SAUGEEN SHORES

URBAN TREE CANOPY PLAN

2024

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Introduction

The Urban Tree Canopy Plan (UTCP) provides the Town of Saugeen Shores with an Urban Tree Canopy management strategy that builds on the recommendations from the 2016 Urban Forestry Management and Operational Plan prepared by Kilgour and Associates. The UTCP will reflect the Town's vision, values, and corporate priorities. The Urban Tree Canopy Plan will be an important document that guides staff and residents in providing a healthy urban tree population that provides aesthetic, environmental, ecological and economic benefits to the Town of Saugeen Shores.

Tree Canopy is defined as the layer of tree leaves, branches and stems that cover the ground when viewed from above. This Plan applies to the Towns Urban Settlement Area or all area contained within the red boundary as shown in Figure 1. Together they function as the Urban Tree Canopy Plan and will provide guidance on canopy management strategies over the next ten (10) years with a reassessment planned for 2035.

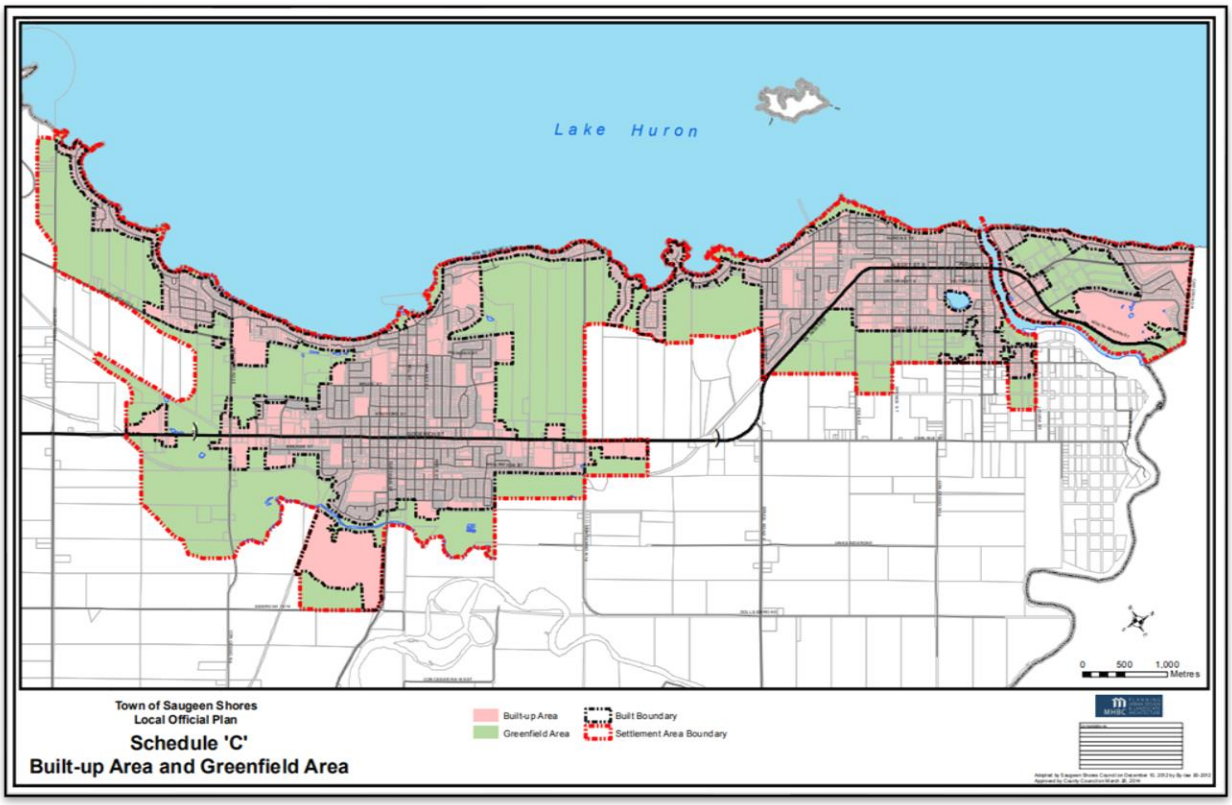

Figure 1 - Schedule 'C' Built-up Area and Greenfield Area of the Towns Official Plan

Executive Summary

This Urban Tree Canopy Plan (UTCP) builds on the recommendations from Saugeen Shores 2016 Urban Tree Canopy Plan (UTCP) and recommendations from the Environmental Stewardship Ad-hoc Committee (ESAC). ESAC identified the need to develop an Urban Tree Canopy Plan and Private Tree By-law and was based on broad and significant community input and support for such a Plan and by-law. Striking Committee, in prioritizing the ESAC recommendations, specifically included the preparation of an Urban Tree Canopy Plan and By-law. Ultimately, its inclusion in the 2024 Business Plan demonstrates the importance of having a coordinated and integrated Plan and By-law.

