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

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

Revised 10/25/2017

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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 plan sheets received by WLCA from Sunrise Senior Living:

a. Fourteen (14) trees **#1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 26, 27, and #28** are to be retained per the current tree disposition plan sheet L-5 by Gates and Associates Landscape Architecture, dated 9/14/2017.

   See WLCA's color-coded tree map markup below in this report to see all potential tree conflicts on one sheet.

   There are various conflicts which may cause significant to severe root loss on one or more sides of the roots zones of the above trees. A table outlining all of the conflicts is includes as table 3.0(a) on pages 5, 6, and 7 of this report Observations/Discussion section. Below is a summary of these conflicts:

   - A proposed bioretention facility south of **trees #1, 2, and #3.**
   - A proposed walkway throughout the north corner of the site with expected base section excavation requirements near **trees #1, 2, 3, 26, 27, and #28**.
   - A proposed walkway along the east side of the site with expected base section requirements near to **trees #4, 5, 6, 7, 9, 10, 11, and #12.**
   - Storm drain trench alignments at various locations will encroach to distances less than 20 feet from the trunk edges of **trees #1, 2, 3, 6, 7, 10, and #26.**
   - Pruning clearance requirements for both the new building footprint and for scaffold erection around the exterior siding to allow for finish work to occur. This pruning will need to be performed on **trees #1, 6, 7, 9, 10, 11, and #12. The most severe pruning will need to occur on the proposed building sides of trees #1, 6, 7, and #10. The severity of pruning required may cause tree decline or even death.**
   - Other pruning to clear the landscape airspace may be required on other trees such as **tree #26.**

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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 associated with 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. The approximate canopy driplines were noted on the WLCA tree map markup as grey colored clouding so that conflicts with the proposed new building can be roughly assessed.

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.

For protection status purposes, WLCA used the County of San Mateo, California standards, which protect tree specimens of all species with at least one mainstem of 12-inches diameter or more as "significant trees", and all native oak specimens with a mainstem of 48-inches or larger as "heritage trees".

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.

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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.

This entire report document was requested to be updated by Sunrise Senior Living in October, 2017, to account for an updated set of plans being submitted to the County of San Mateo Planning Division for review.

3.0 Observations & Discussion

Table 3.0(a) is an exhibit that shows potential conflicts between trees being retained, and the proposed grading, drainage, and utility plan work as it appeared on 10/23/2017:

Tree Being Retained	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
1	Proposed bioretention area excavation 7 feet from trunk.	New pathway paver base section excavation and subgrade prep at 7 feet from trunk edge.	Storm drain pipe trenching at roughly 8 feet west of trunk edge.	Storm drain pipe trenching to street at 15 feet east of trunk edge.	Pruning to clear the proposed new building footprint and scaffolding for exterior work.
2	Proposed bioretention area excavation 7 feet from trunk.	New pathway paver base section excavation and subgrade prep at 7 feet from trunk edge.	Storm drain pipe trenching at roughly 14 feet west of trunk edge.	Storm drain pipe trenching to street at 14 feet east of trunk edge.	
3	Proposed bioretention area excavation 9 feet from trunk.	New pathway paver base section excavation and subgrade prep at 12 feet from trunk edge.	Storm drain pipe trenching to street at 8 feet east of trunk edge.		
4	New pathway base section excavation and subgrade prep at 7 feet from trunk edge.				
5	New pathway paver base section excavation and subgrade prep at 10 feet from trunk edge.				

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Tree Being Retained	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
6	New pathway paver base section excavation and subgrade prep at 10 feet from trunk edge.	New building foundation at 20 feet.	Prune south side of canopy to clear building footprint and scaffold erection airspace.	Proposed storm drain pipe trench alignment will encroach to 3 feet from trunk.	
7	New pathway paver base section excavation and subgrade prep at 8 feet from trunk edge.	New building foundation at 20 to 25 feet.	Prune south side of canopy to clear building footprint and scaffold erection airspace.	Proposed storm drain pipe trench alignment will encroach to 6 feet from trunk.	
9	New pathway paver base section excavation and subgrade prep at 10 feet from trunk edge.	New building foundation at 20 to 25 feet.	Prune south side of canopy to clear building footprint and scaffold erection airspace.		
10	New pathway paver base section excavation and subgrade prep at 7 feet from trunk edge.	Prune south side of canopy to clear scaffold erection airspace.	Proposed storm drain pipe trench alignment will encroach to 4 to 5 feet from trunk.		
11	New pathway paver base section excavation and subgrade prep at 5 feet from trunk edge.	Prune south side of canopy to clear building footprint and scaffold erection airspace.			
12	New pathway paver base section excavation and subgrade prep at 6 feet from trunk edge.	Prune south side of canopy to clear building footprint and scaffold erection airspace.			

