



# Tree Protection Plan

---

**Site:**

**6085 Thunderbird Blvd**

**TEF3 Parking Lot**

Vancouver, BC V6T 1Z4

**Prepared for:**

**The University of British Columbia**

1100 – 2329 West Mall

Vancouver, BC V6T 1Z4

**Prepared by:**

**Adela Parlesak**

ISA Certified Arborist PN-8202AT

ISA Tree Risk Assessment Qualified

ISA Certified Tree Worker Specialist



**Bartlett Tree Experts**

3081 Norland Avenue

Burnaby, BC V5B 3A9

604-322-1375

[www.bartlett.com](http://www.bartlett.com)

---

## Table of Contents

Executive Summary ..... 1

Introduction ..... 1

Site and Project Description ..... 1

Methodology ..... 2

Tree Data ..... 2

Tree Impacts ..... 2

Recommendations ..... 5

Limits of the Assignment ..... 5

Appendix I – Site Plans ..... 6

Appendix II – Tree Details ..... 9

Appendix III – Photographs ..... 11

Appendix IV – Tree Protection ..... 18

Appendix V - Assumptions and Limiting Conditions ..... 20

Appendix VI - Certificate of Performance ..... 21

## Executive Summary

Bartlett Tree Experts (BTE) were retained by The University of British Columbia to provide recommendations regarding the management of trees for the construction of a proposed basketball court. The court will be constructed at the east corner of an existing parking lot located at Thunderbird Blvd. and Health Science Mall.

Thirty one (31) trees were identified as potentially being impacted by the construction project. Three (3) trees have been identified where work is to take place above and below ground within their critical root zones. All trees on the site will be retained and protected throughout the construction project. The work will be carried out in a manner that minimizes the risk of harm being caused to the tree(s) and their root zones and will be supervised by the project arborist.

## Introduction

In April 2021, The University of British Columbia retained Bartlett Tree Experts to provide advice on the management of trees on the site of a proposed basketball court construction project. This project is in conjunction with a previous development that had included the construction of a Hydrogen refueling station, relocation of the basketball court and associated infrastructure. A separate report was provided in March 2021 that had addressed the scope of the aforementioned project to which a separate tree protection plan was provided.

The intended purpose of this report is to provide information on the condition of the trees which are located in close proximity to the proposed construction site of the new basketball court. It will also provide information regarding the site and/or any potential work that could impact the tree(s), and to make any future management recommendations.

## Site and Project Description

The site sits within the campus of the University of British Columbia in Vancouver, BC. The land is currently occupied by a parking lot which is bordered by a green strip boulevard to the northeast, south, and southwest. The trees are situated within the boulevard between the parking lot and road.

There are two entrance ways into the parking lot within the proposed scope of work area. One is located at the north side of the area along Health Science Mall, and the other is at the southeast side along Thunderbird Blvd.

The basketball court is to be constructed at the east corner of the proposed work area and the parking lot is to be painted and re-lined. The proposed development plan includes: removal of a concrete curb (small section along the south side), removal of the old

asphalt, regrading and compacting the fill, and the installation of new “asphaltic concrete”. The Engineers report provided had stated that the underlying granular fill soils are considered unsuitable as a subbase material and, therefore, will require replacement with suitable material to provide a durable pavement structure.

## Methodology

Email correspondence with the client and the client’s representatives prior to our site visit outlined the scope of the project and the trees that were of concern. We were asked to include all trees situated within the ‘Approx. Scope of Work’ (appendix I) in addition to the site plan design, geo-tech report, and construction details.

An inventory of the trees on the site was performed to assess the impact the project would have on those whose critical root zones (CRZ) could be affected by the work. A visual inspection was performed for these trees and a numbering system was assigned. Data collected in the field included species, DBH (measured at 1.4m), height, canopy spread and condition. Critical Root Zone (CRZ) radius was determined using the calculation adopted by the City of Vancouver, a table of which is provided in appendix IV. Assessments were made of the trees ability to tolerate root disturbance and the likely impact that the proposed work will have on each specimen.

## Tree Data

Our inventory of the site identified thirty one trees that could potentially be affected. Property lines were not identified so it is possible that some trees are located on third party land. The collected data is presented in Appendix II.

## Tree Impacts

Of the thirty one (31) trees:

The (4) larger red oaks (*Quercus rubra*) have wider root zones and canopies that extend into areas of construction activity, specifically trees #1, #4, #7, & #9. It is likely that the roots of these trees extend beyond the boulevard and beneath the existing asphalt.

Three (3) trees will be moderately impacted, trees #1, #4, and #7. The scope of work is in close proximity to these trees. The height of the chain link fence has been adjusted to reach a height of 2.4m. Some canopy pruning will be required to provide clearance for the installation of the fence. Clearance pruning will need to achieve allowance to accommodate the height of the fence, construction crew and vehicles, which also includes the equipment and vehicles used for the removal, regrading and installation of the new asphalt. The proposed path within the critical root zone of tree #1 has been limited to the

area at the northwest corner to limit the root disturbance to this tree. Consequently, minimal root disturbances are expected with the adjusted scope of work around this tree.

