Assessment of Twenty-Eight (28) Trees
At Sunrise Senior Living Facility, Redwood City (Proposed)
(Multiple Residential and Commercial Lots)
2915 El Camino Real
Redwood City, California

draft

Prepared for:

Sunrise Senior Living
Attn: Ms. Jackie Dominguez
7902 Westpark Drive
McLean, VA 22102

Site Visit:

Walter Levison, Consulting Arborist (WLCA)

5/2/2017

Report:

WLCA

5/5/2017

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1.0 Summary

Twenty-eight (28) protected-size trees on the proposed project area and directly adjacent to the proposed Sunrise Senior Living facility build area were tagged as #1 through #28 and visually assessed by Walter Levison, Consulting Arborist (WLCA) on 5/2/2017. The following is a summary of tree disposition based on the current conceptual site plan project build parameters shown on plan sheets received by WLCA from Sunrise Senior Living:

a. Retain Pending Plan Adjustments (8 trees): Trees that appear to be retainable if certain adjustments are made to the proposed utility trench alignments, storm drain alignments, walkways, and other items include **trees #1, #2, #3, #6, #7, #11, #12, and #13**. See WLCA's color-coded tree map markup below in this report to see all potential tree conflicts on one sheet.

b. Prune & Retain (4 trees): Trees that will require significant pruning to clear the proposed new building footprint include (**trees #1 and #6 noted above in 'a'), #7, and #10,** along the north side and at the northeast corner of the proposed building. Other trees in this area may also require significant pruning (to be determined).

   Given the complexity of dealing with tree canopy driplines and proposed construction work, it may be necessary for Sunrise to retain a surveyor to accurately render the southward and westward lopsided canopy dripline edges of trees such as trees #1 through #14 onto a survey plot sheet in order to more accurately assess negative impacts to the trees from buildout of the Sunrise building footprint.

c. Conflict Removals (8 trees): Trees required to be removed due to direct conflicts **include trees #15, #19, #20, #21, #22, #23, #24, and #25.**

   Three large oaks #23, 24, and #25 are within this grouping of removals. It is not known if impacts to these three trees could be mitigated to an insignificant level, since a site plan amendment to restrict the driveway width at the west side of the facility might not be feasible. Also, even if the driveway build area were to be restricted, that driveway work may require deep excavation for replacement of baserock, etc. which may in itself cause severe loss of lateral roots connected to these trees, even if the above-ground portions of the trees were preserved.

d. Author-Recommended Removals (4 trees): Additional trees suggested to be removed due to poor health, poor structure, and/or other issues include **trees #8, #16, #17, and #18.**

e. Trees to be Retained (6 trees): Trees that appear to be easily retained (pending review of the proposed irrigation pipe trench routes for new landscaping), include **trees #4, #5, #9, #14, #27, and #28**.

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2.0 Assignment & Background

The author Walter Levison Consulting Arborist (WLCA) was retained by Sunrise Senior Living to tag and assess 28 trees of protected size within and adjacent to the proposed lot merger area in Redwood City at the corner of El Camino Real and E. Selby Lane. WLCA was also retained to prepare a formal written arborist report with a tree map, tree images, tree data, discussion of expected impacts to trees, and detailed comprehensive recommendations for tree protection and maintenance, based on the conceptual proposed plan sheets available for review as of the date of writing.

WLCA tagged the trees as #1 through #28 using racetrack shaped aluminum numbered tags affixed to a mainstem at eye level, with one or two trees being tagged at lower elevation due to shrubs surrounding the trunks.

Some of the trees such as #22, #23, #24, #25, and #26 were not accessible due to locked gates that prevented WLCA from tagging the trunks, measuring the trunks, or assessing the lower trunk and root crown areas. These trees are on private residential lots currently occupied by residents.

The trees in this study are noted by number on the color-coded tree location map markup by WLCA inserted below in this report. The sheet used for this purpose was a conceptual site plan sheet dated 2016 showing both the existing tree plot dots and the proposed building and below-ground parking garage footprints. WLCA subsequently added yellow highlighting to indicate current proposed walkways, magenta lines to indicate various proposed storm drain trenches and utility trenches, and a heavy black outline to indicate the proposed extent of excavation for the underground parking facility which matches the proposed new building exterior wall footprint.

Note that WLCA also included thin black lines attached to each numeric tree tag number on the WLCA tree map. The black lines extend exactly to each surveyed tree plot dot, and can be used as a relatively accurate reference of actual offset distances between proposed work and the tree trunks.

Trees mainstems were measured at between 6 and 36 inches above grade (standard City of Redwood City tree measuring height) using a forester's D-tape that converts actual trunk circumference into diameter inches and tenths of inches. Trees that measure less than approximately 12 inches diameter at this height range were excluded from the study.

Tree heights were determined through use of a Nikon forestry pro 550 digital hypsometer.

Tree canopy spreads were estimated visually, and were noted as a total maximum observed spread diameter in the "height/spread" column in WLCA's tree data tables.

Canopy driplines were not indicated on the WLCA tree map markup. However, lopsided canopies with lopsided azimuth were noted in the attached WLCA Excel tree data tables under a dedicated column for canopy lopsidedness. Given the complexity of dealing with tree canopy driplines and proposed construction work, it may be necessary for Sunrise to retain a surveyor to accurately render the southward and westward lopsided canopy dripline edges of trees such as trees #1 through #7, etc. onto a survey plot sheet in order to more accurately assess negative impacts to the trees from buildout of the Sunrise building footprint.

Digital images of the study trees are included in this report, and show the trees mainly in groupings.

Tree data charts (Excel) are attached to the end of this report. The data charts contain both existing data for reference of pre-project conditions, as well as detailed notes and suggested tree protection and maintenance recommendations for each tree that correspond to the recommendations outlined in section 5.0 of this report.

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3.0 Observations & Discussion

Existing Parking Lot & Tree Canopy Lopsidedness

The trees

The Sunrise project proposes to amalgamate a number of separate lots that include an existing asphalt parking lot, a number of single family residential dwellings, and a restaurant. Many of the trees are native evergreen coast live oak (*Quercus agrifolia*) which tend to grow well without any supplemental irrigation. Most of these coast live oaks in the project area are growing along the fence line that separates the existing parking lot from East Selby Lane to the east (see WLCA tree map markup below in this report).

