

Arboricultural Inventory and Report



Site Location:

UBC Campus Lot 26 – 5988 Gray Avenue,
Vancouver, BC

To be submitted with Tree Management Plan
dated October 18, 2023

Submitted to:

Attention: Sarah Christianson

Polygon Development 233 Ltd.

900 – 1333 West Broadway

Vancouver, BC V6H 4C2

Phone: 604-877-1131

Email: schristianson@polyhomes.com

Date: May 16, 2023

Updated: October 18, 2023

Submitted by:



The following Diamond Head Consulting staff conducted the on-site tree inventory and prepared or reviewed the report.

All general and professional liability insurance and staff accreditations are provided below for reference.

Supervisor:



Max Rathburn | Principal | Arboriculture Manager | Senior Arborist
ISA Certified Arborist (PN-0599A)
ISA Tree Risk Assessment Qualified (TRAQ)

Project Staff:



Joey Banh | Arborist
ISA Certified Arborist (PN-9035A)
ISA Tree Risk Assessment Qualified (TRAQ)
BC Parks Wildlife and Danger Tree Assessor (P3051)

Project Staff:



Nour Dalati
ISA Certified Arborist (PN-9729A)
B.Sc. Arch | B. UF

Contact Information:

Phone: 604-733-4886
Fax: 604-733-4879
Email: Max@diamondheadconsulting.com
Website: www.diamondheadconsulting.com

Insurance Information:

WCB: # 657906 AQ (003)
General Liability: Northbridge General Insurance Corporation - Policy #CBC1935506, \$10,000,000
Errors and Omissions: Lloyds Underwriters – Policy #1010615D, \$1,000,000

Scope of Assignment:

Diamond Head Consulting Ltd. (DHC) was retained to complete an arboricultural assessment to supplement the proposed development application for Lot 26 in UBC, 5988 Gray Avenue, Vancouver. This report contains an inventory of trees and summarizes management recommendations with respect to future development plans and construction activities. The approximate location and general health of off-site trees are included, as a limited assessment, because there is a legal obligation to protect them. This report is produced with the following primary limitations, detailed limitations specified in Appendix 7:

- 1) Our investigation is based solely on visual inspection of the trees during our last site visit. This inspection is conducted from ground level. We do not conduct aerial inspections, soil tests or below grade root examinations to assess the condition of tree root systems unless specifically contracted to do so.
- 2) Unless otherwise stated, tree risk assessments in this report are limited to trees with a *high* or *extreme* risk rating in their current condition, and in context of their surrounding land use at the time of assessment.
- 3) The scope of work is primarily decided by site boundaries. Only trees specified in the scope of work were inventoried.
- 4) Beyond six months or if there are significant changes to the site or to the trees, from the date of this report, the client must contact DHC to confirm its validity because site base plans and tree conditions may change beyond the original report's scope. Added site visits and report revisions may be needed after this point to ensure report accuracy for the municipality's development permit application process. Site visits and reporting needed after the first submission are not included within the original proposal fee and will be charged to the client at an additional cost.

The client is responsible for:

- Obtaining a tree removal permit from the relevant authority prior to any tree cutting.
- Reviewing this report to understand and implement all tree **risk**, removal and protection requirements related to the project.
- Understanding that we have shown trees along the outskirts of the property boundary but not shrubs or other material that could be impacted by your contractors working at your property. The trees we have located are approximate locations and a legal survey is required to determine proper ownership of a tree. It is your responsibility to ensure that all plant material that may have roots passing property lines are protected.
- Obtaining relevant permission from adjacent property owners before removing off-site trees and vegetation.
- Obtaining a timber mark if logs are being transported offsite.
- Ensuring the project is compliant with the tree permit conditions.
- Constructing and maintaining tree protection fencing.
- Ensuring an arborist is present onsite to supervise any work in or near tree protection zones.

DRAFT

Table of Contents

1.0	Introduction	1
1.1	Site Overview	1
1.2	Proposed Land Use Changes	1
1.3	Report Objective	1
2.0	Process and Methods	3
2.1	Tree Inventory	3
2.2	Tree Risk Assessment	3
2.3	Tree Protection	3
3.0	Findings: Tree Inventory and Risk Assessment	4
3.1	Tree Inventory	4
3.2	Tree Risk Assessment	4
4.0	Tree Retention, Removal and Replacement	5
4.1	Tree Retention	5
4.2	Tree Removal	5
4.3	Tree Replacement	6
5.0	Summary and Conclusions	6
5.1	Trees On-site	6
5.2	Trees on Adjacent Properties	6
Appendix 1	Complete Tree Inventory Table	7
Appendix 2	Site Photographs	24
Appendix 3	Tree Health and Structure Rating Criteria	29
Appendix 4	Tree Retention Value Rating Criteria	30
Appendix 5	Risk Rating Matrices	31
Appendix 6	Construction Guidelines	32
Appendix 7	Report Assumptions and Limiting Conditions	36

List of Figures

Figure 1. Lot 26 – 5988 Gray Avenue in context of the surrounding landscape and infrastructure.	2
--	---

List of Photographs

Photo 1. Overview of subject site	24
Photo 2. Boulevard trees #2010-2020	24
Photo 3. Overview of subject site	25
Photo 4. Landscape trees by water feature	25
Photo 5. Boulevard trees #2073-2078	26
Photo 6. Trees #2084-2085	26
Photo 7. Trees #2091-2094.	27
Photo 8. Tree #2095.	28

1.0 Introduction

1.1 Site Overview

The subject site is Lot 26 at the University of British Columbia (UBC), Vancouver campus. The lot is 46,115 square feet and is predominantly flat. Trees medium in size or smaller, all varying in species front the property lines of the lot. The center of the lot is an empty field. The southwest corner has a presentation center to show the proposed design, with some surrounding small trees.

1.2 Proposed Land Use Changes

The proposed development consists of a 16-storey concrete high-rise with an underground parking structure.

In preparing this report, we reviewed the following information:

- Topographic Survey by Aplin & Martin Geomatics Land Surveying Ltd. dated July 20, 2022.
- Proposed Site Plan provided by the client on June 8, 2023.

1.3 Report Objective

This report has been prepared to ensure the proposed development is compliant with UBC's Planning and development "protected trees", which are summarized as:

- Trees with a stem diameter at breast height (DBH, measured at 1.4 m above grade) equal to or greater than 15 cm.
- Replacement trees of any size.