Trees #4, and #7 are likely to experience long term health impacts due to damage to their roots and the surrounding soil. These trees are situated approximately 2.5 meters from the curb edge with their CRZs extending at the very least 2.7 meters beyond the curb. These distances are the minimum required tree protection distances stipulated by the City of Vancouver. However, industry standards suggest 8 to 12 times their diameter, therefore, extending that CRZ distance to 3.6 meters from the stem. These measurements are based on the trees diameter (maturity) and species tolerance to construction profile.

Since tree roots are generally confined to the uppermost 45cm of the soil profile it is highly probable that roots will be encountered during the removal of the existing asphalt, regrading and compacting of the fill, and installation of the new asphalt. To minimize damage to tree roots, low impact equipment such as an AirSpade and/or HydroVac can be used to expose the roots within the critical root zone and remove the asphalt. Once these roots are exposed they will likely need to be severed to create an even surface. Depending on the quantity and size of roots removed the extent of damage to the tree will vary (ideally no more than 25% of the trees roots are removed and/or impacted). The increase in root loss usually results in a decrease in structural stability and increased probability of decline. The larger the root and the closer to the trunk a root is severed the more likely structural integrity is jeopardized.

Tree #4 is the largest in diameter and closest to the proposed basketball court and therefore may experience the greatest impacts from construction. Extra care should be taken around the roots of this tree. Implementing a post construction soil care program may help to supplement for root loss however, it does not eliminate the possibility of tree death where significant impacts (such as root and canopy loss) have been sustained.

Alternatively, leaving the roots intact and resurfacing the court will have an equally negative impact on the trees roots. Soil compaction limits the root growth beneath the soil as well as the trees ability to absorb moisture and nutrients from the soil which eventually leads to mortality. This may be exacerbated with the addition of chemicals such as those used in road works. Construction activities can cause profound changes to the area surrounding a tree's root system, by virtue of what has to be done for the majority of projects. Access traffic, storage of materials, grading, and trenching can result in soil compaction, crushing or severing of roots, injury to aboveground portions (trunk and branches), and drainage changes.

In general, cutting of roots reduces a tree's ability to supply itself with water and nutrients necessary to produce the sugars and carbohydrates necessary for sustaining life. Compaction of the soil reduces air pockets in the soil and makes it more difficult for roots to grow through it. It also slows or even prevents drainage of irrigation or storm water, which can result in excessively wet conditions, leading to root rot. Breakage and injury

to a tree's trunk and branches reduce its aesthetic value, but more importantly, can leave entry points for pests and diseases.

The issues above often do not appear immediately after the area surrounding a tree has been disturbed. It can be years after the project has been completed that stress signs become apparent. Reduced growth, changes in color or leaf size, branch dieback, or even tree death can follow large disturbances.

Tree #7 will require protection and some canopy pruning. This is to ensure no construction materials will be stored within the critical root zone of this tree. Furthermore, light canopy pruning may be required to provide clearance for construction vehicles. Any work taking place within the CRZ will need to be conducted under arborist supervision.

Tree #9 will require protection fencing to prevent the storage of construction materials and avoid any potential injury to its critical root zone.

Trees which are growing in close proximity to each other, or where large diameter tree fence is to include the smaller tree, a single fence can be erected. However, the minimum protection distance must be accounted for (e.g. large diameter tree fence includes and is greater than the smaller tree protection distance. Or, small diameter tree at the edge of the large diameter tree fence, tree fence must extend to include the minimum protection distance from the smaller tree)

The clearance pruning will help to prevent damage to trees and construction equipment and will ensure that obstructing branches are removed correctly and in a manner that optimizes trees recovery. Branches damaged by construction equipment are also unsightly and suggest neglect and a lack of care to outside observers.

The project as outlined in the site plans provided can be achieved with minimal to moderate impacts on the existing trees. Trees #26 & #27 are situated further back on the boulevard. Tree protection fencing is required for these trees and any work taking place within the CRZs will be conducted under arborist supervision.

Currently, trees #11-#25 will not be directly impacted by the proposed construction of the basketball court. However, tree protection has been recommended to boarder the parking lot to prevent the storage of materials, and any potential physical injury that could be caused by construction crew and/or machinery, especially, during the repainting of the lot. Any changes to the proposed development plan may change the impacts to these trees.

All work conducted within a CRZ will be supervised by the project arborist. Any roots exposed during this process will be recorded and covered with damp soil. Any roots that need to be removed will be hand pruned by the project arborist with their size, species and position being recorded. A written report on this process will be submitted to the client following completion.

The only way to eliminate any impacts to the trees (especially the oak trees #1, #4, & #7) is to either off-set or relocate the basketball court.

## Recommendations

1. Tree pruning should be executed prior to the arrival of construction vehicles and equipment.
2. Tree protective fencing should be installed prior to the arrival of construction vehicles and equipment.
3. Monitoring of the impact on trees during the project may reveal the need for mitigation work such as additional pruning and soil care.

## Limits of the Assignment

The following documents were provided by the client's representative to aid in the preparation of this report:

- *Approx. Scope of Work.jpg*
- *BCS100018\_20210405\_PHASE1 BASKETBALL COURT CD.vwx*. Site drawings prepared by Dialog and dated 4.28.21
- *257772-A1 EXP LE 2021-04-29-Geo Rpt. Thunderbird Basketball court-rev-01 s-s.pdf* a geotechnical report prepared by: EXP Services Inc.

All recommendations made in this report are based on our interpretation of the site plans provided and our email communication with the client's representatives. A review of the project and the management of the trees may be required once site plans have been finalized.

