Proposed Trail Location and Arborist Assessment

For:
West Greenway Project
University of British Columbia

Submitted to:
UBC Properties Trust
Suite 101 - 555 Great Northern Way
Vancouver, British Columbia
V5T 1E2

Date: May 15, 2019

Submitted by:

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All staff accreditations are provided below for reference.

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1.0 Introduction

1.1 Scope of Assignment

Diamond Head Consulting Ltd. (DHC) was retained to review the location of the proposed trail amongst the trees within the greenway and offer input in relation to the path direction and the potential impact on trees. In addition, select areas were assessed for tree risk. DHC visited the site in April and May of 2019. In preparing this report, we also reviewed the following information:

- **Arborist Assessment for the Western Greenway Project**, report prepared by Diamond Head Consulting Ltd, May 2, 2018.
- Tree survey, AutoCad dwg from Murray and Associates (obtained from UBC Properties Trust).
- Initial trail location, AutoCad dwg from Perry and Associates.

This report is produced with the following primary limitations, detailed limitations specified in Appendix 1:

1) Our investigation is based solely on visual inspection of the trees during our last site visit.
2) This inspection is conducted from ground level and is involves a visual inspection of the tree from all sides to look at the site, roots, trunk and branches. 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.
3) Risk assessments consider only known targets and visible tree conditions, and represent the condition at the time of inspection only.
4) Only the trees specified in the scope of work [see the map below indicating the areas assessed] were assessed and assessments were performed within the limitations specified.
5) Risk is assessed in the context of the timeframe specified (1 year). However, it is not a guarantee period for the risk assessment.
6) This report does not provide any estimates to implement the proposed recommendations provided in this report.
7) Tree Risk Assessments were completed following ISA Standards to the accepted industry standard of care. Trees that do not have signs of visible weakness can however fail under abnormal weather conditions and wind events, or in any case where the forces applied exceed the strength of the tree or its parts.

1.2 Site Overview

The western greenway is in the South Campus neighbourhood of UBC and is adjoining to the Farm property boundary (see Figure 1 below). It is a well forested, linear strip that is located between Ross Road, and the development that is occurring along it to the south, and the northeastern edge of the Farm. The forest cover is a mixed stand dominated by western redcedar (*Thuja plicata*) and Douglas-fir (*Pseudotsuga mensiezzii*). Along the edges of the stand where there has been previous disturbance there is red alder (*Alnus rubra*) and throughout the stand there are scattered bigleaf maple (*Acer macrophyllum*), willow (*Salix scouleriana* hybrid) and cherry (*Prunus emarginata*). There are a few

scattered western hemlock (*Tsuga heterophylla*) trees, a large Sitka spruce (*Picea sitchensis*) and an arbutus (*Arbutus mensiezzii*). Both the arbutus (#7292 by the large fir with the eagle's nest) and spruce (#7256 south of the Polygon Development) are uncommon in this area and region. Within this greenway there are a few factors affecting the overall health of the trees. These include:

1) There are two laminated root rot pockets (*Phellinus suphurascens*) where large Douglas-fir trees are dead. This disease is significant in that tree species that are susceptible to the disease (Douglas-fir and Western hemlock in this forested area) are infected by root to root contact. Infected trees are prone to failure in any direction with little to no force exerted on them. Western redcedar and deciduous tree species are thought to be resistant to immune to this disease. Fortunately, in both areas near these pockets there are few susceptible species nearby to continue the spread of the disease.
2) Many of the western redcedar in the lower mainland are declining in response to several stressors including climate change and this is being exacerbated by other stressors including development. The forest health specialist from the province stated that "by the end of the 2017 summer, many areas throughout the province were displaying symptoms of drought stress and drought related mortality. On the Coast, the most obvious signs were detected in western redcedar (on drier sites such as rocky outcrops/areas with thin soils and south facing slopes) and young plantations. We anticipate there will be more drought impact that will manifest in 2018 and although we have had periods of drought in the past, what we've experienced since the late 90s does seem to be more out of the ordinary."[1]
3) Those trees that have been removed for the development to the north of the greenway have left a forested edge that got exposed to light and warmth that it was not accustomed to on the lower canopy levels. The needles on those trees that were in the shade were accustomed to lower light levels (shade needles) and with the new sun exposure had to expend energy to grow new needles to adapt to the sunlight (sun needles). This can take up to three years for the tree to change and if the tree is also experiencing drought, this new needle growth can cause a lot of stress on the tree and cause it to decline. All along the new edge there are smaller western redcedar trees that have died and it is suspected that many died in response the change in light levels.
4) Human caused impacts. Any work near or that changes the hydrology of a site will cause some impact to trees nearby. Some tree species are more susceptible to these changes than others. Western redcedar is one of the more intolerant species found within this stand of trees.

[1] Email correspondence with Babita Bains, Provincial Forest Entomologist from Ministry of Forests, Lands and Natural Resource Operations. October 24, 2018.

Figure 1. The top map indicates the layout of the greenway in relation to Ross Road and the aerial below shows the forested area in relation to the South Campus Neighborhood and the UBC Farm.

2.0 Process and Methods Trail Location

A pathway is proposed within the greenway to help facilitate the movement of people throughout the campus. The pathway is to be a 3-4 meter asphalt path. When it is located amongst trees the path will narrow to 3 meters and may be even narrow where located adjacent to significant trees. The proposed route prepared by Perry and Associates was initially developed considering design principles prepared by UBC Campus Planning. This included the principle that "mature tree root systems, forest soils, understory and mid-canopy vegetation should be retained whenever possible."