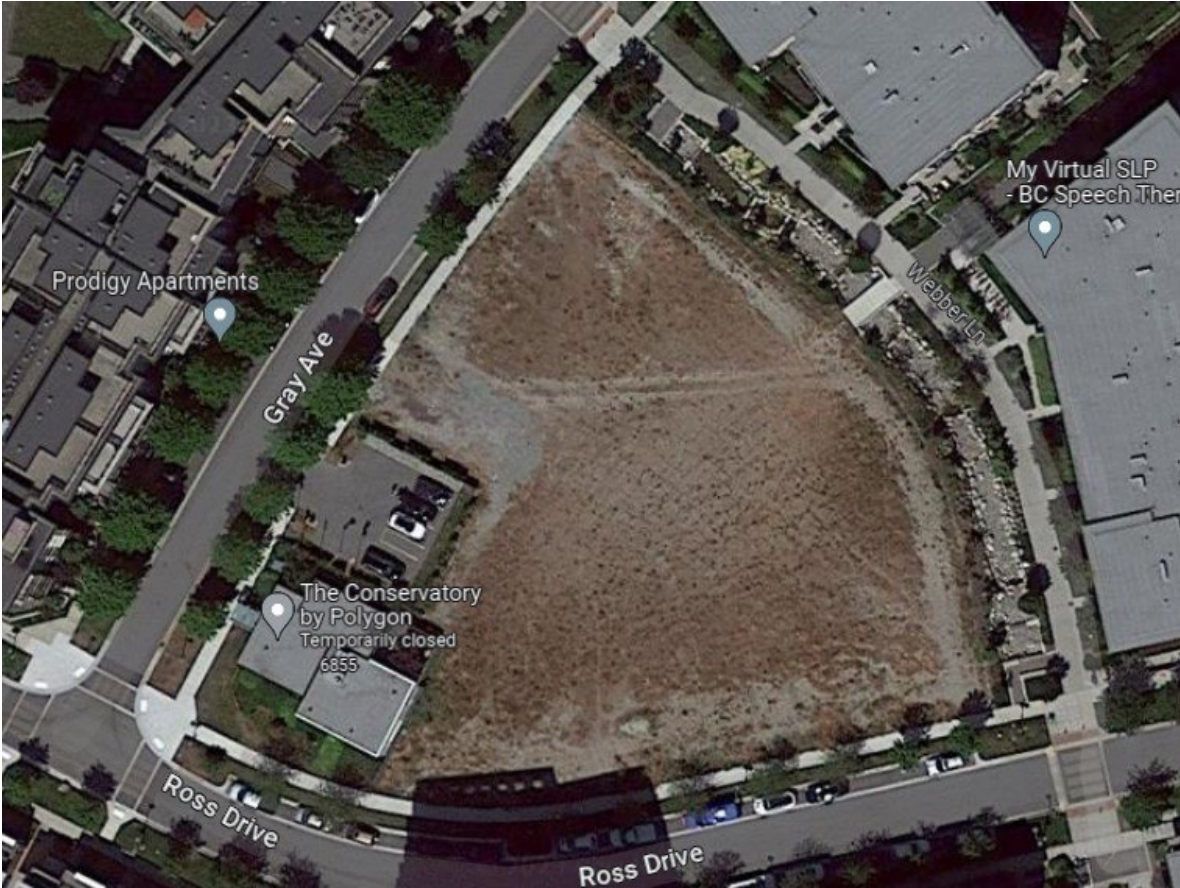


Figure 1. Lot 26 – 5988 Gray Avenue in context of the surrounding landscape and infrastructure. Figure courtesy of Google Maps.

2.0 Process and Methods

Joey Banh of Diamond Head Consulting (DHC) visited the site on May 9, 2023. The following methods and standards are used throughout this report.

2.1 Tree Inventory

Select trees on site and shared with adjacent properties were marked with a numbered tag and assessed for attributes including species; height measured to the nearest meter; and diameter at breast height (DBH) measured to the nearest centimeter at 1.4 m above grade. Off-site trees had a limited visual assessment and their locations have been noted, but not tagged. The general health and structural integrity of each tree was assessed visually and assigned to one of five categories: *excellent*; *good*; *moderate*; *poor*; or *dying/dead*. Descriptions of the health and structure rating criteria are given in Appendix 3.

Tree retention value, categorized as *high*, *medium*, *low*, or *nil*, was assigned to each tree or group of trees based on their health and structure rating, and potential longevity in a developed environment. Descriptions of the retention value ratings are given in Appendix 4. Recommendations for tree retention or removal were determined by taking into account a tree's retention value rating, its location in relation to proposed building envelopes and development infrastructure.

2.2 Tree Risk Assessment

Tree risk assessments were completed following methods of the ISA Tree Risk Assessment Manual¹. This methodology assigns risk based on the likelihood of failure, the likelihood of impact and the severity of consequence if a failure occurs. Only on-site trees that had *high* or *extreme* risk ratings in their current condition and in context of their surrounding land use were noted. Appendix 5 gives the likelihood and risk rating matrices used to categorize tree risk. DHC recommends that on-site trees be re-assessed for risk after the site conditions change (e.g., after damaging weather events, site disturbance from construction, creation of new targets during construction or in the final developed landscape).

2.3 Tree Protection

Tree protection zones were calculated for each tree at 6 x the DBH but may be modified based on professional judgement of the project arborist to accommodate species specific tolerances and site-specific growing conditions.

¹ Dunster, J.A., Smiley, E.T., Matheny, N. and Lilly, S. (2013). Tree Risk Assessment Manual. *International Society of Arboriculture*. Champaign, Illinois.

3.0 Findings: Tree Inventory and Risk Assessment

3.1 Tree Inventory

Table 1 summarizes the trees on site and Appendix 1 contains the complete tree inventory.

Trees On-site

Nine (9) protected trees are on the site and belong to deciduous and coniferous species. All on-site trees were assessed to have good health and structure and high retention value (See Appendix 1 for individual tree inventory information).

Trees on Adjacent Properties

Eighty-three (83) protected UBC owned trees belong to various deciduous and coniferous species. Sixty-one (61) trees were assessed to have good health and structure and high retention value, twenty-one (21) were moderate in condition and have a medium retention value, and one (1) tree was poor and has a low retention value (See Appendix 1 for individual tree inventory information).

3.2 Tree Risk Assessment

No trees on this site posed a *high* or *extreme* risk to targets at the time of assessment.

