Urban Forest Management Plan – 2018 to 2037

Town of Cobourg

Final Draft Report (July 2018) Prepared by Kilgour & Associates Limited

Urban Forest Management Plan for the Town of Cobourg

Final Draft Report

July 2018

Submitted To:

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1.0 EXECUTIVE SUMMARY

This Plan represents a collaborative effort of the Town of Cobourg, its stakeholders, and the community to build a plan for managing the community's urban forest over the next 20 years, and longer. The Plan sets detailed, practical and adaptive guidelines, and actions for the Town to follow in its long-term and day-to-day management of public trees. The vision for the 2037 urban forest of the Town is:

Cobourg will be a community in the forest.

Five goals provide guidance to accomplish this vision:

1. The urban forest will be lush, diverse, healthy & resilient
2. The urban forest will contribute to community sustainability
3. The Town of Cobourg community will understand the urban forest's importance and will be actively involved in its care
4. The Town's approach to management of trees on public lands will meet urban forest & community needs
5. The Town will support residents and businesses in the stewardship of trees on private property

This Plan documents and builds upon the Town's existing effective management practices and standards. It updates the Town's overall urban forestry management through integration of the existing approach with relevant industry best practices and stakeholder and community input. The management plan is organized according to nine programs for:

1. Tree Planting
2. Tree Maintenance
3. Risk Management
4. Community Stewardship
5. Resourcing Strategy
6. Regulatory Initiatives
7. Heritage Trees
8. Governance, and
9. Alignment with Other Initiatives.

This Plan presents a workplan for the next 20 years and an operational plan that details the activities required for integrated, cost-effective and proactive management of the urban forest over the next five years, 2018-2022. The operational plan addresses Town challenges in maintaining and replacing public trees, implements tree maintenance and risk management programs, engages the community in tree planting and care, and proposes approaches that use resources efficiently and achieves more effective management over time.

Plan implementation will result in short-term resource implications to complete the necessary immediate term activities of: update the public tree inventory, enhance monitoring of management activities and forest health, complete tree health assessment and maintenance duties and implement the supporting community stewardship program and resourcing strategy. The benefit of following the recommendations in this Plan will be trees that are healthier, will require less intensive care over time, and will live longer for the community's enjoyment and benefit. There will also be timely tree maintenance, community-wide participation, and continued planting of new trees that will result in an eventual increase of the future urban tree canopy. Over time, the management costs per capita / per tree should decrease with realization of a collaboratively managed, healthy and diverse urban forest.

This Urban Forest Management Plan is a guidance document that reflects the best information available at the time of its preparation. The Plan will be periodically updated to respond to new information and opportunities that arise while maintaining the spirit of the long-term directions to achieve the desired future urban forest.

2.0 INTRODUCTION

This Plan delivers upon the Town of Cobourg's commitment to prepare an Urban Forest Management Plan for optimal management of trees on Town-owned lands and to provide direction for increased forest cover and health for trees on private property. The Town has existing policies, programs and data in place that contribute to the strategic directions and operational activities presented through this Plan. These include the Town's GIS-based tree inventory, aligned Official Plan policies, a tree preservation by-law, urban and landscape design guidelines, Master Plans for Town Parks and Heritage, and an Asset Management Plan currently under development. The existing forestry program components for Emerald Ash Borer management, maintenance of a tree inventory, and completion of tree inspections, replacement, maintenance, risk management, and health and safety provide a strong base upon which to build this comprehensive and practical urban forestry management plan for the Town. The existing Town programs have been supplemented by best management practices employed within the urban forest management industry and a proposed approach to encourage more community participation in expansion and care of the urban forest.

2.1 Plan Rationale and Purpose

The overall goal of the Urban Forest Management Plan (UFMP) is a healthy and sustainable urban forest that contributes to the economic, environmental, and social vitality of the Town. Through this Plan, the Forestry Section wishes to move from reactive to proactive urban forest management. This Plan document formalizes existing management practices and standards by documentation in one place, with update of the Town's overall urban forest management approach by integration with relevant industry best practices. Policies within the UFMP will direct enhanced integration of tree management into other relevant municipal plans throughout the Town's departments in a manner that aligns with existing Town strategic directions. The Plan provides strategic long-term direction for the community, defining desired outcomes for the entire urban forest of Cobourg. Plan content includes characterization of the current state of the Town's urban forest, analysis of current forestry management operations, identification of strategies to improve urban forest health and sustainability and recommended management changes and future needs.

This Plan applies predominantly to trees on public or Town-owned lands within the Town of Cobourg in order to effectively manage this important community asset. The Plan also provides guidance for improving the health and extent of forest cover on private lands because residents and businesses are estimated to contribute approximately 60% of the current urban forest cover. This approach is designed to increase the overall health of the Town's urban forest through improved tree maintenance and planting on lands in both public and private ownership.

2.2 Structure of the Urban Forest Management Plan

The Plan presents the process review, findings and recommendations for future management of the Town's urban forest. The report structure is as follows:

1. **Executive Summary**
2. **Introduction** – Plan Purpose and Structure

3. **Context and Characteristics of the Town's Current Urban Forest** – Environmental, Social and Policy Context; Forest Profile, Management Approach, Urban Forest Management Opportunities and Challenges
4. **Urban Forest Management Best Practices** – Industry Practices and Standards
5. **Community and Stakeholder Perspectives** – Engagement Process and Results that informed Plan Development
6. **Strategic Directions for the 2037 Urban Forest** – Vision, Principles, Goals, Objectives & Strategies
7. **Cobourg's Urban Forest Management Plan** – Guidance for all aspects of urban forest management detailed through nine programs
8. **Business Case for Sustainable Urban Forest Management**
9. **Implementation Strategy** – description of how the plan will be implemented – list of actions with responsibilities, required human/financial/equipment and tree resources, timing, priorities for 2018-2022
10. **Conclusion**
11. **Glossary –** definition of key terms used in the Plan
12. **References –** documents consulted in the preparation of the Town's Plan
13. **Closure –** signature by Plan authors
14. **Appendices** of Supporting Documentation – Compiled supporting information, standards, procedures.

2.3 Study Area

The following Official Plan schedule of the Greenlands system (Figure 2.1) shows the connectivity of vegetated areas within the Town. The aerial photographic view in Figure 2.2 provides a perspective of the Town's landscape.

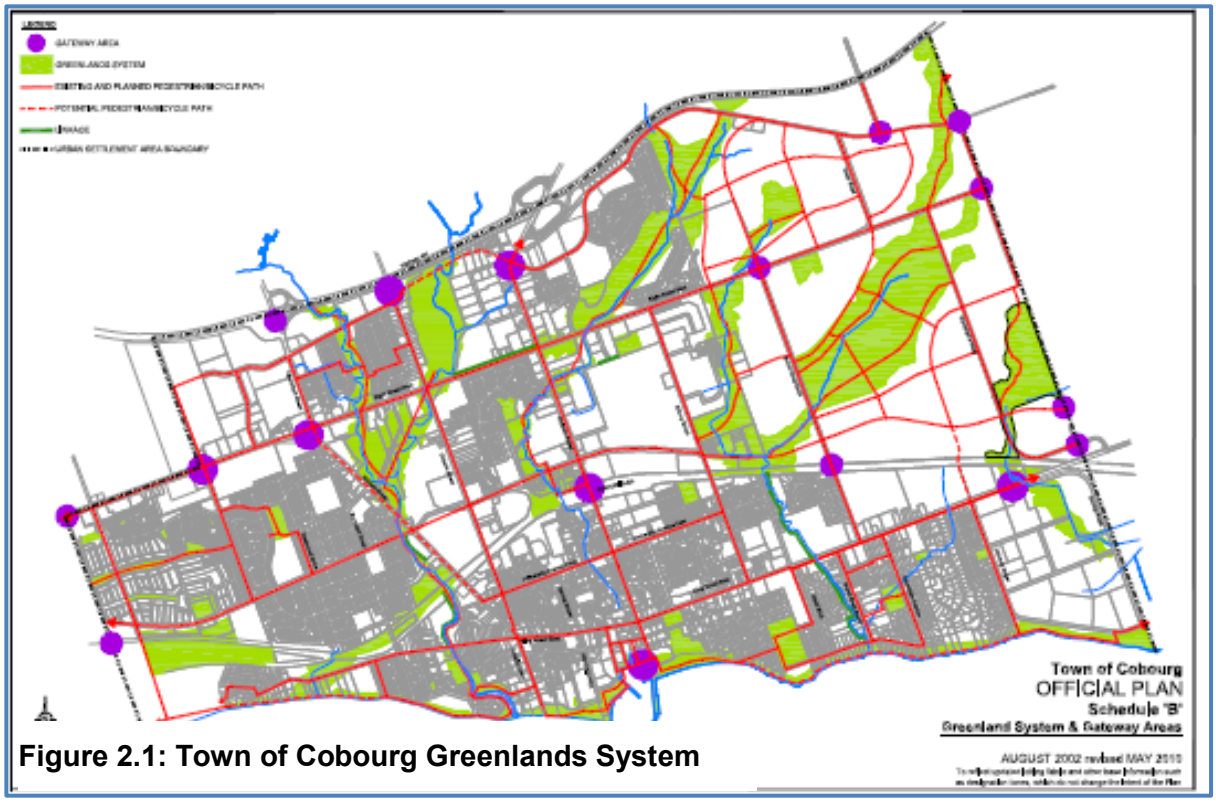
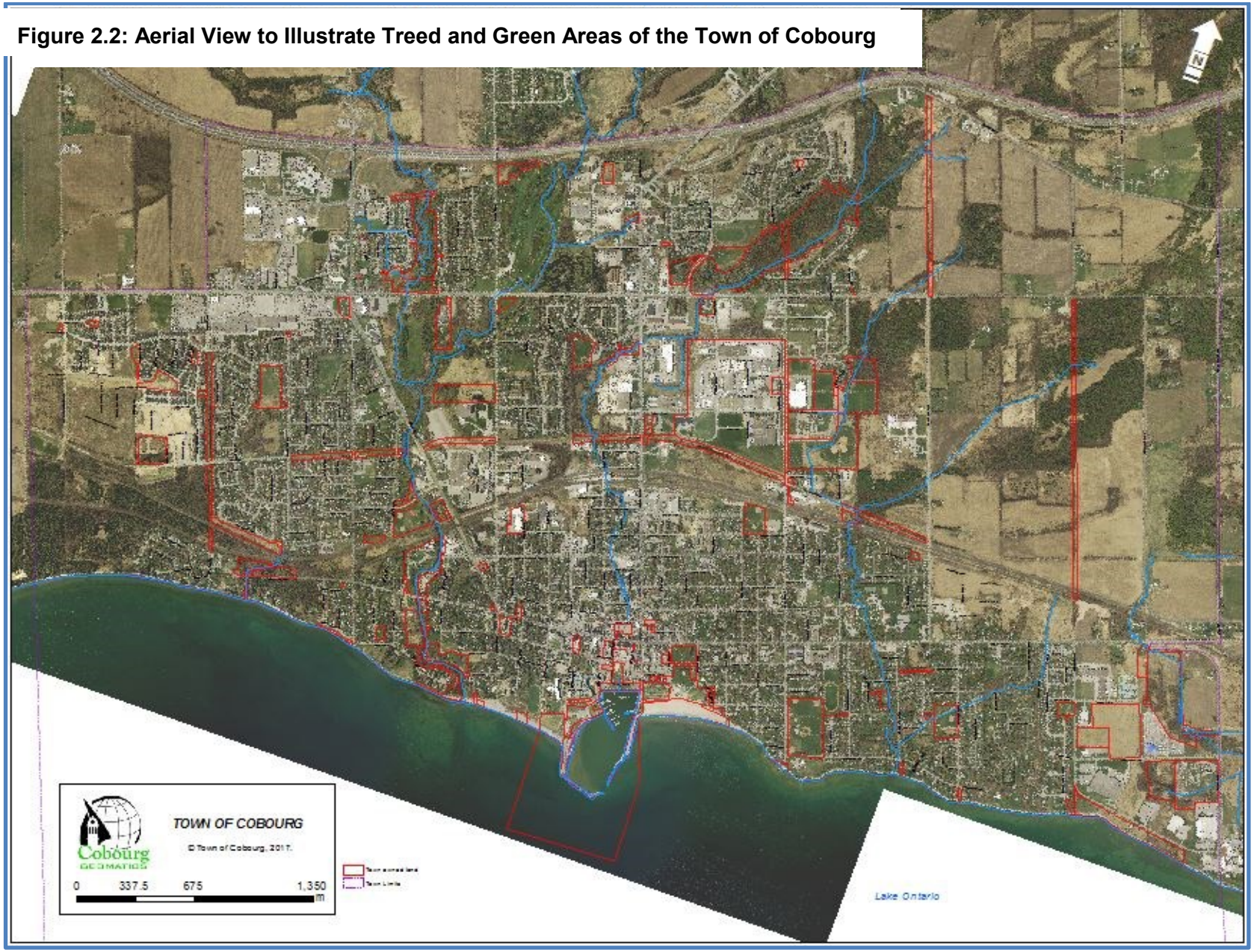


Figure 2.1: Town of Cobourg Greenlands System

Figure 2.2: Aerial View to Illustrate Treed and Green Areas of the Town of Cobourg



The focus for the Town Urban Forest Management Plan is for management of public trees within the Town limits. It is important to note, however, that all trees in the Town, located on either public or private land, provide benefits to residents and visitors. To acknowledge and better optimize the shared benefit of trees, this Plan also includes guidance for maintaining and enhancing the health and diversity of the urban forest on private property.

2.4 Plan Development Approach

Development of this urban forest management plan for the Town involved the following steps:

- Review current Town management practices
- Compare current approach to industry best practices
- Obtain input from urban forest stakeholders & community
- Recommend management strategies for tree care, inventory, inspections, planting, risk management, standards, partnership opportunities, integration with other Town policies, strategies and programs
- Refine Plan through stakeholder and community feedback
- Develop operational plans, business case and final management plan
- Review of Final Plan by Town management and Council.

3.0 COBOURG'S CURRENT URBAN FOREST

This section describes the environmental and policy context for the Town's urban forest, the characteristics of the existing urban forest and current Town and industry practices, opportunities and challenges in managing urban forests. This information sets the stage for development of the strategic approach (section 6) and operational activities (sections 7 and 9) recommended for immediate and long-term management of the Town's urban forest.

3.1 Geographic and Historic Context

The Town is located on the shore of Lake Ontario within Northumberland County approximately half way between Toronto and Kingston. Although the landscape rises somewhat as one travels away from Lake Ontario, the topography tends to be flat to gently sloping, except for some of the steeper banks along the creeks that cross the Town to empty into Lake Ontario and along the Lake Ontario shoreline itself. These steeper slopes, and some of the beach sands along the shoreline, are susceptible to erosion. Strong winds and storms, such as ice storms, that arise due to the community's location on Lake Ontario can cause significant stress to trees, sometimes resulting in loss of limbs and blowdown of whole trees. In general, the Town has noted that the maintenance program in place has resulted in less tree damage resulting from storms than is observed in some neighbouring communities.

People have lived in the area that is now Cobourg for some time, with the area founded as a settlement in 1798, named Cobourg in 1818 and officially incorporated as a Town in 1837. A number of early settlers and visitors came to Cobourg from the United States, across Lake Ontario. During this settlement, some of the southerly tree species were introduced to the area. As well, apple orchards have been identified as significant area features that supported early Town settlers.

The Town of Cobourg's population in 2016 was recorded as 19,440. The Official Plan projects an increase in the Town's population of 3975 between 2006 (population of 18,210 in 2006) and 2031, as allocated under the *Growth Plan for the Greater Golden Horseshoe*. Cobourg is the largest municipality, in terms of population, of the seven that are located in Northumberland County.

With regard to people pressures, the Town has experienced residential growth over the past several years. This has resulted in a mix of older and new developments across the community. The more established neighbourhoods are characterized by old, larger trees, some of which are nearing the end of their life and have increasing maintenance requirements.

The Town of Cobourg is located within the Great Lakes St. Lawrence Forest Region. The natural forest vegetation of this region was characterized by mixed-hardwood forests of beech, maple, hickory and white pines as well as tallgrass prairie and oak savannah. Prior to settlement, it is expected that much of the current area of Cobourg was tree-covered. Although some natural areas remain within the Town, much of the original forests were cleared for settlement and for farming to take advantage of the predominantly high capability lands for agriculture that are located within the Town boundaries.

Environment Canada data notes climatic data for the Town of Cobourg as follows:

- a mean annual average temperature of 7.5°C
- mean daily minimum/maximum temperature in January of -9.7/-1.4°C
- mean daily minimum/maximum temperature in July of 15.2/24.6°C
- mean annual precipitation of 890 mm
- mean annual rainfall of 794
- mean annual snowfall of 96.5 cm.

Town soil information is available for about 70% of the area through the Northumberland County Soil Survey (1974). The then developed area of Town – from the downtown core to the lake and north to Elgin Street – was not surveyed, however, it is expected that similar materials described in the following extend into the unsurveyed area. Soils tend to be mainly water deposited materials, without stones, ranging in texture from medium sandy soils

comprised of beach and outwash deposits to some areas of finer-textured lake deposited fine sands and silty clay loams. Two areas of glacial till occur to the northeast and east edges of town. These soils have steeper slopes and are moderately stony, in comparison to the rest of the Town area. A few other areas of somewhat droughty soils and low nutrient content, Brighton sandy loam, are located in more upland pockets in the north central and northeast sections of town. There are also a few low-lying areas of organic soils and wet sands. For the majority of the Town, however, the soils contain good nutrient contents that are located on gentle slopes and provide good moisture holding capacity to well support trees. Appendix A presents an excerpt of the soils map and supporting information available for Cobourg from the County soil survey.

Given the climate, including moderating effects from Lake Ontario, and the soils, the Town of Cobourg is blessed with favourable site conditions and climate that support a diverse range of trees with the potential to comprise a strong healthy forest. Still, the Town's urban forest is exposed to the harsher environmental conditions characteristic of all urban areas, relative to a more rural natural environment. These stressors include potential for droughty and low nutrient soil conditions, high levels of people activity that may result in tree injury and soil compaction that can limit water availability to roots as well as the conflict of sharing canopy and root space with other Town infrastructure of overhead wires, underground sewer and water pipes, and surface infrastructure of sidewalks and roads. The Town will also experience effects from climate change that will impact upon trees. These include an increase in extreme weather events (such as heavy rains, strong winds, droughts and ice storms), an increase in temperature and precipitation in both summer and winter, disruption of precipitation patterns (Environment & Climate Change Canada, 2016) and increased incidence potential for tree pests, diseases and invasive species .

3.2 Urban Forest Characteristics

The following provides an urban forest profile for the Town, developed from site visits, discussions with Town staff and review of the current inventory of public trees:

- There are 6422 active trees documented within the inventory of trees (majority are located on public lands). The inventory captures close to all of the trees that the Town manages on publicly owned lands located along streets and laneways and in parks and greenspaces. This estimate does not include Town-owned trees located within natural areas, river corridors and land buffers;
- Range in age, species, health; more young, smaller trees;
- New trees added each year –tree planting, new development;
- Town planted 2111 trees in 2014 (through grants), 150 in 2015 and 175 in 2016;
- Maples are dominant species,~ 38% of Town trees;
- ~70% of trees are native species;
- There are a total of 111 different tree species identified in the public tree inventory;
- Majority of trees are in Good-Fair condition;

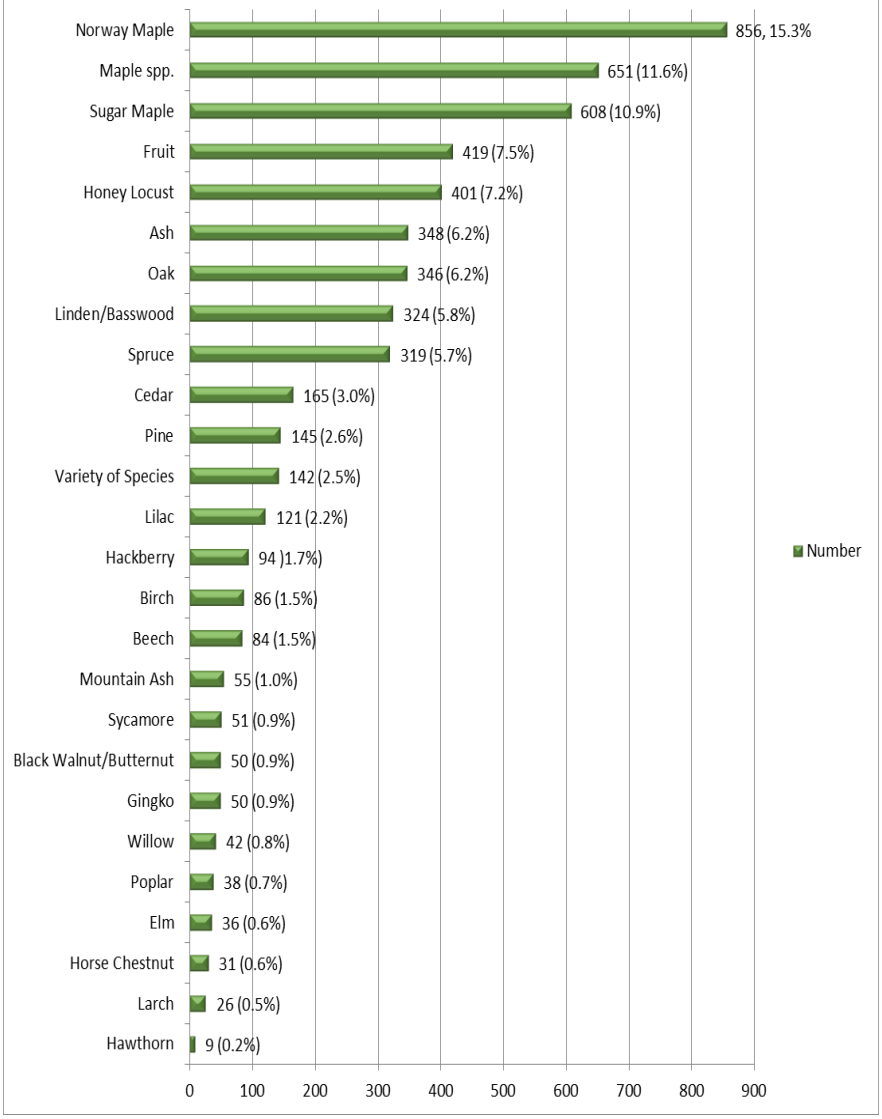
- Larger, older trees are in established neighbourhoods, parks;
- Close to 50% of Town trees are <20 cm in diameter; and
- Tree Heights:
    - 30% of Town trees are less than or equal to 5.0 m in height;
    - ~40% of trees are between 5 and 10 m; and
    - 25% of trees are between 10 and 20 m in height.

The following tables and graphs present summarized information from the Town (public) tree inventory in the areas of: general information, tree species and tree type distributions, proportion of native/non-native species; tree size – diameter at breast height (DBH), height and canopy widths, tree health and tree locations.

Table 3.1: General Information from the Tree Inventory

No. of tree records	6908
No. of trees missing Easting-Northing location	291
Lifecycle	
- Active	6422
- Removed	486
Private Trees Captured in Inventory	
- Yes	132
- Maybe/Potential Shared Tree (Public & Private)	73
Potential for Utilities Conflict with Trees	
- Trees in close proximity to overhead lines	959
Comments field completed for tree records	1133
- Number of trees identified for maintenance (pruning, regular inspection/monitoring)	304
- Number of ash trees treated with Tre-Azin (note some trees may be removed with time)	21
Records collected before 2010	3857

Figure 3.1: Tree Species Distribution



Tree Type	*Number*	*%**
Hawthorn	9	0.2%
Larch	26	0.5%
Horse Chestnut	31	0.6%
Elm	36	0.6%
Poplar	38	0.7%
Willow	42	0.8%
Gingko	50	0.9%
Black Walnut/Butternut	50	0.9%
Sycamore	51	0.9%
Mountain Ash	55	1.0%
Beech	84	1.5%
Birch	86	1.5%
Hackberry	94	1.7%
Lilac	121	2.2%
Variety of Species	142	2.5%
Pine	145	2.6%
Cedar	165	3.0%
Spruce	319	5.7%
Linden/Basswood	324	5.8%
Oak	346	6.2%
Ash	348	6.2%
Honey Locust	401	7.2%
Fruit	419	7.5%
Sugar Maple	608	10.9%
Maple spp.	651	11.6%
Norway Maple	856	15.3%
Subtotal Known Trees	5593	100.0%
Unknown Species	829	
Total Number of Active Trees in Inventory	6422	

*% expressed relative to total # known species

Figure 3.2: Proportion of Native Tree Species

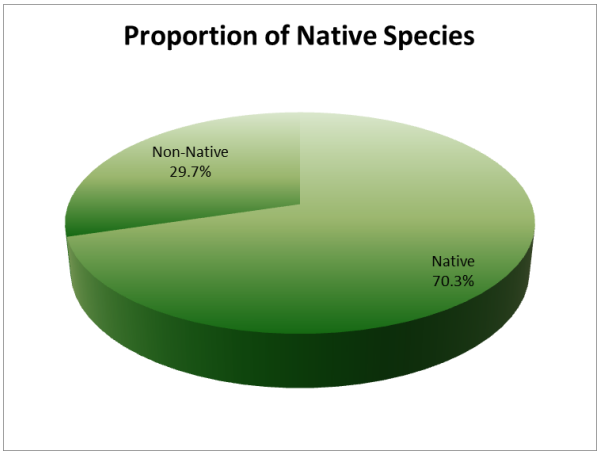
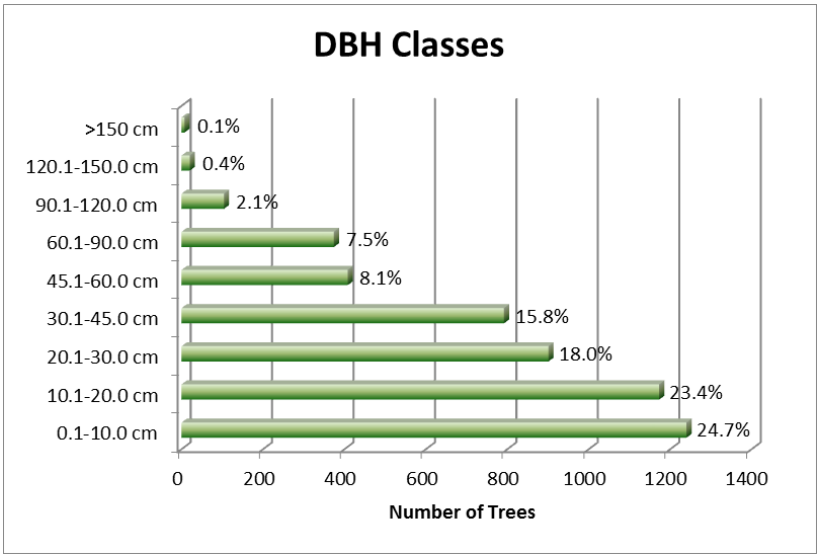
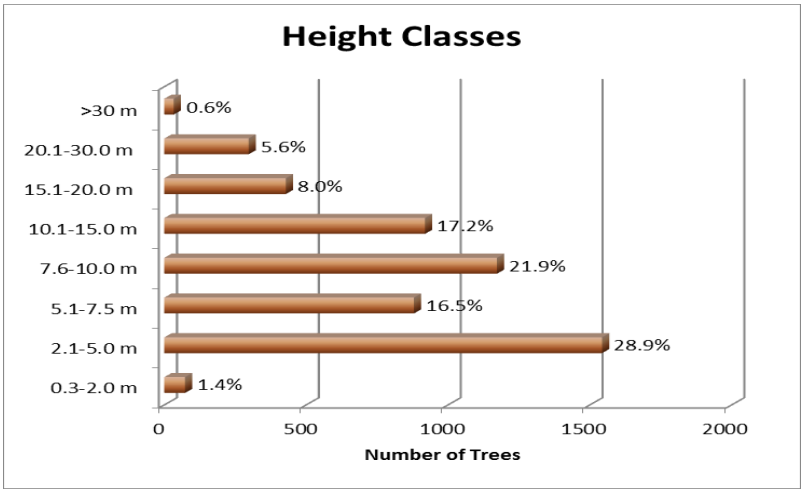


