

MMM Group Limited



Tree Conservation Report

Costco Kanata
Gas Bar Expansion

COMMUNITIES
TRANSPORTATION
BUILDINGS
INFRASTRUCTURE



February 14, 2012

Tree Conservation Report

**Costco Kanata
Gas Bar**

Prepared for:

Costco Wholesale Canada Limited

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Introduction

This report has been prepared taking into consideration Costco Wholesale Canada Limited's plan to construct a Gas Bar at the northwestern portion of the Kanata Warehouse site. This report is an inventory of the trees within the limits of the site and a visual assessment of any trees within 6.0m of the property. Recommendations have been provided for tree protection and tree removals based on the limits of grading and construction.

This report is to be read in conjunction with:

- Tree Inventory and Preservation Chart (Table 1)
- Tree Inventory Plan (TI-1)
- Tree Preservation Plans (TP-1 & TP-2)

General Overview

The subject lands are designated as Employment Area in the Official Plan and zoned IL6 (305 light industrial zone, Subzone 6, Exception 305). A $\pm 11,500\text{m}^2$ warehouse building occupies a portion of the 5.66ha site. The owner is Costco Wholesale Canada Limited located at 415 West Hunt Club Road, Ottawa, ON, K2E 1C5. The majority of the site is parking stalls and parking islands. At the northwest portion of the site is a storm pond that has been vegetated with herbaceous plant material. A tree grouping approximately 1312m^2 in area consisting of young to medium aged trees is located treed between Costco's property line and the Highway 417 off ramp. To the east is Highway 417, to the south is vacant land and to the west is Silver Seven Road. The terrain is generally flat within property lines. Along the eastern property line there is a 3:1 slope as the off-ramp is at a higher elevation than the Costco property.

Costco Wholesale proposes to construct a Gas Bar within the Kanata Warehouse property. This will involve the removal of existing asphalt, bases and curbs and the installation of services, storage tanks, bases, paving and re-grading.

The majority of vegetation observed on site was found to be a mixture of hardwood (deciduous) and softwood (coniferous) species within a range of 3-13cm DBH for deciduous trees and 2.5 to 4m in height for coniferous trees. Most trees and shrubs found in parking islands and along property lines appear to have been planted when the site was developed approximately 5-10 years ago. Tree species consist of White Ash (*Fraxinus americana*), Austrian Pine (*Pinus nigra*), White Spruce (*Picea glauca*), Colorado Blue Spruce (*Picea pungens* 'Glauca'), Honeylocust (*Gleditsia triacanthos*), Scots Pine (*Pinus sylvestris*) and Freeman Maple (*Acer x freemanii*).

The vegetation within the 1313m^2 treed area is predominantly deciduous between 5-45cm DBH. The treed area is likely the remnant of a forest that once existed before development occurred. The property line cuts through the treed area, the deepest point being 8.5m. The spacing of trees was found to be 5-6m for trees above 10cm DBH, and 1-3m for trees below 10cm DBH. The highest concentration of trees is within the northeastern portion of the treed area. There is an abundance of European White Poplar (*Populus alba*), with frequent occurrences of Bur Oak (*Quercus macrocarpa*) and Sugar Maple (*Acer saccharum*). To a lesser extent there is American Elm (*Ulmus Americana*), Basswood (*Tilia Americana*), White Ash (*Fraxinus Americana*) and Manitoba Maple (*Acer negundo*).

Field Observations

The field observations were conducted on December 1st, 2011 at the Costco Kanata Warehouse site at 770 Silver Seven Road, in the regional municipality of the City of Ottawa. The trees have been assessed for their species, diameter at breast height (DBH), dripline radius and general health condition. The preservation recommendations have been provided for each tree based on the potential impacts to the trees in relation to the proposed gas bar. A total of 57 individual trees and one tree grouping assessed for this report.

Definitions

The following are the definitions of the assessment categories utilized in our tree assessment:

Tree Number	this number refers to the number on the reference plan.
Species	the botanical and common names are provided for each tree.
DBH —	this refers to diameter (in centimetres) at breast height and is measured at 1.3 m above the ground for each tree.
Trunk Integrity (T.I.)	this is an assessment of the trunk for any defects or weaknesses. It is measured on a scale of poor, fair, good.
Canopy Structure (C.S)	this is an assessment of the scaffold branches, unions and the canopy of the tree. This is measured on a scale of poor, fair, good.
Canopy Vigour (C.V.)	this is an assessment of the health of the tree and assesses the amount of deadwood and live growth in the crown as compared to a 100% healthy tree. The size, colour and amount of foliage are also considered in this category. This is measured on a scale of poor, fair, good.

