

**ADDENDUM TO THE
ARBORICULTURAL REPORT
RE-EVALUATION OF TREES
AT**

**THE TOTEM LAKE APARTMENTS SITE
At NE 115th Street & 124th Avenue NE
KIRKLAND, WA 98033**

February 10, 2011 Original Report

April 7, 2011 Addendum

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ASSIGNMENT

Kim Faust of CamWest Development, LLC contacted Gilles Consulting to discuss comments received from the City of Kirkland Planning Department about the design of the new structure and the impacts on the trees. She asked me to review the design and respond to the two questions in the correspondence from the City.

DESIGN OBSERVATIONS

The property is located in the corner of inside NE 116th Avenue, 124th Avenue NE, and NE 115th at Slater Road in Kirkland, Washington. The property is bisected by the old Slater Road. The area between Slater Road and 124th Avenue NE is relatively flat. There is a sharp drop in elevation from the vacated Slater Road to the west where the 76 gas station/store are located on flat ground. There is a retaining wall along the west property line.

The proposed design has a structure, parking lots, sidewalks, landscape areas filling the majority of the property east of the old Slater Road and extending to the west property line in the south while leaving the northwest quarter of the property, (approximately) unaltered.

CITY'S REQUEST

Jon Regala, Senior Planner for the City of Kirkland asked the following questions:
öAlso, the report did not address the criteria in KZC 95.30.4.c in regards to:

1. Significant trees potentially impacted by proposed development activity as determined by the Planning Official (*basically trees that could be affected by building and construction activities-Jon*)
2. Proposed removal of trees with a high retention value in required landscape areas)ö

Responses

When my original report was complete, dated February 10, 2011, the design for the building and associated infrastructure improvements had not yet been completed. On Thursday, March 31, 2011 I met with Ms. Faust at the CamWest offices in Kirkland to review the plan. We discussed the layout of the design and how the trees will or will not be impacted. My responses are as follows:

Kirkland Zoning Code Chapter 95.30.4.c is quoted as follows:

- c. An arborist report containing the following:
 - 1) A complete description of each tree's health, condition, and viability;

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- This is included in Attachment 2, Tree Inventory / Condition Spreadsheet of the original report and is included below for the trees in question.
- 2) A description of the method(s) used to determine the limits of disturbance (i.e., critical root zone, root plate diameter, or a case-by-case basis description for individual trees);
- This was done on a tree by tree basis depending upon the location of the tree in relation to existing site improvements, the size and species of the tree, and the topography of the site.
- 3) Any special instructions specifically outlining any work proposed within the limits of the disturbance protection area (i.e., hand-digging, tunneling, root pruning, any grade changes, clearing, monitoring, and aftercare);
- These are included in the original report in Attachment 4, Tree Protection Measures, Section 5 of Page 27 of 30 of the February 10, 2011 report. Specific excavation instructions are repeated here:
 - When excavation occurs near trees that are scheduled for retention, the following procedure must be followed to protect the long term survivability of the tree:
 - An International Society of Arboriculture, (ISA) Certified Arborist must be working with all equipment operators.
 - The Certified Arborist should be outfitted with a shovel, hand pruners, a pair of loppers, a handsaw, and a power saw (a õsawsallö is recommended).
 - The hoe must be placed to õcombö the material directly away from the trunk as opposed to cutting across the roots.
 - Combing is the gradual excavation of the ground cover plants and soil in depths that only extend as deep as the tines of the hoe.
 - When any roots of one inch diameter or greater, of the tree to be retained, is struck by the equipment, the Certified Arborist should stop the equipment operator.
 - The Certified Arborist should then excavate around the tree root by hand/shovel and cleanly cut the tree root.
 - The Certified Arborist should then instruct the equipment operator to continue.

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- CamWest is proposing to retain the 2 remaining conifers in the southwest property corner. They are # 934, and 938.
 - # 934 is a 39.8-inch Douglas Fir in Very Good condition. It should be able to be retained with all of the *Tree Protection Measures* in the February 10, 2011 report.
 - # 938 is a 39.9-inch Douglas Fir right up along Slater Road. It is in Fair condition.
 - The base of the tree is very near the edge of the gravel shoulder. The construction of the parking lot will be within the dripline of the tree but only by a few feet.
 - If the Tree Protection Measures are followed the tree should tolerate the incursion fine and suffer no long-term problems.
 - Specific tree protection measures that must be followed include:
 1. Tree protection fencing place prior to any construction work commencing.
 2. Cover the area within the tree protection fence with 10 to 12 inches of wood chips.
 3. Follow the section 5 excavation techniques listed above and on Page 27 of 30 of the February 10, 2011 report and repeated above.
- 4) For trees not viable for retention, a description of the reason(s) for removal based on poor health, high risk of failure due to structure, defects, unavoidable isolation (wind firmness), or unsuitability of species, etc., and for which no reasonable alternative action is possible must be given (pruning, cabling, etc.);
 - This is included in Attachment 2, Tree Inventory / Condition Spreadsheet of the original report and copied below.
 - Note, all trees that are rated as either Dead, Dying, or Poor Condition are subsequently rated as *Non-Viable*. More detail is given also in the February 10, 2011 report *Attachment 3, Glossary*. The glossary explains the arboricultural terms used in *Attachment 2, Tree Inventory / Condition Spreadsheet* and explains why trees are rated as being *Non-Viable*. It is repeated below for convenience.

