

<u>Talbot Mackenzie & Associates</u> Consulting Arborists

## 210 Gorge Road East, Victoria

## Construction Impact Assessment &

## Tree Preservation Plan

#### PREPARED FOR:

Victoria Cool Aid Society c/o CitySpaces Consulting Ltd. 5<sup>th</sup> floor, 844 Courtenay Street Victoria, BC V8W 1C4

#### PREPARED BY:

Talbot, Mackenzie & Associates

Michael Marcucci – Consulting Arborist ISA Certified # ON-1943A TRAQ – Qualified

DATE	OF	<b>ISSUANCE</b> :
		AMENDED:

February 7, 2018 June 4, 2018 March 18, 2019

Box 48153 RPO - Uptown Victoria, BC V8Z 7H6 Ph: (250) 479-8733 Fax: (250) 479-7050 Email: tmtreehelp@gmail.com



**Consulting Arborists** 

Jobsite Property:210 Gorge Road East, VictoriaDate of Site Visits:December 12, 2017 – May 31, 2018

Site Conditions: No construction activity present.

**Summary:** A municipal Hawthorn tree (#929, 39cm DBH) and a private non-bylaw protected Horsechestnut (60cm DBH) will require removal. Exploratory excavations were conducted around the neighbour's Big Leaf Maple #932 (78cm DBH) for the proposed foundation excavation and Horsechestnut #931 (90cm DBH) for the proposed sidewalk grading. We determined that neither tree will be significantly impacted by excavations if only one metre of working room is required within the maple's CRZ and 30cm of depth is required for the sidewalk grade. A large ~40cm diameter scaffold limb and a ~20cm diameter limb from Horsechestnut #931 will likely require removal for building clearance.

European Hornbeam #786 (34cm DBH), located in the municipal sidewalk, may be removed depending on the location of the water service and underground hydro service as well as whether it is destabilized by the removal of the sidewalk and retaining wall. The retention status of the municipal Hawthorn #928 will also depend on the location and size of the water service and the roots encountered.

Three small Spruce trees (NT#1-3, owned by neighbour) will be impacted by the proposed retaining wall adjacent to the hydro transformer and the south-east building foundation corner. If retention is desired, we recommend an arborist make the final determination as to their retention viability at the time of excavation. Parts of the neighbour's Western Red Cedar hedge (NT#4-7) may also be impacted.

**Scope of Assignment:** To inventory the existing bylaw protected trees and any trees on neighbouring properties that could be potentially impacted by construction or that are within 3 meters of the property line. Review the proposal to demolish the existing buildings and construct a six-storey housing complex. 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 or root collar. 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. This report is based upon building plans from Number Ten Architectural Group (dated 2019-03-15). The amended reports

210 Gorge Road East - Tree Preservation Plan

are based upon the updated sidewalk designs around Horsechestnut #931 and updated preliminary servicing designs attached (no date). The Landscape Design, dated March 14, 2019, has also been reviewed.

**Summary of Tree Resource:** 21 trees and shrubs were inventoried. Tree #932 is a 78cm DBH Big Leaf Maple owned by 3023 Carroll Street. There is one bylaw protected tree on the subject property: #931, a 90cm DBH Horsechestnut. There are three municipal trees fronting the property: two on the Carroll St. flank (two Hawthorns, #928 and 929) and one on the Gorge Road flank (European Hornbeam, #786). One non-bylaw protected tree was inventoried (#930).

#### Trees to be Removed:

- Horsechestnut #930 (60cm DBH): This private non-by-law protected tree has extensive decay in the lower trunk and is unsuitable to retain in our opinion.
- Hawthorn #929 (39cm DBH): This municipal tree will be within 1m of the proposed driveway and within the footprint of the proposed sidewalk.