Condition Assessments (G,F,P):

GOOD -	tree displays less than 15% deficiency/defect within the given tree assessment criteria (TI, CS, CV).
FAIR -	tree displays 15%-40% deficiency/defect within the given tree assessment criteria (TI, CS, CV).
POOR -	tree displays greater than 40% deficiency/defect within the given tree assessment criteria (TI, CS, CV).
Tree Protection Zone -	this refers to the preservation area of the tree to be protected with tree protection measures. No construction activities are to be undertaken within this zone.
Critical Root Zone -	established as being 10 centimetres from the trunk of a tree for every centimetre of trunk diameter. The trunk diameter is measured at a height of 1.2m for trees of 15cm diameter and

greater and at a height of 0.3m for trees less than 15cm in diameter (Per City of Ottawa Tree Protection Guidelines)

Method of Evaluation

The following are the general methods of vegetation evaluation that were used as part of this tree inventory.

Assessment:

- Vegetation is assessed based on a visual inspection of the trunk and branch condition, structure, foliage condition, and evidence of abiotic (environmental, mechanical and physical damage) and biotic (insects and disease) stressors.
- Trunk Integrity: Assessment of the trunk for any defects
- Canopy Structure: Assessment of the scaffold branches and canopy of the tree
- Canopy Vigor: Assessment of the amount of deadwood versus live growth in the tree crown, also consider size, colour and amount of foliage.
- As tree health is best judged in late summer when tree stress is reflected by foliage condition, the condition of deciduous trees was not able to be accurately determined. Since the inventory was conducted in winter during the dormant season, vegetation was assessed based on stability, structure, branch attachment, deadwood, and trunk defects. Evaluations were given based on the above attributes.

Recommendations:

- Recommendations are a declaration of future action to be taken upon assessment of the current state of the plant and future context within which it will be located.
- Vegetation recommended to be 'Retained' are deemed to be minimally affected by development and/ or outside of the limits of construction. This designation may also be applied to trees that are in excellent, good or fair conditions and species at risk.
- Vegetation recommended to be 'Removed' are deemed to be within development/construction limits and would not be able to withstand construction related activities or changes to grading. This designation also may be applied to trees that are dead, in poor condition or trees that could pose future safety concerns.
- Vegetation recommended to be 'Transplanted' are deemed to be within development/construction limits, in 'good' condition and typically under 30cm caliper. Transplantation of trees is dependant on available space on site.

Municipal By-laws / Permits:

Urban Tree Conservation By-law No. 2009-200

The City of Kanata is within the Regional Municipality of Ottawa therefore the City of Ottawa's by-laws apply to this site. The City's Urban Tree Conservation By-law applies to the removal of trees 10cm DBH and above.

Based on the definition the site work area would be subject to this by-law. Prior to commencing tree clearing work a permit will be required from the City.

Vegetation Summary and Recommendations:

At the time this report was prepared, a site plan showing the proposed development was made available to the Arborist. Determinations were made with respect to tree survival based on their proximity to the proposed development.

North Property Line

There is an approximate 3:1 slope between the Highway 417 off ramp and the Costco parking lot. There are 31 trees along the slope consisting primarily of coniferous trees (T-1 to T-31). Species consist of White Ash, Austrian Pine, Colorado Blue Spruce, White Spruce, Scots Pine and Honeylocust ranging in size between 3-12cm DBH for deciduous tree and 2.5 to 3.65m in height for coniferous trees. The trunk integrity on the majority of trees was found to be good as trunks were straight and no signs or symptoms of damage or decay. The canopy structure and vigour was in general in good condition. Thirteen trees showed signs of dieback ranging between 10-15% and one tree at 40%. Most of the dieback faced northwest and likely is due to wind exposure and salt spray from the highway.

