As trees are moved to larger containers, circling roots shall be either pruned to a point where they can grow straight, straightened in the new container, or removed. Kinked roots shall be pruned to a point where they will grow straight outward or downward.

The trunk and branches shall be of a structure where a central leader is defined, or the central leader can be easily selected. The competing leaders have a smaller diameter, and can be pruned shorter.

Appendix C

Tree Protection

The edge of the site outside of the construction area shall be fenced off with construction fencing, either temporary orange fence or chain link fence. The fence shall be placed as far from the trees as possible, targeting outside the dripline. If the fence cannot be placed outside of the dripline, the project arborist shall determine if the distance is acceptable or some other soil protection is necessary. A certified arborist must approve the placement of the tree fence. The fence will be marked with weather appropriate signage clearly stating the area as "Protected! Do not enter! Tree preservation zone." Sign(s) will be placed every 15' of fence line.

No storage of supplies or materials, parking, or other construction activity shall occur within the fenced area. If a construction activity is required within the construction area, specific specifications and mitigation shall be written to cover the work, and the fencing may be entered during the necessary construction activity, then the fencing shall be replaced after the activity is completed for the day.

The construction protection shall remain in place until the project is completed, including landscape activities. Landscape activities shall have specifications that protect the trees during the landscape activities.

Any bare soil around protected trees should be covered with a 4-inch layer of mulch consisting of ground-up tree parts.

If the protected trees appear to show signs of yellowing leaves, dead leaves, or other abnormal appearance, contact the project arborist for inspection and mitigation.

Long Term Landscape Maintenance Plan and Specifications

<u>General</u>

This plan and specifications are intended to promote the optimum landscape growth and lifespan. Individual tree planting in specific sites in the parking lot are intended to provide a large shade canopy over time covering 50% or greater of the parking lot. The border and natural screening plantings are overplanted and intended to fill the space initially, and have the weaker trees removed over time, to create the space and site resources necessary for the remaining trees. Trees initially will be planted on approximate 10 foot centers, with the long term spacing to be approximately 20 foot centers. As trees are thinned, they may be transplanted or removed, as best suited to the remaining trees on the site.

These trees shall be pruned to establish a central leader, to provide the best structure by managing size relationships between parent and subordinate trunk and branches, and to encourage growth into a large shade canopy. These trees shall not be topped or rounded over. Trees may have competing leaders headed back to promote the strong central leader necessary to eliminate co-dominant stems and weak branching.

Design Intent

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Lupine Ridge, Cameron Woods #9

Canopy Preservation Plan

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The trees planted around the perimeter and alongside the sidewalk or street are intended to replicate natural areas and to screen the project and adjacent properties. The native oaks shall be more tightly spaced at planting and thinned over time to promote the growth of the final or climax trees on the site. The thinning for spacing shall be performed as the trees get larger and their crowns begin to overlap. When the desired tree crowns are being impacted by an adjacent tree, the adjacent tree should either be pruned or removed, to provide the optimum screening while enhancing the desired tree growth. Pruning shall retain a dominant central leader and for decurrent tree structures, remove competing leaders, and maintain the appropriate size relationships between parent and subordinate trunk and branches.

Pruning Small Trees

Branches are to be pruned by either reduction, thinning, or raising cuts to achieve the appropriate clearance over the area. The smallest diameter branches should be removed, working from the branch tips towards the center, removing none to minimal interior foliage inside the final outward branch cut. Trees shall be cleaned to remove dead branches, weakly attached branches, and branches where significant damage has occurred by rubbing, animals, insects, or critical disease. All pruning cuts shall be made in accordance with American National Standards Institute (ANSI) A300 Part 1 Pruning Standards and International Society of Arboriculture (ISA) Best Management Practices for Pruning.

On trees up to six inches in diameter, all dead branches greater than one-half inch diameter shall be removed. All weakly attached branches and potential co-dominant branches shall either be reduced by at least 20% or be removed, as most appropriate for the long term structure of the tree. The weakest or most damaged branch of a pair or group of rubbing branches shall be shortened to avoid rubbing, or removed. All temporary branches along the trunk should be retained and shortened to obtain necessary clearance. When either temporary branches exceed one-inch diameter, or the trunk forms mature bark, the temporary branches should be removed.

Stakes shall be installed as necessary to support a straight growing tree, and reduce crooked growth caused by high wind. The trunk shall be supported at the lowest point to keep the crown supported straight, and the portions of the stake above the tie point cut off to avoid rubbing branches. After the tree becomes firmly rooted, and the stake is no longer necessary to support the tree, the stakes shall be removed.