It is recommended that the restoration work that is proposed for this area consider placing mulch around those larger western redcedar trees that are in close proximity to the development as they are stressed and will potentially need supplemental irrigation this summer. In addition, it is critical that any machine work that is to be done within the greenway be conducted under supervision or with strict guidelines about what constitutes disturbance of the surrounding ecology and penalties for not following these guidelines.

The following maps and tables provide a summary of the trees impacted by the proposed route and those trees that are either dead or considered hazards in relation to the development or people on the trail.

The proposed trail is to be built with no excavation in the root zone of trees and in general is to be built above the existing grade. It will meander with the existing topography to help reduce the impacts to the surrounding soils and vegetation. The trail design is to incorporate techniques to allow the passage of air to roots below and help minimize compaction. Appendix 2 provides the maps showing the initial location of the path and where it was re-routed to accommodate mature trees.

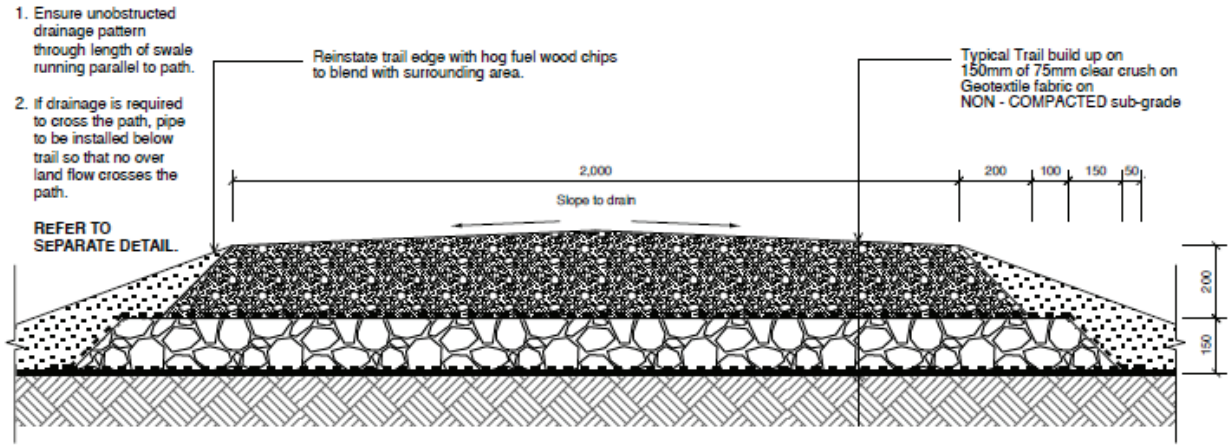


Figure 2. A typical trail detail with aerated base material in critical root zones. Asphalt would be placed instead of clear crush.

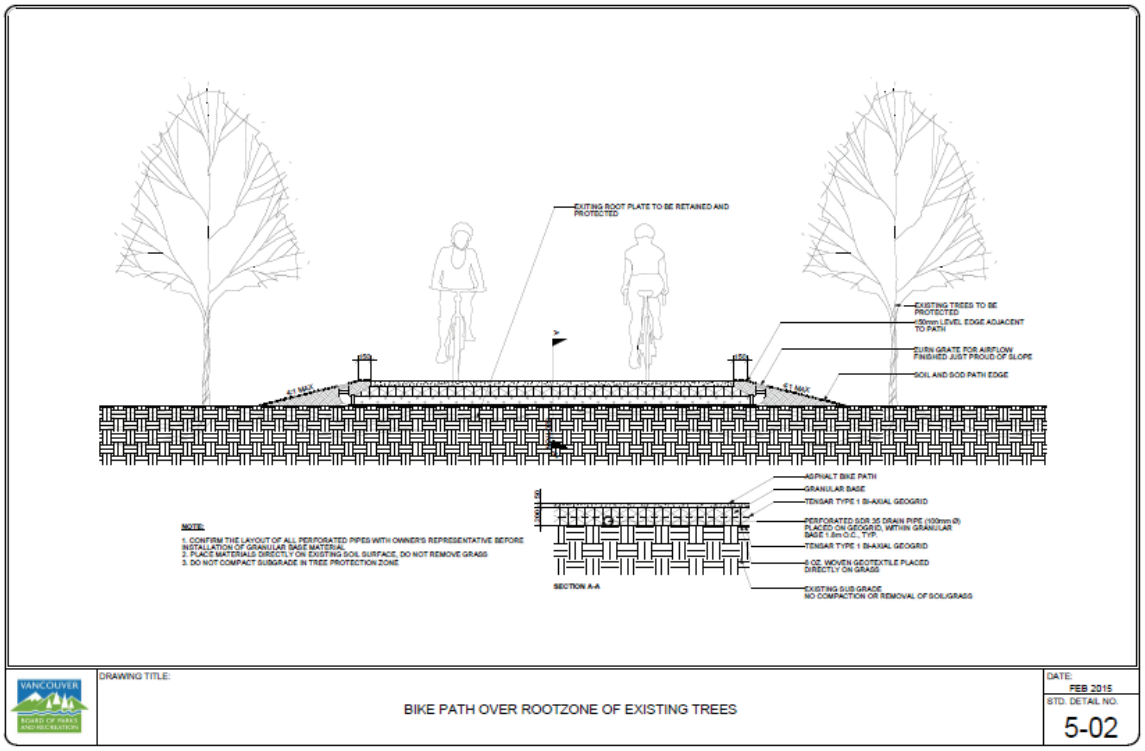


Figure 3. A trail detail from the City of Vancouver showing an asphalt trail over root zones. The aeration pipes would only be necessary in areas where the depth of the trail is to exceed 0.30m.