4.0 Tree Retention, Removal and Replacement

4.1 Tree Retention

The opportunities for tree retention on the site are limited due to the health and structure of existing trees and the anticipated impact of the proposed development. Trees that were found to have medium or greater retention value were considered for retention where design conflicts could be resolved. Refer to Appendix 1 for the noted tree protection zone and retention comments by the tree, and ensure the proposed design accommodates the tree protection zones shown in the Tree Management Plan. The following is a summary of tree retention recommendations:

- **UBC Owned Trees # 2021, 2054 to 2072, and 2083:** retain and protect as required, per the associated tree management plan and arborist notes. Installation of tree protection fencing is required. Within the tree protection zone's, vertical excavation and shoring and low impact methods are to be used for the proposed building's foundation and the paved path, under arborist supervision.
- **UBC Owned trees # 2008 to 2010, 2014-2017, 2019, 2020, 2022, 2039, 2040, 2081, 2082, and 2084:** retain and protect as required, per the associated tree management plan and arborist notes.
- **UBC Owned trees # 2023 to 2038, 2041 to 2053, 2073 to 2080, and 2096:** retain and protect as required, per the associated tree management plan and arborist notes. The trees are outside the scope of the project and are not expected to be impacted by the proposed development.
- **UBC Owned trees OS01, OS02, and OS03:** retain and protect as required, per the associated tree management plan and arborist notes. The trees are outside the scope of the project and are not expected to be impacted by the proposed development.

4.2 Tree Removal

Tree removals have been recommended to accommodate the proposed development and/or due to tree health and structure. Refer to Appendix 1 for the tree removal comments by the tree and to the Tree Management Plan for the location of trees to be removed. The following trees are recommended for removal:

- **On-Site trees # 2011 to 2013, 2090, and 2095:** are proposed for removal due to conflicts with the proposed building's envelope.
- **On-Site trees # 2091 to 2094:** are proposed for removal due to conflict with the proposed landscaped and paved area.
- **UBC-owned tree # 2018** is proposed for removal due to conflict with the proposed letdown into the underground parkade.
- **UBC-owned tree # 2085-2089** is proposed for removal due to conflict with the proposed curbside parking.

4.3 Tree Replacement

UBC will determine the species and quantity of trees to be replaced if required.

5.0 Summary and Conclusions

5.1 Trees On-site

All nine (9) on-site trees are proposed for removal due to conflicts with the development proposal.

5.2 Trees on Adjacent Properties

One (1) UBC owned tree tagged #2018 is proposed for removal due to conflict with the proposed letdown into the underground parkade.

Five (5) UBC owned trees tagged #2085-2089 are proposed for removal due to conflict with the proposed curbside parking. Transplanting these trees is not possible due to the size of the trees.

Permission is required from UBC prior to removal.

All other seventy-seven (77) UBC-owned trees are recommended for retention as part of this development proposal. The retained trees will require protection and fencing as per the arborist notes on the associated tree management plan.

DRAFT

Appendix 1 Complete Tree Inventory Table

The complete tree inventory below contains information on tree attributes and recommendations for removal or retention. Tree ownership in this inventory table is not definitive, its determination here is based on information available from the legal site survey, GPS locations, and field assessment during site visits. Tree protection Zones are measured from the outer edge of a tree's stem. If using these measurements for mapping the tree protection zone, ½ the tree's diameter must be added to the distance to accommodate a survey point at the tree's center. Where tree protection fencing is proposed to vary from the minimum municipal TPZ, comments will be included in the Retention/TPZ comments and shown on the Tree Management Plan.

*TPZ is the tree protection zone size required by the relevant municipal bylaw or, if not defined, the project arborist.