Phototropism

Unfortunately, most of the oaks have developed phototropic growth that tends toward the south and west which is the direction receiving the most intense sunlight as the sun tracks across the sky. The trees are thus in many cases lopsided with most of their canopies hanging into the project area. The current concept plan shows the proposed new building footprint and excavated underground garage within the canopy driplines of these trees (driplines not shown on WLCA tree map).

Building Footprint

Many of the oaks would be required to be significantly pruned back using branch and limb length reduction type pruning to reduce their southward and westward extension, thereby gaining adequate clearance between the new building and the trees. It is not entirely clear that this can be achieved, and it is suggested that an architect and/or surveyor plot the canopies accurately on a scaled architectural drawing to determine how much pruning would actually be required on each tree to achieve adequate clearance, accounting for such items as exterior scaffold erection around the perimeter of the building, staging, bucket lift vehicle travel, etc.

Roots Growing Horizontally

Another issue is the fact that older parking lots have less than modern standard baserock base compaction. This means that the lateral woody roots of trees such as trees #1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, etc. have likely developed extensive lateral woody root systems that extend horizontally as far as 30 to 40 feet or more southward and westward into the existing parking lot area, with roots mainly present in the uppermost 24 inches of the soil profile (i.e. between the bottom of the existing asphalt, and 24 inches below the baserock surface elevation). This is the typical Bay Area peninsula growth pattern of tree roots in clay-based soils, especially in urban areas where soil has been compacted to percentages higher than normal background compaction percent. These roots may be severely damaged or destroyed during demolition of the existing parking lot and during excavation for the new underground garage and new building footprint.

The solution from an arborist consultant's standpoint would be to simply allow the existing asphalt to remain as-is between the trunks and out to approximately 30 feet radius from trunks during the entire site plan development period, and then carefully demolish only the uppermost asphalt surfacing at the very end of the project, just prior to landscape and irrigation pipe installation. This would allow the existing asphalt to remain as a "ground protection barrier" or "soil buffer" throughout the entire site demolition and construction phase, preventing unnecessary soil pore space compaction, rutting, etc. that would normally occur on open soil tree root zone areas stripped of asphalt surface protection.

It is clear that there are both potential canopy conflicts and root extension conflicts with the proposed building footprint and proposed garage excavation footprint, which are both currently set at the same limit line shown on the author's tree map markup below in this report.

Tree Species' Desirability & Overhead Utility Line Clearance Pruning Damage

Some of the trees at this project site are of lower desirability, such as tree of heaven #9, birch #15, and tulip poplars #16, 17, and #18. These trees are considered to be weaker (#9) and of shorter lifespans than would be species such as coast live oak. Additionally, tulip poplars are susceptible to various pest insects which secrete fecal matter as sugary "honeydew" that sticks to car paint and is a serious and legitimate nuisance.

Another issue to consider is the fact that many of the trees have been pruned to clear overhead high voltage electrical utility wires than run at approximately 30 to 35 feet elevation.

Some of the trees have also been pruned to clear lower elevation wires such as low voltage cable TV and/or telephone communications wires. It is not known why this would have occurred, since these low voltage wires are never normally cleared by utility company pruning contractors unless a tree fails and has destroyed the wire system.

Trees #16, 17, and #18 are potentially retainable. However, considering the above-noted factors, it may be better to simply remove the trees and replace them with more desirable species that attain shorter ultimate heights such that the trees do not end up being pruned to clear the wires in the future. The landscape arborist of record (LAOR) on this project can be consulted to recommend appropriate replacement tree species, or WLCA can work with the LAOR to determine appropriate species.

Tree #9 can either be retained or removed. Although the tree of heaven is typically considered a weak wooded, fast growing, short lived trash tree, specimens in good condition in terms of structure and vigor (such as this particular specimen #9) can be retained as shade trees for relatively long periods of time in the landscape. Some specimens of this species have been known to provide good site screening and shade value for many decades in and around the Bay Area peninsula area. As always, good maintenance practices are warranted, such as periodic monitoring for branch splitouts, regular irrigation application, etc.

Oaks #23, #24, and #25 in Proposed Driveway Area

Construction of the current proposed driveway area that extends west of the proposed new building footprint will require removal of large diameter coast live oaks #23, 24, and #25 in good, good, and fair overall condition respectively.

Native oaks of this diameter class size and canopy size in the landscape are typically not allowed by City Planners and City Councilmembers to be removed on a residential area site plan project, especially when the trees are located as these are at the outermost perimeter area of a proposed site. However, given the extensive reach of the proposed Sunrise project, it is possible that these trees will be allowed to be removed.

If the City of Redwood City Staff and Council is flexible in terms of allowing removal of these trees and allowing replacement of lost evergreen canopy value with new landscape trees, then we can reach a solution. Two basic options for retention or removal of these coast live oaks exist:

a. Request removal of the trees, with the understanding that each large diameter oak is replaced with an on-site irrigated planting of three 48" box size native oaks or other high value tree species to be determined.

   This would be a total of nine 48" box size trees as on-site landscape replacement for the loss of these three oaks.

b. Adjust the proposed driveway plan to eliminate the northmost 50% of the proposed paved area that connects the proposed building to the existing neighbor parking lot to the west of the project site.

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The drawback to this solution is that if the southmost 50% of the proposed drive area is demolished and renovated, the use of modern over-excavation and subbase soil compaction to 95% proctor, etc. along the southmost half of the current proposed asphalt driveway might in itself result in extensive root loss or root damage to the three oaks, ending in possible decline or death of the trees that were intended to be preserved.

Also, it is not likely that the existing older asphalt drive located south of the three oaks would be allowed to remain "as-is" in order to avoid damages to the oak trees' root systems growing horizontally beneath the asphalt, no matter how valuable or important the oaks might be. This means that the trees' root systems may end up being damaged by driveway renovations occurring south of the trees, even if the tree canopies themselves were to be preserved and protected above ground.