#### Impacts on Trees to be Retained and Mitigation Measures

- Horsechestnut #931 (90cm DBH):
  - Clearance Pruning: The codominant main stems of this tree are heavily weighted and over-extended. One of these limbs extends into the area of the proposed building and will likely require removal for building clearance. If it is pruned back to the main trunk, this would result in a large 40cm pruning wound, which could potentially be a future site for decay. The limb should be pruned once framing for the second storey is in place so that the exact location of the necessary pruning cut is clear. If possible, the limb should be pruned back to a lateral branch. However, the remaining branch will likely be within a metre of the building if it is retained at all. A 20cm limb may also require removal for building clearance.
  - Sidewalk: An exploratory excavation (three photos below) was conducted to assess the impacts from the updated sidewalk design, which will not allow the sidewalk to be raised above the existing grade as originally planned due to sloping requirements. We hand dug a trench 4m south from the centre of the tree in the location of the proposed sidewalk edge. A depth of approximately 30cm was reached throughout most of the trench. We attempted to retain as many roots above 2cm as possible while smaller roots were pruned back to the edge of the trench to facilitate further excavation.

Roots of the following sizes were encountered throughout the length of the trench: two 3cm roots (retained), five 2cm roots (one required removal), and eight 1cm roots. A moderate density of small fibrous roots (smaller than 1cm in diameter) were severed. One 5cm root oriented vertically was observed at the edge of the trench.

Given the amount and size of roots observed, we do not anticipate the tree will be significantly impacted by the proposed sidewalk if the excavation required is restricted to 30cm in depth. There may still be roots underneath 30cm and therefore, if the sidewalk requires excavation to a greater depth, there may be additional impacts to the health of the tree. If significant root loss is to be avoided, this may mean decreasing the depth of the sub-base and/or retaining soil rich in organic matter (and containing roots) below the sidewalk. If a curb or retaining wall is desired at this edge of the sidewalk, its foundation should "bridge" above significant roots encountered (such as by using reinforced concrete).

The project arborist should supervise the excavation associated with the sidewalk, the removal of the retaining wall and the re-grading of the area.



210 Gorge Road East - Tree Preservation Plan



• Patio: The patio area covers a small portion of the critical root zone (15-20%) and there will be approximately 10-30cm of fill in different areas of the patio above existing grade. If our mitigation measures are followed, we do not believe this will have a significant impact on the overall health of the tree. The area of the patio is currently covered in asphalt, which is already affecting the accessibility of air and water to the roots. The area of fill covers a small portion of the CRZ in relation to the remaining exposed CRZ. If the patio requires a 10-20cm tall retaining wall, this wall should be constructed in such a way that excavation resulting in root loss is not necessary (for example, loose stacked rock).

To mitigate the impacts of the patio, we recommend that the patio surface be made of a permeable material, such as paving stones. The asphalt should be removed under arborist supervision and the area below the patio should not be excavated if roots are observed.

• **Removal of existing asphalt driveway:** The asphalt on the remaining portion of the existing driveway will eventually be removed which will allow more water and air penetration to the roots likely below the asphalt. This could be of significant benefit to the tree as a large portion of the CRZ is currently beneath this asphalt. This removal of asphalt should be done under arborist supervision to ensure roots are not damaged in the process and we recommend that there be no significant fill layer on the remaining portions of the CRZ.

We recommend this asphalt be retained during at least the demolition portion of the construction so that roots are not damaged by heavy machinery. If it is anticipated construction traffic or activity will have to encroach into this area during construction, we recommend the asphalt surface be left in place for as long as possible, preferably until the end of construction.

• **Building Foundation:** It is our understanding that the south-west corner of the building closest to this tree (indicated as the lounge room) will only have a crawlspace. Therefore, we assume that working room will be restricted to one metre outside the proposed building footprint. We do not anticipate significant root loss as a result of these excavations in relation to the remaining undisturbed portion of the root system.

#### • #932 Big Leaf Maple (78cm DBH)

Exploratory excavations were conducted adjacent to this tree to determine the impact of the excavations associated with the north-east corner of the building and parking lot. Based on these excavations, we determined that there will be very little impact to the tree's health as a result of the proposed construction. This is based on the understanding that the extent of excavation will be limited to one metre from the perimeter of the building foundation and parking lot retaining wall. Exploratory excavations were conducted by hand-digging two narrow trenches approximately 45cm in depth at these locations:

- 1) For the building corner foundation: 6.6m west of the east property line, from the existing building to 20cm from the property line. Roots observed and their sizes are as follows: two 2cm and three 1cm.
- 2) For the parking lot corner: 5.2m south of the north property line, from the existing building to 2m west of east property line. Roots observed and their sizes are as follows: one 3cm, two 2cm and one 1cm.

