

June 9, 2023

Todd Sherman
Design Build Homes
11400 SE 8th, Suite 415
Bellevue, WA 98004

Site: 4719 86th Ave SE
Mercer Island, WA 98040
TPN: 7598100421
Area: 11,500 sq ft. = .26 acres

Re: RFI from John Kenney:

(Repeat comment provided at intake screening) Have the project arborist or landscape architect provide or approve tree replacement plan. Trees must be planted to survive long term. The only native tree, a cedar, is planted 10 feet from the home. This will soon become a nuisance because of the size of tree at maturity. Half the trees must be native species according to MICC19.10.070. Three trees are planted within five feet of the house, there is room in the back yard for planting outside the SS easement. Move these trees to have room to mature long term. I have emailed the fee in lieu form you requested for you to complete. The replacement tree for the right of way tree must be on your private property since no room on the right of way at this location exists. No tree watering plan is provided to ensure the trees survive. Irrigation and associated water service should be planned for now.

Dear Todd:

I have updated the included report to show that you are unable to replant the onsite mitigation for removed trees as required by code because there was no space for the plantings that was 10' from hardscape or utilities or building footings. Instead, you will pay a fee-in-lieu of for all eighteen (18) ROW and Onsite replacement trees.

Tree Density Calculations	
Total number of onsite trees	29
Total number of non-viable trees	7
Total number of viable trees	22
Number of onsite trees removed for site improvements	12
Number of offsite trees removed for site improvements	1
Total number of required tree credits (30% X 22)	7
Total number of retained tree credits	1
Mitigation:	
Exceptional trees (6: 1) 2	12
Large trees 24"-36" (3:1) - 1	3
10"-24" (2:1) - 0	0
Offsite Large tree 24"-36" (3:1) - 1	3
Required Mitigation Total	18
Actual Mitigation Total	0
Total number of trees to pay fee -in-lieu-of	18

If you have any questions, please contact me. I can be reached on my cell phone: 425.890.3808 or by email: sprince202@aol.com.

Warm regards,

A handwritten signature in blue ink that reads "Susan Prince". The signature is written in a cursive style with a long, sweeping tail on the letter "e".

Susan Prince
Creative Landscape Solutions
ISA Certified Arborist #1481
TRAQ Certified Arborist #481
Landscape Designer
425.890.3808

Trees must be protected at Arborist given limits of allowable disturbance. Building pads must have a minimum 5-foot buffer to access and construct the building. As an example, placing a building pad 2-feet away from a tree will result in the tree being damaged and removed. (Completed)

Show the different options for building pad/utility placement/retaining walls that retain the largest number or best suitable for retention exceptional trees. (Is an east/west or north/south configuration best for tree retainage?)

Determine the allowed setbacks and maximum gross floor area and configure the building pad to best avoid any exceptional trees and retain 30 percent of large trees (what building can fit without encroaching into exceptional trees dripline). You may need to modify the traditional rectangle building pad to accommodate for exceptional trees dripline.

You must make the case in a narrative and plan showing you have followed these steps.

You may only remove the exceptional tree after this exercise takes place and you find, retaining the tree would limit the constructible gross floor area to less than 85% of the maximum gross floor area.

There are two (2) exceptional trees (#262 and #262) located in the proposed building site. Their dripline + 5' buffer are shown on the Tree Retention Sheet. Permission to remove the two (2) trees is requested because the driveway is the maximum distance the fire Department will allow from the street. To move the house to a different location requires an increase in the driveway access which in turn makes the structure a fire hazard.

2. (for architect provided at intake screening) Provide a replanting plan according to the following At least half of the trees need to be Pacific Northwest native, see the following link. You are showing all non-native species. <https://your.kingcounty.gov/dnrp/library/water-and-land/yard-and-garden/native-plant-guide-western-washington.pdf>. The trees need to be at least 10' apart from each other, structures, fences and utilities. If requested and you can show no room exists on site for all the trees, the remainder can be a fee in lieu if requested. A tree watering plan must also be provided to show the trees would survive long term. (see Architectural plans)