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2008	UBC owned	Magnolia	<i>Magnolia spp.</i>	12	4	1	Good	Established landscape tree.	High	Retain	Protect as required, per associated TMP.	2
Y	2009	UBC owned	Red Maple	<i>Acer rubrum</i>	13	6	2	Good	Street boulevard tree. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2010	UBC owned	Red Maple	<i>Acer rubrum</i>	16	6	2	Good	Street boulevard tree. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2011	UBC owned	White Spruce	<i>Picea glauca</i>	3	1	1	Good	Tree planted on landscape area by temporary show building. Untagged due to density of foliage.	High	Remove	Tree conflicts with the proposed building's envelope.	2
Y	2012	UBC owned	White Spruce	<i>Picea glauca</i>	3	1	1	Good	Tree planted on landscape area by temporary show building. Untagged due to density of foliage.	High	Remove	Tree conflicts with the proposed building's envelope.	2
N	2013	UBC owned	White Spruce	<i>Picea glauca</i>	3	1	1	Good	Tree planted on landscape area by temporary show building. Untagged due to density of foliage.	High	Remove	Tree conflicts with the proposed building's envelope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2014	UBC owned	Red Maple	<i>Acer rubrum</i>	13	6	2	Good	Street boulevard tree. Crown raised to 2.5 m. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2015	UBC owned	Red Maple	<i>Acer rubrum</i>	14	6	2	Good	Street boulevard tree. Crown raised to 2.5 m. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2016	UBC owned	Red Maple	<i>Acer rubrum</i>	14	6	3	Good	Street boulevard tree. Crown raised to 2.5 m. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2017	UBC owned	Red Maple	<i>Acer rubrum</i>	15	6	3	Good	Street boulevard tree. Crown raised to 2.5 m. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2018	UBC owned	Red Maple	<i>Acer rubrum</i>	14	6	3	Good	Street boulevard tree. Crown raised to 2.5 m. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Remove	In conflict with the proposed let down into the underground parkade.	2
Y	2019	UBC owned	Red Maple	<i>Acer rubrum</i>	14	6	3	Good	Street boulevard tree. Crown raised to 2.5 m. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2020	UBC owned	Red Maple	<i>Acer rubrum</i>	14	6	3	Good	Street boulevard tree. Crown raised to 2.5 m. Roots restricted by narrow growing space between sidewalk and curb. Good vigour.	High	Retain	Protect as required, per associated TMP.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2021	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	10	4	1	Good	Tree planted within a few years in landscape area. Roots restricted by concrete walkway. Good vigour.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2022	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	16	5	1	Good	Tree planted in landscape area. Roots restricted by concrete walkway and sidewalk. Good vigour.	High	Retain	Protect as required, per associated TMP.	2
Y	2023	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	16	5	2	Good	Tree planted in grass strip by apartment. Roots restricted by concrete walkway, storm drain and sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2024	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	15	5	2	Good	Tree planted in grass strip by apartment. Roots restricted by concrete walkway, storm drain and sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2025	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	17	5	2	Good	Tree planted in grass strip by apartment. Roots restricted by concrete walkway and sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2026	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	15	5	2	Good	Tree planted in grass strip by apartment. Roots restricted by concrete walkway and sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2027	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	10	3	2	Good	Tree planted in landscape strip between concrete sidewalks. Roots restricted by concrete sidewalk. Good vigour.	High	Retain	Outside project scope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2028	UBC owned	Western White Pine	<i>Pinus monticola</i>	10	3	2	Good	Tree planted in landscape strip between concrete sidewalks. Phototrophically corrected. Roots restricted by concrete sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2029	UBC owned	Japanese stewartia	<i>Stewardia pseudocamellia</i>	10	5	1	Good	Tree planted in landscape strip between concrete sidewalks. Roots restricted by concrete sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2030	UBC owned	Japanese stewartia	<i>Stewardia pseudocamellia</i>	8	5	1	Good	Tree planted in landscape strip between concrete sidewalks. Roots restricted by concrete sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2031	UBC owned	Japanese stewartia	<i>Stewardia pseudocamellia</i>	7	5	1	Good	Tree planted in landscape strip between concrete sidewalks. Roots restricted by concrete sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2032	UBC owned	Japanese stewartia	<i>Stewardia pseudocamellia</i>	7	5	1	Good	Tree planted in landscape strip between concrete sidewalks. Roots restricted by concrete sidewalk. Good vigour.	High	Retain	Outside project scope.	2
N	2033	UBC owned	Western White Pine	<i>Pinus monticola</i>	10	3	2	Good	Tree planted in landscape strip between concrete sidewalks. Roots restricted by concrete sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2034	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	16	5	3	Good	Tree planted in grass strip by apartment. Roots restricted by concrete walkway, storm drain, manhole and sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2035	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	14	4	2	Moderate	Tree planted in grass strip by apartment. Roots restricted by concrete walkway and sidewalk. Crown thin with	Medium	Retain	Outside project scope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
									signs of insect activity on leaves.				
Y	2036	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	17	5	3	Good	Tree planted in grass strip by apartment. Roots restricted by concrete walkway, storm drain and sidewalk. Good vigour.	High	Retain	Outside project scope.	2
Y	2037	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	17	5	3	Good	Tree planted in grass strip by apartment. Roots restricted by concrete walkway. Good vigour.	High	Retain	Outside project scope.	2
Y	2038	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	17	5	3	Moderate	Tree planted in grass strip by apartment. Roots restricted by concrete walkway. Frass found on trunk.	Medium	Retain	Outside project scope.	2
Y	2039	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	16	5	3	Good	Tree planted in landscape area. Roots restricted by concrete walkway and sidewalk. Good vigour.	High	Retain	Protect as required per associated TMP.	2
Y	2040	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	17	5	3	Good	Tree planted in landscape area. Roots restricted by concrete walkway. Good vigour.	High	Retain	Protect as required per associated TMP.	2
Y	2041	UBC owned	Hornbeam	<i>Carpinus betulus</i>	11	5	2	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Good vigour.	High	Retain	Outside project scope.	2
Y	2042	UBC owned	Vine Maple	<i>Acer circinatum</i>	5	3	1	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Multistem. Good vigour. Tag on tree stake.	High	Retain	Outside project scope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2043	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	8	4	1	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Good vigour.	High	Retain	Outside project scope.	2
Y	2044	UBC owned	Vine Maple	<i>Acer circinatum</i>	8	3	1	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Multistem. Good vigour. Tag on tree stake.	High	Retain	Outside project scope.	2
Y	2045	UBC owned	Vine Maple	<i>Acer circinatum</i>	5	3	1	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Multistem. Good vigour. Tag on tree stake.	High	Retain	Outside project scope.	2
Y	2046	UBC owned	Hornbeam	<i>Carpinus betulus</i>	12	5	2	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Good vigour.	High	Retain	Outside project scope.	2
Y	2047	UBC owned	Bird Cherry	<i>Prunus avium</i>	12	5	2	Moderate	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Crown appears thin. Tag on tree stake.	Medium	Retain	Outside project scope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2048	UBC owned	Bird Cherry	<i>Prunus avium</i>	10	6	3	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Asymmetrical crown. Good vigour.	High	Retain	Outside project scope.	2
Y	2049	UBC owned	Bird Cherry	<i>Prunus avium</i>	10	6	3	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Asymmetrical crown. Good vigour.	High	Retain	Outside project scope.	2
Y	2050	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	8	5	1	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Good vigour.	High	Retain	Outside project scope.	2
Y	2051	UBC owned	Vine Maple	<i>Acer circinatum</i>	9	3	1	Moderate	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Thinning crown. Multistem.	Medium	Retain	Outside project scope.	2
Y	2052	UBC owned	Vine Maple	<i>Acer circinatum</i>	10	3	2	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete walkway and water feature. Good vigour. Multistem.	High	Retain	Outside project scope.	2
Y	2053	UBC owned	Hornbeam	<i>Carpinus betulus</i>	12	6	2	Good	Tree planted in landscape area by concrete sidewalk and water feature. Roots restricted by concrete	High	Retain	Outside project scope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
									walkway and water feature. Good vigour.				