4.0 Tree Ordinance / City of Redwood City, California

All trees on street right of ways, and all private property trees of all species measuring 12.1 inches diameter at between 6" and 36" above mean grade are protected within the City of Redwood City, California areas that are not "County-controlled" areas.

Per this definition, all 28 study trees in this report are considered to be of protected size, and cannot be removed without formal City approval.

5.0 Tree Protection and Maintenance Recommendations

a. Project Arborist:

Prior to commencement of the project work, retain the services of a project arborist ("PA") if required per Redwood City Staff conditions of approval (COA). The PA shall be either an ASCA registered consulting arborist, or an ISA certified arborist, with at least 5 years of experience inspecting construction around trees in the Bay Area.

The PA may perform such services as, but not limited to the following:

a. Soil moisture monitoring with a Lincoln moisture meter or equivalent.
b. Trunk buffer verification.
c. Fencing erection verification.
d. Preparation of periodic inspection reports to be sent to the project team and City Staff.
e. Assessment of root damages, root pruning quality, trench alignment "field adjustments", etc.

b. Trunk Buffers:

Prior to any site demolition work commencement, **install trunk buffers around the trunks of all of the subject trees assessed in this report that are to be retained.** Use at least one (1) entire roll of orange plastic snow fencing, wrapping the roll around the lowermost eight feet of the trunk of each tree. Place 2X4 wood boards or waste wood pieces standing upright, side by side, over the plastic buffer, and secure the boards with duct tape per the sample spec image above right.

c. Root Protection Zone Fencing:

Chain Link Fencing Protection:

Erect five-foot tall chain link fence on seven-foot long, two-inch diameter iron tube posts pounded 24 inches into the ground. Alternatively, use chain link fence panels set on small moveable concrete block footings and affixed to rebar or steel layout stakes pounded into the ground at the end of each fence panel to make the fence perimeters rigid and immobile (see sample image at right).

Pre-demolition fence:

This fencing must be erected prior to any heavy machinery traffic or construction material arrival on site.

The protective fencing must not be temporarily moved during construction . No materials, tools, excavated soil, liquids, substances, etc. are to be placed or dumped, even temporarily, inside the root protection zone or “RPZ”.

The general route for fencing erection should be at least 15 to 30 feet radius offset from each tree trunk, or the canopy dripline, or as far as possible offset from trunk to allow for proposed work to occur.

No storage, staging, work, or other activities will be allowed inside the RPZ except with PA monitoring.

Signage:

The RPZ fencing shall have one sign affixed with UV-stabilized zip ties to the chain link at eye level for every 20-linear feet of fencing, minimum 8”X11” size each, plastic laminated, with wordage that includes the Town Code section that refers to tree fence protection requirements (wordage can be adjusted):

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TREE PROTECTION ZONE FENCE

ZONA DE PROTECCION PARA ARBOLES

-NO ENTRE SIN PERMISO-
-LLAME EL ARBOLISTA-
REMOVAL OF THIS FENCE IS SUBJECT TO PENALTY ACCORDING TO CITY OF REDWOOD CITY CODE

(ADD APPROPRIATE CODE HERE)

PROJECT ARBORIST:
TELEFONO CELL: **EMAIL:**

d. Project Team Plan Adjustments & Verifications:

i. Demolition of Asphalt Parking Lot / Special Notes:

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Demolition Phasing:

Surface materials such as the older **asphalt (A/C) parking lot areas within 30 feet of oaks being retained** should be demolished only at the end of the project, and **should be allowed to remain as-is throughout the entire building period**, such that the asphalt acts as ground protection for the root zones of oaks #1 through #7, etc. This will avoid rutting, soil pore space compaction, etc. from machinery and vehicle travel.

Demolish the asphalt just prior to final landscape and irrigation work at the very end of the project.

Demolition Methods / Special:

Use the “shallow-peel” technique which involves peeling laterally with the bucket teeth of an excavator. If possible, all baserock base course beneath the surfacing shall be allowed to remain in-situ, to avoid damaging or destroying existing woody lateral roots extended from oaks from trunks to 30 feet out from trunks.

ii. Tree / Pipe Trench Offsets:

It is suggested that the project team verify that all proposed trench routes for all utilities and drainage pipe alignments (including landscape plant and tree irrigation pipes). **The finalized alignments need to maintain a minimum of 20 to 30 lateral feet offset between trench edges and tree trunk edges of all trees being retained**, except in special cases such as for trees #27 and #28 where the trenches will be aligned through a historical residence foundation at 10 to 20 feet from trunks (i.e. an area which is assumed to have been an impediment for most tree root growth and would therefore theoretically not contain a dense tree root mass).

Trees most likely to be affected by trenching are **trees #1, 2, 3, 6, 7, 11, and #12.**

iii. Walkway Offsets:

Consider realignment of the proposed walkway that is currently proposed to extend directly adjacent to tree #13 being retained. WLCA suggests adjusting the walkway such that the walk edge is at least **10 feet offset from the tree #13 trunk.**

Alternatively, the walkway could be raised up and floated over the existing soil root zone surface to become what is known as a “root bridge” or a “no dig system”, with zero cut below grade for baserock placement. These systems are simple to install, and will either have no baserock or a shallow layer of baserock. Edging is typically a feathered (tapered) edge, or a very shallow wood header board set at maximum 2 inches below existing grade.

iv. Building Footprint vs. Lopsided Oak Canopies:

Oaks #1, 6, 7, and #10 are lopsided to the south and/or west, and will be in direct conflict with the proposed new Sunrise building footprint exterior, or at least the scaffolding that will be erected around the perimeter of the new building. Other tree specimens may also be in conflict with the proposed building footprint (not verified at the time of writing).

In order to preserve as many trees as possible along the E. Selby Lane corridor area of the site, we will need to either push the proposed building footprint farther south and west, or **perform extensive limb length reduction to reduce the trees’ extension to the south and west.**

Given the complexity of dealing with tree canopy driplines and proposed construction work**, it may be necessary for Sunrise to retain a surveyor to accurately render the southward and westward lopsided canopy dripline edges of trees such as trees #1 through #14, etc. onto a survey plot sheet with the proposed building footprint overlaid, in order to more accurately assess negative impacts to the trees from required lateral clearance pruning to clear the buildout of the Sunrise building footprint and any additional offset required for scaffold erection around the building.**

The project team may want to physically set up some type of **spray paint or survey markers along the route of the current proposed building footprint exterior**, so that City Staff and the project team (including the chosen tree pruning contractor) can assess actual conflicts between oak canopies and the building north side and northeast corner areas, and spray paint or otherwise note exact locations of where to prune oaks #1, 6, 7, and #10 (and other trees as necessary) to clear the proposed building and any required standard scaffolding that may extend an additional five to six horizontal feet around the building.