The construction of the curb and drive aisle will have a minimal to no impact on trees therefore all trees can be retained. Due to the proximity of construction it is recommended that the trees be protected with tree protection fencing placed at the Critical Root Zone. See Tree Preservation and Removal Chart on plan TP-1 for minimum tree protection fence placement distances. All trees found in this area are in good condition and appear to be thriving in the ample growing space that is available. The retention of these trees will ensure that the visual and wind screen that they provide will be enhanced as the trees mature. Between trees 19 and 20 the soil has been compacted by vehicles. It is recommended that the soil within the tire tracks be scarified to 150mm depth. Re-install topsoil (150mm depth) and sod during landscape operations.

Tree grouping

A tree grouping approximately 1312m² exists at the northwest portion of the site adjacent to the Highway 417 east off ramp, Silver Seven Road and an existing Storm Water Management Pond. The grouping is predominantly deciduous with an abundance of European White Poplar, with frequent occurrences of Bur Oak and Sugar Maple. To a lesser extent there is American Elm, Basswood, Manitoba Maple and White Ash (G-1). Sizes of vegetation ranges between 5-45cm DBH and spacing of trees was found to be 5-6m for trees above 10cm DBH, and 1-3m for trees below 10cm DBH. The trunk integrity in general was good as a majority of the trunks were straight with minimal signs of damage or decay. Trunk defects found on several Manitoba Maple, Bur Oak and American Elm included co-dominant stems, weak unions, lean, epicormic growth at base and crooked stems. The canopy structure was found to be generally in good condition. Defects such as broken branches and deadwood up to 40% were found primarily on Manitoba Maple.

The construction of a new concrete curb and drive aisle will impact into approximately ±130m² of the grouping. The existing edge is comprised of young trees predominantly poplar saplings. Construction activities will result in the removal of 20 trees over 10cm DBH and 29 trees under 10cm DBH. The 20 trees over 10cm DBH are regulated by the City's Urban Tree Conservation By-law and will require a permit for removal. The 29 trees below 10cm DBH are exempt from the by-law and therefore do not require a permit for removal. Place tree protection fencing 1.75m from the property line or 1m from the proposed curb. This will not only allow for sufficient space for the construction of the curb but also minimize the loss and potential damage to trees.

in the grouping. The preservation of the remaining trees will ensure that the buffer between the site and highway is maintained and will aid in reducing the urban heat island effect by shading asphalt.

As a new edge will be created and potentially exposing trees to damage from the sun and wind it is recommended that a layer of trees be planted along the new edge where possible to minimize the effects of sunscald, exposure and desiccation from winter winds. Once removals have been completed it is recommended that the new edge be inspected to determine the extent of damage to existing trees that were retained and if necessary and additional removals that may be required as well as recommendations for remediation and monitoring.

Stormwater Management Pond

An existing Stormwater management Pond enclosed with a chainlink fence is located northwest of the loading dock. The area of the pond is approximately 3010m². Vegetation within the fence is predominantly herbaceous with a minimal amount of shrubs and poplar saplings. There are 26 trees along the perimeter of the fence and within landscape open spaces consisting of Colorado Blue Spruce, Honeylocust, White Spruce, Freeman Maple, Scots Pine, White Ash and Ornamental Pear (T-31 to T-57). Trees range in size between 5-13cm DBH (Deciduous) and 1-4m in height (Coniferous). The trunk integrity on a majority of trees was found to be in good condition with straight trunks a no defects. The canopy structure and vigour ranged between fair and good with signs and symptoms of witches broom, canker growth on Scots Pine (*crumenulopsis sororia*), broken branches and 10-20% deadwood.

There are 8 trees outside of the limit of construction that can be retained as there will be no impacts from construction activities (T-32 to T-34 & T-41 to T-45). These trees are in good condition and provide aesthetic value to the site. It is recommended that 6 trees within proximity to construction be retained and protected as the impacts will be minimal to nil (T-35 to T-40). These trees are in good condition and provide aesthetic value as well as shading of asphalt reducing the urban heat island effect. One Honeylocust (T-38) is within the municipal right of way; however it will be retained and protected. Place tree protection fencing at the Critical Root Zone. See Tree Preservation and Removal Chart on plan TP-1 for minimum tree protection fence placement distances. Within the limits of the proposed gas bar, excavation for underground storage and installation of a storm sewer there are 12 trees (T-46 to T-57) that will not survive demolition and construction activities and therefore have been recommended to be removed. Seven trees over 10cm DBH will require a permit for removal. Five trees fewer than 10cm DBH is exempt from the by-law and will not require a permit for removal. This loss of habitat created by the storm pond is unlikely to be replaced.

