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EVALUATION OF SELECTED TREES AT

KIRKLAND PARKPLACE
6th Street & Central Way
Kirkland, WA 98033

August 30, 2010

PREPARED FOR:

Touchstone Corporation
Attn: Shawn Parry
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EXECUTIVE SUMMARY

117 Trees were evaluated:

Current Health Ratings:	
1	Dead
1	Previously Cut Down**
5	Poor
47	Fair
43	Good
15	Very Good
5	Excellent
117	**Total**

SIGNIFICANCE RATINGS:	
7	- Non-Significant
	They are #'s 103, 133, 134, 135, 163, 168, & 212.
110	- Significant
117	**Total**

TREE LOCATIONS:	
30	Private Property (On-site)
55	Adjacent Properties
31	Right-of-Way (Central Way)
1	Right -of-Way (Kirkland Avenue)
117	**Total**

Viability Ratings:	
6	Non-Viable*
1	Cut down**
110	Viable
117	**Total**

ASSIGNMENT

Shawn Parry of Touchstone Corporation contracted with Gilles Consulting to evaluate selected trees at Kirkland Parkplace in downtown Kirkland. The property is located at the southwest corner of the intersection of 6th Street and Central Way. The property is bounded by Peter Kirk Park and the Kirkland Performing Arts Center on the west and private property to the south and east. The property is being considered for re-development and the City of Kirkland requires an analysis of the trees as part of the permit process. This report provides the analysis. The information in this report can be utilized to create a Tree Plan as required by Chapter 95 of the Kirkland Code.

METHODOLOGY

To evaluate the trees and to prepare the report, I drew upon my 25+ years of experience in the field of arboriculture and my formal education in natural resources management, dendrology, forest ecology, plant identification, and plant physiology. I also followed the protocol of the International Society of Arboriculture (ISA) for Visual Assessment (VA) that includes looking at the overall health of the trees as well as the site conditions. This is a scientifically based process to look at the entire site, surrounding land and soil, as well as a complete look at the trees themselves.

In examining each tree, I looked at such factors as: size, vigor, canopy and foliage condition, density of needles, injury, insect activity, root damage and root collar health, crown health, evidence of disease-causing bacteria, fungi or virus, dead wood and hanging limbs.

Tree Tags

The trees were tagged and numbered 101 through 217. The tags are made of shiny aluminum approximately one inch by three inches in size and are attached to the tree with staples and a one foot strip of brightly colored survey tape. The tags were placed as high as possible to minimize their removal and were generally placed on the backsides of the trees as inconspicuously as possible. Please refer to *Attachment 1, Site Plan* for an orientation to the site and the approximate location of the trees.

Missing Trees

There were a few trees that were not included on the survey. They were labeled with the next number in the sequence and then their approximate location was indicated on the included site plan. These trees may need to be surveyed to determine their exact location in relation to the proposed site improvements and their retainability.

There were a few trees that were added to the inventory because they were within a few feet of the trees in the delineated impact zone. They will likely require tree protection and the City of Kirkland will want the information about them. It was more efficient to pick up these few trees at the same time rather than have to go back and collect the data at a later time.

OBSERVATIONS

The property is an irregularly shaped parcel bounded on the north by Central Way, the east by 6th Street, to the south by private property with access to Kirkland Avenue, and to the west by City of Kirkland propertyð namely the Kirkland Performance Center and Peter Kirk Park. The streets are at a higher elevation than the building floors, drive lanes, and the parking lots. The north, south, and east sides have existing retaining walls to make the most efficient use of the property.

Almost all of the trees on the property appear to appear to have been planted as part of historic landscape plans. There is one Black Cottonwood and two Red Alder trees in the southeast corner area that appear to have seeded themselves into the landscape.

In an effort to present the information and conclusions for each tree in a manner that is clear and easy to understand, as well as to save paper, (the ISA form is a two page form for each tree), I have included a detailed spreadsheet, *Attachment 2, Tree*

Inventory/Condition Spreadsheet. All the same information from the ISA Tree Hazard Form is included in this spreadsheet and the attached glossary. The descriptions on the spreadsheet were left brief in order to include as much pertinent information as possible and to make the report manageable. The attached glossary provides a detailed description of the terms used in the spreadsheet and in this report. It can be found in *Attachment 3, Glossary*. A brief review of these terms and descriptions will enable the reader to rapidly move through the spreadsheet and better understand the information.

Additional Testing

None of the trees presented symptoms or signs that would indicate internal decay or structural defects. Therefore, no additional tests were performed during this site visit.