A hard pan clay layer of soil was encountered within the top 25cm of soil and no roots were observed below this point. We do not anticipate significant roots to be encountered below the depth excavated. It is our understanding that no grade change will take place in the remaining undisturbed portion of the CRZ. Very little to no clearance pruning will be required for the canopy of the tree.

• #786 European Hornbeam (34cm DBH, in municipal sidewalk)

It is our understanding that the city requires the existing sidewalk be removed and converted to turf. This footprint of the existing sidewalk will eventually be converted into a planned bike lane at an undetermined time in the future.

The retention of this tree will depend on the location of the proposed water service (Option #2 is approximately 2m from the tree) and the location of the underground hydro line to the transformer (line not shown on plans). Because the tree may have a confined root ball and may have roots that are braced against the sidewalk and retaining wall footing, there is the possibility that removing the sidewalk and wall footing may destabilize the tree.

If retention of the tree is to be attempted, the project arborist should supervise excavation for the new services, the removal of the sidewalk and retaining wall and the re-grading of the soil within the critical-root-zone of the tree. We also recommend that the existing curb be retained if possible.

210 Gorge Road East – Tree Preservation Plan

The amount of roots encountered in the area of the proposed sidewalk will depend on whether the footing of the wall and the amount of soil beyond the wall have restricted root growth in this direction.

#### #928 Hawthorn (23cm DBH, municipal)

The updated preliminary servicing drawing shows Option #1 for the water service line 2.5m from this tree. The extent of excavation and impacts to the tree will depend on the exact location, depth and size of the water meter box, which is not accurately shown to scale on the preliminary drawing attached.

We recommend the raised planter boxes in front of this tree be removed (the preferred option) or result in no more than 10cm of well-drained soil over the existing grade surrounding the tree.

#### Neighbour's Spruce trees NT #1-3

There are three Spruce trees (NT #1-3, 10-19cm DBH) on the neighbouring property to the east which are growing close to the property line (from directly beside the property line to 1.5m away). The retaining wall associated with the hydro transformer will run along the property line as will the excavation for the south-east corner of the building foundation. The stability and health of these trees may be impacted; this is especially likely for NT #2 and 3 which are growing close to the property line. We recommend that an arborist supervise the excavations to make the final determination as to the impacts and the trees' retention viability.

If any roots are retained from NT #3 and its structural stability is not compromised, the health of the tree will then be impacted by the one metre of fill soil above the existing grade (18.72 to 19.72 in this area).

#### • Neighbour's Western Red Cedar hedge (NT#4-7)

This hedge is made up of four Western Red Cedar trees (DBH of approximately 20cm each) that have been topped at four metres and are growing approximately one metre from the property line. Excavation for the south-east corner of the building foundation will likely be to the property line. There may not be significant root loss for trees #5-7 due to a 0.5m to 1m tall retaining wall that runs along the property line that may be restricting some root growth away from this area. The retaining wall appears to end between trees NT #4 and 5 and therefore there may be more roots cut around NT #4. There is, however, existing pavement over the area to be excavated and therefore there may not be as many roots in this area. If retention of the hedge is desired, we recommend the project arborist supervise the excavation to prune any roots encountered.

• 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 to be erected 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.

• **Demolition of the existing building:** The demolition of the existing house 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.

In particular, the removal of the north-east corner of the existing building's foundation should be supervised by the project arborist to ensure roots from the Big Leaf Maple #932 are not unnecessarily damaged in the process.