The existing stormwater management pond will be demolished in order for the gas bar to be constructed. The herbaceous plant material, shrubs and saplings will be removed during this process; however all the vegetation is below 10cm DBH and therefore is exempt from the City's Urban Tree Conservation By-law and will not require a permit for removal.

Compensation

The development of the new gas bar will impact vegetation within the tree grouping, within the storm pond and along the boundary of the storm pond. There will be 27 trees above 10cm DBH removed to facilitate the construction of the gas bar. Tree planting is recommended where possible within the limits of construction or within available space on site to mitigate the overall loss of vegetation throughout the site. On the Landscape Plan (L-1) 26 trees and 350 shrubs have been proposed. Eleven trees have been proposed along the new edge of the treed area. A

majority of the large landscape island has been vegetated with proposed trees, shrubs and grasses.

Tree species recommended to be planted within restoration and landscape open space areas are to be native, urban tolerant and similar species that exist on site:

- Bur Oak (*Quercus macrocarpa*)
- Basswood (*Tilia Americana*)
- American Elm (*Ulmus Americana*)
- White Spruce (*Picea glauca*)

Note: No single species should exceed 30% of the total restoration planting total.

Preservation and Protection Recommendations

The survival rates for trees, which are in proximity to construction, are dependent on the resultant changes to a variety of environmental and anthropogenic factors. These construction activities bring about changes to a variety of environmental features including the existing microclimate including winds, temperature, soil moisture, amount of available sunlight, soil quality, and the level of the water table. Increased human activities may also damage the structure and/or physiological activities of the trees. The full effects of the damage may not appear until several years after its occurrence. Thus, it is essential that both vegetative clearing and preservation methods follow the guidelines below and those generally accepted as keeping with good horticultural and construction practices. The guidelines are subject to adjustments deemed reasonable and appropriate considering the proximity and number of trees involved and the site-specific servicing requirements

General Recommendations

The following is a list of practical considerations for the construction phase of the project that applies to all trees that may be impacted by the construction.

- Prior to the commencement of tree removals, all limits of the locations of the tree preservation fencing must be clearly staked in the field and approved by MMM Group Limited. All trees within the tree preservation zone must be left standing. The tree removals must be coordinated to be completed outside of the nesting season, May 1 to August 8.
- All removals must be felled into the work area to ensure that damage does not occur to the trees within the tree preservation zone.
- Upon completion of the tree removals, all felled trees are to be removed from the site, and all brush chipped. All brush, roots and wood debris must be shredded into pieces that are smaller than 25 mm in size to ensure that any insect pests that could be present within the wood are destroyed. This work must be completed outside of the nesting season, May 1 to August 8.
- Tree protection fencing must be constructed and installed as per the details on the approved Tree Preservation Plan (TP-2). Upon installation of the fencing, the contractor will contact the consulting arborist to review and approve the fencing and its location prior to commencement of any grading work.

- Areas within the tree preservation zone are not to be used for any type of storage (e.g. storage of debris, construction material, surplus soils, and construction equipment). No trenching or tunnelling for underground services shall be located within the tree protection zone or dripline of trees designated for preservation within or adjacent to the construction zone.
- No grade changes shall occur within tree preservation zone unless approved as part of this report. In the event that any grade changes may occur, either as a cut or fill situation, the consulting arborist must be notified prior to such work occurring to ensure that all precautions to preserve the tree can be made.
- Trees shall not have any rigging cables or hardware of any sort attached or wrapped around them, nor shall any contaminants be dumped within the protective areas. Further, no contaminants shall be dumped or flushed where they may come into contact with the feeder roots of the trees.
- In the event that it is necessary to remove additional limbs or portions of trees, after construction has commenced, to accommodate construction, the consulting arborist is to be informed and under their direction the removal is to be executed carefully and in full accordance with arboricultural techniques, by a certified arborist.

