Talbot Mackenzie & Associates
Consulting Arborists

1475 Fort St, Victoria

Construction Impact Assessment &

Tree Preservation Plan

Prepared For: Lantern Properties Ltd
#101-1176 Burnaby St
Vancouver, BC
V6E 1P1

Prepared By: Talbot, Mackenzie & Associates
Noah Borges – Consulting Arborist
ISA Certified: #PN-8409A
TRAQ – Qualified

Date of Issuance: April 5, 2019

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Jobsite Property: 1475 Fort St, Victoria

Date of Site Visit: June 6, 2018

Site Conditions: Existing multi-storey residential building with panhandle driveway. No ongoing construction activity.

Summary: Ten trees will require removal for construction of the underground parkade. Assuming excavation will occur up to the property line, roots from trees NT2-4 and NT6 are likely to be encountered. As NT2 and NT3 are located adjacent to the east fence line, their health may be significantly impacted. We recommend the project arborist supervise all excavation within the critical root zones of these four trees and prune any roots severed back to sound tissue at the edge of excavation.

Scope of Assignment:

- To inventory the existing bylaw protected trees and any trees on municipal or neighbouring properties that could potentially be impacted by construction or that are within three metres of the property line
- Review the proposal to demolish the existing building and construct a new multi-storey housing complex with underground parking
- Comment on how construction activity may impact existing trees
- Prepare a tree retention and construction damage mitigation plan for those trees deemed suitable to retain given the proposed impacts

Methodology: We visually examined the trees on the property and prepared an inventory in the attached Tree Resource Spreadsheet. Each by-law protected tree was identified using a numeric metal tag attached to its lower trunk. Municipal trees and neighbours' trees were not tagged. Information such as tree species, DBH (1.4m), crown spread, critical root zone (CRZ), health, structure, and relative tolerance to construction impacts were included in the inventory. The by-law protected trees with their identification numbers were labelled on the attached Site Plan. The conclusions reached were based on the information provided within the attached plans from Cascadia Architects (dated 02/12/19).

Limitations: No exploratory excavations have been requested and thus the conclusions reached are based solely on critical root zone calculations and our best judgement using our experience and expertise. The location, size and density of roots are often difficult to predict without exploratory excavations and therefore the impacts to the trees may be more or less severe than we anticipate.

Servicing plans were not available for comment. We recommend the project arborist review servicing plans once they become available to evaluate the proposed impacts to any trees to be retained.

Summary of Tree Resource: Seventeen trees were inventoried, three of which are by-law protected. There is a row of large elm trees along the west fence line on the neighbouring property.

Trees to be Removed: Ten trees will require removal as a result of construction-related impacts:

- **Trees #985-993 and NT5** are within or immediately adjacent to the footprint of the underground parkade. We assume excavation will occur up to the property line along the west property line.

  We anticipate large, structural roots from **Elm NT5** (56cm DBH, under shared ownership with west neighbour) will be severed during excavation, resulting in significant health and structural impacts.

Potential Impacts on Trees to be Retained and Mitigation Measures

- **Dogwood NT1** (5cm DBH): This tree is located 3m from the existing driveway. We do not anticipate its health will be impacted by the proposed construction but recommend barrier fencing be erected at the edge of the driveway around the tree up to the property line to avoid accidental mechanical injury and unnecessary soil compaction within its CRZ.

- **Portuguese Laurel hedge NT2** (stems up to ~15cm DBH) and **Pyramidal Cedar hedge NT3** are located on neighbouring properties to the east (1479 Fort St and 1046 St. Charles St). Assuming excavation for construction of the underground parkade occurs up to the east fence line, roots from both of these hedges will be encountered. Half the CRZs of the cedar stems and the laurel stems growing along the fence will be severed, potentially resulting in significant health impacts (particularly to the cedar hedge). We recommend the project arborist prune any roots severed back to sound tissue at the time of excavation and that the neighbours be informed of the proposed impacts to their trees.

- **Apple NT4** (~25cm DBH) is located on the property of 1030 St. Charles St, approximately 1.5m from the fence line. Assuming excavation for construction of the underground parkade occurs up to the east fence line, we anticipate roots from this tree will be impacted, potentially resulting in minor health impacts. We recommend the project arborist prune any roots severed back to sound tissue at the time of excavation and that the neighbour be informed of the proposed impacts to their tree.

- **Elm NT6** (~60cm DBH) is under the ownership of #1465 Fort St and is located approximately 4m from the northwest property corner. We anticipate some roots from this tree may be encountered if excavation occurs up to the property corner, but its health will not be significantly impacted. No clearance pruning will be required, as the aboveground portions of the building are 5.5m from the west property line.

- **Arborist Supervision**: All excavation occurring within the critical root zones of protected trees should be completed under supervision by the project arborist. Any severed roots must be pruned back to sound tissue to reduce wound surface area and encourage rapid compartmentalization of the wound. In particular, the following activities should be completed under the direction of the project arborist:

    - Excavation within the CRZ of trees NT2-4 and NT6

- **Barrier fencing:** The areas surrounding the trees to be retained should be isolated from the construction activity by erecting protective barrier fencing. Where possible, the fencing should be erected at the perimeter of the critical root zones. The barrier fencing must be a minimum of 4 feet in height, of solid frame construction that is attached to wooden or metal posts. A solid board or rail must run between the posts at the top and the bottom of the fencing. This solid frame can then be covered with plywood, or flexible snow fencing. The fencing must be erected prior to the start of any construction activity on site (i.e. demolition, excavation, construction), and remain in place through completion of the project. Signs should be posted around the protection zone to declare it off limits to all construction related activity. The project arborist must be consulted before this fencing is removed or moved for any purpose.

- **Minimizing Soil Compaction:** In areas where construction traffic must encroach into the critical root zones of trees to be retained, efforts must be made to reduce soil compaction where possible by displacing the weight of machinery and foot traffic. This can be achieved by one of the following methods:

    - Installing a layer of hog fuel or coarse wood chips at least 20 cm in depth and maintaining it in good condition until construction is complete.
    - Placing medium weight geotextile cloth over the area to be used and installing a layer of crushed rock to a depth of 15 cm over top.
    - Placing two layers of 19mm plywood.
    - Placing steel plates.

- **Demolition of the Existing Buildings:** The demolition of the existing multi-storey building and garage, and any services that must be removed or abandoned, must take the critical root zone of the trees to be retained into account. If any excavation or machine access is required within the critical root zones of trees to be retained, it must be completed under the supervision and direction of the project arborist. If temporarily removed for demolition, barrier fencing must be erected immediately after the supervised demolition. We do not anticipate that any trees to be retained will be impacted by the demolition of the existing structures.

- **Mulching**: Mulching can be an important proactive step in maintaining the health of trees and mitigating construction related impacts and overall stress. Mulch should be made from a natural material such as wood chips or bark pieces and be 5-8cm deep. No mulch should be touching the trunk of the tree. See “methods to avoid soil compaction” if the area is to have heavy traffic.

- **Blasting:** Care must be taken to ensure that the area of blasting does not extend beyond the necessary footprints and into the critical root zones of surrounding trees. The use of small low-concussion charges and multiple small charges designed to pre-shear the rock face will reduce fracturing, ground vibration, and overall impact on the surrounding environment. Only explosives of low phytotoxicity and techniques that minimize tree damage should be used. Provisions must be made to ensure that blasted rock and debris are stored away from the critical root zones of trees.

- **Scaffolding:** This assessment has not included impacts from potential scaffolding including canopy clearance pruning requirements. If scaffolding is necessary and this will require clearance pruning of retained trees, the project arborist should be consulted. Depending on the extent of pruning required, the project arborist may recommend that alternatives to full scaffolding be considered such as hydraulic lifts, ladders or platforms. Methods to avoid soil compaction may also be recommended (see "Minimizing Soil Compaction" section).

- **Landscaping and Irrigation Systems:** The planting of new trees and shrubs should not damage the roots of retained trees. The installation of any in-ground irrigation system must take into account the critical root zones of the trees to be retained. Prior to installation, we recommend the irrigation technician consult with the project arborist about the most suitable locations for the irrigation lines and how best to mitigate the impacts on the trees to be retained. This may require the project arborist supervise the excavations associated with installing the irrigation system. Excessive frequent irrigation and irrigation which wets the trunks of trees can have a detrimental impact on tree health and can lead to root and trunk decay.

- **Arborist Role:** It is the responsibility of the client or his/her representative to contact the project arborist for the purpose of:

    - Locating the barrier fencing
    - Reviewing the report with the project foreman or site supervisor
    - Locating work zones, where required
    - Supervising any excavation within the critical root zones of trees to be retained
    - Reviewing and advising of any pruning requirements for machine clearances

- **Review and site meeting**: Once the project receives approval, it is important that the project arborist meet with the principals involved in the project to review the information contained herein. It is also important that the arborist meet with the site foreman or supervisor before any site clearing, tree removal, demolition, or other construction activity occurs and to confirm the locations of the tree protection barrier fencing.

Please do not hesitate to call us at (250) 479-8733 should you have any further questions.

