Memo

To: Cindy Carmichael, Lacey Community Development Department

From: Kevin M. McFarland, City of Lacey Tree Protection Professional

Date: 10/26/2016

Re: Case #16-269

The following are my findings and comments in association with the Request for Review by Tree Protection Professional application submitted by Christina Conyers representing Elliott Bay Healthcare Realty. The applicant is proposing the removal of one tree at 4525 3rd Ave SE.

Tree Risk Assessment

The tree risk assessment methodology used for this report was developed by the International Society of Arboriculture in 2013. It replaces the original method adopted in 2011.

Tree risk assessment can be conducted at different levels of intensity, each employing varying methods and providing the client with varied options of reporting and recommendations. The level selected should be appropriate for the assignment.

The ANSI standard for risk assessment and ISA's *Best Management Practices: Tree Risk Assessment* defines three levels of tree risk assessment:

Level 1: Limited visual
Level 2: Basic
Level 3: Advanced

Level 1 assessment involves a visual assessment of an individual tree or populations of trees near specified targets, conducted from a specified perspective in order to identify certain obvious defects or specified conditions. A limited visual assessment typically focuses on identifying trees with *imminent* and/ or *probable* likelihood of failure.

A Level 2 or basic assessment is the standard assessment performed by arborists in response to most private client requests for tree risk assessments. It consists of a detailed visual inspection of a tree and its surrounding site and a synthesis of the information collected. A basic assessment requires walking completely around the tree – looking at the site, buttress roots, trunk and branches. Looking at the tree from some distance away, as well as close up, to consider crown shape and surroundings.

Level 3 is an advanced assessment and it is performed to provide detailed information about specific tree parts, defects, targets, or site conditions. It may be in conjunction with or after a basic assessment if additional information is needed and the client approves the additional service. Specialized equipment, data collection and analysis, and/or expertise are usually required for advanced assessments. These assessments are, therefore, generally more time intensive and more expensive.

After determining the likelihood of failure and the likelihood of impacting a target, the combined likelihood of a failure impacting a target can be categorized. Matrix 1 can be used as a guide in relating these likelihood factors within a given time frame. The resulting terms (unlikely, somewhat likely, likely, very likely) are defined by their use within the table and are used to represent this combination of occurrences in Matrix 2.

Matrix 1. Likelihood of Failure

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Unlikely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk Rating

Likelihood of Failure and Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Findings and Comments

I visited the site on October 24, 2016 and conducted a Level 3 risk assessments on the identified tree. The following table presents my findings and recommendations, please reference the attached tree location map. The tree has been marked with an aluminum tag.

Tree ID#	Species	DBH (in)	Height (ft)	Live Canopy Ratio	Target	Distance to Target	Condition	Comments	Risk Rating	Recommendations
1	Big Leaf Maple	68	65	40	Building, patios, sidewalk, street	40', 25', 30', 20', 32'	Poor	An interior canopy co-dominant stem failed within the last year due to *Ganoderma applanatum* infection, there are scaffold branches currently within the canopy that are in decline due to this infection, 10% of the canopy is showing signs of decline. Multiple areas around the base and trunk that are discolored with sap ooze. Extracted 3 core samples, south side @ 5' had 4.5" of solid wood until discoloration, north side @ 3' had 7" of good wood, east side @ 5' had 2" of good wood and then discolored.	High	Remove