DISCUSSION

The trees have been broken into four categories. They are: Adjacent Property Trees, Trees on Private Property (On-site), Right-of-Way Trees, and trees within the limits of the proposed parking garage. Due to the required excavation, this fourth group of trees will need to be removed and are not included in this evaluation. The first three categories data appears as follows:

Trees on Adjacent Properties

There are 55 trees on adjacent properties and the extension of the property line out to Kirkland Avenue.

Photo # 1: Panoramic view of the west property line extension with trees # 101 - 124

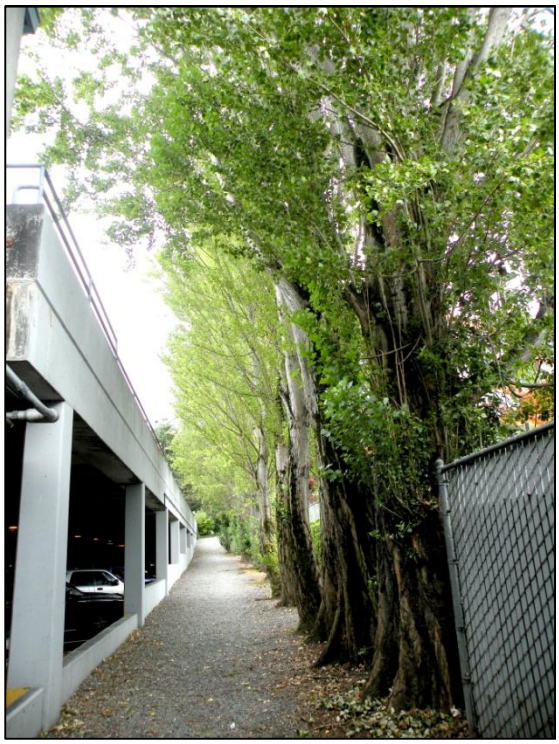
Photo # 2: West property line extension trees # 126--131

Photo # 3: Tree # 183 west of the west property line

Photo # 4: The base of # 183 showing the open wound and the included bark

Trees on Private Property (On-site)

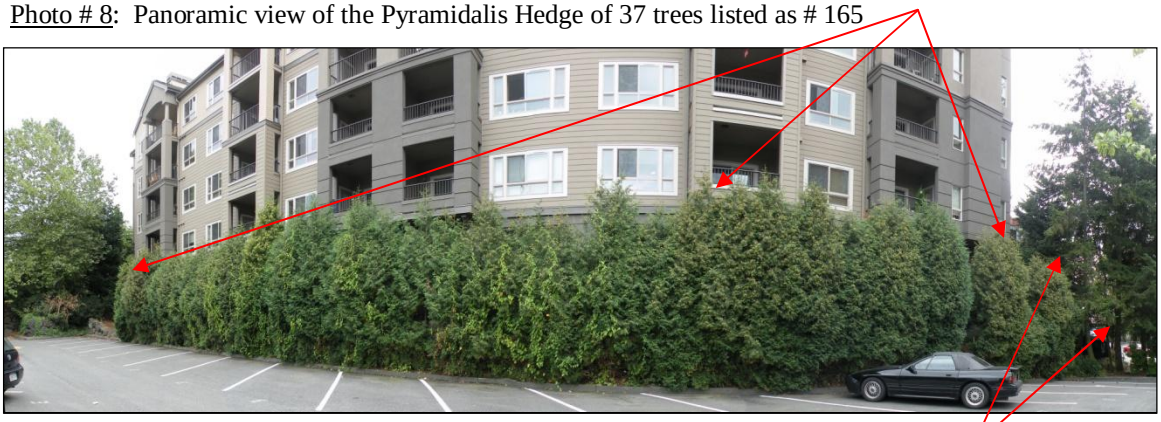
There are 30 trees along the southern property line that are in this category. Trees # 138 through 153 are a row of Lombardy Poplars, *Populus nigra 'Italica,'* that are growing in a row between the parking garage structure and the block retaining wall that is holding up the parking lot on the adjacent property to the south. They are all in Fair to Good Condition. This is surprising given the limited soil volume they have to exploit.



Photos # 5, 6, & 7: showing the row of Lombardy Poplars from various views

Trees # 154 ï 167 are along the eastern and southern boundaries as one moves from the parking garage towards 6th Street. There is a Pyramidalis hedge along the southern property line between the parking lot and the apartments to the south. They have been given the number 165 for the entire hedge which consists of 37 trees.