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Tree Being Retained	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
26	**New pathway paver base section excavation and subgrade prep at 1 to 2 feet from trunk edge.**	**New storm drain pipe trench at 16 to 17 feet from trunk.**	**Prune to clear new pathway airspace as needed.**		
27	**New pathway paver base section excavation and subgrade prep at 8 feet from trunk edge.**				
28	**New pathway paver base section excavation and subgrade prep at 8 feet from trunk edge.**				

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.

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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.

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. Per the September 2017 revised landscape plan and tree disposition sheet L-5, these trees are to be removed.

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. Per the September 2017 version of tree disposition sheet L-5, this tree is to be retained.

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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. These trees are proposed to be removed per sheet L-5 tree disposition dated September, 2017.

REPLACEMENT TREE SPECIES PER LANDSCAPE PLANS DATED SEPTEMBER, 2017

The tree species and cultivars noted on the landscape plan set of sheets reviewed for this assignment, dated September 2017, contains some trees that need to be adjusted or clarified to avoid common disease issues to which these trees are susceptible. The current landscape palette and WLCA's suggested adjustments are outlined in the table below for clarity:

TABLE 3.0(b) WLCA Suggested Tree Palette Changes

Current Proposed Tree / Cultivar	Problems	Suggested by WLCA
1) Japanese maple.	**Finicky in dry weather such as at this site, unless given very fast drainage and heavy irrigation. Susceptible to wind burn if foliage is exposed to frequent winds without protection.**	**Try paperbark maple instead. (*Acer griseum*)**
2) Marina strawberry tree (*Arbutus* 'Marina').	**Has started to become susceptible to various maladies over the last few years.**	**Try evergreen swamp myrtle (*Tristaniopsis laurina*), or mix and match with Marina strawberry tree. They are sometimes planted together.**
3)* Flowering crabapple *Malus floribunda	**Bacterial fireblight, etc.**	**Use tree genera that are not in the fireblight-susceptible rose family of trees. I suggest we delete this tree from the palette.**
4) Chinese elm.	**Most of the cultivars are susceptible to Chinese elm anthracnose fungal infections, which are cankers that appear as concentric circles (like targets).**	**Use 'Drake', and/or another cultivar that is claimed by the tree grower to be resistant to Chinese elm anthracnose.**

IRRIGATION PLAN

There was no irrigation plan sheet available for review by WLCA at the time of writing.

4.0 Tree Ordinance / County of San Mateo, California

All trees measuring 12 inches and greater are considered "significant trees". All native oaks (coast live oak, California valley oak, etc.) are considered protected as "heritage trees" at the 48 inch diameter threshold.

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Per this definition, all 28 study trees in this report are considered to be protected as "**significant trees**" per County of San Mateo tree ordinance governing privately owned tree specimens, and cannot be removed without formal County approval. There are zero (0) heritage size trees included in this tree study of 28 tree specimens.

5.0 Tree Protection and Maintenance Recommendations

1) Project Arborist:

Prior to commencement of the project work, retain the services of a project arborist ("PA") if required per County of San Mateo 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 County Staff.
e. Assessment of root damages, root pruning quality, trench alignment "field adjustments", walkway base section excavation and subbase prep activity monitoring to verify maximum suggested cut depths.

2) 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.

3) Root Protection Zone Fencing:

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).

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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 initial fencing erection should be per the red-dashed lines shown on the color-coded WLCA tree map markup sheet attached to this report. The fencing routes may need to be continually adjusted over time to allow for landscape walkways, paths, plantings, irrigation, etc. to be installed.

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):

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 SAN MATEO COUNTY CODE

(ADD APPROPRIATE CODE HERE)

PROJECT ARBORIST:

TELEFONO CELL: **EMAIL:**

4) Project Team Plan Adjustments & Verifications:

i. Demolition of Asphalt Parking Lot / Special Notes:

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 20 or 30 feet south and west of the trunk edges.

Maximum depth of demolition excavation cut work shall be roughly 4 inches of asphalt and base rock material, stopping at the soil root zones of trees #1 through #12 below. Under no circumstances shall the open soil tree root zone areas between the proposed new Sunrise residential building and garage footprint edge and the trunks of trees #1 through #12 be demolished or adulterated. This zone shall be preserved as a no-dig zone where shallow-cut storm drains and shallow-cut or no-dig type walkway base work shall be performed. See recommendation #5(d)iii below for further information, and a side cut detail sketch.

ii. East Selby Lane Sidewalk:

Do not replace the existing sidewalk along E. Selby Lane sections adjacent to trees #1 through #12, as there may be an extensive network of both fibrous and woody roots coursing through the baserock of the existing older walkway, except in small areas where the storm drain pipes will need to shallow-run through the sidewalk slab to the street surface.

iii. Storm Drain Pipe Trenching / Shallow Cut Protocol:

It is suggested that the project team shallow-cut all proposed trench routes for all utilities and drainage pipe alignments (including landscape plant and tree irrigation pipes) which are proposed for the areas within 15 linear feet of trees being retained. Per WLCA's markup below, and per WLCA's discussion with the project civil engineer Kier and Wright[1], the new storm drain pipes will run from over-grade generally eastward toward E. Selby Lane, as very shallow cut trenches at or slightly below existing soil grade (i.e. soil grade elevations after existing older asphalt and baserock parking lot materials roughly 4 inches thickness or more are removed from the site). The storm drains are to run through the existing sidewalk slabs, and outfall onto the roadway surface at E. Selby Lane.