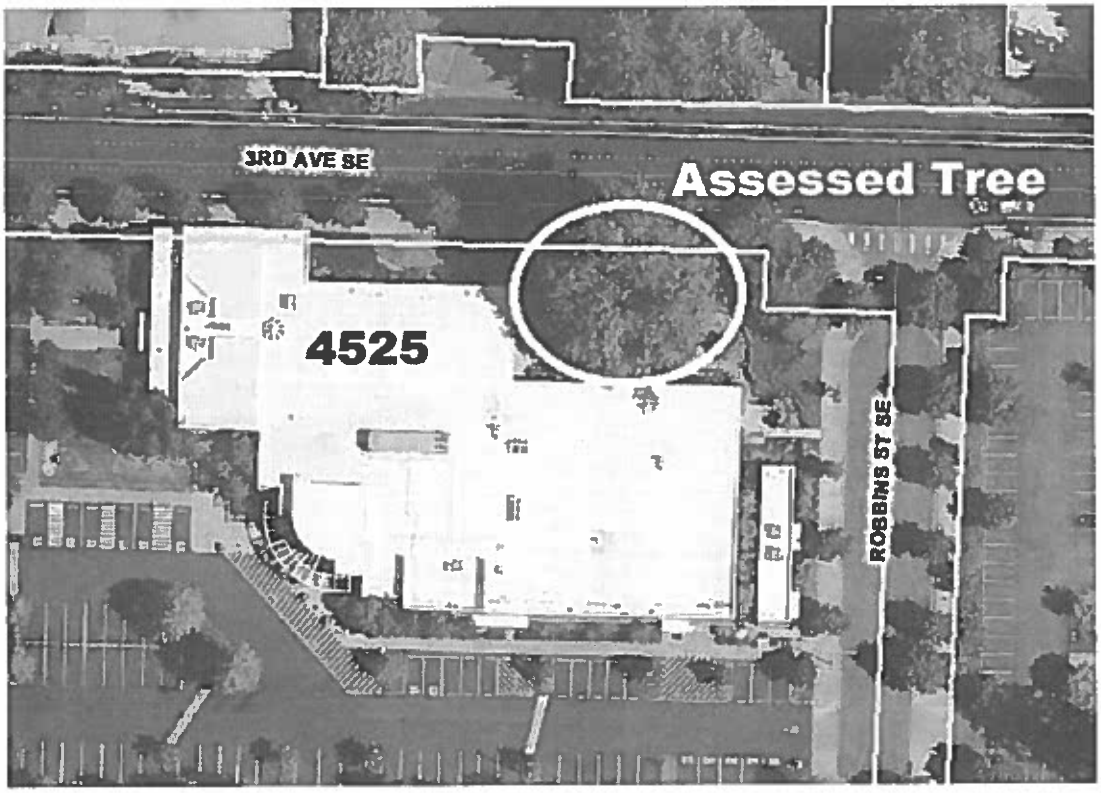
Summary

I have determined that this tree is a high risk that is likely to fail and could cause significant damage. Damage has already occurred with large co-dominant stem failure this last year that landed on the building. That was due to included bark between the adjacent stem (pressure point) and decay associated with the *Ganoderma* infection.

Currently there are 3 co-dominant stems that are showing signs of decline with dead branches, sloughing bark, small leaves and limited internode growth. All are related to the wood decay caused by *Ganoderma*. The infection is wide spread within the co-dominant unions at the main stem. This is a cause of concern due to the number of co-dominant stems, their sizes and potential targets. It is my opinion that there are no mitigation measures such as support systems or pruning that can reduce the risk that this tree presents. I recommend this tree be removed.

There are approximately 64 additional trees within this parcel (including street trees).

Tree Location Map



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1919 Yelm Hwy SE, Suite C
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November 15, 2016

Ryan Andrews
Community Development Department
420 College St. SE
Lacey, WA 98503

RE: Elliott Bay Healthcare Realty LLC – Tree Assessment – Case #: Unknown

Dear Mr. Andrews:

At your request I met with Kevin McFarland of Sound Urban Forestry to provide a second opinion of the health and risk posed by the large bigleaf maple tree at 4525 3rd Ave. SE in Lacey, WA. I inspected the tree prior to Kevin's arrival and formed an independent opinion about the risk and longevity of the tree. A Level 2 inspection was done.

This will be a brief summary of my opinion in lieu of a formal report.

Summary Opinion

This large diameter bigleaf maple is over 4 feet in diameter and is considered to be over-mature. Typically, bigleaf maple matures around about 80 years and tends to decrease in vigor rapidly after that. The decline is facilitated by 2 diseases in particular, Ganaderma trunk rot and Verticillium wilt.

Recently a large scaffold branch failed onto the building to the south. Damage was minor. The failure was likely due to infection with Ganaderma a trunk rot fungi that is commonly found in older bigleaf maples and other tree species.

The large diameter central stem of this tree is also infected with Ganaderma showing evidence of bark loss, decay, and reduced vigor. At a minimum, this central stem would need to be removed since I consider it a 'High' risk to fail. Removal of this lead (which forks and forms a large part of the main canopy of the tree) will create a large gap in the center of the trees crown, leaving numerous upright large stems to form the canopy. However, a second disease, Verticillium wilt appears to be in at least 1 of the remaining large stems overhanging the building, as well as in the main central stem that has Ganaderma.

In short, the cost to make the tree 'safe' for a short period of time (estimated to be $2,000), is not likely a good plan since other major failures of large stems will likely occur in this time period. This is a short-term tree with a **'High'** risk that other large parts will fail and potentially cause damage or injury. The possible risk ratings are 'Low', 'Moderate', **'High'**, and 'Extreme'.

It is my professional opinion that this tree should be removed today and a new replacement tree planted. If this is done, then in 10 years we will have a healthy tree that will be 30-40 feet tall and 7-8 inches in

diameter, versus a deformed dying old bigleaf maple along with the risk that it poses to surrounding targets in this time period.

I recommend that the landowner consider these 3 species to replace this old maple tree: Sugar maple (*Acer saccharum*), swamp white oak (*Quercus bicolor*), or Oregon white oak (*Quercus garryana*). Sugar maple is my preferred choice since it will provide excellent, yellow fall color and is a long-lived tree. The replacement tree should be a 2-2.5 inch caliper balled and burlap tree and planted according to industry and the City of Lacey standards.