Photo # 8: Panoramic view of the Pyramidalis Hedge of 37 trees listed as # 165



Trees 159 ï 167

Right-of-Way Trees

There is one tree in a four by four foot planter box in the Kirkland Way sidewalk immediately west of the entrance to the parking lot. It will likely require tree protection during construction.

Photos # 9 & 10: Looking east on Central Way at trees # 188 ï 207

There are 31 trees on the Central Way right-of-way. There is a row of 21 London Plane trees in a grass covered planter strip between the curb and the sidewalk. South of the sidewalk is a flower bed with 10 additional trees, shrubs, and a large sign.

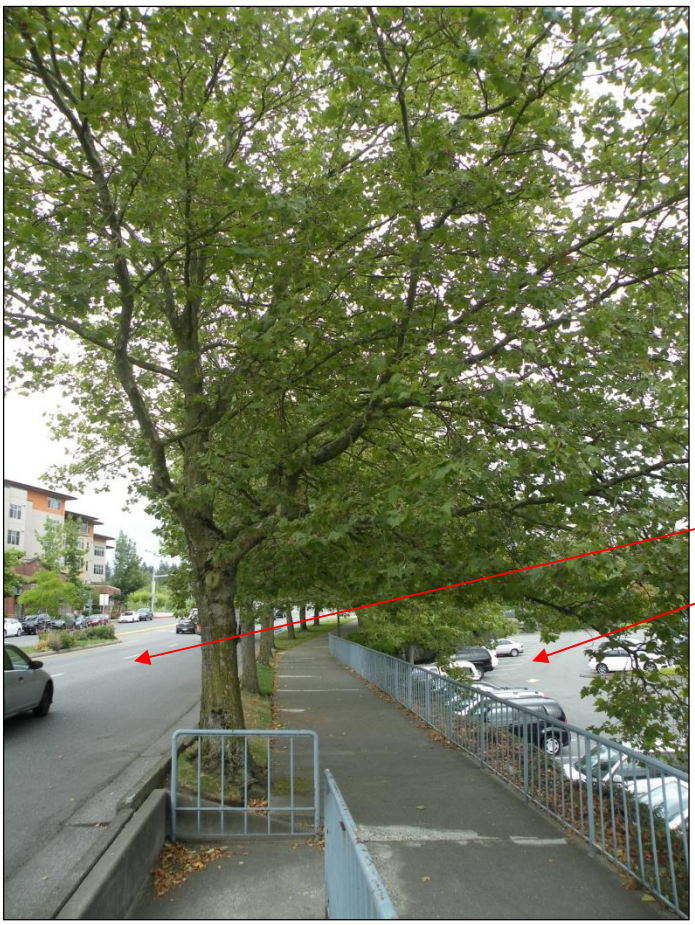


Photo #11: Looking west along Central way

Note the Elevation difference between the street and the parking lot

In the planter bed south of the sidewalk that parallels Central Way are trees # 208 to 217. They are growing in an area between the sidewalk and the retaining wall at the edge o the parking lot. There are some utilities and the Parkplace sign is located there.

The site plan shows a tree symbol that we have given the number 211. The tree was a pine but, judging from the oxidation of the stump that remains, it was cut down a few years ago. It is included in the inventory to account for the symbol on the site plan.

Photo # 12: trees # 208 ï 210 and the sign in the northeast corner of the property

Photo # 13: the stump of # 211

Required Tree Retention

Retention of course, needs to take into account the location of the trees and the location of the proposed improvements. However, strongly advocate retaining as many more trees as possible over the minimum required if development allows. This affords significant

flexibility during construction when unforeseen circumstances and events require the removal of trees that were at first planned for retention. If there is a bank of extra *Significant Trees* somewhere else on the property they can be switched out with a tree or more that needs to be removed unexpectedly.

Given the scope of this project is may be difficult to retain any of the trees. It may be better to remove and replace several of the trees where excavation is required. This would allow the addition of adequate soil volume to be part of the planning and design process.

Minimum Tree Density Calculations

The City of Kirklandôs Tree Code now requires that each lot have a minimum density of at least 30 tree credits per acre. The density may consist of existing trees, supplemental trees, or a combination of existing and supplemental trees. The tree credits are calculated, by dividing the size of the individual lot by the square footage in an acre and multiplying by 30: lot area in square feet / 43,560 square feet x 30 (rounded to the nearest whole #) = the number of tree credits required for each lot.

However, given the scope of this project no internal property trees will be able to be retained. Therefore, I have calculated the tree credits for each individual tree and will leave it to the design team to use that information as is needed.