Pruning Practices:

- All limbs damaged or broken during the course of construction should be pruned cleanly, utilising by-pass secateurs in accordance with approved horticultural practices. Should there be a potential risk of transfer of disease from infected to non-infected trees; tools must be disinfected after pruning each tree by dipping in methyl hydrate. This practice is particularly important during periods of tree stress and when pruning many members of the same genera, within which a disease could be spread quickly (i.e., Verticillium Wilt on Maples or Fireblight on genera of the Rosacea family).
- During excavation operations in which the root area is affected, the contractor is to prune all exposed roots cleanly. Pruned root ends are to be neatly and squarely trimmed and the area is to be backfilled with clean native fill as soon as possible to prevent desiccation and promote root growth. The exposed roots should not be allowed to dry out, and the contractor shall discuss watering of the roots with the consulting arborist so that the roots shall maintain optimum soil moisture during construction and backfilling operations, yet so not to interfere with construction operations. Backfilling must be with clean uncontaminated topsoil from an approved source. Texture must be coarser than existing soils, and to come into clean contact with existing soils (remove air pockets, sod, etc.)
- All pruning cuts should be made to a growing point such as a bud, twig or branch, cut just outside the branch collar (the swollen area at the base of the branch that sometimes has a bark ridge), and perpendicular to the branch being pruned rather than as close to the trunk as possible. This minimizes the size of the wound. No stubs should be left. Poor cut location, poor cut angle and torn cuts are not acceptable.
- Tree roots should not be excavated within the critical structural rooting area. This is the minimum area of the root system necessary to maintain vitality or stability of

the tree. Typically this area extends to the dripline of the tree. The severing of one root can cause approximately 5-20% loss of the root system. A reduction of this area by greater than 30% can pose stability concerns for the tree.

- Extensive pruning is best completed before plants break dormancy. Pruning should be limited to the removal of no more than one third (1/3) of the total bud and leaf bearing branches. Pruning should include the careful removal of:
 - deadwood,
 - branches that are weak, damaged, diseased and those which will interfere with construction activity,
 - secondary leaders of conifers,
 - trunk and root suckers,
 - trunk waterspouts, and
 - tight V-shaped or weak crotches (included unions).

The Contractor must report immediately any damage to trees such as broken limbs, damage to roots, or wounds to the main trunk or stem systems so that the damage can be assessed immediately.

The tree protection fencing will be maintained until all construction is completed, soils are stabilized and all of the equipment has been removed from the site.

Establishment of Tree Protection Zone (TPZ)

- Tree preservation measures, including the establishment of Tree Protection Zone (TPZ) shall apply to the individual trees denoted for preservation on the Tree Preservation Plans (refer to plans TP-1 to TP-2), as well as all vegetated areas noted for retention.
- Trees located within the project area that are to be preserved will have tree protection fencing installed at the dripline plus 1 metre to establish a tree protection zone. All trees located on adjacent properties shall be preserved unless otherwise stated in this report.
- No grade changes shall occur within tree protection zone. In the advent that grade changes occur either as a cut or fill situation, the consulting arborist must be notified so that precautions to preserve the tree can be determined prior to the placement of fill or excavation activities.
- Every precaution must be taken to prevent damage to trees and root systems from damage, compaction and contamination resulting from the construction to the satisfaction of the consulting arborist.
- Trees that require pruning to permit construction activities have been identified in the Arborist report. In the event that it is necessary to remove additional limbs or portions of trees, after construction has commenced, to accommodate construction, the consulting arborist is to be informed and under their direction the removal is to be executed carefully and in full accordance with arboricultural techniques, by a certified arborist.
- Any damage to trees such as broken limbs, damage to roots, or wounds to the main trunk or stem systems are to be reported to the consulting arborist so that the damage can be assessed immediately and mitigation can be promptly implemented.

Tree Protection Fencing

The Tree Protection Zone (TPZ) shall be established by the installation of tree protection fencing.

Temporary Tree Protection Measures:

- Protection of retained trees will be provided by the installation of temporary protective fencing as per the details provided on the Tree Preservation Plans (refer to plant TP-2); and
- All of the tree protection measures are to be installed and approved prior to commencement of site grading. Periodic inspection and maintenance of the tree protection measures will be required throughout construction.

