



March 31, 2022

The Village of Lions Bay  
**Attn:** Naizam Jaffer  
PO Box 141, 400 Centre Road  
Lions Bay, BC  
V0N 2E0

**RE:** Arborist Report #1 for tree at corner of Bayview Rd & Stewart Rd, Lions Bay

**ASSIGNMENT:**

This report is in response to your request to assess one tree located within the boulevard at the corner of Bayview Road and Stewart Road. The intent of this report is to assess the current overall condition of this tree and provide a risk assessment along with recommendations for action for managing it over the long term.



**Picture 1.**  
Aerial view  
of site

**TREE & SITE DETAILS:**

A site visit was conducted on March 29<sup>th</sup> to assess the one (1) Douglas fir (*Pseudotsuga menziesii*) tree and review the site. This tree is located on the municipal boulevard on a slightly sloped grade at the north side of Stewart Rd. This is a mature tree that has been growing in this location for some time and is well established.

For the purpose of this report this tree has been assigned a reference number for identification. Its species has been identified; its height has been approximated, the diameter measured at 1.4 meters above grade (D.B.H) and any observations are recorded in the inventory table below (Figure 1).



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Tree #	Species	DBH (cm)	Ht (m) approx	Canopy Radius (m)	Observations
1	Douglas fir – <i>Pseudotsuga menziesii</i>	70	27.4 to 30.5	6.5	<b>Good</b> – blvd tree located corner of Bayview Rd & Stewart Rd; phototropic lean to south-southwest; previously topped (co-dominant or split top at 22.9 to 24.4 m above grade); previous canopy failures (broken, hanging branches); moderate to good trunk taper; moderate live crown ratio – <b>retain &amp; monitor</b>

Figure 1. Inventory Table

It is noted that tree #1 is the tallest tree growing at the east end of a larger span of previously topped trees along the blvd. It is however not the tallest tree within the immediate neighbourhood. Although there are Hydro lines noted along this blvd spanning between Stewart Rd and Bayview Rd it is anticipated that these other trees were likely previously topped to maintain view corridors for the properties above. Tree #1 appears to have two co-dominant stems or a split top but it doesn't appear to have been mechanically cut or topped for view like the adjacent trees have.



Picture 2. Tree #1 – view NW from Stewart Rd



View south east towards site tree from along Bayview Rd

Picture 3. Tree #1 – view SE from Bayview Rd



Picture 4. Tree #1 – view SE from Bayview Rd

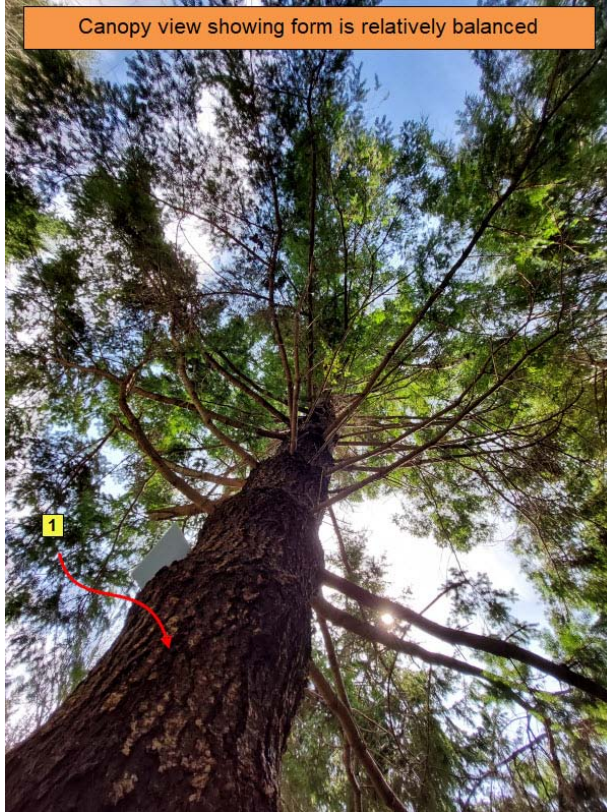


Picture 5. Tree #1 – previous topping pt

Tree #1 is considered to have a fairly healthy and balanced canopy with an overall nice form. There is evidence of previous canopy failures that have occurred in this tree. There are a number of stubs from broken branches as well as a number of dead or broken & hanging branches within the canopy.