[1] Personal communication, Kier and Wright Civil. 10/25/2017.

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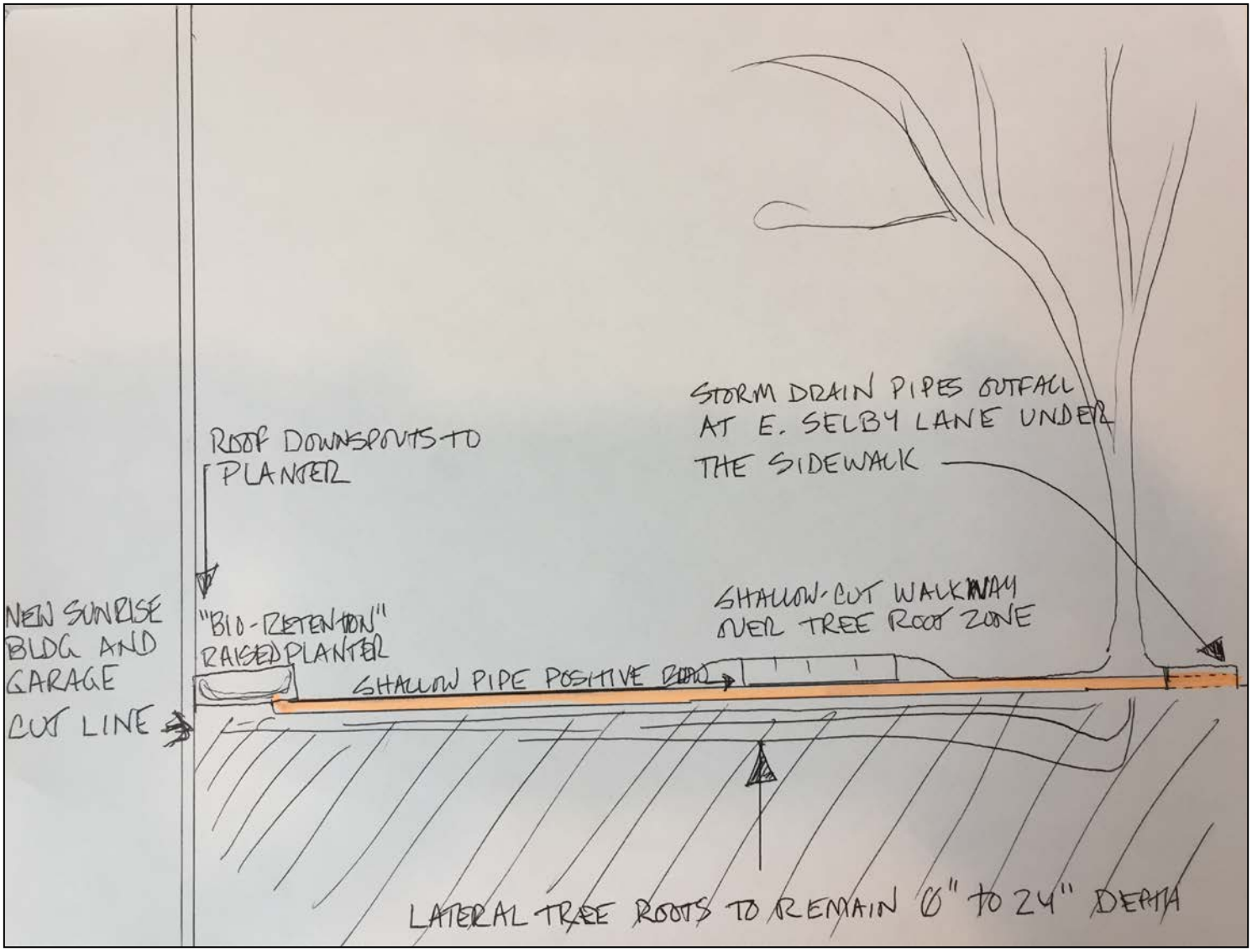
If possible, the actual storm drain pipe cut depth should be no deeper than 1 to 2 inches below soil grade, through the zone between the raised bed bio-retention planters and E. Selby Lane. See the WLCA side cut detail sketch below on page 13 (conceptual only, not to scale), showing how the shallow-cut storm drain pipe system would be installed with relatively very little loss of lateral woody tree roots from **trees #1, 2, 3, 4, 6, 7, and #10.** In order for the system to work, the construction phase team will need to limit scarification of the existing parking lot area, removing only 4-inches of material from over the soil root zones of the trees, thereby preserving the lateral woody roots extended westward and southward from trees #1 through #12 along E. Selby Lane. The construction team will also need to ensure that all excavation for the new base rock base section of the walkway is actually at or above original soil grade so as to avoid destroying the root systems of trees #1 through #12 between the trunks of the trees shown at the right of the image, and the new Sunrise building and garage siding limit at the left side of the image:



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iv. Walkway Base Section Installation / Shallow Cut:

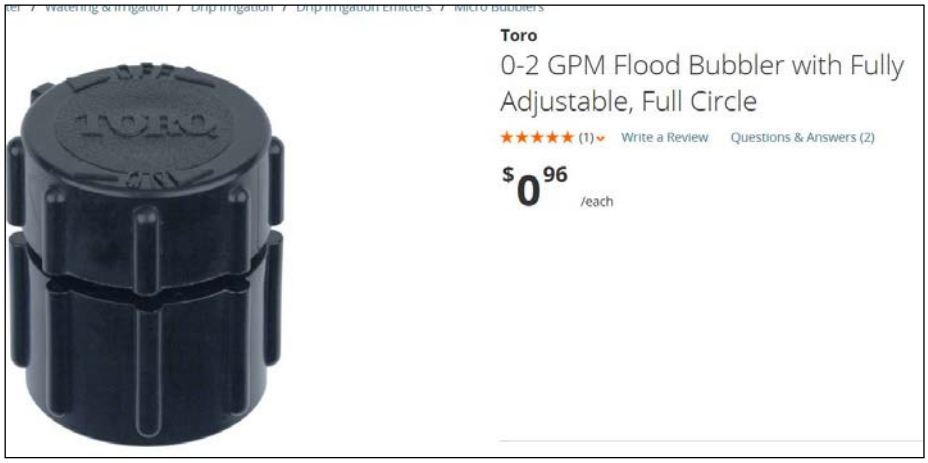
Walkways proposed for areas within 15 feet of **trees #1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, and #26** will need to be kept shallow in terms of subbase prep work and base rock base section excavation and compaction. The maximum depth of work should be **2 to 4-inches or less below existing soil grade**[2]. In order to raise the elevation of the walkway finish surface and allow for the storm drain shallow-cut pipe to run through the base of the walkway, the base section of the walkway will need to be crowned up over existing soil grade and placed in or on top of a fill soil layer. Edging for these shallow cut or no-dig type systems is typically a feathered (tapered) tamped soil edge against a very shallow header board set at maximum 2 to 4-inches or so below existing grade. Mulch of various types can also be used to feather out the edge such that the floating raised or crowned walkway conforms to ADA slope requirements and is not a trip hazard.

v. Trees in Landscape Palette:

It is suggested that the trees in the Gates and Associates landscape palette be adjusted to account for the information provided by WLCA in table 3.0(b) above in this report.

vi. Irrigation:

It is suggested that the irrigation pipe trenching routes for new landscaping be aligned such that there is at least 15 to 20 feet minimum offset from pipe trench edge to the tree trunk edges of all trees being retained.



Bubblers for new trees shall be minimum two (2) count ½" diameter adjustable high-flow type Toro or equivalent flood bubblers (0 to 2 gallons per minute adjustable) set on the soil surface and either covered with mulch or left uncovered, directly over the rootball of each tree (see sample image below):

Route all final plan sheet versions to the project arborist (i.e. the "PA") for review and comment.

vii. Bio-retention:

It is suggested that the bioretention facility be relocated such that all excavation associated with this item be offset at least **15 lateral feet from the trunks of trees #1, 2, 3, and #4. Alternatively, build the bio-retention area over-grade in order to avoid excavation within 15 feet of the trunk edges of the trees.**

[2] Personal communication with project architect 10/25/2017. WLCA directed the project architect to design a walkway that either floated completed over soil grade, or involved very minor excavation cuts into the soil root systems of trees #1 through #12, in order to preserve the lateral woody root systems extended southward and westward from the trunks of the trees through the existing older asphalt parking lot area to be demolished. The estimated thickness of materials to be demolished is 4 inches of asphalt and baserock, which will expose the soil tree root zone beneath.

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viii. Building Footprint vs. Lopsided Oak Canopies:

Oaks #1, 6, 7, and #10 are lopsided to the south and/or west, and will be in 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, **perform extensive limb length reduction to remove the outermost sections of the trees' canopies, reducing their radial canopy extension to the south and west.**

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.

ix. 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.

In order to avoid unnecessary excavation which would destroy the root systems of the trees, avoid using "OSHA layback cuts", often used during deep excavation for new underground parking garages as a safety device that continues a slope cut away from the vertical cut face.

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.