Thank you,

Neal Borgan

Noah Borges
ISA Certified #PN-8409A
TRAQ – Qualified

Talbot Mackenzie & Associates
ISA Certified Consulting Arborists

Encl. 2-page tree resource spreadsheet, 1-page site plan with trees, 2-page building plans, 1-page barrier fencing specifications, 2-page tree resource spreadsheet methodology and definitions

Disclosure Statement

Arborists are professionals who examine trees and use their training, knowledge and experience to recommend techniques and procedures that will improve their health and structure or to mitigate associated risks.

Trees are living organisms, whose health and structure change, and are influenced by age, continued growth, climate, weather conditions, and insect and disease pathogens. Indicators of structural weakness and disease are often hidden within the tree structure or beneath the ground. It is not possible for an Arborist to identify every flaw or condition that could result in failure or can he/she guarantee that the tree will remain healthy and free of risk.

Remedial care and mitigation measures recommended are based on the visible and detectable indicators present at the time of the examination and cannot be guaranteed to alleviate all symptoms or to mitigate all risk posed.

1475 Fort Street
Tree Resource Spreadsheet

Tree ID	Common Name	Latin Name	DBH (cm) ~ approximate	Crown Spread (m)	CRZ (m)	Relative Tolerance	Health	Structure	Remarks and Recommendations	By-Law Protected	Retention Status
985	Hawthorn	*Crataegus spp.*	43	10	5.0	Good	Good	Fair/poor	Under utility lines. Previously topped. Water sprouts. Codominant union at 1.5m	N	X
986	Big Leaf Maple	*Acer macrophyllum*	86 below unions	14	10.0	Moderate	Fair	Poor	Tridominant union at 1m. Large pruning wounds. Fill around base. Crossing/rubbing limbs. Swelling at base. Epicormic growth	Y	X
987	Big Leaf Maple	*Acer macrophyllum*	~50, 45	12	9.0	Moderate	Good	Fair/poor	Possibly shared with neighbour. Codominant union at base. Damaged surface roots. Asymmetric crown due to competition with adjacent maple	Y	X
988	Big Leaf Maple	*Acer macrophyllum*	58	14	7.0	Moderate	Good	Fair	* Possibly by-law protected *. Sweep at base, corrected. Large pruning wounds.	N	X
989	Big Leaf Maple	*Acer macrophyllum*	~45	8	5.5	Moderate	Good	Fair	Codominant union at 5m	N	X
990	Western Red Cedar	*Thuja plicata*	40	8	6.0	Poor	Fair/poor	Fair	Declining top	N	X
991	European Ash	*Fraxinus excelsior*	29	8	3.5	Moderate	Good	Fair/poor	Codominant union at 6m	N	X
992	Holly	*Ilex aquifolium*	24	6	2.5	Good	Good	Fair/poor	Multiple leaders	N	X
993	Cherry	*Prunus spp.*	12	3	1.5	Moderate	Fair	Fair/poor	Second stem cut at base	N	X
NT1	Dogwood	*Cornus spp.*	5	2	1.0	Poor	Good	Fair	Neighbour's. 3m from driveway	N	Retain
NT2	Portuguese Laurel hedge	*Prunus lusitanica*	Multistem	3	1.5	Good	Good	Fair	Neighbour's. Adjacent to fence, stems up to ~15cm DBH	N	Retain
NT3	Pyramidal Cedar hedge	*Thuja spp.*	Multistem	1	1.5	Poor	Good	Good	Neighbour's. Adjacent to fence	N	Retain
NT4	Apple	*Malus spp.*	~25	6	3.0	Moderate	Good	Fair	Neighbour's. 1.5m from fence	N	Retain

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1475 Fort Street
Tree Resource Spreadsheet

Tree ID	Common Name	Latin Name	DBH (cm) ~ approximate	Crown Spread (m)	CRZ (m)	Relative Tolerance	Health	Structure	Remarks and Recommendations	By-Law Protected	Retention Status
NT5	Elm	*Ulmus spp.*	56	10	6.5	Moderate	Good	Fair	Under shared ownership with neighbour. Adjacent to fence. Overhangs 6m. Asymmetric due to competition	N	X
NT6	Elm	*Ulmus spp.*	~60	16	7.0	Moderate	Good	Fair	Neighbour's. 1m from fence. Deadwood. Roots likely uplifting pavement.	N	Retain
NT7	Elm	*Ulmus spp.*	~50	10	6.0	Moderate	Good	Fair	Neighbour's. Adjacent to fence. Ivy. Deadwood	N	Retain
NT8	Elm	*Ulmus spp.*	~60, 40	20	10.0	Moderate	Fair	Fair/poor	building clearance (1471 Fort St). Codominant union at base. Significant epicormic growth. Large pruning wounds	Y	Retain

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BC LAND SURVEYORS SITE PLAN OF:

Civic: 1475 Fort Street

Legal Lot 2, Section 74,
Victoria District, Plan 9796

Parcel Identifier: 005-397-863 in the City of Victoria

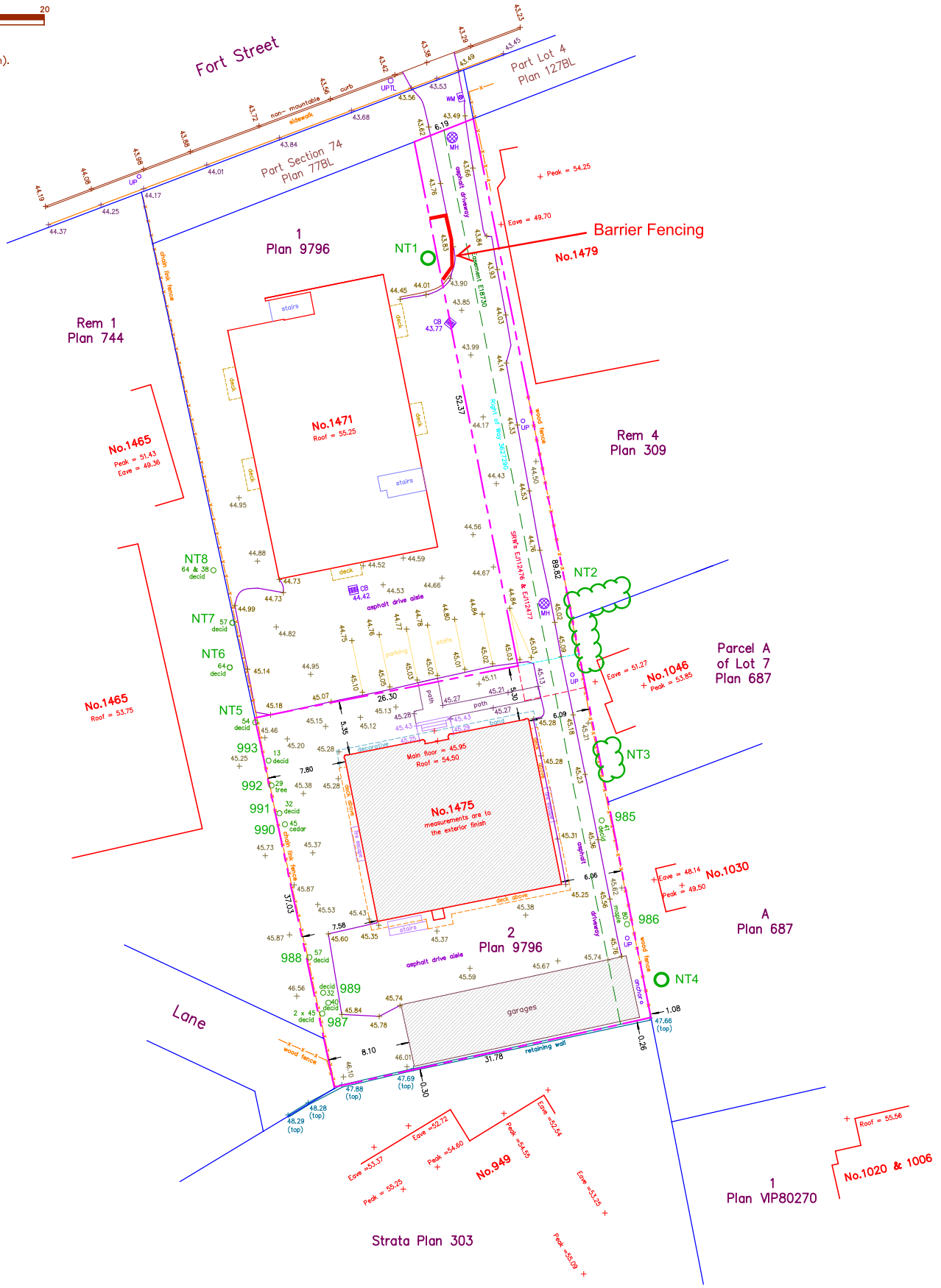
Scale - 1 : 250 Distances are in metres.

0 2 10 20

The intended print size is
Arch C (609.60mm x 457.20mm).

Date	December 5, 2018
Drawing	Site- 1475 Fort Street
File	File : 12897 - 15

POWELL & ASSOCIATES
B C Land Surveyors
250-2950 Douglas Street
Victoria, BC V8T 4N4
phone (250) 382-8855



LEGEND

Elevations are to geodetic datum.

+ 44.44 – denotes – existing elevation
CB – denotes – Catch Basin
MH – denotes – Manhole
UP – denotes – Utility Pole
UPTL – denotes – Utility Pole with Transformer and Lamp
WM – denotes – Water Meter

Tree diameters are in centimetres.