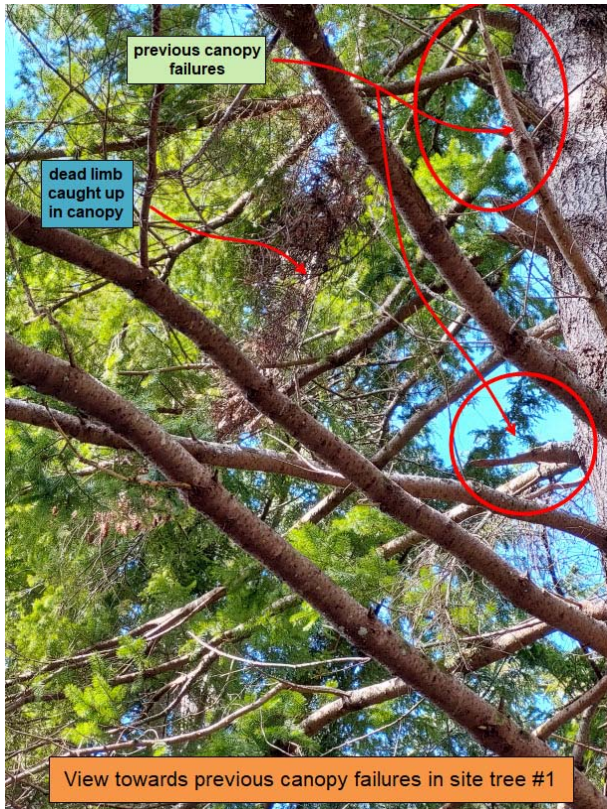
There were no significant grade or slope issues observed on the blvd where the tree is located. The understory near tree #1 is naturalized with a good population of Western Sword Ferns (*Polystichum munitum*) and Common Salal (*Gaultheria Shallon*). There appears to be no automated irrigation within the blvd however efforts have been made to redirect surface runoff from the roadway into the blvd landscape.

The subject tree is located approximately half way up the slope between Highway 99 and Sunset Dr which appears to be the northeastern extent of the Village of Lions Bay. The subject tree is located within a high wind corridor with the prevailing winds coming off Howe Sound.



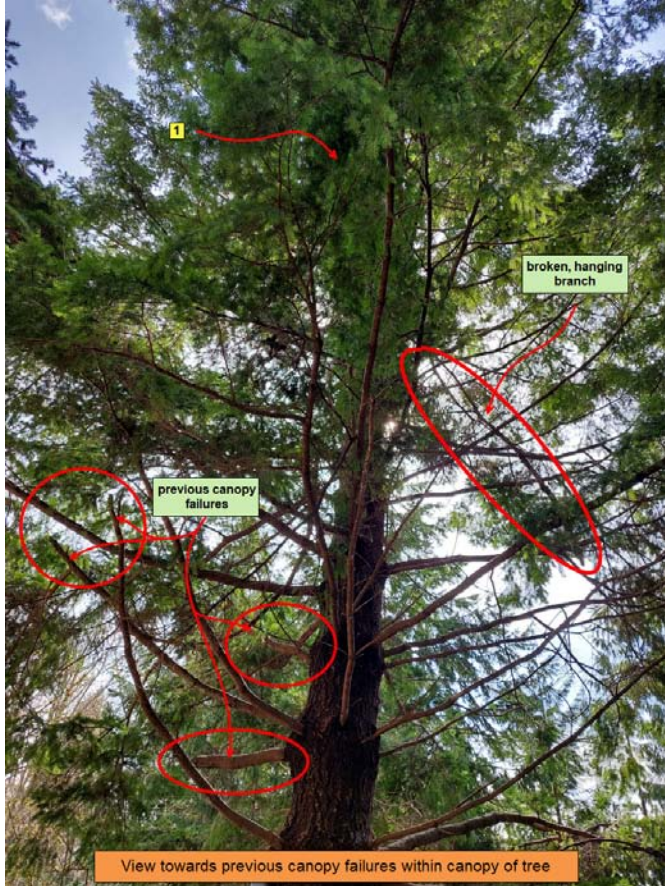
Canopy view showing form is relatively balanced