Y	2054	UBC owned	Hornbeam	<i>Carpinus betulus</i>	6	5	1	Moderate	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Thinning crown.	Medium	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2055	UBC owned	Vine Maple	<i>Acer circinatum</i>	6	3	1	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour. Multistem. Tag on tree stake.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2056	UBC owned	Vine Maple	<i>Acer circinatum</i>	6	3	1	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour. Multistem. Tag on tree stake.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2057	UBC owned	Hornbeam	<i>Carpinus betulus</i>	4	6	1	Poor	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Very thin crown. Epicormic growth on trunk indicating stress.	Low	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2058	UBC owned	Full Moon Maple	<i>Acer japonicum</i>	8	3	2	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour. Tag on tree stake.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2059	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	8	4	2	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2060	UBC owned	Bird Cherry	<i>Prunus avium</i>	8	6	3	Moderate	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Crown appears to be thinning.	Medium	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2061	UBC owned	Bird Cherry	<i>Prunus avium</i>	8	6	3	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2062	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	7	4	2	Moderate	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Moderate vigour.	Medium	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2063	UBC owned	Full Moon Maple	<i>Acer japonicum</i>	7	3	1	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour. Tag on tree stake.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2064	UBC owned	Vine Maple	<i>Acer circinatum</i>	7	3	1	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Multistem. Good vigour.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2065	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	8	5	2	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2066	On Site	Hornbeam	<i>Carpinus betulus</i>	7	6	1	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour. Narrow tree.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2067	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	8	5	2	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2068	UBC owned	Hornbeam	<i>Carpinus betulus</i>	7	6	1	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour. Narrow tree.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2069	UBC owned	Engelmann Spruce	<i>Picea engelmannii</i>	8	5	2	Moderate	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Bottom whorls thin.	Medium	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2070	UBC owned	Hornbeam	<i>Carpinus betulus</i>	8	6	1	Good	Tree planted in landscape area by open field and water feature. Roots restricted by water feature. Good vigour. Narrow tree.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2071	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	13	5	3	Good	Tree planted in landscape area. Good vigour.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2072	UBC owned	Birchbark Cherry	<i>Prunus serrula</i>	14	5	3	Good	Tree planted in landscape area. Roots restricted by sidewalk. Good vigour.	High	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	2
Y	2073	UBC owned	Magnolia	<i>Magnolia spp.</i>	8	4	3	Moderate	Tree planted on boulevard. Base of tree appears to have had something that restricted its growth. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
Y	2074	UBC owned	Magnolia	<i>Magnolia spp.</i>	7	4	3	Moderate	Tree planted on boulevard. Base of tree appears to have had something that restricted its growth. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2075	UBC owned	Magnolia	<i>Magnolia spp.</i>	7	4	3	Moderate	Tree planted on boulevard. Base of tree appears to have had something that restricted its growth. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
Y	2076	UBC owned	Oriental hornbeam	<i>Carpinus orientalis</i>	5	4	3	Moderate	Tree growing on boulevard. Poor pruning has slightly cut into main trunk. Thin crown. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
Y	2077	UBC owned	Magnolia	<i>Magnolia spp.</i>	9	4	3	Moderate	Tree planted on boulevard. Base of tree appears to have had something that restricted its growth. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
Y	2078	UBC owned	Magnolia	<i>Magnolia spp.</i>	11	5	3	Moderate	Tree planted on boulevard. Has some flush cuts on trunk. Base of tree appears to have had something that restricted its growth. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
Y	2079	UBC owned	Magnolia	<i>Magnolia spp.</i>	9	5	2	Moderate	Tree planted on boulevard. Has some flush cuts on trunk. Moderate vigour. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
Y	2080	UBC owned	Magnolia	<i>Magnolia spp.</i>	7	5	2	Moderate	Tree planted on boulevard. Recently pruned from 0.5 - 1 m. Moderate vigour. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
Y	2081	UBC owned	Magnolia	<i>Magnolia spp.</i>	11	5	2	Good	Tree planted on boulevard. Recently pruned from 0.5 - 1 m. Good vigour. Roots restricted by concrete sidewalk and road.	High	Retain	Protect as required per associated TMP.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2082	UBC owned	Magnolia	<i>Magnolia spp.</i>	7	4	3	Moderate	Tree planted on boulevard. Base of tree appears to have had something that restricted its growth. Roots restricted by concrete sidewalk and road.	Medium	Retain	Protect as required per associated TMP.	2
Y	2083	UBC owned	Magnolia	<i>Magnolia spp.</i>	71	12	4	Moderate	Tree planted on boulevard. Crown slightly encroaching light pole. Roots restricted by concrete sidewalk and road. Historical sunscald or mechanical damage that has since sealed.	Medium	Retain	Within TPZ, vertical excavation and shoring, and low-impact methods are to be used for the proposed building foundation and paved path, under arborist supervision.	4.26
Y	2084	UBC owned	Magnolia	<i>Magnolia spp.</i>	19	12	4	Good	Tree planted on boulevard. Crown slightly encroaching light pole. Roots restricted by concrete sidewalk and road. Good vigour.	High	Retain	Protect as required per associated TMP.	2
Y	2085	UBC owned	Magnolia	<i>Magnolia spp.</i>	24	12	4	Good	Tree planted on boulevard. Crown slightly encroaching light pole. Roots restricted by concrete sidewalk and road. Minor sunscald damage on trunk but tree still has good vigour.	High	Remove	In conflict with the proposed parking along the curbside.	2
Y	2086	UBC owned	Red Maple	<i>Acer rubrum</i>	24	12	4	Moderate	Tree planted on boulevard. Root zone on south side recently paved over. Roots restricted by concrete sidewalk and road. Historical sunscald damage that has been sealed.	Medium	Remove	In conflict with the proposed parking along the curbside.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
Y	2087	UBC owned	Red Maple	<i>Acer rubrum</i>	17	12	4	Moderate	Tree planted on boulevard. Root zone on south side recently paved over. Roots restricted by concrete sidewalk and road. Historical sunscald damage that has been sealed.	Medium	Remove	In conflict with the proposed parking along the curbside.	2
Y	2088	UBC owned	Red Maple	<i>Acer rubrum</i>	20	12	4	Good	Tree planted on boulevard. Root zone on south side recently paved over. Roots restricted by concrete sidewalk and road. Minor sunscald on trunk but still has good vigour.	High	Remove	In conflict with the proposed parking along the curbside.	2
Y	2089	UBC owned	Red Maple	<i>Acer rubrum</i>	16	12	4	Good	Tree planted on boulevard. Root zone on south side recently paved over. Roots restricted by concrete sidewalk and road. Some poor pruning visible in crown. Minor sunscald on trunk but still has good vigour.	High	Remove	In conflict with the proposed parking along the curbside.	2
N	2090	On Site	Japanese Snowbell	<i>Styrax japonicus</i>	8	4	2	Good	Planted by temporary show building. Roots restricted within wooden retaining wall. Good vigour.	High	Remove	Tree conflicts with the proposed building's envelope.	2
N	2091	On Site	Japanese Snowbell	<i>Styrax japonicus</i>	5	3	2	Good	Planted by temporary show building. Roots restricted within landscape space sharing with 3 other trees. Good vigour. Crown suppressed by adjacent trees.	High	Remove	Tree conflicts with the proposed landscaped and paved area. Retention is possible if landscaping was redesigned to accommodate the tree.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
N	2092	On Site	Japanese Snowbell	<i>Styrax japonicus</i>	4	3	2	Good	Planted by temporary show building. Roots restricted within landscape space sharing with 3 other trees. Good vigour. Crown suppressed by adjacent trees.	High	Remove	Tree conflicts with the proposed landscaped and paved area. Retention is possible if landscaping was redesigned to accommodate the tree.	2
N	2093	On Site	Japanese Snowbell	<i>Styrax japonicus</i>	4	4	2	Good	Planted by temporary show building. Roots restricted within landscape space sharing with 3 other trees. Good vigour. Crown suppressed by adjacent tree.	High	Remove	Tree conflicts with the proposed landscaped and paved area. Retention is possible if landscaping was redesigned to accommodate the tree.	2
N	2094	On Site	Japanese Snowbell	<i>Styrax japonicus</i>	7	4	2	Good	Planted by temporary show building. Roots restricted within landscape space sharing with 3 other trees. Good vigour. Crown suppressed by adjacent tree.	High	Remove	Tree conflicts with the proposed landscaped and paved area. Retention is possible if landscaping was redesigned to accommodate the tree.	2
N	2095	On Site	Japanese Maple	<i>Acer palmatum</i>	20	6	4	Good	Tree planted by temporary show building within fencing. Tree appears to have good vigour. Untagged and not full 360 degree assessment due to site restriction.	High	Remove	Tree conflicts with the proposed building's envelope.	2
Y	2096	UBC owned	Red Maple	<i>Acer rubrum</i>	15	6	4	Moderate	Tree planted on boulevard. Moderate vigour. Old pruning wounds have sealed. Roots restricted by concrete sidewalk and road.	Medium	Retain	Outside project scope.	2
N	OS01	UBC owned	Vine Maple	<i>Acer circinatum</i>	10	3	2	Good	Off-site multistem tree.	High	Retain	Outside project scope.	2