- Arborist Supervision: All excavation occurring within the critical root zones of protected trees should be completed under supervision by the project arborist. In particular, the following activities should be completed under the direction of the project arborist:
  - Removal of the north-east corner of the existing building's foundation within the CRZ of Big Leaf Maple #932
  - Excavation for the north-east building corner foundation and parking lot retaining wall within the CRZ of #932 Big Leaf Maple
  - Removal of the sidewalk and retaining wall, and any re-grading within the CRZ of #786 European Hornbeam and #931 Horsechestnut
  - Removal of the existing asphalt driveway within the CRZ of #931 Horsechestnut
  - Any excavation associated with constructing the new sidewalk within the CRZ of #931 Horsechestnut
  - Excavation for the hydro transformer retaining wall along the property line adjacent to trees NT#1-3
  - Excavation for the building foundation within the CRZs of trees NT#4-7
  - Excavation for the water service and underground hydro (depending on location of lines and trees retained)
  - Any excavation associated with constructing fencing within the CRZs of retained trees
- **Pruning Roots:** Any severed roots must be pruned back to sound tissue to reduce wound surface area and encourage rapid compartmentalization of the wound. Backfilling the excavated area around the roots should be done as soon as possible to keep the roots moist and aid in root regeneration. Exposed roots should be kept moist until the area is backfilled, especially if excavation occurs during a period of drought. This can be accomplished in a

number of ways, including wrapping the roots in burlap or installing a root curtain of wire mesh lined with burlap, and keeping the area moist throughout the construction process.

- 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).
- 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.
- **Mulching**: Mulching is an important proactive step to maintaining the health of the trees to be retained 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. As much of the area within two times the dripline of the tree should be mulched, both inside and outside of the critical root zone. No mulch should be touching the trunk of the tree. See "methods to avoid soil compaction" if the area is to have heavy traffic.
- 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.
- 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.

- 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
  - o Reviewing the report with the project foreman or site supervisor
  - o Locating work zones, where required
  - Supervising any excavation within the critical root zones of trees to be retained
  - o 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 demolition, site clearing or other construction activity occurs.

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

Midul Maun-

Michael Marcucci ISA Certified # ON-1943A TRAQ – Qualified

Talbot Mackenzie & Associates ISA Certified Consulting Arborists

Encl. 2-page tree resource spreadsheet, 1-page Tree Protection Plan (original survey with barrier fencing and tree protection details added), 3-page site plan and grading details, 1-page servicing drawing, 1-page Victoria tree fencing specifications

#### **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.

#### 210 Gorge Road East Tree Resource Spreadsheet

Tree ID	Common Name	Latin Name	DBH (cm)	Crown Spread (m)	CRZ (m) custom	Relative Tolerance	Health	Structure	Remarks and Recommendations	Retention Status X = Removal TBD =
	European	Carpinus								To be peterininea
786	Hornbeam	betulus	34.0	6.0	3.5	Moderate	Good	Fair	Municipal sidewalk tree. Codominant union at 1.5m	TBD
	Carriere	Crataegus X							Municipal. Aphid infestation. Common for this species. Located	
928	Hawthorn	lavallei carrierei	23	8.0	3.0	Moderate	Good	Good	on the Carroll Street municipal frontage.	TBD
929	Cockspur hawthorn	Crataegus crus- galli	39	10.0	4.0	Moderate	Good	Good	Municipal. Dense canopy will benefit from pruning. Low epicormic growth on trunk. Located on the Carroll Street municipal frontage.	x
		Aesculus							Not protected. Cavity with extensive lower trunk decay. Poor	
930	Horse chestnut	hippocastanum	60	13.0	6.0	Good	Good	Poor	specimen to retain long term	X
931	Horse chestnut	Aesculus hippocastanum	90	16.0	8.0	Good	Good	Fair	Heavily weighted scaffold limbs. Would benefit from weight reduction pruning.	Retain
932	Big Leaf maple	Acer macrophyllum	78	16.0	6.0	Good	Good	Fair	Neighbour's (3023 Carroll St), less that 1.0 metre from the property boundary. Large surface roots extend up to the existing building footprint, 4.0 metres from the boundary. Canopy extends 6.0 metres over the property. <i>Ganoderma</i> fruiting bodies at base on east side.	Retain
NT 01	Spruce	Picea spp	~12	4.0	2.0	Moderate	Good	Good	Neighbour's, 1.5m from fence	TBD
NT 02	Serbian Spruce	Picea omorika	10.0	2.0	2.0	Moderate	Good	Good	Neighbour's, 0.5m from fence	TBD
NT 03	Serbian Spruce	Picea omorika	19.0	4.0	2.0	Moderate	Good	Good	Neighbour's, growing against fence. Branches overhang 1m.	TBD
NT 04	Western Red Cedar	Thuja plicata	~20	4.0	3.0	Poor	Good	Fair	Neighbour's, 4m tall, part of hedge. Topped. 1m from fence.	Retain
NT 05	Western Red Cedar	Thuja plicata	~20	4.0	3.0	Poor	Good	Fair	Neighbour's, 4m tall, part of hedge. Topped. 1m from fence.	Retain
NT 06	Western Red Cedar	Thuja plicata	~20	4.0	3.0	Poor	Good	Fair	Neighbour's, 4m tall, part of hedge. Topped. 1m from fence.	Retain
NT 07	Western Red Cedar	Thuja plicata	~20	4.0	3.0	Poor	Good	Fair	Neighbour's, 4m tall, part of hedge. Topped. 1m from fence.	Retain
NT 08	Рутаmidal Cedar	<i>occidentalis</i> 'Pyramidalis'	~7	1.0	2.0	Poor	Good	Good	Neighbour's 30cm from fence	Retain
NT 09	Dogwood	Cornus spp	~8	4.0	2.0	Poor	Good	Good	Neighbour's 2m from fence	Retain
NT 10	Japanese Maple	Acer palmatum	~8, 8, 6, 6	5.0	2.0	Poor	Good	Good	Neighbour's 20cm from fence. Branches overhang 1.5m	Retain