The Plan includes a background review and is further outlined in the Urban Tree Canopy Plan Discussion Paper found in Appendix A. This review provides background on the development of the plan including the review of how existing practices, policies and regulations affect the UTC, understanding the current condition of the UTC through assessments, development of the community engagement strategy and determining what procedures and policies are needed to maintain quality canopy cover in the Town of Saugeen Shores long-term. Key policies, by-laws and legislation affecting the Town Urban Tree Canopy were reviewed in addition to the assessment of the UTC, and general condition and maintenance as further discussed throughout this Plan.

The Urban Tree Canopy Plan Discussion Paper was presented to the Environmental Ad Hoc Committee in September, 2024 and to Council in October of 2024. Councils feedback was provided and considered into the final development of the Urban Tree Canopy Plan Discussion Paper. A Final Report was also presented by the Environmental Ad Hoc Committee to council on the implementation of the Urban Tree Canopy Plan. The Final Report identified the Committees support of the Draft Urban Tree Canopy Plan and its recommendations. The Final Report did also outline additional recommendations regarding the scope of the Tree Conservation By-law as well as rationale and are addressed further in this report.

The Urban Tree Canopy Plan will guide staff and residents in providing a healthy tree population in the Built-up Area as identified in Schedule ‘C’ of the Town’s Official Plan. It is also encouraged that the canopy management strategies and guidelines outlined in the Plan be considered in the remaining rural areas of Saugeen Shores.

As a result of the background review conducted, recommendations have been made in order to achieve the vision and objectives of this Plan. Recommendations in this Plan are categorized into short, medium and long term for time frame to achieve recommendations. Short Term means recommendations which can be carried out within the next one (1) to two (2) years. Medium term means recommendations which can be carried out over the next three (3) to five (5) years. Long term means recommendations which can be carried out over the next six (6) to ten (10) years or which require on-going implementation to achieve.

Similar to that of the time frame to achieve recommendations, priority types have also been assigned to recommendations being low, medium and high. The assigned priority type been assessed based on the time frame and ability to implement the recommendation as well as the recommendations impact on preserving and increasing canopy cover in Saugeen Shores.

The Urban Tree Canopy Plan outlines the background, recommendations and resources needed to address key components that have a significant impact in maintaining and increasing tree canopy cover in Saugeen Shores, including:

- Tree Maintenance;
- Tree Planting;
- Development Review;
- Awareness and Education; and
- Urban Tree Conservation By-law.

Overall, implementation of this Plan will occur over the next ten (10) years with a reassessment planned for 2030.

Consolidated Recommendations

The following recommendations are made and further discussed in this Plan.

Recommendation	Time frame to achieve recommendation	Priority
Tree Maintenance		
Recommendation 1: Continue to perform corrective pruning on younger trees (and older trees) in Saugeen Shores, particularly in removing codominant stems on younger trees.	Long-term	High
Recommendation 2: Over the long-term, Town-owned Manitoba maple and ash trees and replaced with native species.	Long-term	Moderate
Recommendation 3: Update the Town-owned Tree inventory to provide a database that can be updated in live time to support tree management and inclusion of trees as green infrastructure in the Town Asset Management Plan.	Mid-term	High
Recommendation 4: The Town should maintain and update, as best practices change, its tree management practices to guide tree establishment, maintenance and removal. ANSI A300 Standards developed by the Tree Care Industry Association are standard and generally accepted industry standards for tree care practice**.**	Mid-term	Moderate
Recommendation 5: Along the Saugeen Rail Trail and in natural areas and on other Town-owned land: - Control invasive plants such as buckthorn, garlic mustard and Manitoba maple - Plant additional trees and shrubs to occupy the open areas created by invasive species control, and replace the ash trees killed by the Ash Borer. - Shade tolerant trees should be planted in the understory of areas dominated by poplar to diversify the future forest.	Long-term	Moderate
Tree Planting		
Recommendation 6: Saugeen Shores should continue to diversify the urban forest by planting less common species of trees including, for example, oaks, sycamore, and hackberry where appropriate**.**	Long-term	Moderate
Recommendation 7: The Town should continue to develop plans to plant and fund trees on municipal properties, such as road allowances, parks, and facilities where appropriate. Funding strategies and educational opportunities should be developed as well.	Long-term	High
Recommendation 8: A plan to plant and/or reforest Town-owned lands, including the closed landfill in Port Elgin could be developed to contribute to a more substantial increase in canopy cover. Consider small high-density patches (i.e. Miyawaki or micro forests) of trees in	Mid-term	Moderate