Depending on the location and site needs, clearance should be performed by pruning the smallest branches inward from the branch tips until the permanent branches are in place. Clearance minimums should be set, for example: 7.5' over sidewalks, 10 feet over parking spaces, and 14.5 feet over truck traffic streets. Clearance pruning shall be carefully performed until the permanent branches are identified. Up to 25% of the total foliage on any tree should be the maximum removed during any planned pruning cycle. Follow-up pruning for structure or clearance on young trees can be performed at any time if pruning small amounts of foliage (up to 10%) and retaining the central leader and branch size relationships.

Pruning Large Trees

Branches are to be pruned by either reduction, thinning, or raising cuts to achieve the appropriate clearance over the area. The smallest diameter branches should be removed, working from the branch tips towards the center, removing none to minimal interior foliage inside the final outward branch cut. Trees shall be cleaned to remove dead branches, weakly attached branches, and branches where significant damage has occurred by rubbing, animals, insects, or critical disease. All pruning cuts shall be made in accordance with American National Standards Institute (ANSI) A300 Part 1 Pruning Standards and International Society of Arboriculture (ISA) Best Management Practices for Pruning.

On trees larger than six inches in diameter, all dead branches greater than one-inch diameter shall be removed. Long heavy branches that are either growing flat or bending down shall have approximately 15% of the end weight reduced, accomplished by a combination of pruning the downward growing branches, shortening long tips, and thinning endweights. If any structural issues are observed by the climber working in the tree, they shall notify the property manager immediately to discuss the tree's needs.

Depending on the location and site needs, clearance should be performed by pruning the smallest branches inward from the branch tips until the permanent branches are in place. Clearance minimums should be set, for example: 7.5' over sidewalks, 10 feet over parking spaces, and 14.5 feet over truck traffic streets. Clearance pruning shall be carefully performed until the permanent branches are identified. Up to 25% of the total foliage on any tree should be the maximum removed during any planned pruning cycle.

Any special site issues for utility clearance or conflicts with other objects shall be managed by early pruning to direct growth away from the target lines, overhead lights, flags, or buildings.

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Thinning of Dense Planting

Many landscape plantings and natural landscape areas are over-planted by installing a greater number of plants at closer spacing than optimum for the full-sized plants. Over time, plants will grow into each other, the crowns will conflict, and the spacing will need to be corrected. Correct spacing is obtained by removing the least desirable plants to meet the final spacing target, within reasonable tolerances.

If conflicting plants are all healthy, it won't matter which plants are removed to achieve the spacing distances. Spaced thinning should be performed before the foliar crowns are intertwined or overlapping. The thinning may be performed over two or three cycles as the trees grow over time, depending on the density and desired final spacing.

The trees initially will be planted on approximate 10 foot centers, with the long term spacing to be approximately 20 foot centers. The healthiest and best specimens should be retained on site. As trees are thinned, they may be transplanted or removed, as best suits the remaining trees on the site.

Avoiding Tree Damage During Construction

An ISA document.

As cities and suburbs expand, wooded lands are being developed into commercial and residential sites. Homes are constructed in the midst of trees to take advantage of the aesthetic and environmental value of the wooded lots. Wooded properties can be worth as much as 20 percent more than those without trees, and people value the opportunity to live among trees.

Unfortunately, the processes involved with construction can be deadly to nearby trees. Unless the damage is extreme, the trees may not die immediately but could decline over several years. With this delay in symptom development, you may not associate the loss of the tree with the construction.

It is possible to preserve trees on building sites if the right measures are taken. The most important step is to hire a professional arborist during the planning stage. An arborist can help you decide which trees can be saved and can work with the builder to protect the trees throughout each construction phase.

How Trees Are Damaged During Construction

Physical Injury to Trunk and Crown. Construction equipment can injure the aboveground portion of a tree by breaking branches, tearing the bark, and wounding the trunk. These injuries are permanent and, if extensive, can be fatal.

Cutting of Roots. The digging and trenching that are necessary to construct a house and install underground utilities will likely sever a portion of the roots of many trees in the area. It is easy to appreciate the potential for damage if you understand where roots grow. The roots of a tree are found mostly in the upper 6 to 24 inches of the soil. In a mature tree, the roots extend far from the trunk. In fact, roots typically are found growing a distance of one to three times the height of the tree. The amount of damage a tree can suffer from root loss depends, in part, on how close to the tree the cut is made. Severing one major root can cause the loss of 5 to 20 percent of the root system.