3.0 Findings: Trees in the Proposed Pathway

3.1 Tree Conflicts

Table 1. Attributes of trees to be removed for the pathway.

Tag #	Species	DBH (cm)	Ht (m)	Condition	Comments
2530	Alder (A. rubra)	30	20	Moderate	Single stem, intermediate tree.
2586	Cedar (T. plicata)	27	12	Good	Single stem, intermediate.
2509	Maple (A. macrophyllum)	23	15	Moderate	
2526	Alder (A. rubra)	21	17	Moderate	Phototropic lean west
2530	Alder (A. rubra)	30	20	Moderate	Single stem, intermediate tree.
2567	Holly (I. aquifolium)	18	12	Moderate	Two main stems
2577	Cedar (T. plicata)	93	25	Moderate	Two stems from base, 42 and 51, acute union, small seam.
2586	Cedar (T. plicata)	27	12	Good	Single stem, intermediate.
2598	Cedar (T. plicata)	17	12	Poor	suppressed
2624	Maple (A. macrophyllum)	28	15	Moderate	

Tag #	Species	DBH (cm)	Ht (m)	Condition	Comments
2636	Alder (A. rubra)	48	18	Moderate	
2991	Alder (A. rubra)	16	6	Poor	
2994	Alder (A. rubra)	27	18	Good	
6658	Alder (A. rubra)	28	18	Moderate	
6680	Cedar (T. plicata)	20	5	Poor	Adj tree failure broke main stem
6681	Douglas-fir (P. menziesii)	45	27	Poor	Lean to W. unsure why, dominant adj fir has very thin crown, possibly root rot.
6800	Alder (A. rubra)	55	17	Dead/Dying	2 stems both in Advanced decline
6892	Hemlock (T. heterophylla)	15	10	Poor	
6898	Cedar (T. plicata)	24	12	Moderate	
6931	Alder (A. rubra)	24	12	Moderate	
6938	Cedar (T. plicata)	28	7	Moderate	Two stems
6964	Alder (A. rubra)	20	7	Moderate	
6983	Alder (A. rubra)	18	15	Moderate	
6990	Birch (B. papyrifera)	21	14	Moderate	Suppressed
7300	Cedar (T. plicata)	84	25	Moderate	Crooked upper stem
7359	Hemlock (T. heterophylla)	57	28	Poor	Heavy cone crop, thinning crown. Possible decay column, bird activity. New exposure north.
8970	Maple (A. macrophyllum)	20,21,15,10	15	Moderate	Coppiced maple, young tree

Table 2. Total number of trees to be removed for the trail by species.

Tree Species	Trees to be Removed
Alder (A. rubra)	10
Birch (B. papyrifera)	1
Cedar (T. plicata)	7
Douglas-fir (P. menziesii)	1
Hemlock (T. heterophylla)	2
Holly (I. aquifolium)	1
Maple (A. macrophyllum)	3
Grand Total	25

4.0 Process and Methods Tree Risk Assessment

Tree risk assessments were completed following methods of the ISA Tree Risk Assessment Manual[2] published in 2013 by the International Society of Arboriculture, which is the current industry standard for assessing tree risk. This methodology assigns risk based on the likelihood of failure, the likelihood of impact and the severity of consequence if a failure occurs. The likelihood and risk rating matrices used to categorize tree risk are provided below. These two risk rating matrices are taken from the International Society of Arboriculture Tree Risk Assessment Qualification Manual. We conducted a basic assessment from ground level.

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

This risk assessment was limited to targets located on the proposed trail as well as the buildings at Lot 8 and Lot 11. No other areas were assessed for targets.

Please note that trees that were rated as a moderate risk but had an extreme consequence of failure were noted for removal. In addition, dead trees that could strike a target were also noted. Many of these trees can have a part or parts removed such that they no longer pose a risk to the target. This includes 'wildlifing' (cutting it down) to a certain height so that it can continue to provide habitat.

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

In addition, some of the recently dead or dying trees have an overall lower risk in that they have yet to decay in such a way that the probability of their failure has increased substantially. There is an opportunity to remove some of these trees in subsequent years. There are operational efficiencies in being able to remove these trees all at once, but it comes at a cost to the habitat that these trees provide. UBC Campus and Community Planning should carefully consider the risk these trees pose versus the habitat they provide in deciding which trees to remove. These trees are identified in Table 5 below.

4.1 Tree Hazards

Table 3. Attributes of tree hazards that should be removed/wildlifed prior to trail building.