municipal parks and facilities.		
Recommendation 9: To diversify the tree age and size profile of the Annual Tree Sale, 20 to 40L (5 to 10 gallon) potted trees should be added to the list of available trees.	Short-term	Moderate
Recommendation 10: As per the Towns Annual Tree Sale program, trees available for purchase should be limited to native trees and selected non-invasive exotic species as outlined in Appendix C. Trees shall be planted according to specifications as indicated in Appendix B.	Short-term	Moderate
Development Review		
Recommendation 11: Review and supplement as needed, relevant Town policies regarding planting trees in new developments. Provisions for tree planting should also be included in the Development Guide.	Short-term	High
Recommendation 12: The Town should supplement and enhance, where possible, policies to maintain Urban Tree Canopy Cover, Section 2.6 Environmental Features.	Short-term	Moderate
Recommendation 13: The Town should reinforce policies to ensure tree cover is maintained through the development process, particularly the woodlands/heavily treed areas along the shores of Lake Huron and Saugeen River.	Short-term	High
Recommendation 14: Specifications for compensation requirements for tree removals should be expanded in planning documents to include all of the Settlement Area. The ratio of planted trees to removed trees should increase with tree diameter.	Short-term	High
Recommendation 15: The Town should amend its Official Plan to recognize the public tree (i.e., Town-owned trees) as green infrastructure and inclusion in the Asset Management Policy as non-core, biologic assets.	Short-term	Moderate
Recommendation 16: The Town should continue to confirm the qualifications for professionals who author or approve Tree Protection Plans, Tree Retention Plans and Hazard Tree Assessment reports.	Short-term	High
Awareness and Education		
Recommendation 17: In addition to the Annual Tree Sale, the Town should engage with and support private and commercial landowners to plant trees on their properties through communications and education campaigns, logistical/technical support and access to funding.	Short-term	Moderate
Recommendation 18: Designate a staff person as the Town Urban Forest Manager to review and coordinate urban forest management, Chair community and interdepartmental committees that foster communications among departments, the community and Council.	Long-term	Moderate
Recommendation 19: The Town consider formalizing the establishment of an Environmental Committee to guide Town tree establishment, removal, and management procedures. Alternatively,	Long-term	Moderate

the Town should examine other ways which may assist in same.		
Recommendation 20: The Town form a staff working group that includes representatives from all administrative units that affect the Urban Tree Canopy to help harmonize planning for trees in developments/construction, planting, tending, protecting, replacing and benefitting from trees.	Mid-term	Moderate
Urban Tree Conservation By-law		
Recommendation 21: The Town implement a Tree Conservation By-law that address public and private lands	Short-term	High
Recommendation 22: The Town consider amending the Property Standards By-law (or Clean Yards By-law) to include hazardous trees in Treed Areas that may be threatening adjacent properties.	Short-term	High

Vision and Objectives

Vision

The Town of Saugeen Shores recognizes and values the environmental, social, cultural, and economic contribution of the urban tree canopy to our community. The Town will, in partnership with its residents, and businesses work to conserve and, where sensible, increase urban tree canopy coverage that is diverse, healthy and a sustained asset for future generations.

Objectives

The objectives of this Plan are the following:

1. Protect existing public trees and encourage the retention of private trees.
2. Increase the canopy cover over 10 years to help mitigate the effects of climate change through tree protection, planting, and maintenance.
3. Increase tree planting with native species that enhances biodiversity and ecological connectivity.
4. Encourage the creation of beautifully treed places for people to enjoy.
5. Increase awareness and education about the benefits of increasing urban tree canopy coverage.
6. Understand the role tree canopy plays in generating economic activity and enhance economic activity where possible.
7. Explore partnership opportunities that promote stewardship of the tree canopy.
8. Ensure good tree management practices to keep municipal trees healthy and safe.

Recommendations

Recommendations outlined in this Plan will achieve the vision and objectives of this Plan. Recommendations in this Plan are categorized into short, medium and long term. Similar to that of the time frame to achieve recommendations, priority types have also been assigned to recommendations being low, medium and high. Implementation of this Plan will occur over the next ten (10) years with a reassessment planned for 2030.

Tree Maintenance

It has been found that the Town of Saugeen Shores generally has a good tree maintenance program. A survey conducted in Saugeen Shores noted that the maintenance needs were preventative in nature. Most outstanding tree maintenance issues were related to the removal of dead trees which were either scheduled to be dealt with or were being monitored, the pruning of deadwood, crown raising and tree planting to ensure a continuous urban canopy over time.

An analysis also confirmed that while the tree inventory data is currently updated when trees are maintained or removed, it is likely that there are periods when the inventory was not updated to reflect tree maintenance, removals or planting.

Recommendations

Recommendations to improve tree maintenance in Saugeen Shores are provided below.

Recommendation 1: Continue to perform corrective pruning on younger trees (and older trees) in Saugeen Shores, particularly in removing codominant stems on younger trees.

Recommendation 2: Over the long-term, Town-owned Manitoba maple and ash trees and replaced with native species.

Recommendation 3: Update the Town-owned Tree inventory to provide a database that can be updated in live time to support tree management and inclusion of trees as green infrastructure in the Town Asset Management Plan.

Recommendation 4: The Town should maintain and update, as best practices change, its tree management practices to guide tree establishment, maintenance and removal. ANSI A300 Standards developed by the Tree Care Industry Association are standard and generally accepted industry standards for tree care practice**.**

Recommendation 5: Along the Saugeen Rail Trail and in natural areas and on other Town owned land:

- Control invasive plants such as buckthorn, garlic mustard and Manitoba maple
- Plant additional trees and shrubs to occupy the open areas created by invasive species control, and replace the ash trees killed by the Ash Borer.
- Shade tolerant trees should be planted in the understory of areas dominated by poplar to diversify the future forest.

Tree Planting

Since 2000, the Town has planted relatively few trees on road allowances and other Town property. This observation is supported through the analysis of the Public Tree Inventory, which showed that while Saugeen Shores had good numbers of the medium and largest trees, there were fewer smaller trees. A lot of smaller trees are required for there to be some larger trees in 60 or 100 years. The larger numbers of mid-sized trees likely resulted from the rapid increase in residential development.

The Public Tree Inventory showed that Saugeen Shores has a good number of medium and large trees while there are significantly fewer small trees. With Saugeen Shores experiencing a growth in commercial and residential development, it is detrimental that continued tree planting take place to ensure canopy cover is maintained and increased. Various Municipal Tree Planting Programs have been explored and the following should be considered by the Town for implementation:

1. Municipal Tree Planting Program

   Program focused on the planting of trees on road allowances and maintained areas of parks and facilities, where appropriate and increasing over time.
2. The 10,000 Trees program

   The 10,000 Trees Program would focus on the planting of 1,000 trees on Municipal lands every year over the next 10 years.
3. Volunteer Tree Tracking Inventory

   Online resident initiative where residents can locate and identify locations of private trees in the Town.
4. Tree Sale Day Program

   The Town continue its sponsorship of the Annual Tree Sale Program operating since 2013, working with community groups and local nurseries. Improvements to the program will be made to limit species type to native and selected non-invasive exotic species as well as support smaller sized trees that are lighter, easier to plant and are more affordable.

Educating the community and community groups about the value of tree planting and Tree Canopy and supporting landowners with technical and material support or supplying trees is of high importance to the Town to enable greater tree planting and maintenance of existing trees.

Funding opportunities for tree planting will also be explored including the new Growing Canada's Community Canopies (GCCC) through Tree Canada.

Recommendations

Recommendations related to improve tree planting and opportunities in Saugeen Shores are provided below.

Recommendation 6: Saugeen Shores should continue to diversify the urban forest by planting less common species of trees including, for example, oaks, sycamore, and hackberry where appropriate**.**

Recommendation 7: The Town should continue to develop plans to plant and fund trees on municipal properties, such as road allowances, parks, and facilities where appropriate. Funding strategies and educational opportunities should be developed as well.

Recommendation 8: A plan to plant and/or reforest Town-owned lands, including the closed landfill in Port Elgin could be developed to contribute to a more substantial increase in canopy cover. Consider small high-density patches (i.e. Miyawaki or micro forests) of trees in municipal parks and facilities.

Recommendation 9: To diversify the tree age and size profile of the Annual Tree Sale, 20 to 40L (5 to 10 gallon) potted trees should be added to the list of available trees.

Recommendation 10: As per the Towns Annual Tree Sale program, trees available for purchase should be limited to native trees and selected non-invasive exotic species as outlined in Appendix C. Trees shall be planted according to specifications as indicated in Appendix B.

Development Review Process

With the fastest growing population in Bruce County, the Town of Saugeen Shores has seen a growth in commercial and residential development, resulting in a perceived loss of tree canopy by the public. As development pressures increase in Saugeen Shores, it will be important to prioritize woodland retention in development proposals to maintain canopy cover, particularly in the heavily treed areas along the shore of Lake Huron, and to increase canopy in developed areas. Policies to maintain canopy cover in urban areas (e.g., Urban Tree Conservation By-law) should be developed and implemented.

Important components such as education opportunities should also be reviewed and developed to bring awareness to developers and commercial landowners in the community about the importance of preserving, maintaining and increasing tree canopy where possible to ensure greatest benefits for all residents and visitors in Saugeen Shores.