Construction Implementation

Pre-Construction

- A site meeting will be held with Contractor and Contract Administrator to review the clearing limits and confirm the installation location for the temporary tree protection fence;
- The tree removals must be coordinated to be completed outside of the nesting season; May 1 to August 8, or a visual survey must be undertaken by an ornithologist to ascertain that there are no nests present within the nesting season;
- Tree removal along the tree retention limit must be carefully felled away from the tree retention limit and into the construction / development area. Stumps adjacent to trees identified for retention are to be flush cut and not chipped or grubbed in order to avoid impacts to retained trees; and

Construction

- Periodic inspections will be undertaken by the site supervisor to ensure that the mitigation measures are being maintained during construction;
- The temporary protection fence is to be maintained throughout the entire construction period. No equipment storage, flushing of fuel, washing of construction equipment, and storage of spoil or construction debris is to occur behind the temporary protection fence;
- To avoid root zone impacts on trees to be retained, excavated material will not be stored against the tree protection barrier;
- Where the root system of trees to be preserved are exposed or damaged through construction activities, the cut ends are to be neatly and squarely trimmed back to the limits of disturbance and the area is to be backfilled with clean native fill as soon as possible to prevent desiccation and promote root growth. Proportional selective thinning of the canopy is not recommended as canopy pruning is only recommended in the event that the health of the tree declines.

Post-Construction

- The temporary protection fence will be removed last after all of the construction has ended, soils are stabilized and all of the equipment has been removed.

Conclusion

The majority of the trees on site are in good condition; however construction and grading will require the removal of 27 trees above 10cm DBH. The overall impact to vegetation will not be significant as most trees recommended for removal are immature. The protection of the tree grouping and management of the new edge is important in ensuring the sustainability of the grouping as it provides a wind buffer between the highway and site and natural habitat.

Any trees slated for removal should be done so with care, avoiding and mitigating any negative impacts to adjacent trees to be retained, and in accordance with good arboricultural practices. The majority of vegetation can be retained. Care should be taken to protect trees with tree protection fencing as illustrated on the attached plans. Tree protection fencing shall be erected prior to the start of construction and demolition.

Limitations of Assessment

It is our policy to attach the following clause regarding limitations. We do this to ensure that the client is aware of what is technically and professionally realistic in retaining trees.

The assessment of the trees presented in this report has been made using accepted arboricultural techniques. These include a visual examination of all the above ground parts of the tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of attack by insects, discoloured foliage, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the trees and the surrounding site, and the proximity of property and people. Except where specifically noted, the trees were not cored, probed or climbed and there was no detailed inspection of the root crowns involving excavations.

Notwithstanding the recommendations and conclusions made in this report, it must be recognized that trees are living organisms, and their health and vigour constantly change over time. They are not immune to changes in site conditions or seasonal variations in the weather conditions.

While reasonable efforts have been made to ensure that the subject trees are healthy, no guarantees are offered, or implied, that these trees or any of their parts will remain standing. It is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree or its component parts under all circumstances. Inevitably, a standing tree will always pose some level of risk. Most trees have the potential for failure under adverse weather conditions, and the risk can only be eliminated if the tree is removed.

Although every effort has been made to ensure that this assessment is reasonably accurate, the trees should be re-assessed periodically. The assessment presented in this report is valid at the time of inspection.

MMM GROUP LIMITED

A handwritten signature in black ink, appearing to read "Peter McNamara".

Peter McNamara, BA
Project Technologist | ISA Certified Arborist ON-1140A

Table 1: Tree Inventory & Preservation Chart

Project: Costco Kanata - Gas Bar			Field Work Completed By: Peter McNamara							
Date of Field Work: December 1st, 2011			Weather: Partial cloud 2 degrees						Conditions: Good, Fair, Poor, Dead	
Tree #	Botanical Name	Common Name	No.	DBH (cm)	Height (m)	Condition			Recommendation	Remarks
						Trunk	Canopy	Canopy		
T-1	Fraxinus americana	White Ash	1	12		Good	Good		Retain	Improper pruning. Retain as tree is in good condition and is outside limit of work
T-2	Pinus nigra	Austrian Pine	1		3.5	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-3	Picea pungens 'Glauca'	Colorado Blue Spruce	1		3	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-4	Picea glauca	White Spruce	1		3	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-5	Picea pungens 'Glauca'	Colorado Blue Spruce	1		3	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-6	Picea pungens 'Glauca'	Colorado Blue Spruce	1		3	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-7	Picea pungens 'Glauca'	Colorado Blue Spruce	1		3	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-8	Gleditsia triacanthos	Honeylocust	1	3		Good	Good		Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-9	Gleditsia triacanthos	Honeylocust	1	3		Good	Good		Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-10	Picea glauca	White Spruce	1		2.5	Good	Good	Fair	Retain	Retain as tree provides buffer and is outside of construction activities. Minor dieback (40%) facing north west (off ramp)
T-11	Picea glauca	White Spruce	1		2.5	Good	Good	Good	Retain	Retain as tree provides buffer and is outside of construction activities. Minor dieback (10%) facing north west (off ramp)
T-12	Picea glauca	White Spruce	1		2.5	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work. 15% deadwood
T-13	Picea glauca	White Spruce	1		2.5	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work. 15% deadwood
T-14	Picea glauca	White Spruce	1		2.5	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer & wind screen. 15%
T-15	Picea glauca	White Spruce	1		2.75	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer & wind screen. 15%
T-16	Picea pungens 'Glauca'	Colorado Blue Spruce	1		3.65	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer & wind screen.
T-17	Picea glauca	White Spruce	1		3	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer, 10% deadwood facing northwest (off ramp)
T-18	Picea glauca	White Spruce	1		3.65	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer and windscreen
T-19	Pinus nigra	Austrian Pine	1		3.25	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. Compacted soil between trees 19 & 20 from vehicles
T-20	Picea pungens 'Glauca'	Colorado Blue Spruce	1		3.65	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. Compacted soil between trees 19 & 20 from vehicles

