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June 14, 2020

Mr. Stan Roberts
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ARBORIST REPORT

Purpose and Scope:

On May 29, 2020 I was contacted by Ms. Sabrina Pearson requesting our services as a consulting arborist. The primary purpose and scope of our role in the project being to assess several trees at a project site for new home construction. Due to the slope and geological history of the site, construction of the building foundation will require drilling load-bearing piers into the hillside in a vertical manner. In order to retain and preserve as many trees onsite as possible, it is requested that we help determine potential negative impact upon the root system of existing trees. Throughout the planning process we are to work with the team to address these potential issues and provide recommendations of methods and means by which to mitigate negative effects in order to protect the health and stability of trees to be retained onsite.

Observations:

On Saturday May 30, 2020 I met with Mr. Jason Morgan, civil engineer, on the site for an initial introduction to the proposed site layout. Due to the slope of the site due SW of existing Hemlock St, a temporary access path had been created by depositing a layer of gravel over existing soil after clearing of underbrush vegetation. This pathway is within the Nenana Avenue right-of-way and is reported to be the proposed driveway access. The forest in this area consists of primarily Sitka spruce (*Picea sitchesis)* and red alder *(Alnus rubra)* trees ranging in size from 13-48" dbh (diameter at breast height or 54" above grade) X 30-40' tall. There are approximately 10 trees in the area that were reported to require removal prior to constructing an elevated bridge-type driveway down to the residential structure. Downslope from these trees Mr. Morgan explained the purpose of an existing water-management drainage system, part of which is visible near where site topography becomes more level. Historical geologic events including landslide and previous damage to Hemlock St due to excessive hydrologic pressure within hillside were described.

Where the site becomes more level, the proposed building site, contains vegetation including several small alder trees, and several Sitka spruce trees along the north property line. Understory vegetation consists of grasses, English ivy, Himalayan blackberry, wild cucumber, ferns, and wildflowers. False lily of the valley *(Maianthemum dilatatum),* a native forest understory plant typically growing in moist shady areas, was noted along the northern portion of property. The northeast property corner was marked with a monument pin and wooden stake. Based upon the pin location, it appears that some of the spruce trees along the northern boundary are bisected by the property line. If this is the case, ownership claim and responsibility for these trees would be shared between the two neighboring property owners.

Beyond the eastern property boundary, the topography rises substantially heading due east towards Hemlock St. The forest consists primarily of Sitka spruce ranging in size from 18"-30" dbh X approximately 40' tall. There is one coast pine tree *(Pinus contorta)* near the base of slope, approximately 11' due east of property line. The size of this pine tree is 20" dbh X 30' tall. There is substantial growth of English ivy within the canopy of tree, shading out some of the crown and resulting in dead branches within the canopy. There are numerous dead limbs in the lower canopy that may need to be pruned to provide building clearance during construction. This tree emerges from the slope at an angle of about 20 degrees due west, the trunk has self-corrected into an upright habit near 15' above ground-level due to phototropism, indicating that it's lean is not due to recent soil or root failure. This tree is a viable candidate for retention, so the roots of this tree should be located and addressed to minimize negative construction impact.

There are two small alder trees (10"/12" dbh) within the building footprint that will require removal. Along the western toe of slope there is one small coast pine tree near the northern edge of proposed building footprint. It appears that this tree is within the building footprint which will require removal prior to construction. The remainder of the western toe of slope is covered primarily with nonnative Himalayan blackberry which obscures viewing of topography further downslope toward the beach and western edge of property.

Discussion/Methodology:

On Saturday June 13, I returned to the site to conduct our initial exploration of the tree root systems considered to be potentially impacted by the construction process. I was unable to evaluate root system impact within the area of driveway access in the right-of-way due to gravel fill on slope and potential revision of pier locations. Our initial assessment focused primarily upon the north and east sides of property and proposed building construction.

There are three Sitka spruce trees along the northern boundary located on and bisected by the property line, the center tree being a standing dead tree. These trees, being partially situated upon two separate and privately-owned properties, should be considered partially owned by both property owners. It is my understanding that these trees are intended to be retained and preserved by the client if possible. In order to protect tree health and stability, it will be important to minimize damage to the root system of these trees throughout the construction

process. As the building is to be situated at the 5' setback line, we mean to inspect the proposed pier locations for the presence or absence of tree roots to establish potential impact upon the trees.

In order to collect a reasonable sampling of information, we chose to select sampling locations where piers are to be placed. We proceeded to locate each foundation pier position as accurately as possible, based upon information from the surveys and plans available to us at the time of assessment. We began by pulling measurement lines from the northeast property pin in directions both due south and west. The NE garage pier was marked at 8' due south from pin and 5' due west from property line. We then used a soil probe to help determine if major tree roots were in the area below ground-level. We encountered resistance to probe several inches below soil grade, then hand excavated with shovel to expose cause of resistance. A rock was found and removed from soil. We then continued probing in the area to depths of approximately 20" without locating any major tree roots. Provided that the location assessed is accurate, drilling of a pier in this location should have no detrimental effect on major roots or tree health.