Recommendations

Recommendations to maintain and improve canopy cover through the development review process are provided below.

Recommendation 11: Review and supplement as needed, relevant Town policies regarding planting trees in new developments. Provisions for tree planting should also be included in the Development Guide.

Recommendation 12: The Town should supplement and enhance, where possible, policies to maintain Urban Tree Canopy Cover, Section 2.6 Environmental Features.

Recommendation 13: The Town should reinforce policies to ensure tree cover is maintained through the development process, particularly the woodlands/heavily treed areas along the shores of Lake Huron and Saugeen River.

Recommendation 14: Specifications for compensation requirements for tree removals should be expanded in planning documents to include all of the Settlement Area. The ratio of planted trees to removed trees should increase with tree diameter.

Recommendation 15: The Town should amend its Official Plan to recognize the public tree (i.e., Town-owned trees) as green infrastructure and inclusion in the Asset Management Policy as non-core, biologic assets.

Recommendation 16: The Town should continue to confirm the qualifications for professionals who author or approve Tree Protection Plans, Tree Retention Plans and Hazard Tree Assessment reports.

Awareness and Education

Important components such as education opportunities should also be reviewed and developed to bring awareness to developers and commercial landowners in the community about the importance of preserving, maintaining and increasing tree canopy where possible to ensure greatest benefits for all residents and visitors in Saugeen Shores.

An important component of this plan is to bring awareness to developers and commercial landowners in the community about the importance of preserving, maintaining and increasing tree canopy where possible to ensure greatest benefits for all residents and visitors in Saugeen Shores. Opportunities to generate continues engagement strategies will be supported and coordinated through the development of a formalized Environmental Committee, an internal staff working group with the assistance of the Town Urban Forest Manager.

Recommendations

Recommendations to increase awareness and improve educational opportunities are provided below.

Recommendation 17: In addition to the Annual Tree Sale, the Town should engage with and support private and commercial landowners to plant trees on their properties through communications and education campaigns, logistical/technical support and access to funding.

Recommendation 18: Designate a staff person as the Town Urban Forest Manager to review and coordinate urban forest management, Chair community and interdepartmental committees that foster communications among departments, the community and Council.

Recommendation 19: The Town consider formalizing the establishment of an Environmental Committee to guide Town tree establishment, removal, and management procedures. Alternatively, the Town should examine other ways which may assist in same.

Recommendation 20: The Town form a staff working group that includes representatives from all administrative units that affect the Urban Tree Canopy to help harmonize planning for trees in developments/construction, planting, tending, protecting, replacing and benefitting from trees.

Urban Tree Conservation By-law

A principal goal of this project is to develop an understanding of the Urban Tree Canopy in Saugeen Shores, and how it can be protected or enhanced. There is currently limited regulation of tree removals and it was deemed important that there should be tools to prevent arbitrary tree removals without going through some assessment and perhaps replacement processes, while not interfering with reasonable property-management. The objectives of the By-law framework were to:

- Prohibit the planting or cutting of trees located on municipal, Town-owned lands.
- Require a permit for the removal of trees located on private woodlots as a significant proportion of the UTC is in woodlots and are under increasing pressures from development and as per the recommendation of the Environmental Committees Final Report.
- Require the planting of replacement trees where a permit for the removal of trees located on private woodlots has been approved.
- Protect trees listed under the Provincial Endangered Species Act or tree species provided protection by the Federal Species at Risk Act, unless approval is granted.
- Maintain the existing canopy cover by preventing arbitrary tree removal and provide education to residents on tree care and planting.

Recommendations

Recommendations related to the implementation of a Tree By-law are provided below.

Recommendation 21: The Town implement a Tree Conservation By-law that address public and private lands

Recommendation 22: The Town consider amending the Property Standards By-law (or Clean Yards By-law) to include hazardous trees in Treed Areas that may be threatening adjacent properties.

Appendices

Appendix A – Urban Tree Canopy Plan Discussion Paper

Urban Tree Canopy Plan Discussion Paper

October, 2024

Town of Saugeen Shores
Urban Tree Canopy Plan Discussion Paper

Authors:

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1.0 Executive Summary

The Urban Tree Canopy Plan (UTCP) provides the Town of Saugeen Shores with an Urban Tree Canopy management strategy that builds on the recommendations from the 2016 Urban Forestry Management and Operational Plan prepared by Kilgour and Associates. The UTCP will reflect the Town's vision, values, and corporate priorities. The Urban Tree Canopy will become an important document that guides staff and residents in providing a healthy urban tree population that provides aesthetic, environmental, ecological and economic benefits to the Town of Saugeen Shores.