Picture 6. Tree #1 – canopy view

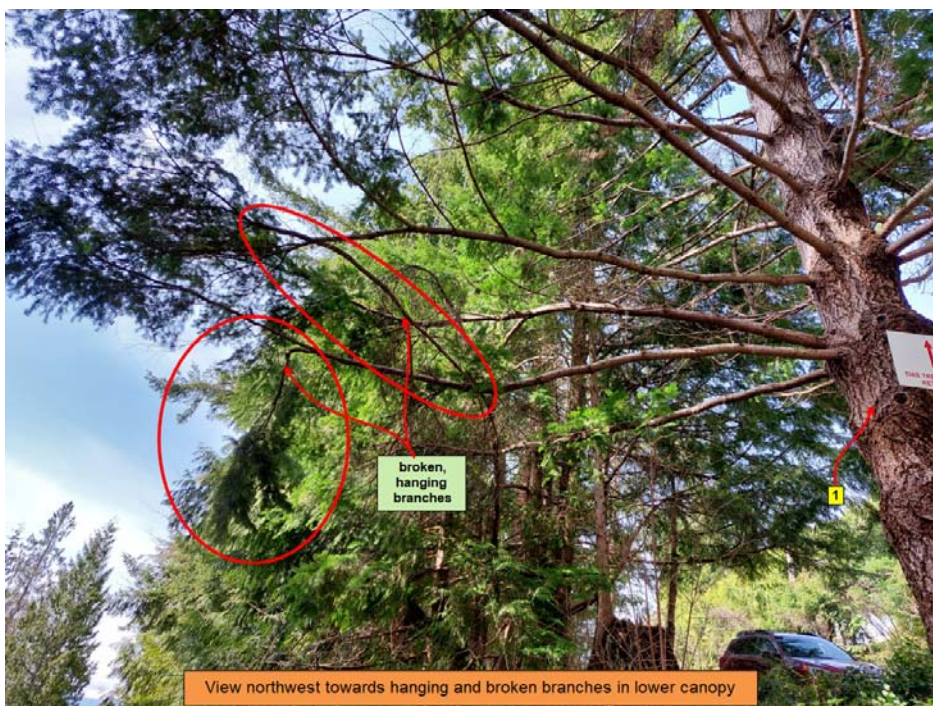


View towards previous canopy failures in site tree #1

Picture 7. Tree #1 – canopy failures



Picture 8. Tree #1 – previous canopy failures



Picture 9. Tree #1 – broken, hanging branches



Picture 10. Tree #1 – hanging branches



Picture 11.  
Tree #1 –  
base of tree



Picture 12. Tree #1 – native planting within understory

The subject tree is in fairly good condition overall. There are no visible fungal conks or outward signs of root decay. There are no obvious or outward indications of cholrosis and or excessive cone production within the canopy. There was no apparent indication of shifting or heaving in the root plate at the time site visit was conducted.

### **DISCUSSIONS:**

As part of the assessment of tree #1, additional information about the site was also reviewed. It appears that this stand of trees may be remaining from when the neighbourhood was originally developed. The stand has likely evolved based on the pruning or management that has occurred to them over that time. Based on available property information many of the homes in the immediate area were built in the early 1970's. This stand of trees has not been left as a result of any recent clearing and has been growing in this location for some time.

Aerial photos from 2018 from the Metro Vancouver's Regional GIS Maps were reviewed. For the most part, this and the adjacent stands of trees appear to have experienced reasonable changes. This is expected as part of the evolution of a forest stand and the noted changes are not considered overly significant or detrimental.

As mentioned tree #1 does appear to have a co-dominant or split top. This appears to have occurred naturally likely through breakage by wind, snow load or even a bird perching on its top. As a result co-dominant stems have grown.



Conifers are more likely to have their branches turn upwards in a competition of growth attempting to re-establish terminal dominance. For deciduous trees, these shoots develop from buds near the surface of the old branches. The multiple stems that result from the topping generally have weak attachments and are more susceptible to failure at these attachment points. Consequently when trees are topped by cutting it leaves large open pruning wounds. Some tree species are much better than others at closing off or compartmentalizing these pruning cuts. Douglas fir species are considered very adept at compartmentalizing their wounds.

In general the topping cuts expose the sapwood and heartwood (inside of the tree), and as a result some trees may fail to compartmentalize. If you look at an old wound, you will notice it does not “heal” from the inside out, but eventually the callus wood will grow around the wound in an attempt to compartmentalize it from infection or decay. Trees that are previously topped have a higher likelihood of decay developing within the tree. This also contributes to the high probability of stem failure if the canopy or top of the tree far outweighs what the lower decayed stems can bear. As trees grow and the stems increase in weight, the branches of a topped tree become susceptible to breaking off during storms, heavy winds, snow or precipitation loads.

It was also noted that tree #1 was exhibiting a moderate to good trunk taper and is considered to have a moderate live crown ratio. *Live Crown Ratio* is defined as the ratio of the vertical extent of the live crown, compared to the overall height of the tree. *Tapered trunks* will withstand greater stress (*wind, vandals, snow load etc*) than those that have little to no taper. Tapered trunks also allow for a more uniform distribution of the stress that will be imposed on the tree. The taper in a tree trunk decreases in diameter the higher up the tree you go. Mechanically the tops of well-tapered trunks are more apt to bend under the wind further from the vertical than those with less taper. This reduces the danger of broken trunks or other deformation from exposure to the heavy winds.

Douglas fir trees are considered to be a long lived tree species that are well adapted to the forest and coastal areas of the Pacific Northwest. The Douglas fir species is also known to tolerate or adapt well to high winds in exposed areas. It is important to note that there is stand support from the green spaces near or around this site. For the most part many of the adjacent stands are also of similar heights as the subject tree. The larger, taller trees deflect wind up and over the area as the wind moves up the slope (elevation) which reduces the potential for wind throw. All of these trees are working together to manage the winds that travel through this area.

Sap weeping and limb drop are also characteristic of the Douglas fir tree species. A few possible causes of sap weep may include the trees being under prolonged stress and or pruning at an inappropriate time of year. Stresses could be resulting from cultural (shallow soils or confined conditions etc) or environmental conditions (drought which we've experienced for a number years in a row for example). Pest (beetle) or disease (fungal pathogens) issues are also feasible.



Douglas fir will naturally shed branches from time to time (self pruning) so some safety pruning periodically would be reasonable to reduce the potential for this. Some of our trees are also experiencing “sudden limb drop”. This seems to be occurring for no apparent reason on some trees and is not specific to Douglas fir. This phenomenon is thought to be a direct result of the prolonged periods of drought and changes to our climates which are also causing the reserves of soil water to be nearly depleted or obsolete very early on in the growing season.

The phototropic lean in the tree #1 is naturally occurring. *Phototropism* is a physiological growth response that plants have adapted themselves to be able to grow in the direction of its light source. This can result from trees growing within close proximity to one another or from growing on a sloped grade but generally occurs because of the conditions that trees are exposed to *in situ*. It is also important to note that a phototropic lean is not an indication of or representative of a potential failure.

It is important to acknowledge that winds are normal for this area and are considered variable. Endemic winds will likely travel through the area at more than one direction at different times of the year. Tree #1 is located at the northeast or leeward edge of the green belt that surrounds a number of properties within this neighbourhood including Lions Bay Elementary. This is the wind sheltered edge of this stand or group of trees. There does not appear to be any significant changes to the overall width of the grouping in relation to tree #1. The remaining stand would have had enough time to acclimate to any changes and as a result would be considered windfirm.

It is also important to note that this risk assessment is based on normal environmental conditions for this area or conditions that can be reasonably expected (endemic). Storm winds like that experienced in 2006/2007 and in August 2015 are not reasonably expected and with wind events like that.....all bets are off.

### **RISK ASSESSMENT**

Further to the information within the report it is important to note that a Level 2 assessment was completed on tree #1 based on what can be reasonably expected as risk over the next 5 yrs. This is the tree that has been identified as the primary concern because of its location.