Figure 3.3: Profile of Tree Sizes - Diameter at Breast Height (DBH)



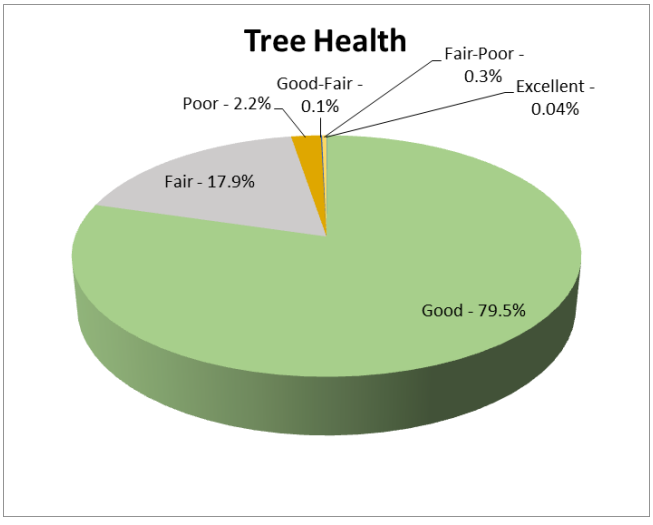
DBH Classes	Number	%
0.1-10.0 cm	1240	24.7%
10.1-20.0 cm	1173	23.4%
20.1-30.0 cm	901	18.0%
30.1-45.0 cm	792	15.8%
45.1-60.0 cm	408	8.1%
60.1-90.0 cm	374	7.5%
90.1-120.0 cm	104	2.1%
120.1-150.0 cm	20	0.4%
>150 cm	7	0.1%
# Trees with Recorded DBH	5019	
Not Yet Recorded	1403	
Total Trees in Inventory	**6422**	

Figure 3.4: Cobourg Tree Heights



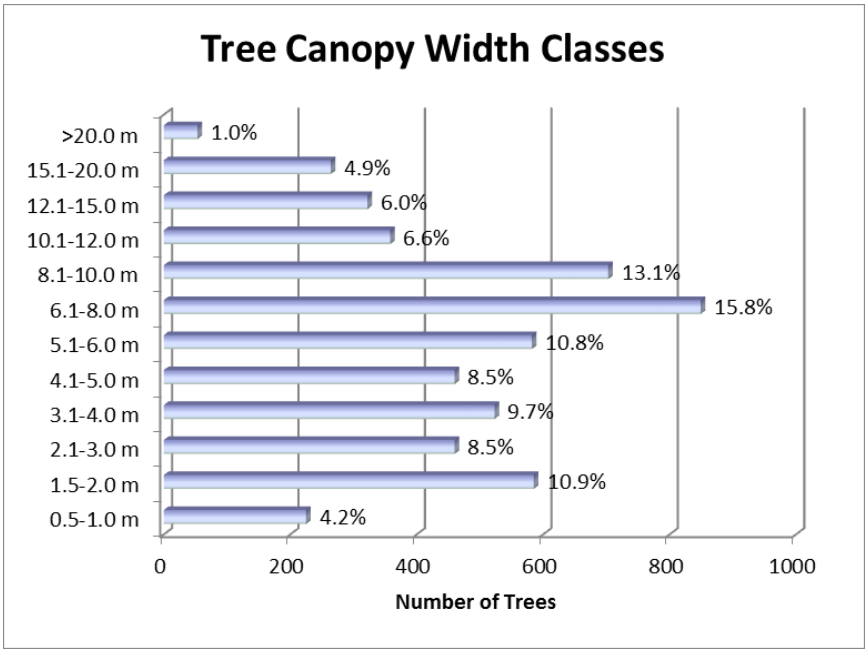
Height Classes	Number	%
0.3-2.0 m	73	1.4%
2.1-5.0 m	1543	28.9%
5.1-7.5 m	880	16.5%
7.6-10.0 m	1173	21.9%
10.1-15.0 m	919	17.2%
15.1-20.0 m	428	8.0%
20.1-30.0 m	297	5.6%
>30 m	33	0.6%
# Trees with Recorded Height	5346	
Not Yet Recorded	1076	
Total Trees in Inventory	**6422**	

Figure 3.5: Health of Cobourg Trees



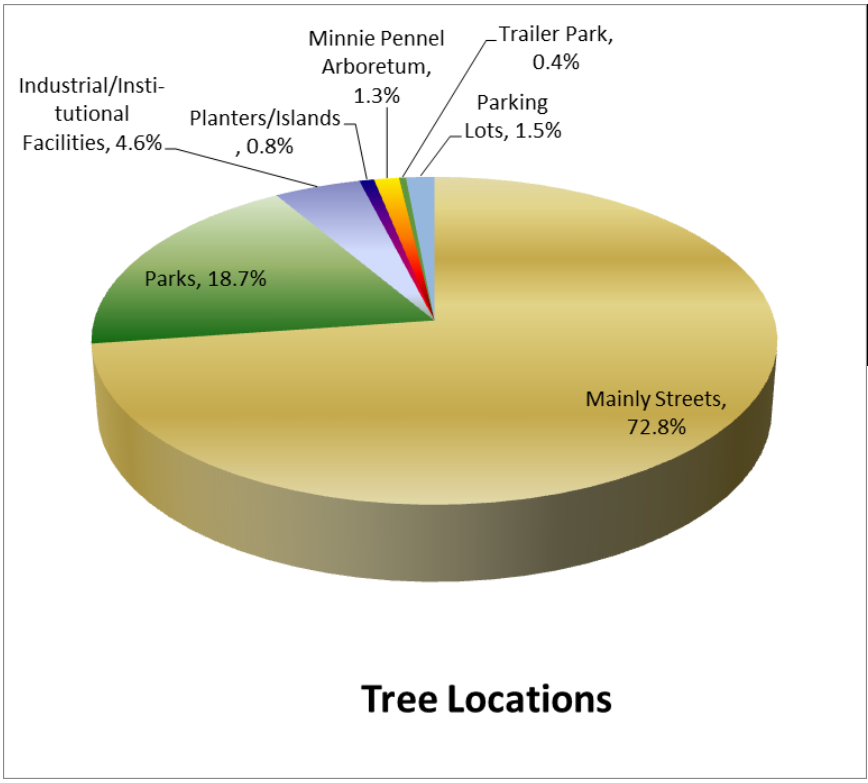
Tree Health	Number	Percent
Excellent	2	0.04%
Good	4346	79.5%
Fair	976	17.9%
Poor	120	2.2%
Good-Fair	5	0.1%
Fair-Poor	18	0.3%
# Trees Health Recorded	5467	
# Not Yet Recorded	955	
Total # Trees in Inventory	6422	

Figure 3.6: Tree Canopy Widths



Canopy Width Classes	*Number*	*%*
0.5-1.0 m	225	4.2%
1.5-2.0 m	585	10.9%
2.1-3.0 m	460	8.5%
3.1-4.0 m	523	9.7%
4.1-5.0 m	460	8.5%
5.1-6.0 m	582	10.8%
6.1-8.0 m	849	15.8%
8.1-10.0 m	703	13.1%
10.1-12.0 m	358	6.6%
12.1-15.0 m	322	6.0%
15.1-20.0 m	264	4.9%
>20.0 m	53	1.0%
# Trees with Canopy Width	5384	
Not Yet Recorded	1038	
Total Trees in Inventory	**6422**	

Figure 3.7: Location of Public Trees



Tree Locations	Number	%
Mainly Streets	4482	72.8%
Parks	1149	18.7%
Industrial/Institutional Facilities	284	4.6%
Planters/Islands	48	0.8%
Minnie Pennel Arboretum	82	1.3%
Trailer Park	22	0.4%
Parking Lots	93	1.5%
Location not identified	262	
Total	6422	

3.2 Cobourg's Urban Forest Canopy Cover

Cobourg's current urban forest canopy cover was assessed through use of the i-Tree software application. Through classification of 1000 points as to their land use within the Town of Cobourg's boundaries, the application calculated

a forest canopy cover of 27.2% of the total Town area. This assessment included all trees across the Town located in private yards and business properties and on public lands along streets, in parks and other properties and in open and forested natural areas[1].

In addition to supporting the calculation of Cobourg's canopy cover, the i-Tree application also calculates the estimated value of Cobourg's trees in removing air pollutants. The following table presents the annual amount (in tonnes) of air pollutants removed each year by trees, as well as the total amount of carbon dioxide stored within the trees and their respective dollar values to the community[2]. Appendix C presents the full Cover Assessment and Tree Benefits Report generated by i-Tree.

Table 3.2: Tree Benefit Estimates for the Town of Cobourg's Urban Forest*

Removed Annually		Tonnes	Canadian$
Carbon Monoxide	CO	0.61	$71.68
Nitrogen Dioxide	NO_2	3.69	$123.39
Ozone	O_3	36.73	$6,426.08
Particulate Matter - fine	$PM_{2.5}$	1.78	$13,283.89
Particulate Matter - coarse	PM_{10}	12.3	$4,665.18
Sulphur Dioxide	SO_2	2.32	$21.56
Carbon Dioxide Sequestered Annually	CO_2	7478.53	$329,572.98
Carbon Dioxide Stored in Trees	CO_2	188557	$8,309,561.43
Total Value of "Pollutants" Removal			$354,164.74

* as estimated from i-Tree Canopy Cover and Tree Benefits Assessment

3.4 Cobourg's Policy Context for Urban Forest Management

This section presents the directions within other plans and strategies that are relevant to urban forest management within the Town of Cobourg.

The Town of Cobourg and Northumberland County Official Plans both provide for a number of policies that favour retention and protection of trees during development, specifying approaches for natural areas management and tree conservation, as required by the Provincial Policy Statement (2014). Relevant to trees, the Town's Official Plan (2017) specifies requirements in its policies such as:

- Development review process requires preparation of a Tree Conservation Plan, to maintain and enhance existing woodlots, and to encourage the planting of new trees. Planned developments that propose to add and/or remove trees are required to obtain approval from the Town Arborist for their plans, according to the provisions of the Tree Preservation By-Law;
- Description of the Town's significant existing system of natural areas and parkland which should form the basis of a comprehensive greenlands system and tree lined streets which are described in the Official Plan as "integral to the image of Cobourg and should be maintained and enhanced";

[1] It is expected that the assessed percentage cover for shrubs of 0.6% may be lower than the actual value due to the difficulty in identifying shrubs on the aerial photography. It is possible that a proportion of Cobourg's grassed area, estimated as 33.4%, may include a small proportion of shrub cover.

[2] Benefits of air pollutant removal and carbon storage by trees are based on standardized costs of removal per tonne by human technology. Dollar values above are converted to Canadian $ using a currency rate of $1.25 Cdn per $1 US.

- Greenlands (comprised of the natural heritage system and parklands) /open space system is intended to enhance biodiversity and ecological health and function, while providing educational and recreational opportunities;
- Development is to respect nature of the streetscape, incorporate linkages to Town greenland system;
- New road design is to allow for tree-lined streets; and
- Policies for protection and enhancement of natural features.

Appendix D presents a list of the 2017 Official Plan sections relevant to Cobourg's urban forest.

Cobourg's Parks Master Plan (2013) provides directions for a system of parks that will consist of a network of parks, trails and open spaces. This parks system will link all parts of the community with green corridors and nodes. This Master Plan also recommends park areas and connections that benefit from the existing tree canopy and identifies areas where further community benefits from the parks would be realized through tree planting.

The Town's Urban and Landscape Design Guidelines (2015) also provide detailed guidance and support for planting and maintenance of existing trees on public and private lands so as to retain and enhance Town aesthetics and character. Specific guidelines for tree placement and types are stated to inform the design of all types of urban developments on public lands, streets, parks and stormwater management facilities, within cemeteries, and on private lands. Guidance is also provided for integration of sustainable practices, provision of space for trees, and for natural areas protection. Appendix E and Section 7.9.6 summarize the guideline text relevant to the urban forest and how the guidelines will be applied in its management.

Cobourg's Tree Preservation By-Law regulates injury or destruction of trees on public lands, such as adjacent to roads and in parks and on private land parcels that are greater than 0.8 hectares in size. As a result, the by-law supports the Official Plan directions for retention of trees when development is proposed on private property, allows for compensation to be provided to the Town for removed trees and for planting and initial care of trees within new developments.

Cobourg's *Heritage Master Plan* (2016) provides directions for heritage tree & cultural landscape designation & conservation through the Master Plan and four **heritage conservation district plans,** prepared according to Ontario's *Heritage Act*. These provisions can be used to identify, protect, maintain and enhance urban tree, and forest contributions to Cobourg's cultural heritage.

The Town is currently in process of preparing an Asset Management Strategy that intends to include trees as part of the portfolio of municipal assets to be managed together. Inclusion of trees within the scope of municipal infrastructure asset management can help achieve better protection and health of public trees through the consideration of their health and space needs during infrastructure development, maintenance and replacement. Trees formally identified as the community's "green infrastructure will assist in optimizing the life and contribution of public trees to the community, enhancing Town aesthetics, reduction of stormwater flows, improvement of air quality, provision of wildlife habitat, and microclimate mitigation (reduction of wind effects, cooling for buildings).

Another proactive Town initiative in process during 2018 is preparation and implementation of a risk management strategy. Addressing the risks associated with maintaining trees on Town lands is intended to be part of this risk management program.

3.5 Existing Approach to Urban Forest Management

The Town's existing urban forest management program is led by the Town Arborist who is supported by a number of knowledgeable Town staff. Qualified contract resources are available to complete tree removal, pruning, pest and disease management and other specialized services, as needed, to complement Town staff capacity.

The current GIS-based **tree inventory database** is captured within *CityWorks*, the Town's asset management and work order system. The tree inventory includes a listing of ~6422 (active) trees, mainly public street and park trees, for which 5600 individual trees have relatively complete information. It was noted that the Town is maintaining more trees than the 6422 trees captured in the inventory. Tracking of tree removals in the database is a recent occurrence. The inventory reflects mainly trees in parks and on streets. Tree inventory fields include tree botanical and common name, species, location (easting-northing, street address, type of surroundings), health, size (dbh, height, canopy width), inspections, private or public lands, potential conflict from overhead and underground utilities, comments, maintenance activities and costs. Tree data is collected with each tree site visit and the information is entered into the database as time allows. An inventory does not currently exist for public trees located in naturalized lands. A total of 80+ trees captured within the inventory are located on private property.

Tree inspections occur as requests for tree maintenance are prepared by Town staff or through issues reported by the public. The Forestry Section maintains a **work order and service requests system** to track identified tree maintenance requirements and requests from others for service. With the current health of the urban forest stressed by the arrival of Emerald Ash Borer, normal urban environment stresses, and the presence of older, mature trees, the current level of service demand places significant pressure on Town staff. Staff note that the current work demand is much more reactive than the desired state of working effectively and proactively. A summary of the numbers and types of tree management activities conducted over a one year period of early 2016 to 2017 is presented below. A total of 445 forestry work orders were completed in 2016 and an average of 262 service requests were addressed per year, between 2014 and 2016. The number of service requests received per year is decreasing (from 360 in 2014 to 174 in 2016)

Table 3.3: Summary From Review of Work Order Data for 2016

WO Description	# of records	Types of Work completed
Forestry By-Law Inspection	23	damaging sidewalk, growing into lines, whose tree is it, tree hazards, were new trees planted?, trees dying and need to be replaced
Forestry Stump	46	mostly removals requests
Miscellaneous	7	age of ash trees for treatment?, plaque base broken for memorial tree in Coverdale Park, trees requiring water
Tree Inspection	70	several trees not well or noted as dying; 33 management areas identified and inspected for EAB in September 2016; also issues of leaning trees, pests, drought stress, water main break required tree removal, concern with ash trees in Daintry Crescent Park, interfering with above ground lines, locate for maintenance of underground cables,
Tree Maintenance	173	generally requests for pruning (obstructing views or walkways, or danger of falling on people or property, dead limbs, fallen branches to remove, few watering (in August) and fertilizer provisions)
Tree Planting	77	# of areas identified for tree planting;
Tree Removal	49	many are ash trees, several boulevard trees

Table 3.4: 2016 Service Requests Summary

SR Description	# of records	Types of Work completed
Business Consultation	8	Advice on tree species and placement, how to build close to trees, how to replace or remove trees, advice on trimming for infrastructure maintenance
General Forestry Inquiry	35	Concerns expressed /Advice sought on sick or dead trees, removal of healthy trees, potential for falling limbs; how to replace trees
Homeowner Consultation	48	Majority of requests are concerns regarding the health of trees in front yard. Some requests involve public tree damage under the tree preservation by-law
Request for a new tree	27	Usually request for replacement tree of one recently removed. A couple requests by homeowners without a tree.
Request for maintenance on a tree	50	Often are requests for pruning or removal due to potential for property damage, interference with pedestrians/drivers or appearance of a sick or dying /dead tree; as well, frequent uncertainty expressed as to the health and potential risk posed by a tree and whether it is on public or private property

Overall, the Town applies **Best Management Practices** for pruning, tree care, planting, risk management where possible, based upon learning from other municipalities. The ANSI 300 standard for tree pruning and the ISA approach to risk management are applied. The Town provides Design Guidelines for new developments, a Preferred Species List and Tree Preservation Guidelines for use by contractors and developers.

Part of the current urban forest program is the **Emerald Ash Borer (EAB)** management plan. There were approximately 450 ash trees identified initially, less now with culling that has occurred over time. The tree inventory identifies 339 ash trees, with about 1/3 noted as in Fair condition and close to 2/3 in Good condition when inspected between 2008 and 2015. The Town is currently working with the County to treat 25-30 trees for EAB, consisting of individuals that are large-canopy, special neighbourhood or park trees that the Town wishes to retain. County staff are responsible for EAB treatment. The Town advises residents on approaches to management of ash trees and EAB on private property when calls are received, a service that is seen to help maintain the overall urban forest canopy. The Town has not planted ash trees since 2003 and removed ash trees from the recommended planting list within new developments in 2006/7.

To the extent possible, the Town takes advantage of available grants and partnership opportunities to support **tree planting** on public (Town) lands. The number of trees planted in recent years has ranged from 150-175; 2100 trees were planted in 2014). In 2014, a grant of $25,000 was obtained from the Great Lakes Funds. Other grant programs that have been obtained include the TD Green funds, Canadian National Railway and Greenstreets ($5000). There is a current initiative of the Highway of Heroes that is requesting Cobourg to participate whereby 117,000 trees will be planted along Highway 401 between Trent and Toronto (trees must be located within 1 km of the highway). A recent initiative, for planting of trees at the cenotaph, created much public interest and is a good example of applied public education and awareness.

Tree stock for planting is obtained from local suppliers, as available. “Whip” trees are the most common size planted. Large canopy trees are planted where feasible along streets, and as budgets allow. Often, inadequate soil volumes are available to support trees in already developed areas.

The Town’s recommended tree species for planting on public and private lands indicate a preference for native species, but there are also some recommended hardier non-native species, such as honey locust and little leaf linden. These species provide choice of trees more likely to survive and thrive in hostile urban locations, such as small soil volumes, potential for droughtiness and areas of predominantly asphalt. Recent directions have also included discontinued planting of Norway maples (the current most dominant species in Town) and selection of tree species to support a more diverse and healthy urban tree canopy.

The **Town partners** with Ganaraska Region Conservation Authority (GRCA) for tree planting, such as part of the Atlantic Salmon Recovery program. Ganaraska Region Conservation Authority (GRCA) and the County of Northumberland are important and valuable Town partners in forest management. Overall, urban forest management has strong working relationships with other Town departments - Public Works, Planning, Clerk’s, GIS, Communications – and with the County, GRCA, utility companies, businesses, the development community, community groups and residents. Community group supporters of urban forest management include Willow Beach Field Naturalists, the Ecology Garden and the Cobourg Horticultural Society.

The Town also encourages and supports tree planting on private property. For example, whip size trees are made available to residents, when feasible, for a cost of $20 with the remainder of the stock cost subsidized by the Town. Residents that access these trees are requested to plant them in their front yard.

The Town is fortunate to have had several **local studies on wildlife habitat and heritage trees** that can help inform ongoing urban forest management. A local book on birding and Lucas Point Park provides excellent background on this important site for tracking of migratory birds. In another local report on red-headed woodpeckers, it was recommended to keep tree stubs as habitat, an approach that the Town has practiced. It is expected that more opportunities exist to integrate creation of wildlife habitat as part of urban forest management practices. At present for example, tree pruning and removal procedures include consideration of migratory bird nesting. The Town also has recent data and a proposed approach for conserving heritage trees (Brouwer, 2012).

For **development application** review, the Town Arborist recommends a 30-10/30-20 rule, meaning that only 30% of trees planted in a particular area/site plan can be of a specific genus and within that, only 10-20% of the specimens can be represented by one species. The Town collects a levy of $350/tree for planting and ongoing maintenance of **trees planted in new developments**. In the past, developers were responsible to plant trees in boulevards; however, this approach resulted in inadequate trees for which the Town became responsible. Now, the Town collects the levy and determines what trees to plant in boulevards, to accomplish diversity and strong survival, healthy individuals and appropriate aesthetics of the planted trees. The Development Review Team meetings of varied staff (Fire, Buildings and Plans, Engineering, Parks, Water, Electricity, Lakefront Utilities Services Inc.) were described as working quite well with good opportunity for the Town Arborist to advise on protection of existing trees and establishment of new trees within proposed developments.

Victoria Park was described as a special case in that it is a location that is very “event heavy”, supporting a number of large events each year resulting in the need for additional protection for trees. The sand growing material is helpful because it is less susceptible to compaction by foot traffic and equipment. There are presently some old, quite large cottonwood trees here that have reached the end of their life and are in process of being removed and

replaced with new trees. There are some past replacement tree plantings of small stature mountain ash that may have not been the best choice for the expansive vistas of this site. Expansion of the number of large-canopy trees; i.e. more oaks, sycamores, birches would fit well in Victoria Park.

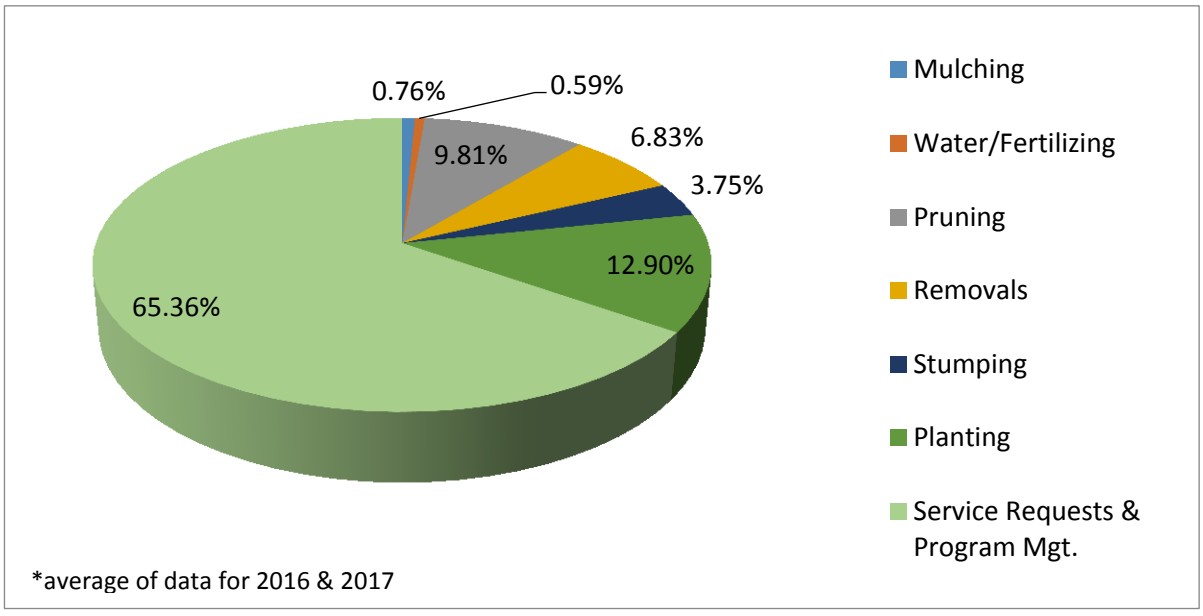
Through the Plan, the Town would like recommendations regarding **tree by-law provisions**. The current by-law captures all properties up to 2 acres in size. There has been uncertainty as to whether the by-law applies to farmlands where wood is cut for firewood. The desire is not to regulate this type of use. Clear direction is also sought for trees within 6 feet of Town property – permission from the Town is required for tree removal.

The **Urban Forest Management operating budget** for 2017 was $219,628 with a forecasted Budget for 2018 and 2019 as $223,483 and $227,402, respectively. These funds cover all aspects of urban forest management activities and administration, including staff, planting and maintenance activities by Town staff and contracted resources. The costs for management activities over the past 4-5 years, tracked in the *CityWorks* database, were assessed to determine the proportion of budget allocated to different types of urban forest management activities (Table 3.5 and Figure 3.8) and the activity cost per tree (Figure 3.9).

Table3.5: Relative Proportion of Budget Allocated to Forest Management Activities

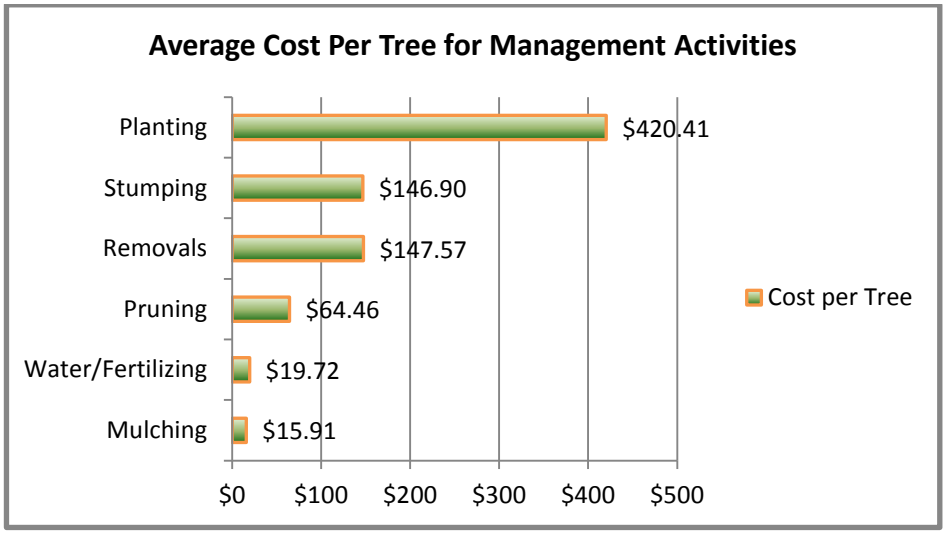
Activity /Year	***Activity Cost***	***Percentage***	***Activity Cost***	***Percentage***
	2016		*2017*	
Mulching	$1,978.23	0.82%	$1,510.07	0.69%
Water/Fertilizing	$2,398.07	0.99%	$303.49	0.14%
Pruning	$22,144.12	9.16%	$23,128.14	10.53%
Removals	$20,295.80	8.40%	$11,225.38	5.11%
Stumping	$10,491.24	4.34%	$6,800.00	3.10%
Planting	$17,116.74	7.08%	$42,400.97	19.31%
Total Staff Time, Service Request & Program Mgt.	$167,212.80	69.20%	$134,259.96	61.13%
Total	$241,637.00	100.00%	$219,628.00	100.00%

Figure 3.8: Relative Proportion of Budget Allocated to Urban Forest Management Activities*



*average of data for 2016 & 2017

Figure 3.9: Average Cost Per Tree for Management Activities



These costs include contractor and equipment costs and some attribution of staff time. Not all staff time dedicated to each forest management activity has been tracked, nor is time for service requests, program management and administration captured. Overall, data tracked within the inventory is improving to become more comprehensive each year, with an expectation of close to complete and accurate information upon which the Town will be able to rely from 2017-2018 onwards. The above information is helpful to illustrate the relative cost of management activities on a per tree basis and can be used for projection of future urban forest management operational budgets.