We then moved approximately 7' due west to test the pier near the middle of north garage wall. While the exact distance between piers was not noted on the plan in hand at that time, an estimate of the location a bit beyond halfway of the 13' wall listed on the Foundation Plan was used. The location of the pier was measured at 12' from east and 8' from north property lines. Due east of this point there exists a visible surface root growing due south from a spruce tree. This root is approximately 4" in diameter and is located 9" due east of pier location. We excavated beside and under this root to inspect for additional branching roots in the vicinity, finding none.

The third location for testing was measured at 18' due west from pin and 5' due south from north property line. The probing process was repeated without locating any major tree roots. As the location selected was an approximation only, we did explore a wider area while probing but found nothing of significance. The tree located due north is a 7" dbh spruce tree and has been dead for some time as noted by dead canopy branches, decay and missing bark from base of trunk.

The fourth sampling location was done 7'8" due west of #3, and slightly due south, as referenced from the Foundation Plan. Resistance was noted during sampling. Upon hand excavation we found rubble consisting of old concrete/mortar attached to the top of a natural stone. Small roots of less than ½" diameter were noted, which could be from trees to be preserved or from nearby alder and pine trees within building footprint. Further probing to a depth of 20" in several locations located no large tree roots.

The fifth location was measured at a point 7'8" further due west, referenced as the central pier along the northern edge of home foundation. This area was near a small pine tree near the toe of slope, with the pine tree located within the building footprint. Roots located near 10" below soil grade were approximately ½" in diameter. These roots again may be from one or more of

several nearby trees. No major structural roots were encountered while probing to 22" below grade.

Transitioning to the east side of home, I tested two locations at 23' and 32' south of pin and 5' due west of property line. The existing trees are fewer and further from building footprint, with the nearest being a coast pine tree located 11' due east of property line. This tree is referenced above as the one with substantial ivy growth in canopy, and a natural lean due west toward proposed construction. The probing of sampling sites in both areas revealed no large structural tree roots of concern at this time.

Recommendations:

The objective of this section is to provide guidance to help minimize the negative impacts of construction on tree health. Tree protection measures are intended to guide the construction project to ensure that appropriate Best Management Practices will be implemented in the field to mitigate potential damage and limit undesirable consequences that may result from construction. Potential issues of concern include but are not limited to physical injury to roots/trunk/crown, soil compaction of root zone, severing of roots, and grade changes.

The trees of highest concern currently include the spruce trees along the northern property line. The plan to create a cut-bank and lower grade 60-62" in this area will certainly have some effect on the roots of these trees. As the highest density of tree root growth is typically within the top 2-3' of soil, the excavation will likely impact the entire root profile. Another point of concern is the proximity to the tree trunk. Tree roots typically radiate outward from the trunk in a radial fashion in all directions with typically 5-9 primary structural flare roots for physical support. The shape of a tree's root system is commonly referred to as a "root plate" as most roots grow within the top 2-4' of soil based on their ability to absorb water, nutrients, and oxygen for uptake into the tree's canopy for photosynthetic processes. From these larger structural roots, smaller diameter roots branch off adding both stability and nutrient-absorptive capacity to the tree. Severing too many roots from a tree impacts nutrient uptake, severing too many large structural roots can potentially impact long term stability.

Whether excavation of soil is limited to a depth of 2' or 4' below grade, a significant amount of tree roots will likely be impacted. Prior to excavation with equipment, it is recommended that further investigation of the proposed north and east foundation stem wall lines be considered. We propose using a process of pneumatic soil excavation with a tool commonly called an "Air Spade". Using pressurized air in this manner will remove soil from a trench as wide and deep as is necessary without damaging the protective outer layer of roots. Doing so will reveal the network of roots below soil grade in the line of proposed excavation to accurately determine extent of potential negative impact so that it may be address in the planning phase.

Regarding the removal of trees as needed for building and driveway construction. The largest trees requiring removal are the Sitka spruce along the north side of Nenana Ave right-of-way.

At this time, I recommend leaving stumps cut to near ground-level rather than excavating for disposal offsite. The soil disturbance required to remove these stumps may likely impact roots in the same area that are growing from nearby trees intended to be preserved. During the tree removal process stumps may be left at a height of 3-4' if some portion of stump/root removal becomes necessary for placement of bridge support piers, this may aid leverage for excavation efforts. In this case, we recommend that excavation be limited as much as possible to only the portion of stump/roots creating conflict. Cutting of roots below grade to facilitate pier installation will minimize potential damage to roots of other trees.