5) Tree Removals Requiring County of San Mateo Permit:

Obtain formal tree removal permits for fourteen (14) "significant trees" in this tree study that are to be removed due to direct and indirect conflicts with the proposed site plan (e.g. **trees #8, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and #25).**

6) Irrigation / Permanent:

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

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Keep all irrigation water output (high flow adjustable bubblers, low flow bubblers, overhead spray, microspray, inline emitters, soaker tubes, etc.) at least 20 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*).

7) 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, or as directed by the PA**).

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.

8) 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.

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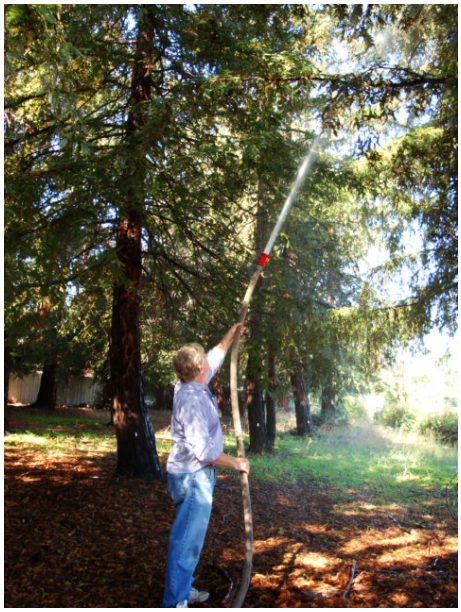
9) Water Spray:

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.



10) 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.

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

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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)

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.

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	

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R to L

6, 7, 8

8

center of image

9

R to L

10, 11, 12

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13, 14

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

15

R to L 16, 17, 18

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19

20

21

22

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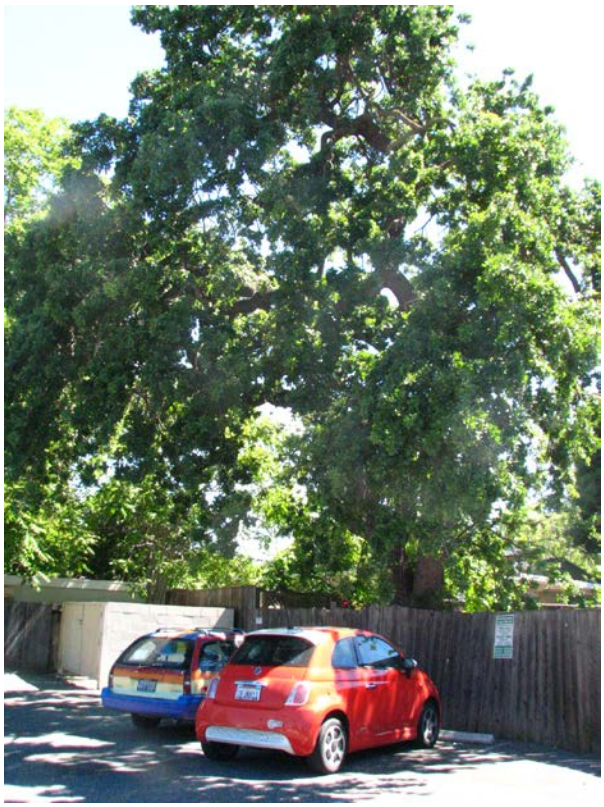
23

24, 25

26



R to L

27, 28

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R to L

27, 28

10.0 Tree Data Table Attached (WLCA)

11.0 Tree Location Map Mark-Up Attached (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, which may or may not be able to be realigned by the project engineer to farther offset from the trunk edges of trees being retained and protected.

Grey colored clouding indicates approximate scaled tree canopy driplines as they were originally rough-surveyed by WLCA.

