



Crystal Pool and Wellness Centre - Preliminary Arborist Report

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City of Victoria Parks
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Executive Summary

Four versions of the proposed layout for the Crystal Pool and Wellness Centre were reviewed in this report. It has been determined that Version B +6.5 could allow for the greatest number of trees to be preserved on all sides of the site. However, there are mitigation measures that would be required in order to retain trees and determine whether others can or cannot be preserved. These associated costs must be taken into account during the planning phase. The location of site trees are shown in Figure 1.

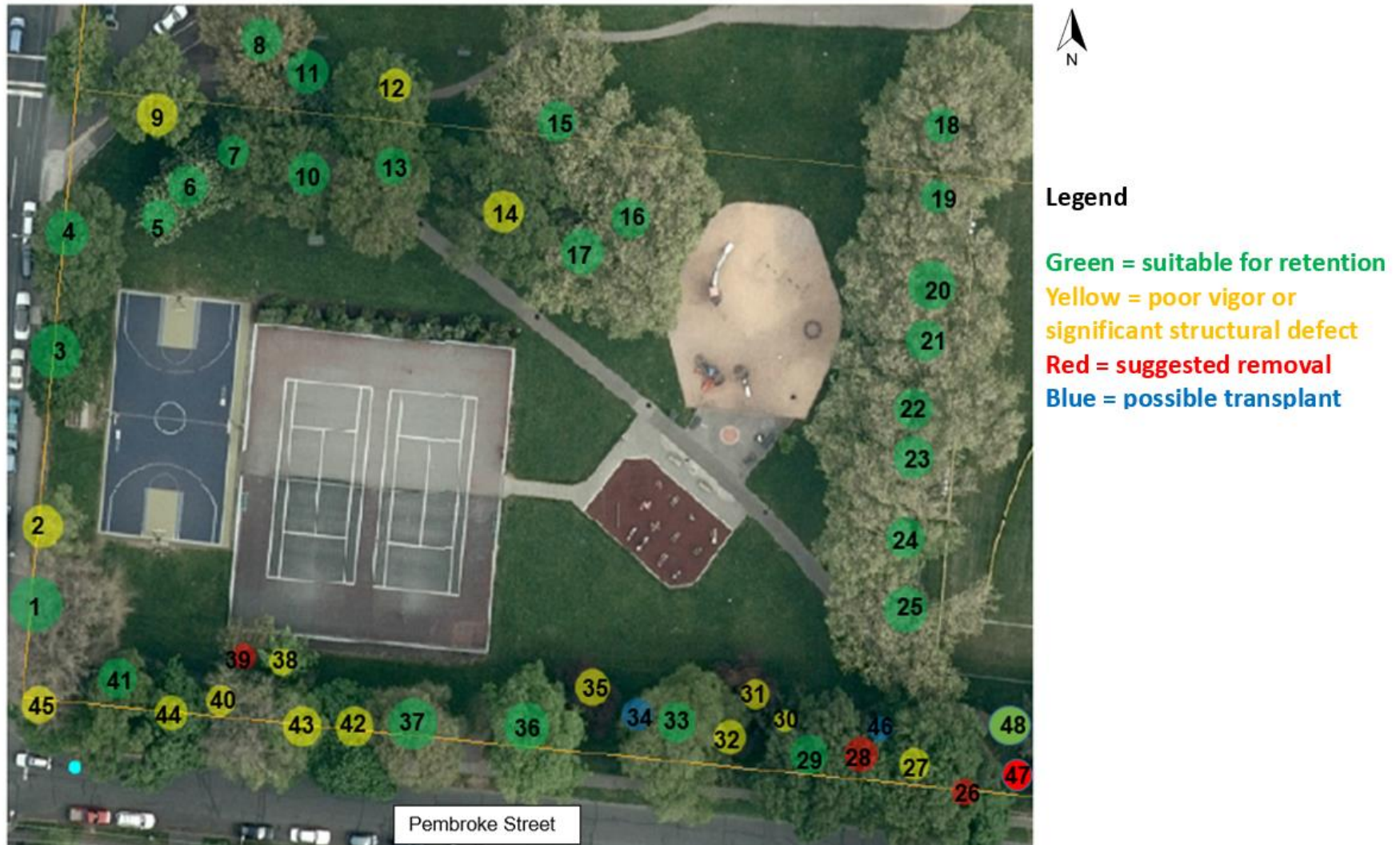


Figure 1. Location and retention potential of trees at the proposed site of the new facility

Introduction

The assignment was to conduct potential tree impact assessments for the proposed location of the new Crystal Pool & Fitness Centre in Central Park. The information provided below is based on the amended *Preliminary Tree Resource Assessment – Crystal Pool Facility Proposed Location* report issued on May 24, 2017. Two proposed building footprints were reviewed, Version A and Version B. Approximate building heights, overhangs and preliminary servicing discussions were taken into consideration. In addition, it was determined that a 6.5m northern shift of the building footprint would allow for retention of trees on the Pembroke frontage. As a result, two additional versions were examined in this report - Version A +6.5 and Version B +6.5 - to evaluate the possible retention of the largest and healthiest trees along the Pembroke frontage.

Methodology

Tree resource parameters such as species and diameter at breast height (DBH) and tree health collected for the preliminary report were used to evaluate potential impacts. Proposed building footprints were marked in the field and building heights assessed with respect to tree canopies. Potential impacts were based on 3m of over excavation. Three categories were used to summarize the potential impacts to the tree resource:

- retain – could be retained during and following construction (GREEN)
- remove- roots and/or canopy would be too severely impacted to retain (RED)
- mitigation – retention depends on construction and excavation methods such as alternative excavation, shoring or the use of floating pavers. In some cases, exploratory excavation is required to trace the roots and determine the true impacts for retention prior to construction activities. (YELLOW)
- transplant – could be successfully relocated (BLUE)

There are four delineated zones on the site: Pembroke frontage; North side; East side and Quadra frontage. Potential impacts to trees in each zone are discussed for Version A, Version B, Version A +6.5 and Version B +6.5.

Tree Resource

There were 46 trees identified in the proposed location in the *Preliminary Tree Resource Assessment – Crystal Pool Facility Proposed Location* report. The addition of the loading area in the southeast corner, along the Pembroke frontage, has potential impacts to 2 additional trees that were not included in the report. These have been added to the tree resource inventory for a total of 48 trees potentially affected by the proposed project; tree #47 is a 29cm DBH purple leaf plum and tree #48 is an 80cm DBH pine. The row of London plane trees adjacent to the baseball field will require extensive pruning and several large limbs will likely have to be removed. Pruning of trees #23, #24 and #25 would be more substantial in Version B which is longer and extends into this area. The remaining trees in the alignment are subject to the same pruning requirements for both versions. Table 1 below shows a brief summary of anticipated pruning impacts to the row of London plane trees:

Table 1. Anticipated Pruning of the London Plane Trees

Tree #	Version A	Version B
18	Minor pruning	Minor pruning
19	Minor pruning	Minor pruning
20	~20cm limb removal and minor pruning	~20cm limb removal and minor pruning
21	~25cm limb removal and reduction	~25cm limb removal and reduction
22	Extensive reduction	Extensive reduction
23	~40cm limb removal and reduction	~40cm limb removal and extensive reduction
24	~25cm limb removal and reduction	~25cm limb removal and extensive pruning
25	Minor pruning	3 X ~20cm limbs to be removed and reduction

Two trees on the Pembroke frontage can be transplanted to another location, but neither version will allow for the retention of any trees on this frontage. Moreover, it is recommended that tree #2 be removed in both versions to facilitate servicing connections to Quadra. This would provide more space to preserve tree #1 and tree #3 which are healthier than tree #2.

It was determined that an additional 6.5m would be required to preserve large, healthy trees on the Pembroke frontage. The existing berm would need to be preserved and retention of trees would also depend on existing soil conditions and potential blasting requirements. This could allow for the retention of four large elms and potentially 2 more with appropriate mitigation measures. Trees #29, #33, #36 and #37 would require pruning and the most extensive work would remove as much as 25% of the canopy of tree #33. If the loading area was reconfigured, this could allow for the retention of tree #27. An aerial assessment is recommended to determine whether tree #41 is suitable for retention. A vertical cut would be required to the full depth of the excavation and some form of shoring would need to be used in order to preserve these trees. If shotcrete shoring is considered, the soil and tree roots would need to be protected with geotextile fabric.

Many of the smaller trees on the Pembroke frontage have structural or health issues that make them poor candidates for long-term retention. However, the smaller trees could be temporarily retained as screening during construction and removed in phases throughout the course of the project. Furthermore, immediate planting of new trees on the North side of the proposed site is an option to compensate for canopy loss and provide a few years of growth before construction is complete. This option could be applied in all scenarios.

Discussion

Version A

This version will ultimately have more of an impact on the North side of the proposed site. Trees #5, #6, #14, #16 and #17 will need to be removed and trees #9, #10 and #13 will require further assessment. Exploratory excavation is recommended for tree #10 and tree #13 to determine the impacts to roots. Advanced risk assessment is recommended for tree #9 which has a deep cavity at the base. Elms are located on the Quadra frontage and this species can have an extensive root system, so exploratory excavation is recommended for tree #3 and tree #4 to determine the potential impacts to the root systems. This will ultimately determine whether alternative construction measures are required when working around these trees. Tree #1 could arguably be a centerpiece tree located at the front entrance. Careful examination of root architecture and mitigation

measures will be required such as the use of floating pavers when working around this tree. In addition, risk assessment including an aerial inspection is strongly recommended for tree #1 to evaluate any defects that may not be seen from the ground. Tree assessments with respect to retention/removal are summarized in Appendix B, Version A.

Version B

This version is longer with less of a western setback and will further encroach on the critical root zones of trees #1, #3 and #4 along the Quadra frontage. As in Version A, exploratory excavation is recommended for these trees. The use of alternative excavation will likely be required and extensive pruning of tree 1 will be necessary to provide clearance for the building and work zone. On the North side of the site, trees #5, #14, #16 and #17 will potentially need to be removed. Risk assessment of tree #9 is recommended as in Version A. The main difference between this version and Version A along the North side, is the retention of tree #6 and exploratory work is not required. Figure 2 and 3 show the approximate location of the building footprint on the northern side of the site illustrated by the yellow measuring tape. Tree assessments with respect to retention/removal are summarized in Appendix B, Version B.



Figure 2. Version A – proposed northern building footprint



Figure 3. Version B – proposed northern building footprint

Version A +6.5

This option would reduce the impacts to tree #1 and shift the main entrance towards the opening between tree #1 and tree #3. Potential impacts to the row of London plane trees would be the same as in Version A. The following trees would need to be removed along the North side of the proposed site: #5, #6, #10, #13, #14, #16 and #17. Short term retention might be possible for tree #7. Tree #12 would require extensive mitigation measures such as exploratory digging to determine whether it can be retained. Trees that could potentially be retained are #8, #11 and #15 (removal a 35cm limb would be required). Tree assessments with respect to retention/removal are summarized in Appendix B, Version A +6.5.

Version B +6.5

This option would also reduce impacts to tree #1 and pruning requirements would likely be lessened. Although there would be further encroachment on trees #23, #24, and #25 in the row of London planes on the east side of the proposed site, the difference in pruning requirements from Version B would be negligible due to available growth points for reduction. Along the North side of the site, trees #5, #6, #14, #16 and #17 would need to be removed. Trees #10 and #13 would require exploratory work to determine retention potential. A vertical cut and shoring would likely be necessary for trees 10 and 13 if these trees are to be preserved. Pruning clearance would require the removal of 2-3 ~30cm limbs. Trees #7, #8, #11, #12 and #15 could likely be retained. Tree assessments with respect to retention/removal are summarized in Appendix B, Version B +6.5.

Mitigation/Recommendations

Once the building design and site servicing plan are available for review, exploratory digging is recommended to determine the exact location of tree roots with respect to the building footprint so that the anticipated impact to tree health and stability can be evaluated. It should be known upfront, before construction, which trees can be retained and which ones cannot so this information can be conveyed to City Council and to the public.

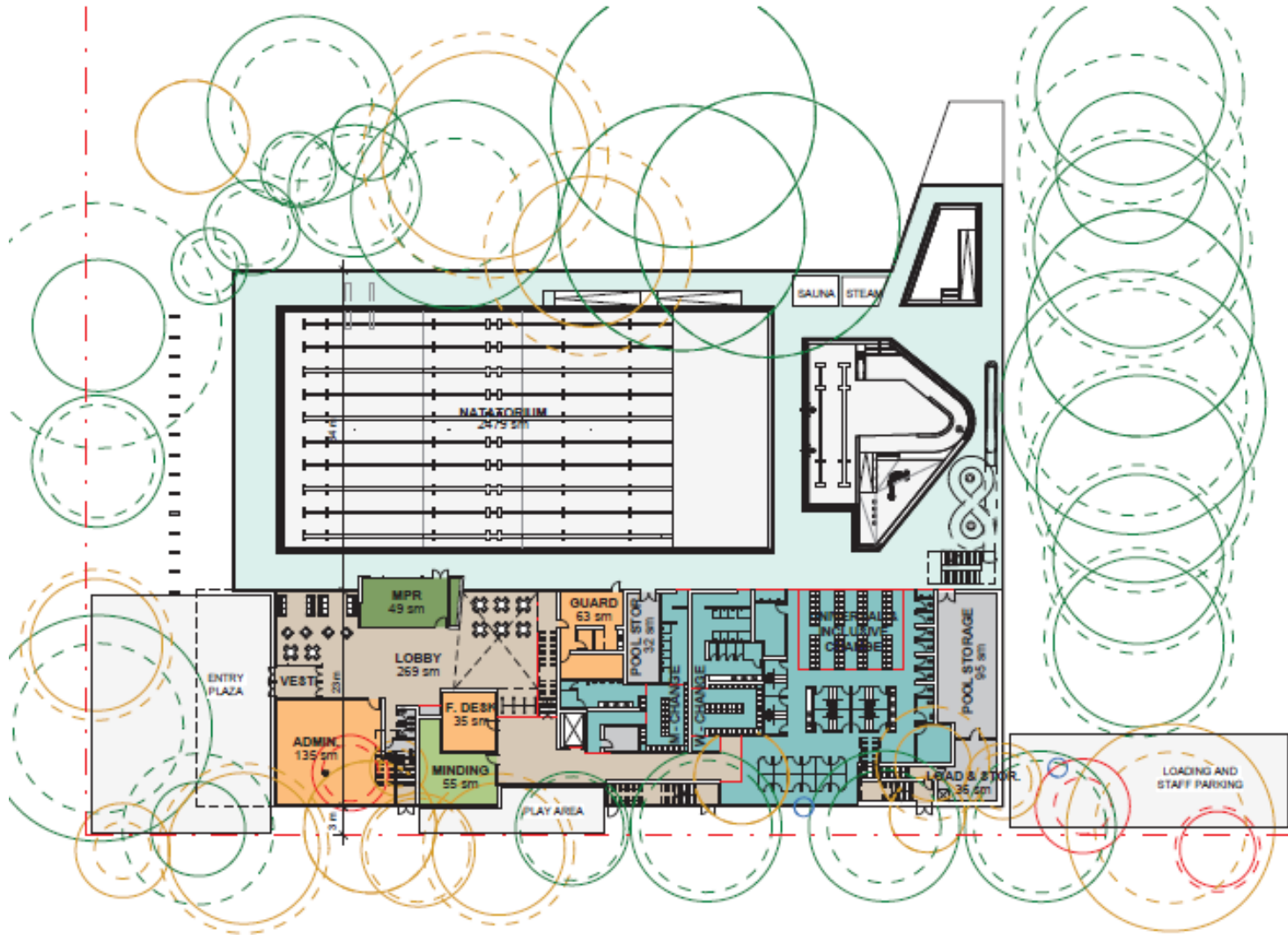
Retention of existing infrastructure can also help to reduce potential impacts to trees. For example, reusing the existing parking lot and sections of the existing walkway will lessen the extent of damage to roots.

Successful tree retention will depend on the extent of required pruning and disturbance that takes place within the critical root zone of trees, the minimum area containing roots required to support tree health and stability. Careful consideration in the design process should be given to the following:

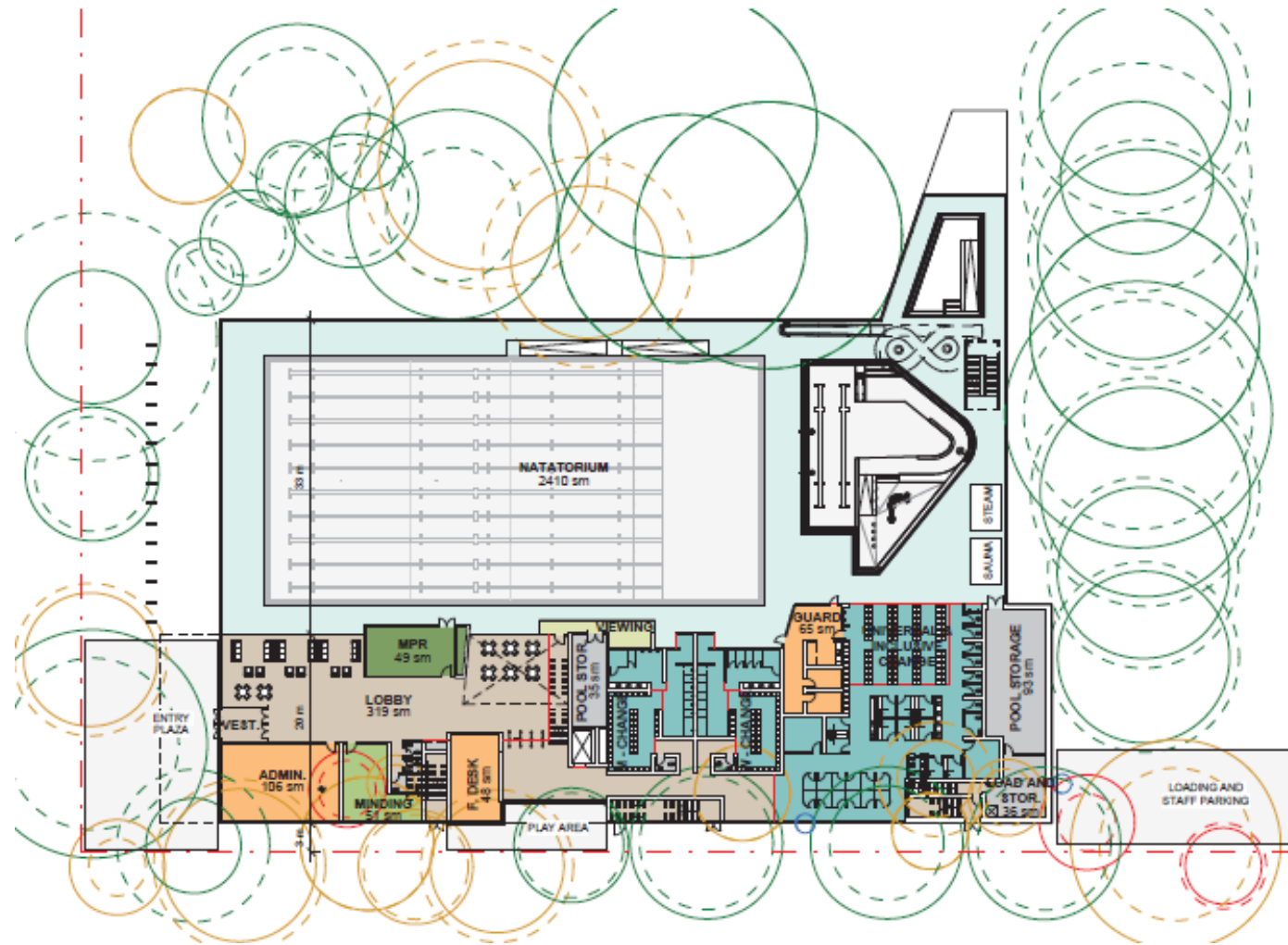
- changes in site hydrology
- grade changes in critical root zones
- use of shoring when working in critical root zones
- addition of impermeable surfaces with respect to root zones
- any blasting that may be required close to trees
- over excavation/cut slope in critical root zones
- building projections (ex. roof line, balcony, staircase) with respect to tree canopies

- landscaping/irrigation installation within critical root zones
- site access during construction with respect to critical root zones and tree canopies
- materials storage areas with respect to critical root zones
- site servicing (above and below ground)
- pre-construction pruning requirements
- location of the outflow ducts of the pool ventilation system with respect to tree canopies
- placement of potential solar panels with respect to tree canopies
- tree protection fencing requirements
- maintenance requirements of trees during construction (ex. watering, mulching)
- regular site inspections and reporting by the Project Arborist during construction

Version A – Level 1



Version B – Level 1



Appendix B

Version A - Summary of tree resource by Zone

Quadra frontage			North side			East side			Pembroke frontage			Pembroke frontage		
Tag #	Species	DBH	Tag #	Species	DBH	Tag #	Species	DBH	Tag #	Species	DBH	Tag #	Species	DBH
1	American elm	96	5	Horsechestnut	33	18	London plane	89	26	Big Leaf maple	39	39	Sycamore maple	33
2	Field elm	86	6	Horsechestnut	43	19	London plane	58	27	Field elm	86	40	American elm	78
3	Field elm	72	7	Horsechestnut	37	20	London plane	86	28	Black oak	31	41	American elm	90
4	American elm	113	8	Field elm	81	21	London plane	110	29	Field elm	79	42	Big Leaf maple	63
			9	Field elm	63	22	London plane	100	30	Black walnut	25	43	Big Leaf maple	46
			10	Field elm	64	23	London plane	79	31	Purple leaf plum	48	44	Big Leaf maple	76
			11	Horsechestnut	40	24	London plane	69	32	Black walnut	33	45	Sycamore maple	34
			12	Garry oak	108	25	London plane	68	33	Field elm	66	46	Florida dogwood	4
			13	Field elm	74				34	Florida dogwood	5	47	Purple leaf plum	29
			14	Garry oak	92				35	Purple leaf plum	41	48	Pine spp.	80
			15	London plane	90				36	Field elm	77			
			16	London plane	106				37	Field elm	61			
			17	London plane	73				38	Sycamore maple	25			

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- mitigation – retention depends on construction and excavation methods such as alternative excavation or the use of floating pavers. In some cases, exploratory excavation is required to trace the roots and determine the true impacts for retention prior to construction activities. (YELLOW)
- transplant – could be successfully relocated (BLUE)

Version B - Summary of tree resource by Zone

Quadra frontage			North side			East side			Pembroke frontage			Pembroke frontage		
Tag #	Species	DBH	Tag #	Species	DBH	Tag #	Species	DBH	Tag #	Species	DBH	Tag #	Species	DBH
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Version A +6.5 - Summary of tree resource by Zone

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