3.6 Cobourg's Urban Forest Management Challenges

Through discussion with Town urban forest management staff and stakeholders, a number of challenges have been identified to address:

- Town tree **maintenance** is more **reactive** in practice than is wished
- Challenge of **maintaining trees in urban environment** – water stress, soil compaction, nutrient availability - particularly along high traffic street and park areas
- **Conflict** of tree roots, trunk and branches **with other infrastructure** – pipes, road & sidewalk maintenance, utility lines
- **Inadequate space and soil volume** in some areas for the growing of healthy trees
- **Tree pests, invasive species & diseases**, such as Emerald Ash Borer, Beech Bark Disease
- **Older, larger trees** require more maintenance
- Areas of **high winds** due to geographic location on Lake Ontario
- **Climate Change Effects** that include changes in microclimates, local site conditions, timing of biological activity, potential change in conditions to favour invasive species and severe weather events
- **Respective Roles and Responsibilities** are not always clear, and the Town wishes to be sure to avoid service gaps and overlap
- **Urban Intensification** that may result in tree removal and/or limited areas available for trees
- Challenges specific to **Victoria Park**, such as how to protect existing trees from the heavy traffic; how to place and plant trees with all the activity that occurs within the Park; how to plant for the future considering compaction and the need for open space and how to deal with the loss of the Two poplars in the south east corner of the Park

3.7 Opportunities Relevant to the Town of Cobourg

Town staff, stakeholders and the community have also identified many opportunities for an enhanced urban forest and management approach:

- **Many potential planting locations** available, on public and private lands; Integration of more trees is possible, with appropriate directions, in new developments, along streets and large boulevards
- Potential to establish a **Town tree nursery**
- **Second Town Arboretum** is possible to be established on public lands
- **Favourable climate and soils**
- Increase **tree species diversity** – there is a large diversity in the tree species planted; however, some species (Norway maples, maples) dominate. The favourable climate and soils offer the opportunity to support a variety of trees, including some Carolinian species
- **Grants** have often been available to support tree planting
- **Partners and community are supportive** of healthy urban forest
- **Potential for more community** (residents, groups, businesses, schools) **involvement** in care and expansion of the Town`s urban forest
- **Strong existing base program** comprised of urban forest management tools, knowledge and supporting Town policies
- Identify and promote Town **Heritage trees** that offer people connections to their history and an opportunity to promote and recognize the importance of community trees. Clarify the important Heritage trees on Town lands and consider what can or should be done to protect these trees. Also consider what can be done to assist landowners with Heritage trees on their land
- Establish **enhanced directions and guiding concepts and procedures for overall urban forest management**, recommended pruning cycles, clear direction on tree planting and pruning
- Advise on need for update of the **tree preservation by-law provisions**, to aid in practical and appropriate enforcement and accomplishment of desired outcome to keep trees whenever feasible; and advise on appropriateness of a **private trees by-law**, pros and cons for establishment within the context for the Town
- From the **Parks Master Plan**'s directions for connected corridors and expansion of open space areas, there is an opportunity to align and integrate complementary directions, such as recommended areas for planting;
- **Specific area opportunities to consider for enhancement of the urban forest**:
    - Lucas Point: Tree species and location of where to plant, to assist with stabilizing the bank along the shoreline trail and to keep the Park area as natural as possible
    - Transplant Bed locations
    - Suggestions on how to improve or enhance plantings along boulevards
    - Areas to consider for new plantings in Lions Park Area
    - Potential for school involvement with trail maintenance and tree management along the trail and in Chris Garrett Park Wetland, south of St. Mary's School
    - Potential area for Arboretum in Town lands on Daintry Crescent; consider species of trees and shrubs to encourage wildlife.

4.0 URBAN FOREST MANAGEMENT BEST PRACTICES AND BENEFITS

This section presents information on municipal and industry standard urban forest best management practices and a summary of compiled literature on community benefits.

4.1 Urban Forest Management in Other Municipalities

For those municipalities in Ontario, Canada and the United States that have developed urban forest plans, they tend to be based upon criteria for sustainable urban forests developed by a number of researchers (Maco and McPherson, Dwyer et.al, Clark et.al.). A recent survey determined that approximately 20% of Canadian municipalities have a documented urban forest management plan (TreeCanada, 2015).

The majority of urban forest management plans in place take a comprehensive approach, providing direction for tree protection, management and establishment, prescribing actions that are integrated across municipal operations as well as those of other agencies (such as conservation authorities) and articulating an approach that ensures that the information, procedures, policies, resources and capacity are available for adaptive management. Partnering with other organizations and education and engagement of residents are also common plan components. Delivery on the direction of the Plans involves detailed budgets and procedures and provision of appropriate tools to well support urban forest managers in their daily responsibilities. Successful Plan implementation involves detailed budgets and operating procedures and provision of a comprehensive set of tools to well support urban forest managers in fulfillment of their responsibilities. Having documented and approved Plans helps urban forest managers in setting priorities, annual operational plans, and appropriate budgets for long-term tree care. Urban forest management criteria are often used for plan development and tracking of progress.

The following municipalities, all of which have a comprehensive urban forest management strategy and work program, were reviewed for their approach, practices and effectiveness in urban forest management. Best Practices highlights of interest for potential application in Cobourg include:

- **Toronto:** Trees cover 26.6 to 28% of Toronto's area, with much of that cover present in the City ravine systems which are protected natural heritage features. The density average is 16,000 trees per square kilometre, 4 trees for each person in the city. Of the total 10.2 million trees, comprised of at least 116 different species, 5.9% consist of street trees, 34.3% are in City parks and natural areas with the remaining 59.8% located on private property. As part of the City's comprehensive community education and engagement program, the City provides small-sized trees to interested individuals in return for their attendance at a 1-hour education session on planting and care of the tree. Other proposed initiatives (2016) include encouraging resident registration of pledges to plant trees, a tree adoption program, workshops, tree tours, reminders to water trees. Work is organized with communities for tree planting, removal of invasive species, tree watering, installation of bird boxes and monitoring of tree health. The City also offers a tree site plan preparation service, for a fee. Funds received from enforcement of the Street Tree and Private Tree By-Laws are placed in a Tree Canopy Reserve for implementation of the City's Tree Planting Strategy.
- **Markham**: The Town has established a clear definition for its urban forest and set a comprehensive program for management within an expansive urban environment. Directions have been set for maintaining a healthy and diverse urban forest that increases to meet a 30% canopy target. Forest restoration will occur on sites such as hydro corridors, parks, schools, stormwater management pond and other public and community infrastructure. The Town requires compensation when trees are damaged, has a Tree Protection By-Law in place, and a detailed design guidelines specific to siting and planting of trees.
- **Halifax:** Halifax supports one of the highest known urban forest cover proportions in Canada at 43%. Their comprehensive management plan includes detailed tree planting and maintenance directions for 10 priority neighbourhoods of the total 111 urban forest management neighbourhoods within this Regional

Municipality. Community input was sought on how best to set up community food orchards. The strategy for Halifax addresses principles, values, objectives, indicators, targets, and then actions.

- **Oakville:** Specify compensation schedule for removed trees, based upon size and species of the tree removed. Detailed guidance available onsite for permitting procedures associated with tree removal on private property. Extensive program in place for tree monitoring, maintenance, planting. Management plan is currently being updated.
- **London:** London has named itself the "forest city" and is in process of implementing its recently developed strategy and management plan. Detailed guidance is in place for how trees are to be maintained, where planted and how, and also has schedules for compensation due when trees are removed. A by-law regulating the removal of trees from private property is in place, as well as a by-law for protection of public trees.
- **Haldimand County**: This recent, 2017,strategy and detailed management plan sets guiding principles and goals to address identified management challenges within the geographic, regulatory, current program, community and climatic context. The County will partner with the conservation authority to deliver the Community Outreach and Stewardship Program. The UFMP is designed to respond to all identified challenges.

The Town urban forest operational practices were reviewed and compared to best practices within the industry. Specific recommendations for updating urban forest management practices are integrated within the policy directions presented in Section 7.0.

4.2 Criteria for Evaluating Urban Forest Management

For those municipalities in Ontario, Canada and the United States that have developed urban forest plans, their framework and evaluation regarding progress is based upon a set of criteria for sustainable urban forests developed by a number of researchers (Maco and McPherson, Dwyer et.al, Clark et.al.). These criteria provide a basis to assess the health of an urban forest and its management according to 3 broad categories that lead to a sustainable urban forest:

1. The **vegetation resource** – health and diversity of the urban forest;

2. **Community framework** (high level of involvement is desired) – how well do others understand the importance of the urban forest and what is their level of participation in its management; and

3. **Tree management approach** – management practices for public (and private) trees are appropriate for the resource.

These criteria are proposed as a base for the Town`s urban forest management, including regular measuring and reporting upon Town progress on plan implementation. Each of the urban forest criteria are presented on a scale of *Low-Moderate-Good-Optimal* with a description of the key objectives inherent within each criterion. The following table presents a description of the Town's current performance against each criterion.

Table 4.1: Current State & Proposed Criteria for Evaluation of Urban Forest Management in Cobourg

Criterion	Objectives	Town Status
Vegetation Resource		
Canopy Cover	Achieve climate appropriate degree of tree cover, community-wide	Moderate-Good tree cover of approximately 27%; opportunity for expansion through planting
Age distribution of trees in the community	Provide for uneven-aged distribution citywide as well as at the neighbourhood and/or street segment level.	Reasonable diversity of tree ages; potential for a number of trees to be approaching maturity
Species suitability	Establish a tree population suitable for the urban environment and adapted to the regional environment.	Good, distribution of Town trees is close to optimal tree species suitability
Species distribution	Establish a genetically diverse tree population Town-wide as well as at the neighbourhood and/or street segment level.	The Town applies a 30-20 rule when planting trees to accomplish genus and species diversity
Condition of Publicly-owned Trees	Detailed understanding of the condition and risk potential of all publicly- owned trees	Moderate to Good; good inventory base established with some description of tree condition for approximately half of public street and park (open space) trees; Opportunity for improved understanding of tree health and potential risk
Publicly-owned natural areas	Detailed understanding of the ecological structure and function of all publicly-owned natural areas.	General knowledge of natural areas at present; no inventory data
Native vegetation	Preservation and enhancement of local natural biodiversity	Good to Optimal - Preference specified for native species, Parks system designed to be connected for residents and wildlife
Community Framework		
Public agency cooperation	Ensure all city department cooperate with common goals and objectives	Inter-departmental co-operation in place; semi-formal coordination in place; enhanced coordination intended through this Plan
Involvement of large private & institutional land holders	Large private landholders embrace Town-wide goals and objectives through specific resource management plans.	Private landowners are engaged in tree planting and maintenance through the development review process. Enhanced landowner participation in the urban forest is an Objective of this Plan
Green industry cooperation	The green industry operates with high professional standards and commits to Town-wide goals and objectives.	Moderate to Good support from and cooperation amongst community groups, local nurseries
Neighbourhood action	At the neighbourhood level, citizens understand and cooperate in urban forest management.	Moderate to Good level of community understanding
Citizen/municipality/ business interaction	All constituencies in the community interact for the benefit of the urban forest.	Some interaction and collaboration amongst community groups
General awareness of trees as a community resource	The general public understands the role of the urban forest.	Moderate level of understanding
Regional cooperation	Provide for cooperation and interaction among neighbouring communities and regional groups.	Good level of co-operation with stated intent for more collaboration on tree initiatives
Management Approach		
Tree Inventory	Complete inventory of the tree resource to direct its management. This includes: age distribution, species mix, tree condition, risk assessment.	Moderate-Good –good base inventory of public trees with need to complete / update information for all public trees; knowledge of some private trees
City-wide management plan	Develop and implement an urban forest management plan for private and public property.	Plan in progress for public trees, some influence on private trees

Criterion	Objectives	Town Status
Municipality-wide funding	Develop and maintain adequate funding to implement a citywide urban forest management plan	Good – through funding, creativity and community support trees are cared for and annual planting; Purpose of this plan to increase efficiency
City staffing	Employ and train adequate staff to implement Town-wide urban forest management plan	Good; Arborist on staff with opportunity for regular training; Purpose of this plan to ensure adequate resources are available
Tree establishment planning and implementation	Urban Forest renewal is ensured through a comprehensive tree planting program driven by canopy cover, species diversity, and species distribution objectives	Good: Annual Town and community tree planting occurs; objectives for enhanced and proactive tree establishment and replacement, species diversity
Pruning of publicly-owned, Intensively managed trees	All publicly-owned trees are pruned to maximize current and future benefits. Tree health and condition ensure maximum longevity.	Moderate-Good: Annual pruning of selected areas, pruning of individuals as issues arise – purpose of this plan is to establish appropriate pruning cycle, more proactive
Tree risk management	Complete tree inventory, which includes detailed tree failure risk ratings; risk abatement program which aims to reduce identified tree risks within one week of their identification. The condition of all publicly owned trees is assessed on an appropriate cycle.	Moderate-Good – immediate response to identified tree risks and working towards comprehensive risk management program through preparation of this plan
Tree Protection Policy Development and Enforcement	The benefits derived from largest mature trees are ensured by the enforcement of municipal wide policies.	Good – Tree protection for public trees, requirement for tree preservation plan for new developments; enhanced protection is desired
Publicly-owned natural areas management planning and implementation	The ecological structure and function of all publicly-owned natural areas are protected and, as appropriate, enhanced.	Protected through OP policies. Opportunity to develop management strategies and level of care standards for natural areas, in cooperation with County and Ganaraska Region CA
Assessment Tools	Develop methods to collect information about the urban forest on a routine basis	Moderate to Good – An almost complete inventory is in place. Tree data is updated as work occurs
Species and Site Selection	Provide guidelines and specifications for species use, including a mechanism for evaluating the site	Good – Acceptable tree species list in place; consideration is given to matching trees to appropriate sites
Standards for Tree Care	Adopt and adhere to professional standards for tree care	Apply Industry Standards for tree care; i.e. ANSI 300
Recycling	Create a closed system for tree materials from pruning, removal.	Good. - Wood materials are recycled. Opportunity to use wood from removed trees for Town amenities, such as benches.

4.3 Community Benefits of a Healthy Urban Forest

People within well-forested urban communities enjoy many benefits from trees. Many studies on tree benefits and their description have been conducted with the values generally categorized as Environmental, Social, Cultural and Economic. Figure 4.1 describes the breadth of the community benefits of trees.

TD Economics prepared reports on the financial contribution of urban forests to selected Canadian cities and specific to the City of Toronto (2014). Report highlights on how urban forests represent an important investment in environmental condition, human health and the overall quality of life included:

- The trees in the City of Toronto's urban forest are worth an estimated $7 billion, or about $700 per-tree. Toronto's urban forest provides residents with over $80 million, or about $8 per-tree, worth of environmental benefits and cost savings each year through services of wet weather flow management, air quality, energy savings, carbon sequestration and energy emission abatement. For the average single family household, this works out to $125 of savings per annum.
- Urban forests within Halifax, Montreal and Vancouver have a combined replacement value of $51 billion and they provide environmental benefits of over $250 million per year, or more than $330 million per year when Toronto is included. These estimates would increase with inclusion of other tree benefits such as the value of tourism, recreation, and increased property values.
- For every dollar spent on annual maintenance, Toronto's urban forest returns anywhere from $1.35 – $3.20 worth of benefits and cost savings each year for services of stormwater retention, air quality improvement, energy savings and carbon storage. The average annual maintenance cost for each tree is $4.20. Street trees are noted as more costly to maintain because of the harsher growing conditions in comparison to parks, yards or natural areas.
- Average forest cover for five largest cities in Canada ranges from ~17% (City of Vancouver) to 40/43% for Halifax Regional Municipality and Greater Vancouver Regional District GVRD). The trees of Halifax tend to be younger than those in Toronto, resulting in less environmental benefit per tree = $0.54/tree and cost benefit ratio of $12.70.
- Halifax has the highest tree number per capita for a Canadian city at 130 trees per resident.
- For the GVRD, the annual benefits are $3.21 per tree and a cost benefit of $4.59. GVRD trees are estimated to remove more than 10% of CO released by major industries in the region and close to 90% of nitrogen dioxide emissions. Major contributions are also obtained through wet weather flow reduction.
- The study also noted the uncalculated benefits that urban trees provide in terms of community identity, encouraging outdoor activity, increase of property values and retail visits, attracting visitors, providing wildlife habitat, supporting biodiversity and as a source of food.

Figure 4.1: Overview of Tree Community Benefits

1. Clean Air. Researchers at the Davey Institute found that urban trees and forests are *saving an average of one life every year per city* because of the particulates that they remove from the air. Trees are often referred to as the "lungs of the planet" because they provide oxygen to animal life.

2. Clean Water. Forests and trees provide natural filtration of water by removing contaminants. Surface water runoff in urban areas contains contaminants washed from impervious surfaces and from the air as well as nutrients from lawns. Trees, shrubs and non-woody vegetation can also intercept nutrients in runoff from agricultural lands in rural areas.

3. Carbon Sequestration. Burning fossil fuels puts heat-trapping carbon dioxide into our atmosphere, changing our climate in disruptive ways. Planting trees can slow down this process. A tree *can absorb as much as 48 pounds of carbon dioxide per year*, and can sequester one ton of carbon dioxide by the time it reaches 40 years old.

4. Reduced Crime. Neighborhoods with abundant trees have significantly fewer crimes than those without. Researchers think that this is because green spaces have a calming effect and encourage people to spend more with their neighbours out of doors, bolstering community trust.

5. Increased Property Values. People are drawn to homes and businesses near trees. Studies have reported property values of 7 to 25 percent higher for houses surrounded by trees. Shoppers spend up to 13 percent more, will travel longer distances and will stay longer at retail areas near green landscapes with high quality trees.

6. Mental Health. Feeling down? Take a walk in the woods. Several studies have found that access to nature yields better cognitive functioning, more self-discipline, and greater mental health overall. One study even found that hospital patients who can see trees out their windows are hospitalized 8 percent fewer days than their counterparts. A study by

7. Human Health: Many studies are observed improved human health in communities characterized by healthy tree cover. Within the City of Toronto, a study of neighbourhood tree density and observed and reported human health found that people living in neighbourhoods with denser treed streets reported better health perception and fewer cardio-metabolic conditions than people living along streets with lower tree densities (Kardan et.al., 2015). Another study in 15 U.S. states found that communities with tree loss due Emerald Ash Borer infestation experienced increased human mortality due to cardiovascular and lower respiratory-tract illness (Donovan et.al., 2013). Expected reasons for this observation relate to loss of tree contributions to better air quality, reduced strees, increased physical activity, and moderated temperatures.

8. Temperature Control and Energy Savings. The shade and wind-breaking qualities that trees provide benefit everyone from the individual taking shelter from a hot summer day to entire communities. The annual mean air temperature of a city with 1 million people or more can be 1–3°C warmer than its surroundings. Planting trees reduces this "heat island effect". And households with shade trees could spend 12% less on cooling costs in the summer. Trees providing windbreaks in winter also provide energy building and home energy savings through reduced loss of building heat.

9. Flood Control. Trees intercept and hold large volumes of water that would otherwise run down hills and increase stream flows. Trees are an important part of stormwater management for many cities, reducing the need for all human-built infrastructure to manage water flows from impervious surfaces.

10. Wildlife Habitat. Wildlife – birds, mammals, reptiles, amphibians and insects - use trees for food, shelter, nesting, and breeding. These habitats can support an incredible variety of plants and animals and contribute to biodiversity.

11. Cultural Heritage and Food Security: Trees provide people with a connection to places and are valued for their aesthetics and part in history. The sense of place and community identity enjoyed by residents in treed areas encourages people interactions and community cohesion. Many species of trees also provide food – fruits and nuts – that can be shared amongst community members.

Source: Added to and Adapted from Earthshare (www.earthshare.org) and Tree Canada (www.treecanada.ca)

5.0 COMMUNITY AND STAKEHOLDER PERSPECTIVES

Cobourg is a community that participates and is interested in Town activities and management. A strong and informed level of community interest has been the Town experience regarding urban forest management. Town Forestry and Parks and Recreation staff responsible for the urban forest also have respectful and effective working relationships with stakeholders involved in urban forest management. As a result of these relationships, the Town identified meaningful input from Cobourg's community and stakeholders as an important component of plan development. This approach aligns with the Town's commitment to public engagement that "is based on the understanding that citizens should have, and want to have, input in the decisions that affect their lives".

5.1 Community and Stakeholder Engagement Process

The urban forest planning team (consultants and Town Arborist) worked with the Town Communications Coordinator to prepare a community engagement strategy at the start of the project. This strategy followed the Town of Cobourg's recently (2016) adopted Public Engagement Policy, Community Engagement Guideline and accompanying Community Engagement Toolkit. The documented approach for community and stakeholder engagement presented the communications objectives, techniques for engaging the public and stakeholders and a detailed engagement workplan for the UFMP project. This strategy, once approved by the Communications and Council Coordinators (see Appendix F), guided public and stakeholder engagement throughout plan development.

Citizen and stakeholder input was sought at the preliminary and draft plan stages to inform the initial Plan content and for refinement of the draft plan material. Meetings were held in April and October, 2017, with community members and stakeholders with an interest in how Cobourg's urban forest is managed. Participants included Town staff in public works, parks, planning and by-laws, the Town CAO, Mayor, Council and Advisory Committee members, and representatives of utility companies, the County, Ganaraska Region Conservation Authority and community groups and residents. The first set of meetings involved a presentation on research findings, current Town approach, opportunities and challenges of urban forest management and discussion on what is working well, what could be changed, future look for the urban forest in 20 years, and how to achieve this desired urban forest. For the second set of discussions, the focus consisted of the proposed set of directions for Town urban forest management – vision, goals and objectives – and a workplan of tasks for the Town to complete.

Paper and online surveys were also available for residents to provide input upon what aspects of the forest are important to them, what the future forest should look like, and how best to manage the Town's urban forest. Stakeholders were invited to meetings by e-mail. Background material was provided in advance to participants. Community members were advised of the public meetings through the Town website, press releases, newspaper advertisements, Twitter and e-mail distribution lists. All public and stakeholder feedback was documented, shared with participants by e-mail and on the Town website, analyzed and integrated into the plan directions, as relevant.

The next steps for the Plan are Council review of the final Urban Forest Management Plan and, upon Council approval, Plan Implementation between 2018 and 2037.

5.2 Perspectives and Input to the Plan Strategic Directions, Management and Action Plan

Through the initial stakeholder and community meetings held April 24 & 25, 2017, highlights of the feedback provided by participants through the meetings, paper and online survey responses include the following:

- **Vision and Principles**: A future forest that is lush, healthy, sustainable and thriving. In 2038, Cobourg's urban forest would consist of tree-lined streets that sometimes provide a closed canopy and that are connected to natural areas and provide treed connections for people and wildlife. Commitments to meeting this future forest include proactive management of trees throughout their life, more trees on both public and private lands, a collaborative effort to managing the urban forest exists amongst Town staff, partners and the community and trees provide significant community benefits.

- **Goals and Objectives**: Plant trees where feasible to expand cover, particularly in areas now without trees; ensure cost-effective & proactive management; support private landowners in tree care; actively replace removed trees; set an aggressive canopy target, 35-40%; maximize access to funding options; and increase protection of existing and heritage trees.
- **Workplan:** Implement a risk management program for trees, ensure respective urban forest management roles and responsibilities are clear and that adequate resources are secured to deliver the proposed Plan; establish tree planting and maintenance plans; and deliver a community education program.

Appendix G presents a detailed summary of the stakeholder and community input received through the preliminary plan content stakeholder and community engagement stage.

Applying the April 2017 stakeholder and community input, industry best practice and identified outcomes for effective urban forest management and consideration of the Town context, assets, current practices and identified challenges and opportunities, the planning team developed a recommended draft urban forest management program. This proposed plan text consisted of a draft vision, principles, goals, objectives, and actions for management of Cobourg's urban forest over the next 20 years. Highlights of the stakeholder and community feedback on the draft plan directions and workplan, received through meetings held on October 25 and 26, 2017, and through completed surveys, include:

- **Vision:** of "Cobourg will be a community in the forest" was unanimously supported. There were suggestions to clarify wording of some of the phrases supporting the vision;
- **Principles:** It is recommended to include the concept of connectivity and integration of the urban forest with the natural heritage system, as directed through the Town and County Official Plans and the Provincial Policy Statement. Suggestions were offered for description and refinement of the proposed principles and addition of a principle for management of the urban forest in a landscape concept.
- **Goals:** Many expressed the opinion that the 5 goals and supporting objectives appear to be comprehensive and well-articulated. It is suggested to be sure to include younger people in urban forest management.
- **Goal #1 - The urban forest will be lush, diverse, healthy and resilient:** Much support was expressed for expansion of the forest canopy cover. Suggestions offered for how to increase forest cover;
- **Goal #2 - The urban forest will contribute to community sustainability**: There was general support expressed for inclusion of food security, with specific suggestions offered for how to do so;
- **Goal #3 - The Town of Cobourg community understands the urban forest's importance and will be actively involved in its care:** Encouragement approach is supported; suggestions offered to involve young people, include tourism and access wealth of relevant public education materials available from other organizations;
- **Goal #4 - The Town's approach to management of trees on public lands will meet urban forest and community needs:** Specific suggestions offered for planting of trees on public lands, tree replacement should address no net loss of canopy cover, manage the forest as a system, integrate wildlife needs and identify and protect cultural landscapes (under the Town's Heritage Master Plan);
- **Goal #5: The Town will support residents and businesses in the stewardship of trees on private property:** increasing compensation received through development process is a good idea but it may need to be phased in over time; consider request for inspection report to confirm follow-up completed on tree-related development conditions; support expressed for proposal to involve whole community in forest management;
- **Workplan:** The proposed programs and their descriptions were supported and expressed as appearing comprehensive. Many specific suggestions were offered for the programs of tree planting, tree maintenance, community stewardship, funding, regulatory initiatives, heritage trees and integration with other initiatives. Further suggestions also offered for ensuring program success and for partnership opportunities.

Appendix G presents a summary of the stakeholder and community input received through the October draft plan stakeholder and community engagement discussions and surveys.

6.0 THE TOWN FOREST IN 2037

The urban forest is defined as all woodlands, hedgerows, small woodlots, groupings and individual trees, understory and shrubs and their supporting soils that are located across the Town on public and private property. This plan aims to address Cobourg's urban forest system that connects to the neighbouring municipalities and County of Northumberland forest and greenspace areas.

The proposed strategic directions for management of Cobourg's urban forest over the next 20 years, and beyond, are organized from a strategic or high-level vision description through statements that provide more specific direction – goals, and then objectives to meet the goals, ending with a set of specific forest management activities. The principles or Town commitments for *how* all the work will be done are aligned with other Town initiatives and apply to fulfillment of all the proposed vision, goal, objective and action statements.

Analysis of the above-described context of the current urban forest, Town management practices, policy and regulatory directions, the geographic and community environment, stakeholder and public input and industry best practices formed the basis for developing this Plan's directions. These consist of Cobourg's urban forest management vision, principles, goals, objectives and operational plan activities.

Figure 6.1: Hierarchy of Plan Strategic Statements

Principle: Statement that articulates Town values and commitments and overall basis for urban forest management.

Vision Statement – desired state in 20 years (and longer term – 50/100/150 years). The statement should be **c**oncise, visual, inspiring, far-reaching, memorable, and long-lasting.

Goals: Action statement of key strategic directions required to meet the vision.

Objectives: break each of the goals into several tasks which are articulated as measurable results, outcomes (statement of the end state to be achieved) or products that achieve part or all of a goal

Targets are expressed as specific numeric objectives that represent end state conditions to achieve

Actions: Specific tasks that work together to meet the goals and achieve the desired outcomes

6.1 Vision

A vision statement is to be inspirational, clear, concise, future-looking, memorable, provides guidance for day-to-day decision-making, is aligned with organizational and community values, is long-term oriented (20 years for this plan) and positive. Review of the strategic directions and vision articulated in the Town's Official Plan, Urban Design Guidelines, and Parks Master Plan and the Town's geographical, ecological and historical context, stakeholder and public input all contributed to Cobourg's urban forest vision of:

Cobourg will be a community in the forest.

This means that the urban forest will be:

- Recognized, valued, and a prized community asset of which residents are proud

- Lush and connected to green areas, enclosed tree canopies that are continuous and connected, tree-lined streets; an ecosystem that looks and functions like a forest ecosystem
- Well managed, with long-term planning of 100-150 years to achieve the desired forest health, composition and cover
- Integrated with and supportive of the health, diversity, extent, connectivity and function of the Town's and the County's natural heritage system
- Contributes to community sustainability – the urban forest provides environmental, social, cultural and economic benefits
- Minimal conflict with infrastructure
- Predominantly native species, evolving to be resilient to climate change; tree planting and maintenance will consider site conditions (soils, moisture, microclimate, nutrients) and features of the surrounding landscape
- The urban forest's look and function reflects some of the forest characteristics (tree sizes, species diversity, ecosystem health) of the pre and early settlement times of Cobourg
- The whole community works together in stewardship of the Town's urban forest

6.2 Guiding Principles for Managing the Town's Urban Forest

To achieve the urban forest vision for the future, guiding principles and goals are helpful to provide more detailed guidance for Town management actions. The above text box illustrates the intent and statement structure generally applied when developing these statements. Principles and goals can be applied to address urban forest management components such as tree data to inform management practices, a planting strategy, maintenance standards, regular inspection of individual trees for early problem identification, tree protection and pest and disease management.

Possible tree program principles and goals suggested by experts include:

- Establish and maintain maximum tree cover / Increase tree cover;
- Maintain trees in a healthy condition through good cultural practices;
- Establish and maintain an optimal level of age and species diversity;
- Conserve / Protect tree resources.
- Select, situate, and maintain street trees appropriately to maximize benefits and reduce risks, nuisance, hardscape damage, and maintenance costs;
- Centralize tree management under a person with the necessary expertise;
- Promote efficient and cost-effective management of the urban forest;
- Foster community support for the local urban forestry program and encourage good tree management on privately owned properties;
- Work with Partners in managing the urban forest; and
- Facilitate the resolution of tree-related conflicts between citizens.

Principles for Management of Cobourg's Urban Forest

Considering the above industry best practices approach, Cobourg's environment, and the community and forest assets, the following principles, refined through stakeholder and community input, will guide how the Town's urban forest will be managed:

- *Proactive and active management of the urban forest, including management of invasive species, pests and diseases.* Being proactive means that issues will be identified and addressed early, resulting in a healthier

forest which is less costly to maintain. Active management of the forest is necessary in an urban environment that tends to be more hostile for tree growth and potentially harmful to trees in areas of high human activity.

- *Cost-effective urban forest management program*
- *The urban forest will provide connections and corridors for people and wildlife*
- *Community outreach and engagement are essential to achieving the urban forest vision*
- *Partnerships will be an important component of managing Cobourg's forest*
- *Right tree in the right place to maximize tree growth, health and longevity and to reduce conflicts.* Factors to be considered include matching the tree species to soil type, moisture availability, air and soil space available for growth, presence of other community infrastructure, preservation of views and area aesthetics, cultural heritage and potential impact upon and from neighbouring land uses.
- *All trees, shrubs and plants comprise the urban forest*
- *Establish a balance between human uses and ecological needs of the urban forest*
- *Management of the urban forest will consider the entire landscape and an ecosystem context.*

6.3 Outcomes to Achieve Through Urban Forest Management

Stakeholder and community input to the management plan, summarized in Section 5 and Appendix G, are integrated throughout the articulation of the vision, principles, goals, objectives, and actions documented in this plan. The following Table 6.1, adapted from Clark et.al. (1997) presents the overall management program outcomes that will be met, combining industry accepted outcomes and those identified by Town staff, stakeholders and community members. The desired results are organized into three categories of:

1. The **vegetation resource** – health and diversity of the urban forest;

2. **Community framework** – how well do others understand the importance of the urban forest and what is their level of participation in its management; and

3. **Tree management approach** – the management practices for public (and private) trees are appropriate for the resource.

6.4 Goals, Objectives and Actions for Management of the Town's Urban Forest

Five Goals were developed to guide Cobourg's urban forest management over the next 20 years. Table 6.2 presents the supporting objectives and strategies for the goals of:

1. The urban forest will be lush, diverse, healthy & resilient
2. The urban forest will contribute to community sustainability
3. The Town of Cobourg community will understand the urban forest's importance and will be actively involved in its care
4. The Town's approach to management of trees on public lands will meet urban forest & community needs
5. The Town will support residents and businesses in the stewardship of trees on private property

Table 6.1: Overall Urban Forest Management Program Outcomes

Vegetation Resource	Community Participation	Tree Management Approach
1. The Town will achieve a tree canopy cover target of 35% 2. The Town plans for age and species tree diversity on a community-wide basis as well as at a neighbourhood/ street segment level 3. The condition and risk of publicly owned trees is well understood 4. Preserve and enhance local natural diversity	1. All Town departments cooperate and follow common goals and objectives 2. Large private and institutional land holders follow Town goals and have their own tree management plans 3. Tree-related businesses operate with high professional standards and commit to Town goals and objectives 4. Citizens understand and cooperate in urban forest management at the neighbourhood level 5. The Town, citizens and businesses interact for the benefits of the urban forest 6. The Town, its citizens and businesses all understand the role of the urban forest as a community resource 7. The Town facilitates cooperation and interaction among neighbouring communities and regional groups	1. Complete up-to-date tree inventory available to inform its management; data includes approximate tree age (using proxy data of tree dbh and height), size (dbh, height, canopy width), species mix, tree condition, risk assessment, actions taken, their cost and effectiveness 2. Community-wide plan addresses trees on public and private property 3. Adequate funding is available to implement the community-wide management plan 4. An adequate number of trained staff implement the plan 5. The urban forest is renewed through a comprehensive tree establishment program that has objectives for canopy cover, species diversity and varied tree distribution (species, size, age) 6. Best management practice is applied for pruning of publicly owned trees to ensure tree health, condition and maximum longevity 7. A Tree Risk Management program is in place for publicly owned trees, with decision-making guided by up-to-date tree inventory data; there is timely management of risks and tree condition is assessed on an appropriate cycle 8. The community's public trees are protected and measures are in place to encourage maintenance of trees on private lands 9. Ecological structure and function of publicly owned natural areas are protected and enhanced; management guidance and level of care standards are available 10. Practices are in place for routine urban forest data collection 11. Apply guidelines and specifications for species use, including a way to evaluate sites to place the ``right tree in the right place`` 12. Apply professional standards for tree care 13. The Town promotes and supports tree care on private property through an education and awareness programs

Table 6.2: Summary of Goals, Objectives and Actions for Cobourg's Urban Forest Management Plan

Objectives	Actions / Strategies
Goal #1: The urban forest will be lush, diverse, healthy and resilient	
a. Native species are preferred in the planting of new trees, with hardy non-native species established in hostile urban locations b. Greater native tree species diversity c. Carolinian tree species are introduced to improve the resilience of the Town's urban forest to climate change d. More trees and an expanded tree canopy throughout the Town e. Biodiverse and resilient enough to adapt to future changes and challenges; performs as an ecosystem f. Set a target of 35% canopy cover, increasing the cover from the current 27%. The trees planted to achieve this target will be in place by 2035 with 35% canopy cover achieved by ~2050.	a) Establish a tree planting plan that meets the stated objectives, including direction on tree establishment and maintenance on a neighbourhood basis. Provide direction on matching tree species to different types of sites to guide establishment of the right tree in the right place. Consider ongoing establishment of Carolinian species such as: blue beech, Kentucky coffee bean tree, hickories. Identify tree species recommended for planting and the types of locations for which specific species are appropriate. Consider enhancement of neighbourhood plantings, as described in the draft tree planting and maintenance plan in Appendix H. b) Establish and maintain more trees on public lands (along streets, in parks, on school and institutional lands, in community common areas) and at the Town entrances and gateways. c) The tree planting program is supported by establishment of a tree nursery and transplant beds on public lands; this work would be managed by a community group, overseen by the Town arborist.
Goal #2: The urban forest will contribute to community sustainability	
a. Provides vitality, colour, variety and sense of life b. Provides shade, saves energy for homes and businesses c. Connected to Cobourg's human and natural history – significant trees; large, majestic trees, tree enclosures and tunnels; apple orchards; Iroquois lake shoreline; tree lined streets, more trees/vegetation along the Lake Ontario shoreline and along creeks; the Town entrances and gateways will be tree-lined, to the extent possible; streetscapes integrate naturalized vegetation, where feasible d. Connected and positive contribution to the regional natural heritage system e. Cobourg will be a welcoming environment, a place where people wish to live, where families feel connected f. Cobourg provides a 'go-to' destination for visitors, and is a place for residents and visitors to explore and experience nature. g. The urban forest will be connected to its parks, providing treed areas and more open spaces, as appropriate to community needs h. The urban forest will maximize ecological benefits provided to the community, such as oxygen, erosion control, cooling in summer, improved air quality, carbon sink, maintenance of soil, increased property values, enhanced Town aesthetics, noise reduction i. The urban forest adds to residents' quality of life	a) Establish a tree planting plan and a tree maintenance program on a Town-wide and neighbourhood basis that establishes more trees and shrubs in locations where it is possible (sufficient space, avoid utility and infrastructure conflicts, enhances area aesthetics, protects trees in heavy traffic areas, proposes strategies in areas of urban intensification and infill), includes a tree replacement strategy, integrates sustainability principles and enables the urban forest to function as an ecosystem and balances maintenance resource requirements with aesthetic outcomes through a combination of naturalized and more intensively managed areas. Ecological connectivity will include green infrastructure contributions such as low impact stormwater management facilities, stream corridors, natural areas, parks managed as natural areas, parks with higher maintenance approaches, tree-lined streets, yards, green roofs and walls. b) The tree establishment and maintenance program will contribute to the community's food security by integrating the planting of fruit and nut trees in appropriate locations. Consider committed community engagement to manage harvest and food distribution. c) The urban forest will contribute to energy savings for residents and businesses through placement of existing and future trees to provide shade and a windbreak for houses and buildings.

Objectives	Actions / Strategies
Goal #3: The Town of Cobourg community understands the urban forest's importance and will be actively involved in its care	
a. Residents and businesses will know the value and benefits of the urban forest b. The Town will manage the forest through partnerships c. The urban forest contributes to the Town's food security	a) Establish programs for enhancing the urban forest and community education on Town trees b) Establish a second Arboretum on Town lands. c) Establish a formal Heritage tree program, aligned with the Town's Heritage Master Plan and integrating findings of Cobourg's Heritage Canopy report (Brouwer, 2012). Identify Heritage trees on Town lands and how the trees will be protected. Define how Heritage trees are identified, recognized and conserved on private property. d) Implement selected urban forest management projects through the County-Municipal CAO's shared services initiative. e) Establish a baseline of the urban forest existing condition and performance and regularly monitor progress at a neighbourhood and Town level. The compiled information will provide feedback to residents, stakeholders, and the Town on plan implementation progress and to urban forest managers for effective and adaptive forest management. f) Establish a Community Stewardship program that includes public education, recognition initiatives), Town-led coordination and provision of incentives for enhanced community participation in initiatives such as tree planting, tree care, harvesting of food trees, education of neighbours. g) The Town's Donation / Memorial tree program will be enhanced and will contribute to community recognition of the value of trees. h) Celebrate and promote Town heritage and special trees through the Town website.

Objectives	Actions / Strategies
Goal #4: The Town's approach to management of trees on public lands will meet urban forest and community needs	
a. The right tree is in the right place, to maximize growth and longevity, limit conflicts with other infrastructure b. The urban forest will be managed according to the life cycle of trees – 50 to 100 to 150 years c. Trees receive attention at the right time d. Risk management program is in place e. Make the best use of spaces and resources available for establishment and care of trees f. Adequate resources are available for timely and effective care of the Town's urban forest g. Data is available to define a baseline for the urban forest at a Town and neighbourhood level; progress is monitored regularly h. Work will be completed in the short term to establish the desired urban forest, resulting in urban forest management that is mainly a maintenance program in 50 years i. The Town will integrate wildlife habitat needs into its approach to urban forest management	a. Establish directions and guiding concepts and procedures for overall proactive urban forest management, recommended pruning cycles, clear direction on tree planting and pruning, management of insects, diseases and invasive species, urban design and tree care standards (including engineering standards that better accommodate trees), care required for large, mature trees. b. Establish a formal Risk Management program that provides direction on the recommended schedule of tree visits and assessment of long term health of trees located on public/Town lands. The risk management program will include a documented approach to pest management to manage existing and evolving invasive species, diseases and insects (building upon the Town's current approach). c. Delivery of the urban forest management program will be supported by an articulated governance structure that specifies urban forest management lead and support responsibilities, approaches for coordination and partnerships (such as with the County, GRCA, utility companies, community groups, schools, others) and provides clear direction on respective urban forest management roles and responsibilities so as to avoid gaps and overlap. The recommended approach consists of the following: i. Confirm Town Forestry Section as the lead for urban forest management, supported by Planning, Public Works, Clerk's & By-Laws; ii. Identify appropriate respective responsibilities and initiatives for Town, contractors, and volunteer and community resources. Town Forestry staff will lead all aspects of implementing the urban forest management plan. Contracted tree technical resources are recommended for activities that required specialized training and equipment, such as tree pruning and removal of larger-sized trees, tree disease treatment and planting of larger trees; iii. Identify appropriate joint initiatives to be implemented in partnership with the County and GRCA. Some examples include tree planting, area naturalization and ecological restoration, identification of priority areas for protection and restoration; iv. Partner with schools for engagement of youth in selected projects, i.e. school yard naturalization, natural areas stewardship. d. A comprehensive urban forest resourcing strategy will be in place to identify and secure the needed level of resources for the operational plans to accomplish the stated vision, goals, objectives, outcomes and strategies. Program funding sources include the Town`s current base operational and capital budgets dedicated to urban forest management, a full range of funding and revenue generation opportunities and the contribution potential of partners, stakeholders, community groups and members. The strategy will take into account the average annual and life cycle maintenance costs of the existing tree inventory. Potential funding sources include: i. Active pursuit of urban forest sponsorship from local businesses; ii. Establishment of a community bequest program; iii. Establish a carbon emissions offset program; iv. Support community volunteers in tree planting and care; v. Support the County of Northumberland ash tree replacement program; vi. Participate in the Tree Canada, Ontario Trees programs for planting; vii. Explore other grant and funding programs for tree management and planting. e. Complete the Town tree inventory and maintain current data for trees located on public lands. Individual tree information to be collected consists of data required for effective urban forest management, including the fields of: tree species, location, diameter, height, structure (multiple stems, single bole) and general health. f. Management of the urban forest will be supported by the Town's Asset Management Strategy, currently under development. This Plan recommends directions for inclusion in the Asset Management Strategy (see Section 7.9.1).

Objectives	Actions / Strategies
Goal #5: The Town will support residents and businesses in the stewardship of trees on private property	
a. Encourage and support more planting of trees on private property b. Enhance site development guidelines to establish more trees c. Consider a compensation program for removal of trees from private property; funds are directed to the Town's urban forest management program; d. Encourage tree cover and "oases" in parking lots and other areas or properties that have predominantly impervious surfaces. The presence of trees would improve area aesthetics, intercept and improve the quality of stormwater runoff, cool buildings and pedestrian areas, reduce heat islands while contributing to urban forest connectivity and cover.	a. Consider the following changes to the Tree Preservation By-Law in the upcoming by-law review: i. Integrate directions for an ecosystem/watershed based approach to maintenance and management of Town trees, enhancing contribution by the Town forest to regional habitat, air and water quality, climate, biodiversity and overall ecological health; ii. Integrate the current development review practice of compensation for tree removal into the by-law and consider increase of the ratio to 6:1 as compensation for trees removed for development. Specify the size and number of replacement trees required proportional to the diameter of the tree to be removed, i.e. more replacement trees are required for larger removed tree; iii. Provide a strategy for valuation of trees removed through the development process. This approach to offer an opportunity for cash-in-lieu of planting could be used as an alternative to specifying replacement trees. The value of trees would be based upon a set amount per tree, according to the tree size. The funds would be used for ongoing tree establishment and replacement. iv. Include soil volume standards for new trees as part of the site plan design for new developments – 30 m3 for a medium tree (>=40 cm in diameter) and 50 m3 for a large tree (>=60 cm in diameter; v. Consider increase of the current collected lot levy of $350 per 12.2 m of road frontage to reflect tree establishment costs and an increase in the amount collected for maintenance to cover a period 2 years (from the current 1 year); Annually review levy needs. vi. Include an exception for managed woodlands (of >=0.8 ha) where the owner is removing wood for their own use. b. Encourage planting of additional trees and shrubs and maintenance of existing trees on private property through incentives such as: i. Continue subsidy of trees available to residents for planting; ii. Issue a business challenge for planting of trees on commercial/ industrial/ institutional properties; iii. When promoting incentives, target priority areas for parking lot tree oases, streets and neighbourhoods that have low tree cover; An incentive approach is favoured over a regulatory one. A voluntary incentivized and informed approach to enhancement of the Town`s urban forest is one which better fits with the Town`s current approach for heritage conservation and sustainable development. A more regulatory approach is likely to result in increased conflict with landowners and a need for additional Town staff for enforcement. Similar outcomes in terms of enhanced tree canopy cover and health are possible with both approaches. c. The Town will deliver a comprehensive public education program - in partnership with others such as schools, businesses, the County, Ganaraska Region Conservation Authority - to instill a community-wide environmental ethic and understanding of the value, benefits and appropriate methods of care for Cobourg's urban forest. The education program will include: i. Detailed information on the Town's comprehensive approach to urban forest management ii. The value of trees and natural areas to the community; iii. Provide detailed guidance to residents on tree planting and ongoing care; iv. Naming of tree species through use of identification tags on trees along downtown streets, in parks; d. Use of the Town website as an overall up-to-date resource of urban forest information and resources. e. Consider impact of urban intensification principles upon establishment and maintenance of a healthy urban forest; balance intensification of urban development with provision of adequate air and soil volumes for healthy tree growth; f. The Town will provide residents and business owners with guidance on tree planting & care; g. Consider establishment of an inventory of data for trees located on private property. **h.** Apply the County volunteer database to accomplish urban forest activities; i.e. community education, tree planting, tree nursery operation, tree inventory update, tree and natural areas stewardship, establish of enhanced urban forest on private property;

7.0 COBOURG'S 20-YEAR URBAN FOREST MANAGEMENT PLAN

The recommended Urban Forest Management Program for the Town of Cobourg is a comprehensive plan that integrates community and stakeholder input and meets industry adopted outcomes and best practices for effective urban forest management. This Plan also meets Town specified program requirements for development of a rationale and recommendations for:

1. The components of Municipal Forestry Operations, Tree Inventory and a Tree Establishment Plan;
2. Approach to address Urban Forestry Issues;
3. Development of a Tree Risk Assessment Approach;
4. Recommendation of supporting Standards, Procedures, Policies and Public Tree By-Law;
5. Development of the Detailed Urban Forest Management Plan vision, strategies, management objectives,
6. Development of five one-year operational plans (the Municipal Forest Action Plan);
7. Identification of objectives for each five-year period of the Plan,
8. Identification of appropriate strategies for public and private lands, partnership opportunities, connections to and alignment with other municipal strategic plans and policies and area-specific recommendations; and
9. Integration of Plan Directions appropriate to the Development and Construction Communities;

To meet the 20 year urban forest management vision, principles, goals and objectives described in Section 6, the Town will complete work according to 9 programs:

1. Tree Planting Plan
2. Tree Maintenance Program
3. Risk Management Program
4. Community Stewardship Program
5. Resourcing Strategy
6. Regulatory Initiatives
7. Heritage Tree Program
8. Governance
9. Integration with Other Related Initiatives

Each of these nine programs is described in the following sections, followed by presentation of the detailed urban forest management workplan in section 7.10. This workplan notes the recommended actions for each program that are required to fulfill effective management of Cobourg's urban forest that meets the vision, goals and objectives of this Plan. An estimate of required human and financial resources is presented for each activity, along with staff and partners responsible, the goals to which the program work contributes, and the recommended timing for completion of the activities during the 20 year plan period.

7.1 Tree Planting Plan

Tree planting is an essential program within an urban forestry plan. The main reasons for planting of trees include replacement of trees that become too old or unhealthy to survive without presenting risk to people and property, the enhancement and expansion of the forest canopy, and the maintenance of the diversity of native tree species within the community comprise the main reasons for tree planting.

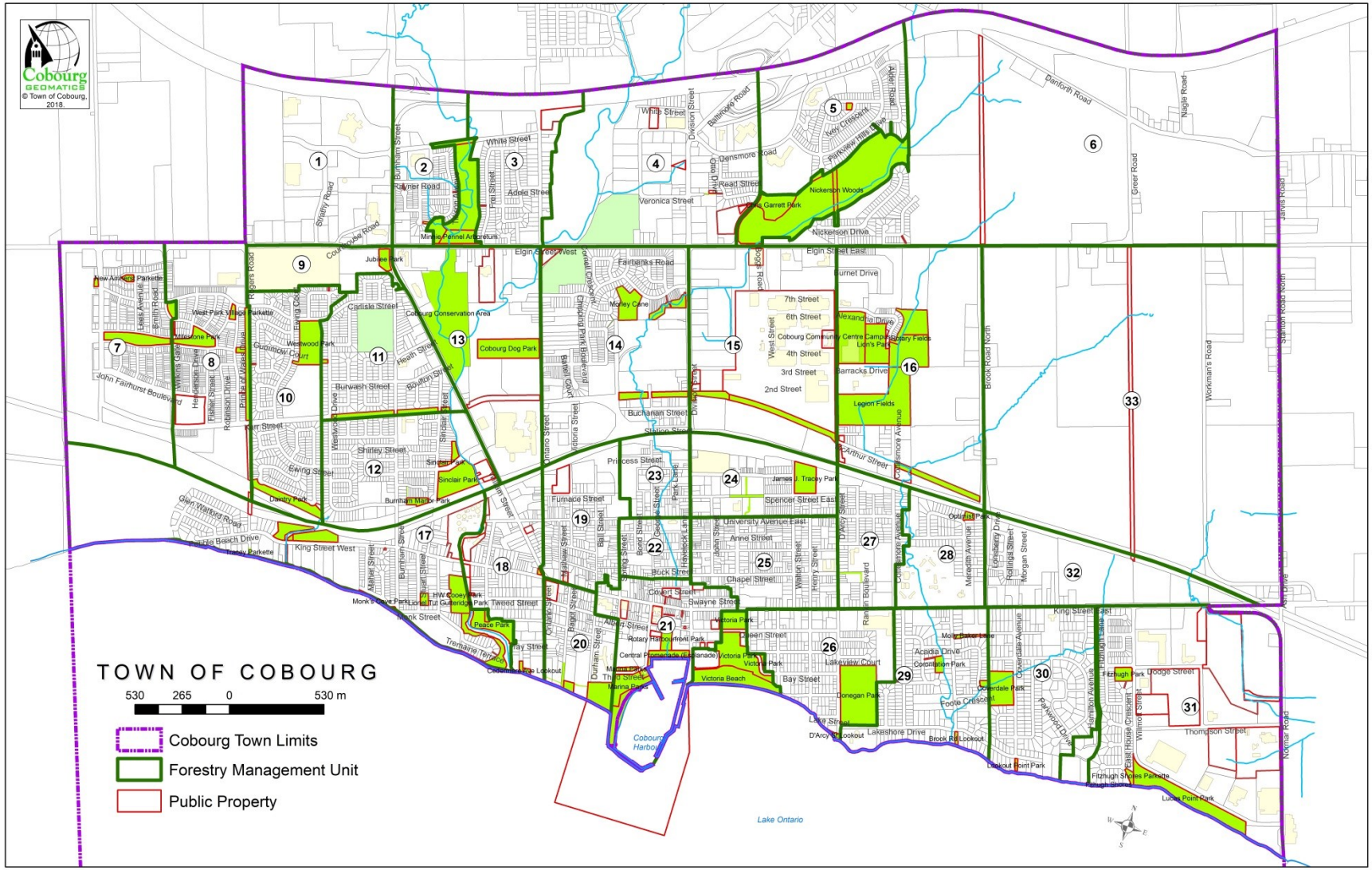
Within the Town of Cobourg, there is currently a mix of tree species, ages and sizes. These trees are located on public lands mainly along streets, in parks and in protected natural areas as well as on private lands on residential and commercial / industrial / institutional properties and undeveloped properties. Evaluation of the Town's inventory of

trees on public lands provides a description of current tree diversity, presented in section 3. It is anticipated that 60% or more of the Town's trees are located on privately owned lands. Opportunities for planting on publicly owned lands remain, but are limited. The current tree canopy cover for the Town, estimated through use of the iTree application, is 27.2% with a margin of error of =/-1.4% (range of 25.8% to 28.6%). To accomplish the forest canopy target of 35% will require a combination of tree planting on publicly and privately owned lands.

To improve overall ecosystem health and accomplish an increase in tree canopy cover to 35% of the Town area over the next 20 years, the following initiatives for tree planting include:

1. The Town will establish a tree planting program that meets the Plan stated objectives for increased urban forest diversity (diversity of tree and shrub species that will attract a variety of animal, bird and insect species) and an increase in canopy cover to achieve the target of 35%. The tree planting plan will identify planting locations on public and private lands on a Town-wide and neighbourhood basis. The approach to tree planting will be supported through direction on tree establishment and care by neighbourhood and hub (school yards, community mail boxes, parks, corridors, other public lands for community use) and guidance on matching tree species to different types of sites so as to establish the right tree in the right place.
2. Identify tree species recommended for planting and the types of locations for which specific species are appropriate. Tables 7.1 and 7.2 present recommended species lists for placement along streets and within parks and on private property. The list will be annually reviewed and updated.
3. Increase of species diversity will include ongoing establishment of Carolinian species such as: blue beech, Kentucky coffee tree, hickories and other species identified as hardy for Cobourg's climate.
4. Consider enhancement of plantings in specific street areas, considering the following criteria for choosing areas that have potential for tree/shrub/plantings enhancement:
    a. Establish more trees and shrubs in locations where it is possible (within areas of sufficient space, avoid utility conflicts, enhance area aesthetics, address heavy traffic areas). Identify planting opportunities for each of the 33 management units illustrated on Figure 7.1. The draft tree planting plan in Appendix H provides direction by neighbourhood management unit. Initial actions include:
        i. Replacement of trees that have been removed from streets;
        ii. Fill-in canopy gaps along Town streets where adequate space is available to place trees on public land, with focus on neighbourhoods with relatively low tree cover;
        iii. Placement of large-sized trees in strategic locations along the Town entrances and gateways, as an aesthetic welcome to visitors and returning residents. Should soil volumes be too small without potential for mitigation through trenching methods, consider placement of other species of smaller mature size with less demanding root volumes.
        iv. Continued planting of trees in public spaces within parks, along trails and in natural spaces. Benefits to consider when selecting location, size and species include potential contribution to shade, wildlife habitat, and naturalization. Figure 7.1 shows Town-owned lands in green.
        v. Encourage planting on private lands within the Town, as described in the Community Stewardship Program in Section 7.4. Continue the requirement to retain as many existing trees as possible and the planting of new trees for housing and commercial /industrial developments. These developments should also be encouraged to plant trees in available spaces, to enhance property aesthetics and contribute to the community's urban forest.
        vi. Consider impact of urban intensification principles upon establishment and maintenance of a healthy urban forest;

Figure 7.1: Map of Cobourg's Urban Forest Management & Neighbourhood Units



b. Implement a tree replacement strategy. This will include tracking of all tree removals from public lands and, to the extent possible, tracking of tree removals on private lands so that an equal number of trees are planted each year to replace tree losses of the previous year.
c. Integrate sustainability principles, such as those identified in the Town's *Urban and Landscape Design Guidelines*[3], and enable the urban forest to function as an ecosystem that well balances maintenance resource requirements with aesthetic outcomes on public lands, identifying a mix of naturalized and more intensively managed areas.

5. Support the tree planting program by establishment of a tree nursery and transplant beds on public lands; this work would be managed by a community group, overseen by the Town Arborist and Horticulturalist.
6. Encourage ecological connectivity of the urban forest through support of green infrastructure contributions such as low impact stormwater management, maintenance and restoration of stream corridors, natural areas, management of selected parks as naturalized areas (identified in the Parks Master Plan for for Lucas Point Park, James Cockburn Conservation Area and Sinclair Park), and enhance connections between all Town parks, tree-lined streets, naturalized yards and green roofs and walls.

7. The tree establishment and maintenance program will contribute to the community's food security by integrating the planting of fruit and nut trees in appropriate locations. Consider committed community engagement to manage harvest and food distribution.
8. The urban forest will contribute to energy savings for residents and businesses through placement of existing and future trees to provide shade and windbreak for houses and buildings.

Tables 7.1 and 7.2 provide a recommended species list with tree location considerations for Town planting on public lands and for planting by residents and businesses on private property. Appendix I presents further guidance for tree planting procedures. The choice of the right tree for the right site along with establishment of a variety of species is essential to achieve forest diversity, overall forest health and resiliency within the public urban forest. Cobourg's current species diversity is presented in section 3. To the extent feasible through available budgets, planting of large size trees is preferred along streets so as to optimize tree survival. Smaller "whip" trees can be planted on other public lands, such as parks, trails and natural areas, that tend to provide more favourable soil and moisture conditions for tree establishment and growth. The Town has been successful with use of "whip" stock in their spring planting program.

[3] Sustainability principles include: Design of public spaces that feature reduced proportion of impervious surfaces; use of locally sourced and adapted tree and shrub species; placement of trees to reduce building energy needs; conservation, buffering and restoration of natural areas; use of low impact design stormwater management that allows infiltration of precipitation where it falls; connection of treed streets and paths to parks and natural areas; retention of mature trees; provision of adequate soil and air volumes for street trees; preservation of existing vegetation to the extent possible on development sites; increased planted areas on sites of high proportions of impervious surfaces, such as parking lots and roofs to mitigate heat island effects

Table 7.1: Trees for Streets and Boulevards

Common Name	Latin Name	Moisture Requirements	Soil Types Preferred	Tolerance to Light	Maximum Height	Comments
Sugar or Hard Maple, Black Maple	*Acer saccharum*, *Acer saccharum* var. *nigrum*	dry-moist	loam, clay	Tolerant	35 m	Not tolerant to root compaction
Red Maple	*Acer rubrum*	Moist - wet	sand, loam, clay	Mid-tolerant	30 m	Prefers moist sites, fast growing
Silver Maple	*Acer saccharinum*	Moist - wet	sand, loam, clay	Mid-tolerant	30 m+	Prefers moist sites, fast growing
Hedge Maple	*Acer campestre*					
Amur Maple	*Acer ginnala*					Brilliant autumn colours
Autumn Blaze Maple	*Acer X Freemanii*					
Serviceberry	*Amelanchier spp.*	dry-moist	loam, sandy-loam, clay	Full light to full shade	10 m	Showy white flowers, edible berries for humans and attract birds
Yellow Birch	*Betula alleghaniensis*	moist	loam, sandy-loam	Mid tolerant	25 m	Wildlife benefits
White birch	*Betula papyrifera*	dry-moist	sand, loam, gravel-loam	Full sun	25 m	Not long lived, susceptible to birch dieback
Hawthorn	*Crataegus spp.*	dry-moist	loam, sandy-loam	Tolerant	10 m	Showy flowers, fruit attracts birds
American Beech	*Fagus grandifolia*	moist	loam	Mid tolerant	25 m	Not recommended due to Beech Bark Disease
Bitternut hickory	*Carya cordiformis*	moist	sand, loam	Mid tolerant	25 m	Fast growing , wildlife preferred
Shagbark Hickory	*Carya ovata*	dry-moist	loam, clay	Mid tolerant	25 m	Wildlife preferred
American Beech	*Fagus grandifolia*	moist	loam	Mid tolerant	25 m	Perhaps avoid because of Beech Bark Disease
Kentucky Coffee Tree	*Gymnocladus dioicus*	moist	Rich deep soils preferred	Mid-tolerant	20 m	Wonderful history and seeds are unique; seeds poisonous if not roasted
Butternut	*Juglans cinerea*	moist	loam	Full light	25 m	Endangered species, check with MNRF (canker)
Black Walnut	*Juglans nigra*	moist	loam, clay	Full light	30 m	Seeds provide food for wildlife, restrict growth of other plants under the tree
Crabapple	*Malus spp.*					
Ironwood/Hornbeam	*Ostrya virginiana*	dry-moist	loam, clay	Full light to full shade	12 m	Seeds for wildlife, hardy species, slow growing
Pin Cherry, Cherries & Plums	*Prunus pensylvanica, Prunus spp.*	dry	sand, loam	Full light	12 m	Seeds for wildlife, not long lived
Black cherry	*Prunus serotine*	dry-moist	sand, loam	Mid tolerant	22 m	Seeds for wildlife, attractive
White oak	*Quercus alba*	dry-moist	loam, clay	Mid-tolerant	35 m	Wildlife food, long lived
Bur oak	*Quercus macrocarpa*	dry-moist	loam, sandy-loam, clay	Mid tolerant	20 m	Wildlife benefits
Red oak	*Quercus rubra*	dry-moist	sand, loam, clay	Mid-tolerant	25 m	Wildlife value, deep rooted
Black willow	*Salix nigra*	moist-wet	Loam, silt	Mid tolerant	20 m	Low lying areas
Basswood	*Tilia americana*	dry-moist-wet	sand, loam, clay	Mid tolerant	35 m	Fast growing , tall, long lived

Common Name	Latin Name	Moisture Requirements	Soil Types Preferred	Tolerance to Light	Maximum Height	Comments
Little leaf Linden	*Tilia cordata*	dry-moist -wet	sand, loam, clay	Mid tolerant	25 m	Tolerant of urban growing conditions.
Honey Locust	*Gleditsia triacanthos*	dry-moist	sand, loam, clay	Mid tolerant	20 m	Tolerant of salt and drought, wildlife value
Sycamore	*Platanus occidentalis*	Dry-moist	Wide range, loam	Mid tolerant	25m	City streets with reasonable moisture
Horse-Chestnut	*Aesculus hippocastanum*	Moist to dry	Well drained loam	Mid tolerant	25m +	Non-native but does well here, showy flowers
Tulip-tree	*Liriodendron tulipifera*	Moist to dry	Well drained deep soils	Mid tolerant	30m+	Attractive tree that can become very large.
Cucumber Magnolia	*Magnoliaceae*	Moist to 'dryish'	Deeper soils	Mid tolerant	30 m+	Parks and open areas
Sassafras	*Sassafras albidum*	Moist	Clay and heavy soils	Intolerant	20 m	Northern Border heavier soils
Blue Beech	*Carpinus caroliniana*	Moist	Loams	Mid tolerant	10 m	History of wood handles with settlers
Pin Oak	*Quercus palustris*	Moist	Clay and heavier soils	Intolerant	20 m	Smaller oak
Rock Elm	*Ulmas thomasii*	Moist -well drained	Clay to loam	Mid-intolerant	25 m	Hardiest of the elms
European Beech	*Fagus sylvatica*	Moist-well-drained			25 m	
Gingko	*Gingko biloba*					
Tree Lilac	*Syringa spp.*					
Ornamental Pear	*Pyrus spp.*					
Golden Weeping Willow	*Salix alba*	Well drained-wet	Loam, silt	Mid tolerant	20 m	Low lying areas
English Oak	*Quercus robur*					
Zelkova	*Zelkova serrate*					

Note: Recommended non-native species include: Little Leaf Linden, Gingko, Horse Chestnut, Honey Locust, European Beech, Tree Lilacs, ornamental pears and crabapples, and Zelkova. While they have become "naturalized" because they are commonly planted throughout Southern Ontario, they are not native to Ontario. They are recommended for planting because they are very tolerant of the tough conditions in Urban or Street settings.

Table 7.2: Additional Trees Recommended for Planting in Park Areas, Along Trails and on Private Property

Common Name	Latin Name	Moisture Requirements	Soil Types Preferred	Tolerance to Light	Maximum Height	Comments
White Cedar	*Thuja occidentalis*	dry-wet	sand, loam, clay	Tolerant	30 m	Wildlife habitat
Eastern hemlock	*Tsuga canadensis*	Moist-wet	sand, loam	Mid tolerant	22 m	Provide food & shelter for wildlife
White pine	*Pinus strobus*	dry-moist	loam, sand	Mid- tolerant	35 m	Wildlife food, long lived
Red Pine	*Pinus resinosa*	dry-moist	loam, sandy-loam	Mid tolerant	20 m	Wildlife benefits, stabilizes soil
White spruce	*Picea glauca*	moist	sand, loam, clay	Mid-tolerant	25 m	Wildlife value, deep rooted
Tamarack	*Larix laricina*	moist-wet	Loam, silt	Mid tolerant-full sun	20 m	Deciduous leaves
Red cedar	*Juniperus virginiana*	dry-moist	sand, loam	Mid tolerant-full sun	12 m	Prickly leaves and branches; provide food & shelter for wildlife

7.2 Tree Maintenance Program

Building upon the Town's current approach to management, the Town will undertake the following:

1. Establish directions, guiding concepts and procedures for overall proactive urban forest management, including: recommended pruning cycles; tree planting and pruning; management of insects, diseases and invasive species; urban design and tree care standards (i.e engineering standards to better accommodate trees); and care required for large, mature trees. Establish the tree maintenance program on a Town-wide and neighbourhood basis. The recommended standards to apply include those already in use by the Town, the *American National Standard for Tree Care Operations (A300 (Part 1)-2001) – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Pruning)* and developed *Town of Cobourg Urban Design Guidelines for Tree Establishment and Protection*. Appendix J presents the available standards.
2. Complete additional standards for tree protection and care, as needed to establish consistent and effective protection of public trees within the Town's urban forest. Work with the County and GRCA to build in approaches that support urban biodiversity; examples include practices that encourage natural cycles for water, nutrients and carbon and provision of habitat for birds, small mammals, reptiles, amphibians and insects.
3. Complete the Town tree inventory and maintain current data for trees located on public lands. Individual tree information to be collected consists of data required for effective urban forest management, including data fields of: tree species, location, diameter, height, structure, and general health. This tree status information can be used to prepare a detailed work plan of needed human and financial resources for proactive maintenance, planting and risk management activities on an annual basis.
4. Maintain, update and create new Best Management Practices (BMP) for trees in the Town of Cobourg engineering standards document to detail minimum requirements for: Tree Inventory and Assessment, Tree Protection, Working within the Trees Dripline, and Tree Planting. Develop additional BMP procedures in future, as needed to ensure standardized and sufficient conditions and protection for trees.
5. Establish a baseline of the urban forest existing condition and performance and regularly monitor progress at a neighbourhood and Town level. The compiled information will provide feedback to residents, stakeholders and the Town on plan implementation progress and to urban forest managers for effective and adaptive forest management.

7.3 Risk Management Program

At present, inspections of Town public street trees tend to be more reactive with response to potential tree issues completed as a result of observations by Town staff or residents. To achieve a more proactive and timely attendance to tree maintenance needs, the Town wishes to update its tree inventory data as noted in section 6.2 and to then plan future tree inspections and maintenance on a prioritized basis determined through assessment of tree health. This knowledge will allow for effective management of the potential risk from tree conditions such as pest infestations, dead or rotten limbs, loss of stability and inadequate growing conditions.

The Town of Cobourg will complete the following:

1. To move forward on proactive tree care and management, one of the key short-term actions for the Town is to conduct the tree inspections required to complete the inventory update. The availability of comprehensive and up-to-date information on the state of all public trees in the urban forest will enable prioritized activities to effectively retain, care for or remove trees, as appropriate, in an efficient and timely manner.
    a. **Tree Inventory Data:** The start of any good program is the understanding of what you have. One of the identified challenges is keeping data current. Trees are living, growing, self-engineering Town assets and can show very little or significant changes in condition from year to year. It is impractical to update the data for all trees every year. To provide a reasonable and realistic up-to-

date database as a starting point in performing a Tree Heath Assessment, the tree inventory feature class data shall not be more than 3 year years old. All data is now relatively current, meaning that the inventory can be updated relatively quickly.

b. **Tree Health Assessment** The now updated 'Tree Inventory Data' feature class, in the Town's corporate GIS Database, will be used to categorize all trees in for a regular inspection cycle. This will determine how often a tree should be visited to assess its health and long term future within the community. This process is intended as a tool to aid decision-making, not to provide definite answers on any particular tree. The tree data will be processed every February in order to create the category and level of inspection to be completed thatyear. The Tree Health Assessment will drive the frequency and the level of the inspection.

   Elements recommended to comprise the inspection matrix

   i. **Tree Category:** Frequency of Scheduled Inspections will be set up according to three Categories as presented in Table 7.3:

      1. Category A: Healthy trees that can be left for at least 5 growing seasons prior to assessment.
      2. Category B: To be assessed within the next three to four growing seasons.
      3. Category C: To be assessed within the next two growing seasons.

   ii. **Elements within the tree GIS** data that will be used to categorize trees:

      1. Species
      2. Size (DBH)
      3. Health rating (Good/Fair/Poor)
      4. Trunk rating (Good/Fair/Poor)
      5. Growth rating (Good/Fair/Poor)
      6. Structure rating (Good/Fair/Poor)

   iii. **Other defining elements such as Location** (park, road, natural area) & known to be adjacent to "targets" upon which the tree or a limb may land.

   iv. **Species, due to their growth and structural characteristics or that have current and serious diseases or insect problems**, will be automatically placed in a category for more frequent inspection. These include:

      1. Category C (see Table 7.3) tree species of: beech (beech bark disease), ash (due to emerald ash borer), butternut (butternut canker), poplar species (due to their fast growth and tendency to be prone to limb breakage);
      2. Category B trees of silver maple (due to growth habits) and Manitoba maple (a species with fast growth and decay issues); and
      3. All other trees in Category C.

Table 7.3: Tree Health Assessment

Factor	Category A Healthy trees that can be left for at least 5 growing seasons prior to assessment	Category B To be assessed within the next three to five growing seasons	Category C To be assessed within the next two growing seasons
1) Species	Healthy trees	All healthy Silver Maple trees. All Manitoba maple.	• All Ash trees, • All Beech trees, • All Butternut trees, • All Aspen trees over 20 cm in diameter • All Balsam poplar trees, • All White birch trees over 40 cm in diameter, • All Manitoba maple greater than 20 cm in diameter, • Silver Maples that have root space issues or have an old injury.
2) Number of Stems	• One Main stem or maximum of two stems; Stems show minor signs of decay or physical harm.	• Two or three stems.	• Two, three, or four stems with one stem showing major signs of decay or physical damage.
3) Diseases and Insects	• Disease and Insects affect less than 15 % of the crown of the tree.	• Disease and Insects affect less than 30 % of the crown of the tree.	• Emerald Ash Borer evidence, • Beech Bark Disease evidence, • Birch dieback evidence, • Disease and Insects affect > 40 % of the crown of the tree.
4) Decay and Internal Problems	• Limited evidence of internal decay i.e. one small conk, one or two dead branches.	• Visible evidence of internal decay but limited to one bole or side of trunk • Branches are dead with no signs of decay.	• Multiple fruiting bodies, • Multiple branches that are dead or showing signs of decay.
5) Branching and Physical Problems	• Limited dead branches • No overhead obstructions now or in the future. • Healthy trees that do have a lean that is less than 15%, • Physical scar that has healed and is less than 20% of the diameter of the tree	• Overhead obstructions, • Limited dead branches, • Possible root obstructions, • Healthy trees with a lean greater than 16% but less than 30 %. • Physical scar that is greater than 21% and is showing signs of healing • Split in the trunk(s) that is (are)healthy now but could be a problem in the future	• Multiple dead branches, • Overhead obstructions, • Root obstructions • Leaning trees greater than 31%, • Leaning trees that have other complicating factors, • Physical scar or split of any size that is not showing signs of healing. • An off colour Crown or undersized leaves.

Decisions on the future of a Tree

Factors such as climate, microclimate, soil conditions, moisture or nutrient availability affect how well a particular species grows and thrives. In one area different species may be very long lived, while in another these same species may only live to a medium length of time. It is therefore important that each tree must be assessed for its specific site and set of growth conditions and characteristics. The List of factors to be considered for each tree includes:

1. *Species and the size and age of the tree*
    - Each species has a risk factor for the size of tree that each individual site could support. In the areas of Cobourg that are comprised of sandy (beach) soils with high winds off the lake, large and newly established trees tend to be susceptible to wind throw with some species being of particular concern.
    - The older a tree becomes, there is more risk that it could shed branches, split, or fall right over. For some species that are not long lived, this can happen at smaller sizes and this has to be considered in assessing the tree.
2. *Does the tree have multiple stems or has the tree branched early in life and now has large branches that could be considered separate stems.*
    - Are all the stems healthy? If we removed one of the stems would it help the tree? If one of the stems has been removed due to rot or disease, are there indications that the surviving stems are healthy or do they show signs that the original rot that infected the first stem remains in the tree?
    - Are there indications that as the stems grow, that there could be splitting? Could cabling or physical intervention, support one or two the stems?
3. *The tree is now infected or demonstrates evidence that the tree has been subjected to disease or infestation by insects.*
    - Can we estimate that less than 40% of the crown of the tree has been infected by the disease or insects? For many species if the tree has retained at least 60% of its crown or is only infected or impacted one growing season, most trees will rebound and survive.
    - Can the disease or insects be treated successfully?
4. *Does the tree have decay or internal problems?*
    - What indications are there of internal problems? Are multiple areas of rot visible? Are there indications that the tree remains vigorous (healthy crown, tight bark)? Do the rot areas show signs that secondary problems exist i.e. carpenter ants?
    - Are the rot areas showing definite signs the main trunk could be weakened i.e. decaying wood that is wet and blackened?
    - If the rotten wood is removed and/or the cut portion of the stem treated is there a chance that the tree could be saved?
5. *Does the tree have a physical problem?*
    - Are there limitations to the site? Can this site support a large tree?
    - Are there physical barriers to the tree's continual growth i.e. driveway, walkway, and/or overhead barriers?
    - Does the tree have a lean? Some species can be wind firm but for many a lean greater than 10 to 20 % can be excessive and puts the tree at risk.
        - Are there dead branches within the crown of the tree? How many? Do these dead branches constitute a risk to the public or property owners? Are dead branches the only problem or are there other factors to be considered in the overall assessment?
        - Is the site overly wet? Is this the right species for this set site? Is there room to grow?

2. Implement a formal Risk Management program that provides direction on the recommended schedule of tree visits and assessment of long term health of trees located on public/Town lands. The risk management program will include a documented approach to pest management to manage existing and evolving invasive species, diseases and insects (building upon the Town's current approach). Elements of this program will be:

1) Clearly define staff roles and responsibility;
2) Define a workable program of risk management;
3) Outline a consistent methodology of how tree risk will be defined and assessed;
4) Continue a strategy of tree inventory and documentation, demonstrating the Town's ongoing due diligence; and
5) Minimize risk to property or persons from damage or injury due to trees.

Without a target located within the vicinity of a failed tree, there is no risk. The Risk management Program should take into account potential targets (persons or property) that could be impacted by a failure, and determine the likelihood and consequence of failure for individual trees.

Further guidance on implementing a formal urban tree risk management program is available through established programs such as of the International Society of Arborists and the U.S. Forestry Service. These manuals provide detailed advice on tree inspection approaches, guidance on visual assessment of tree injury and health, use of corrective actions, and monitoring of program effectiveness. The main goal of a risk management program is ``to reduce the risks that trees pose to public safety to a level that meets professional standards and demonstrates reasonable care`` (USDA Forest Service, 2003).

7.4 Community Stewardship Program

The Town of Cobourg acknowledges that the community greatly benefits from the ongoing interest and activities in the health and enhancement of the urban forest by a number of dedicated individuals and community organizations. Many residents take great care in planting and maintaining (watering, fertilizing, mulching, treatment of pests) trees on their own properties. This level of care is sometimes extended to public street trees. There also exist a number of trees on private property that are in need of care, such as removal of dead limbs or control of pests. Overall, there is potential for increased community involvement in caring for existing Town trees and in the planting and care of an expanded urban forest.

The Town of Cobourg will implement the following to accomplish a Community Urban Forest Stewardship Program:

1. Establish a Community Stewardship Program of public educationand community participation in urban forest management. The program purpose will be to accomplish community-wide participation, encourage understanding and adoption of environmental yard maintenance and improve community understanding of the value, benefits and appropriate methods of care for Cobourg's urban forest. Components of this program will include:

a. Development of a comprehensive education program that articulates the program objective, audiences, key messages, communication methods, existing information/education sources, program partners and respective responsibilities, monitoring and reporting on program accomplishments.

b. Establishment of dedicated, likely additional, staff resource(s) for the development, organization and delivery of the Community Stewardship Program.

c. Use of the Town website as an overall resource of urban forest information that is kept up-to-date. The website will include information such as: a spatial map of Town trees – their location and associated data; Town tree management activities; guidance for private landowners on tree care, planting, recommended species list and pest/invasive species updates (such as current emerald ash borer management status). Direction will also be provided to residents on activities they are allowed to do in regard to tree care, planting, natural areas stewardship; basic tree care; impact of weed trimmers on trees; the importance and value of tree pruning, when and under what conditions, how to conduct and/or arrange, the resulting benefits (such as no loss of limbs from a pruned tree during recent ice storm). There will also be guidance on the importance of watering trees and suggestions for how to do so, such as redirecting storm water runoff from paved areas to trees and use of rainwater, recommendations for improving tree health and adaptability to the effects of climate change and identification and control of invasive species. Residents will also be advised of the potential impacts of tree removal upon their neighbours and the community.

d. Delivery of a comprehensive public education program in partnership with others such as schools; businesses; community organizations such as Cobourg Ecology Garden, the Cobourg Horticultural Society, Willow Beach Field Naturalists; the Cobourg Public Library; local Scout & Girl Guide organizations; commercial institutions such as the TD Bank; and the County of Northumberland and the Ganaraska Region Conservation Authority. Explore working with GRCA to develop an urban biodiversity program that details the yard practices residents can do to improve tree, forest and ecosystem health.

e. Implement a program that benefits from the wealth of existing forest and environmental stewardship information resources[4], partner capabilities, County and Town volunteer resources, and the knowledge and services of community organizations and members.

f. "Take a proactive approach with all related current and future Town initiatives – such as Master Plans', sustainable and green projects, related policy and guideline documents, development projects - that could or do have a connection to strengthening the urban forest. Through these initiatives, demonstrate sustainable site development practices relevant to a healthy urban forest. Beginning with the current opportunity of the Tannery District Sustainable Neighbourhood Master Plan, work with planners to demonstrate sustainable best practices for accomplishing a healthy urban forest.

g. Detailed information on the Town's comprehensive approach to urban forest management – tree planting, maintenance, risk management, removal and replacement;

h. Sharing of annual reports on Town tree planting and maintenance, urban forest management accomplishments and overall state of the urban forest;

i. Compile and share information on the value of trees and natural areas to the community;

j. The Town will coordinate increased community participation in initiatives such as tree planting, tree maintenance, harvesting of food trees and education of neighbours on urban forest management;

k. Naming of tree species through use of identification tags on public trees located along downtown streets and in parks, potentially sponsored by local businesses;

[4] Consider stewardship resources from Ganaraska Region Conservation Authority, Conservation Ontario, Ministry of Natural Resources and Forestry, Nature Canada, Canadian Wildlife Federation, David Suzuki Foundation.

l. Establishment of a second Arboretum on Town lands to enhance the urban forest and contribute to community education on Town tree species;

m. Further promote and expand the Town's Donation/ Memorial tree program to include a range of situations for designation of trees (celebration of life, birth, anniversary, accomplishments) so as to enhance community recognition of trees and their value.

n. Identification and recognition of trees through initiatives such as tree name tags, walking and cycling tours of community and heritage trees, identification of heritage trees, celebration of Town heritage and special trees through a call for sharing of tree stories. All initiatives will be featured on the Town website.

2. Encourage property owners to maintain their current trees according to good arboricultural practice and to plant additional trees and shrubs on their own (private) property through incentives, rather than a regulatory approach.

   Types of incentives include:

   a. Continue subsidy of trees available to residents for planting;

   b. Issue a business challenge for planting of trees on commercial/ industrial/ institutional properties;

   c. Work with partners to develop area or audience-specific incentives for priority planting areas, such as for creation of parking lot "tree oases", and along streets and within neighbourhoods that have low tree cover;

   An incentive approach is favoured over a regulatory one. A voluntary incentivized and informed approach to enhancement of the Town`s urban forest is one which better fits with the Town`s current approach for other initiatives such as heritage conservation and sustainable development. A more regulatory approach is likely to result in increased conflict with landowners and a need for additional Town staff for enforcement. Similar outcomes in terms of enhanced tree canopy cover and health are possible with both approaches.

3. Town staff will provide residents and business owners with guidance on yard design, tree planting & care using Town materials and relevant resources from others, such as the GRCA, Nature Canada, etc. (see section 7.1 and Appendix I);

4. Consider establishment of an inventory of data for trees located on private property. The database could be initially established by the Town and updated by landowners, with Town support, as appropriate;

5. Apply the County volunteer database to deliver relevant management plan activities, such as: community education, tree planting, tree nursery operation, tree inventory update, tree and natural areas stewardship, establish of enhanced urban forest on private property;

7.5 Funding and Resourcing Strategy

With the Town of Cobourg experiencing similar budget constraints to that of other municipalities and levels of government, a comprehensive approach is needed to provide the necessary funding and resourcing for delivery of the urban forest management plan articulated in this document. The recommended approach is one that takes

advantage of a range of funding and volunteer resources to augment Town operating and capital budgets. The Town of Cobourg will undertake the following:

1. Establish a comprehensive urban forest resourcing strategy that identifies and secures the needed level of resources for the operational plans to accomplish the stated vision, goals, objectives, outcomes and strategies. Program funding sources include the Town`s current base operational and capital budgets dedicated to urban forest management, a full range of funding and revenue generation opportunities and the contribution potential of partners, stakeholders, community groups and residents. The strategy will take into account the average annual and life cycle maintenance costs of the existing tree inventory. Potential funding sources include:
    a. Active pursuit of urban forest sponsorship from local businesses;
    b. Establishment of a community bequest program;
    c. Establish a carbon emissions offset program through which Town residents and businesses can purchase carbon offsets from the Town of Cobourg in compensation for their emissions for greenhouse gases for activities such as heating, cooling, automobile and air travel and resource use. The collected funds would be applied to the Town`s tree planting and maintenance program;
    d. Support community volunteers in tree planting and care;
    e. Participate in regional tree planting initiatives or programs offered by the County of Northumberland and Ganaraska Region Conservation Authority;
    f. Participate in the Tree Canada, Ontario Trees programs for planting;
    g. Explore other grant and funding programs for tree management and planting.

7.6 Regulatory Initiatives

Consider the following changes to the Tree Preservation By-Law in the upcoming by-law review:

1. Integrate directions for an ecosystem/watershed based approach to maintenance and management of Town trees. This includes design that accommodates wildlife and plant needs at a landscape scale, beyond the boundaries of the site under development. Consider ecological principles that maintain water, nutrient and carbon cycles to support plant and animal life, and provision of habitat and food that tends toward a balanced urban ecosystem that supports a diversity of plants, birds, mammals, reptiles, amphibians and insects.
2. Integrate the current development review practice of compensation for tree removal into the by-law and consider increase of the ratio that compensates for trees removed for development. The by-law should include a schedule that specifies the value to be provided as compensation, according to the size, number and species of trees proposed for removal. Funds would be directed to the Town for tree planting and establishment;
3. Include soil volume standards for new trees as part of the site plan design for new developments – 30 m3 for a medium tree (>=40 cm in diameter) and 50 m3 for a large tree (>=60 cm in diameter;
4. Consider increase of the current collected lot levy of $350 per 12.2 m of road frontage to reflect updated tree establishment costs (combined cost of spring and fall planting) and an increase in the amount collected for maintenance to cover a period of 2 years (from the current 1 year);
5. Consider requirement of an inspection report to be provided, within one year of development completion, on the health and activities completed to maintain existing trees and plant new trees, according to submitted plans for the site, landscaping and Tree Conservation and Planting.
6. Consider inclusion of an exception within the by-law for private woodlands (of >=0.8 ha or 2 acres) where the owner is removing wood for their own use or according to good forestry practice that is documented in a plan certified by a registered professional forester.