The roots of a tree extend far from the trunk and are found mostly in the upper 6 to 12 inches of soil.

Another problem that may result from root loss caused by digging and trenching is that the potential for the trees to fall over is increased. The roots play a critical role in anchoring a tree. If the major support roots are cut on one side of a tree, the tree may fall or blow over.

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Less damage is done to tree roots if unines are tunneled under a tree (right, top and bottom) rather than across the roots (left, top and bottom).

Less damage is done to tree roots if utilities are tunneled under a tree rather than across the roots.

Soil Compaction. An ideal soil for root growth and development is about 50 percent pore space. These pores—the spaces between soil particles—are filled with water and air. The heavy equipment used in construction compacts the soil and can dramatically reduce the amount of pore space. This compaction not only inhibits root growth and penetration but also decreases oxygen in the soil that is essential to the growth and function of the roots, and water infiltration.

Smothering Roots by Adding Soil. Most people are surprised to learn that 90 percent of the fine roots that absorb water and minerals are in the upper 6 to 12 inches of soil. Roots require space, air, and water. Roots grow best where these requirements are met, which is usually near the soil surface. Piling soil over the root system or increasing the grade smothers the roots. It takes only a few inches of added soil to kill a sensitive mature tree.

Exposure to the Elements. Trees in a forest grow as a community, protecting each other from the elements. The trees grow tall, with long, straight trunks and high canopies. Removing neighboring trees or opening the shared canopies of trees during construction exposes the remaining trees to sunlight and wind. The higher levels of sunlight may cause sunscald on the trunks and branches. Also, the remaining trees are more prone to breaking from wind or ice loading.

Getting Advice

Hire a professional arborist in the early planning stage. Many of the trees on your property may be saved if the proper steps are taken. Allow the arborist to meet with you and your building contractor. Your arborist can assess the trees on your property, determine which are healthy and structurally sound, and suggest measures to preserve and protect them.

One of the first decisions is determining which trees are to be preserved and which should be removed. You must consider the species, size, maturity, location, and condition of each tree. The largest, most mature trees are not always the best choices to preserve. Younger, more vigorous trees usually can survive and adapt to the stresses of construction better. Try to maintain diversity of

Foothill Tree Service Chad Dykstra, Consulting Arborist - 14 -

Lupine Ridge, Cameron Woods #9 Canopy Preservation Plan March 20, 2014 species and ages. Your arborist can advise you about which trees are more sensitive to compaction, grade changes, and root damage.

Planning

Your arborist and builder should work together in planning the construction. The builder may need to be educated regarding the value of the trees on your property and the importance of saving them. Few builders are aware of the way trees' roots grow and what must be done to protect them.

Sometimes small changes in the placement or design of your house can make a great difference in whether a critical tree will survive. An alternative plan may be more friendly to the root system. For example, bridging over the roots may substitute for a conventional walkway. Because trenching near a tree for utility installation can be damaging, tunneling under the root system may be a good option.

Erecting Barriers

Because our ability to repair construction damage to trees is limited, it is vital that trees be protected from injury. The single most important action you can take is to set up construction fences around all of the trees that are to remain. The fences should be placed as far out from the trunks of the trees as possible. As a general guideline, allow 1 foot of space from the trunk for each inch of trunk diameter. The intent is not merely to protect the aboveground portions of the trees but also the root systems. Remember that the root systems extend much farther than the drip lines of the trees.

Instruct construction personnel to keep the fenced area clear of building materials, waste, excess soil, and equipment. No digging, trenching, or other soil disturbance such as driving vehicles and equipment over the soil should be allowed in the fenced area.

Protective fences should be erected as far out from the trunks as possible in order to protect the root system prior to the commencement of any site work, including grading, demolition, and grubbing.

Limiting Access

If at all possible, it is best to allow only one access route on and off the property. All contractors must be instructed where they are permitted to drive and park their vehicles. The construction access drive should be the route for utility wires; underground water, sewer, or storm drain lines; roadways; or the driveway.

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Protective fences should be erected as far out from the trunks as possible in order to protect the root systems.

Specify storage areas for equipment, soil, and construction materials. Limit areas for burning (if permitted), cement wash-out pits, and construction work zones. These areas should be away from protected trees.