To further explain, a Level 2 (Basic) is a visual tree assessment where the assessor walks around the tree using simple tools (binoculars, mallet etc) to assess the tree and site conditions. No invasive testing or probing is completed at this assessment level.

**Summary of hazard rating:** The **probability of failure** rating indicates the biological and mechanical properties of a tree. It can consider the number of defects and how well established they are, as well, it considers the factors that may or may not lead to failure under normal environmental conditions. **Size of defective part** rating indicates the size of branches and stems in diameter. The **target area** rating indicates that there may or may not be major structural damage that could occur in the event of failure. It considers that there may be valuable buildings or areas used frequently by people that fall within striking distance of a particular tree.



Tree Risk Assessment is a systematic process that reviews the site use, risk factors and ranks them into risk categories. The risk rating for these trees has been evaluated and assigned. The variance in the ratings is focused on the relationship between the location of the tree and the use of the site by people, buildings or other structures and the number of obvious defects observed. It is important to note that the risk ratings may change as a result of any findings presented and or information provided after this report is submitted

**Please note** that in February 2014 the International Society of Arboriculture (ISA) undertook changes to the industry credentials for tree risk assessment. **The tree risk assessment process however remains the same.** The process and methodology that is used to undertake this risk assessment has been based on the new TRAQ method. Information from both methods (TRACE & TRAQ) is kept on file with Radix Tree & Landscape Consulting Inc.

**Hazard Risk Rating:** Based on the current overall condition of tree #1 (without action), the following ratings have been assigned for this tree considering its likelihood of failure & impact:

Tree #	Species	DBH (cm)	Likelihood of Failure & Impact (TRAQ)
1	Douglas fir – <i>Pseudotsuga menziesii</i>	70	Low

Figure 2. Risk Rating Table

1. **Likelihood of Failure:** *Rating* = Possible

There are a few defects present in the tree that are well established and individually are not considered serious for the tree. The tree is growing as part of a larger stand of trees within the immediate neighbourhood. This site experiences heavy wind events however this is endemic for this area. Tree #1 is also located at the leeward edge of this stand or group and thus is benefiting from stand support to a certain degree. The stand would be considered windfirm. The obvious lean is naturally occurring and is not an indication of potential failure. The tree has been previously topped albeit it appears to be as a result of natural means.

2. **Likelihood of Impacting a Target:** *Rating* = Medium

The size of the tree part(s) that could potentially fall on a target (dwelling) is between 10 to 50 cms in diameter and or greater than 50 cm in diameter.

3. **Likelihood of Failure & Impact:** *Rating* = Unlikely

There are valuable targets (roadways, Hydro lines, passing vehicles etc) located within striking distance which could suffer damage or injury if the tree fell over, failed in part and or fails due to windthrow.

4. **Consequences of Failure:** *Rating* = Significant

Refer to **Figure 3** for the *Likelihood Matrix (TRAQ)* and to **Figure 4** for the *Risk Rating Matrix (TRAQ)* to interpret the risk ratings and associated risk categories.



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	<b>Unlikely</b>	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Figure 3. ISA Likelihood Matrix (TRAQ)

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	<b>Low</b>	Low

Figure 4. ISA Risk Rating Matrix (TRAQ)

It is very important to remember that there is **risk associated with all trees**. All trees will die and fail at some point so it is essential that all parties working and living in these conditions be aware of the inherent risk associated with the large, older trees, such as the ones discussed within this report. The trees’ **risk ratings have been given under consideration of normal environmental conditions**, that is to say, conditions which **can be reasonably expected**.

\*\* It is also important to note that a **defect** is not an indication of any imminent issues. A *defect* is defined as any feature present in a tree that is less than perfect or that deviates from what is accepted as being normal based on the tree species.

**RECOMMENDATIONS:**

1. Retention & monitoring of the assessed tree is recommended as it provides great value to the site & the ecology within the area. It is not considered in imminent danger of failing at the time the inspection was completed based on the findings of the Level 2 assessment completed on the tree.
2. Safety pruning is recommended and is deemed reasonable. The pruning includes but is not limited to the removal of any dead, diseased or damaged branches (safety pruning or crown cleaning). That is to say focus should be anything that could get knocked out in a wind event. Minor clearance pruning can be completed on the lowest branches at the south side to establish truck clearance along Stewart Rd.