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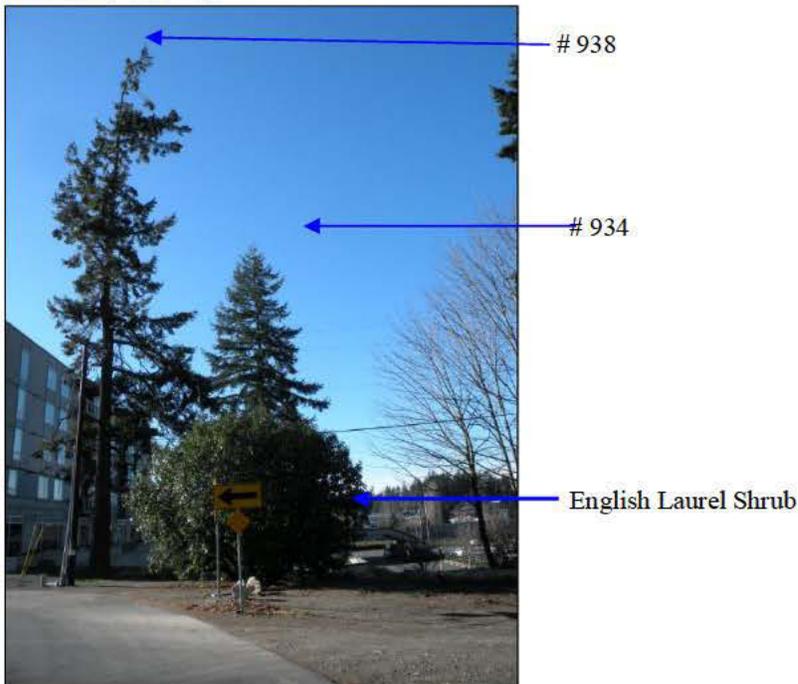
- 5) Describe the impact of necessary tree removal to the remaining trees, including those in a grove or on adjacent properties;
- There are two landscape areas where CamWest is proposing to remove trees. They are the landscape zone along 124th Avenue NE between the back of the sidewalk and the side of the building; and the landscape area along the west property line between the west property line and the western edge of the parking lot.
 - Trees Along 124th Avenue NE:
 - The trees in this area include # 865, 870, 883, 885, and 886.
 - # 865, 870, 883, and 885 are Big Leaf Maples and Bitter Cherry trees that are in Poor Condition. They are *Non-Viable*.
 - *They should be removed for safety.*
 - # 866 is a 31.6-inch Black Cottonwood. It is in Good Condition but will not tolerate the loss of roots required for the construction- it would not be wind firm if retained. In addition, it is reaching an age where it will start dropping large limbs naturally.
 - The tree should be removed for safety.
 - Trees Along the West Property Line
 - Trees include # 910, 911, 912, and 927. All four are in Fair Condition.
 - However, the topography of the area will require the installation of some sort of retaining wall. These four trees will not survive long-term from the impacts of the construction of the retaining wall and parking lot.
 - Trees on Adjacent Properties:
 - There is a row of street trees west of the west property line.
 - They are located below a retaining wall and behind the curb of the drive lane used to access The Brown Bag Café, Sheri's Restaurant, and the motel.
 - Given the topography it is unlikely that this row of trees will be impacted. As noted in the February 10, 2011 report, the Tree Protection Fence and the Temporary

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Erosion/Sedimentation Control (TESC) fencing near the west property line will adequately protect this row of trees.

- 6) For development applications, a discussion of timing and installation of tree protection measures that must include fencing and be in accordance with the tree protection standards as outlined in KZC [95.34](#); and
 - Tree Protection Measures should be installed and inspected prior to the commencement of construction—prior to mobilization on site of any equipment, vehicles, or supplies.
- 7) The suggested location and species of supplemental trees to be used when required. The report shall include planting and maintenance specifications pursuant to KZC [95.50](#) and [95.51](#).
 - I believe this has been covered in the Landscape Plan sheets.

Photo # 1: Looking west from NE 115th



WAIVER OF LIABILITY

There are many conditions affecting a tree's health and stability, which may be present and cannot be ascertained, such as, root rot, previous or unexposed construction damage, internal cracks, stem rot and more which may be hidden. Changes in circumstances and

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conditions can also cause a rapid deterioration of a tree's health and stability. Adverse weather conditions can dramatically affect the health and safety of a tree in a very short amount of time. While I have used every reasonable means to examine these trees, this evaluation represents my opinion of the tree health at this point in time. These findings do not guarantee future safety nor are they predictions of future events.

The tree evaluation consists of an external visual inspection of an individual tree's root flare, trunk, and canopy from the ground only unless otherwise specified. The inspection may also consist of taking trunk or root soundings for sound comparisons to aid the evaluator in determining the possible extent of decay within a tree. Soundings are only an aid to the evaluation process and do not replace the use of other more sophisticated diagnostic tools for determining the extent of decay within a tree.

As conditions change, it is the responsibility of the property owners to schedule additional site visits by the necessary professionals to ensure that the long-term success of the project is ensured. It is the responsibility of the property owner to obtain all required permits from city, county, state, or federal agencies. It is the responsibility of the property owner to comply with all applicable laws, regulations, and permit conditions. If there is a homeowners association, it is the responsibility of the property owner to comply with all Codes, Covenants, and Restrictions (CC&R's) that apply to tree pruning and tree removal.

This tree evaluation is to be used to inform and guide the client in the management of their trees. This in no way implies that the evaluator is responsible for performing recommended actions or using other methods or tools to further determine the extent of internal tree problems without written authorization from the client. Furthermore, the evaluator in no way holds that the opinions and recommendations are the only actions required to insure that the tree will not fail. A second opinion is recommended. The client shall hold the evaluator harmless for any and all injuries or damages incurred if the evaluator's recommendations are not followed or for acts of nature beyond the evaluator's reasonable expectations, such as severe winds, excessive rains, heavy snow loads, etc.

This report and all attachments, enclosures, and references, are confidential and are for the use of the client concerned. They may not be reproduced, used in any way, or disseminated in any form without the prior consent of the client concerned and Gilles Consulting.

Thank you for calling Gilles Consulting for your arboricultural needs.

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Sincerely,



Brian K. Gilles, Consulting Arborist
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ASCA Registered Consulting Arborist # RCA-418
PNW-ISA Certified Tree Risk Assessor #148