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All pruning shall be performed only by, or under direct full time supervision of an ISA-Certified Arborist, and shall conform to the most current iteration of the American National Standard Institute pruning guidelines and accompanying ISA Best Management Practices / Pruning booklet:

- ANSI A300 (Part 1) tree, shrub, and other wood plant maintenance / standard practices (*pruning*). 2001.

- Best Management Practices / Tree Pruning: companion publication to the ANSI A300 Part 1: tree, shrub, and other wood plant maintenance / standard practices (*pruning*). International Society of Arboriculture. 2002.

v. Underground Garage Excavation vs. Oak Root Systems:

Oaks #1 through #7 likely exhibit horizontally extended root systems that extend 30 to 40 feet radius (or more) southward and westward, coursing through the old base rock just underneath the existing asphalt parking lot.
It is suggested that the project team consider modification of the proposed building footprint exterior foundation work limit, and the underground parking garage excavation work limit which coincides exactly with the building exterior. The modification suggested is a push to the south and/or west to allow for better lateral offset distance between the oaks' root systems and the excavation cut which will destroy 100% of all lateral woody and absorbing root mass at that distance.

A suggested minimum distance is 25 to 30 feet from excavation cut to tree trunks.

Also note that an "**OSHA layback cut",** often used during deep excavation for new underground parking garages as a safety device that continues a slope cut away from the vertical cut area, is **suggested to be eliminated** (if proposed) for this project, as it would cause severe root damage to the oaks being preserved and protected to the north and east of the building footprint.

Use of vertical shoring is the preferred alternative to use of an OSHA layback cut. Shoring can be used to hold up the soil in a safe manner for construction personnel while the garage area is built below grade.

See WLCA's sample image above right showing vertical wooden shoring we used at College of Notre Dame to save a large redwood tree specimen adjacent to a retaining wall cut. Because the OSHA layback type cut was eliminated on this project, we were able to preserve most of this tree's root system, and it survived easily. Pumpable aluminum shoring devices are available for other types of shoring situations.

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vi. Landscape Plan and Irrigation Plan:

Route the proposed landscape and irrigation plan through WLCA or another consulting arborist to verify that proposed new **irrigation pipe trench routes** are offset adequately from the trunks of all trees being retained (e.g. **20 to 30 feet offset minimum**), and also verify that new tree species and planting locations selected for new site tree installations are appropriate for the site.

vii. Tree Removals / Required Under Current Concept Plan:

Obtain formal tree removal permits for trees that are to be removed due to direct conflicts with the proposed site plan (e.g. **trees #15, 19, 20, 21, 22, 23, 24, and #25**).

Consider redesigning the asphalt area at the west most end of the site to allow for retention of oaks #23, 24, and #25. Note however that the driveway area south of these three trees, if renovated using standard deep baserock base section excavation, could in itself have a serious negative impact on the trees' horizontally extended root systems, which could damage or kill the trees from below ground impacts, even if their canopies were preserved and protected above ground.

Consider installation of large size boxed trees such as 48" or 60" native coast live oak or other species at a 3:1 mitigation ratio for loss of existing oak #23, 24, and #25 canopy value (if removed). Work with City Staff to determine adequate replacement ratios, etc.

b. Tree Removals / Author Suggested:

WLCA suggests considering removal of **trees #8, 16, 17, and #18** due to poor condition and/or low species value in the landscape.

c. Irrigation / Permanent:

Keep all trenched irrigation piping 20 to 30 feet offset from all trees being retained.

Keep all irrigation water output (high flow adjustable bubblers, low flow bubblers, overhead spray, microspray, inline emitters, soaker tubes, etc.) at least 25 feet offset from the trunk edge of any existing native coast live oak or valley oak specimen being retained on site (*Quercus agrifolia, Quercus lobata*).

d. Irrigation Temporary During Construction:

Apply temporary irrigation to certain specified trees being retained, at a frequency and duration or total output to be specified by the project arborist (PA).

Method of water delivery can be soaker hose, emitter line, garden hose trickle, water truck, tow-behind water tank with spray apparatus, etc.

Most native oaks will only require water on a once-monthly basis, and it will need to be applied as far as possible offset from the trunk edges (e.g. **15 to 20 feet out from trunks only**).

Unlike native oak trees, the non-oaks at this site such as **tree of heaven #9** can be irrigated heavily on a regular basis (e.g. twice weekly, etc.) throughout all areas of their root zones, near to trunks and far from trunks, and will greatly benefit from such construction period temporary irrigation.

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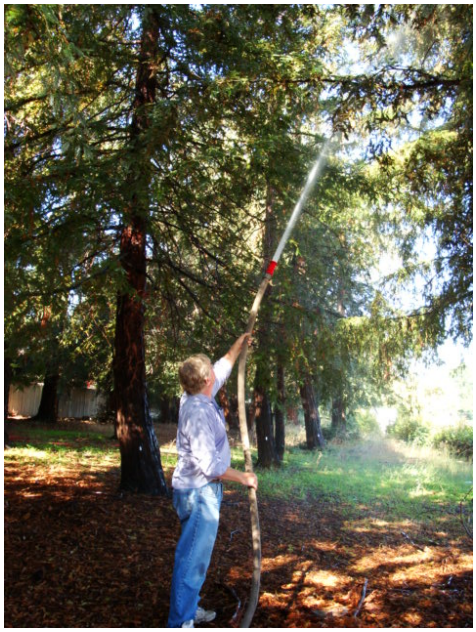
e. Root Pruning:

If **woody roots measuring greater than 1-inch in diameter** are encountered within 25-feet of any tree being retained during site work, contractors shall immediately alert the project arborist, and shall proceed to sever roots at right angles to the direction of root growth using sharp hand tools such as professional grade loppers, hand shears, chain saw, A/C sawzall, or other tools only under his/her direct supervision. See spec images at right. Note that a Sawzall blade indicating use for "bimetal" or "demolition" is typically not a good choice for this work. Instead, opt for a relatively large-toothed blade that indicates use for "pruning" or "wood" (see images at right).