Table 1: Tree Inventory & Preservation Chart

Project: Costco Kanata - Gas Bar			Field Work Completed By: Peter McNamara							
Date of Field Work: December 1st, 2011			Weather: Partial cloud 2 degrees						Conditions: Good, Fair, Poor, Dead	
Tree #	Botanical Name	Common Name	No.	DBH (cm)	Height (m)	Condition			Recommendation	Remarks
						Trunk	Canopy	Vigour		
T-21	Picea pungens 'Glaucia'	Colorado Blue Spruce	1		3.65	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer and windscreen
T-22	Picea pungens 'Glaucia'	Colorado Blue Spruce	1		3.65	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer and windscreen
T-23	Pinus sylvestris	Scots Pine	1		3.65	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 10% dieback facing northwest (off ramp)
T-24	Pinus sylvestris	Scots Pine	1		3	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 10% dieback facing northwest (off ramp)
T-25	Pinus sylvestris	Scots Pine	1		3	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 10% dieback facing northwest (off ramp)
T-26	Pinus sylvestris	Scots Pine	1		3.65	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer and windscreen
T-27	Pinus sylvestris	Scots Pine	1		3	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 15% dieback facing northwest (off ramp)
T-28	Pinus sylvestris	Scots Pine	1		3	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 15% dieback facing northwest (off ramp)
T-29	Pinus sylvestris	Scots Pine	1		4	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 5% dieback facing northwest (off ramp)
T-30	Picea pungens 'Glaucia'	Colorado Blue Spruce	1		4	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 5% dieback facing northwest (off ramp)
T-31	Picea pungens 'Glaucia'	Colorado Blue Spruce	1		4	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer and windscreen
T-32	Gleditsia triacanthos	Honeylocust	1	6		Good	Good		Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-33	Picea glauca	White Spruce	1		3	Good	Good	Good	Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-34	Gleditsia triacanthos	Honeylocust	1	6		Good	Good		Retain	Retain as tree is in good condition, provides buffer & is outside of limit of work
T-35	Acer x freemanii	Freeman Maple	1	11		Good	Fair		Retain & Protect	Within proximity of proposed curb. Witches broom throughout canopy. Provides buffer
T-36	Pinus sylvestris	Scots Pine	1		3	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer. 10% dieback facing northwest (off ramp)
T-37	Pinus sylvestris	Scots Pine	1		3	Good	Good	Good	Retain & Protect	Within proximity of proposed curb. 10% dieback, canker growth on lower twigs (crumenulopsis sororia)
T-38	Gleditsia triacanthos	Honeylocust	1	6		Good	Good		Retain & Protect	Within proximity of proposed curb. In good condition, provides buffer and windscreen
T-39	Pinus sylvestris	Scots Pine	1		3	Good	Fair	Fair	Retain & Protect	Within proximity of proposed curb. Provides buffer, 20% dieback, facing northwest (off ramp)
T-40	Acer x freemanii	Freeman Maple	1	13		Good	Good		Retain & Protect	Within proximity of proposed curb. Provides buffer and windscreen