CONCLUSIONS AND RECOMMENDATIONS

Of the 117 trees evaluated and documented, the breakdown is as follows:

Current Health Ratings:	
1	Dead*
1	Previously Cut Down**
5	Poor*
47	Fair
43	Good
15	Very Good
5	Excellent
117	**Total**

SIGNIFICANCE RATINGS:	
7	- Non-Significant
	They are #'s 103, 133, 134, 135, 163, 168, & 212.
110	- Significant
117	**Total**

Viability Ratings:	
6	Non-Viable*
1	Cut down**
110	Viable
117	**Total**

* The Dead and Poor Condition trees are #ôs 112, 129, 168, 191, 212, & 213.

** Tree # 211 was cut down a few years ago. Only the stump remains.

It is worth noting, that of the 7 *Non-Significant Trees* two are *Non-Significant* due to poor health. They are #ôs 168 and 212. Trees # 103, 133, 134 and 163 are *Non-Significant* due to their diameters being less than 6 inches measured at the standard 4.5 feet above the average ground level. However, #ôs 133, 134, and 163 are all in Fair condition and # 13 is in Very Good Condition. They are worthy of retention if development plans and construction requirements allow.

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 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 minimum Tree Protection Measures in *Attachment 4, Tree Protection Measures* are on three separate sheets that 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.

WAIVER OF LIABILITY

There are many conditions affecting a treeôs 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 conditions can also cause a rapid deterioration of a treeôs 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 treeôs 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&Rôs) 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 evaluatorôs recommendations are not followed or for acts of nature beyond the evaluatorôs 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.

Sincerely,

Brian K. Gilles, Consulting Arborist
ISA Certified Arborist # PN-0260A
ASCA Registered Consulting Arborist # RCA-418
PNW-ISA Certified Tree Risk Assessor #148

ATTACHMENTS

ATTACHMENT 1 - SITE PLAN
Attach here

ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET

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 readerôs 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**ð Whether the tree is on or off the Subject Property, or a Right-of-Way tree.
2) **TREE LOCATION**ð Relative placement of the tree.
3) **TREE #**ð the unique tag number of each tree.
4) **SPECIES**ð this describes the species of each tree with both most readily accepted common name and the officially accepted scientific name.
5) **DBH**ð 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, ó28.4ò at 36òô
    ii) Trees with multiple stems are listed as a ñclump of x,ò 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**ð Tree Credit based on Trunk Diameter
7) **DRIP LINE**ð the radius, the distance from the trunk to the furthest branch tips.
8) **LIMITS OF DISTURBANCE**ð the boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional.
9) **% LCR**ð Percentage of Live Crown Ratio. The relative proportion of green crown to overall tree height. This is an important indication of a treeôs 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 treeøs 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 treeøs 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 treeøs 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 treeøs 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**ð this is the area to note any defects that can have an impact on the treeôs stability or hazard potential. Typical things noted are:
    i) FORKEDð bifurcation of branches or trunks that often occur at a narrow angle.
    ii) INCLUDED BARKð 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 GROWTHð 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 WEAKNESSð 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) BOWEDð 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) KINKEDð 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 FLOWERð an area of deformed bark near the base of a tree trunk that indicates long-term root rot.
14) **ROOT COLLAR**ð 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 **N**o **A**pparent **D**efects.
15) **ROOTS**ð 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**ð 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**ð a ñsignificantò tree is at least 6ò in diameter measured at 4.5ô above the average ground level.
18) **CURRENT HEALTH RATING**ð 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 ñNon-Viableò due to poor health, poor structure, or the tree may be below the size threshold for a ñViable Tree.ò 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**ð 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: "**Monitorò 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. ñMonitor annuallyò (or bi-annually, tri-annually, etc.)ò 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 remain 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.
    iii) **Habitat will remove:** means that the tree has a high potential to fail and cause either personal injury or property damageð 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, 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 ñSignificant,ò while another may be marked ñNon-Significant.ò The difference is in the degree of the descriptionð 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.

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.

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 Fencesð 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 ñsawsallò is recommended).
    b. The hoe must be placed to ñcombò 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.
    d. The Certified Arborist should then excavate around the tree root by hand/shovel and cleanly cut the tree root.