5. Provide the required form showing at least the minimum amount of required trees protected on site
HYPERLINK

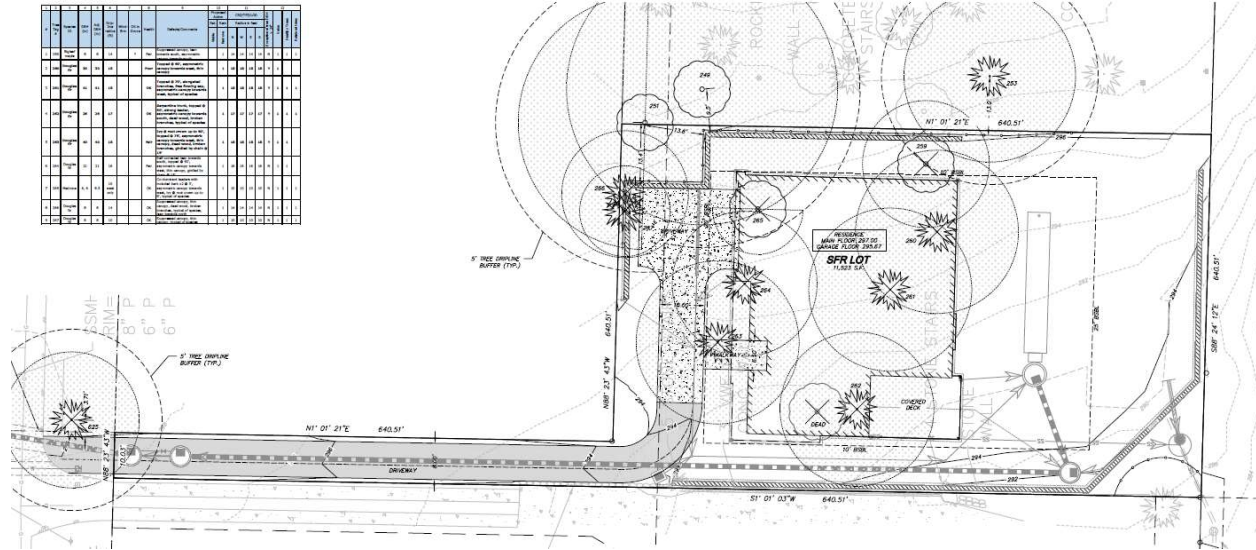
"https://www.mercerisland.gov/sites/default/files/fileattachments/community_planning_amp_development/page/21988/mercerislandtreeinventory.pdf" mercerislandtreeinventory.pdf (See Architecture plans)

*6. I located a tree in the ROW that has previously not been discussed and I am adding that now. I am presuming its removal will require an additional 3 trees for mitigation. The tree has been tagged #625 and is located on the north side of the property adjacent to a 10' wide roadway access. The tree is viable and needs to be removed. I have updated the spreadsheet to include it in the discussion and modified my summary to consider the removal and mitigation.

The subject tree is a white pine, with a lean (self-corrected) to the east. The root ball is shallow (typical of the species) and soil is slightly elevated, likely the consequence of a previous wind throw event. The roots that are preventing the tree from falling are located primarily on the east and south of the tree. Those roots need to be cut in order for the driveway to meet the grade of the street. There are no alternate pathways around this narrow driveway nor are there any construction BMP to span the roots and keep the tree, due to the elevation change to meet grade.

Applicant proposes to mitigate for the loss of the tree by replanting the same species 10' further to the east in the easement.

Proposed Site Plan:



Summary:

Tree Density Calculations	
Total number of onsite trees	29
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Large trees 24"-36" (3:1) - 1	3
10"-24" (2:1) - 0	0
Offsite Large tree 24"-36" (3:1) - 1	3
Required Onsite Mitigation Total	18
Actual Mitigation Total	6
Total number of trees to pay fee -in-lieu-of	12
Required Offsite Mitigation Total	1

May 2, 2023

Todd Sherman
Design Build Homes
11400 SE 8th, Suite 415
Bellevue, WA 98004

Site: 4719 86th Ave SE
Mercer Island, WA 98040
TPN: 7598100421
Area: 11,500 sq ft. = .26 acres

Dear Todd:

Thank you for requesting my services. On December 28th, 2021, we performed a Level 2 Tree Risk Assessment (TRA) for all onsite trees as well as any offsite trees with driplines that overhang the property lines. The information gathered is required to obtain a building permit. (MICC 19.10.090(C)(1) & (2))

In summary:

Tree Density Calculations	
Total number of onsite trees	29
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Required Mitigation Total	18
Actual Mitigation Total	6
Total number of trees to pay fee -in-lieu-of	12

I have included a detailed report of my findings, if you have any questions, please contact me. I can be reached on my cell phone: 425.890.3808 or by email: sprince202@aol.com