The tree inventory was performed from the ground for visual conditions. The site conditions were overcast and raining at the time of the assessment.

This tree inventory was not a tree risk assessment. As such, no trees were assessed for risk in accordance with industry standards, nor are there any tree risk ratings or risk mitigation recommendations provided within this preservation plan.

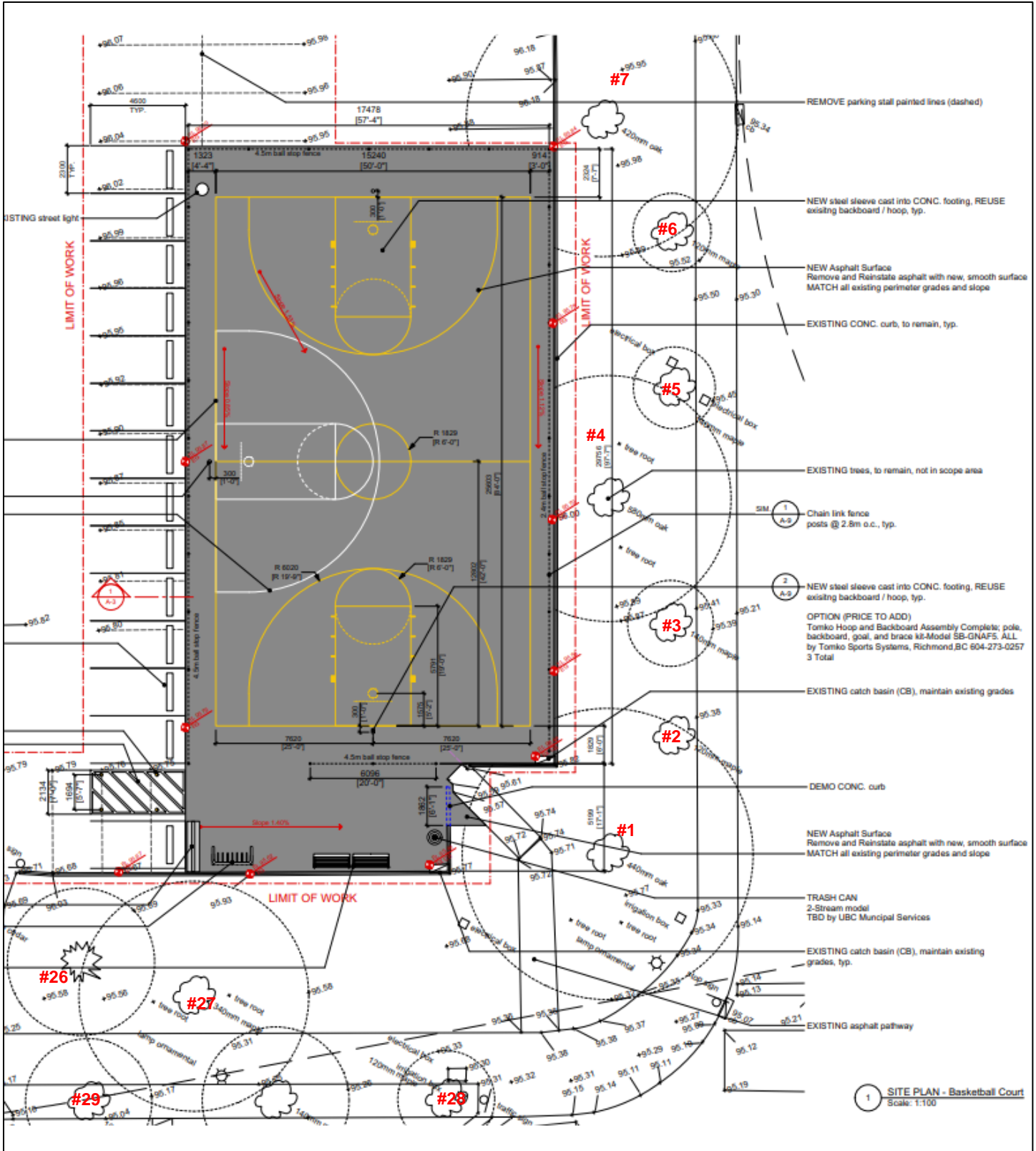


## Appendix I – Site Plans

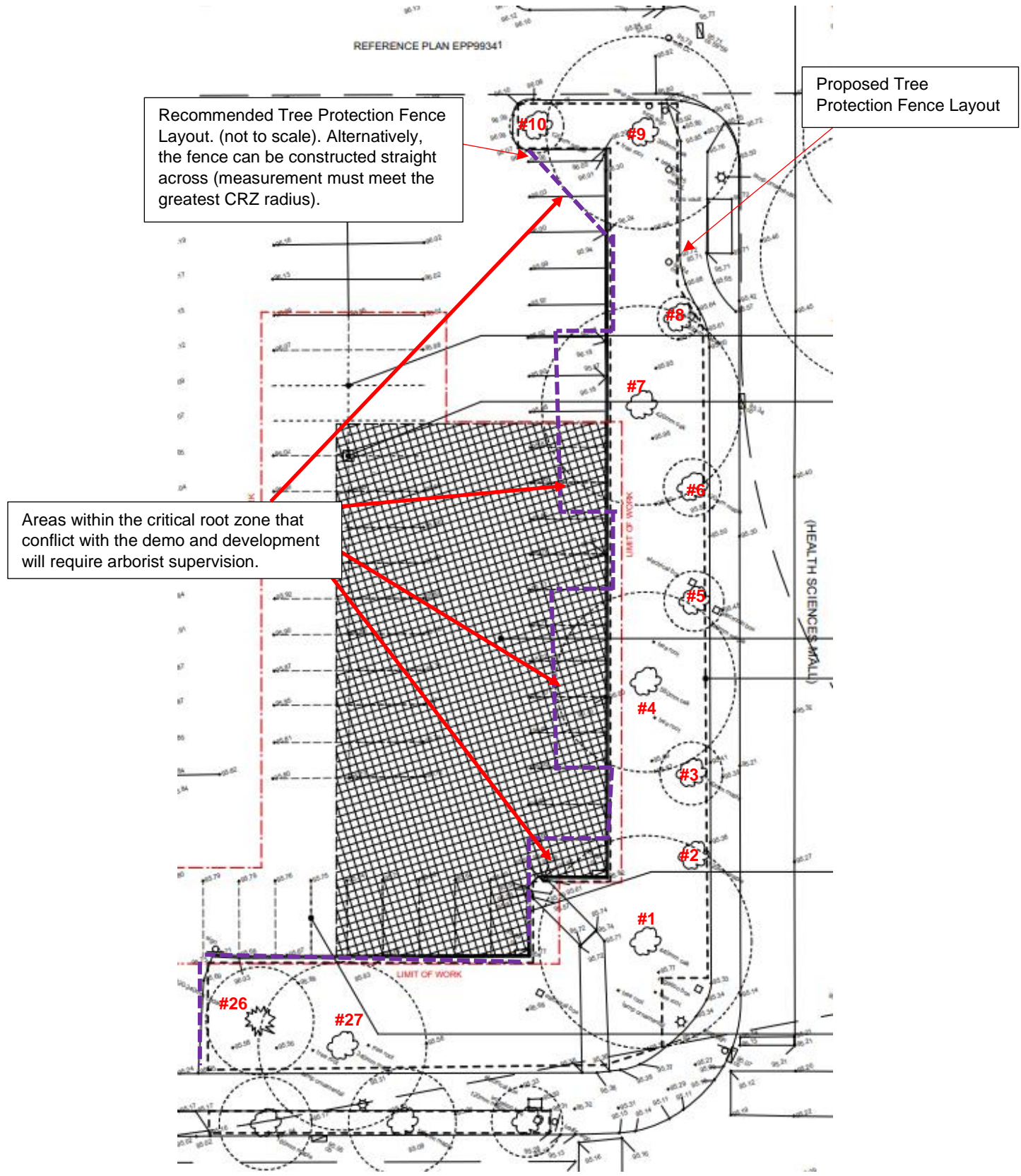


Aerial photograph of the site showing inventoried trees within the 'Approx. Scope of Work' area.





Trees in close proximity to the proposed development.



Demo plan and tree protection fence layout. (not to scale)

## Appendix II – Tree Details

Tree ID	Common Name	DBH (cm)	Height (m)	Canopy Radius (m)	Age Class	Condition	Construction Tolerance	Suitability for Preservation	CRZ Radius (m)	Observations	Recommendations
1	Red Oak ( <i>Quercus rubra</i> )	49	8	8	Semi Mature	Good	Good	Moderate	3.0	Deadwood. Exposed roots.	Retain with protection. Prune.
2	Red Maple ( <i>Acer rubrum</i> )	13	5	1.5	Young	Good	Good	High	1.2		Retain with protection.
3	Red Maple ( <i>Acer rubrum</i> )	18	5	2	Young	Good	Good	High	1.2		Retain with protection.
4	Red Oak ( <i>Quercus rubra</i> )	61	8	8	Mature	Good	Good	Moderate	3.6	Deadwood.	Retain with protection. Prune.
5	Red Maple ( <i>Acer rubrum</i> )	14	5	2	Young	Good	Good	High	1.2		Retain with protection.
6	Red Maple ( <i>Acer rubrum</i> )	13	5	1	Young	Good	Good	High	1.2		Retain with protection.
7	Red Oak ( <i>Quercus rubra</i> )	45	8	8	Semi Mature	Good	Good	Moderate	2.7	Deadwood.	Retain with protection. Prune.
8	Red Maple ( <i>Acer rubrum</i> )	10	4	1	Young	Good	Good	High	1.2		Retain with protection.
9	Red Oak ( <i>Quercus rubra</i> )	40	8	6	Semi Mature	Good	Good	Moderate	2.4		Retain with protection. Prune.
10	Little leaf linden ( <i>Tilia cordata</i> )	12	4	2	Young	Fair	Moderate	Moderate	1.2	Basal suckers.	Retain with protection. Prune.
11	European beech ( <i>Fagus sylvatica</i> )	18	4	1	Young	Good	Moderate	High	1.2		Retain with protection.
12	European beech ( <i>Fagus sylvatica</i> )	14	4	1	Young	Good	Moderate	High	1.2		Retain with protection.
13	Green Ash ( <i>Fraxinus pennsylvanica</i> )	17	4	3	Young	Fair	Good	High	1.2		Retain with protection.
14	Honey locust ( <i>Gleditsia triacanthos</i> )	15	4	4	Young	Good	Good	High	1.2		Retain with protection.
15	Katsura ( <i>Cercidiphyllum japonicum</i> )	12+8+ 6	3.5	3	Young	Fair	Good	High	1.2	Multi-stem form	Retain with protection.
16	Persian Ironwood ( <i>Parrotia persica</i> )	4	2.5	1	Young	Good	Good	High	0.5		Retain with protection.
17	Austrian Pine ( <i>Pinus nigra</i> )	66	10	5	Mature	Fair	Good	High	3.9	Lg. scaffold limbs	Retain with protection.
18	Western Red Cedar ( <i>Thuja plicata</i> 'Zebrina')	32	5	4	Semi Mature Mature	Good	Poor	High	1.9		Retain with protection.

Tree ID	Common Name	DBH (cm)	Height (m)	Canopy Radius (m)	Age Class	Condition	Construction Tolerance	Suitability for Preservation	CRZ Radius (m)	Observations	Recommendations
19	Austrian Pine ( <i>Pinus nigra</i> )	54	10	5	Mature	Fair	Good	High	3.3	Deadwood.	Retain with protection. Prune.
20	Austrian Pine ( <i>Pinus nigra</i> )	68	12	6	Mature	Good	Good	High	4.1	Deadwood. Lg. scaffold limbs	Retain with protection. Prune.
21	Mountain Ash ( <i>Sorbus sp.</i> )	24	7	4	Semi Mature	Fair	Moderate	High	1.5	Deadwood	Retain with protection. Prune.
22	Little lead linden ( <i>Tilia cordata</i> )	12	5	2	Young	Fair	Moderate	High	1.2	Dieback	Retain with protection.
23	Little lead linden ( <i>Tilia cordata</i> )	13	5	2	Young	Fair	Moderate	High	1.2	Dieback	Retain with protection.
24	Little lead linden ( <i>Tilia cordata</i> )	14	6	2	Young	Fair	Moderate	High	1.2	Dieback	Retain with protection.
25	Mountain Ash ( <i>Sorbus sp.</i> )	32	8	4	Semi Mature	Fair	Moderate	High	1.9	Deadwood	Retain with protection. Prune.
26	Leyland Cypress ( <i>Cupressus x leylandii</i> )	24+24	8	3	Semi Mature	Fair	Poor	Low	2.1	Moderate dieback.	Retain with protection. Prune.
27	Red Maple ( <i>Acer rubrum</i> )	37	5	5	Semi Mature	Good	Good	High	2.2		Retain with protection.
28	Red Maple ( <i>Acer rubrum</i> )	14	4.5	2	Young	Good	Good	High	1.2		Retain with protection.
29	Red Maple ( <i>Acer rubrum</i> )	16	5	2	Young	Good	Good	High	1.2		Retain with protection.
30	Red Maple ( <i>Acer rubrum</i> )	18	5	2	Young	Good	Good	High	1.2		Retain with protection.
31	Red Maple ( <i>Acer rubrum</i> )	15	4	2	Young	Good	Good	High	1.2		Retain with protection.

## Notes:

- DBH was measured at 1.4m.
- CRZ calculated from the chart provided in appendix IV.



### Appendix III – Photographs



Figure 1: Tree #1, zoomed photo showing the exposed roots.





Figure 2: Trees at the east side of the site.





Figure 3: Trees at the north side of the site.



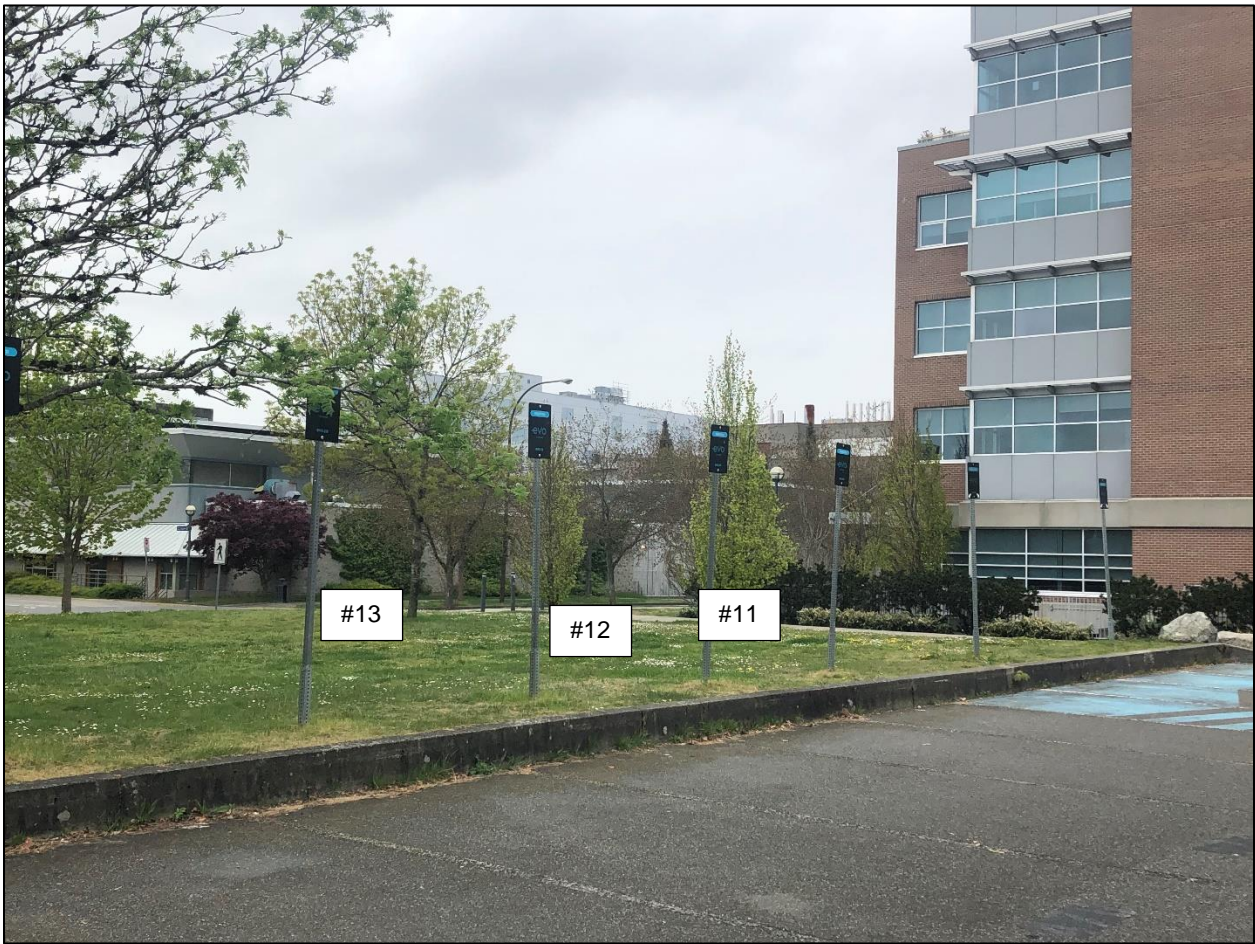


Figure 4: Trees on the northwest side of the site.



Figure 5: Trees to the west side of the site. Trees #14-#16 are situated behind trees #22-#25.



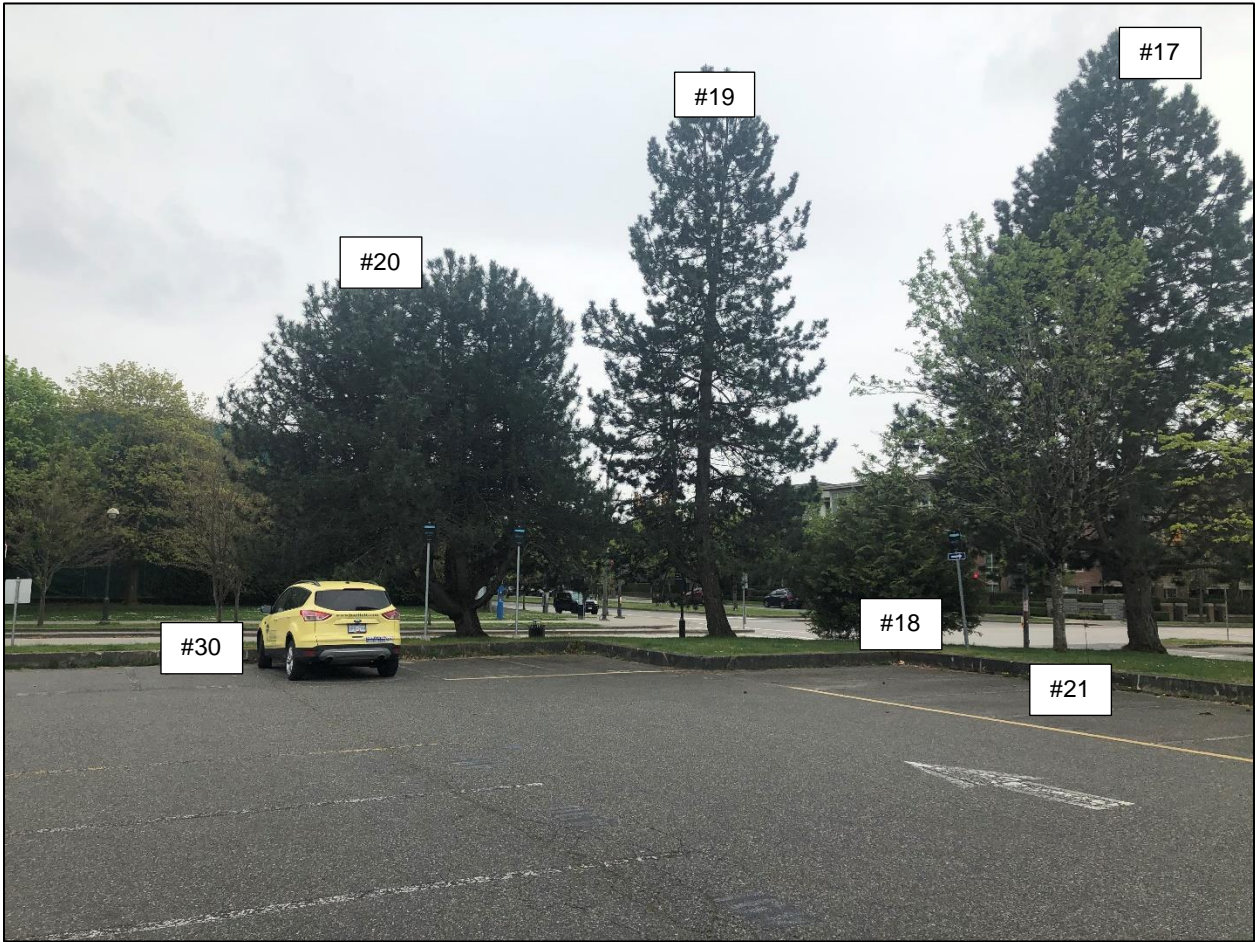


Figure 6: Trees on the southwest side of the site.



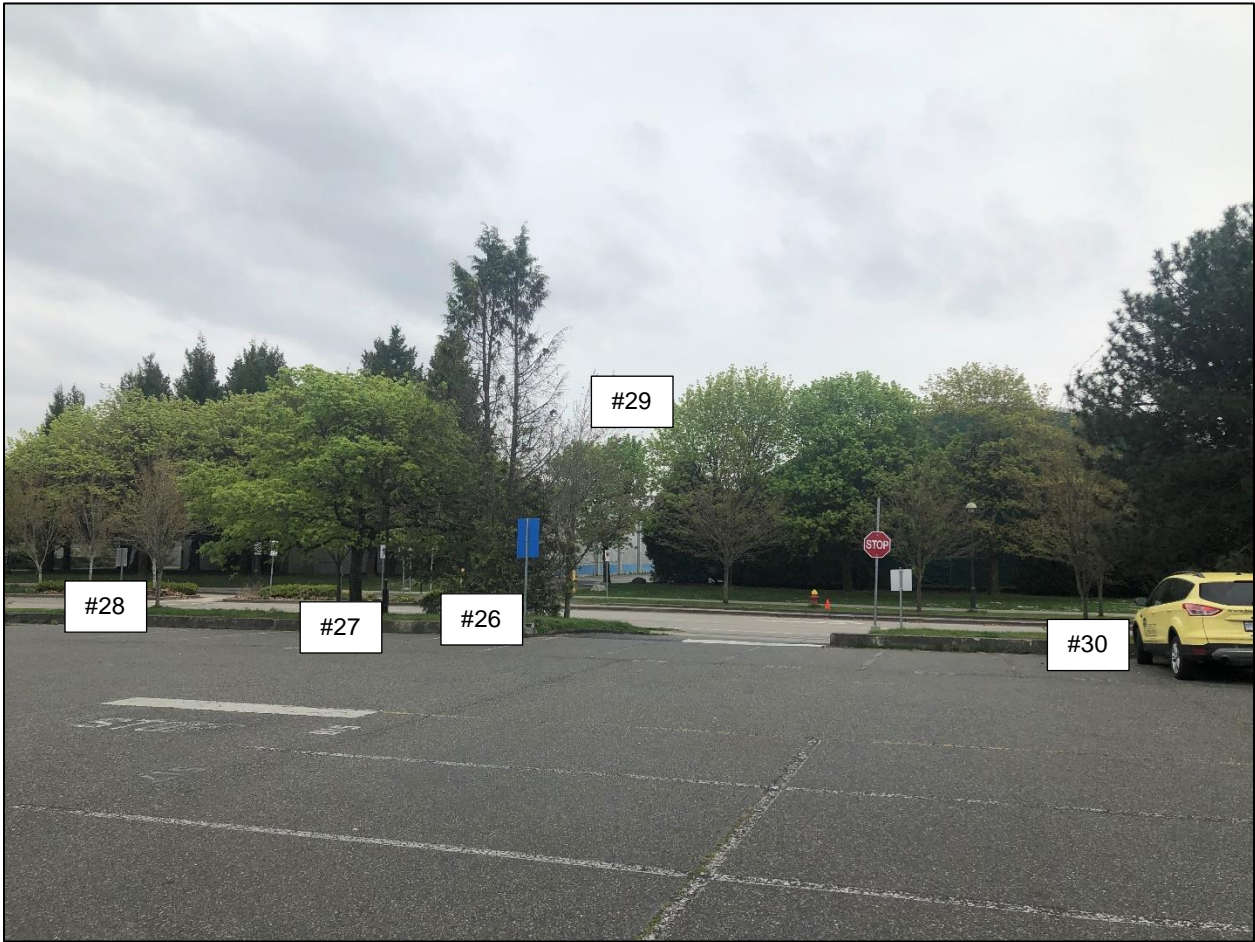


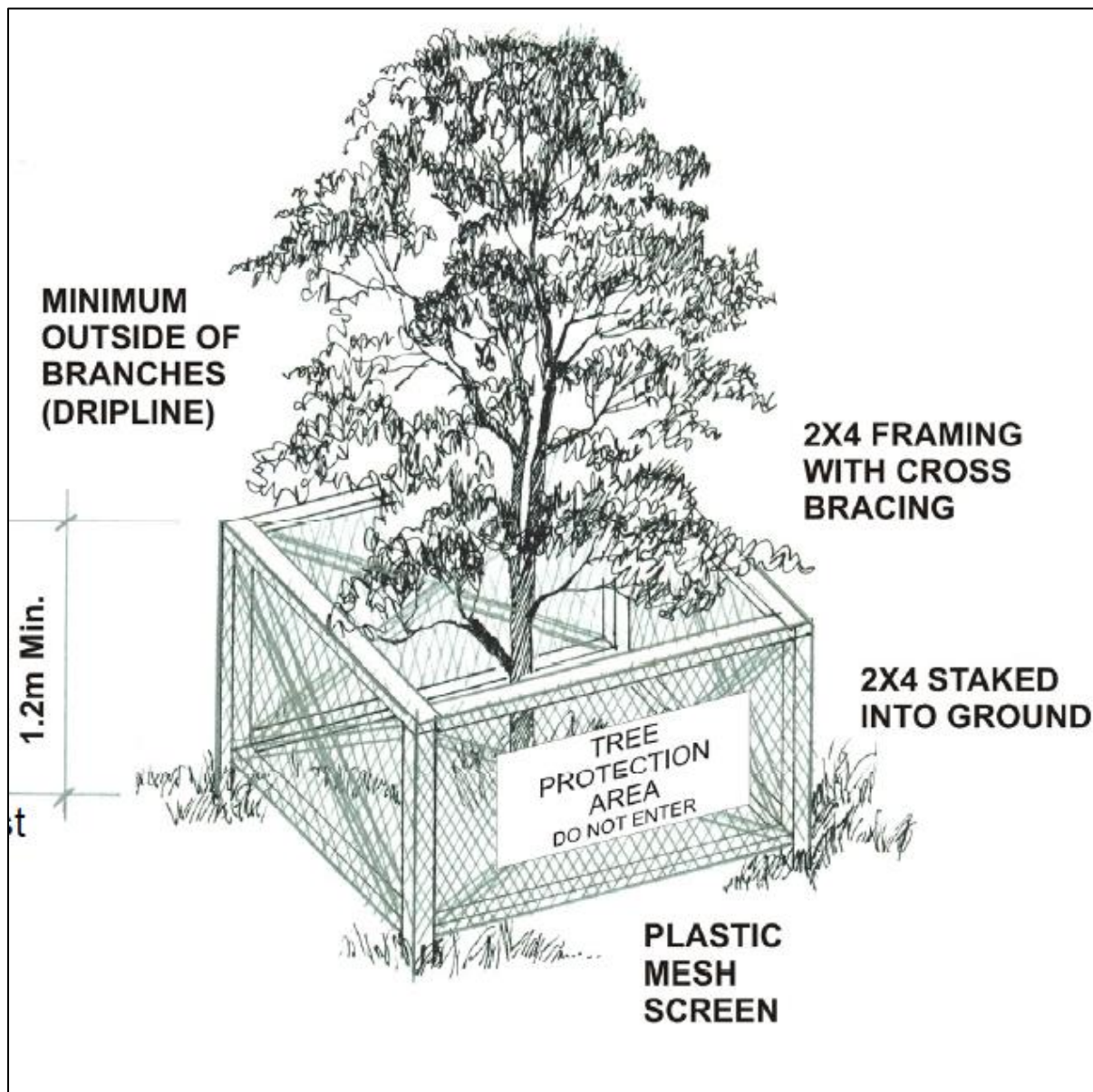
Figure 7: Trees on the south side of the site.

## Appendix IV – Tree Protection

**Tree Protection Distance Table**

\*Minimum Protection Required Around Tree

Tree Trunk Diameter			Distance from Trunk		Total Diameter	
cm	inches	feet	m	feet	m	feet
20	8	0.6	1.2	3.9	2.60	8.5
25	10	0.8	1.5	4.9	3.25	10.7
30	12	1.0	1.8	5.9	3.90	12.8
35	14	1.2	2.1	6.9	4.55	14.9
40	16	1.3	2.4	7.9	5.20	17.1
45	18	1.5	2.7	8.9	5.85	19.2
50	20	1.7	3.0	9.8	6.50	21.3
55	22	1.8	3.3	10.8	7.15	23.5
60	24	2.0	3.6	11.8	7.80	29.6
75	30	2.5	4.5	14.8	9.75	32.0
90	36	3.0	5.0	16.4	10.90	35.8
100	40	3.3	6.0	19.7	13.00	42.7



---

## **Appendix V - Assumptions and Limiting Conditions**

Any legal description provided to the consultant is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is evaluated as though free and clear, under responsible ownership and competent management.

Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

The consultant shall not be required to give testimony or 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.

Loss or alteration of any part of this report invalidates the entire report.

Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the persons to whom it is addressed, without the prior expressed written or verbal consent of the consultant.

This report, or any copy thereof, shall not be conveyed, in whole or in part, by anyone, including the client, to the public via any media type or outlet, without the prior expressed consent of the consultant specifically as to value conclusions, identity of the consultant, or any reference to any professional society or institute or to any initialed designation conferred upon the consultant as stated in his qualification.

This report and values expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

Illustrations, 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.

Information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plans or property in question may not arise in the future.

---

## Appendix VI - Certificate of Performance

I, Adela Parlesak, certify that:

I have no current or prospective interest in the trees on the property, and have no personal interest or bias with respect to the parties involved;

The analysis, opinions and conclusions stated herein are my own and are based on current scientific procedures and facts;

My analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices;

No one provided significant professional assistance to me, except as indicated within this report;

My compensation is not contingent upon the reporting of a predetermined conclusion that factors the cause of the client or any other party, nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am an International Society of Arboriculture (ISA) Certified Arborist #PN-8202AT and am tree risk assessment qualified. I am a member in good standing of the ISA. I have been involved in the field of Arboriculture in a fulltime capacity for a period of 7 years.

Signed:



Date: May 17, 2021