Specifications

Specifications are to be put in writing. All of the measures intended to protect your trees must be written into the construction specifications. The written specifications should detail exactly what can and cannot be done to and around the trees. Each subcontractor must be made aware of the barriers, limitations, and specified work zones. It is a good idea to post signs as a reminder.

Fines and penalties for violations should be built into the specifications. Not too surprisingly, subcontractors are much more likely to adhere to the tree preservation clauses if their profit is at stake. The severity of the fines should be proportional to the potential damage to the trees and should increase for multiple infractions.

Maintaining Good Communications

It is important to work together as a team. You may share clear objectives with your arborist and your builder, but one subcontractor can destroy your prudent efforts. Construction damage to trees is often irreversible.

Visit the site at least once a day if possible. Your vigilance will pay off as workers learn to take your wishes seriously. Take photos at every stage of construction. If any infraction of the specifications does occur, it will be important to prove liability.

Final Stages

It is not unusual to go to great lengths to preserve trees during construction, only to have them injured during landscaping. Installing irrigation systems and roto-tilling planting beds are two ways the root systems of trees can be damaged. Remember also that small increases in grade (as little as 2 to 6 inches) that place additional soil over the roots can be devastating to your trees. ANSI A300

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Lupine Ridge, Cameron Woods #9

Canopy Preservation Plan March 20, 2014 Standards Part 5 states that tree protection shall be in place for the landscape phase of the site development. Landscape tree protection may be different than other construction process tree protection, and a conference with the landscape contractor should be held prior to the commencement of the landscape work. Careful planning and communicating with landscape designers and contractors is just as important as avoiding tree damage during construction.

Post-Construction Tree Maintenance

Your trees may require several years to adjust to the injury and environmental changes that occur during construction. The better construction impacts are avoided, the less construction stress the trees will experience. Stressed trees are more prone to health problems such as disease and insect infestations. Talk to your arborist about continued maintenance for your trees. Continue to monitor your trees, and have them periodically evaluated for declining health or safety hazards.

Despite the best intentions and most stringent tree preservation measures, your trees still might be injured from the construction process. Your arborist can suggest remedial treatments to help reduce stress and improve the growing conditions around your trees. In addition, the International Society of Arboriculture offers a companion to this brochure titled "Treatment of Trees Damaged by Construction".



- 1. Consultant assumes that any legal description provided to Consultant is correct and that title to property is good and marketable. Consultant assumes no responsibility for legal matters. Consultant assumes all property appraised or evaluated is free and clear, and is under responsible ownership and competent management.
- 2. Consultant assumes that the property and its use do not violate applicable codes, ordinances, statutes or regulations.
- 3. Although Consultant has taken care to obtain all information from reliable sources and to verify the data insofar as possible, Consultant does not guarantee and is not responsible for the accuracy of information provided by others.
- 4. Client may not require Consultant to testify or attend court by reason of any report unless mutually satisfactory contractual arrangements are made, including payment of an additional fee for such Services as described in the Consulting Arborist Agreement.
- 5. Unless otherwise required by law, possession of this report does not imply right of publication or use for any purpose by any person other than the person to whom it is addressed, without the prior express written consent of the Consultant.
- 6. Unless otherwise required by law, no part of this report shall be conveyed by any person, including the Client, the public through advertising, public relations, news, sales or other media without the Consultant's prior express written consent.
- 7. This report and any values expressed herein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event or upon any finding to be reported.
- 8. Sketches, drawings and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by Consultant as to the sufficiency or accuracy of the information.
- 9. Unless otherwise agreed, (1) information contained in this report covers only the items examined and reflects the condition of the those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing or coring. Consultant makes no warranty or guarantee, express or implied that the problems or deficiencies of the plans or property in question may not arise in the future.
- 10. Loss or alteration of any part of this Agreement invalidates the entire report.

I, Chad Dykstra, certify that:

I have personally inspected the trees and site referred to in this report, and have stated my findings accurately. The extent of the inspection is stated in the attached report under Assignment;

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

The analysis, opinions and conclusions stated herein are my own and are based on current scientific procedures and facts;

My analysis, opinions, and conclusions were developed, and this report has been prepared according to commonly accepted arboricultural practices;

No one provided significant professional assistance to me, except as indicated within the report;

My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client, or any other party, nor upon the results of the assignment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am a member in good standing of the International Society of Arboriculture (ISA) and a Certified Arborist. I am also a member in good standing of the American Society of Consulting Arborists. I have been involved in the practice of arboriculture and the care and study of trees for over 20 years.

Signed: Chad Dykstra

Date: March 20, 2014