Warm regards,



Susan Prince
Creative Landscape Solutions
ISA Certified Arborist #1481
TRAQ Certified Arborist #481
Landscape Designer
425.890.3808

*The City of Mercer Island defines a *significant tree* as an existing tree over 10" in diameter

Personal qualifications, scope of work and methodology:

My examination was limited to a visual one, and did not involve any root excavation, trunk or limb coring, or any soil testing. To evaluate the trees and prepare the report, I drew on my formal college education in botany, preparation and training used to obtain my ISA certification in addition to my certification as a Tree Risk Assessor. I have worked in the field of arboriculture since 1994, have been an ISA Certified Arborist since 1999 and have been TRACE/TRAQ certified since 2009.

I followed protocol delineated by the International Society of Arboriculture (ISA) for Visual Risk Assessment (VRA). By doing so, I am examining each tree independently as well as collectively as groups or stands of trees provide stability and can lower risk of independent tree failure. This scientific process examines tree health (e.g. size, vigor, and insect and disease process) as well as site conditions (soil moisture and composition, quantity of impervious surfaces surrounding the tree etc.)

Introduction:

Identifying and managing the risks associated with trees is still largely a subjective process. Since the exact nature of tree failures remains largely unknown, our ability as scientists and arborists to predict which trees will fail and in what fashion remains limited. As currently practiced, the science of hazard tree evaluation involves examining a tree for structural defects, including genetic problems, those caused by the local environmental that the tree grows in and those attributed to man (pruning etc.).

The assessment process involves evaluating three components: 1) a tree with the potential to fail, 2) an environment that may contribute to that failure, and 3) a person or object that would be injured or damaged (the target). A defective tree cannot be considered hazardous without the presence of a target. All trees have a finite life-span though it is not pre-programmed internally in the same manner as annual plantings. As trees age, they are less able to compartmentalize structural damage following injury from insects, disease or pruning. Trees in urban settings have a shorter life span than trees grown in an undisturbed habitat.

Each species of trees grows differently. Evergreen trees have a "reputation" of growing slowly and defensively. These trees allocate a high proportion of their resources to defending themselves from pathogens, parasites and wounds. As a rule, trees with this type of growth tend to be long lived. Though like all other living things, they have a predictable life span. Examples of this type of tree include the northwest *Pseudotsuga menziesii* - Douglas fir, and *Thuja plicata* - Western red cedar.

Deciduous trees are trees that annually shed leaves or needles. These trees tend to grow quickly and try to "outgrow" problems associated with insects, disease and wounds. They allocate a relatively small portion of their internal resources to defense and rely instead upon an ability to grow more quickly than the pathogens which infect them. However, as these trees age, their growth rate declines and the normal problems associated with decay begins to catch up and compromise the tree's structural integrity. Examples of this type of tree include *Salix*, *Populus* and *Alnus*.

Knowledge of the growth and failure patterns of individual tree species is critical to effective hazard analysis. Species vary widely in their rates of failure. The hazard tree evaluation rating system used by most arborists was developed by the Colorado Urban Forest Council and recognizes this variation in species failure and includes a species component as part of the overall hazard evaluation.

Method's used to determine tree location and tree health:

Trees were identified previously by numbered aluminum tags attached to the western side of the tree. All the trees on site were examined using the Matheny and Clark¹ criteria for determining the potential hazard of trees in an urban environment as well as the Tree Risk Assessment in Urban Areas and The Urban/Rural Interface by Julian Dunster². Tree diameters were measured at DSH (diameter standard height - 4.5' above ground) using a logger's tape. Tree driplines were measured using a PRO Laser Rangefinder™.

Spreadsheet Legend:

1. Tree tag #: Numbered aluminum tags attached to the trees in the field*¹
2. Species: The common name of each tree
3. Species: Species ID: Spreadsheet contains common names of trees which correspond to scientific names as follows:
 - Apple: *Malus sp.*
 - American sycamore: *Plantanus occidentalis*
 - Austrian pine: *Pinus nigra*
 - Bigleaf maple: *Acer macrophyllum*
 - Birch: *Betula nigra*
 - Bitter Cherry: *Prunus emarginata*
 - Blue atlas cedar: *Cedrus atlantica 'Glauca'*
 - Cedar: *Thuja plicata*
 - Cherry: *Prunus sp.*
 - Dawn redwood: *Chamaecyparis nootkatensis*
 - Deodora cedar: *Cedrus deodara*
 - Colorado blue spruce: *Picea pungens*
 - Cottonwood: *Populus trichocarpa*
 - Dogwood: *Cornus nuttallii*
 - Douglas fir: *Pseudotsuga menziesii*
 - English laurel: *Prunus laurocerasus*
 - Filbert: *Corylus avellana var.*
 - Grand fir: *Abies grandis*
 - Hemlock: *Tsuga heterophylla*
 - Holly: *Ilex aquifolium*
 - Japanese maple: *Acer palmatum*
 - Leylandii cypress: *Cupressocyparis leylandii*
 - Lodgepole pine: *Pinus contorta*
 - Mountain ash: *Sorbus americana*
 - Nobel fir: *Abies procera*
 - Pear: *Pyrus sp.*
 - Plum: *Prunus*
 - Red Alder: *Alnus rubra*
 - Red maple: *Acer rubrum*
 - Walnut: *Juglans sp.*
 - Western red cedar: *Thuja plicata*
 - Weeping Alaska cedar: *Metasequoia glyptostrobides*
 - White fir: *Abies concolor*
 - White pine: *Pinus strobus*
4. DBH: Diameter of the tree measured at 48" above grade
5. Adjusted Diameter of the tree: Calculated equivalent for multi-stemmed tree
6. Dripline Radius: Measurement in feet of the tree canopy from tree trunk to outermost branch tip
7. Windfirm: Whether the tree can withstand wind if surrounding grove is changed
8. Health: A measurement of overall tree vigor and vitality rated as excellent, good, and fair or poor based on an assessment of crown density, leaf color and size, active callusing, shoot growth rate, extent of crown dieback, cambium layer health, and tree age
 - Excellent: Tree is an ideal specimen for the species with no obvious flaws
 - Good: Tree has minimal structural or situational defects
 - OK: Tree has minimal structural defects AND minimal environmental concerns
 - Fair: Tree has structural or health issues that predispose it to failure if further stressed, it is not suitable for retention as a single tree but may sometimes be retained if it is retained in a grove
 - Poor: Tree has significant structural and/or health issues. It is exempt from total tree count.
9. Defects/Concerns: A measure of the tree's structural stability and failure potential and rated as good, fair or poor based on assessment of specific structural features, e.g., decay, conks, co-dominant trunks, included bark, abnormal lean, one-sided canopy, history of failure, prior construction impact, pruning history, etc.
10. Proposed action:
 - Retain
 - Remove due to viability
 - Remove due to planned development (tree is otherwise healthy)
11. Limits of disturbance: The area surrounding the tree that defines the area that surrounds the trunk that cannot be encroached upon during construction. This may be a multiple of the trunk diameter (1 -1.5 times the trunk diameter converted to feet.) or it may be related to the width of the canopy. It is always determined by tree species and environment and is up to the discretion of the ISA Certified Arborist to determine
12. Value: The value the municipality assigns a tree with the specific DBH, species or location of the assessed tree; notification of size (exceptional etc)

13. Mitigation:

-
- C. Size – All replacement trees shall be at least 6’ tall for conifers and at least 1.5” diameter at the base for deciduous trees. Shrubs and bushes are not an acceptable replacement for trees. Smaller replacement trees are allowed if the applicant can demonstrate that smaller trees are more suited to the species, site conditions, neighborhood character, and the purposes of MICC 19.10 and that such replacement trees will be planted in sufficient quantities to meet the intent of MICC 19.10.

- D. Number of Replacement Trees – Removed trees shall have the following base replacement ratio:

Tree Replacement Ratios	
Diameter of Removed Tree (measured 4.5’ above ground)	Number of Replacement Trees Required
Less than 10 inches	1
10 inches up to 24 inches	2
24 inches up to 36 inches	3
More than 36 inches and any exceptional tree(s)	6

- E. Maintenance – the applicant must maintain replacement trees in a healthy condition for a period of five years after planting. The applicant shall be obligated to replant any replacement tree that dies, becomes diseased, or is removed during this five-year time period.

Specific Tree Observations:

1	2	3	4	5	6	7	8	9	10			11				12				13	
									Proposed Action			CRZ/TPZ/LOD				Exceptional tree	Value	Healthy Trees	Retained trees		Mitigation
									Retain	Remove	Construction	Radius in feet									
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in Groves	Health	Defects/Comments	Viable	Non-viable	Construction	N	W	E	S	Exceptional tree	Value	Healthy Trees	Retained trees	Mitigation
1	251	Bigleaf maple	26	26	28 north only			OK	Asymmetric canopy towards north, typical of species, dead wood, moss and lichen	1			28	28	28	28	Y	1	1	1	
2	260	Douglas fir	30	30	18			Poor	Topped @ 60', asymmetric canopy towards west, thin canopy		1		18	18	18	18	Y	1			
3	261	Douglas fir	41	41	18			OK	Topped @ 70', elongated branches, free flowing sap, asymmetric canopy towards west, typical of species			1	18	18	18	18	Y	1	1		6
4	262	Douglas fir	26	26	17			OK	Serpentine trunk, topped @ 50', strong leader, asymmetric canopy towards south, dead wood, broken branches, typical of species			1	17	17	17	17	Y	1	1		3
5	263	Douglas fir	40	40	18			Fair	Ivy @ root crown up to 50', topped @ 75', asymmetric canopy towards west, thin canopy, dead wood, broken branches, girdled by chain @ 15'		1		18	18	18	18	Y	1	1		

1	2	3	4	5	6	7		8	9	10			11				12				13
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in Grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Exceptional tree	Value	Healthy Trees	Retained trees	Mitigation
										Retain	Remove		Radius in feet								
										Viable	Non-viable	Construction	N	W	E	S					
6	264	Douglas fir	21	21	16			Fair	Self-corrected lean towards south, topped @ 50', asymmetric canopy towards west, thin canopy, girdled by chain @ 15'		1		16	16	16	16	N	1	1		
7	265	Madrona	6, 6	8.5	10 west only			OK	Co-dominant leaders with included bark x2 @ 3', asymmetric canopy towards west, ivy @ root crown up to 8', typical of species			1	10	10	10	10	Y	1	1		6
										1	3	3									15

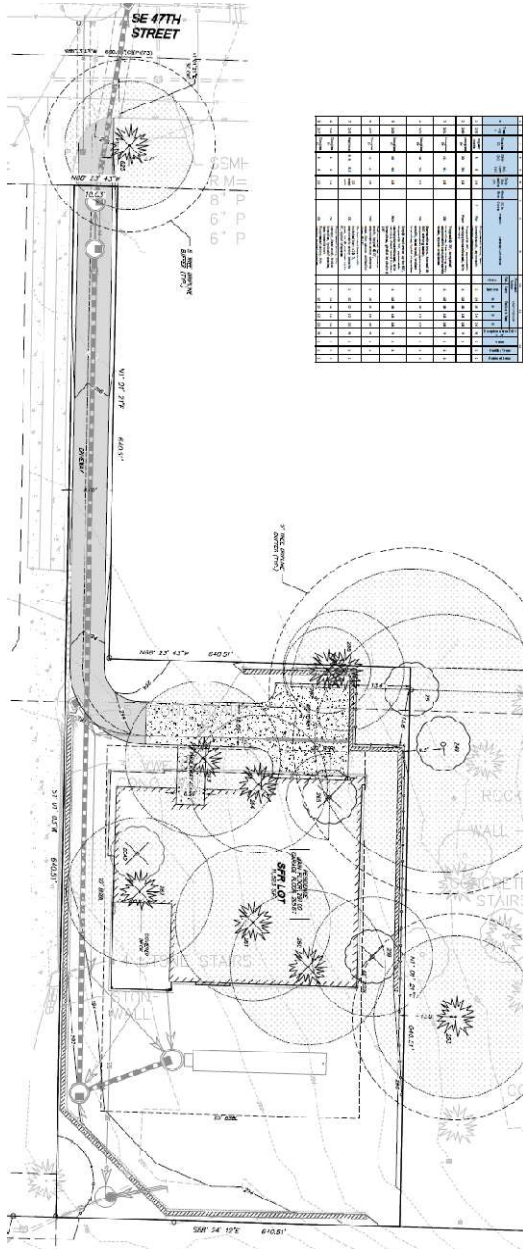
Offsite trees:

1	2	3	4	5	6	7		8	9	10			11							
#	Tree Tag #	Species ID	DBH inches	Adj. DBH inches	Drip-line radius feet	Wind-firm	OK in Grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD							
										Retain	Remove		Radius in feet							
										Viable	Non-viable	Construction	N	W	E	S				
1	625	White pine	26	26	15		Y	Fair	Codominant leaders @ 8', lean left, self-corrected			1	15	15	15	15				
										0	0	1								

Aerial View of Site:



Proposed Site Improvements (for reference only, see Civil Engineering Plans for details):



Discussion:

Tree Density Calculations	
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Total number of trees to pay fee -in-lieu-of	12

The applicant requests a SFR building permit for the lot located at 84XX SE 47th. Currently there is no existing home on the site. There are seven (7) trees with DBH's greater than 10" on the parcel; three (3) are non-viable.