Tag #	Species	DBH (cm)	Ht (m)	Condition	Comments
2538	Cedar (T. plicata)	43	20	Dead/Dying	
2570	Cedar (T. plicata)	62	25	Poor	Poor structure
3033	Alder (A. rubra)	26	18	Dead/Dying	
4773	Cedar (T. plicata)	83	30	Dead/Dying	Dead
4780	Cedar (T. plicata)	35	15	Moderate	One main stem, secondary stems growing from large surface roots. Dieback in top
4789	Cedar (T. plicata)	49	18	Moderate	Still roots have formed. Large intermediate tree,
6657	Hemlock (T. heterophylla)	38	26	Dead/Dying	Dead
6676	Cherry (P. emarginata)	17	16	Dead/Dying	Tree is dead and has a high height to diameter ratio
6682	Douglas-fir (P. menziesii)	35	27	Poor	Lean to W. unsure why, dominant adj fir has very thin crown, possibly root rot.
6688	Douglas-fir (P. menziesii)	85	40	Poor	Very thin. Down, appears to be in decline. Looks like root rot..
6691	Cedar (T. plicata)	22	5	Poor	Adj tree failure broke mai stem.
6757	Alder (A. rubra)	34	18	Dead/Dying	Dead
6797	Maple (A. macrophyllum)	50	24	Poor	Large cavity midstem.
6807	Alder (A. rubra)	25	13	Dead/Dying	In advanced decline
6821	Hemlock (T. heterophylla)	26	15	Dead/Dying	Dead
7266	Cedar (T. plicata)	77	23	Poor	Major decay cavity at base.
7375	Douglas-fir (P. menziesii)	83	40	Poor	Sig. dieback in crown. Potential root rot. Can't confirm.

Table 4. Total number of immediate hazard trees to be removed or wildlifed.

Tree Species	Trees to be Removed
Alder (A. rubra)	3
Cedar (T. plicata)	7
Cherry (P. emarginata)	1
Douglas-fir (P. menziesii)	3
Hemlock (T. heterophylla)	2
Maple (A. macrophyllum)	1
Grand Total	17

Table 5. Attributes of tree hazards that can be removed subsequently if desired.

Tag #	Species	DBH (cm)	Ht (m)	Condition	Comments
413	Maple (A. macrophyllum)	21	15	Dead/Dying	Dead tree
773	Cherry (P. emarginata)	33	16	Dead/Dying	
2526	Cedar (T. plicata)	65	25	Moderate	
2934	Cedar (T. plicata)	35,35	25	Dead/Dying	In decline, create wildlife tree such that no part can reach a target. two stems from base.
2934	Cedar (T. plicata)	70	25	Dead/Dying	In decline, almost dead
6622	Alder (A. rubra)	99	21	Moderate	Two stems from base, 51 and 48 cm
6698	Cedar (T. plicata)	55	20	Dead/Dying	Almost dead, in decline
6698	Cedar (T. plicata)	55	20	Dead/Dying	In decline, create wildlife tree such that no part can reach a target.
7251	Cedar (T. plicata)	32	18	Dead/Dying	In decline
7261	Cedar (T. plicata)	77	25	Poor	Dead top
7263	Cedar (T. plicata)	88	19	Moderate	Codominant in stand, thinning of foliage. Tree is almost dead .
7271	Cedar (T. plicata)	66	25	Dead/Dying	In decline. Dead as of May 2019
7271	Cedar (T. plicata)	68	25	Dead/Dying	Tree is dead
7322	Cedar (T. plicata)	30	16	Dead/Dying	Almost dead, in decline
7322	Cedar (T. plicata)	30	16	Dead/Dying	In decline, create wildlife tree such that no part can reach a target.

Tag #	Species	DBH (cm)	Ht (m)	Condition	Comments
7326	Cedar (T. plicata)	70	20	Poor	In decline almost dead
7326	Cedar (T. plicata)	70	20	Dead/Dying	In decline. Create as a wildlife tree to a height that no part can reach a target

Table 6. Total number of trees that can be removed/wildlife in the near future.

Tree Species	Trees to be Removed
Alder (A. rubra)	1
Cedar (T. plicata)	14
Cherry (P. emarginata)	1
Maple (A. macrophyllum)	1
Grand Total	17

5.0 Summary and Conclusions

In total, 25 trees were found to be in direct conflict with the proposed path. There are 17 trees that are immediate tree hazards and another 17 trees that UBC Campus and Community Planning can determine their risk threshold for recently dead trees adjacent to targets.

The time-frame for this risk assessment covers 1 year and is based on the conditions present at the time of assessment.

It is up to the risk manager (tree owner or manager) to choose among these risk mitigation options and prioritize the treatments according to their threshold for acceptable risk.

It is recommended that trees on-site be inspected adjacent to the trail after construction and a frequency for re-assessment be discussed based on budgets and other tree related policies that UBC adheres to. A tree risk assessment adjacent to the buildings is recommended every two years or at any time site conditions change or after unusual weather events.

Appendix 1 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, discoloured 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 by-laws, policies, guidelines an 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.

Appendix 2 Maps of Trees to be Retained and Removed with the Path Location

LEGEND

- CRITICAL ROOT ZONE
- TREE PROTECTION ZONE AND FENCING
- SURVEYED TREE TO BE RETAINED
- UN-SURVEYED TREE TO BE RETAINED (MUST BE SURVEYED)
- 8998 TREE TO BE REMOVED FOR PATH
- 7261 TREE TO BE REMOVED BECAUSE IT IS AN IMMEDIATE OR FUTURE HAZARD
- AREA ASSESSED BESIDE BUILDING

NOTES

1. The location of un-surveyed trees on this plan is approximate. Their location and ownership cannot be confirmed without being surveyed by a Registered BC Land Surveyor.
2. All tree protection fencing must be built to the relevant municipal bylaw specifications.The dimensions shown are from the outer edge of the stem of the tree.
3. The tree protection zone shown is a graphical representation of the critical root zone, measured from the outer edge of the stem of the tree. (½ the trees diameter was added to the graphical tree protection circles to accommodate the survey point being in the center of the tree)
4. Any construction activities or grade changes within the Root Protection Zone must be approved by the project arborist.
5. This plan is based on a topographic and tree location survey provided by the owners' Registered British Columbia Land Surveyor (BCLS) and layout drawings provide by the owners' Engineer (P Eng).
6. This plan is provided for context only, and is not certified as to the accuracy of the location of features or dimensions that are shown on this plan. Please refer to the original survey plan and engineering plans.

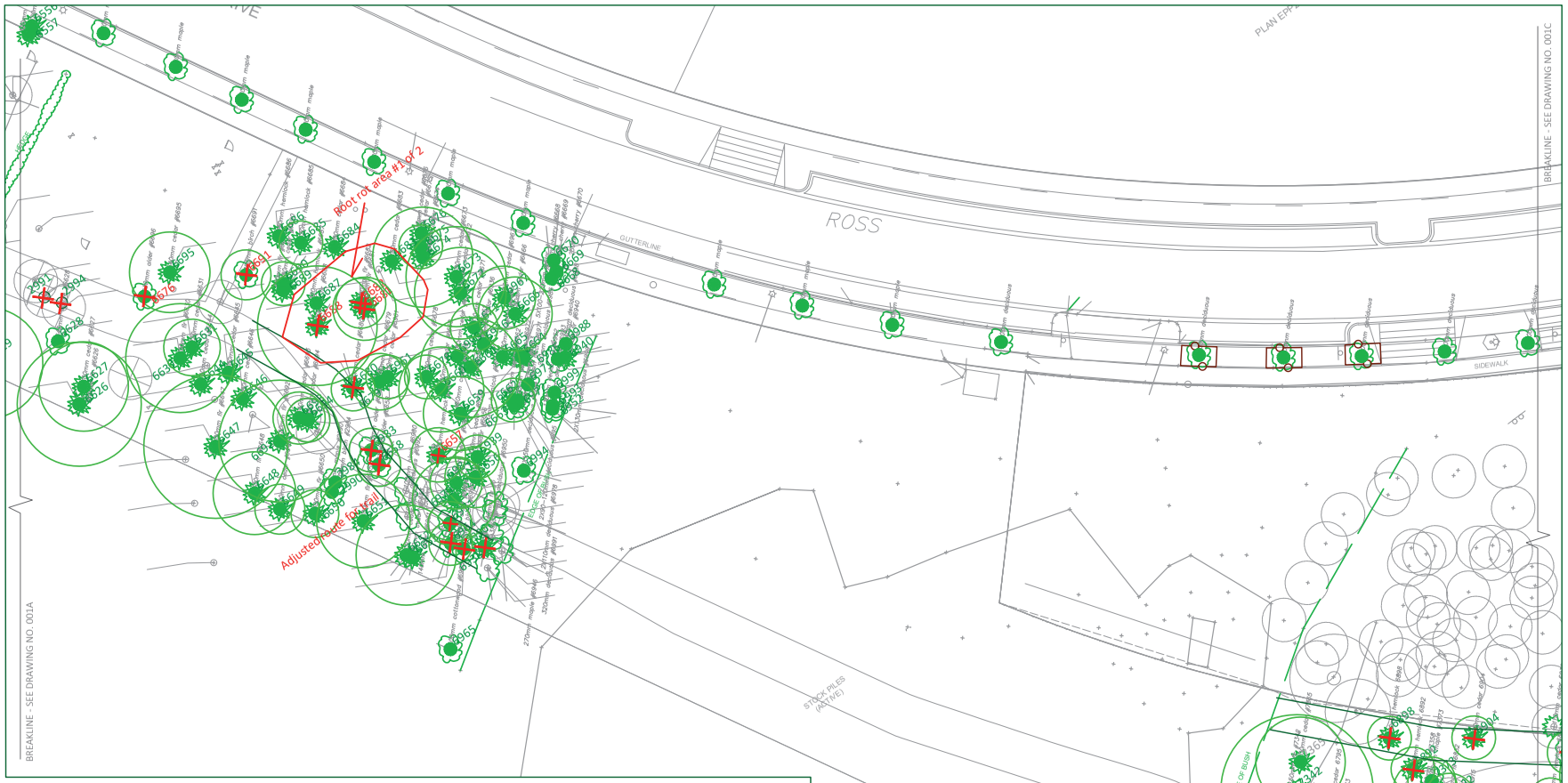
REFERENCE DRAWINGS

1. Base Survey by:

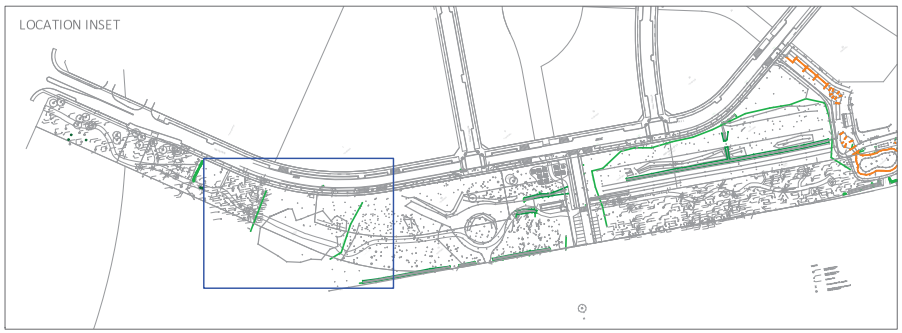
DIAMOND HEAD
3559 COMMERCIAL STREET
VANCOUVER BC | V5N 4E8
T 604.733.4886 | F 604.733.4879

Drawing title: Proposed Trail Re-alignment
Project address: West Greenway
Client: UBCPT

Drawing No: 001A
Date: 2019/05/10
Drawn by: KW
Page Size: TABLOID 11"x17"



LOCATION INSET



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LOCATION INSET

LEGEND

- CRITICAL ROOT ZONE
- TREE PROTECTION ZONE AND FENCING
- SURVEYED TREE TO BE RETAINED
- UN-SURVEYED TREE TO BE RETAINED (MUST BE SURVEYED)
- 8998 TREE TO BE REMOVED FOR PATH
- 7261 TREE TO BE REMOVED BECAUSE IT IS AN IMMEDIATE OR FUTURE HAZARD
- AREA ASSESSED BESIDE BUILDING

NOTES

1. The location of un-surveyed trees on this plan is approximate. Their location and ownership cannot be confirmed without being surveyed by a Registered BC Land Surveyor.
2. All tree protection fencing must be built to the relevant municipal bylaw specifications.The dimensions shown are from the outer edge of the stem of the tree.
3. The tree protection zone shown is a graphical representation of the critical root zone, measured from the outer edge of the stem of the tree. (½ the trees diameter was added to the graphical tree protection circles to accommodate the survey point being in the center of the tree)
4. Any construction activities or grade changes within the Root Protection Zone must be approved by the project arborist.
5. This plan is based on a topographic and tree location survey provided by the owners' Registered British Columbia Land Surveyor (BCLS) and layout drawings provide by the owners' Engineer (P Eng).
6. This plan is provided for context only, and is not certified as to the accuracy of the location of features or dimensions that are shown on this plan. Please refer to the original survey plan and engineering plans.