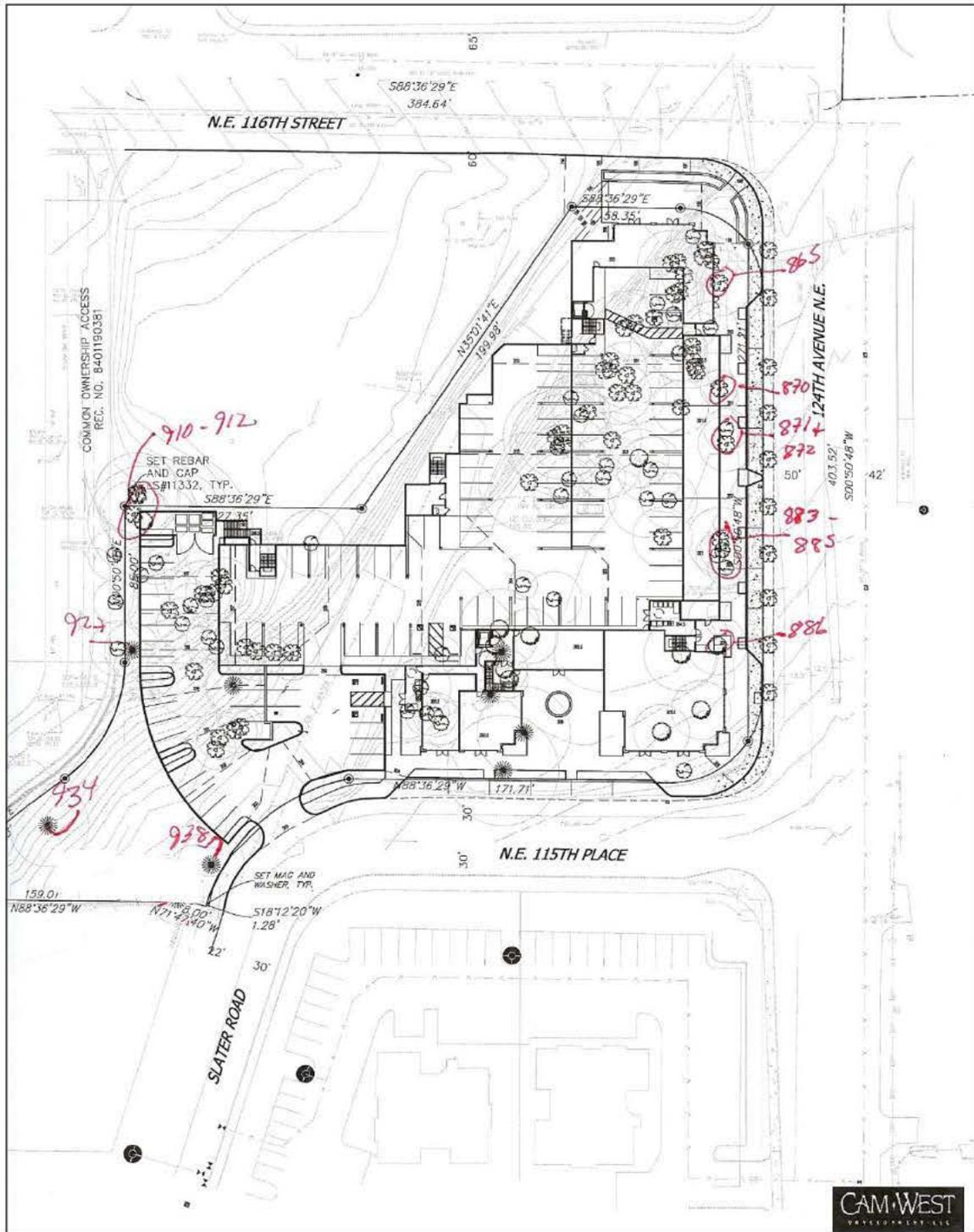
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ATTACHMENT 1 - SITE PLAN



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ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET

ABBREVIATED LEGEND—SEE GLOSSARY IN REPORT ATTACHMENTS FOR GREATER DETAIL																									
#1	Property: Whether the tree is on or off the Subject Property, or a Right-of-Way tree.										#6 Limits of Disturbance: The boundary between the area of minimum protection around a tree and the allowable site disturbance.														
#2	Tree #: The unique tag number of each tree.										#9 LCR: Live Crown Ratio - the amount of live canopy expressed as a % of the entire tree height.														
#3	Species:										#10 Symmetry: General shape of canopy and weight distribution of the tree around the trunk.														
	BCh/Pe	Bitter Cherry, <i>Prunus emarginata</i>									#11 Foliage: General description of foliage density that indicates tree health and vigor.														
	BcW/Pt	Black Cottonwood, <i>Populus trichocarpa</i>									#12 Crown Condition: The most important external indication of tree health and vigor.														
	BLM/Am	Big Leaf Maple, <i>Acer macrophyllum</i>									#13 Trunk: Description of trunk condition or abnormalities if any.														
	Ch/Psp.	Cherry, <i>Prunus sp.</i>									#14 Root Collar: The base of the tree where the trunk flares into the roots—deformities or problems are noted here.														
	DF/Pm	Douglas Fir, <i>Pseudotsuga menziesii</i>									#15 Roots: Root problems are noted here.														
	PDW/Cn	Pacific Dog Wood, <i>Comus nuttallii</i>									#16 Comments: Additional observations about the tree's condition.														
#4	2011 DBH: Trunk diameter at 4.5 above the average ground level.										#17 Significance: A significant tree is at least 6-in diameter measured at 4.5 above the average ground level.														
#5	2006 DBH: Trunk diameter @ 4.5 above average ground level.										#18 Current Health Rating: A description of general health ranging from dead, dying, hazard, poor, suppressed, fair, good, very good, to excellent.														
#6	Tree Credit: This is based upon Table 95.35.1, Page 12, Chapter 95 of the Kirkland Municipal Code.										#19 Viability: A significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.														
#7	Drip Line: The radius, the distance from the trunk to the furthest branch tips.										#20 Recommendation: This is an estimate of whether or not the tree is of sufficient health, vigor, and structure to consider retaining.														
1	2	3	4	5	6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20	18		
PROPERTY	TREE #	SPECIES	DBH 2011	DBH 2006	TREE CREDIT	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE 2011	CURRENT HEALTH RATING 2011	VIABILITY 2011	RECOMMENDATION	SIGNIFICANCE 2006	CURRENT HEALTH RATING 2006	VIABILITY 2006
East Landscape Area	865	BLM/Am	10.4", 10.3", & 10.2"	10.4", 10.3", & 10.2"	0.0	N/A	N/A	N/A	N/A	N/A	60%	Min. Asym.	Average	Average	Center Rot	Base Rot	-	Stump sprouts	Significant	Poor	Non-viable	Remove	Significant	Poor	Non-Viable
East Landscape Area	870	BLM/Am	8.2"	8.2"	0.0	20	N/A	N/A	N/A	N/A	30%	Maj. Asym.	Average	Weak	Serpentine	Possible base rot	-	Forked @ 16', Dead branches in canopy, Kinked @ 1' & 5'	Significant	Poor	Non-viable	Remove	Significant	Poor	Non-Viable
East Landscape Area	871	BLM/Am	clump of 5	clump of 5	0.0	30	N/A	N/A	N/A	N/A	35%	Min. Asym.	Average	Average	Typical, Center rot	Base Rot	-	Stump sprouts, Dead branches in canopy, DBH 11.3", 11.2", 5.5", 11.2", 7.6"	Significant	Poor	Non-viable	Remove	Significant	Poor	Non-Viable
East Landscape Area	872	BCh/Pe	10.1" & 7.2"	10.1" & 7.2"	0.0	30	N/A	N/A	N/A	N/A	50%	Min. Asym.	Thin	Weak	Leans East, Center rot	Base Rot	-	Forked @ base. Survey tag # 1070.	Significant	Poor	Non-viable	Remove	Significant	Poor	Non-Viable
East Landscape Area	883	BCh/Pe	6.9"	6.9"	0.0	N/A	N/A	N/A	N/A	N/A	40%	Maj. Asym.	Average	Average	Leans SW, Serpentine	NAD	fill on 30% of CRZ	dead branches in canopy, not wind firm	Significant	Poor	Non-viable	Remove	Significant	Fair	Non-Viable
East Landscape Area	884	BCh/Pe	6.6"	6.6"	0.0	N/A	N/A	N/A	N/A	N/A	40%	Maj. Asym.	Average	Average	leans west	partial failure	Fill on 35% of root zone	dead branches on canopy, not wind firm	Significant	Poor	Non-viable	Remove	Significant	Poor	Non-Viable
East Landscape Area	885	BcW/Pt	30.1"	30.1"	0.0	50.0'	N/A	N/A	N/A	N/A	90%	Min. Asym.	Average	Average	Straight	exposed	Fill on 35% of root zone	dead branches in canopy, not wind firm	Significant	Poor	Non-viable	Remove	Significant	Good	Non-Viable
East Landscape Area	886	BcW/Pt	31.6"	30.5"	11.0	50.0'	20.0'	20.0'	20.0'	20.0'	85%	Gen. Sym.	Average	Average	Straight	exposed	Fill on 35% of root zone	sap sucker activity	Significant	Good	Viable	Potential to retain with tree protection measures	Significant	Fair	Viable
West Landscape Area	910	BLM/Am	12.0"	9.5", 4.6"	1.0	N/A	N/A	to property line	N/A	N/A	50%	Maj. Asym.	Average	Average	Forked @ 12', Leans East, Center rot	Base Rot	Restricted	2011 trunk diameters are 1.7 & 5.4 = single trunk of 12.0 inches.	Significant	Fair	Viable	Potential to retain with tree protection measures	Significant	Poor	Non-Viable
West Landscape Area	911	BLM/Am	13.9"	16.0"	2.0	N/A	N/A	N/A	N/A	N/A	45%	Maj. Asym.	Thin	Average	Forked @ 18", included bark down	Base Rot	Restricted	center rot, open wound east side from fork to base, 2006 trunk diameters are: 6.8", 4.6", 6.1", & 6.2" = a tree of 16", 2011 trunk diameters are 7.3, 5.6, 7.1, & 7.6 inches = single trunk of 13.9 inches.	Significant	Fair	Viable	Potential to retain with tree protection measures	Significant	Poor	Non-Viable
West Landscape Area	912	BcW/Pt	43.2"	40.0"	17.0	56.0'	24.0'	24.0'	24.0'	20.0'	45%	Gen. Sym.	Dense	Healthy	Typical	NAD	Restricted	20 feet east of parking lot curb growing 12 feet east of parking lot curb, early Bark Beetle infestation, Ivy up 85% of tree. Survey tag #	Significant	Fair	Viable	Potential to retain with tree protection measures	Significant	Excellent	Viable
West Landscape Area	927	DF/Pm	33.6"	38.0"	12.0	44.0'	20.0'	20.0'	20.0'	to curb	25%	Gen. Sym.	Dense	Healthy	Straight	Ivy	Restricted	to top of retaining wall	Significant	Fair	Viable	Potential to retain with tree protection measures	Significant	Fair	Viable
SW prop corner	934	DF/Pm	39.8"	35.3"	15.0	46.0'	20.0'	20.0'	20.0'	to top of retaining wall	90%	Gen. Sym.	Dense	Healthy	Kinked @ 34', Straight	NAD	Restricted	Ivy up 24 feet, growing 18 feet southeast of 4 foot rock retaining wall	Significant	Very Good	Viable	Potential to retain with tree protection measures	Significant	Good	Viable
SW prop corner	938	DF/Pm	39.9"	39.6"	15.0	40.0'	18.0'	to prop line	to edge of road	18.0'	80%	Min. Asym.	Dense	Regenerating, Average	Forked @ 60'	Restricted	open wound west side 2 feet to 5 feet with sap flow, ice storm damage, in gravel parking area near road, wire and metal embedded in base of trunk.	Significant	Fair	Viable	Potential to retain with tree protection measures	Significant	Fair	Viable	

ATTACHMENT 3 - GLOSSARY

Terms Used in This Report, on the Tree Condition / Inventory Spreadsheet, and Their Significance

In an effort to clearly present the information for each tree in a manner that facilitates the reader's ability to understand the conclusions I have drawn for each tree, I have collected the information in a spreadsheet format. This spreadsheet was developed by Gilles Consulting based upon the *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface* course manual and the *Tree Risk Assessment Form*, both sponsored by the Pacific Northwest Chapter of the International Society of Arboriculture, and the *Hazard Tree Evaluation Form* from the book, *The Evaluation of Hazard Trees in Urban Areas*, by Matheny and Clarke. The descriptions were left brief on the spreadsheet in an effort to include as much pertinent information as possible, to make the report manageable, and to avoid boring the reader with infinite levels of detail. However, a review of these terms and descriptions will allow the reader to rapidly move through the report and understand the information.

- 1) **PROPERTY** – Where the tree is on the Subject Property.
- 2) **TREE LOCATION** – Relative placement of the tree.
- 3) **TREE #** – the unique tag number of each tree.
- 4) **SPECIES** – this describes the species of each tree with both most readily accepted common name and the officially accepted scientific name.
- 5) **DBH** – Diameter Breast Height. This is the standard measurement of trees taken at 4.5 feet above the average ground level of the tree base.
 - i) Occasionally it is not practical to measure a tree at 4.5 feet above the ground. The most representative area of the trunk near 4.5 feet is then measured and noted on the spreadsheet. For instance, a tree that forks at 4.5 feet can have an unusually large swelling at that point. The measurement is taken below the swelling and noted as, 28.4" at 36"
 - ii) Trees with multiple stems are listed as a "clump of x," with x being the number of trunks in the clump. Measurements may be given as an average of all the trunks, or individual measurements for each trunk may be listed.
 - (1) Every effort is made to distinguish between a single tree with multiple stems and several trees growing close together at the bases.
- 6) **TREE CREDIT** – Tree Credit based on Trunk Diameter
- 7) **DRIP LINE** – the radius, the distance from the trunk to the furthest branch tips.
- 8) **LIMITS OF DISTURBANCE** – the boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional.
- 9) **% LCR** – Percentage of Live Crown Ratio. The relative proportion of green crown to overall tree height. This is an important indication of a tree's health. If a tree has a

high percentage of Live Crown Ratio, it is likely producing enough photosynthetic activity to support the tree. If a tree has less than 30 to 40% LCR it can create a shortage of needed energy and can indicate poor health and vigor.

- 10) **SYMMETRY** is the description of the form of the canopy. That is, the balance or overall shape of the canopy and crown. This is the place I list any major defects in the tree shape does the tree have all its foliage on one side or in one unusual area. Symmetry can be important if there are additional defects in the tree such as rot pockets, cracks, loose roots, weak crown etc. Symmetry is generally categorized as Generally Symmetrical, Minor Asymmetry or Major Asymmetry:
- i) Gen. Sym. Generally Symmetrical. The canopy/foliage is generally even on all sides with spacing of scaffold branches typical for the species, both vertically and radially.
 - ii) Min. Asym. Minor Asymmetry. The canopy/foliage has a slightly irregular shape with more weight on one side but appears to be no problem for the tree.
 - iii) Maj. Asym. Major Asymmetry. The canopy/foliage has a highly irregular shape for the species with the majority of the weight on one side of the tree. This can have a significant impact on the tree's stability, health and hazard potential especially if other defects are noted such as cracks, rot, root defects.
- 11) **FOLIAGE/BRANCH** describes the foliage of the tree in relation to a perfect specimen of that particular species. First the branch growth and foliage density is described, and then any signs or symptoms of stress and/or disease are noted. The condition of the foliage, or the branches and buds for deciduous trees in the dormant season, are important indications of a tree's health and vigor.
- i) For Deciduous trees in the dormant season:
 - (1) The structure of the tree is visible,
 - (2) The quantity and quality of buds indicates health, and is described as good bud set, average bud set, or poor bud set. These are abbreviated in the spreadsheet as: gbs, abs, or pbs.
 - (3) The amount of annual shoot elongation is visible and is another major indication of tree health and vigor. This is described as:
 - a) Excellent, Good, Average, or Short Shoot Elongation. These are abbreviated in the spreadsheet as ESE, GSE, ASE, OR SSE.
 - ii) For evergreen trees year round and deciduous trees in leaf, the color and density of the foliage indicates if the tree is healthy or stressed, or if an insect infestation, a bacterial, fungal, or viral infection is present. Foliage is categorized on a scale from:
 - (1) Dense extremely thick foliage, an indication of healthy vigorous growth,
 - (2) Good thick foliage, thicker than average for the species,
 - (3) Normal/Average thick foliage, average for the species, an indication of healthy growth,

- (4) Thin or Thinning – needles and leaves becoming less dense so that sunlight readily passes through; an indication that the tree is under serious stress that could impact the long-term survivability and safety of the tree,
 - (5) Sparse – few leaves or needles on the twigs, an indication that the tree is under extreme stress and could indicate the future death of the tree
 - (6) Necrosis – the presence of dead twigs and branchlets. This is another significant indication of tree health. A few dead twigs and branches are reasonably typical in most trees of size. However, if there are dead twigs and branchlets all over a certain portion of the tree, or all over the tree, these are indications of stress or attack that can have an impact on the tree's long-term health.
 - (7) Hangers – a term to describe a large branch or limb that has broken off but is still hanging up in the tree. These can be particularly dangerous in adverse weather conditions.
- 12) **CROWN CONDITION** – the crown is uppermost portion of the tree, generally considered the top 10 to 20% of the canopy or that part of the canopy above the main trunk in deciduous trees and above the secondary bark in evergreen trees.
- i) The condition of the tree's crown is a reflection of the overall health and vigor of the entire tree. The crown is one of the first places a tree will demonstrate stress and pathogenic attack such as root rot.
 - ii) If the **Crown Condition** is healthy and strong, this is a good sign. If the crown condition is weak, broken out, or shows other signs of decline, it is an indication that the tree is under stress. It is such an important indication of health and vigor that this is the first place a trained forester or arborist looks to begin the evaluation of a tree. Current research reveals that, by the time trees with root rot show significant signs of decline in the crown, fully 50% or more of the roots have already rotted away. **Crown Condition** can be described as:
 - (1) Healthy Crown – exceptional growth for the species.
 - (2) Average Crown – typical for the species.
 - (3) Weak Crown – thin spindly growth with thin or sparse needles.
 - (4) Flagging Crown – describes a tree crown that is weak and unable to grow straight up.
 - (5) Dying Crown – describes obvious decline that is nearing death.
 - (6) Dead Crown – the crown has died due to pathological or physical injury. The tree is considered to have significant stress and/or weakness if the crown is dead.
 - (7) Broken out – a formerly weak crown condition that has been broken off by adverse weather conditions or other mechanical means.
 - (8) Regenerated or Regenerating – formerly broken out crowns that are now growing back, Regenerating crowns may appear healthy, average, or weak and indicate current health of the tree.