Woody roots shall not be shattered or broken in any way as a result of site activities. Shattered or broken areas shall be hand dug back into clear healthy root tissue and re-severed at right angles to root growth direction under the direct supervision of the project arborist (PA). Immediately (same day) backfill over roots and heavily irrigate (same day) after backfill to saturate the uppermost 24 inches of the soil profile.

f. Water Spray:

Spray off foliage of all trees within 30 feet of construction activity using a very high power garden hose or a pressure washer system set on low pressure setting to wash both the upper and lower surfaces of foliage. This helps keep the gas portals (stomata) unclogged for better gas exchange which is crucial for normal tree function (see image at right in which a fire hose system was used to wash approximately 50 redwood tree specimens during a one-year long demolition period). Spray should be applied approximately twice yearly, or when ambient airborne dust concentration is unusually high.



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g. Optional Tree Maintenance:

It is suggested that the tree owner consider retaining a qualified tree care service provider to install **through-bolt braces** through the bark inclusion type mainstem forks of **oaks #1 and #3**.

All tree support systems would need to be installed per the detailed specifications noted in the most current iteration of ANSI A300 standard for tree support systems.

If **oak #8** is retained, then monitor vigor in 2017. If the tree does not rebound with relatively good vigor in 2017 (e.g. good live twig and foliar density and good live twig extension, etc.), then consider soil injection fertilization with **Greenbelt 22-14-14** (this is the Best Management Practice fertilizer formula currently in use in the Bay Area by local tree care providers who have soil injection fertilization trucks).

6.0 Consultant's Qualifications

- Contract City Arborist to the City of Belmont Department of Planning and Community Development
  5/99-present
- Contract Town Arborist, Town of Los Gatos, California Planning and Community Development
  11/15-present
- Continued education through attendance of arboriculture lectures and forums sponsored by The American Society of Consulting Arborists, The International Society of Arboriculture (Western Chapter), and various governmental and non-governmental entities.
- ISA Qualified Tree Risk Assessor
- ISA Qualified Tree Risk Assessor Course, Palo Alto, CA. 2013
- PNW-ISA Certified Tree Risk Assessor Course graduate, 2009
  Vancouver, B.C., Canada
- ASCA Registered Consulting Arborist (RCA) #401
- Millbrae Community Preservation Commission (Tree Board)
  2001-2006
- ASCA Arboriculture Consulting Academy graduate, class of 2000
- ISA Certified Arborist (CA) #WC-3172
- Associate Consulting Arborist
  Barrie D. Coate and Associates
  4/99-8/99
- U.S. Peace Corps Soil and Water Conservation Extension Agent (Agroforestry, etc.)
  Chiangmai Province, Thailand 1991-1993
- B.A. Environmental Studies/Soil and Water Resources
  UC Santa Cruz, Santa Cruz, California 1990

  Chancellor's Award, 1990

  Wildlands Studies Joint U.S./China Field Ecology Study (12 Weeks). 1989
  Xujiaba Forest Reserve, Yunnan, China

  Rocky Mountain Wilderness Field Ecology Study (5 Weeks). 1986
  UC Santa Cruz Extension

(My full curriculum vitae is available upon request)

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7.0 Assumptions and Limiting Conditions

Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised and evaluated as through free and clean, under responsible ownership and competent management.

It is assumed that any property is not in violation of any applicable codes, ordinance, statutes, or other government regulations.

Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.

The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

Unless required by law otherwise, the possession of this report or a copy thereof does not imply right of publication or use for any other purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the consultant/appraiser.

Unless required by law otherwise, neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales, or other media, without the prior expressed conclusions, identity of the consultant/appraiser, or any reference to any professional society or institute or to any initiated designation conferred upon the consultant/appraiser as stated in his qualifications.

This report and any values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraiser's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

Sketches, drawings, and photographs in this report, being intended for visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise. The reproduction of any information generated by engineers, architects, or other consultants on any sketches, drawings, or photographs is for the express purpose of coordination and ease of reference only. Inclusion of said information on any drawings or other documents does not constitute a representation by Walter Levison to the sufficiency or accuracy of said information.

Unless expressed otherwise:

- information contained in this report covers only those items that were examined and reflects the conditions of those items at the time of inspection; and
- the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

Loss or alteration of any part of this report invalidates the entire report.

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. Tree are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborist 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. The only way to eliminate all risk associated with trees is to eliminate the trees.

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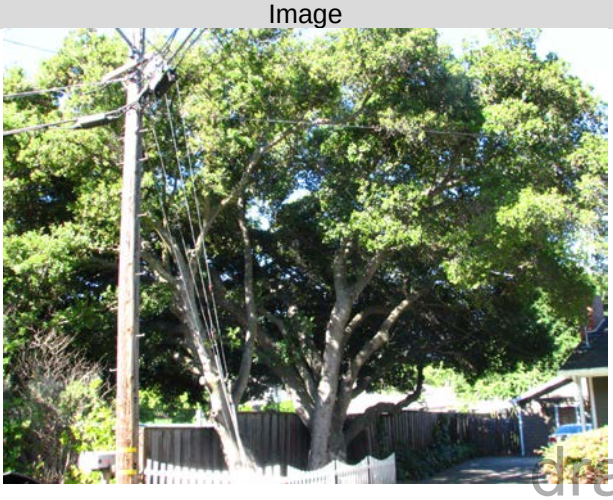
8.0 Certification

I 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 are made in good faith.

Signature of Consultant

9.0 Digital Images

Tag #	Image	Tag #	Image
1, 2, 3		R to L 4, 5	
R to L 6, 7, 8		8 center of image	

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9

R to L

10, 11, 12

13, 14

North view of oaks 10, 11, 12, 13, & 14 extend-ed south and west into the (e) lot.

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15

R to L
16, 17,
18

19

20

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21

22

23

24, 25

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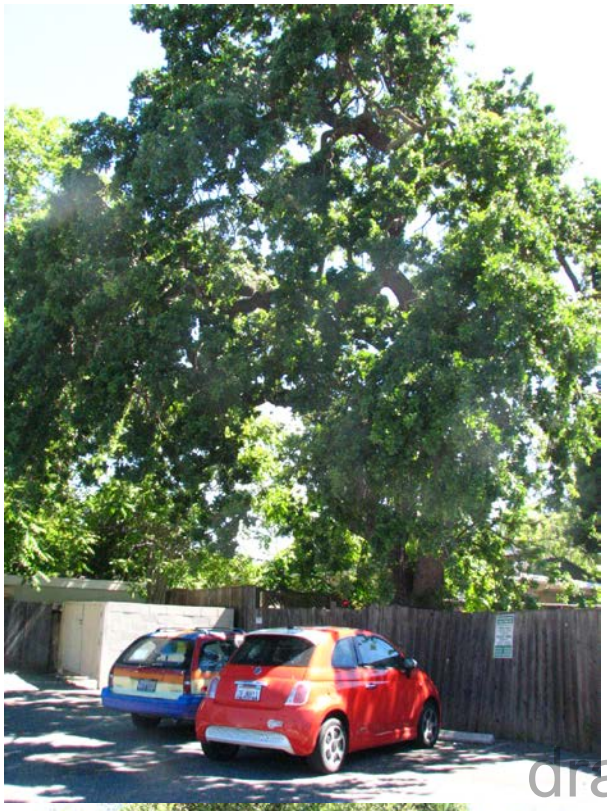
26



R to L

27, 28

R to L

27, 28

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10.0 Tree Location Map Mark-Up (WLCA)

The following map is a markup by WLCA utilizing the current proposed grading and drainage plan sheet. The tree plot dots were surveyed by the project surveyor. Numbers indicated on the markup are tree tag numbers affixed to each tree by WLCA. The black lines shown next to each tree tag number end at each trunk plot dot.

Magenta colored lines are the current team-proposed utility and drainage pipe alignments.

Yellow highlighted areas are the current team-proposed walkways.

Black heavy lines outline the limit of current-proposed underground garage excavation, which coincides with the proposed building foundation footprint.

WLCA assumes that these proposed utility, drainage, and walkway items can be adjusted as necessary to avoid destroying the root systems of important trees being retained, such as native oaks in good overall condition (see the Excel tree data charts for more details in individual trees).

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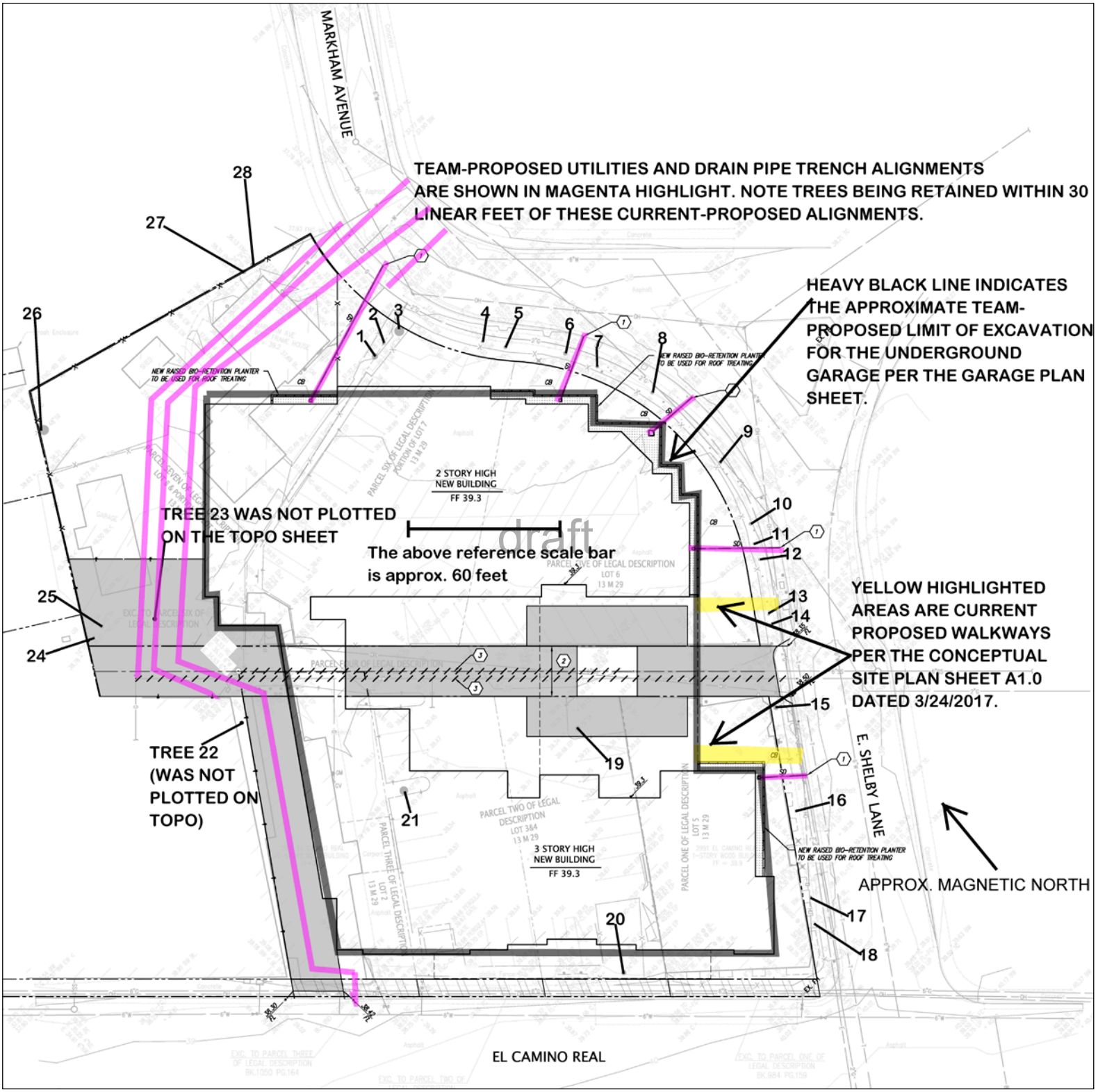

Site Address: 2915 El Camino Real, Redwood City, CA Version: 5/5/2017

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11.0 Tree Data Table Attached (WLCA)

(ATTACHED EXCEL DOC)

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Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
1	coast live oak	*Quercus agrifolia*	30.4	0	0	0	30.4	Yes	30/40	90/85	78% good	good				south and west	south and west		yes					X								Possible canopy and root zone conflict with proposed foundation footprint.	TB, RPZ, endweight reduction pruning, fork bracing
2	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Yes	35/25	80/70	75% good	mod to good				west	north															Possible root zone conflict with proposed foundation footprint.	TB, RPZ
3	coast live oak	*Quercus agrifolia*	28.2	0	0	0	28.2	Yes	30/25	75/65	70% good	mod to good				south	south		yes.														Was pruned to clear overhead wires.	TB, RPZ, and possible fork bracing
4	California valley oak	*Quercus lobata*	16.5	0	0	0	16.5	Yes	45/30	86/77	80% good	good																					Was pruned to clear overhead wires.	TB, RPZ
5	California valley oak	*Quercus lobata*	20.4	0	0	0	20.4	Yes	45/30	85/80	83% good	good				southwest	south west																Was pruned to clear overhead wires.	TB, RPZ
6	coast live oak	*Quercus agrifolia*	est. 24	0	0	0	est. 24	Yes	35/45	75/75	75% good	mod to good				southwest	south																Was pruned to clear overhead wires. Proposed storm drain conflicts with root system. Possible canopy conflict with proposed new building.	TB, RPZ, adjust storm drain trench to another location at least 20 feet or more offset from trunk edge of this tree.
7	coast live oak	*Quercus agrifolia*	14.3	0	0	0	14.3	Yes	35/35	80/70	74% good	mod to good				southwest																	Was pruned to clear overhead wires. Proposed storm drain conflicts with root system. Possible canopy conflict with proposed new building.	TB, RPZ, adjust storm drain trench to another location at least 20 feet or more offset from trunk edge of this tree (tree may be destroyed due to heavy clearance pruning).
8	coast live oak	*Quercus agrifolia*	est. 22	0	0	0	est. 22	Yes	40/30	20/20	20% very poor	very poor																			X	Tree may or may not rebound in terms of live twig density over time. Possible severe pruning required to clear proposed new building footprint.	If retain tree, then use TB, RPZ, and Greenbelt 22-14-14 fertilizer over open soil root zone areas, and monitor over time to determine if tree is increasing in live twig density. Clearance pruning may destroy tree.
9	tree of heaven	*Ailanthus altissima*	est. 22	0	0	0	est. 22	Yes	45/40	75/75	75% good	mod																					Tree appears to be retainable based on current proposed site plan work limits. Tree is considered to be a trash tree by many, but this specimen is in good condition.	TB, RPZ, W
10	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Yes	35/35	85/75	80% good	good				west	west								X								Canopy is lopsided west, and may require significant pruning to reduce size and maintain adequate lateral airspace.	TB, RPZ, Prune to clear proposed work area.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
11	coast live oak	*Quercus agrifolia*	15.8	0	0	0	15.8	Yes	27/30	90/55	75% good	good				west	west							X								Proposed storm drain will destroy root system. Need to realign the SD. Note severe lean. Prune to reduce extension?	TB, RPZ, Prune to reduce westward extension? Realign proposed storm drain to at least 15 or 20 feet offset from trunk.
12	coast live oak	*Quercus agrifolia*	19.4	0	0	0	19.4	Yes	35/40	85/80	84% good	good				south west	south west															Proposed storm drain will destroy root system. Need to realign the SD.	TB, RPZ Realign proposed storm drain to at least 15 or 20 feet offset from trunk.
13	coast live oak	*Quercus agrifolia*	13.6	0	0	0	13.6	Yes	35/25	85/75	83% good	good				south																Proposed walkway is in conflict with the root system of this tree, unless it is relocated or built as a floating baserock system over existing soil grade with zero excavation.	TB, RPZ, and either relocate proposed walkway or eliminate baserock excavation cut to keep this as a "no dig" walkway system.
14	coast live oak	*Quercus agrifolia*	12.0	0	0	0	12	Yes	20/20	75/50	66% fair	good				south west	south west	Yes. And truck hits noted														Tree appears retainable, even with proposed roadway work just south of tree. Tree was pruned to clear various low voltage phone or TV utility wires in the past.	TB, RPZ, and prune to clear proposed roadway footprint as necessary.
15	European birch	*Betula pendula*	14	8	5	0	27	Yes	35/45	65/50	55% fair	mod						X												X	X	Was topped to clear various overhead utility wires in the past. Tree appears to be less than 5 feet offset from proposed new roadway. Expect tree to be removed if roadway base is rebuilt, due to deep excavation for new baserock, etc. that will destroy the north side of this tree's root system.	——
16	tulip poplar	*Liriodendron tulipifera*	17.5	0	0	0	17.5	Yes	25/30	70/45	57% fair	mod	X					X													?	Was topped to clear various overhead utility wires in the past. Tree is susceptible to various insect pests. Root system extension westward is very limited, due to presence of existing building foundation. Root system expansion causing severe sidewalk slab displacement.	TB, RPZ, W if retained.
17	tulip poplar	*Liriodendron tulipifera*	17.3	0	0	0	17.3	Yes	25/30	65/55	59% fair	mod	X					X													?	(Same as #16 above)	TB, RPZ, W if retained.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
18	tulip poplar	*Liriodendron tulipifera*	15.6	0	0	0	15.6	Yes	30/25	65/55	59% fair	mod	X					X													?	(Same as #16 above)	TB, RPZ, W if retained.
19	American elm	*Ulmus americana*	29.7	0	0	0	29.7	Yes	35/40	25/25	25% very poor	poor	X																	X	X	Twig and branch dieback throughout noted. Root crown decay noted. Tree is slated for removal due to conflicts with plan.	—
20	tree of heaven	*Ailanthus altissima*	28.1	0	0	0	28.1	Yes	35/30	20/15	18% very poor	very poor	X																	X	X	Twig and branch dieback throughout noted. Root crown decay noted. Flux noted on bark. Assymetrical root plate noted. Tree is slated for removal due to conflicts with plan.	—
21	American elm	*Ulmus americana*	43.5	0	0	0	43.5	Yes	45/45	40/30	35% poor	poor	X					X	X											X	X	Tree has been limbed up many times to clear the existing Bentley's restaurant parking lot stall areas. Tree exhibits multiple codominant mainstems with bark inclusions (structural defect). Tree to be removed due to conflicts with building footprint.	—
22	tree of heaven (tree located in a locked fence area)	*Ailanthus altissima*	Est. 21	0	0	0	Est. 21	Yes	35/30	70/55	65% fair								X											X	X	Tree not plotted on surveyor's topo sheet. Tree was added as a rough plot dot by WLCA. Tree expected to be removed during excavation for new commercial vehicle access road.	—
23	coast live oak (not plotted on project topo)	*Quercus agrifolia*	est. 35	0	0	0	est. 35	Yes	40/50	90/60	80% good	good				east			X											X		There was no access to this tree which is located within a locked fenced area. Tree located in the proposed multiple pipe trenching zone. It is assumed tree will be removed anyway, due to the proposed asphalt driveway footprint for the west side of the site.	—
24	coast live oak	*Quercus agrifolia*	est. 26	0	0	0	est. 26	Yes	35/30	90/60	73% good	good				south east	south east													X		Tree to be removed due to proposed asphalt driveway at the west side of the site	—

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 6 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
25	coast live oak	*Quercus agrifolia*	est. 26	0	0	0	est. 26	Yes	27/30	90/40	65% fair	good				west	west													X		Tree to be removed due to proposed asphalt driveway at the west side of the site. Note severe trunk lean off vertical to the west.	----
26	California valley oak	*Quercus lobata*	est. 30	0	0	0	est. 30	Yes	35/35	75/65	70% good	mod																				Tree is shown on the conceptual site plan sheet A1.0 to be retained at the northwest corner of the merged lot area. Tree was not fully assessed due to lack of access to the lower trunk. Assume "good" overall condition rating.	TB, RPZ, and maintain offsets of at least 30 feet between trunk and nearest trenching for irrigation, utilities, drainage.
27	coast live oak	*Quercus agrifolia*	30.5	0	0	0	30.5	Yes	50/50	90/70	80% good	good				south west																Note root extension to south may be severely limited due to presence of existing house foundation 4 or 5 feet south of trunk, but this cannot be verified. Current proposed utility trenching appears far enough offset to south that it will not interfere with the root system of this tree.	TB, RPZ, and maintain offsets of at least 15 to 20 feet between trunk and nearest trenching for irrigation, utilities, drainage. Do not renovate driveway to the north of trunk, as this could cause severe root loss and death of the tree.
28	coast live oak	*Quercus agrifolia*	30.3	0	0	0	30.3	Yes	30/30	75/60	67% fair	good	X		X	south east																Sycamore bark moth larvae feeding causing severe wood tissue necrosis in lower trunk area. Root expansion causing severe displacement of the existing driveway to north (neighbor property). As noted above, root extension to south is limited due to existing house to be demolished. However, WLCA still recommends keeping all utilities offset from trunk at least 15 to 20 feet.	TB, RPZ, and maintain offsets of at least 15 to 20 feet between trunk and nearest trenching for irrigation, utilities, drainage. Do not renovate driveway to the north of trunk, as this could cause severe root loss and death of the tree.

Notes:

1. On-site survey trees include all existing specimens of tree species with at least one (1) mainstem measuring greater than or equal to 12.1 inches diameter when measured at between 6 inches and 36 inches above mean grade.

2. Various trees in this study were located behind locked private property gates, and were therefore assessed from afar without access to the lower trunks. These trees are noted with trunk diameters of "estimated" in the table above.

3. Heights measured using a Nikon 550 Forestry Pro. Diameters were measured at between Redwood City standard height of between six and thirty-six inches above mean grade using a forestry D-tape that converts circumference to an average diameter. Canopy spread is noted in visually estimated feet (shown with both height and spread data for each tree in a single cell).

4. Locations of the trees are shown on a tree plot sheet provided by Sunrise, marked up by WLCA.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance

Protection and Maintenance Specifications:

RPZ: Root protection zone fence, chain link, with 2" diameter iron posts driven 24" into the ground, 6 to 8 feet on center max. spacing.
RB: Root buffer consisting of wood chip mulch lain over existing soil as a 12 inch thick layer, overlain with 1 inch or greater plywood strapped together with metal plates. This root buffer or soil buffer should be placed over the entire width of the construction corridor between tree trunks and construction.
RP: Root pruning. Prune woody roots measuring greater than or equal to 1 inch diameter by carefully back-digging into the soil around each root using small hand tools until an area is reached where the root is undamaged. Cleanly cut through the root at right angle to the root growth direction, using professional grade pruning equipment and/or a Sawzall with wood pruning blade. Backfill around the cut root immediately (same day), and thoroughly irrigate the area to saturate the uppermost 24 inches of the soil profile.
TB: Trunk buffer consists of 20-40 wraps of orange plastic snow fencing to create a 2 inch thick buffer over the lowest 8 feet of tree trunk (usually takes at least an entire roll of orange fencing). Lay 2X4 wood boards vertically, side by side, around the entire circumference of the trunk. Secure buffer using duct tape (not wires).
F: Fertilization with Greenbelt 22-14-14 tree formula.
M: 4-inch thick layer of wood chip mulch (Lyngso, self pickup). Do not use bark chips or shredded redwood bark.
W: Irrigate using various methods to be determined through discussion with General Contractor. Irrigation frequency and duration to be determined through discussion.
P: Pruning per specifications noted elsewhere. All pruning must be performed only under direct site supervision of an ISA Certified Arborist, or performed directly by an ISA Certified Arborist, and shall conform to all ANSI A300 standards.
MON: Project Arborist must be present to monitor specific work as noted in the notes box for each tree.