Surveyed? Y/N	Tag #	Location	Species Common Name	Botanical Name	DBH (cm)	Height (m)	Dripline Radius (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	*TPZ (m)
N	OS02	UBC owned	Vine Maple	<i>Acer circinatum</i>	10	3	2	Good	Off-site multistem tree.	High	Retain	Outside project scope.	2
N	OS03	UBC owned	Vine Maple	<i>Acer circinatum</i>	10	3	2	Good	Off-site multistem tree.	High	Retain	Outside project scope.	2

DRAFT

Appendix 2 Site Photographs



Photo 1. Overview of subject site. Viewing north.

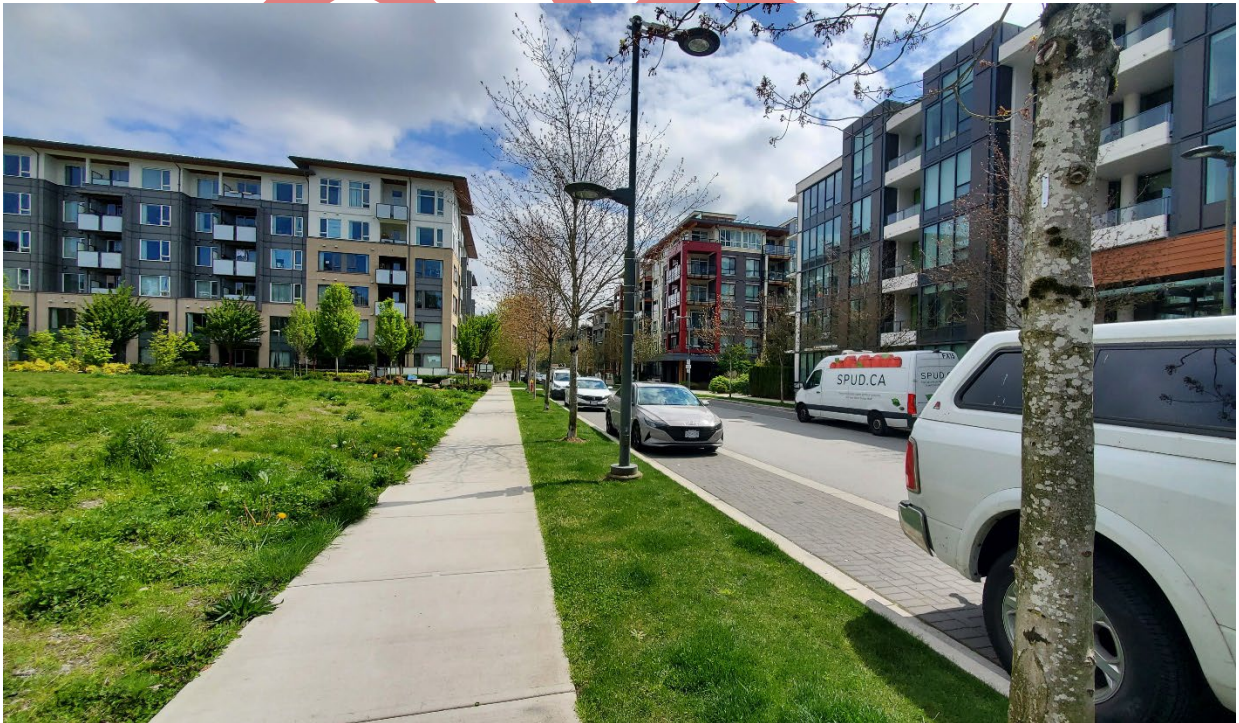


Photo 2. Boulevard trees #2010-2020 right in photo.



Photo 3. Overview of subject site. Viewing east.



Photo 4. Landscape trees by water feature.



Photo 5. Boulevard trees #2073-2078.



Photo 6. Trees #2084-2085 with new paved access within their root zones.



Photo 7. Trees #2091-2094.



Photo 8. Tree #2095.

Appendix 3 Tree Health and Structure Rating Criteria

The tree health and structure ratings used by Diamond Head Consulting summarize each tree based on both positive and negative attributes using five stratified categories. These ratings indicate health and structural conditions that influence a tree's ability to withstand local site disturbance during the construction process (assuming appropriate tree protection) and benefit a future urban landscape.

Excellent: Tree of possible specimen quality, unique species, or size with no discernible defects.

Good: Tree has no significant structural defects or health concerns, considering its growing environment and species.