There are two (2) exceptional trees (#262 and #262) located in the proposed building site. Their dripline + 5' buffer are shown on the Tree Retention Sheet. Permission to remove the two (2) trees is requested because the driveway is the maximum distance the fire Department will allow from the street. To move the house to a different location requires and increase in the driveway access which in turn makes the structure a fire hazard.

Mercer Island municipal code requires that during site development, the applicant retain 30% of the existing trees (4 * 30%) or one (1) tree.

Mitigation for exceptional DBH – sized trees is 6: 1 or or 6 X 2= 12 trees. There is one onsite large tree removal as well as one offsite/ROW proposed tree removal. Replacement for those trees is 3:1 or 6 trees. Site mitigation requires 12 + 6 = 18 trees, however, code requiring new trees not be planted within 10 'of each of, utilities or structures allows for only six (6) trees to be replanted.

The additional trees 18-6 = 12 trees will require a fee-in-lieu-of be paid.

The replacement trees should be at least 6' tall for conifers and at least 1.5" caliper (see above recommendation to increase caliper to 2") for deciduous trees. (MICC 19.10)

Tree Protection Fencing: Tree Protection fencing should be erected prior to any site grading

First, protect roots that lie in the path of construction. Approximately 90 to 95 percent of a tree's root system is in the top three feet of soil, and more than half is in the top one foot. Construction activities should be avoided in this area. Protect as much of the area beyond the tree's dripline as possible. Some healthy trees survive after losing half of their roots. However, other species are extremely sensitive to root damage even outside the dripline.

Do not disturb the Critical Root Zone (CRZ). The CRZ is defined by its "critical root radius." It is more accurate than the dripline for determining the CRZ of trees growing in forests or that have narrow growth habits. To calculate critical root radius, measure the tree's diameter (DBH) in inches, 4.5 feet above the ground. For each inch, allow for 1 to 1.5 feet of critical root radius. If a tree's DBH is ten inches, its critical root radius is 10 to 15 feet.

In addition to the CRZ, it is important to determine the Limits of Disturbance (LOD) for preserved trees. Generally, this is approximating the CRZ however in previously excavated areas around the dripline the LOD may be smaller, or in the case of a tree situated on a slope the LOD may be larger. The determination of LOD is also subject to the tree species. Some tree species do better than others after root disturbance.

Tree protection is advised throughout the duration of any construction activities whenever the critical root zone or leaf canopy may be encroached upon by such activities.

The Critical Root Zone (CRZ) or LOD should be protected with fencing adequate to hinder access to people vehicles and equipment. Fencing detail is provided. It should consist of continuous 4 ft. high temporary chain-link fencing with posts set at 10' on center or polyethylene laminar safety fencing or similar. The fencing must contain fencing signage detailing that the tree protection area cannot be trespassed on.

Soil compaction is one of the most common killers of urban trees. Stockpiled materials, heavy machinery and excessive foot traffic damage soil structure and reduce soil pore space. The effected tree roots suffocate. When construction takes place close to the protected CRZ, cover the site with 4 inches of bark to reduce soil compaction

Tree Protection fencing must be erected prior to soil excavation, boring, grading or fill operations. It is erected at the LOD. If it is necessary to run utilities within the LOD, the utilities should be combined into one cut, as practical. Trenching is not allowed in the LOD. In these areas boring or tunneling techniques should be used. In the event that roots greater than 1" diameter near the LOD are damaged or torn, it is necessary to hand trim them to a clean cut. Any roots that are exposed during construction should be covered with soil as soon as possible.

During drought conditions, trees must be adequately watered. Site should be visited regularly by a qualified ISA Certified Arborist to ensure the health of the trees. Tree protection fencing is the last item to be removed from the site after construction is completed.

After construction has been completed, evaluate the remaining trees. Look for signs and symptoms of damage or stress. It may take several years for severe problems to appear.