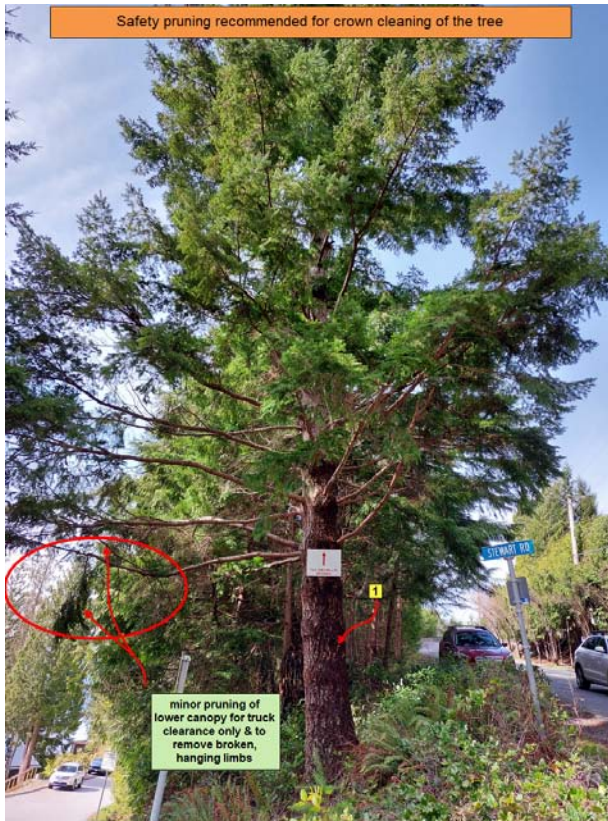
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Canopy raising is not recommended. Safety pruning may also include the removal of select branches and or some end weight reduction on branches that are overextended. Some of these pruning specs may be best left to the discretion of the climbing arborist once they're up in the tree to ensure the intent for safety is achieved at the time the pruning occurs.

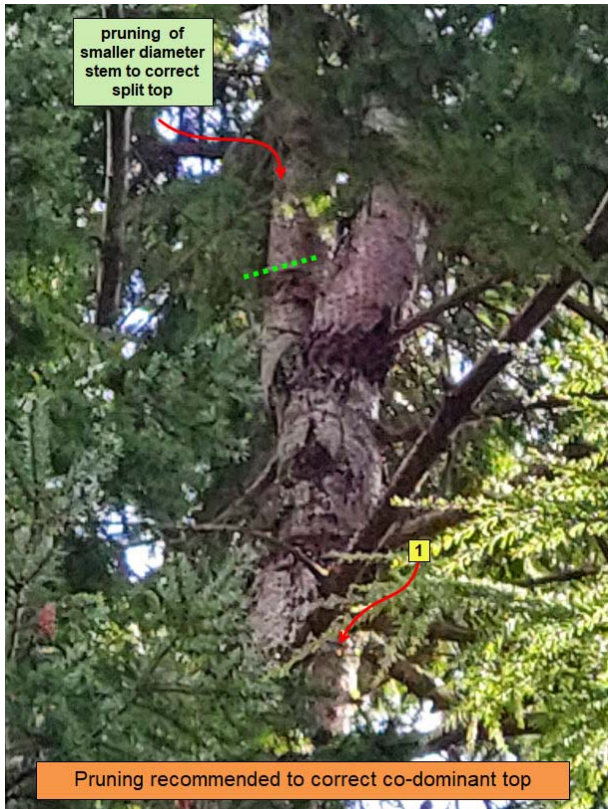
- This pruning is to be thoughtful and intentional to mitigate the likelihood or reduce the risk of dead, broken or hanging branches from failing. **\*\*Do not mutilate this tree** by over pruning.
- All pruning combined on any given tree should not exceed removal of more than 20% to 25% of the “live crown” at any one given pruning cycle.
- **NB:** Thinning the canopy density contributes to further branch failures in the Douglas fir tree species. Spiral pruning or canopy thinning is not recommended for tree #1.
- It is also reasonable to continue to manage the adjacent span of previously topped trees west of tree #1 by means of maintaining their lowered height. This is an established view corridor and regular maintenance is reasonable. Proper management and pruning practices are also req'd regardless of the past pruning history.
- Proper pruning practices must be adhered to and be in conformity with the ISA Best Mgmt Practices and the ANSI Standards (ANSI A300) for pruning.
- This work is to be conducted by or under the direct supervision/instruction of a qualified Certified Arborist and reputable tree service provider in good standing with the Village of Lions Bay.
- Pruning & any other recommendations for this tree is as follows:

Tree #	Species	DBH (cm)	Observations
1	Douglas fir – <i>Pseudotsuga menziesii</i>	70	<b>Retain &amp; monitor</b> – safety prune to remove dead, diseased or damaged branches (crown clean); prune to establish truck clearance along Stewart Rd (this is selective and not intended to “canopy raise”); prune to correct split top to encourage tree to re-establish a terminal leader. This includes the removal of the smaller diameter or east stem to encourage self-correction

Figure 5. Pruning Recommendations Table



Picture 13. Tree #1 – pruning recommended



Picture 14. Tree #1 – pruning recommended



3. Implementing an inspection schedule at regular intervals to monitor this tree over the long term and to mitigate any risks as they may arise is recommended. A baseline for the tree has now been established at this time. It is reasonable however to expect that trees require attention from time to time. It is reasonable for home or tree owners to conduct inspections on their trees at every 3 to 5 years. In this scenario every 5 to 7 yrs is reasonable and or after any significant weather events to mitigate any concerns (as req'd). Recommendations for action can be made based on the findings at the time each inspection occurs. This work is to be conducted by or under the direct supervision/instruction of a qualified Certified Arborist and Qualified Tree Risk Assessor.

### **CONCLUSION:**

In conclusion, the assessed tree is considered reasonable to retain and monitor. It does however require some attention as it has been some time since any major maintenance or safety pruning was completed for this tree. Establishing a baseline for that is reasonable, prudent and responsible based on the history of branch failures.

The primary concerns are the overall long term health and safety for the trees and for those living around them. To reside in environments like that of the Lions Bay, we are surrounded by large mature trees and or forested areas.....that is the beauty of it. Trees are living organisms and are subject to stress and change just like we humans are. Establishing a baseline for this tree moving forward is an important means of managing the stand over the long term.

The recommendations are subject to change should further or additional info become available or are presented after the report is submitted. Trees play an important role in the urban ecology, and all of us must be stewards to ensure a tree's survival and our own safety.

### **Testing and Analysis:**

The assessment completed on the trees defined within this report, consisted of a visual and physical inspection from the ground and was based upon the principals of Visual Tree Assessments. No invasive tests, such as using a resistograph or increment borer, were used during the testing for this report.

### **Assumptions and Limiting Conditions:**

1. The information contained in this report covers only those items that were examined and reflect the condition of these items at the time of inspection. The inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the trees or property in question may not arise in the future.
2. The opinions in this Report are given based upon observations made using generally accepted professional judgment, however, because trees and plants are living organisms and subject to change, damage and disease, the results, observations, recommendations, and analysis as set out in this Report are valid only as at the date any such testing, observations and analysis took place. No guarantee, warranty, representation or opinion is offered or made by Radix Tree and Landscape Consulting Inc as to the length of the validity of the results, observations, recommendations and analysis contained within this Report.



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3. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the appraiser/company can neither guarantee nor be responsible for the accuracy of information provided by others.
4. All tree work is to be completed under the supervision of an ISA Certified Arborist and in compliance with ISA, BC Hydro and WCB standards.
5. Alteration of any part of this report invalidates the entire report.

If you have any questions or concerns please feel free to contact us.

Sincerely yours,

Michelle McEwen  
ISA Certified Arborist (PN-6707A)  
ISA Qualified Tree Risk Assessor (TRAQ)  
Wildlife/Danger Tree Assessor BC (P-1453)  
C of Q #00317-LH-08  
Certified Horticulturist  
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