- (9) Suppressed a term used to describe poor condition of an entire tree or just the crown. Suppressed crowns are those that are entirely below the general level of the canopy of surrounding trees which receive no direct sunlight. They are generally in poor health and vigor. Suppressed trees are generally trees that are smaller and growing in the shade of larger trees around them. They generally have thin or sparse needles, weak or missing crowns, and are prone to insect attack as well as bacterial and fungal infections.
- 13) **TRUNK** this is the area to note any defects that can have an impact on the tree's stability or hazard potential. Typical things noted are:
- i) FORKED bifurcation of branches or trunks that often occur at a narrow angle.
 - ii) INCLUDED BARK a pattern of development at branch or trunk junctions where bark is turned inward rather than pushed out. This can be a serious structural defect in a tree that can and often does lead to failure of one or more of the branches or trunks especially during severe adverse weather conditions.
 - iii) EPICORMIC GROWTH this is generally seen as dense thick growth near the trunk of a tree. Although this looks like a healthy condition, it is in fact the opposite. Trees with Epicormic Growth have used their reserve stores of energy in a last ditch effort to produce enough additional photosynthetic surface area to produce more sugars, starches and carbohydrates to support the continued growth of the tree. Generally speaking, when conifers in the Pacific Northwest exhibit heavy amounts of Epicormic Growth, they are not producing enough food to support their current mass and are already in serious decline.
 - iv) INTERNAL STRUCTURAL WEAKNESS a physical characteristic of the tree trunk, such as a **kink, crack, rot pocket, or rot column** that predisposes the tree trunk to failure at the point of greatest weakness.
 - v) BOWED a gradual curve of the trunk. This can indicate an Internal Structural Weakness or an overall weak tree. It can also indicate slow movement of soils or historic damage of the tree that has been corrected by the curved growth.
 - vi) KINKED a sharp angle in the tree trunk that indicates that the normal growth pattern is disrupted. Generally this means that the internal fibers and annual rings are weaker than straight trunks and prone to failure, especially in adverse weather conditions.
 - vii) GROUND FLOWER an area of deformed bark near the base of a tree trunk that indicates long-term root rot.
- 14) **ROOT COLLAR** this is the area where the trunk enters the soil and the buttress roots flare out away from the trunk into the soil. It is here that signs of rot, decay, insect infestation, or fungal or bacterial infection are noted. **NAD** stands for **No Apparent Defects**.

- 15) **ROOTS**— any abnormalities such as girdling roots, roots that wrap around the tree itself that strangle the cambium layer and kill the tree, are noted here.
- 16) **COMMENTS**— this is the area to note any additional information that would not fit in the previous boxes or attributes about the tree that have bearing on the health and structure of the tree.
- 17) **SIGNIFICANCE**— a “significant” tree is at least 6” in diameter measured at 4.5’ above the average ground level.
- 18) **CURRENT HEALTH RATING**— a description of general health ranging from dead, dying, poor, senescent, suppressed, fair, good, very good, to excellent.
- 19) **VIABILITY**— a significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
 - (1) Please note that many trees may be listed as “Non-Viable” due to poor health, poor structure, or the tree may be below the size threshold for a “Viable Tree.” However, it is worth examining the Non-Viable Trees to determine if any or all of them can be left on the property. They can add significant benefit to the landscape and contribute to wildlife habitat.
- 20) **RECOMMENDATION**— this is an estimate of whether or not the tree is of sufficient health, vigor, and structure that it is worth retaining. Specific recommendations for each tree are included in this column. They may include anything from pruning dead wood, mulching, aerating, injecting tree-based fertilizer into the root system, shortening into a habitat tree or wildlife snag, or to completely removing the tree.
 - i) **Monitor:** “Monitor” is a specific recommendation that the tree be re-evaluated on a routine basis to determine if there are any significant changes in health or structural stability. “Monitor annually” (or bi-annually, tri-annually, etc.) means the tree should be looked at once every year (or every 2 or 3 years, etc.) This yearly monitoring can be a quick look at the trees to see if there are any significant changes. Significant changes such as storm damage, loss of crown, partial failure of one or more roots, etc. require that a full evaluation be done of the tree at that time.
 - ii) **Potential to retain with tree protection measures:** means that the tree appears to have the internal resources, the health and vigor, structural stability, and the wind firmness to be able to withstand the stresses of construction if development requirements and construction requirements allow.
 - iii) **Habitat or Remove:** means that the tree has a high potential to fail and cause either personal injury or property damage— in other words the tree has been declared a hazard tree and should be dealt with prior to the next large storm. If it is at all possible the recommendation is to leave some of the trunk standing for wildlife habitat and some of the trunk on the ground as a nurse log. The height of the standing habitat tree depends upon the size of the tree,

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the condition of the tree, and the distance to a probable target. It should be short enough so that when it does fail years in the future it will not cause personal injury or property damage. Nurse logs can be laid horizontally across the slope to aid with erosion control and to provide microenvironments for new plantings. The nurse logs meaning to be steak to prevent their movement and potential harm to people. If for some reason this is not possible that should be removed for safety.

NOTE: TREES WITH THE SAME DESCRIPTION AND DIFFERENT RATINGS:

Two trees may have the same descriptions in the matrix boxes, one may be marked "Significant," while another may be marked "Non-Significant." The difference is in the degree of the description— early necrosis versus advanced necrosis for instance. Again, these descriptions were left brief in an effort to include as much pertinent information as possible, to make the report manageable, and, not to bore the reader with infinite levels of detail.

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ATTACHMENT 4 - TREE PROTECTION MEASURES

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and will possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The following minimum Tree Protection Measures are included on three separate sheets so that they can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

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TREE PROTECTION MEASURES:

1. Tree Protection Fences will need to be placed around each tree or group of trees to be retained.
 - a. Tree Protection Fences are to be placed according to the attached drawing and as noted in the attached Tree Inventory/Conditions Spreadsheet, Column 6 - Limits of Disturbance.
 - b. Tree Protection Fences must be inspected prior to the beginning of any construction work/activities.
 - c. Nothing must be parked or stored within the Tree Protection Fences - no equipment, vehicles, soil, debris, or construction supplies of any sorts.
2. Cement trucks must not be allowed to deposit waste or wash out materials from their trucks within the Tree Protection Fences.
3. The Tree Protection Fences need to be clearly marked with the following or similar text in four inch or larger letters:

TREE PROTECTION AREA, ENTRANCE PROHIBITED

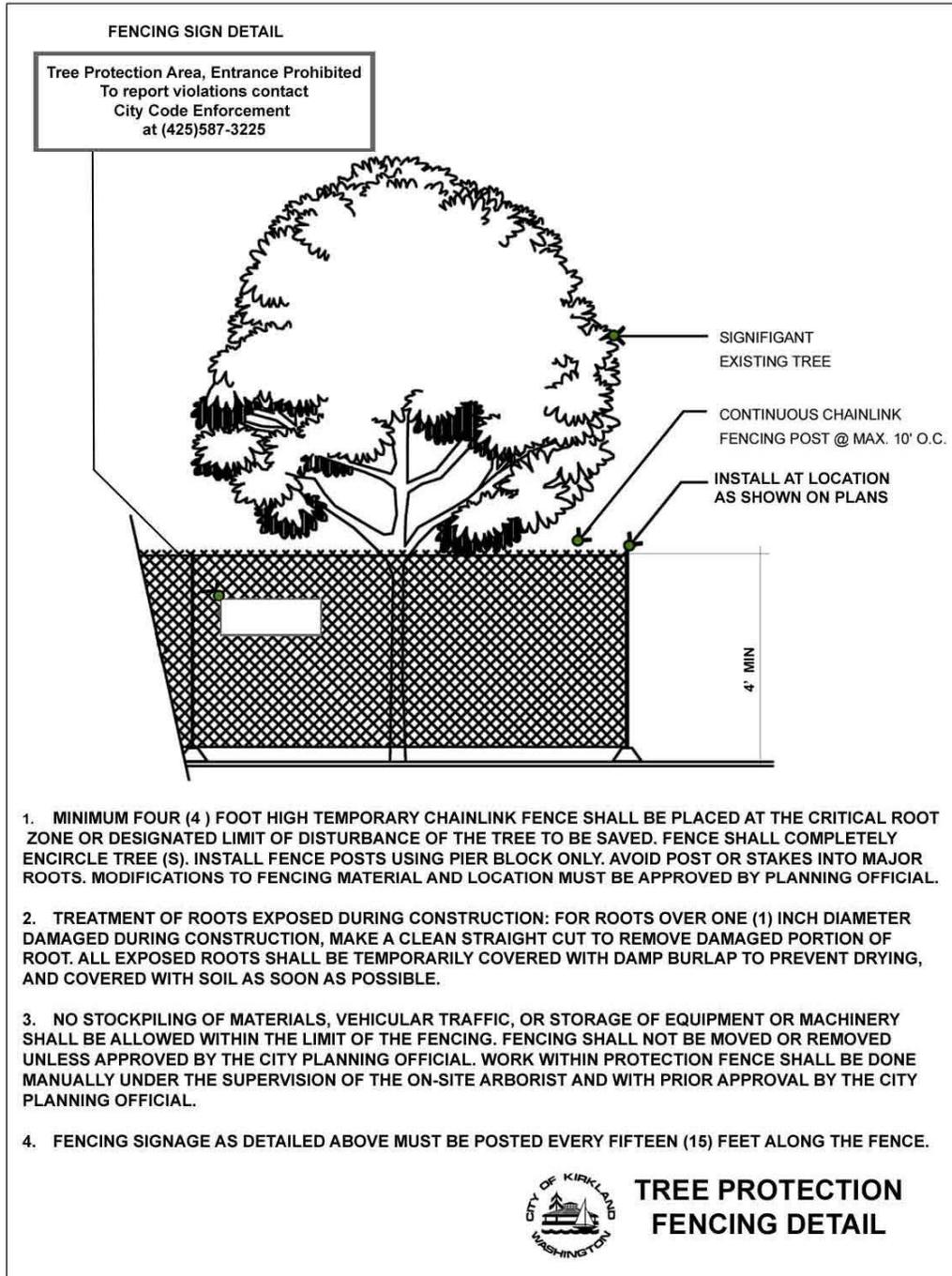
**To report violations contact
City Code Enforcement at
425-587-3225**

4. The area within the Tree Protection Fencing must be covered with wood chips, hog fuel, or similar materials to a depth of 8 to 10 inches. The materials should be placed prior to beginning construction and remain until the Tree Protection Fencing is taken down.
5. When excavation occurs near trees that are scheduled for retention, the following procedure must be followed to protect the long term survivability of the tree:
 - a. An International Society of Arboriculture, (ISA) Certified Arborist must be working with all equipment operators.
 - i. The Certified Arborist should be outfitted with a shovel, hand pruners, a pair of loppers, a handsaw, and a power saw (a chainsaw is recommended).
 - b. The hoe must be placed to remove the material directly away from the trunk as opposed to cutting across the roots.
 - i. Combing is the gradual excavation of the ground cover plants and soil in depths that only extend as deep as the tines of the hoe.
 - c. When any roots of one inch diameter or greater, of the tree to be retained, is struck by the equipment, the Certified Arborist should stop the equipment operator.

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- d. The Certified Arborist should then excavate around the tree root by hand/shovel and cleanly cut the tree root.
 - i. The Certified Arborist should then instruct the equipment operator to continue.
6. Putting Utilities Under the Root Zone:
- a. Boring under the root systems of trees (and other vegetation) shall be done under the supervision of an ISA Certified Arborist. This is to be accomplished by excavating a limited trench or pit on each side of the critical root zone of the tree and then hand digging or pushing the pipe through the soil under the tree. The closest pit walls shall be a minimum of 7 feet from the center of the tree and shall be sufficient depth to lay the pipe at the grade as shown on the plan and profile.
 - b. Tunneling under the roots of trees shall be done under the supervision of an ISA Certified Arborist in an open trench by carefully excavating and hand digging around areas where large roots are exposed. No roots 1 inch in diameter or larger shall be cut.
 - c. The contractor shall verify the vertical and horizontal location of existing utilities to avoid conflicts and maintain minimum clearances; adjustment shall be made to the grade of the new utility as required.
7. Watering:
- a. The trees will require significant watering throughout the summer and early fall in order to survive long-term. An easy and economical watering can be done using soaker hoses placed three feet from the trunk of the tree and spiraled around the tree. One 75-foot soaker hose per tree is adequate. It is best to place the soakers using landscape staples, (available from HD Fowler in Bellevue for pennies apiece) then cover the area with two to three inches composted materials. The composted material will act as a mulch to minimize evaporation and will also stimulate the microbial activity of the soil which is another benefit to the health of the tree.
 - b. Water the tree to a depth of 18 to 20 inches. I recommended leaving the water on the soaker hoses for six to eight hours and then digging down to determine how deep your water is penetrating. Then adjust accordingly. It may take a good two days of watering to reach the proper depth.
 - c. Once the water reaches the proper depth, turn off the hoses for four weeks and then water again. Water more often when temperatures increase every three weeks when temperatures exceed 80 degrees and every two weeks when temperatures exceed 90 degrees. This drying out of the soil in between watering is important to prevent soil pathogens from attacking the trees.