Moderate: Tree has noted health and/or minor to moderate structural defects. This tree can be retained, but may need mitigation (e.g., pruning or bracing) and monitoring post-development. A moderate tree may be suitable for retention within a stand or group, but not suitable on its own.

Poor: Tree is in serious decline from previous growth habit or stature, has multiple defined health or structural weaknesses. It is unlikely to acclimate to future site use change. This tree is not suitable for retention within striking distance of most targets.

Dying/Dead: Tree is in severe decline, has severe defects or was found to be dead.

Appendix 4 Tree Retention Value Rating Criteria

The tree retention value ratings used by Diamond Head Consulting provide guidance for tree retention planning. Each tree in an inventory is assigned to one of four stratified categories that reflect its value as a future amenity and environmental asset in a developed landscape. Tree retention value ratings take into account the health and structure rating, species profile*, growing conditions and potential longevity assuming a tree's growing environment is not compromised from its current state.

High: Tree suitable for retention. Has good or excellent health and structure rating. Tree is open grown, an anchor tree on the edge of a stand or dominant within a stand or group. Species of *Populus*, *Alnus* and *Betula* are excluded from this category.

Medium: Tree suitable for retention with some caveats or suitable within a group**. Tree has moderate health and structure rating but is likely to require remedial work to mitigate minor health or structural defects. Includes trees that are recently exposed, but wind firm, and trees grown on sites with poor rooting environments that may be ameliorated.

Low: Tree has marginal suitability for retention. Health and structure rating is moderate or poor; remedial work is unlikely to be viable. Trees within striking distance of future site developments should be removed.

Nil: Tree is unsuitable for retention. It has a dying/dead or poor health and structure rating. It is likely that the tree will not survive, or it poses an unacceptable hazard in the context of future site developments.

* The species profile is based upon mature age and height/spread of the species, adaptability to land use changes and tree species susceptibility to diseases, pathogen, and insect infestation.

** Trees that are 'suitable as a group' have grown in groups or stands that have a single, closed canopy. They have not developed the necessary trunk taper, branch and root structure that would allow them to be retained individually. These trees should only be retained in groups.

Appendix 5 Risk Rating Matrices

Trees with a *probable* or *imminent* likelihood of failure, a *medium* or *high* likelihood of impacting a specified target, and a *significant* or *severe* consequence of failure have been assessed for risk and included in this report (Section 3.2). These two risk rating matrices showing the categories used to assign risk are taken without modification to their content from the International Society of Arboriculture Tree Risk Assessment Qualification Manual.

Matrix 1: Likelihood

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

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

Appendix 6 Construction Guidelines

Tree management recommendations in this report are made under the expectation that the following guidelines for risk mitigation and proper tree protection will be adhered to during construction.

Respecting these guidelines will prevent changes to the soil and rooting conditions, contamination due to spills and waste, or physical wounding of the trees. Any plans for construction work and activities that deviate from or contradict these guidelines should be discussed with the project arborist so that mitigation measures can be implemented.

Tree Protection Zones

A Tree protection zone (TPZ) is determined using either dripline or a DBH multiplier to define a radius measured in all directions from the outside of a tree's trunk. It is typically determined according to local municipal bylaw specifications and may be modified based on professional judgement of the project arborist to accommodate species specific tolerances and site-specific growing conditions. For retained trees, the TPZ and fencing indicated in this report are proposed as suitable in relation to the level of disturbance proposed on the site plan provided to the project arborist. Arborist consultation is required if any additional work beyond the scope of the plans provided is proposed near the tree. Work done in addition to the proposed impacts discussed in this report may cause the tree to decline and die.

Tree Protection Fencing: Tree protection zones (TPZs) will be protected by Tree Protection Fencing except where site features constrict roots (e.g., retaining walls or roads), where continual access is required (e.g., sidewalks), or when an acceptable encroachment into the TPZ is proposed, in which case the fencing will be modified. Tree Protection Fencing is shown on the Tree Management Plan and, where it varies from the TPZ, the rationale is described in the inventory table in Section 3.1.

Within a TPZ, no construction activity, including materials storage, grading, or landscaping, may occur without project arborist approval. Within the TPZ, the following are tree preservation guidelines based on industry standards for best practice and local municipal requirements:

- No soil disturbance or stripping.
- Maintain the natural grade.
- No storage, dumping of materials, parking, underground utilities, or fires within TPZs or tree driplines.
- Any planned construction and landscaping activities affecting trees should be reviewed and approved by a consulting arborist.
- Install specially designed foundations and paving when these structures are required within TPZs.
- Route utilities around TPZs.
- Excavation within the TPZs should be supervised by a consultant arborist.
- Surface drainage should not be altered in such a way that water is directed in or out of the TPZ.

- Site drainage improvements should be designed to maintain the natural water table levels within the TPZ.

Prior to any construction activity, Tree Protection Fencing must be constructed as shown on the Tree Management Plan. The protection barrier or temporary fencing must be at least 1.2 m in height and constructed of 2" by 4" lumber with orange plastic mesh screening. Tree Protection Fencing must be constructed prior to tree removal, excavation or construction and remain intact for the entire duration of construction.

Tree Crown Protection and Pruning

All heavy machinery (excavators, cranes, dump trucks, etc.) working within five meters of a tree's crown should be made aware of their proximity to the tree. If there is to be a sustained period of machinery working within five meters of a tree's crown, a line of colored flags should be suspended at eye-level of the machinery operator for the length of the protected tree area. Any concerns regarding the clearance required for machinery and workers within or immediately outside tree protection zones should be referred to the project arborist so that a zone surrounding the crowns can be established or pruning measures undertaken. Any wounds incurred to protected trees during construction should be reported to the project arborist immediately.

Un-surveyed Trees

Un-surveyed trees identified by DHC in the Tree Management Plan have been hand plotted for approximate location only using GPS coordinates and field observations. The location and ownership of un-surveyed trees cannot be confirmed without a legal survey. The property owner or project developer must ensure that all relevant on- and off-site trees are surveyed by a legally registered surveyor, whether they are identified by DHC or not.