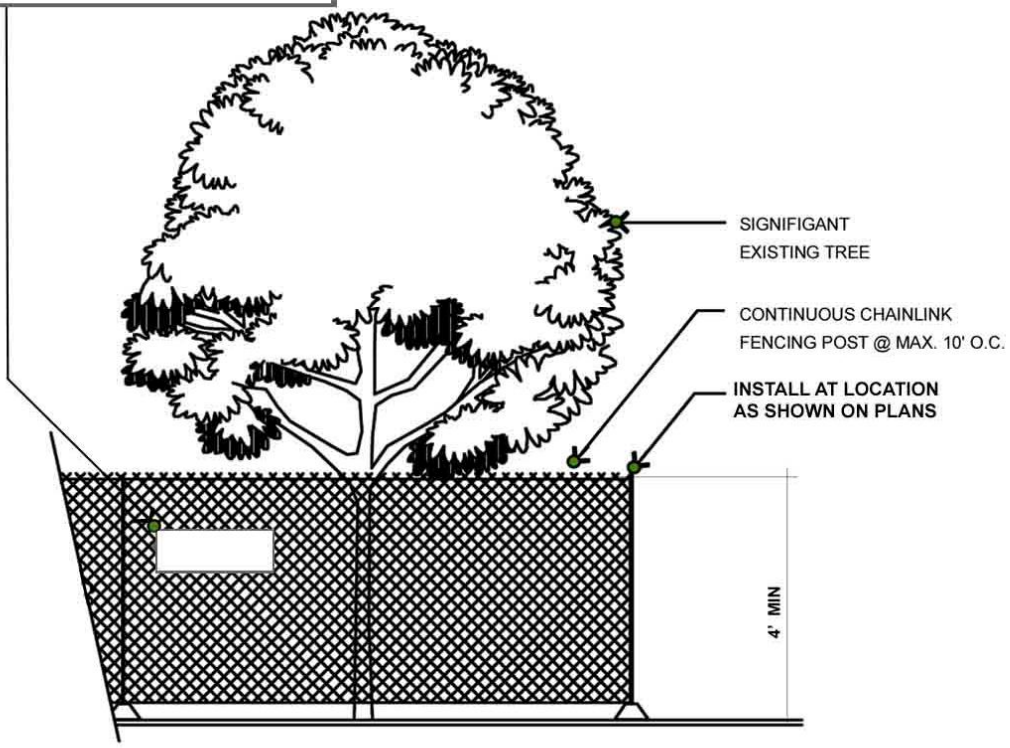
i. The Certified Arborist should then instruct the equipment operator to continue.

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 composed 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 increaseð 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.

FENCING SIGN DETAIL

Tree Protection Area, Entrance Prohibited
To report violations contact
City Code Enforcement
at (425)587-3225



1. MINIMUM FOUR (4) FOOT HIGH TEMPORARY CHAINLINK FENCE SHALL BE PLACED AT THE CRITICAL ROOT ZONE OR DESIGNATED LIMIT OF DISTURBANCE OF THE TREE TO BE SAVED. FENCE SHALL COMPLETELY ENCIRCLE TREE (S). INSTALL FENCE POSTS USING PIER BLOCK ONLY. AVOID POST OR STAKES INTO MAJOR ROOTS. MODIFICATIONS TO FENCING MATERIAL AND LOCATION MUST BE APPROVED BY PLANNING OFFICIAL.

2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER ONE (1) INCH DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING, AND COVERED WITH SOIL AS SOON AS POSSIBLE.

3. NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING. FENCING SHALL NOT BE MOVED OR REMOVED UNLESS APPROVED BY THE CITY PLANNING OFFICIAL. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY UNDER THE SUPERVISION OF THE ON-SITE ARBORIST AND WITH PRIOR APPROVAL BY THE CITY PLANNING OFFICIAL.

4. FENCING SIGNAGE AS DETAILED ABOVE MUST BE POSTED EVERY FIFTEEN (15) FEET ALONG THE FENCE.

CITY OF KIRKLAND WASHINGTON

TREE PROTECTION FENCING DETAIL

ATTACHMENT 5 - REFERENCES

1. Dirr, Michael A. *Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses*. Champaign: Stipes Publishing Company, 1990.

2. Harris, Richard W. et al. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines*. 4th ed. Upper Saddle River: Prentice Hall, 2004.

3. Matheny, Nelda P. and Clark, James R. *Evaluation of Hazard Trees*. 2nd ed. Savoy: The International Society of Arboriculture Press, 1994

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 1.2. PNW-ISA: Silverton, Oregon, 2008.

7. Watson, Gary W., and Neely, Dan, eds. *Trees & Building Sites*. Savoy: The International Society of Arboriculture Press, 1995.