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ATTACHMENT 5 - REFERENCES

1. Arno, Stephen F. and Hammerly, Ramona P. *Northwest Trees*. Anniversary Ed. Seattle, Washington: The Mountaineer Books, 2007.
2. Brockman, C. Frank, *Trees of North America, A Guide to Field Identification*. New York: Golden Press, 1979.
3. Harris, Richard W. et al. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines*. 4th ed. Upper Saddle River: Prentice Hall, 2004.
4. Matheny, Nelda P. and Clark, James R. *Trees & Development, A Technical Guide to Preservation of Trees During Land Development*. Savoy: The International Society of Arboriculture Press, 1998.
5. Mattheck, Claus and Breloer, Helge. *The Body Language of Trees, A Handbook for Failure Analysis*. London: HMSO, 1994.
6. Pacific Northwest Chapter-ISA. *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface*. Course Manual. Release 1.4. PNW-ISA: Silverton, Oregon, 2010.
7. Watson, Gary W., and Neely, Dan, eds. *Trees & Building Sites*. Savoy: The International Society of Arboriculture Press, 1995.



CITY OF KIRKLAND
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www.ci.kirkland.wa.us

MEMORANDUM

To: Jon Regala, Senior Planner
From: Deb Powers, Urban Forester
Date: July 12, 2011
Subject: Urban Forester Review / ZON11-00026

The Tree Retention Plan for ZON11-00026 has been reviewed and approved. Per Kirkland Zoning Code (KZC) Chapter 95, Tree Retention Standards for commercial properties apply to significant trees potentially impacted by the proposed improvements. For commercial properties, High Retention Value trees are assessed as those trees located within required landscape areas, setbacks and buffers.

The majority of the site's significant trees are located outside required landscape areas or within the footprint of proposed improvements, which precludes them from the City's tree retention standards for commercial properties. In addition, although the trees on this site have been functioning as wildlife habitat, most of the predominantly alder, cottonwood or bitter cherry trees are dead or declining and are not good candidates for retention. Of the 68 viable significant trees related to the subject property, two trees have been identified for retention, Trees #934 and 938. Tree #934 is a High Retention value tree, being windfirm and in good condition. Tree #934, which is located in the right-of-way, is in fair condition, which is typically not a good candidate for retention considering the potential impacts of construction. It is assessed as a Moderate retention value tree, to be retained if feasible.

The applicant's arborist has outlined adequate tree retention measures in the arborist report and the applicant is showing sufficient tree protection fence on the submitted plan set. However, the proposed grading shown on Sheet C3 indicates a grade cut of twelve inches within the limits of disturbance for Tree #934. Both trees are shown with a pedestrian path or sidewalk within their limits of disturbance in the Landscape Plan; therefore subsequent development permit applications shall include special instructions *on the site plan* specifying how to minimize these impacts on retained Trees #934 and 938.

Public Works frontage improvements regarding street trees and landscaping requirements per KZC 95.40 will apply.

Let me know if you have any questions regarding this review.

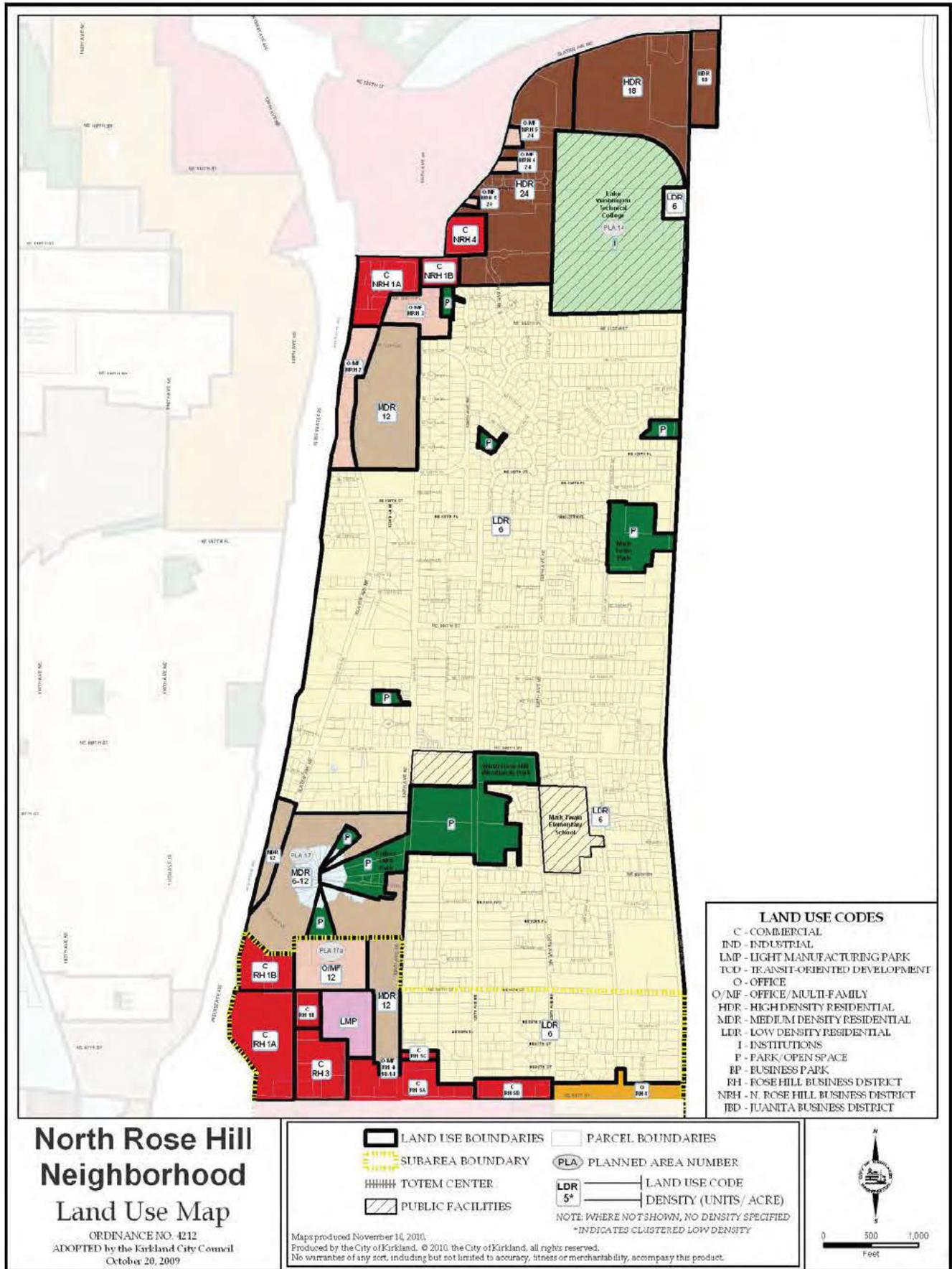


Figure NRH-4: North Rose Hill Land Use