Prepared by: Talbot Mackenzie & Associates ISA Certified and Consulting Arborists Phone: (250) 479-8733 Fax: (250) 479-7050 email: tmtreehelp@gmail.com December 12, 2017

#### 210 Gorge Road East Tree Resource Spreadsheet

Tree ID	Common Name	Latin Name	DBH (cm) ~ approximate	Crown Spread (m)	CRZ (m) custom	Relative Tolerance	Health	Structure	Remarks and Recommendations	Retention Status X = Removal TBD = To Be Determined
NT 11	Japanese Maple	Acer palmatum	~7	2	1.5	Poor	Good	Good	Neighbour's 2m from fence	Retain
NT 12	Hedge (multiple species)		Multistem	3	2.0	Poor	Good	Fair	Neighbour's shrubs growing against fence, some overhanging 2m with most of canopy on subject property. 4 plants including 2 pyramidal Cedars (~5cm DBH)	Retain
NT 13	Japanese Maple	Acer palmatum	3	2	1.5	Poor	Good	Good	Neighbour's 0.5m from fence	Retain
NT 14	Colorado Blue Spruce	Picea pungens	36	4	4.5	Moderate	Good	Good	Neighbour's 3m from fence	Retain
NT 15	Pyramidal Cedar hedge	<i>occidentalis</i> 'Pyramidalis'	Multistem	1	1.5	Poor	Good	Good	Neighbour's hedge against fence.	Retain

Prepared by: Talbot Mackenzie & Associates ISA Certified and Consulting Arborists Phone: (250) 479-8733 Fax: (250) 479-7050 email: tmtreehelp@gmail.com

....

Page 2 of 2











# 210 GORGE ROAD

SCALE: 1:100

DATE: MARCH 14, 2019 (REVISED & RESUBMITTED)





. Projector 30012 - Woome Date and - FHE Despendent - Engineering ME - Engineering At Southeast (Engl) 30017 Baseding - Part Date Jonores 12, 2218

PRELIMINARY SITE PLAN VICTORIA COOL AID 500 1:250 500 1 d 1 -----Em Prettine 30612 JE ANDERSON & ASSOCIATES SURVEYORS ENGINEERS

PHONE 200-121-2214 140. 200-121-228

WEIDER



#### TREE PROTECTION FENCING

- 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

### TREE PROTECTION FENCING AND SIGNAGE DETAIL

REVISIONS DRAWING NUMBER: