

Guidelines for Evaluation of Trees

BOULEVARD AND OPEN SPACE TREES, OPEN SPACE OPERATIONS

Last Update: August 2020

Edmonton

The City of Edmonton (CoE) is committed to preserving Edmonton's urban forest for future generations, as it provides many environmental, ecological, economic, and social benefits. With careful stewardship, these benefits can continue for generations, appreciating over time. Proper management and education is crucial for continuous growth and improvement of the urban forest.

The Corporate Tree Management Policy states that the CoE has a responsibility to protect and preserve all trees on City land from destruction, loss or damage. The *Guidelines for Evaluation of Trees* provides detail on monetary valuation used to calculate equitable compensation for loss of tree canopy due to damage or removal. This recovered value is used to replace, preserve, and enhance the City's urban forest canopy, as outlined by the Corporate Tree Management and Tree Reserve Procedure.¹

When Will the Guidelines for Evaluation of Trees Apply?

The City may pursue equitable compensation for the loss of canopy from the civic or private entity that causes partial loss (damage) or total loss (removal) of Boulevard and Open Space Tree(s) as defined in the Corporate Tree Management Policy.

How are the Guidelines for the Evaluation of Trees Applied?

A CoE urban forester will evaluate the Boulevard and Open Space Tree(s) for monetary value. If the applicant is requesting tree removal as per the Live Tree Removal Guide or has damaged a City tree and as a result the tree requires removal, the applicant is responsible for the total loss of City tree(s). The CoE urban forester will work with the applicant and provide costs associated with tree loss or damage. The CoE urban forester will facilitate the operational work required to remove the tree.

If you are unsure of who is responsible for paying equitable compensation for damage or loss of a City tree, please consult with a CoE urban forester *by calling 311*.

The CoE urban forester will follow these steps:

¹ Unit rate costs will be updated annually by the City's Urban Forestry team. CoE will review and update the methodologies as well as guiding documents on an ongoing basis to match the evolving industry standards.

1. Determine if equitable compensation should be applied. This will be done by ensuring that the tree(s) is on City owned land, not under any existing servicing agreement and live tree removal guidelines are followed, if applicable. Further, CoE will evaluate the damage and determine if it is a total loss (step 2) or a partial loss (step 3).
2. Assess the monetary value for total loss of the tree(s) using the trunk formula method. This procedure determines the monetary value to be recovered for a complete loss of Boulevard and Open Space Tree(s):

Total Loss:

- Trees will be evaluated as a total loss if the health, structure and/or form is severely impacted.
- CoE has determined that a tree is a total loss if its condition is evaluated at 20% or less.

$$\text{Monetary Value} = \text{Base Value} \times \text{Species Rating \%} \times \text{Condition \%}$$

Where,

- ❖ *Base Value = Basic Unit Value x Cross Sectional Area*
- ❖ *Basic Unit Value= \$11.81/ cm² (adjusted annually for inflation)*
- ❖ *Cross Sectional Area (cm²) = (DBH/2)² x π*
- ❖ *Diameter at Breast Height or DBH (cm) = measured 1.2 metres above the ground*
- ❖ *Species Rating % = Regional Tree Species Rating Class and Percentage (Table 1, Appendix)*
- ❖ *Condition % = Considers various components of health, structure and form as outlined by the ISA guide in the 9th edition (Table 2, Appendix); location factor may also be considered to calculate condition %*
 - *Location Factor = Location can influence the condition calculation up to a plus or minus 10% (a 10% premium or a 10% penalty); Location rating can be applied to the condition factor if required;*
 - *Location rating = considers the site of the property, the plant's functional and aesthetic contributions, and the placement of the plant in the landscape*

Note: If the calculated monetary value is less than the replacement cost, then replacement cost will be used as compensation.

3. Calculate the partial loss of a tree:

A CoE forester will evaluate the condition of a tree (post damage condition) to determine:

- parts of the tree that have been affected
- whether the health, structure and/or form have been compromised
- extent of the damage i.e. % of trunk girdling, % of root loss or % of crown loss
- whether a tree can be restored to pre-damage condition by treatment

The post damage condition will be compared with the pre damage condition of a tree and the differences will be calculated. The value that is obtained from this calculation will be determined as a partial loss of a tree.

$$\text{Partial Loss Value} = \text{Monetary Value (Pre Damage)} - \text{Monetary Value (Post Damage)}$$

Where,

- ❖ *Monetary Value (Pre Damage) = Calculated in Step 2*
- ❖ *Monetary Value (Post Damage) = $(DBH/ 2)^2 \times (\pi) \times \% \text{ species class} \times \text{Current Condition} \times \text{Unit value per cm}^2 (\$11.81)$*
- ❖ *Current Condition = (% of Tree Unaffected by Damage x Tree Condition Before Damage) + (%Tree Crown Above the Damage x % Affected Portion After Damage)*
 - *% of Tree unaffected by damage = $1 - (100\% \times \% \text{Crown Above Injury})$*
 - *% Affected Portion After Damage = % Condition Before Injury - (% Condition Before Injury x % Devaluation)*

CoE will calculate the reductions or changes in the tree condition as below:

1. Damage to the trunk (tree stem)

$$\% \text{ of Condition Class Loss} = ((1.1) \times \% \text{ of Circumference Injury}) - 6$$

Here, % of Circumference Injury is the circumference of the tree at the location of the injury and the width of the injury at the largest point.