Lot Area = 1500 m2

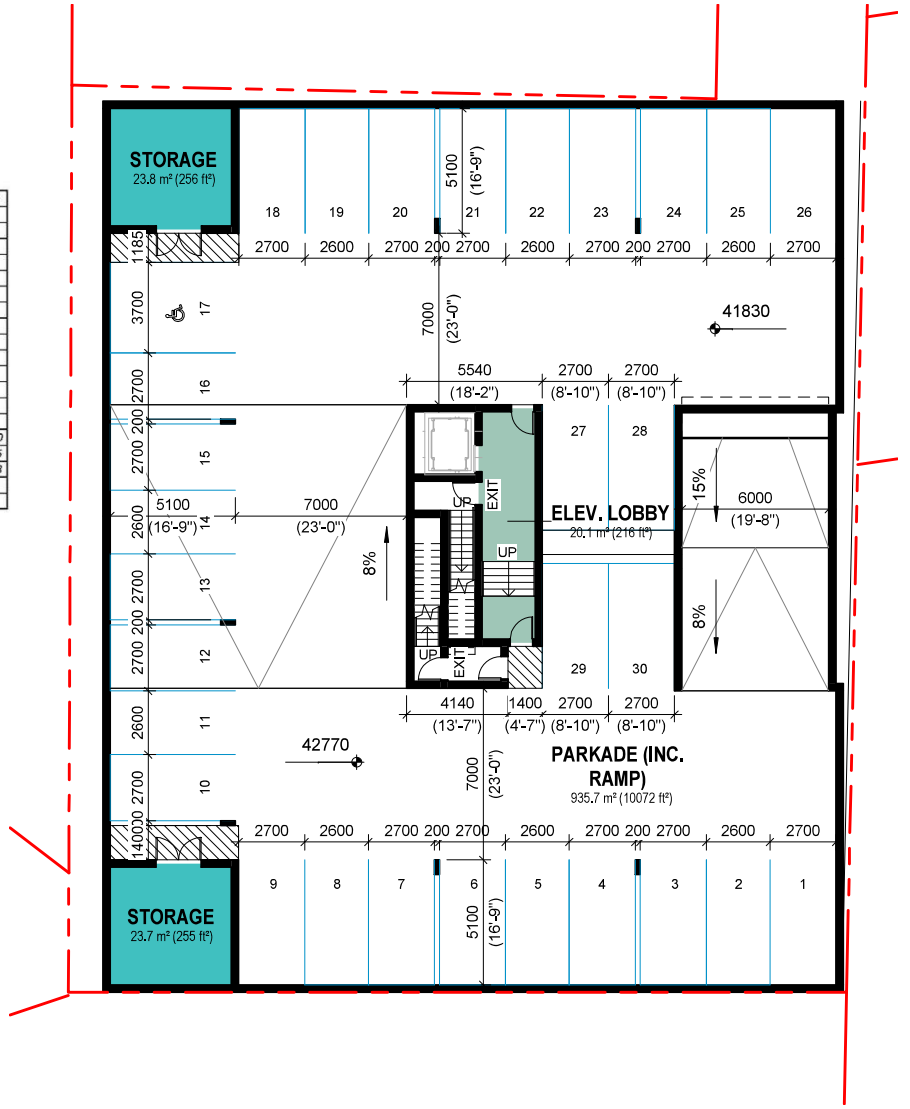
The following non-financial charges are shown on the current title and may affect the property.
362729G – Right of Way
E18730 – Easement
EJ112476 – Statutory Right of Way
EJ112477 – Statutory Right of Way

Setbacks are derived from field survey.

Parcel dimensions shown hereon are derived from Land Title Office records.

This document shows the relative location of the surveyed features and shall not be used to define property boundaries.

VERSION 5.7 (4 STOREY W/ UNDERGROUND PARKING)	ZONE ALLOWANCE	PROPOSED	VARIANCE	VISITOR STALLS	UNITS >45sqm	UNITS <45sqm	AFF. >45sqm	AFF. <45sqm
LOT AREA:	920M2	1500m2	N					
FSR:	1.6:1	1.44	N					
OPEN SITE SPACE (MIN):	30%	33.99%	N	*ASSUMES 3 VISITOR STALLS AT GRADE				
OPEN SITE SPACE WITH DRIVEWAY (MIN):	50%	56.90%	N					
SITE COVERAGE (MAX):	40%	40.65%	N					
# OF STOREYS:	4	4	N					
ALLOWABLE HEIGHT:	12M	12.90M	Y					
SETBACK - FRONT YARD	6.45M	3.56M	Y					
SETBACK - SIDE YARD W.	6.45M	5.68M	Y					
SETBACK - SIDE YARD E.	6.45M	4.97M	Y					
SETBACK - REAR YARD	6.45M	4.00M	Y					
# OF UNITS	N/A	33	N/A					
MINIMUM UNIT AREA:	33M2	39M2	N					
MINIMUM # OF CAR STALLS (APARTMENT):	32.1	33	N	3.3	2.25	21.6	0	0
MINIMUM # OF CAR STALLS (AFFORDABLE):	18	N/A	N	3.3	0	0	1.2	13.5
COMBINED APARTMENT/AFFORDABLE	29.25	N/A	N	3.3	2.25	21.6	3	3
LONG TERM BICYCLE PARKING:	39.75	40	N					
SHORT TERM BICYCLE PARKING:	6	6	N					