In the event that fencing around portions of the CRZ of a tree to be retained are not practical to erect due to construction or obstacles, tree protection fencing should be placed three feet laterally from the obstruction (ex. three feet back of a curb, building, or other existing or planned permanent infrastructure.

Glossary:

ANSI A300: American National Standards Institute (ANSI) standards for tree care

Chlorotic: discoloration caused by lack of chlorophyll in the foliage

Conifer: A tree that bears cones and has evergreen needles or scales

Crown: the above ground portion of the tree comprised of branches and their foliage

Crown raise pruning: a pruning technique where the lower branches are removed, thus raising the overall height of the crown from the ground

DBH or DSH: diameter at breast or standard height; the diameter of the trunk measured 54 inches (4.5 feet) above grade

Deciduous: tree or other plant that loses its leaves annually and remains leafless generally during the cold season

Epicormic: arising from latent or adventitious buds

Evergreen: tree or plant that keeps its needles or leaves year round; this means for more than one growing season

Increment: the amount of new wood fiber added to a tree in a given period, normally one year.

ISA: International Society of Arboriculture

Landscape function: the environmental, aesthetic, or architectural functions that a plant can have

Lateral: secondary or subordinate branch

Limits of disturbance: The boundary of minimum protection around a tree, the area that cannot be encroached upon without possible permanent damage to the tree. It is a distance determined by a qualified professional and is based on the age of the tree, its health, the tree species tolerance to disruption and the type of disturbance. It also considers soil and environmental condition and previous impacts. It is unique to each tree in its location.

Limited visual assessment: a visual assessment from a specified perspective such as foot, vehicle, or aerial (airborne) patrol of an individual tree or a population of trees near specified targets to identify specified conditions or obvious defects (ISA 2013)

Live crown ratio: the percentage of living tissue in the canopy versus the tree's height. It is a good indicator of overall tree health and the trees growing conditions. Trees with less than a 30% Crown ratio often lack the necessary quantity of photosynthetic material necessary to sustain the roots; consequently, the tree may exhibit low vigor and poor health.

Monitoring: keeping a close watch; performing regular checks or inspections

Owner/manager: the person or entity responsible for tree management or the controlling authority that regulates tree management

Pathogen: causal agent of disease

Phototropic growth: growth toward light source or stimulant

ROW: Right-of-way; generally referring to a tree that is located offsite on a city easement

Reaction wood: Specialized secondary xylem which develops in response to a lean or similar mechanical stress, it serves to help restore the stem to a vertical position

Self-corrected lean: a tree whose trunk is at an angle to the grade but whose trunk and canopy changes to become upright/vertical

Significant tree: a tree measuring a specific diameter determined by the municipality the tree grows in. Some municipalities deem that only healthy trees can be significant, other municipalities consider both healthy and unhealthy trees of a determined diameter to be significant

Snag: a tree left partially standing for the primary purpose of providing habitat for wildlife

Soil structure: the size of particles and their arrangement; considers the soil, water, and air space

Sounding: process of striking a tree with a mallet or other appropriate tool and listening for tones that indicate dead bark, a thin layer of wood outside a cavity, or cracks in wood

Structural defects: flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure; may be genetic, or environmental

Tree credit: A number assigned to a tree by a municipality that may be equal to the diameter of the tree or a numerical count of the tree, or related to diameter by a factor conveyed in a table of the municipal code

Trunk area: the cross-sectional area of the trunk based upon measurement at 54 inches (4.5 ft.) above grade

Visual Tree Assessment (VTA): method of evaluating structural defects and stability in trees by noting the pattern of growth. Developed by Claus Mattheck (Harris, et al 1999) detailed visual inspection of a tree and surrounding site that may include the use of simple tools. It requires that a tree risk assessor walk completely around the tree trunk looking at the site, aboveground roots, trunk, and branches (ISA 2013)

References

- Dirr, Michael A. Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses. Champaign: Stipes Publishing Company, 1990.
- Dunster & Associates Environmental Consultants Ltd. Assessing Trees in Urban Areas and the Urban-Rural Interface. US Release 1.0. Silverton: Pacific Northwest Chapter ISA, 2006.
- Dunster, J. A. 2003. Preliminary Species Profiles for Tree Failure Assessment. Bowen Island: Dunster & Associates Environmental Consultants Ltd.
- Dunster, Julian A., E. Thomas Smiley, Nelda Matheny and Sharon Lilly. Tree Risk Assessment Manual. Champaign, Illinois: International Society of Arboriculture, 2013.
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