Glossary

All definitions in the [Corporate Tree Management and Tree Reserve Procedure](#) apply to this guideline.

Crown: The upper part of a tree, measured from the lowest to the highest branch, that includes all branches and foliage.

Equitable Compensation: Costs incurred by the City including labour, material, equipment charges and applicable overheads associated with the value of a City Tree. It can also mean the diminishment of a tree's value. (*Guidelines for Evaluation of Trees, Guide for Plant Appraisal, Council of Tree and Landscape Appraisers, International Society of Arboriculture*)

Partial Loss: A situation in which a damaged tree cannot be fully restored to its pre damaged condition but is otherwise expected to produce future benefits.

Plant Appraisal or Valuation: The act or process of formulating an opinion of a defined value or a defined cost.

Replacement Cost: The cost of replacing a similar tree having equivalent functional utility. CoE charges this cost to replace and establish a caliper tree. It includes plant material, installation, all planning components, watering and young tree maintenance (pruning and stake removal).

Remedial Care: Tree work required after a tree has sustained damages. It might include any one or combination of the following over a period of time: tree surgery, watering, fertilization, aeration or radial trenching for soil compaction and pruning.

Unit Rate Cost: Operational cost to complete tasks. These are based on previous years actuals.

Value: Monetary value of a tree at a given moment in time.

References

Bernatzky, A. 1978. *Tree Ecology and Preservation*. Elsevier Scientific Publishing Company.

Council of Tree and Landscape Appraisers. 2000. *Guide for Plant Appraisal 9th Edition*. International Society of Arboriculture.

Council of Tree and Landscape Appraisers. 2019. *Guide for Plant Appraisal 10th Edition*. International Society of Arboriculture

Coder, Dr. Kim D 2001. Appraising Condition Class of Trees With Injuries [Paper'](#) [Appraising Condition Class of trees with injuries](#) Follow up correction [correction to root damage formula](#)

Grainger, G., *Determining Replacement Value of Trees and Shrubs in Alberta*. Alberta Tree Nursery and Horticultural Centre.

Prairie Chapter International Society of Arboriculture. 2003. *Alberta Tree Species Rating Guide*.

<http://www.isaprairie.com/docs/Alberta-Tree-Species-Rating-Guide.pdf>

APPENDICES

Table 1: Tree Species Rating Classes and Percentages for the City of Edmonton

BOTANICAL NAME	COMMON NAME
Class 1 – 110% (Special Class)	
Picea pungens ‘Koster’	Kosters Blue Spruce
Picea spp. (Specialties)	All grafted types of Spruce
Pinus spp. (Specialties)	All grafted types of Pines
Quercus spp.	Oak species
Class 2 – 100%	
Abies spp.	All Firs
Aesculus glabra	Ohio buckeye
Aesculus hippocastanum	Chestnut/Horse Chestnut
Elaeagnus angustifolia	Russian olive
Betula pendula gracilis	Weeping birch
Fraxinus selections	Patmore/Summit/Fallgold/Manchurian
Larix sibirica	Siberian Larch
Larix spp.	Larch Species
Picea spp.	All types of Spruce
Pinus spp.	All types of Pines
Populus tremula ‘Erecta’	Swedish Columnar Aspen
Pseudotsuga menziesii	Douglas fir
Syringa reticulata	Japanese lilac tree
Tilia americana	American basswood
Tilia cordata	Little Linden Leaf, Lime (Hybrids)
Ulmus americana ‘Brandon’	American elm “Brandon”

Ulmus americana	American elm
Class 3 – 80%	
Acer ginnala	Amur maple
Acer saccharinum	Silver maple
Betula spp.	All other types of Birch
Crataegus spp.	Hawthorns
Fraxinus spp.	Common Green Ash & Black Ash
Juniperus scopulorum	Rocky Mountain Juniper & Cultivars
Malus baccata	Siberian flowering crab
Malus “Rosybloom Hybrids”	Rosybloom Crabs
Malus spp. Hybrids	Hybrid Apple/Crab
Populus x canescens ‘Tower’	Tower Poplar
Populus x jackii ‘Northwest’	Northwest poplar - cultivar
Prunus padus commutata	Mayday tree
Prunus spp.	Plums and Cherries
Prunus spp. Hybrids	Hybrid Cherries & plums
Pyrus ussuriensis	Ussurian Pear
Sorbus spp.	Mountain Ash Species
Class 4 – 60%	
Acer negundo (upright var. or form)	Manitoba maple (specialty upright forms)
Alnus spp.	Alder
Caragana arborescens	Standard Pea tree
Caragana arborescens vars.	Standard Pea tree – forms
Populus Hybrids	Hybrid Poplars
Salix acutifolia	Sharp leaf willow
Salix pentandra	Laurel leaved willow

Ulmus pumila	Siberian/Manchurian elm
Class 5 – 40%	
Acer negundo	Manitoba maple
Populus X 'Brooks #6'	Brooks #6 Poplar
Populus X 'Griffin'	Griffin Poplar (Non-fluff)
Populus spp.	Native poplars
Salix spp.	Native Willows

*Values adapted from *Alberta Tree Species Rating Guide*.

Table 2: Meaning (description) of final tree condition

Percent	Description
100%	Perfect tree or specimen quality
90%	Excellent tree
80%	Very Good tree
70%	Above Average tree
60%	Good or Average tree
50%	Below Average tree
40%	Fair tree
30%	Poor tree
20%	Very poor tree