CASCADIA ARCHITECTS

OPTION 5.7 PLAN & DATA

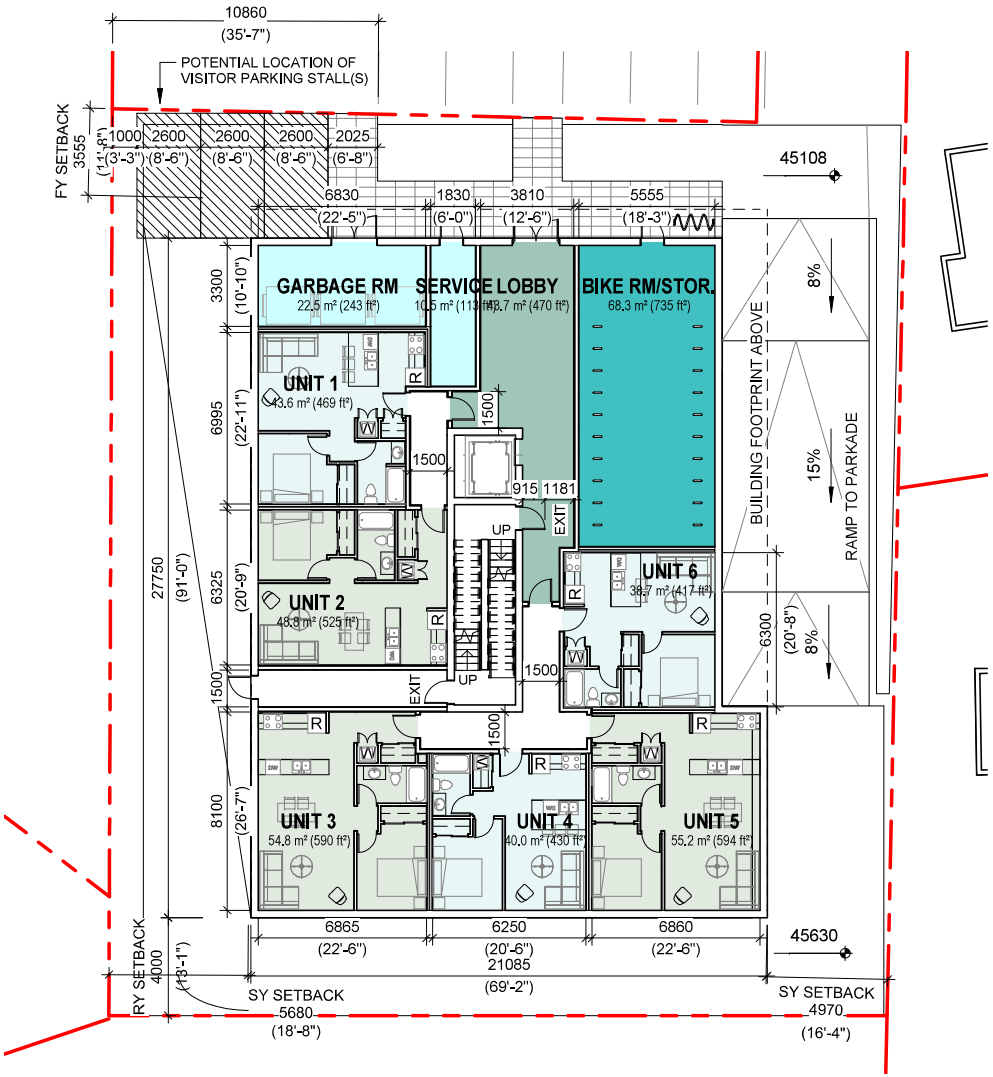
LANTERN PROPERTIES LTD

1475 FORT STREET

02/12/19

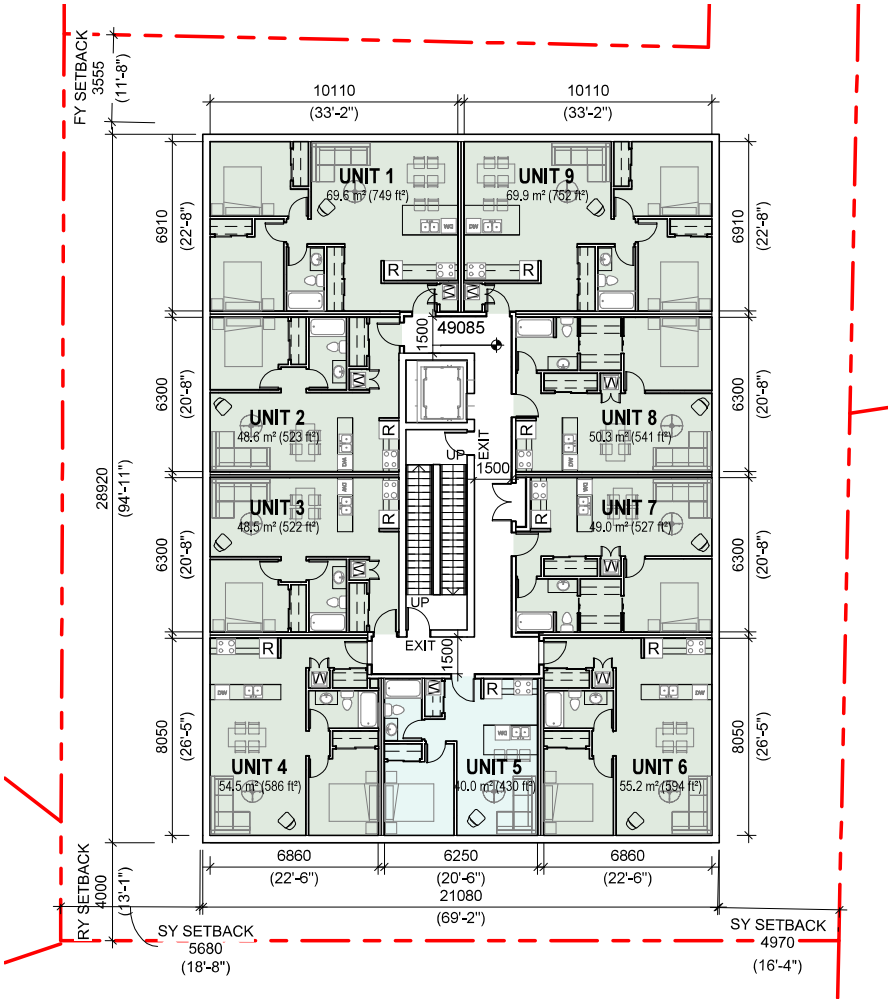
1 : 200

ASK 01



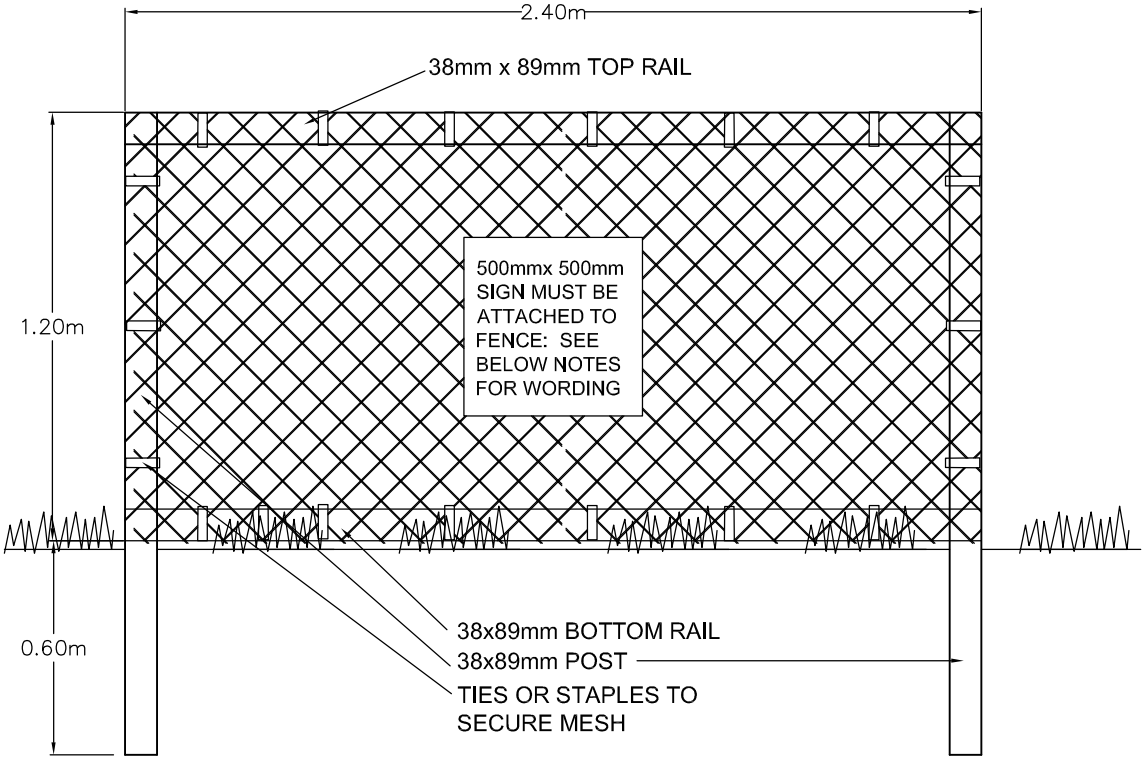
1 LOBBY LEVEL

SCALE = 1 : 200



2 TYPICAL UNIT LAYOUT

SCALE = 1 : 200



TREE PROTECTION FENCING

1. FENCE WILL BE CONSTRUCTED USING 38 mm X 89mm WOOD FRAME: TOP, BOTTOM AND POSTS * USE ORANGE SNOW-FENCING MESH AND SECURE THE WOOD FRAME WITH"ZIP" TIES OR GALVANIZED STAPLES.

2. ATTACH A 500mm X 500mm SIGN WITH THE FOLLOWING WORDING: WARNING- TREE PROTECTION AREA. THIS SIGN MUST BE AFFIXED ON EVERY FENCE OR AT LEAST EVERY 10 LINEAR METERS.

* IN ROCKY AREAS, METAL POSTS (T-BAR OR REBAR) DRILLED INTO ROCK WILL BE ACCEPTED

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Tree Resource Spreadsheet Methodology and Definitions

Tag: Tree identification number on a metal tag attached to tree with nail or wire, generally at eye level. Trees on municipal or neighboring properties are not tagged.

NT: No tag due to inaccessibility or ownership by municipality or neighbour.

DBH: Diameter at breast height – diameter of trunk, measured in centimetres at 1.4m above ground level. For trees on a slope, it is taken at the average point between the high and low side of the slope.
* Measured over ivy
~ Approximate due to inaccessibility or on neighbouring property