The Urban Tree Canopy Plan and Tree Cutting By-law project required the deliverables below:

- Urban Tree Canopy Plan, containing:
  - Public Engagement Plan
  - Review and recommendations for Tree Policies
  - Recommendations for a Tree Maintenance Program
  - Recommendations for a Tree Planting Program
  - Recommendations for further action
- Tree Cutting By-law

The UTCP focuses on how existing practices, policies and regulations affect the UTC, understanding the current condition of the UTC through assessments and determining what procedures and policies are needed to maintain quality canopy cover in the Town of Saugeen Shores long-term. Key policies, by-laws and legislation affecting the Town Urban Tree Canopy were reviewed in addition to the assessment of the UTC, their general condition and maintenance and are further discussed throughout this Discussion Paper.

The Engagement process included consultation with the community through Engage Saugeen Shores website as well as with conversations with interested community groups and with a public open house/meeting. Consultation was solicited with Saugeen Ojibway Nation and the Historic Saugeen Metis. Other interested parties, including utility companies and the Saugeen Valley Conservation Authority were also contacted and offered alternative consultation opportunities.

While this process primarily reviewed the Towns existing policies, it also included identifying how the Conservation Authority, County of Bruce, Provincial, and Federal regulations influence the Urban Forest Canopy and its management in Saugeen Shores.

2.0 Important Findings

The different components of this project revealed that Saugeen Shores:

- Has a good level of Canopy Cover (Total Urban CC%) with significant amounts associated with "woodland" areas along the lake in proximity to and within Port Elgin and undeveloped parts of Southampton.
- Takes good care of its municipal trees, with a full-time Arborist and is supported by staff and appropriate equipment/infrastructure.
- Has strong policies supporting urban forest/tree management. However, there is need to consider stronger policies to better include compensatory planting requirements for tree removals

and professional requirements for those making tree-management recommendations.
- Has limited support in some regards to tree management (e.g., tree planting on municipal property and tree protection polices) and is actively developing plans and programs.

It is also worth nothing that the age classes of Saugeen Shores' municipal trees are unbalanced. While there were excellent numbers of medium-sized and larger trees, there is a shortage of young trees. The high numbers of medium-sized trees are likely due to the planting of trees in residential areas created 30 to 40 years ago. These numbers have somewhat reduced as a result of Emerald Ash Borer and not many new trees have been planted on municipal property in recent years.

Revisions or amendments to the Town's existing system should incorporate findings and recommendations from this Discussion Paper and should be considered in all relevant documents and their policies as it relates specifically to trees and urban forest management. However, it should also be updated to incorporate current standards and expanded to provide guidance for additional activities (e.g., municipal tree inventory, assessment of trees that may be affected by construction projects, recommending tree protection measures (TPM), monitoring TPM implementation, tree planting and maintenance and asset management).

As trees age, they get bigger, develop more foliage and wood, and the many benefits increase exponentially as they grow larger. However, some trees are lost each year thus, it is of significant importance that they be able to grow and that a larger population of young trees are provided to maintain the numbers of future large trees.

Two things are critical to maintain the Towns Tree Canopy. The first is to protect the larger trees and continue good maintenance procedures to allow the trees to continue to grow. The second is to ensure that there are larger numbers of smaller trees that will grow into those larger sizes over time. A Tree Conservation By-Law will help both aspects by protecting public and private trees. On Private property, a By-Law could protect larger trees from indiscriminate removal and prevent the large-scale removal of smaller trees.

This UTCP is an important step in moving towards the sustainable management of urban forest and canopy in Saugeen Shores. The strategic infrastructure, policy, and management recommendations will help ensure that the community can maintain its tree Canopy Cover objectives long-term.

Recommendations

Below is a list of recommendations in the Saugeen Shores Urban Tree Canopy Project.

Recommendation 1: *Update relevant Town policies regarding planting trees in new developments.*

Recommendation 2: *Diversify the urban forest by planting less common species of trees including oaks, sycamore, and hackberry**.***

Recommendation 3: *Perform corrective pruning on younger trees in Saugeen Shores, particularly in removing codominant stems on younger trees.*

Recommendation 4: *Along the Saugeen Rail Trail and in natural areas and on other Town-owned land,*

- *Control invasive plants such as buckthorn, garlic mustard and Manitoba maple*
- *Plant additional trees and shrubs to occupy the open areas created by invasive species control and to replace the ash trees killed by the Ash Borer.*
- *Shade tolerant trees should be planted in the understory of areas dominated by poplar to diversify the future forest.*

Recommendation 5: *Remove Town-owned Manitoba maple and ash trees and replaced with native species.*