7.7 Heritage Tree Program

Identification and conservation of Heritage Trees contributes to linking residents to the cultural and natural history of their community. Heritage trees can include distinct trees of community interest and importance because of their location, size, species, aesthetics and connection to the people and history of Cobourg. Collections of trees within a landscape may also provide important areas of identity for communities.

Formal programs for designation of heritage trees are available through the Heritage Tree Program of Trees Ontario and the Ontario Urban Forest Council, as part of the Ontario Heritage Trust Program, under the Ontario *Heritage Act*, designation by the Government of Canada as a National Historic Site or by formal programs established by a municipality, non-governmental or community organization. As explained in the report on *Cobourg's Heritage Canopy* (Brouwer, 2012), various approaches to conservation and protection of heritage trees can be employed, dependent upon the method of designation. For sites or trees not identified and legally protected through provincial (Ontario *Heritage Act*, *Species at Risk Act*) or federal (National Historic Sites and Monuments Board, federal *Species at Risk Act*) processes, heritage tree identification and protection can be accomplished through a combination of recognition, landowner support and public education.

Heritage trees and cultural heritage landscapes of Cobourg's urban forest will be identified and protected as follows:

1. Establish a formal Heritage tree program, aligned with the Town's Heritage Master Plan (HMP). This will include:
    a. Work with Town Planners to identify and protect cultural heritage landscapes, to contribute to Goal #1 – Protect and conserve significant cultural heritage resources over the long term, and as directed under section 4.2.1c, of the Town of Cobourg Heritage Plan. Potential cultural heritage landscapes could include parks, gardens, main streets, neighbourhoods, or natural areas of cultural heritage value or interest to the community and that feature Cobourg's urban forest;
    b. Maintain and plant trees to contribute to the small-town character of Cobourg, including an abundance of street trees, as identified in Goal #2 of the Heritage Master Plan;
    c. Contribute to and support implementation of the Town-wide landscape strategy that will focus on street trees and other landscaping initiatives, as identified in 4.3.1.2b of the Heritage Master Plan;
    d. Support through tree planting and maintenance, the improvement of linkages between the downtown and the waterfront (Recommendation 4.5.1.4c)
    e. Replace removed trees and plant additional trees to help retain the broader character of Cobourg streetscapes and neighbourhoods (Recommendation 4.6.1.5c.).
    f. As recommended in the guidelines of the *Commercial Core Heritage Conservation District Plan* (Section 11.5), consider tree planting and replacement in suitable locations within this district of identified "heritage" species of sugar maple, silver maple, mountain ash, Norway spruce, white spruce, catalpa, horse chestnut, honey locust, gingko, tulip tree, basswood and blue beech. For hedging and shrub borders, implement and encourage planting of lilac, viburnums, fragrant currant, deutzia, mock orange, Japanese quince, rose of Sharon, smoke bush, spindle tree, weigela, dogwood, privet, alpine currant and flowering almond.
    g. For the East, West and George Street Heritage Conservation Districts, as identified in the *Street trees and boulevards* and *Views* sections of the respective Heritage Conservation District Plans:
        i. Replace removed trees promptly, within existing locations, to retain the vitality of the streetscapes;
        ii. Retain the existing pattern of trees and the framed views of Victoria College and Victoria Park along College Street (north and south, respectively) when planting and replacing removed trees along the College Street boulevard;

iii. Replacement planting of trees along the Bagot Street boulevard should follow the existing pattern, with trees located closer to the sidewalk than the street, so as to protect views south to the waterfront and north to St. Andrew's Presbyterian Church;
iv. Replacement planting of street trees along George Street should continue to frame the view to Victoria Hall and be placed so as not to obstruct views.

2. Identify Heritage trees on Town lands and how the trees will be protected.
3. Define how Heritage trees are identified, recognized and conserved on private property.
4. For identification and protection of Heritage Trees on publicly and privately owned lands, the Heritage Tree Program will integrate findings and recommendations of *Cobourg's Heritage Canopy* report (Brouwer, 2012), including:
    a. Designation and protection of the identified significant specimen trees;
    b. Adoption of the criteria for identification of Town Heritage Trees;
    c. Implementation of the recommended approaches for conservation, protection and recognition of Town Heritage Trees;
    d. Implementation of a formal recognition program for identified Heritage Trees, including public education on their location and significance through methods that include the Town website, tourism materials, plaques and a Heritage Tree tour.
5. Consult with the Cobourg Heritage Advisory Committee, Parks & Recreation Advisory Committee, and other applicable Advisory Committees and stakeholders in the development and implementation of the Town Heritage Tree Program.

7.8 Governance

Delivery of the urban forest management program will be supported by an articulated governance structure that specifies urban forest management lead and support responsibilities, approaches for coordination and partnerships (such as with the County, GRCA, utility companies, community groups, schools) and provides clear direction on respective urban forest management roles and responsibilities so as to avoid gaps and overlap; The recommended approach consists of the following:

1. Confirm the Forestry Section, within the Town Parks, Recreation and Tourism Department, as the lead for urban forest management. Forestry is supported by Building & Planning, Public Works, Clerk's & By-Laws;
2. Identify appropriate respective responsibilities and initiatives for Town, contracted, volunteer and community resources. Town of Cobourg Forestry Section staff lead all aspects of implementing the urban forest management plan. Contracted tree technical resources are recommended for activities that required specialized training and equipment, such as tree pruning and removal of larger-sized trees, tree disease treatment and planting of larger trees;
3. Identify appropriate joint initiatives to be implemented in partnership with the County and GRCA. Some examples include tree planting, area naturalization and ecological restoration, identification and completion of priority areas (stream corridors, natural areas, headwaters) for protection and restoration;
4. Partner with schools for engagement of youth in selected projects, i.e. school yard naturalization, natural areas stewardship, Town tree nursery and arboretum care.
5. Implement selected urban forest management projects through the County-Municipal CAO's shared services initiative, such as approaches to invasive species management, climate change resilience, and ecological connectivity.

7.9 Integration with Other Town, County & Neighbouring Community Initiatives

The urban forest management plan has been developed to align with, to support and be supported by other Town, County, regional and provincial initiatives. These include:

1. Management of the urban forest may be well supported by the Town's ***Asset Management Strategy***, currently under development. Suggested directions for inclusion in the Asset Management Strategy consist of the following:

    a. Include trees located on public lands as assets managed under the strategy;
    b. Allocate resources for management of trees on public lands, as identified in the Town's urban forest management plan;
    c. Integrate the growth needs of trees when planning for replacement and establishment of new infrastructure assets.

2. The Cobourg ***Official Plan*** has policies supportive of the urban forest, including directions for tree conservation & planting, enhancement and preservation of natural heritage, a linked Greenlands system, provision of wildlife habitat and linkages, development that respects surroundings and incorporates linkages, and new road design that allows for tree-lined streets. UFMP directions support and implement these directions, as well as those of the Provincial Policy Statement and the Northumberland Official Plan which direct maintenance, improvement and restoration of the health, diversity, size and connectivity of natural heritage features and their functions.

3. As part of the tree planting plan and overall approach to urban forest management, the Town will work with the County and GRCA to achieve **regional connectivity** in relation to **trails and the natural heritage system**. Town management of the urban forest will support the goals and objectives of the natural heritage and trails systems – at the Town, County, Ganaraska River watershed and Greater Golden Horseshoe levels. Urban forest coordination with the future Trails Master Plan, as directed through the Town's *Parks Master Plan*, will occur. The following Figure 7.2 shows the Town's natural environment and open space/park areas. Maintenance and enhancement of the urban forest canopy will improve vegetated connections between these areas.

Figure 7.2: Connectivity of the Town of Cobourg Greenlands System

The Town of Cobourg Greenlands System is comprised of the Natural Environment and Open Space components.

4. The Town ***Parks Master Plan*** provides directions for a system of parks (network of parks, trails and open spaces) that link all parts of the community with green corridors and nodes and directs maintenance that results in a mix of manicured & naturalized parks. The directions within the urban forest management plan support all of the Parks Master Plan's seven goals for: Character, Connectivity, Diversity, Environment, Accessibility, Management and Waterfront. This plan will support the Parks' system approach of connections along streets, pathways and trails between Town parks, open spaces, people destinations and natural areas. Opportunities for additional planting of trees within all classes of parks will be explored according to directions in the Parks Master Plan and in coordination with other Parks staff for purposes of: shade, activity definition and screening of park activities from adjacent land uses in Leisure Parks (Burnham Manor, Coverdale, Fitzhugh, Legion Fields, Lionel Tut, Lions Park, Morley Cane, New Amherst Park and Parkette, Optimist, Peace, Westpark Village, Westwood), focus upon planting within Nature Parks to restore and enhance environmental functions (Lucas Point, Peace, and Sinclair Parks, and James Cockburn Conservation Area), planting along Connector Parks (Monk's Cove), naturalized planting along the western waterfront area and protection of trees, enhancement of connectivity and erosion mitigation within Portal and Landmark Parks (Lookout Point, Tracey Parkette, Fitzhugh Shores, Victoria Beach) along the waterfront.

5. Cobourg's ***Tree Preservation By-Law*** will continue to be applied to control tree injury or destruction on lands adjacent to roads and on property parcels greater than 0.8 hectares in size. Integrate recommended by-law updates, as described above in section 7.6, in the next by-law review. Continue to monitor the need for updated tree protection regulatory controls for public and/or private trees for consideration in each subsequent 5-year by-law review (~2023, 2028, 2033, and 2038).

6. Cobourg's ***Urban and Landscape Design Guidelines***: Many of the guidelines for urban and landscape design across the Town address the health, character and diversity of the urban forest. Urban forest management is supported by and will implement the design guidelines relevant to trees as follows:

    a. **Public Realm** (development within streets, parks and open spaces) Guidelines support the urban forest through their direction for sustainability (use of durable materials, locally sources, made of recyclable materials), well landscaped streets and public spaces, connection to the Greenlands System, a broad tree canopy that shades buildings and reduces summer energy costs, promotion of trees and other vegetation that improve stormwater treatment by filtering out pollutants before they enter the storm drain system and guidance for reduction of impervious hard surfaces;

    b. **Natural Environment** guidance for protection, access, recognition, buffering and linking of natural environmental features, maintenance of natural drainage networks, linking of public parks, streets and paths to natural areas;

    c. Community Gardens may be located within **Local Parks** as a valuable recreation activity that can contribute to community development, environmental awareness, positive social interaction and community education.

    d. **Cemeteries**: Encourage the use of cemeteries for public cultural and educational opportunities including arboretums, public art and education.

    e. **Stormwater Management Facilities**: To promote SWM facilities as an important and desirable component of the Greenlands System, street and block patterns should enhance views and access

through street frontage wherever possible. Planting within SWM facilities should be compatible with the adjacent natural areas. Edges of stormwater ponds abutting the Greenlands System should remain naturalized.

f. **Streets and Streetscapes** provide space for planting of trees along the range of street types that occur within the Town. Design Guidelines include:

i. street trees and landscaping that is comprised of locally adapted species,
ii. improvement of soil infrastructure on boulevards where trees will be planted (to ensure the long term health of the tree and benefits to the community),
iii. location of trees offset a minimum of 1.5 metres from the curb to accommodate snow storage, large vehicle movements and minimize salt damage (or when this is not possible, street trees should be located between the sidewalk and the public right-of-way),
iv. consistent spacing of trees at 6.0 to 9.0 metre intervals based on mature size (ensure appropriate clearances from utility boxes, street lights and sight triangles);
v. consideration to the type and location of trees to ensure that higher branching trees are positioned to avoid interference with large vehicles such as trucks and to prevent interference with sight lines at intersections
vi. preserve existing trees to extent possible (mature street trees create a greater sense of enclosure along roads); replace removed street trees with ones that will grow to be comparable in size;
vii. plant trees to infill gaps along streets and in heritage areas, using trees of similar or compatible species along streets and matching traditional species and spacing in heritage areas;
viii. Minimize local street pavement widths (from curb to curb) to reduce impervious surfaces and stormwater runoff and to maximize boulevard areas (from curb edge to building face) for future planting.
ix. Use bioswales for maximizing water infiltration and cleansing of runoff in the design of roads and parking lots.
x. Locate above and below ground utilities on one side of the road to help create more favorable growing conditions for trees.
xi. Use engineered soils and new planting techniques when planting in hard surface areas (i.e. parking areas) to maximize soil availability.

g. **Private Realm** design should be encouraged to include LEED (Leadership in Energy & Environmental Design), green roofs, capture and use of precipitation on site augmented by methods to further reduce water consumption (use of mulch, compost, native plants), landscaping that preserves existing significant trees and vegetation, use of plant materials native to the Town and integration of grassy or vegetated swales for drainage of parking areas, front yards to be landscaped with trees, shrubs and native plantings, planting strips between street lines and parking lots, use of landscaped parking islands with shade trees at the end of parking rows and for pedestrian connections;

h. Enhancement of the Town Gateway Precincts of:

- Burnham Street/Elgin Street West/William Street
- Highway 401/Burnham Street
- Cobourg Marina
- Railway Station
- King Street East/Town Line
- West Gateway on Elgin Street West
- East Gateway on Danforth Road

7. As described in section 7.7, Cobourg's *Heritage Master Plan* provides directions for heritage tree & cultural landscape designation & conservation through the Master Plan and four **heritage conservation district plans**. Town urban forest staff will work closely with Town planners to protect, maintain and enhance urban tree and forest contributions to Cobourg's cultural heritage.
8. Municipal responsibilities under the ***Invasive Species Act*** will be fulfilled, including: management of invasive species located on public lands (i.e. implementation of prevention and response plans developed in future that apply to the Town of Cobourg, avoid breeding/growing, deposit or release of prohibited or restricted species) and inclusion of public education information on best management practices/link to the Ministry of Natural Resources & Forestry website for guidance and best management practices for controlling invasive woodland species such as dog strangling vine, Japanese knotweed, phragmites, common and glossy buckthorn, garlic mustard, giant hogweed, Norway maple and exotic honeysuckles.
9. The Town Urban Forest Risk Management Program will be aligned with the approach of Cobourg`s overall risk management strategy.

7.10 Workplan for Cobourg's Urban Forest Management

The following workplan in Table 7.5 presents the activities to be completed during the 20-year life of this plan. Identification of Objectives and Actions for Each Five-Year Period of the Plan - 2018-2022, 2023-2027, 2028-2032, and 2033-2037 – are identified by colour in Table 7.5.

Table 7.4: Workplan for Recommended Urban Forest Management Strategies

Strategy / Strategy Sub-Task	Responsibility		*Resource Requirements	Timing
	Lead	Support		
1. Tree Planting Plan (Supports Goals 1, 2, 3, 4 & 5)				
1.1 Develop Town and Neighbourhood Tree Planting Strategy, including anapproach to tree replacement, to increase canopy cover to 35% and to increase connectivity for people and for the natural heritage system	Forestry	Partners	2 weeks for Arborist to refine Plan	2018
1.2 Coordinate annual tree planting, according to the strategy (task 1.1), on public and private lands to replace removed trees (~50 per year for reasons of age, death, disease, pests or safety) and to increase canopy cover by ~1% per year to reach 35% forest canopy target (minimum 200 trees/year = 50 replacement trees + 150 trees for planting, with half the trees (~100) planted each on public and private lands)	Forestry	Community and Agency Partners	Annual budget increases to meet the requirement will be outlined in the Town and Neighbourhood Tree Planting Strategy; cost for planting additional trees on public lands is ~$420/tree 2 weeks of time for each of the Arborist and Community Stewardship Coordinator to coordinate planting to meet targets on public and private lands, respectively	2022 & ongoing to ~2030 (year 13) # of trees planted in 2018-2021 will aim to be slightly higher each year with full capacity achieved in 2022
1.3 Compile report on annual tree planting as part of overall annual reporting on urban forest management activities	Forestry		As part of base operational budget	annual
1.4 Develop a tree species list with guidance on recommended site characteristics per species to guide planting on public and private lands	Forestry		Provided in the UFMP and refined on an ongoing basis, as needed	2018
1.5 Develop and provide a tree planting guide for use by Town staff, contractors, residents & landowners	Forestry	Public Works, Community	Provided in the UFMP and refined on an ongoing basis, as needed	2018-2019
1.6 Update Town Neighbourhood Tree Planting Strategy annually	Forestry	Partners	2 days per year for Town Arborist	2019 and ongoing
1.7 Establish tree nursery on publically-owned lands; possible options includeTown parks or public lands not dedicated to other uses; i.e. programs, school yards.	Forestry	Community,	Town Arborist lead - ~2 weeks per year Expected low cost for purchase of stock / planting of seeds from significant Town trees Stewardship Coordinator arranges community participation in care of tree nursery and trees planted in parks, natural areas	2020 2021
1.8 Once the number of trees are planted to reach the 35% Town forest canopy target, reduce the planting plan to focus on replacing trees (to maintain the canopy) and encouragement of	Forestry	Partners	2 days per year for Town Arborist	~2035-2037

Legend:

Ongoing Task	Short-Term, Year 1-2	Medium-Term, Year 3-5	Long-Term 1, Year 6-10	Long-Term 2, Year 11-15	Long-Term 3, Year 11-15

Strategy / Strategy Sub-Task	Responsibility		*Resource Requirements	Timing
	Lead	Support		
continued planting on private property				
2. Tree Maintenance Program (Supports Goals 1, 2, 4 & 5)				
2.1 Develop the Tree Maintenance Program and integrate annually into the work order system	Forestry		Provided in the UFMP and refined on an ongoing basis, as needed	2017 and ongoing
2.2 Complete the Town's tree inventory, updating and completing information for the approximate 6500 trees in the existing inventory, and adding street, park and laneway trees not yet fully captured in the database. Data is uploaded directly to the CityWorks database through use of a Data Collector Application used on a tablet or phone by field staff	Forestry	GIS	Forestry staff and Contracted resources - within existing Forestry budget	2018
2.3 Hire a Forest Technician / Arborist to support the Town Arborist in delivery of this urban forest management program	Forestry		Addition to the urban forest operational budget	2019
2.4 Update the inventory on an annual basis to reflect activities completed under the Tree Planting and Maintenance Programs	Forestry		As part of base operational budget	2019 and ongoing
2.5 Conduct catch-up on tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species) identified through the 2018 tree inventory update	Forestry	Contractors	Increase annual maintenance budget as identified in the annually updated Tree Maintenance Program derived from the up-to-date inventory	2019 2020, 2021
2.6 Conduct annual tree inspections, identifying trees requiring inspection from data in the tree inventory by applying the criteria in the risk management maitrix (Table 6.1)				2019 and ongoing
2.7 Complete annual tree maintenance – formative pruning, management for pests, diseases and invasive species and removal of high risk trees - as identified through the tree inventory data and risk management assessment	Forestry	Contractors	As part of base operational budget	ongoing
2.8 Report on Baseline urban forest existing conditions (base provided in this UFMP) for annual reporting on progress	Forestry	GIS	~2 weeks per year for Community Stewardship Coordinator	2018 and ongoing
2.9 Develop and implement natural areas management strategy, including identification of areas for restoration, naturalization and provision of ecological connectivity through the urban forest. Refine strategy with input from partners and the community, as appropriate	Forestry	Planning, GRCA, County	Provided in the UFMP and	2020-2022 Then ongoing

Legend:

Ongoing Task	Short-Term, Year 1-2	Medium-Term, Year 3-5	Long-Term 1, Year 6-10	Long-Term 2, Year 11-15	Long-Term 3, Year 11-15

Strategy / Strategy Sub-Task	Responsibility		*Resource Requirements	Timing
	Lead	Support		
3. Risk Management Program (Supports Goals 1, 2 & 4)				
3.1 Inspect all public trees according to the risk management maitrix in table 6.2, at the same time as update of the tree inventory data described in Task 2.2	Forestry	Contractors	Resource requirement captured in Task 2.2 as part of project to inventory all trees on Town lands	2018
3.2 Address all high risk trees requiring attention, as identified through the updated tree inventory	Forestry	Contractors	Proposed budget increase of $	2018-2020
3.3 Complete annual tree inspection program according to the direction provided in the Risk Management Maitrix	Forestry		As part of base operational budget	ongoing
3.4 Prioritize completion of preventative maintenance identified through the inspection program, pruning trees to manage/prevent development of unstable tree limbs and removing high risk trees	Forestry		As part of base operational budget	ongoing
4. Community Stewardship Program ((Supports Goals 1, 2, 3, 4 & 5)				
4.1 Hire a Community Stewardship Coordinator, initially on contract to support Town Arborist and to initiative Community Stewardship Program; demonstrate progress, then consider establishment of a permanent position	Forestry		Addition to base operational budget	Second half of 2018
4.2 Develop the Community Stewardship Program (base program provided in this UFMP)	Forestry	Communications	Arborist and Community Stewardship Coordinator staff time of ~6 weeks total	2018
4.3 Implement the program, including web information, development of public education materials, Town support to encourage community participation in tree care and planting, tree tag identification, celebration of trees,	Forestry	Communications Town partners	Recommend additional full-time staff resource for community education and coordination	2020 and ongoing
4.4 Establish second tree arboretum on Town lands;	Forestry	Corporate/ Community Partners	4 months total, split between Arborist & Community Stewardship Coordinator	2020
4.5 Continue and expand the Town's Memorial tree program	Forestry		~2 weeks per year for Stewardship Coordinator	2019 and ongoing
4.6 Partner with schools for projects such as natural areas stewardship (Nickerson's Woods, others), tree nursery, tree planting, school yard naturalization	Forestry		~3 weeks per year for Community Stewardship Coordinator	2021
4.7 Work with site master planning teams, such as for the Tannery Site, Waterfront and others, to integrate sustainable urban forest concepts as a demonstration for the community	Planning	Forestry	~2 days of staff time per year	2018-2021

Legend:

Ongoing Task	Short-Term, Year 1-2	Medium-Term, Year 3-5	Long-Term 1, Year 6-10	Long-Term 2, Year 11-15	Long-Term 3, Year 11-15

Strategy / Strategy Sub-Task	Responsibility		*Resource Requirements	Timing
	Lead	Support		
4.8 Complete an inventory of trees on private lands through participation of Town landowners. Consider use of web-based application whereby landowners enter their own data	Forestry	GIS, volunteers	~ 2 weeks staff time for Forestry and ~ 4 weeks for GIS	2023
5. Resourcing Strategy (Supports Goals 1, 2, 3, 4 & 5)				
5.1 Develop a Resourcing Strategy to ensure the staff, capital and operating resources are in place to implement the UFMP	Forestry		~2 weeks of staff time	2018
5.2 Pursue local funding opportunities, i.e. corporate sponsorships, a bequest program, other fund-raising	Forestry		~ 8 weeks per year	2018 and ongoing
5.3 Seek all available agency and grant opportunities for tree planting and maintenance	Forestry		~5 weeks per year	2018 and ongoing
5.4 Implement recommended by-law updates to increase funding for tree establishment and maintenance	Forestry	Clerk's, Planning	~2 weeks per year	2019
6. Regulatory Initiatives (Supports Goals 1, 2, 3 & 5)				
6.1 Integrate recommended Tree By-Law updates into the upcoming by-law review	Clerk's	Forestry	~ 2 weeks staff time	2019
6.2 Monitor and report on results of the Tree Protection By-Law	Forestry	Clerk's	~1 week of staff time per year	ongoing
6.3 Periodic update of by-law to integrate recovery of required maintenance costs, increased compensation for removed trees and other controls identified for protection of trees	Clerk's	Forestry	~1-2 weeks of Forestry staff time every 5 years	1st update in 2018
6.3.1 By-Law Update #2	Clerk's	Forestry	~1-2 weeks of Forestry staff time every 5 years	2nd update in 2023
6.3.2 By-Law Update #3	Clerk's	Forestry	~1-2 weeks of Forestry staff time every 5 years	3rd update in 2028
6.3.3 By-Law Update #4	Clerk's	Forestry	~1-2 weeks of Forestry staff time every 5 years	4th update in 2033
7. Heritage Tree Program (Supports Goals 1, 2 & 3)				
7.1 Develop a Town Heritage Tree Program	Forestry	Planning, Heritage Advisory Committee, Community	~1 week staff time (Community Stewardship Coordinator & Town Arborist)	2020
7.2 Establish the Town Heritage Tree Program	Forestry		~ 3 weeks for Community Stewardship Coordinator	2020-2022
7.3 Recognize and promote identified heritage trees through initiatives such as the Town website, walking & cycling tours, tourism materials	Forestry		As part of base operational budget for Community Stewardship Program	2020 and ongoing

Legend:

Ongoing Task	Short-Term, Year 1-2	Medium-Term, Year 3-5	Long-Term 1, Year 6-10	Long-Term 2, Year 11-15	Long-Term 3, Year 11-15

Strategy / Strategy Sub-Task	Responsibility		*Resource Requirements	Timing
	Lead	Support		
8. Governance (Supports Goals 3 & 4)				
8.1 Continue coordination of tree protection on proposed development lands through Development Review Team	Planning	Forestry	As part of base operational budget	ongoing
8.2 Engage the County CAO's shared services initiative to implement urban forest projects (i.e. tree planting, pest management, ecological restoration & connectivity) and add advice on urban forest management to the mandate of the Planning & Sustainability and Environmental & Active Transportation Advisory Committees	Planning & Public Works	Forestry	~1 week staff time per year	2018
8.3 Consider set-up of an urban forest working group to coordinate initiatives across Town departments and with partners such as the County, GRCA, utility companies; Work through existing Public Works-Utility Companies committee meetings to coordinate projects for the urban forest	Forestry	Partners	~ 4 days staff time per year	2018
8.4 Consider establishment of a Community Advisory Group to coordinate community-led & neighbourhood projects	Forestry		~1.5 weeks staff time per year	2020
9. Integration with Other Town, County and Neighbouring Community Initiatives (Supports Goals 1 to 5)				
9.1 Include directions within the Town's Asset Management Strategy for adequate consideration of tree needs in overall management of Town infrastructure assets	Forestry	Public Works	~1 week of staff time	2018
9.2 Continue to **follow *Official Plan*** policies and enhance OP policies for the next review to reflect the Town canopy cover target of 35%, enhanced natural heritage and trails connectivity, development review requirements	Planning	Forestry	~2 days of time for Arborist/Community Stewardship Coordinator	2019
9.3 Establish Trail and Natural Heritage System Connectivity, according to the directions of Cobourg's Official Plan and the Ganaraska Region Conservation Authority policies and County of Northumberland Official Plan and programs	Parkd	Forestry and Partners	~3 days' time per year for Town Arborist	2020-2022
9.4 Integrate urban forest management directions with those of the Town ***Parks Master Plan,*** providing direction for park naturalization for Lucas Point Park, James Cockburn Conservation Area, Sinclair Park,	Forestry		Part of existing urban forest management responsibilities	2018-2019

Legend:

Ongoing Task	Short-Term, Year 1-2	Medium-Term, Year 3-5	Long-Term 1, Year 6-10	Long-Term 2, Year 11-15	Long-Term 3, Year 11-15

Strategy / Strategy Sub-Task	Responsibility		*Resource Requirements	Timing
	Lead	Support		
9.5 Update the Tree Preservation By-Law, monitor progress on by-law implementation and track needs for future additional regulatory controls for tree preservation.	By-Laws	Forestry	Part of existing staff responsibilities	2018 and ongoing
9.6 Continue to implement Cobourg's Urban and Landscape Design Guidelines as part of tree planting and maintenance	Forestry	All Other Partners	Within existing program responsibilities in tree planting, maintenance and risk management	2018 and ongoing
9.7 Work with Town Planners to identify and protect heritage trees and cultural landscapes according to Heritage Master Plan	Forestry	Planning	~3 weeks of time for Arborist/Community Stewardship Coordinator	2023-2025
9.8 Fulfill Town responsibilities under the *Invasive Species Act*, including: management of invasive species located on public lands as part of the Town Risk Management Program and public education, guidance and best management practices for controlling invasive woodland species	Forestry	GRCA, County, Community, MNRF	Part of Arborist responsibilities under Risk Management and Community Stewardship Coordinator role in community stewardship program	2018 and ongoing

*Based upon the cumulative resource requirements identified in the above workplan, it is recommended that a Forest Technician/Arborist and a Community Stewardship Coordinator be added to the Town staff to support the Town Arborist in plan implementation. The proposed base operational budget is estimated as the current $220,000 operating budget + funds for addition of a Forest Technician/Arborist position and a Community Stewardship Coordinator. These financial resources would be obtained through addition to the operating budget and implementation of the above funding strategy, as needed to implement the overall urban forest management plan as presented.