Removal of logs from sites

Private timber marks are required to transport logs from privately-owned land in BC. It is the property owner's responsibility to apply for a timber mark prior to removing any merchantable timber from the site. Additional information can be found at: <http://www.for.gov.bc.ca/hth/private-timber-marks.htm>

Regulation of Soil Moisture and Drainage

Excavation and construction activities adjacent to TPZs can influence the availability of moisture to protected trees. This is due to a reduction in the total root mass, changes in local drainage conditions, and changes in exposure including reflected heat from adjacent hard surfaces. To mitigate these concerns the following guidelines should be followed:

- Soil moisture conditions within the tree root protection zones should be monitored during hot and dry weather. When soil moisture is inadequate, supplemental irrigation should be provided that penetrates soil to the depth of the root system or a minimum of 30 cm.
- Any planned changes to surface grades within the TPZs, including the placement of mulch, should be designed so that any water will flow away from tree trunks.

- Excavations adjacent to trees can alter local soil hydrology by draining water more rapidly from TPZs more rapidly than it would prior to site changes. It is recommended that when excavating within 6 m of any tree, the site be irrigated more frequently to account for this.

Root Zone Enhancements and Fertilization

Root zone enhancements such as mulch, and fertilizer treatments may be recommended by the project arborist during any phase of the project if they deem it necessary to maintain tree health and future survival.

Paving Within and Adjacent to TPZs

If development plans propose the construction of paved areas and/or retaining walls close to TPZs, measures should be taken to minimize impacts. Construction of these features would raise concerns for proper soil aeration, drainage, irrigation, and the available soil volume for adequate root growth. The following design and construction guidelines for paving and retaining walls are recommended to minimize the long-term impacts of construction on protected trees:

- Any excavation activities near or within the TPZ should be monitored by a certified arborist. Structures should be designed, and excavation activities undertaken to remove and disturb as little of the rooting zone as possible. All roots greater than 2 cm in diameter should be hand pruned by a Certified Arborist.
- The natural grade of a TPZ should be maintained. Any retaining walls should be designed at heights that maintain the existing grade within 20 cm of its current level. If the grade is altered, it should be raised not reduced in height.
- Compaction of sub grade materials can cause trees to develop shallow rooting systems. This can contribute to long-term pavement damage as roots grow. Minimizing the compaction of subgrade materials by using structural soils or other engineered solutions and increasing the strength of the pavement reduces reliance on the sub-grade for strength.
- If it is not possible to minimize the compaction of sub-grade materials, subsurface barriers should be considered to help direct roots downward into the soil and prevent them from growing directly under the paved surfaces.

Plantings within TPZs

Any plans to landscape the ground within the TPZ should implement measures to minimize negative impacts on the above or below ground parts of a tree. The existing grass layer in TPZs should not be stripped because this will damage surface tree roots. Grass layer should be covered with mulch at the start of the project, which will gradually kill the grass while moderating soil moisture and temperatures. Topsoil should be mixed with the mulch prior to planting of shrubs, but the new topsoil layer should not be greater than 20 cm deep on top of the original grade. Planting should take place within the newly placed topsoil mixture and should not disturb the original rooting zone of the trees. A two-meter radius

around the base of each tree should be left unplanted and covered in mulch; a tree's root collar should remain free from any amendments that raise the surface grade.

Monitoring during construction

Ongoing monitoring by a consultant arborist should occur for the duration of a development project. Site visits should be more frequent during activities that are higher risk, including the first stages of construction when excavation occurs adjacent to the trees. Site visits will ensure contractors are respecting the recommended tree protection measures and will allow the arborist to identify any new concerns that may arise.

During each site visit the following measures will be assessed and reported on by a consulting arborist:

- Health and condition of protected trees, including damage to branches, trunks and roots that may have resulted from construction activities, as will the health of. Recommendations for remediation will follow.
- Integrity of the TPZ and fencing.
- Changes to TPZ conditions including overall maintenance, parking on roots, and storing or dumping of materials within TPZ. If failures to maintain and respect the TPZ are observed, suggestions will be made to ensure tree protection measures are remediated and upheld.
- Review and confirmation of recommended tree maintenance including root pruning, irrigation, mulching and branch pruning.
- Changes to soil moisture levels and drainage patterns; and
- Factors that may detrimentally impact the trees.

Appendix 7 Report Assumptions and Limiting Conditions

- 1) Unless expressly set out in this report or these Assumptions and Limiting Conditions, Diamond Head Consulting Ltd. (“Diamond Head”) makes no guarantee, representation, or warranty (express or implied) regarding this report, its findings, conclusions, or recommendations contained herein, or the work referred to herein.
- 2) The work undertaken in connection with this report and preparation of this report have been conducted by Diamond Head for the “Client” as stated in the report above. It is intended for the sole and exclusive use by the Client for the purpose(s) set out in this report. Any use of reliance on or decisions made based on this report by any person other than the Client, or by the Client for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Diamond Head accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties, or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution, or publication of this report (except for the internal use of the Client) without the express written permission of Diamond Head (which consent may be withheld in Diamond Head’s sole discretion) is prohibited. Diamond Head retains ownership of this report and all documents related thereto both generally and as instruments of professional service.
- 3) The findings, conclusions and recommendations made in this report reflect Diamond Head’s best professional judgment given the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report on the date of this report. Except as expressly stated in this report, the findings, conclusions, and recommendations it sets out are valid for the day on which the assessment leading to such findings, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.
- 4) Conditions affecting the trees subject to this report (the “Conditions”, include without limitation, structural defects, scars, decay, fungal fruiting bodies, evidence of insect attack, discolored foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise stated, information contained in this report covers only those Conditions and trees at the time of inspection. The inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing or coring. While

every effort has been made to ensure that any trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will not be subject to structural failure or decline. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behavior of any single tree, or groups of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification of Conditions change or additional information becomes available.

- 5) Nothing in this report is intended to constitute or provide a legal opinion and Diamond Head expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title and ownership of real or personal property and matters relating to cultural and heritage values). Diamond Head makes no guarantee, representation, or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or First Nations bodies (collectively, “Government Bodies”) or as to the availability of licenses, permits or authorizations of any Government Body. Revisions to any regulatory standards (including bylaws, policies, guidelines and any similar directions of a Government Bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if any such regulatory standard is revised.
- 6) Diamond Head 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.
- 7) In preparing this report, Diamond Head has relied in good faith on information provided by certain persons, Government Bodies, government registries and agents and representatives of each of the foregoing, and Diamond Head assumes that such information is true, correct, and accurate in all material respects. Diamond Head accepts no responsibility for any deficiency, misinterpretations, or fraudulent acts of or information provided by such persons, bodies, registries, agents, and representatives.
- 8) 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.
- 9) Loss or alteration of any part of this report invalidates the entire report.