Please give me a call if you have questions.

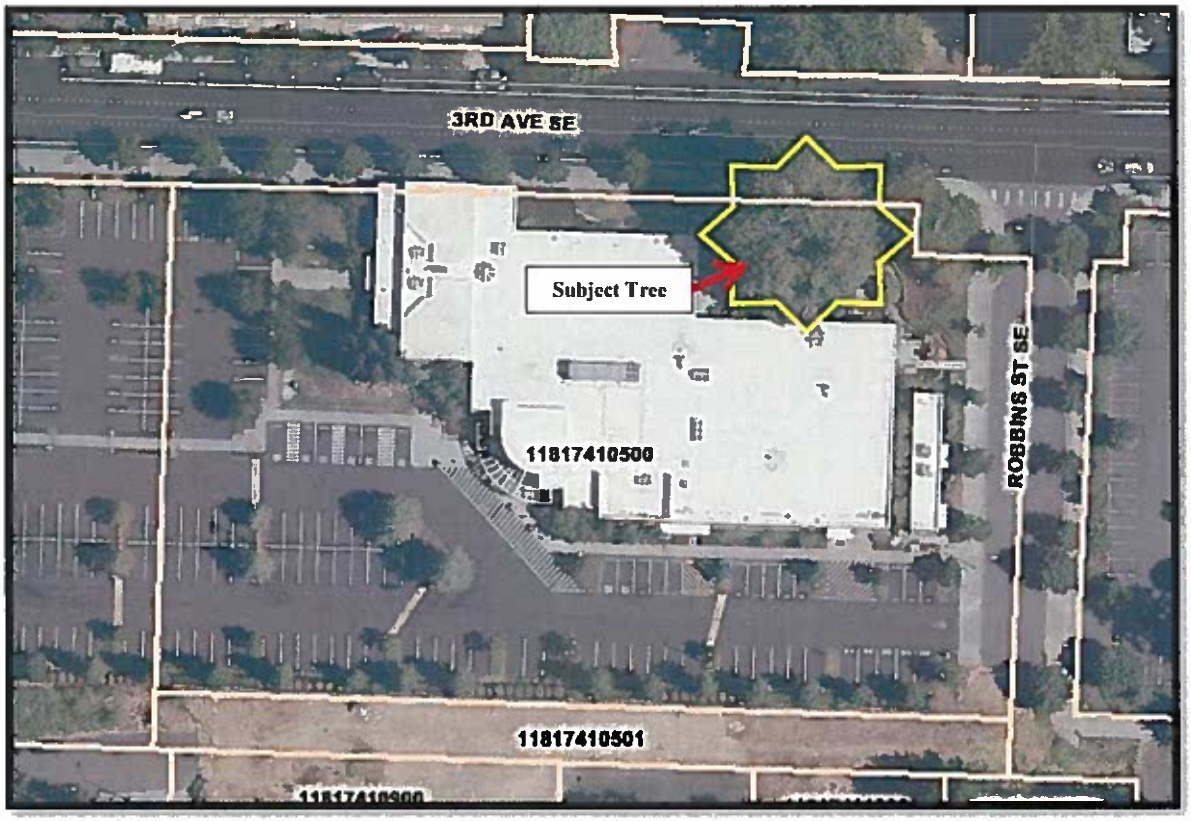
Respectfully submitted,

Washington Forestry Consultants, Inc.

Galen M. Wright

Galen M. Wright, ACF, ASCA
ISA Board Certified Master Arborist No. PN-129
Certified Forester No. 44
ISA Tree Risk Assessor Qualified

Attachment #1. Aerial photo showing location of subject bigleaf maple tree (Thurston County Geodata – 2015).



**This 2015 aerial photo appears to show evidence of Verticillium wilt dieback in other portions of the crown as well as the stem overhanging the building.*

Attachment #2. Tree Risk Assessment – Brief Summary of Process

The purpose of this document is to summarize the methodology of modern tree risk assessment for users of this type of information. This methodology has been put into place by the International Society of Arboriculture and has been in use in its present form since 2013. It updates the initial changes put into place in 2011.

Tree risk assessment is the systematic and qualitative process to identify, analyze, and evaluate tree risk. Tree risk evaluation is the process of comparing the assessed risk against given risk criteria to determine the significance of the risk. This methodology is based on the ANSI A300 standard[1] for tree risk assessment. This standard is supported by a best management practices guide[2].

Those qualified to do tree risk assessment have the qualification from the International Society of Arboriculture called **'Tree Risk Assessor Qualified.'** The methodology for tree risk assessment is more recently detailed in the authoritative tree risk assessment manual[3], which provides the state of the art for tree risk assessment.