Crown Spread: Indicates the diameter of the crown spread measured in metres to the dripline of the longest limbs.

Relative Tolerance Rating: Relative tolerance of the tree species to construction related impacts such as root pruning, crown pruning, soil compaction, hydrology changes, grade changes, and other soil disturbance. This rating does not take into account individual tree characteristics, such as health and vigour. Three ratings are assigned based on our knowledge and experience with the tree species: Poor (P), Moderate (M) or Good (G).

Critical Root Zone: A calculated radial measurement in metres from the trunk of the tree. It is the optimal size of tree protection zone and is calculated by multiplying the DBH of the tree by 10, 12 or 15 depending on the tree's Relative Tolerance Rating. This methodology is based on the methodology used by Nelda Matheny and James R. Clark in their book "Trees and Development: A Technical Guide to Preservation of Trees During Land Development."

- 15 x DBH = Poor Tolerance of Construction
- 12 x DBH = Moderate
- 10 x DBH = Good

To calculate the critical root zone, the DBH of multiple stems is considered the sum of 100% of the diameter of the largest stem and 60% of the diameter of the next two largest stems. It should be noted that these measures are solely mathematical calculations that do not consider factors such as restricted root growth, limited soil volumes, age, crown spread, health, or structure (such as a lean).

Health Condition:

- Poor - significant signs of visible stress and/or decline that threaten the long-term survival of the specimen
- Fair - signs of stress
- Good - no visible signs of significant stress and/or only minor aesthetic issues

Structural Condition:

- Poor - Structural defects that have been in place for a long period of time to the point that mitigation measures are limited
- Fair - Structural concerns that are possible to mitigate through pruning
- Good - No visible or only minor structural flaws that require no to very little pruning

Retention Status:

- X - Not possible to retain given proposed construction plans
- Retain - It is possible to retain this tree in the long-term given the proposed plans and information available. This is assuming our **recommended mitigation measures are followed**
- Retain * - See report for more information regarding potential impacts
- TBD (To Be Determined) - The impacts on the tree could be significant. However, in the absence of exploratory excavations and in an effort to retain as many trees as possible, we recommend that the final determination be made by the supervising project arborist at the time of excavation. The tree might be possible to retain depending on the location of roots and the resulting impacts, but concerned parties should be aware that the tree may require removal.
- NS - Not suitable to retain due to health or structural concerns