Legend:

Ongoing Task	Short-Term, Year 1-2	Medium-Term, Year 3-5	Long-Term 1, Year 6-10	Long-Term 2, Year 11-15	Long-Term 3, Year 11-15

8.0 BUSINESS CASE FOR SUSTAINABLE URBAN FOREST MANAGEMENT

The preceding sections describe the context within which Cobourg's urban forest is set, its characteristics and value, Town and community wishes for the future urban forest and the methods by which this future vision will be accomplished. All of this information taken together also provides the business case for implementing the urban forest management program described in this plan. The rationale for Town adoption of the urban forest management plan is presented below according to topics of:

1. Town authority and mandate, commitments, applicable legislation, policy directions and related programs
2. Current urban forest assets
3. Community expectations and benefits
4. Program design for effectiveness, efficiency and continuous improvement.

8.1 Town Mandate and Commitments

The vision for the Town of Cobourg, as articulated in the Official Plan, includes description of a "strong, liveable and healthy community providing a full range of opportunities to live, work, play and shop within the town". This will be reinforced through a number of ways including "the enhancement and preservation of its historical, natural and rural heritage, including a linked greenlands system" and an emphasis on sustainable development. Trees and the urban forest are integral to the Town's natural heritage and linked greenlands system and support the community in achieving sustainable development and in functioning as an "environmentally aware urban centre".

Town development of this plan for managing its urban forest demonstrates its ongoing commitment to continuing the maintenance and planting of trees within the community. Over time, the Town has invested significant resources in maintaining existing trees and planting new ones. Other Town programs, as described in Section 3.0, support this effort to retain and enhance the urban forest, such as:

- the Official Plan directions for protecting natural areas and trees, for maintaining, enhancing and restoring ecological features, functions and connectivity and for establishment of trees along streets and within new developments; these directions fulfill the Town responsibilities to follow the Northumberland County Official Plan and the Provincial Policy Statement
- the Town's urban design and landscape guidance for retention and planting of trees to contribute to community character, aesthetics, sustainability and connectivity
- provisions in the Heritage Master Plan for conservation of heritage trees and treed cultural landscapes that connect people to their history, and
- the featured importance of trees within the *Parks Master Plan* to connect the parks and open space system, to connect people to places, for aesthetics, and to provide shade and separation of activities.

Additional commitment to the urban forest is also demonstrated through recent Council direction for the community, such as integration of sustainability principles into the design of new developments, including the master plan for the re-development of the Tannery site. As well, in October 2017, the Town of Cobourg passed a declaration supporting people's right to a healthy environment, as part of the David Suzuki Foundation Blue Dot Campaign, joining 159 Canadian communities in this campaign. This declaration is that "all Canadians deserve to breathe clean air, drink clean water and eat safe food. These can only be guaranteed for all Canadians — today and into the future — through a nationally recognized right to a healthy environment, such as a federal environmental bill of rights or a constitutional amendment. This would embed our values as a country in our highest laws, strengthen our environmental performance and ensure all levels of government fulfil their duty to protect the people and places we love." As discussed in section 4.0, trees are integral to a healthy environment for humans, and for wildlife.

Also in 2017, Town of Cobourg Council endorsed Bill 68 - Modernizing the Ontario Legislative Act. One of these amendments states that all municipalities shall develop a Tree Canopy and Vegetation Plan in 2018. Specifically, the proposed amendment to the Municipal Act states that On March 1, 2019, "all municipalities shall adopt and maintain policies with respect to the manner in which the municipality will protect and enhance the tree canopy and natural vegetation in the municipality".

Given the above, the mandate and commitment of the Town to urban forest management is resoundingly strong. Delivering on this commitment in an efficient, effective and economical manner will in turn fulfill municipal responsibilities to its residential and business taxpayers.

8.2 Current Investment in the Urban Forest

Cobourg's favourable climate and soils support a diverse and healthy urban forest that has been established over a long period of time, mainly through planting in developed areas and natural regeneration and planting in natural areas. The current annual Town forestry budget is $220,000 to accomplish tree maintenance and planting on public lands. With past annual budgets approaching this value along with a projected replacement cost of $70 million for the approximately 10,000 public street and park trees, the investment in the existing forest is substantial.

A 2015 literature review of the municipal costs associated with maintaining and not maintaining trees (Vogt, J. et. al., sponsored by the International Society of Arboriculture) helps provide further guidance on choosing investments in the urban forest. This study found that while there is limited costing data available for the range of management activities; some valuable information was obtained. From the information retrieved from the large number of reviewed Canadian and U.S. studies, the authors concluded the following:

- Trees that are not maintained (pruning, pests, diseases, watering, prevention of damage), immediately after planting and throughout their lifecycle, are more likely to be grow less quickly or be lost, resulting in the loss of community benefits that the tree would otherwise have provided. Unmaintained trees also have a greater probability of causing property damage, increasing liability
- The cost of not maintaining a tree early in life (such as formative pruning) may result in greater tree maintenance costs later (i.e. structural pruning)
- An optimal pruning cycle for trees of four to five years
- Proper tree selection for the site could reduce annual maintenance costs
- Adequate root conditions could make trees easier to maintain later in life
- Although limited information exists, some species of trees are much less costly to maintain than others
- Use of best management practices for planting and regular maintenance, maintaining a mix of age classes and species, and promptly removing declining trees can help minimize potential costs due to tree failure
- Watering is crucial for establishment and survival of newly planted trees
- Mulching around trees is recommended at planting and on an ongoing basis to decrease root competition from other plants, improve soil moisture content, and help protect the tree from lawnmower and weed trimmer damage. Mulching was found to improve the health of a tree, increase trunk, branch and root growth and perhaps reduce the requirement for maintenance later in the tree's life
- Excessive application of calcium or phosphorus in turf fertilizers may cause leaf chlorosis in trees
- Protecting trees during construction is effective (barriers, disturbance-free zones, grading to direct potentially contaminated runoff away from trees, tunneling and boring to avoid root damage); one study noted that trees near road construction were twice as likely to die as those not adjacent to construction
- Studies on the effects of fertilization on tree survival and growth were mixed, inconclusive
- Homes without trees could experience decreased equity relative to homes with trees and loss of additional tax revenues by the municipality
- US study reported recovery by builders of the cost of preserving trees through higher house price

- Limited data is available on the effectiveness of varied maintenance levels (i.e. unknown cost-benefit between more and less maintenance, what is the most cost effective interval); the authors recommend that urban forest managers track their maintenance activities /overall maintenance regime – what is done, how much, how often, for how long and to which tree part or to which trees, who does the maintenance and what is the cost and tree health response
- The relative higher cost of deferred tree maintenance can be viewed as being passed on to the next generation of urban foresters and residents to address.

8.3 Community Expectations and Benefits

Community members and stakeholders that participated in the development of this plan expressed strong support for the community forest. There were also numerous descriptions of the aesthetic value of trees, the positive experiences they provide for outdoor activities (walking, cycling, and nature enjoyment) and overall sense of well-being experienced in treed areas of the Town. The majority of participants in this planning process expressed a desire to keep the trees the Town already has and to add more trees. Many wished to see lots more trees.

In addition to the aesthetic and experiential benefits trees provide to the community, they also supply ecological services that offset the impacts of human activities. Estimated air quality benefits provided by Cobourg's total forest canopy (~27.2% forest cover) comprise an air pollutant removal service value of $354,000 and carbon storage service $8.3M (i-Tree calculation). Trees provide additional benefits and cost savings to the community (see Section 4.3), including stormwater management (flow management and pollutant removal) that does not need to be provided by constructed municipal infrastructure; reduced crime (possibly due to observed calming effects of trees); increased residential property values and increased retail visits for properties with more trees; improved human mental health, reduced stress and improved thinking ability (cognitive function); better cardiovascular and respiratory health, healthier weights; building energy savings and temperature moderation; and provision of wildlife habitat and cultural heritage.

8.4 Design of the Urban Forest Management Program

The design of the urban forest management program presented in this Plan builds upon the strong management practices already in place and integrates industry best practices and addresses the management challenges and opportunities identified for Cobourg by Town managers, partners and community members. The resulting program is a comprehensive one that aims to efficiently achieve a healthy, diverse, and expanded urban forest. Key design features include:

- The comprehensive urban forest management approach follows current industry best practice and entails an approach that has been refined over a long period of time by urban foresters across Canada and the United States
- Adaptive management is built in, also according to industry best practice. This is accomplished by continually identifying ways to increase program efficiency and effectiveness through continued and enhanced monitoring of forest health, the actions taken, their costs, and long-term effectiveness in accomplishing tree health and longevity
- With the large number of trees, shrubs and landscape that comprise and impact upon the structure and health of Cobourg's urban forest, it is logical that the management program engage as many community members as possible. The more residents, businesses, organizations, and individuals that participate in planting and maintaining trees, the easier and quicker the Town's urban forest vision, goals and 35% cover target can be met. The proposed stewardship program raises community understanding of the what, why and how the Town manages the urban forest and encourages active and informed participation in tree planting and care. As one consultation participant observed, most people like trees and the more one learns about trees, the more one likes and becomes committed to them. The work of the Community

Stewardship Coordinator would support the role of the Town Arborist in urban forest management and would significantly relieve this position of some of the time-consuming community work that now occurs.

- The approach for long term management of Cobourg's urban forest is strengthened considerably by the work that is and will be accomplished through committed partners. A preliminary list of partners includes Town departments, Council, Council Committees and Advisory Committees, Northumberland County, Ganaraska Region Conservation Authority, schools, utility companies, Guides, Scouts, TD, Library, Town businesses & institutions, community groups (i.e. Willow Beach Naturalists, Ecology Ottawa, Cobourg Horticultural Society, community gardens, neighbourhood associations), landscaping, nursery and forestry companies and professionals.

- The UFMP provides links through trees to the Town's history, linking to the past and providing a source of pride for the future through trees that provide beauty, shade, mitigate winds, clean water and air, store carbon, provide food for humans and wildlife and provide habitat and ecological system functions.

8.5 Business Case Conclusion

As described above, the Town is committed to maintaining and enhancing its urban forest. Several community members and groups expressed their support for a future forest as described in this plan. The community benefits from the existing forest are substantial and would increase in value with delivery on this management approach. The realized total benefits of maintaining trees – social, cultural, environmental and economical – are expected to surpass the economic investment in tree planting and maintenance. As described above, the cost of not maintaining trees has the potential to be more costly than maintaining them. Overall, this management plan proposes wise management of an asset that has seen significant past investment and that could represent a replacement value of $70,000,000.00[5], or more, for the approximately 10,000 public trees along streets and in parks.

[5] I-Tree calculation of the value of Cobourg`s urban forest.

9.0 IMPLEMENTATION STRATEGY/OPERATIONAL PLAN

Upon Town Council approval of this 2018-2037 Urban Forest Management Plan, the directions and activities will be put into action. Table 9.1 presents a summary of the overall objectives and actions for each five-year period of the Plan.

Table 9.1: Forest Management Objectives for each Five-Year Period of the Plan

Program	2018-2022	2023-2027	2028-2032	2033-2037
1. Tree Planting	- Refine & implement tree planting plan - Increase in *future canopy cover by about 3%, to 30% - Establish Town tree nursery	- Increase in *future canopy cover by about 5%, to 35% - Increase proportion of trees planted on private property	- Tree planting plan transitions to maintenance status of replacing removed trees	- Tree planting plan continues maintenance status of replacing removed trees
2. Tree Maintenance	- Complete tree inventory - Develop & Begin 10-Year Tree Maintenance Program - Hire a Forest Technician/ Arborist to support delivery of the UFMP	- Continue to keep tree inventory updated - Implement second half of tree maintenance program - ~2027, refine tree maintenance program for next 10 year period	- Continue to keep tree inventory updated - Implement second 10-Year tree maintenance program	- Continue to keep tree inventory updated - Continue tree maintenance - 2027, refine tree maintenance program for next 10 year period
3. Risk Management	- Implement Risk Management approach - Address high risk trees	- Continue to use tree health and risk assessment approach to identify and manage tree health - Watch for emerging pests, diseases, invasive species and climate effects	- Continue to use tree health and risk assessment approach for annual tree maintenance workplans - Watch for emerging pests, diseases, invasive species and climate effects	- Continue to use tree health and risk assessment approach for annual tree maintenance workplans - Watch for emerging pests, diseases, invasive species and climate effects
4. Community Stewardship	- Hire Community Stewardship Coordinator - Develop & Implement urban forest Community Stewardship education and participation initiatives; built in evaluation of program -Establish second Town arboretum and assist with community involvement in Town tree nursery - Develop school, neighbourhood and business partner projects	- Continue stewardship program, expanding reach to additional residential neighbourhoods and businesses - Complete tree inventory for private property - Refine stewardship program as appropriate, based upon annual/project evaluation findings	- Continue the urban forest stewardship program, extending the reach to additional groups, businesses and residents and introducing events and initiatives as needed to keep people interested, involved and learning	- Continue stewardship and education initiatives - Refine program to support any updates in other urban forest management programs
5. Resourcing Strategy	- Develop and implement resourcing strategy - Maximize access to tree funding & grant programs	- Development of Town bequest, sponsorship and carbon credit programs		

Program	2018-2022	2023-2027	2028-2032	2033-2037
6. Regulatory Initiatives	- Update Tree Preservation By-law and implement changes for increased tree funding and improved monitoring of development conditions involving trees	- Research and compile needs for By-Law Update as part of five –year review	- Research and compile needs for By-Law Update as part of five –year review; consider relevance of further tree protection control on private property	- Research and compile needs for By-Law Update as part of five –year review
7. Heritage Tree Program	-Develop and begin Heritage Tree Program; initial focus is for trees on public lands	- Implement approach for Heritage Trees on private property - Work with Town Planners to identify/ protect cultural heritage landscapes - Review potential for criteria update ~2027	- Continue and promote Town Heritage Trees and treed cultural landscapes	- Continue and promote Town Heritage Trees and treed cultural landscapes
8. Governance	- Confirm Forestry Section as lead on urban forest management - Establish clear roles for all urban forest partners - Expand and engage partnerships in Town urban forest management	- Continue to maintain & expand partner projects (County, GRCA, schools, utilities, Guides/Scouts, TD Library, businesses, others) - Explore UF connectivity with nearby municipalities	- Maintain partnerships	- Maintain partnerships
9. Alignment with Other Initiatives	- Work with County & GRCA on strategy for trail and natural heritage system connectivity - Work collaboratively with all partners on related initiatives identified in this Plan	Monitor Provincial and Federal legislative and policy changes for relevance to urban forests; Integrate into the management program, as needed	Continue to monitor legislative, policy, community and environmental changes for potential impact and/or support to urban forest management	
Overall UFMP	- Develop and produce annual urban forest state of health & management progress report	- Consider 10 year review, ~2027, of the plan directions, programs and workplan	- Continue annual program evaluation and reporting, refining the management approach, as appropriate	- Develop review scope for update of the UFMP to apply for the next 20+ years

*trees planted will take several years before achieving the target increase in forest cover of 1% per year

Expanding upon the workplan presented in Table 7.5, specific activities to be completed at the outset of the plan period are presented in Table 9.1 below. This is the Municipal Forest Action Plan that is comprised of Annual Operational Plans for the first five years of the Urban Forest Management Plan (2018-2022).

Table 9.2: Municipal Forest Action Plan

2018 (Year 1)

Priorities are: Finalization & initiation of Tree Planting Plan, Update of the Tree Inventory, Development of a 10-Year Tree Maintenance Program, Manage identified high risk trees, Hire Community Stewardship Coordinator and Develop Stewardship Program, Development of Resourcing Strategy, Update of the Tree Preservation By-Law, Establishment of urban forest management partnerships and Begin alignment of forest management with other projects.

Program	Task	Timing	Resources	Lead	Support
Tree Planting Plan	1.1 Develop Town and Neighbourhood Tree Planting Plan, including a tree replacement strategy, to increase canopy cover to 35% and to increase connectivity for people and for the natural heritage system – base plan is provided in Appendix H.	Q1 (1st quarter, Jan.-Mar. of 2018)	Town Arborist – 1-2 weeks to refine plan	Forestry	Contractors, Town Partners
	1.4 and 1.5 Provide recommended tree list, guide for species selection and planting on Town website for use by the community	Early Q2	Town Arborist	Forestry	Communications
	1.2.1 Coordinate tree planting on Town lands (~150 trees) on streets in identified priority neighbourhoods and in Town parks, and to replace trees removed in 2017	Q2 & Q4	Town Arborist: 1-2 weeks to oversee planting	Forestry	Contractors, Town Partners
	1.2.2 Continue coordination to provide subsidized trees to residents for planting on private property	Q2	Town Arborist ~ 1week	Forestry	Town Partners
	1.2.3 Develop approach and begin coordination to encourage an increase in the number of trees planted on private residential and business properties in 2019	Q4	Community Stewardship Coordinator	Forestry	Town Partners
	1.3 Prepare first annual tree planting report, as part of overall annual urban forest management plan progress report, that documents progress towards implementation of the neighbourhood tree planting plan (Appendix H); shared with Council & on Town website and 1.6 Update the planting plan, as needed, identifying replacement tree needs and new planting location opportunities and 1.4 and 1.5 Update, as needed, the recommended tree list, guide for species selection and planting; re-post on Town website	Q4	Town Arborist ~3 days	Forestry	Communications
Tree Maintenance Program	2.5 Complete tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species), with trees chosen for maintenance from data within the existing tree inventory	Q1-Q4	Coordination by Town Arborist ~6 weeks Contractors funded from current operating budget	Forestry	Contractors

2018 (Year 1)

Priorities are: Finalization & initiation of Tree Planting Plan, Update of the Tree Inventory, Development of a 10-Year Tree Maintenance Program, Manage identified high risk trees, Hire Community Stewardship Coordinator and Develop Stewardship Program, Development of Resourcing Strategy, Update of the Tree Preservation By-Law, Establishment of urban forest management partnerships and Begin alignment of forest management with other projects.

Program	Task	Timing	Resources	Lead	Support
	2.4 Update the inventory to reflect activities completed under the Tree Planting and Maintenance Programs in 2018	Q1-Q4	Town Arborist ~1 week Data entry by Admin. staff	Forestry	
	2.2 Complete the Town's tree inventory, updating and completing information for the 6500 trees in the existing inventory and adding the approximate3500 trees not yet captured in the database	Q2-Q3	Forestry staff and Contracted resources - within existing Forestry budget	Forestry	Contractors
	2.1 Develop the 10-Year Tree Maintenance Program, based upon information obtained from the tree inventory update; integrate 2019 maintenance priorities into the work order system	Q3-Q4	Town Arborist – 3 weeks	Forestry	
	2.8 Compile summary of annual tree maintenance activities and baseline urban forest existing conditions for annual reporting on urban forest management	Q4	Town Arborist and GIS Coordinator– ~1 week each	Forestry	GIS
Risk Management Program	3.5 Review, update and report on the Town's Health and Safety program and how it can be applied to the Tree Maintenance and Tree Risk Programs. Ensure that the Town's Urban Forest Management Staff receive regular training in the safe use of equipment. Expand Safe Operating Procedures to ensure that Forestry staff are covered for all items ensuring that Provincial Workplace Safety and Prevention Services have been considered.	Q1-Q2	~3 weeks for Town Arborist	Forestry	Contractors
	3.1 Inspect all public trees according to the risk management maitrix in table 7.2, to obtain supporting data for the Tree Maintenance Program. Trees would be inspected at same time as update of the tree inventory data described in Task 2.2	Q2	Resource requirement captured in Task 2.2 as part of inventory of all trees on Town lands	Forestry	Contractors
	3.2 Address all high risk trees requiring attention, as identified through the updated tree inventory	Q3-Q4	Address trees needing immediate attention – budget depends on number of trees and type of work required	Forestry	Contractors
Community Stewardship Program	4.1.1 Develop job description for urban forest community stewardship coordinator	Q2	2 days - Town Arborist, Parks Manager	Forestry	Human Resources
	4.1.2 Hire a Community Stewardship Coordinator, initially on contract to	Q3	4 days - Town Arborist, Parks	Forestry	Human

2018 (Year 1)

Priorities are: Finalization & initiation of Tree Planting Plan, Update of the Tree Inventory, Development of a 10-Year Tree Maintenance Program, Manage identified high risk trees, Hire Community Stewardship Coordinator and Develop Stewardship Program, Development of Resourcing Strategy, Update of the Tree Preservation By-Law, Establishment of urban forest management partnerships and Begin alignment of forest management with other projects.

Program	Task	Timing	Resources	Lead	Support
	support Town Arborist and to initiate Community Stewardship Program; demonstrate progress, then consider establishment of a permanent position		Manager		Resources
	4.2 Develop the Community Stewardship Program (base program provided in this UFMP)	Q3-Q4	6 weeks total, led by Community Stewardship Coordinator, Town Arborist	Forestry	Communications
	4.3 Begin to implement the program, including web information, development of public education materials, Town support to encourage community participation in tree care and planting, tree tag identification, celebration of trees,	Q4	Full time role for community stewardship coordinator	Forestry	Communications
	4.7 Work with Master Planning Team to integrate sustainable urban forest concepts into the site re-development as a demonstration for the community	Q1	2 days – Town Arborist	Planning	Forestry
Resourcing Strategy	5.1 Develop a Resourcing Strategy to ensure the staff, capital and operating resources are in place to implement the UFMP and its operational plans	Q1	2 weeks total -Town Arborist, Parks Manager	Forestry	
	5.2 Begin pursuit and development of local funding opportunities, i.e. corporate sponsorships, a bequest program, other fund-raising	Q1-Q4	8 weeks total – Town Arborist & Stewardship Coordinator	Forestry	
	5.3 Seek all available agency and grant opportunities for tree planting and maintenance; consider engagement of community volunteers to help seek funding opportunities	Q1-Q4	~ 5weeks total – Town Arborist and Community Stewardship Coordinator	Forestry	
	5.1 Update the Resourcing Strategy as part of the Town budget process to ensure the staff, capital and operating resources are in place to implement the UFMP and its operational plan for 2019	Q1-Q4	1 week total – Town Arborist, Stewardship Coordinator, Parks Manager	Forestry	
Regulatory Initiatives	6.3 Update of Tree Preservation By-law to integrate recovery of required maintenance costs, increased compensation for removed trees and other controls identified for protection of trees	~Q2	2 weeks Town Arborist	Clerk's	Forestry
Governance	8.1 Continue coordination of tree protection on proposed development lands through Development Review Team	Q1-Q4	1 week Town Arborist	Planning	Forestry

2018 (Year 1)

Priorities are: Finalization & initiation of Tree Planting Plan, Update of the Tree Inventory, Development of a 10-Year Tree Maintenance Program, Manage identified high risk trees, Hire Community Stewardship Coordinator and Develop Stewardship Program, Development of Resourcing Strategy, Update of the Tree Preservation By-Law, Establishment of urban forest management partnerships and Begin alignment of forest management with other projects.

Program	Task	Timing	Resources	Lead	Support
	8.2.1 Engage the County CAO's shared services initiative to implement urban forest projects (i.e. tree planting, pest management, ecological restoration & connectivity)	Q2	1 week Town Arborist	CAO's Office	Forestry
	8.2.2 Update mandate of the Town's Planning & Sustainability Advisory Committee to include advice on urban forest management	Q2	1 day – Town Arborist, Parks Manager	Clerk's	Forestry
	8.3.1 Consider set-up of an urban forest working group to coordinate initiatives across Town departments and with partners such as the County, GRCA, utility companies;	Q2	If implemented, 1-2 weeks for Town Arborist	Planning, Public Works	Forestry
	8.3.2 Work through existing Public Works-Utility Companies committee meetings to coordinate projects for the urban forest	Q1-Q4	3 days Town Arborist	Public Works	Forestry
Urban Forest Management Integration with Other Initiatives	9.1 Include directions within the Town's Asset Management Strategy for adequate consideration of tree needs in overall management of Town infrastructure assets	Q1-Q4	2 days	Public Works	Forestry
	9.4 Continue to align urban forest management directions and work orders with those of the Town ***Parks Master Plan***	Q1	Part of Town Arborist role	Forestry	
	9.5 Monitor progress on Tree Preservation by-law implementation and track needs for future additional tree preservation controls.	Q1-Q4	3 days	Forestry	Clerk's
	9.6 Continue to implement Cobourg's Urban and Landscape Design Guidelines as part of tree planting and maintenance; Ensure all appropriate design guidelines relevant to trees are known by all partners, and are being implemented	Q1-Q4	Part of Town Arborist role	Forestry	Planning, Public Works, Town Partners, Contractors
	9.8 Fulfill Town responsibilities under the *Invasive Species Act*, including: management of invasive species located on public lands as part of the Town Risk Management Program and public education, guidance and best management practices for controlling invasive woodland species	Q2-Q3	~ 1 week total for Town Arborist and Community Stewardship Coordinator	Forestry	Town Partners, Contractors

2019 (Year 2)

Priorities are: Increase planting of trees on private property, hiring of a forest technician/arborist, begin implementation of the 10-year Tree Maintenance Program, Implementation of the Risk Management Program, implementation of the updated tree by-law and funding mechanisms, expansion of the Town's tree memorial program and continued base program activities for tree planting, maintenance, risk management, community stewardship, tree protection, partnership initiatives and program alignment with other initiatives.

Program	Task	Timing	Resources	Lead	Support
Tree Planting Plan	1.2.1 Coordinate tree planting on Town lands (~150+ trees), plus replacement of trees removed in 2018	Q2 & Q4	Town Arborist: 1-2 weeks to oversee planting	Forestry	Contractors, Town Partners
	1.2.2 Continue coordination to provide subsidized trees to residents for planting on private property	Q2	Town Arborist/ Stewardship Coordinator~ 1week	Forestry	Town Partners
	1.2.3 Continue coordination to encourage an increase in the number of trees planted on private residential and business properties	Q1 & Q2	Community Stewardship Coordinator	Forestry	Town Partners
	1.3 Prepare annual tree planting report, as part of overall annual urban forest management plan progress report, that documents progress towards implementation of the neighbourhood tree planting plan (Table 7.6); shared with Council & on Town website and 1.6 Update the planting plan, as needed, identifying replacement tree needs and new planting location opportunities and 1.4 and 1.5 Update, as needed, the recommended tree list, guide for species selection and planting; re-post on Town website	Q4	Town Arborist ~3 days	Forestry	Communications
Tree Maintenance Program	2.5 Complete tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species), with trees chosen for maintenance through use of information within the updated tree inventory (completed in 2018)	Q1-Q4	Coordination by Town Arborist ~6 weeks Contractors funded from current operating budget	Forestry	Contractors
	2.4 Update the inventory to reflect activities completed under the Tree Planting and Maintenance Programs during 2019	Q1-Q4	Coordination by Town Arborist ~1 week Data entry by Admin. staff	Forestry	
	2.3.1 Develop a job description for a Forest Technician / Arborist to support the Town Arborist in delivery of this urban forest management program	Q1	Town Arborist, Parks Manager - 1 day	Forestry	Human Resources
	2.5 Conduct catch-up on tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species) identified	Q1-Q4	Resourcing depends upon prioritization and # of trees	Forestry	Contractors

2019 (Year 2)

Priorities are: Increase planting of trees on private property, hiring of a forest technician/arborist, begin implementation of the 10-year Tree Maintenance Program, Implementation of the Risk Management Program, implementation of the updated tree by-law and funding mechanisms, expansion of the Town's tree memorial program and continued base program activities for tree planting, maintenance, risk management, community stewardship, tree protection, partnership initiatives and program alignment with other initiatives.