Risk is the evaluation and categorizing of both the likelihood (probability) of occurrence of a tree or tree part failure, and the severity of consequences (value of and damage to the target that is impacted). The magnitude of risk can be categorized and compared to the client's tolerances to determine if the risk is acceptable.

Tree risk management is the application of policies, procedures and practices used to identify, evaluate, mitigate, monitor, and communicate tree risk. It is up to the tree owner to determine what level of risk they are able to tolerate, and to conduct any mitigation required when that risk is unacceptable.

There are 3 levels of tree risk assessment:

Level 1 – assessment is limited to a visual assessment of the tree (s) near specified targets, such as along roadways or utility rights-of-ways to identify specified conditions or obvious defects. Assessment shall be from a specified perspective such as foot, vehicle, or aerial patrol.

Level 2 – assessment shall include a 360 degree, ground based visual inspection of the tree crown, trunk, trunk flare, above-ground roots, and site conditions around the tree in relation to targets. It may include sounding the stem to look for internal decay and/or the use of hand tools, or binoculars to view the crown better. Surrounding site conditions are also evaluated.

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[1] ANSI A300 (Part 9 – 2011) – *American National Standard for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management – Standard Practices (Tree Risk Assessment a. Tree Structure Assessment).* American National Standards Institute, Inc. Washington D.C. 14 pgs.

[2] Smiley, E. Thomas, Nelda Matheny, and Sharon Lilly. 2011. *Best Management Practices – Tree Risk Assessment.* International Society of Arboriculture. Champaign, IL.

[3] Dunster, Dr. Julian et al. 2013. *Tree Risk Assessment Manual.* International Society of Arboriculture. Champaign, IL.

Level 3 – all of the level 2 techniques, plus advanced methodologies such as coring or drilling the tree stem or roots to look for decay, a climbing assessment, probing, pull testing, or radiation, sonic, or subsurface root assessments.

In tree risk assessment, **targets** are people who could be injured, property that may be damaged, or activities that could be disrupted by a tree failure. A tree must have a target for there to be a risk rating higher than 'Low'. The target has a value and people are the highest value target, followed by structures, cars and other high value objects. Fences would be a low value target. As part of a target assessment, the assessor considers if the target can be moved out of reach of the tree or tree part that might fail, or if people could be excluded from the target area of the tree.

As part of the risk analysis, the assessor must conduct a site analysis. This may include looking for signs of recent tree removal that may expose a previously sheltered subject tree to winds, construction activity that severed roots of the tree, or other site or soils conditions/changes that affected drainage or tree health.

Defects often predispose a tree or part of a tree to failure. A key part of tree risk assessment is to categorize the likelihood of failure of the tree or a defective part. The tree or defect is examined, and the likelihood of failure is categorized in a matrix (below) as: **Improbable, Possible, Probable, or Imminent**. A tree with a lifting root plate would likely be categorized as 'Imminent' to fail. A tree with a broken and hanging branch that is still attached would likely be categorized as 'Improbable' or 'Possible.' Cracks in a trunk or branch would likely be categorized as 'Probable' or 'Imminent' to fail.

This rating of **'Likelihood of Failure'** is then brought forward into the Likelihood of Failure and Impact matrix to assign a level of risk of the tree. The level of risk is then categorized as **Low, Moderate, High, or Extreme.**

The following 2 tables are used by Tree Risk Assessor Qualified professionals to rate the risk of the tree. Note: this system does not use a numerical rating system as old systems used.

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Attachment #3. Assumptions and Limiting Conditions.

1) Any legal description provided to the Washington Forestry Consultants, Inc. is assumed to be correct. Any titles and ownership's to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

2) It is assumed that any property is not in violation of any applicable codes, ordinances, statutes, or other governmental regulations, unless otherwise stated.

3) Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, Washington Forestry Consultants, Inc. can neither guarantee nor be responsible for the accuracy of information.

4) Washington Forestry Consultants, Inc. shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

5) Loss or alteration of any part of this report invalidated the entire report.

6) Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc.

7) Neither all or any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc. -- particularly as to value conclusions, identity of Washington Forestry Consultants, Inc., or any reference to any professional society or to any initialed designation conferred upon Washington Forestry Consultants, Inc. as stated in its qualifications.

8) This report and any values expressed herein represent the opinion of Washington Forestry Consultants, Inc., and the fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence neither of a subsequent event, nor upon any finding in to reported.

9) Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

10) Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the tree or other plant or property in question may not arise in the future.

Note: Even healthy trees can fail under normal or storm conditions. The only way to eliminate all risk is to remove all trees within reach of all targets. Annual monitoring by an ISA Certified Arborist or Certified Forester will reduce the potential of tree failures. It is impossible to predict with certainty that a tree will stand or fail, or the timing of the failure. It is considered an 'Act of God' when a tree fails, unless it is directly felled or pushed over by man's actions.