Table 1: Tree Inventory & Preservation Chart

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						Trunk	Canopy	Vigour		
T-41	Fraxinus americana	White Ash	1	7		Good	Good		Retain	Retain as tree is in good condition and provides aesthetic value to site
T-42	Fraxinus americana	White Ash	1	7		Good	Good		Retain	Retain as tree is in good condition and provides aesthetic value to site
T-43	Picea pungens 'Glauca'	Colorado Blue Spruce	1		4	Good	Good	Good	Retain	Retain as tree is in good condition and provides aesthetic value to site
T-44	Picea pungens 'Glauca'	Colorado Blue Spruce	1		4	Good	Good	Good	Retain	Retain as tree is in good condition and provides aesthetic value to site
T-45	Picea pungens 'Glauca'	Colorado Blue Spruce	1		4	Good	Good	Good	Retain	Retain as tree is in good condition and provides aesthetic value to site
T-46	Acer x freemanii	Freeman Maple	1	10		Good	Good		Remove	Will not survive construction of gas bar
T-47	Acer x freemanii	Freeman Maple	1	11		Good	Good		Remove	Will not survive construction of gas bar
T-48	Acer x freemanii	Freeman Maple	1	13		Good	Good		Remove	Will not survive construction of gas bar
T-49	Picea glauca	White Spruce	1		3.25	Good	Good	Good	Remove	Will not survive construction of gas bar
T-50	Picea glauca	White Spruce	1		3.25	Good	Good	Good	Remove	Will not survive construction of gas bar
T-51	Acer x freemanii	Freeman Maple	1	11		Good	Good		Remove	Will not survive construction of gas bar. Broken branches
T-52	Acer x freemanii	Freeman Maple	1	12		Good	Good		Remove	Within proximity of construction. In good condition, provides aesthetic value & shade of asphalt
T-53	Pyrus calleryana	Ornamental Pear	1	5		Good	Good		Remove	Within proximity of construction. In good condition, provides aesthetic value & shade of asphalt
T-54	Picea pungens 'Glauca'	Colorado Blue Spruce	1		2.25	Good	Good	Good	Remove	Within proximity of construction. In good condition, provides aesthetic value & shade of asphalt
T-55	Picea pungens 'Glauca'	Colorado Blue Spruce	1		1	Good	Good	Good	Remove	Within proximity of construction. In good condition, provides aesthetic value & shade of asphalt
T-56	Picea pungens 'Glauca'	Colorado Blue Spruce	1		1	Good	Good	Good	Remove	Within proximity of construction. In good condition, provides aesthetic value & shade of asphalt
T-57	Picea pungens 'Glauca'	Colorado Blue Spruce	1		1	Good	Good	Good	Remove	Will not survive construction of curb

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						Trunk	Canopy	Vigour		
G-1	Treed Area									Area of grouping ±1312m². Tree spacing 5-6m above 10cm & 1-3m for trees below 10cm
	Quercus macrocarpa	Bur Oak	F	>10		Good	Good		Retain / Remove	Approx 10 trees will require removal due to construction of proposed curb. Retain & protect remaining vegetation
	Ulmus americana	American Elm	O	>10		Good	Good		Retain / Remove	Approx 2 trees will require removal due to construction of proposed curb. Retain & protect remaining vegetation. Co-dominant stems, weak unions
	Populus alba	European White Poplar	A	>10		Good	Good		Retain / Remove	Approx 5 trees will require removal due to construction of proposed curb. Retain & protect remaining vegetation
	Acer saccharum	Sugar Maple	F	>10		Good	Good		Retain & Protect	No trees will be impacted by the construction of proposed curb. Retain and protect vegetation
	Tilia americana	Basswood	O	>10		Good	Good		Retain & Protect	No trees will be impacted by the construction of proposed curb. Retain and protect vegetation
	Fraxinus americana	White Ash	R	>10		Good	Good		Retain & Protect	No trees will be impacted by the construction of proposed curb. Retain and protect vegetation
	Acer negundo	Manitoba Maple	O	>10		Good	Good		Retain / Remove	Approx 3 trees will require removal due to construction of proposed curb. Retain & protect remaining vegetation. Weak unions, lean, crooked, broken branches, 40% deadwood
										Trees that will require removal below 10cm dbh were assessed using a line transect method. Refer to plan TP-2 for definition. Approximately 29 trees below 10cm will require removal. Retain and protect grouping as majority of trees are in good condition, they provide buffer between highway, wind screen and will shade asphalt
Frequency Legend										
D	Dominant									
A	Abundant									
O+	Frequent									
O	Occasional									
R	Rare									