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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 County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	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 Conflicts with Proposed New Work	Protection and Maintenance
1	coast live oak	*Quercus agrifolia*	30.4	0	0	0	30.4	Significant tree	30/40	90/65	78% good	good				south and west	south and west		yes					X								Storm drain pipes will cut two separate routes around this tree. Possible canopy and root zone conflict with proposed bio-retention area. Possible pathway base section excavation conflict with root system.	TB, RPZ, endweight reduction pruning, fork bracing, and limit paver path base section excavation to 2 to 4 inches cut depth max. Move the proposed bio-retention area? Keep storm drain as shallow-cut 2 inches below grade.
2	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Significant tree	35/25	80/70	75% good	mod to good				west	north															Possible conflicts with proposed bio-retention work, walkway base excavation. Two storm drain pipe trenches will be cut at 14 feet on two sides of tree.	TB, RPZ, Limit paver base excavation to 2 to 4 inches. Move proposed bioretention area? Keep storm drain pipe trench 2 inches max. cut below grade.
3	coast live oak	*Quercus agrifolia*	28.2	0	0	0	28.2	Significant tree	30/25	75/65	70% good	mod to good				south	south		yes.														Possible conflicts with proposed bio-retention work, walkway base excavation. Storm drain trench to be cut at 8 feet from trunk edge.	TB, RPZ, and possible fork bracing. Move proposed bioretention area or keep as shallow-cut system or over-grade no-dig system. Keep storm drain pipe trench shallow cut at 2 inches max. cut depth below grade. Limit walkway base prep to max. of 2 to 4 inches cut depth.
4	California valley oak	*Quercus lobata*	16.5	0	0	0	16.5	Significant tree	45/30	86/77	80% good	good																				Was pruned to clear overhead wires. New walkway base excavation will occur at 7 feet from trunk edge.	TB, RPZ. Limit new walkway base excacvation to 2 to 4 inches cut depth max.
5	California valley oak	*Quercus lobata*	20.4	0	0	0	20.4	Significant tree	45/30	85/80	83% good	good				southwest	south west																Was pruned to clear overhead wires. New walkway base excavation will occur at 10 feet from trunk edge.	TB, RPZ. Limit new walkway base excacvation to 2 to 4 inches cut depth max.
6	coast live oak	*Quercus agrifolia*	est. 24	0	0	0	est. 24	Significant tree	35/45	75/75	75% good	mod to good				southwest	south																Was pruned to clear overhead wires. New walkway base excavation work to occur at 10 feet from trunk edge. New building foundation cuts will be at 20 feet from trunk edge. Will need pruning to clear new building and also scaffold erection airspace for exterior finishing work. Storm drain pipe trench to encroach to 3 feet from trunk.	TB, RPZ, P. Limit walkway base excavation to max. 2 to 4 inches cut depth. Keep storm drain pipe trench shallow cut at max. 2 inches cut depth below grade.

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 County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	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 Conflicts with Proposed New Work	Protection and Maintenance
7	coast live oak	*Quercus agrifolia*	14.3	0	0	0	14.3	Significant tree	35/35	80/70	74% good	mod to good				southwest																Was pruned to clear overhead wires. Proposed walkway to be excavated at 8 feet from trunk. Will need clearance pruning to clear proposed building and expected scaffolding. Storm drain trench to encroach to 6 feet from trunk.	TB, RPZ, adjust storm drain trench to farther offset from trunk. Limit pathway base excavation to 2 to 4 inches cut depth max. Note that this tree may be destroyed due to heavy clearance pruning.
8	coast live oak	*Quercus agrifolia*	est. 22	0	0	0	est. 22	Significant tree	40/30	20/20	20% very poor	very poor																		X	X		
9	tree of heaven	*Ailanthus altissima*	est. 22	0	0	0	est. 22	Significant tree	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. New walkway base excavation to occur within 10 feet of trunk edge. Tree will need south side clearance pruning for building footprint and scaffold areas.	TB, RPZ, W, P. Limit walkway base excavation to 2 to 4 inches cut max.
10	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Significant tree	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. Walkway base to cut within 7 feet of trunk edge. Storm drain trench to cut within 4 or 5 feet of trunk edge.	TB, RPZ, Prune to clear proposed building and scaffolding areas. Limit walkway base cut depth to 2 to 4 inches max. Keep storm drain pipe trench shallow-cut at max. 2 inches cut below soil grade.
11	coast live oak	*Quercus agrifolia*	15.8	0	0	0	15.8	Significant tree	27/30	90/55	75% good	good				west	west								X							New walkway base excavation to encroach to within 5 feet of trunk edge. Will require clearance pruning for both new building footprint and scaffolding clearance.	TB, RPZ, Prune to reduce westward extension. Keep storm drain pipe trench cut to max. 2 inches depth of cut below soil grade. Limit walkway base excavation to 2 to 4 inches max. cut.

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 County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	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 Conflicts with Proposed New Work	Protection and Maintenance
12	coast live oak	*Quercus agrifolia*	19.4	0	0	0	19.4	Significant tree	35/40	85/80	84% good	good				south west	south west															New walkway base excavation to encroach to within 6 feet of trunk edge. Will require south side clearance pruning for both new building footprint and scaffolding clearance.	TB, RPZ, Prune to reduce westward extension. Keep storm drain pipe trench shallow-cut at max. 2 inches cut depth below existing soil grade. Limit walkway base excavation to 2 to 4 inches max. cut.
13	coast live oak	*Quercus agrifolia*	13.6	0	0	0	13.6	Significant tree	35/25	85/75	83% good	good				south															X			
14	coast live oak	*Quercus agrifolia*	12.0	0	0	0	12	Significant tree	20/20	75/50	66% fair	good				south west	south west	Yes. And truck hits noted													X		Tree was pruned to clear various low voltage phone or TV utility wires in the past.	
15	European birch	*Betula pendula*	14	8	5	0	27	Significant tree	35/45	65/50	55% fair	mod						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	Significant tree	25/30	70/45	57% fair	mod	X					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.	
17	tulip poplar	*Liriodendron tulipifera*	17.3	0	0	0	17.3	Significant tree	25/30	65/55	59% fair	mod	X					X													X		(Same as #16 above)	
18	tulip poplar	*Liriodendron tulipifera*	15.6	0	0	0	15.6	Significant tree	30/25	65/55	59% fair	mod	X					X													X		(Same as #16 above)	

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 County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	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 Conflicts with Proposed New Work	Protection and Maintenance
19	American elm	*Ulmus americana*	29.7	0	0	0	29.7	Significant tree	35/40	25/25	25% very poor	poor	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	Significant tree	35/30	20/15	18% very poor	very poor	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	Significant tree	45/45	40/30	35% poor	poor	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	Significant tree	35/30	70/55	65% fair								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.	X
23	coast live oak (not plotted on project topo)	*Quercus agrifolia*	est. 35	0	0	0	est. 35	Significant tree	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	Significant tree	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 County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	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 Conflicts with Proposed New Work	Protection and Maintenance
25	coast live oak	*Quercus agrifolia*	est. 26	0	0	0	est. 26	Significant tree	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	Significant tree	35/35	75/65	70% good	mod																				Tree was not fully assessed due to lack of access to the lower trunk. Assume "good" overall condition rating. New walkway base prep will encroach to 1 or 2 feet from trunk edge. This walkway routing will probably have to be changed to farther offset from trunk, and the base cut depth limited to avoid killing the tree. New storm drain pipe route appears far enough from trunk (16 to 17 feet) that root loss will be minimized, though farther would be better (e.g. 20 to 25 feet offset from trunk).	TB, RPZ. Limit new walkway base excacvation to 6 inches cut depth max. Move proposed walkway route to at least 4 to 5 feet offset from trunk edge. Realign the proposed storm drain pipe trench if possible to 20 feet or more from trunk edge.
27	coast live oak	*Quercus agrifolia*	30.5	0	0	0	30.5	Significant tree	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. New walkway will be roughly 8 feet from trunk, in the area where an older residence foundation will be demolished (expect zero root extension in this area, though roots may still be present if they somehow plunged under the older foundation and grew southward).	TB, RPZ, 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	Significant tree	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. Do not renovate driveway to the north of trunk, as this could cause severe root loss and death of the tree.

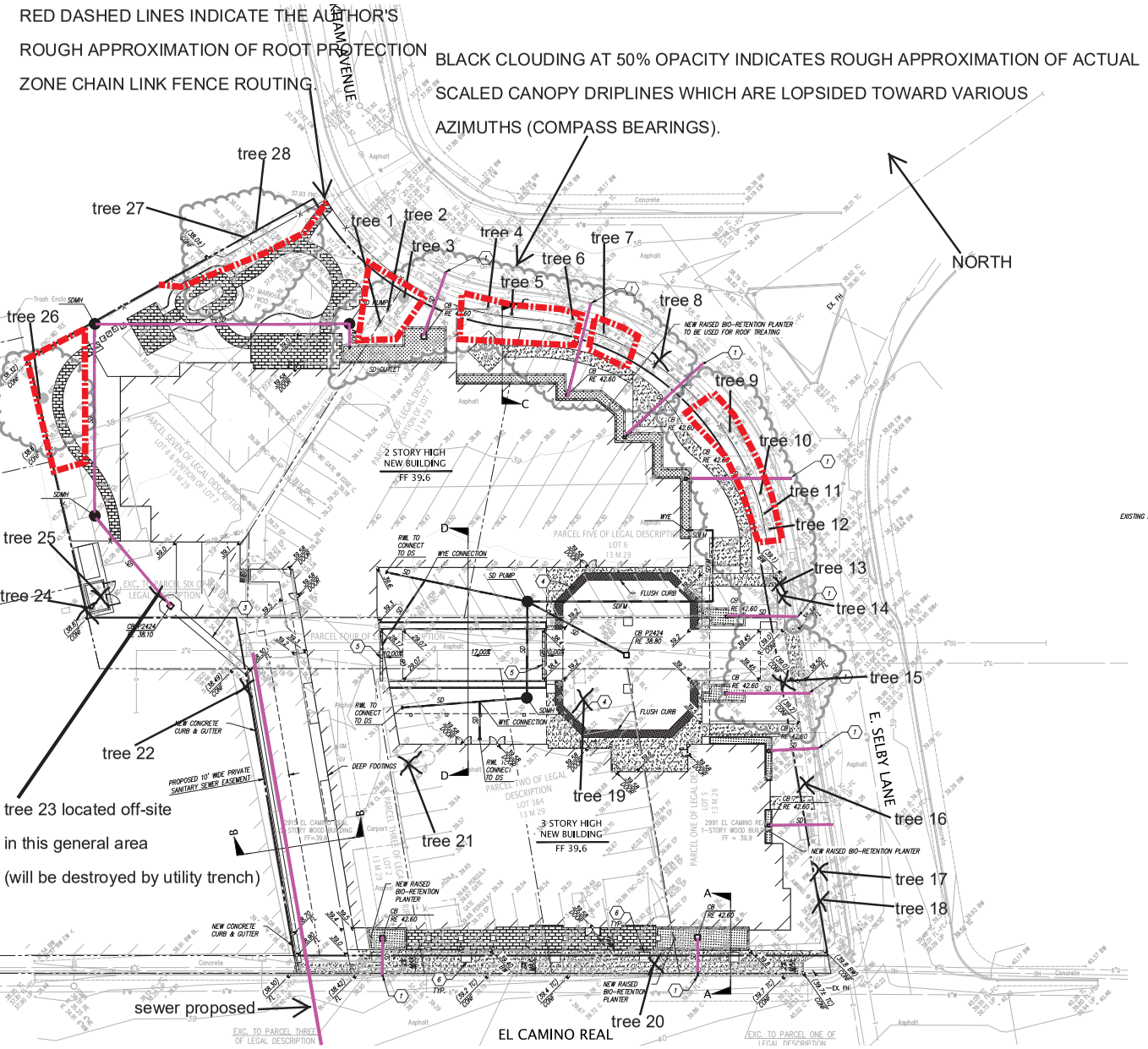
Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	Height & Spread (ft.)	Health and 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 Conflicts with Proposed New Work	Protection and Maintenance
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.**																																	

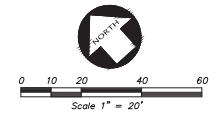
Protection and Maintenance Specifications:

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.

RED DASHED LINES INDICATE THE AUTHOR'S ROUGH APPROXIMATION OF ROOT PROTECTION ZONE CHAIN LINK FENCE ROUTING.

BLACK CLOUDING AT 50% OPACITY INDICATES ROUGH APPROXIMATION OF ACTUAL SCALED CANOPY DRIPLINES WHICH ARE LOPSIDED TOWARD VARIOUS AZIMUTHS (COMPASS BEARINGS).





EARTHWORK SUMMARY

CUT: 11,000± CY

FILL: 0 CY

NOTES:

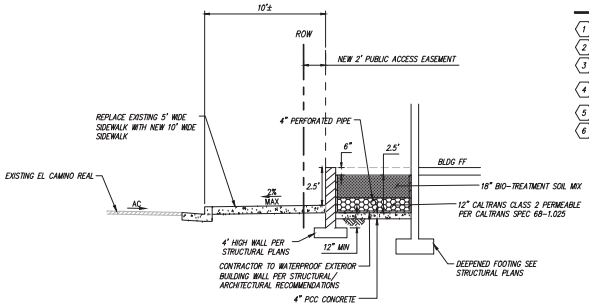
1. THE EARTHWORK QUANTITIES LISTED ON THESE PLANS ARE STATED ONLY FOR CALCULATION OF GRADING AND BUILDING PERMIT FEES. THESE QUANTITIES DO NOT INCLUDE TRENCH OR FOOTING SPOILS, SHRINK OR SWELL FROM COMPACTING EFFORTS OR OTHER VARIABLES. THE ENGINEER MAKES NO REPRESENTATION THIS SITE WILL BALANCE. THE CONTRACTOR SHALL DETERMINE HIS OWN EARTHWORK QUANTITIES AND BASE HIS BID ACCORDINGLY.

LEGEND

- AREA DRAIN
- STORM DRAIN CATCH BASIN
- STORM DRAIN JUNCTION BOX
- STORM DRAIN MANHOLE
- FL FLOW LINE
- FF FINISH FLOOR
- PV PAVEMENT
- RE RIM ELEVATION
- ROW RIGHT-OF-WAY
- 23.8 SPOT ELEVATION
- X"SD STORM DRAIN LINE
- TC TOP OF CURB
- BIO-RETENTION PLANTER
- NEW IMPERVIOUS PAVEMENT
- CONCRETE SIDEWALK: 5.5" PCC OVER 6" CLASS II AB
- PERMEABLE PAVERS

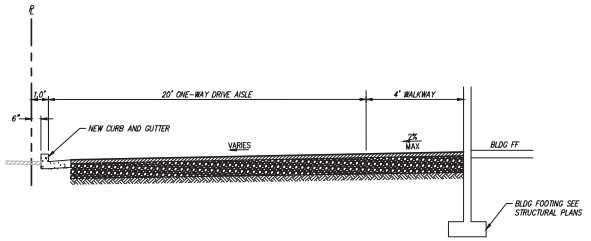
LEGEND

1. DAY LIGHT THROUGH CURB
2. VACATE EXISTING 20' PUBLIC ACCESS ROAD
3. 3" WIDE VALLEY GUTTER
4. 3" WIDE TRUNCATED DOMES TO BE EMBEDDED IN CONCRETE
5. TRENCH DRAIN
6. NEW TREE WELLS



SECTION A

NOT TO SCALE



SECTION B