Program	Task	Timing	Resources	Lead	Support
	through the 2018 tree inventory update		requiring care		
	2.6 Conduct annual tree inspections, identifying trees requiring inspection from data in the tree inventory by applying the criteria in the risk management maitrix (Table 7.1)	Q1-Q4	Resourcing depends upon # of trees to be inspected, as determined from the updated inventory	Forestry	(Contractors)
	2.7 Complete annual tree maintenance – formative pruning, management for pests, diseases and invasive species and removal of high risk trees - as identified through the tree inventory data and risk management assessment	Q1-Q4	Resourcing linked to task 2.5	Forestry	Contractors
	2.3.2 Hire a Forest Technician / Arborist to support the Town Arborist	Q3	Addition to the urban forest operational budget	Forestry	Human Resources
	2.1 Integrate 2020 maintenance priorities identified in the Tree Maintenance Program into the work order system	Q4	Town Arborist – 3 weeks	Forestry	
	2.8 Compile summary of annual tree maintenance activities and baseline urban forest existing conditions for annual reporting on urban forest management	Q4	Town Arborist and GIS Coordinator– ~1 week each	Forestry	GIS
Risk Management Program	3.2 Address all high risk trees requiring attention, as identified through the updated tree inventory	Q1 to Q4	Budget depends on number of trees and work required	Forestry	Contractors
	3.3 Complete annual tree inspection program according to the direction provided in the Risk Management Maitrix	Q2	Resourcing to be determined from updated tree inventory – Town Arborist & Parks Staff	Forestry	
	3.4 Prioritize completion of preventative maintenance identified through the inspection program, pruning trees to manage/prevent development of unstable tree limbs and removing high risk trees	Q3-Q4	Resourcing to be determined from updated tree inventory	Forestry	Contractors
Community Stewardship Program	4.3 Continue to implement the program, including web information, sharing of public education materials, Town support to encourage community participation in tree care and planting, tree tag identification, celebration of trees, encourage planting on private	Q1 to Q4	Full time role for community stewardship coordinator	Forestry	Communications

2019 (Year 2)

Priorities are: Increase planting of trees on private property, hiring of a forest technician/arborist, begin implementation of the 10-year Tree Maintenance Program, Implementation of the Risk Management Program, implementation of the updated tree by-law and funding mechanisms, expansion of the Town's tree memorial program and continued base program activities for tree planting, maintenance, risk management, community stewardship, tree protection, partnership initiatives and program alignment with other initiatives.

Program	Task	Timing	Resources	Lead	Support
	property – residential, businesses, institutions				
	4.7 Work with the Tannery Site Master Planning Team to integrate sustainable urban forest concepts into the site re-development as a demonstration for the community	Q1 to Q4	2 days – Town Arborist	Planning	Forestry
	4.5 Continue and expand the Town's Memorial tree program	Q1 to Q4	~2 weeks for Community Stewardship Coordinator	Forestry	
	4.1 Verify continued role for Community Stewardship Coordinator and renew contract or hire full-time	Q2	2 days – Parks Manager	Forestry	Human Resources
Resourcing Strategy	5.2 Continue to pursue, develop and coordinate local funding opportunities, i.e. corporate sponsorships, a bequest program, other fund-raising	Q1-Q4	8 weeks total – Town Arborist & Community Stewardship Coordinator	Forestry	
	5.3 Continue to seek all available agency and grant opportunities for tree planting and maintenance	Q1-Q4	~ 5weeks total – Town Arborist and Stewardship Coordinator	Forestry	
	5.4 Implement recommended by-law updates to increase funding for tree establishment and maintenance	Q1	1 week Town Arborist	Forestry	Planning
	5.1 Update the Resourcing Strategy to ensure the staff, capital and operating resources are in place to implement the UFMP and its operational plan for 2020	Q4	1 week total – Town Arborist, Stewardship Coordinator, Parks Manager		
Regulatory Initiatives	6.1 Implement updated Tree Preservation By-Law	Q1	Part of Town Arborist duties	Forestry	Planning, other Town Dept.
	6.2 Monitor and report on results of the Tree Protection By-Law implementation as part of annual UFMP Progress Report	Q4	3 days – Town Arborist	Forestry	Planning
Governance	8.1, 8.2 and 8.3 Continue working through partnerships to accomplish and coordinate Town urban forest management and tree preservation	Q1 to Q4	3-4 weeks for Town Arborist	Forestry	
Program Integration with	9.1, 9.2, 9.4, 9.5, 9.6, 9.8 Continue to implement urban forest management practices that are aligned with other Town initiatives	Q1 to Q4	Role responsibilities of Town Arborist and Community	Forestry	

2019 (Year 2)

Priorities are: Increase planting of trees on private property, hiring of a forest technician/arborist, begin implementation of the 10-year Tree Maintenance Program, Implementation of the Risk Management Program, implementation of the updated tree by-law and funding mechanisms, expansion of the Town's tree memorial program and continued base program activities for tree planting, maintenance, risk management, community stewardship, tree protection, partnership initiatives and program alignment with other initiatives.

Program	Task	Timing	Resources	Lead	Support
Other Initiatives	for Asset Management, tree conservation through the Official Plan and Tree Preservation By-Law, Parks Master Plan, Urban Design Guidelines and fulfillment of Town responsibilities under the *Invasive Species Act*		Stewardship Coordinator		

2020 (Year 3)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, partnership initiatives, and integration with other initiatives; New projects include planning for the Town tree nursery, establishment of second Town arboretum, Develop a Heritage Tree Program and Develop a Strategy for regional trail and natural heritage system connectivity, and possible establishment of a community advisory/working group.

Program	Task	Timing	Resources	Lead	Support
Tree Planting Plan	1.2.1 Coordinate tree planting on Town lands (~150+ trees), plus replacement of trees removed in 2019	Q2 & Q4	Town Arborist: 1-2 weeks to oversee planting	Forestry	Contractors, Town Partners
	1.2.2 Continue coordination to provide subsidized trees to residents for planting on private property	Q2	Town Arborist/ Stewardship Coordinator~ 1week	Forestry	Town Partners
	1.7 Develop approach (location, resources/budget, tree sourcing, equipment, site preparation) for establishment of a tree nursery on publically-owned lands; possible options Town parks or public lands not dedicated to other uses; i.e. programs, school yards.	Q3-Q4	Town Arborist & Forest Technician ~3-4 weeks	Forestry	
	1.2.3 Continue coordination to encourage an increase in the number of trees planted on private residential and business properties	Q1 & Q2	Community Stewardship Coordinator	Forestry	Town Partners
	1.3 Prepare annual tree planting report, as part of overall annual urban forest management plan progress report, that documents progress towards implementation of the neighbourhood tree planting plan (Table 7.6); shared with Council & on Town website and 1.6 Update the planting plan, as needed, identifying replacement	Q4	Town Arborist ~3 days	Forestry	Communications

2020 (Year 3) Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, partnership initiatives, and integration with other initiatives; New projects include planning for the Town tree nursery, establishment of second Town arboretum, Develop a Heritage Tree Program and Develop a Strategy for regional trail and natural heritage system connectivity, and possible establishment of a community advisory/working group.					
	tree needs and new planting location opportunities and 1.4 and 1.5 Update, as needed, the recommended tree list, guide for species selection and planting; re-post on Town website				
Tree Maintenance Program	2.5 Complete tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species), with trees chosen for maintenance through use of information within the updated tree inventory (completed in 2018)	Q1-Q4	Coordination by Town Arborist ~6 weeks Contractors funded from current operating budget	Forestry	Contractors
	2.4 Update the inventory to reflect activities completed under the Tree Planting and Maintenance Programs during 2020	Q1-Q4	Coordination by Town Arborist ~1 week Data entry by Admin. staff	Forestry	
	2.5 Complete catch-up on tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species) identified through the 2018 tree inventory update	Q1-Q4	Resourcing depends upon prioritization and # of trees requiring care	Forestry	Contractors
	2.6 Conduct annual tree inspections, identifying trees requiring inspection from data in the tree inventory by applying the criteria in the risk management maitrix (Table 7.1)	Q1-Q4	Resourcing depends upon # of trees to be inspected, as determined from the updated inventory	Forestry	(Contractors)
	2.7 Complete annual tree maintenance – formative pruning, management for pests, diseases and invasive species and removal of high risk trees - as identified through the tree inventory data and risk management assessment	Q1-Q4	Resourcing linked to task 2.5	Forestry	Contractors
	2.1 Integrate 2021 maintenance priorities identified in the Tree Maintenance Program into the work order system	Q4	Town Arborist – 3 weeks	Forestry	
	2.8 Compile summary of annual tree maintenance activities and baseline urban forest existing conditions for annual reporting on urban forest management	Q4	Town Arborist and GIS Coordinator– ~1 week each	Forestry	GIS
Risk Management Program	3.2 Address all high risk trees requiring attention, as identified through the updated tree inventory	Q1 to Q4	Budget depends on number of trees and work required	Forestry	Contractors

2020 (Year 3) Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, partnership initiatives, and integration with other initiatives; New projects include planning for the Town tree nursery, establishment of second Town arboretum, Develop a Heritage Tree Program and Develop a Strategy for regional trail and natural heritage system connectivity, and possible establishment of a community advisory/working group.					
	3.3 Complete annual tree inspection program according to the direction provided in the Risk Management Maitrix	Q2	Resourcing to be determined from updated tree inventory – Town Arborist & Forestry Staff	Forestry	
	3.4 Prioritize completion of preventative maintenance identified through the inspection program, pruning trees to manage/prevent development of unstable tree limbs and removing high risk trees	Q3-Q4	Resourcing to be determined from updated tree inventory	Forestry	Contractors
Community Stewardship Program	4.3 Continue to implement the program, including web information, sharing of public education materials, Town support to encourage community participation in tree care and planting, tree tag identification, celebration of trees, encourage planting on private property – residential, businesses, institutions and 4.5 Continue Town's Memorial tree program	Q1 to Q4	Full time role for community stewardship coordinator	Forestry	Communications
	4.7 Work with the Tannery Site Master Planning Team to integrate sustainable urban forest concepts into the site re-development as a demonstration for the community	Q1 to Q4	2 days – Town Arborist	Planning	Forestry
	4.1 Verify continued role for Community Stewardship Coordinator and renew contract or hire full-time	Q2	2 days – Parks Manager	Forestry	Human Resources
	4.4 Establish second tree arboretum on Town lands; Consider possible location on Daintry Crescent	Q2-Q3	4 months total, Town Arborist & Community Stewardship Coordinator	Forestry	
Resourcing Strategy	5.2 Continue to pursue, develop and coordinate local funding opportunities, i.e. corporate sponsorships, a bequest program, other fund-raising	Q1-Q4	8 weeks total – Town Arborist & Community Stewardship Coordinator	Forestry	
	5.3 Continue to seek all available agency and grant opportunities for tree planting and maintenance	Q1-Q4	~ 5weeks total – Town Arborist and Community Stewardship Coordinator	Forestry	
	5.1 Update the Resourcing Strategy to ensure the staff, capital and operating resources are in place to implement the UFMP and its operational plan for 2021	Q4	1 week total – Town Arborist, Stewardship Coordinator, Parks Manager	Forestry	

2020 (Year 3) Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, partnership initiatives, and integration with other initiatives; New projects include planning for the Town tree nursery, establishment of second Town arboretum, Develop a Heritage Tree Program and Develop a Strategy for regional trail and natural heritage system connectivity, and possible establishment of a community advisory/working group.					
Regulatory Initiatives	6.1 Continue to implement Tree Preservation By-Law	Q1	Part of Town Arborist duties	Forestry	Planning, other Town Dept.
	6.2 Monitor and report on results of the Tree Protection By-Law implementation as part of annual UFMP Progress Report	Q4	3 days – Town Arborist	Forestry	Planning
Heritage Tree Program	7.1 Develop a Town Heritage Tree Program for identification and preservation of heritage trees and cultural (treed) landscapes	Q1	2 week Town Arborist & Stewardship Coordinator	Forestry	Planning
	7.2 Establish the Town Heritage Tree Program	Q2	3 weeks Stewardship Coord.	Forestry	Planning
	7.3 Recognize and promote identified heritage trees through initiatives such as the Town website, walking & cycling tours, tourism materials	Q2-Q4	As part of Community Stewardship Program	Forestry	Planning
Governance	8.1, 8.2 and 8.3 Continue working through partnerships to accomplish and coordinate Town urban forest management and tree preservation	Q1 to Q4	3-4 weeks for Town Arborist	Forestry	
	8.4 Consider establishment of a Community Advisory Group to coordinate community-led & neighbourhood projects	Q1	3 weeks for Community Stewardship Coordinator	Forestry	
Program Integration with Other Initiatives	9.1, 9.2, 9.4, 9.5, 9.6, 9.8 Continue to implement urban forest management practices that are aligned with other Town initiatives for Asset Management, tree conservation through the Official Plan and Tree Preservation By-Law, Parks Master Plan, Urban Design Guidelines and fulfillment of Town responsibilities under the *Invasive Species Act*	Q1 to Q4	Role responsibilities of Town Arborist and Community Stewardship Coordinator	Forestry	
	9.3 Establish a strategy for Trail and Natural Heritage System Connectivity, according to the directions of Cobourg's Official Plan and the Ganaraska Region Conservation Authority policies and County of Northumberland Official Plan and programs	Q1 to Q4	Town Arborist – 1 week	Parks	Forestry, County of Northumberland, Ganaraska Region CA

2021 (Year 4)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, Heritage tree program, partnership initiatives, and integration with other initiatives; New initiatives include establishment of the Town tree nursery and partnerships with schools for naturalization, tree planting and maintenance.

Program	Task	Timing	Resources	Lead	Support
Tree Planting Plan	1.2.1 Coordinate tree planting on Town lands (~150+ trees), plus replacement of trees removed in 2020	Q2 & Q4	Town Arborist: 1-2 weeks to oversee planting	Forestry	Contractors, Town Partners
	1.2.2 Continue coordination to provide subsidized trees to residents for planting on private property	Q2	Town Arborist/ Stewardship Coordinator~ 1week	Forestry	Town Partners
	1.7 Establish tree nursery according to approach developed in 2020	Q2	Town Arborist ~2 weeks/year Stewardship Coordinator arranges community participation in tree nursery	Forestry	Community
	1.2.3 Continue coordination to encourage an increase in the number of trees planted on private residential and business properties	Q1 & Q2	Community Stewardship Coordinator	Forestry	Town Partners
	1.3 Prepare annual tree planting report, as part of overall annual urban forest management plan progress report, that documents progress towards implementation of the neighbourhood tree planting plan (Table 7.6); shared with Council & on Town website and 1.6 Update the planting plan, as needed, identifying replacement tree needs and new planting location opportunities and 1.4 and 1.5 Update, as needed, the recommended tree list, guide for species selection and planting; re-post on Town website	Q4	Town Arborist ~3 days	Forestry	Communications
Tree Maintenance Program	2.5 Complete tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species), with trees chosen for maintenance through use of information within the updated tree inventory (completed in 2018)	Q1-Q4	Coordination by Town Arborist ~6 weeks Contractors funded from current operating budget	Forestry	Contractors
	2.4 Update the inventory to reflect activities completed under the Tree Planting and Maintenance Programs during 2021	Q1-Q4	Coordination by Town Arborist ~1 week Data entry by Admin. staff	Forestry	
	2.6 Conduct annual tree inspections, identifying trees requiring inspection from data in the tree inventory by applying the criteria in	Q1-Q4	Resourcing depends upon # of trees to be inspected, as	Forestry	(Contractors)

2021 (Year 4)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, Heritage tree program, partnership initiatives, and integration with other initiatives; New initiatives include establishment of the Town tree nursery and partnerships with schools for naturalization, tree planting and maintenance.

Program	Task	Timing	Resources	Lead	Support
	the risk management maitrix (Table 7.1)		determined from the updated inventory		
	2.7 Complete annual tree maintenance – formative pruning, management for pests, diseases and invasive species and removal of high risk trees - as identified through the tree inventory data and risk management assessment	Q1-Q4	Resourcing depends upon prioritization and # of trees requiring care	Forestry	Contractors
	2.1 Integrate 2022 maintenance priorities identified in the Tree Maintenance Program into the work order system	Q4	Town Arborist – 3 weeks	Forestry	
	2.8 Compile summary of annual tree maintenance activities and baseline urban forest existing conditions for annual reporting on urban forest management	Q4	Town Arborist and GIS Coordinator– ~1 week each	Forestry	GIS
Risk Management Program	3.2 Address all high risk trees requiring attention, as identified through the updated tree inventory	Q1 to Q4	Budget depends on number of trees and work required	Forestry	Contractors
	3.3 Complete annual tree inspection program according to the direction provided in the Risk Management Maitrix	Q2	Resourcing to be determined from updated tree inventory – Town Arborist & Forestry Staff	Forestry	
	3.4 Prioritize completion of preventative maintenance identified through the inspection program, pruning trees to manage/prevent development of unstable tree limbs and removing high risk trees	Q3-Q4	Resourcing to be determined from updated tree inventory	Forestry	Contractors
Community Stewardship Program	4.3 Continue to implement the program, including web information, sharing of public education materials, Town support to encourage community participation in tree care and planting, tree tag identification, celebration of trees, encourage planting on private property – residential, businesses, institutions	Q1 to Q4	Full time role for community stewardship coordinator	Forestry	Communications
	4.6 Partner with schools for projects such as natural areas stewardship (Nickerson's Woods, stream corridors, parks), tree nursery, tree planting, tree maintenance, school yard naturalization	Q2	~3 weeks per year for Community Stewardship Coordinator	Forestry	
Resourcing	5.2 Continue to pursue, develop and coordinate local funding opportunities, i.e. corporate sponsorships, a bequest program, other	Q1-Q4	8 weeks total – Town Arborist & Community Stewardship	Forestry	

2021 (Year 4)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, Heritage tree program, partnership initiatives, and integration with other initiatives; New initiatives include establishment of the Town tree nursery and partnerships with schools for naturalization, tree planting and maintenance.

Program	Task	Timing	Resources	Lead	Support
Strategy	fund-raising		Coordinator		
	5.3 Continue to seek all available agency and grant opportunities for tree planting and maintenance	Q1-Q4	~ 5weeks total – Town Arborist and Community Stewardship Coordinator	Forestry	
	5.1 Update the Resourcing Strategy to ensure the staff, capital and operating resources are in place to implement the UFMP and its operational plan for 2023	Q4	1 week total – Town Arborist, Stewardship Coordinator, Parks Manager	Forestry	
Regulatory Initiatives	6.1 Continue to implement Tree Preservation By-Law	Q1	Part of Town Arborist duties	Forestry	Planning, other Town Dept.
	6.2 Monitor and report on results of the Tree Protection By-Law implementation as part of annual UFMP Progress Report	Q4	3 days – Town Arborist	Forestry	Planning
Governance	8.1, 8.2 and 8.3 Continue working through partnerships to accomplish and coordinate Town urban forest management and tree preservation	Q1 to Q4	3-4 weeks for Town Arborist	Forestry	
Program Integration with Other Initiatives	9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.8 Continue to implement urban forest management practices that are aligned with other Town initiatives for Asset Management, tree conservation through the Official Plan and Tree Preservation By-Law, Parks Master Plan, Urban Design Guidelines and fulfillment of Town responsibilities under the *Invasive Species Act* and implementation of the trail & natural heritage connectivity strategy	Q1 to Q4	Role responsibilities of Town Arborist and Community Stewardship Coordinator	Forestry	

2022 (Year 5)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, Heritage tree program, partnership initiatives, and integration with other initiatives.

Program	Task	Timing	Resources	Lead	Support
Tree Planting Plan	1.2.1 Coordinate tree planting on Town lands (~150+ trees), plus	Q2 & Q4	Town Arborist: 1-2 weeks to	Forestry	Contractors,

2022 (Year 5)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, Heritage tree program, partnership initiatives, and integration with other initiatives.

Program	Task	Timing	Resources	Lead	Support
	replacement of trees removed in 2021		oversee planting		Town Partners
	1.2.2 Continue coordination to provide subsidized trees to residents for planting on private property	Q2	Town Arborist/ Stewardship Coordinator~ 1week	Forestry	Town Partners
	1.2.3 Continue coordination to encourage an increase in the number of trees planted on private residential and business properties	Q1 & Q2	Community Stewardship Coordinator	Forestry	Town Partners
	1.3 Prepare annual tree planting report, as part of overall annual urban forest management plan progress report, that documents progress towards implementation of the neighbourhood tree planting plan (Table 7.6); shared with Council & on Town website and 1.6 Update the planting plan, as needed, identifying replacement tree needs and new planting location opportunities and 1.4 and 1.5 Update, as needed, the recommended tree list, guide for species selection and planting; re-post on Town website	Q4	Town Arborist ~3 days	Forestry	Communications
Tree Maintenance Program	2.5 Complete tree maintenance (pruning of all trees, as needed, treatment for pests, disease and invasive species), with trees chosen for maintenance through use of information within the updated tree inventory (completed in 2018)	Q1-Q4	Coordination by Town Arborist ~6 weeks Contractors funded from current operating budget	Forestry	Contractors
	2.4 Update the inventory to reflect activities completed under the Tree Planting and Maintenance Programs during 2022	Q1-Q4	Coordination by Town Arborist ~1 week Data entry by Admin. staff	Forestry	
	2.6 Conduct annual tree inspections, identifying trees requiring inspection from data in the tree inventory by applying the criteria in the risk management maitrix (Table 7.1)	Q1-Q4	Resourcing depends upon # of trees to be inspected, as determined from the updated inventory	Forestry	(Contractors)
	2.7 Complete annual tree maintenance – formative pruning, management for pests, diseases and invasive species and removal of high risk trees - as identified through the tree inventory data and risk management assessment	Q1-Q4	Resourcing depends upon prioritization and # of trees requiring care	Forestry	Contractors

2022 (Year 5)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, Heritage tree program, partnership initiatives, and integration with other initiatives.

Program	Task	Timing	Resources	Lead	Support
	2.1 Integrate 2023 maintenance priorities identified in the Tree Maintenance Program into the work order system	Q4	Town Arborist – 3 weeks	Forestry	
	2.8 Compile summary of annual tree maintenance activities and baseline urban forest existing conditions for annual reporting on urban forest management	Q4	Town Arborist and GIS Coordinator– ~1 week each	Forestry	GIS
Risk Management Program	3.2 Address all high risk trees requiring attention, as identified through the updated tree inventory	Q1 to Q4	Budget depends on number of trees and work required	Forestry	Contractors
	3.3 Complete annual tree inspection program according to the direction provided in the Risk Management Maitrix	Q2	Resourcing to be determined from updated tree inventory – Town Arborist & Forestry Staff	Forestry	
	3.4 Prioritize completion of preventative maintenance identified through the inspection program, pruning trees to manage/prevent development of unstable tree limbs and removing high risk trees	Q3-Q4	Resourcing to be determined from updated tree inventory	Forestry	Contractors
Community Stewardship Program Resourcing Strategy	4.3 Continue to implement the program, including web information, sharing of public education materials, Town support to encourage community participation in tree care and planting, tree tag identification, celebration of trees, encourage planting on private property – residential, businesses, institutions	Q1 to Q4	Full time role for community stewardship coordinator	Forestry	Communications
	4.6 Continue to partner with schools for projects such as natural areas stewardship (Nickerson's Woods), tree nursery, tree planting, school yard naturalization	Q2	~3 weeks per year for Community Stewardship Coordinator	Forestry	
	5.2 Continue to pursue, develop and coordinate local funding opportunities, i.e. corporate sponsorships, a bequest program, other fund-raising	Q1-Q4	8 weeks total – Town Arborist & Community Stewardship Coordinator	Forestry	
	5.3 Continue to seek all available agency and grant opportunities for tree planting and maintenance	Q1-Q4	~ 5weeks total – Town Arborist and Community Stewardship Coordinator	Forestry	
	5.1 Update the Resourcing Strategy to ensure the staff, capital and operating resources are in place to implement the UFMP and its operational plan for 2022	Q4	1 week total – Town Arborist, Stewardship Coordinator, Parks Manager	Forestry	

2022 (Year 5)

Priorities are: Continue base program activities for tree planting, maintenance, risk management, community stewardship, tree preservation, program resourcing, Heritage tree program, partnership initiatives, and integration with other initiatives.

Program	Task	Timing	Resources	Lead	Support
Regulatory Initiatives	6.1 Continue to implement Tree Preservation By-Law	Q1	Part of Town Arborist duties	Forestry	Planning, other Town Dept.
	6.2 Monitor and report on results of the Tree Protection By-Law implementation as part of annual UFMP Progress Report	Q4	3 days – Town Arborist	Forestry	Planning
Governance	8.1, 8.2 and 8.3 Continue working through partnerships to accomplish and coordinate Town urban forest management and tree preservation	Q1 to Q4	3-4 weeks for Town Arborist	Forestry	
Program Integration with Other Initiatives	9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.8 Continue to implement urban forest management practices that are aligned with other Town initiatives for Asset Management, tree conservation through the Official Plan and Tree Preservation By-Law, Parks Master Plan, Urban Design Guidelines and fulfillment of Town responsibilities under the *Invasive Species Act* and implementation of the trail & natural heritage connectivity strategy	Q1 to Q4	Role responsibilities of Town Arborist and Community Stewardship Coordinator	Forestry	

10.0 CONCLUSION

The workplan and operational plans for 2018-2022 that are described in this document are designed to guide Town staff in management of the urban forest over the next twenty years, to meet the stated vision, principles, goals and objectives of Section 6. The work detailed above is deliberately aggressive, in order to achieve the perspective of Cobourg as a community within a forest, shaded by a 35% forest cover that connects people, ecosystems and wildlife, involves the majority of residents, businesses and youth in management of an urban forest that is healthy, thriving, diverse and truly valued for the wide range of benefits enjoyed by all who live, work and visit in Cobourg. By 2038, the community will be proud of the urban forest that all built together through an efficient, effective and economic management program.

It is recommended that the next set of five-year operational plans be completed during 2022 and that an update of the work plan be completed in 10 years, around 2027, the mid-way point in the life of this urban forest management plan.

11.0 GLOSSARY

Canopy Cover - The amount of land area occupied by tree crown (leaf) area when viewed from above. This measure consists of the two-dimensional area extent of the combined canopies of all trees within a specified land area

Carolinian Species – Species that are indicative of the Carolinian Canada ecosystem. This unique ecosystem that occurs in southern Ontario is comprised of decisuous forests similar to those found in North and South Carolina. A list of Carolinian Canada indicator tree, shrub, animal and bird species is available at www.CarolinianCanada.ca.

DBH – tree Diameter at Breast Height, at a level situated 1.3 meters above ground level.

Management Plan – Written directions that provide a longer term perspective for decision-making on how to approach and what to accomplish as part of day-to-day or operational activities related to a particular mandate, such as urban forest care. A management plan generally includes a description of the future state of the resources being managed, goals and/or objectives to reach that future state and strategies for achieving the goals/objectives.

Native Tree Species – Tree species identified as naturally occurring within a specified geographic area. Native species are characterized as robust and adapted for surviving and thriving within the specific climate, soils and overall environmental conditions of an area for which they have adapted.

Operational Plan – Detailed description of the shorter-term activities, generally 1 to 5 years, that need to be accomplished for effective delivery of services, management of a specified resource.

Risk Management – A process whereby the potential risks to tree health are identified and actions taken for their mitigation as early as possible so as to efficiently and effectively apply available resources and to better protect individual tree and urban forest health.

Tree Health Assessment – Observation and documentation of tree characteristics that indicate its health, including number of tree stems, visual presence and extent of disease, insect or pest damage, decay, evidence of internal problems, unbalanced branching or other physical issues. Collection of tree health data is used to inform an appropriate approach to managing the identified tree health risks.

Urban Forest - All woodlands, hedgerows, small woodlots, groupings and individual trees, understory and shrubs and their supporting soils that are located across the Town of Cobourg, within landscaped and natural areas on publicly and privately owned property.

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13.0 CLOSURE

This report was prepared by the undersigned for the Town of Cobourg.

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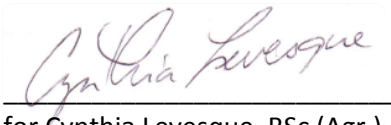
FINAL DRAFT



for Cynthia Levesque, BSc (Agr.)

And for Larry Powell, BScF, RPF