Recommendation 6: *Update the Public Tree inventory to provide a database that can be updated in live time to support tree management and inclusion of trees as green infrastructure in the Town Asset Management Plan.*

Recommendation 7: *Develop an objective in the Official Plan to maintain Urban Tree Canopy Cover, Section 2.6 Environmental Features.*

Recommendation 8: *Strengthen policies to ensure tree cover is maintained through the development process, particularly the woodlands/heavily treed areas along the shores of Lake Huron and Saugeen River, shown in Figure 5.3.*

Recommendation 9: *Specifications for compensation requirements for tree removals should be included in planning documents. The ratio of planted trees to removed trees should increase with tree diameter as shown in Table 6.2.*

Recommendation 10: *The Town should continue to develop plans to plant trees on municipal properties, such as road allowances, parks, and facilities.*

Recommendation 11: *Develop and implement a plan to reforest the closed landfill in Port Elgin could be developed to contribute to a more substantial increase in canopy cover. Small high-density patches (i.e. Miyawaki or micro forests) of trees in municipal parks and facilities.*

Recommendation 12: *In addition to the annual tree sale, the Town should engage with and support private and commercial landowners to plant trees on their properties through communications campaigns, logistical/technical support and access to funding.*

Recommendation 13: *The Town should amend its Official Plan to recognize the public tree as green infrastructure and inclusion in the Asset Management Policy as non-core, biologic assets.*

Recommendation 14: *The Town consider amending the Property Standards By-law (or Clean Yards By-law) to include hazardous trees in Treed Areas that may be threatening adjacent properties.*

Recommendation 15: *The Town should document the qualifications for professionals who author or approve Tree Protection Plans, Tree Retention Plans and Hazard Tree Assessment reports.*

Recommendation 16: *Designate staff person as the Town Urban Forest Manager to review and coordinate urban forest management, Chair community and interdepartmental committees that foster communications among departments, the community and Council.*

Recommendation 17: *Establish an Urban Forest Management Committee to guide Town tree establishment, removal, and management procedures.*

Recommendation 18: *The Town update its tree management practices to guide tree establishment, maintenance and removal. ANSI A300 Standards developed by the Tree Care Industry Association are standard and generally accepted industry standards for tree care practice.*

Recommendation 19: *Develop an Interdepartmental Urban Forest Management Committee that includes representatives from all administrative units that affect the Urban Tree Canopy to help harmonize planning for trees in developments/construction, planting, tending, protecting, replacing and benefitting from trees.*

Recommendation 20: *To diversify the tree age and size profile of the Annual Tree Planting, should add 20 to 40L (5 to 10 gallon) potted trees to the list of available trees.*

Recommendation 21: *As per the Towns Annual Tree Sale program, trees available for purchase shall be limited to native trees and selected non-invasive exotic species. Trees shall be planted according to specifications as indicated in Appendix C.*

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3.0 Project Background and Introduction

This Urban Tree Canopy Plan (UTCP) project provides Saugeen Shores with an effective Urban Tree Canopy management strategy and builds on the recommendations from Saugeen Shores 2016 Urban Tree Canopy Plan (UTCP) which anticipated the loss of ash from the urban forest, recommended pro-active tree management and updating the municipal Tree inventory. It also is directly derived from recommendations of the Environmental Stewardship Ad-hoc Committee (ESAC). ESAC identification to develop an Urban Tree Canopy Plan (and by-law) was based on broad and significant community input and support for such a Plan and by-law. Striking Committee, in prioritizing the ESAC recommendations, specifically included the preparation of an Urban Tree Canopy Plan and By-law. Ultimately, its inclusion in the 2024 Business Plan demonstrates the importance of having a co-ordinated and integrated Plan and By-law. This Discussion Paper provides key background findings and a preliminary set of recommendations for discussion purposes.

The development of the UTCP focused on assessments of Saugeen Shores' Urban Tree Canopy (UTC), the health and maintenance of public trees (i.e., trees on Town property), and how existing practices, policies and regulations affect the UTC. The UTC and general condition and maintenance of public trees were assessed and key policies, by-laws, and legislation affecting the Town's Urban Tree Canopy were reviewed and their implications for the management of the Town's urban forest discussed.