Conclusion:

Included herein are our observations and recommendations based upon our initial onsite review of the project site, plan documentation, and preliminary site investigation. Photographic documentation of our methods and findings are available upon request. This report shall be considered a draft report to be amended as additional information becomes available. In general, the consulting arborist should be onsite during any soil excavation within the Tree Protection Zone. Our presence onsite will allow us to monitor, document, and recommend mitigation strategies as needed to preserve the integrity of trees remaining onsite. Should it be requested, we will be happy to help facilitate the further investigation of root size and density with pneumatic soil excavation in the areas of stem walls and piers. We recommend this as the most accurate method to accurately determine potential for negative impact to preserved trees.

Thank you for the opportunity to assist with your tree care needs. We appreciate your interest in taking the necessary steps to ensure preservation of the value that trees bring to our landscape and world. I look forward to working with your team on this project. Please feel free to contact me with any questions you may have.

Sincerely,

David Sip

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July 9, 2020

Mr. Stan Roberts
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ARBORIST REPORT: ADDENDUM

Having received and reviewed final plans for proposed new construction, we submit our recommendations for your consideration. In conjunction with our prior report, our intention is to provide guidance to help minimize the potential negative impacts of construction on tree health. Tree protection measures provided are intended to guide the construction project to ensure a successful tree preservation program. All work shall be completed in accordance with ANSI A300 (Part 5)-2019.

Regarding the Tree Permit Application Form questions.

1. Tree removal permits should be considered using "Criteria A." per City application forms. Pursuant to "Attachment A: Removing Trees Because of Construction", we are willing to be your certified arborist on record for the duration of the project.

2. There will be trees affected by the proposed construction. There will be a few trees requiring removal due to their location either within the building site or the right-of-way site access.

3. a. The site plan created by your team indicates the location and size of trees impacted by the project and should be submitted with the tree removal application forms. We will work with your team to help implement mitigation measures to reduce potential impact on trees to be retained.

   b. Trees requiring removal should be marked with orange flagging, and trees meant to be retained should be marked with green flagging in order to clearly note the intention

for each throughout the duration of the project. We will complete this task prior to project commencement.

c. We will also coordinate with your team to help ensure steps are taken to avoid damaging trees not proposed for removal by assisting with delineating the Tree Protection Zone prior to fence installation. This process will help limit potential impact by excavation, soil compaction, or storage of materials. Excavation and construction equipment shall be kept out of the TPZ without approval by the arborist and with appropriate mitigation.

d. We will meet with your surveyor onsite to assist with delineating the area to be protected by the Tree Protection Zone. Once the area is defined you will be able to proceed with installation of the protective fencing as required by the City. Fencing material installed shall be in accordance with City requirements

Regarding the requirements of Cannon Beach Municipal Code Section 17.70 Tree Removal and Protection, and Section 12.36.020.A. Tree Maintenance by the City.

Prior to standard soil excavation for the building site, we will conduct preliminary pneumatic soil excavation," air spade", of the proposed grading perimeters of north and east boundaries to evaluate tree root mass, depth, and diameter. The areas selected for inspection will be those closest to root zones of trees most likely to have structural roots in the line of excavation. The air spade excavation of soil from a narrow trench along the grading line will not damage the tree roots but expose them to view for evaluation prior to pruning/excavation. Roots to be pruned from trees intended to be preserved shall be evaluated for size and approximate percentage of total root mass being removed from any given tree. Prior to standard soil excavation near trees, roots should be pruned or cleanly cut at the excavation limit, outside the TPZ where feasible. We will conduct root pruning as needed prior to excavation in coordination with your general contractor. We will also be onsite during excavation to monitor for any additional unforeseen potential impacts.

During removal of trees indicated by the drawings and specifications, we recommend doing so in a manner that will avoid or minimize damage to adjacent trees or structures or compaction of the soil. Excavation and construction equipment shall be selected, positioned, and operated to avoid damage to tree roots, branches, and trunks. If clearance is inadequate for equipment access, lower branches should be lifted or pruned. During stump excavation within the right-of-way for driveway piers, we recommend being onsite in order to provide root pruning as needed to protect adjacent trees. The total cumulative impact on remaining trees will depend on the overall percentage of root mass removed.

Provided that potential root loss can be limited, successful preservation of trees outside of the building area should be considered feasible. We also recommend additional mitigation strategies including but not limited to fertilization and application of plant growth regulators to promote new root growth and help minimize potential adverse effects.

We look forward to working with you on this project. We appreciate your interest in taking the necessary steps to ensure preservation of the value that trees bring to our landscape and world. Please feel free to contact us with any questions or if you need any further information.

Sincerely,

David Sip

David Sip
Consulting Arborist
Ecologic Tree, LLC