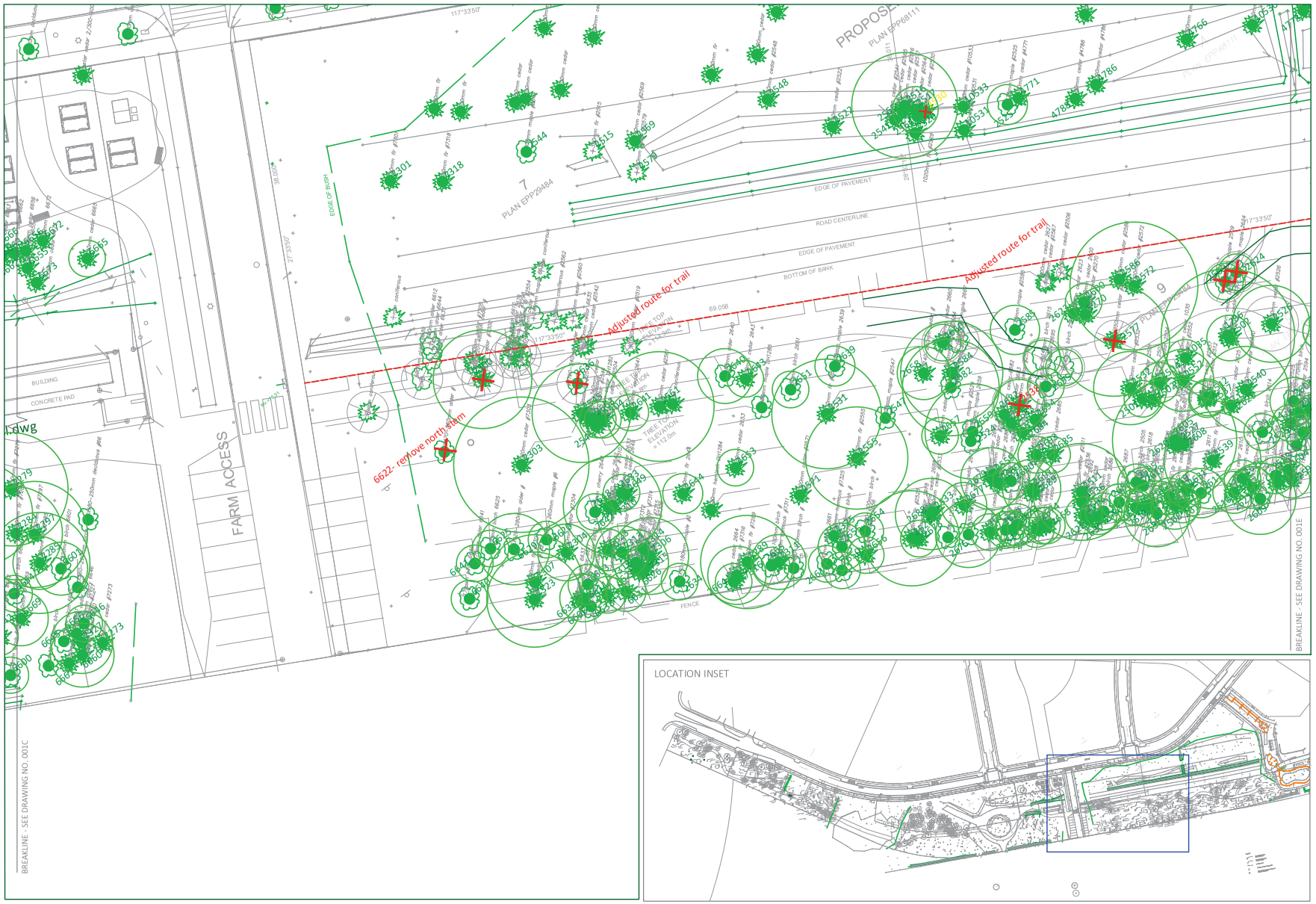
REFERENCE DRAWINGS

1. Base Survey by:

DIAMOND HEAD
3559 COMMERCIAL STREET
VANCOUVER BC | V5N 4E8
T 604.733.4886 | F 604.733.4879

Drawing title: Proposed Path Re-alignment
Project address: West Greenway
Client: UBCPT

Drawing No: 001C
Date: 2019/05/10
Drawn by: KW
Page Size: TABLOID 11"x17"



LOCATION INSET

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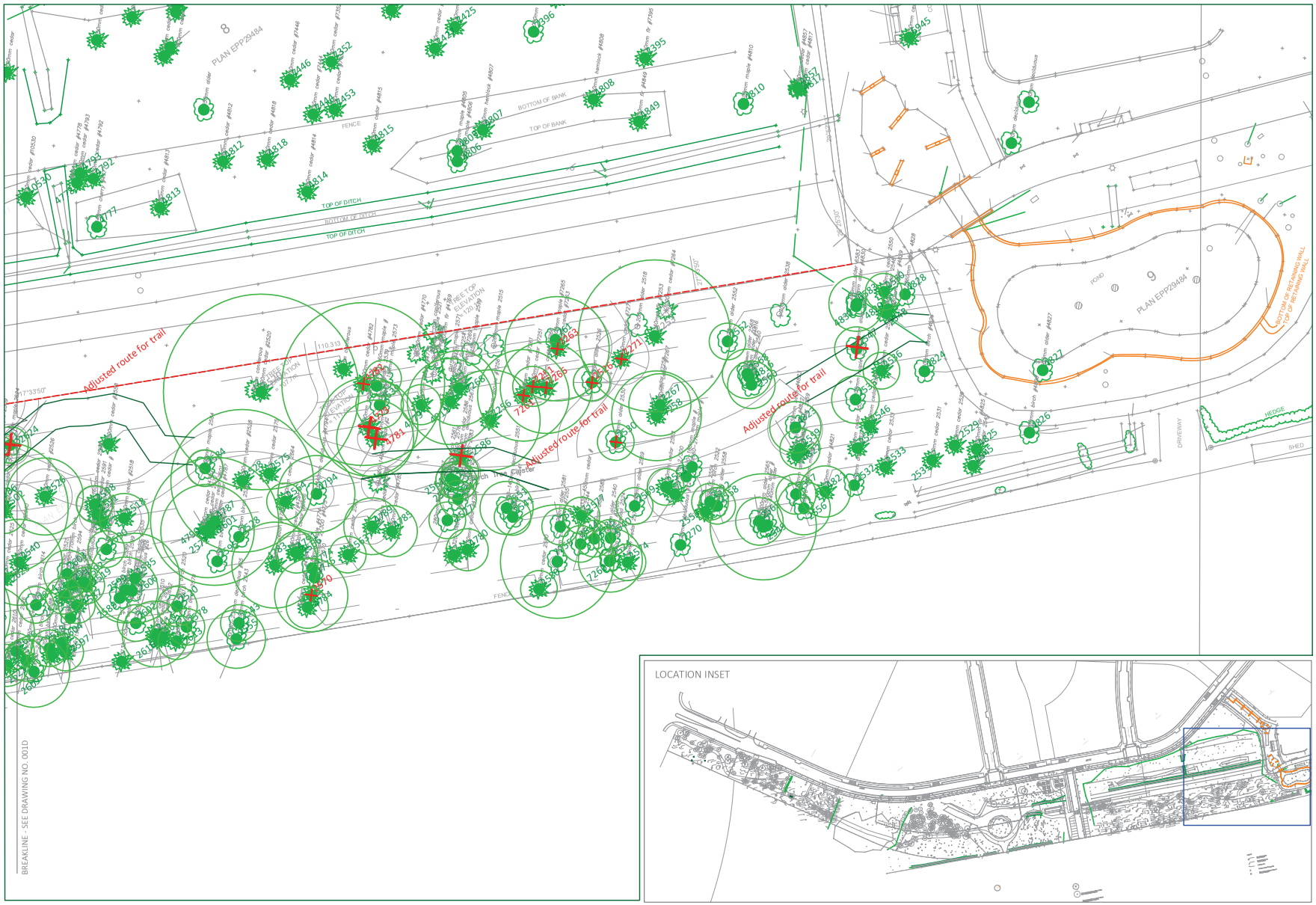
Client: UBCPT

Drawing No: 001D
Date: 2019/05/10
Drawn by: KW
Page Size: TABLOID 11"x17"



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Client: UBCPT

Drawing No: 001E
Date: 2019/05/10
Drawn by: KW
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South Campus Greenway

DRAFT Design Principles

Background: In response to concern from the UBC community that the greenway improvements adjacent to the UBC farm would undermine the ecological value of the existing landscape, an environmental report was commissioned. The report was shared with participants in a workshop to develop design principles for a greenway design. The following considerations where introduced to help guide the workshop:

1. **Policy context, User groups and Adjacencies**
2. **Transportation and Connectivity**
3. **Place Making and Amenities**
4. **Safety, Accessibility and Wellness**
5. **Ecology and Environmental Sustainability**
6. **Construction and Maintenance**

C+CP Staff summarized the thoughts and ideas which, along with input from the Pacific Spirit Park Society and the UBC Farm Land Use Committee, informed the following Design Principles:

1. **Canopy cover and understory generally be maintained in a natural state, or rehabilitated with appropriate native planting. No invasive species should be included.**

   The proposed greenway treatment allows for the retention of the native canopy and understory plantings in a natural state and proposes new plantings of native canopy and understory vegetation to reinstate a naturalized greenway corridor. Trees that are removed that are hazards or due to trail alignment will be replaced. The plans identify a zone adjacent to the trail where the existing and new plantings will be maintained to allow for pedestrian and cyclist visibility. Existing non native species will be removed. Refer to plans;

   Plans L1.0 – 1.2 for trail alignment
   Plans L2.0 – 2.2 for tree removals
   Plans L4.0 – 4.3 for schematic planting design
   Arborist report

2. **Any pathways should be oriented to the east side of the corridor to maximize preservation of natural greenspace adjacent to the farm edge**

   The pathway has been located to seek the least disruptive routing through the existing treed and understory areas and where appropriate has been shifted towards the east. The previous trail alignment is indicated on the plan where the trail routing has been changed. Refer to;

   Plans L1.0 – 1.2 for trail alignment

3. **Pathways should be universally accessible and provide for the community to appreciate the value to the natural space. However, they do not need to support high speed travel such as cycling or running. A greenway not a transportation corridor**

The pathway design will include for a universally accessible surfacing treatment and graded to maintain slopes of less than 5%. To optimize tree retention, the pathway meanders through the forest and the width of the finished trail will vary to some degree depending on the site constraints. Refer to;

Plans L5.0 – 6.2 for proposed trail details and sections.

4. **Safety and accessibility must be maintained for adjacent residential units (townhouses). Lighting should be limited to achieve safety and visibility while not disturbing the ecological value of the greenway.**

The proposed trail has been aligned to optimize connectivity between the adjacent residential units. As these residential units are placed along the east edge of the Greenway corridor, the trail alignment is shifted to the east optimizing the amount of area left undisturbed between the trail and the west boundary of the Greenway. The proximity of the trail to overlook from the adjacent residential units also provides an 'eyes on the street' approach to the design to enhance the sense of security.

The trail is proposed to be illuminated with a post top luminaire. Additional ambient line for the trail will be from the residential unit entries that connect to the trail. Refer to;

L1.0 – L1.2 Layout plans

L50.0 – L6.0 Proposed trail/lighting details and sections.

5. **Surface treatments should minimize impact on the root systems**

The proposed trail will be designed in collaboration with the Project arborist. Refer to;

L5.0 – 5.1 for trail details

Arborist report

6. **Educational opportunities should be incorporated.**

A signage system is proposed to provide for both directional and educational opportunities. Refer to;

L5.0 for proposed signage elements

7. **The greenway should be considered as a portion of system of natural areas which act as a wildlife corridor connecting to Pacific Spirit Park.**

   The greenway corridor is an existing natural corridor of native canopy trees and understory that extends from 16th Avenue south along the south edge of Nobel park, across Wesbrook extending to Pacific Spirit Park. Enhancement to the proposed greenway will include rehabilitation of the existing canopy and understory, removal of invasive species and retention of existing wildlife trees. Refer to;

   L0.1 for larger context of the proposed trail in the Wesbrook neighbourhood.

8. **Any pathways should be routed to avoid existing valuable native vegetation, and utilize disturbed areas such as former access roads.**

   Where opportunities allow the trail has been routed to utilize previously disturbed areas for trail alignment. Refer to;

   L3.1 Demolition plan for location of trail on existing road base

9. **Mature tree root systems, forest soils, understory and mid-canopy vegetation should be retained whenever possible.**

   Disturbance to the existing naturalized area of the Greenway corridor will be limited to the trail corridor. Existing root systems, soils and vegetation will be retained and augmented with new native plantings. Refer to;

   Arborist report

   LL5.0 – 5.1 for proposed trail details

10. **The greenway should seek to provide a visual and acoustic screen between the residential properties and the farm.**

    The greenway corridor has been aligned to optimize tree removals and where possible has been aligned along the east edge of the corridor to optimize the visual and acoustical separation from the UBC farm.

    L1.0 – 1.2 Layout of trail

11. **Trail meanders should be placed in well-draining areas to avoid the need for unnecessary ditching and resulting root damage.**

    Drainage has been considered in the design of the greenway trail to allow surface water to drain under the trail at low points along the trail. Refer to

    L1.0 – 1.2 Layout of trail and location of drain pipes

12. **Large specimen native trees and understory should be planted to replace any mature trees removed during construction.**

    Replacement species plantings are proposed along the Greenway trail to augment the existing native vegetation. Replacement plantings will occur throughout the greenway to

replace trees and understory lost as a result of the trail alignment and removal of hazard trees and in areas that have been previously disrupted. Refer to;

L1.0 – 1.2 trail layout

L4.0 – 4.3 Schematic planting and rehabilitation plan.