The steps taken in the UTCP development process included

- Tree Canopy Assessment of Saugeen Shores and its Urban Areas
- Assess the general health and maintenance of Municipal trees
- Assess the existing tree inventory and the Town's Municipal tree population
- Review Town practices, policies and regulations affecting the UTC
- Develop and implement an Engagement/Communications Plan considering Municipal staff and Council, the public, Interested and affected parties – including:
  - Bruce County, Hydro and other utility services,
  - Indigenous peoples,
  - Saugeen Valley Conservation Authority,
  - Service clubs and citizen's groups.
- Develop the UTCP
- Develop a Draft Urban Tree Conservation By-law

Table 3.1 Area of Saugeen Shores and percentage of its settlement Areas and Rural Area

	Hectares	% of Saugeen Shores
Port Elgin	1,800	10%
Southampton	1,200	7%

Rural Area	14,339	83%
Saugeen Shores (Total)	17,339	100%

4.0 Assessment of Municipal Trees

The Urban Forest and policy framework were assessed for an Urban Tree Canopy Plan (Kilgour & Associates, 2016). This Plan documented existing strong management practices and standards, and updated the Town's overall urban forestry management by recommending updating the existing approach with relevant industry best practices. They also documented that there was an Inventory of 7301 Public Trees on Town property (e.g., road allowances, parks and facilities) that included 487 Ash trees. Most of the Ash trees were subsequently killed by the Emerald Ash Borer (EAB).

To plan for the Urban Tree Canopy of the future, it is important to assess and document the current number, species, sizes, condition and maintenance of public trees. In general trees provide exponentially-greater benefits (e.g. shade, carbon storage, pollution reduction) as they get larger. As trees get larger, some are removed because they become unhealthy, are damaged or removed for construction projects. There should always be more smaller/young trees growing than large ones to replace the large ones when they decline. Tree planting, species composition, tree maintenance and protection are important parts of maintaining the Tree Canopy, and assessing current conditions will provide strategies to maintain the health and growth of the tree population.

4.1 Windshield Survey of Saugeen Shores Municipal Trees

To characterize the condition of Municipal trees in the urban forest, a Windshield Survey of the urban areas of Saugeen Shores was conducted on January 31 and February 1, 2024, by Williams & Associates (W&A). A windshield survey is a reconnaissance-level survey that provides insights into Saugeen Shores' urban forest and tree management with the ability to map the degree of tree maintenance required in neighbourhoods and recommended actions.

The need for a municipality to manage municipal tree risk through a proactive maintenance system is fundamental to address corporate liability and public safety issues; and is an important component of a corporate asset management strategy. The Urban Tree Canopy Plan will address this need for the Town of Saugeen Shores.

The Windshield Survey was conducted by driving Town roads throughout the urban areas of Port Elgin and Southampton, noting aspects about the trees within the public road allowance including species, size, health, condition, distribution, and maintenance needs. This survey is different from a Tree Inventory which collects detailed information for each tree and makes recommendations

The amount of maintenance needs or volume of work identified in each neighbourhood was categorized as 'Low,' 'Moderate,' or 'High' (Figure 2.1). No individual Tree Risk Assessment was conducted during the Windshield Survey. Tree Risk Assessment is done on individual trees, often while updating the municipal tree inventory. Therefore, the windshield survey methodology only provides general indications regarding the volume and urgency of work.

4.1.1 Survey Methodology

Approximately 88 km of the 150 km of roads in the urban areas, almost 60% of the urban road network was sampled. The "neighbourhoods" were grouped by the estimated age of the area (i.e., pre-1945, 1946-1990, post 1990 and "Lakeshore") and trees were observed along the roadways, municipal parks and facilities were (Figures 2.2, 2.3). It was identified that the Lakeshore areas had high variability in the age and density of the buildings, and lots were often associated with woodlands. Additionally, portions of the Saugeen Rail Trail were surveyed within Port Elgin and Southampton for maintenance needs and opportunities to contribute to the urban canopy.

Within each neighbourhood, the three most frequent tree species were noted, and general observations such as the dominant age, and the overall health and structure of the trees (i.e., Good, Fair, Poor). were made. The observed maintenance needs to meet the tree maintenance standards below was recorded for each neighborhood.

1. Town tree maintenance: a standard of 14.5' clearance over the travelled portion of the road and 8' clearance over the sidewalk was assumed.
2. GAPP (Generally Acceptable Arboricultural Practices as defined by including:
    a. raise crown - (above a minimum clearance for vehicles and pedestrians)
    b. deadwood removal - (to prevent injury to people or damage to property)
    c. tree removal - (to prevent injury to people or damage to property
    d. (appropriate) clearance - to Hydro lines/ traffic signs/ vehicular site lines
    e. stump removal - (to avoid tripping hazards)
    f. tree planting - (to improve stocking level of the street and increase tree canopy which has the additional benefit of improving public health through filtering more criteria pollutants and sequestering more carbon from the air)
    g. corrective pruning – (to improve tree's health/condition rating and future tree structure which makes a tree more resilient to future severe weather events thereby reducing future tree maintenance costs during cleanup from wind and ice storms.)

Maintenance needs observed during the Windshield Survey were mostly tree planting and corrective pruning.

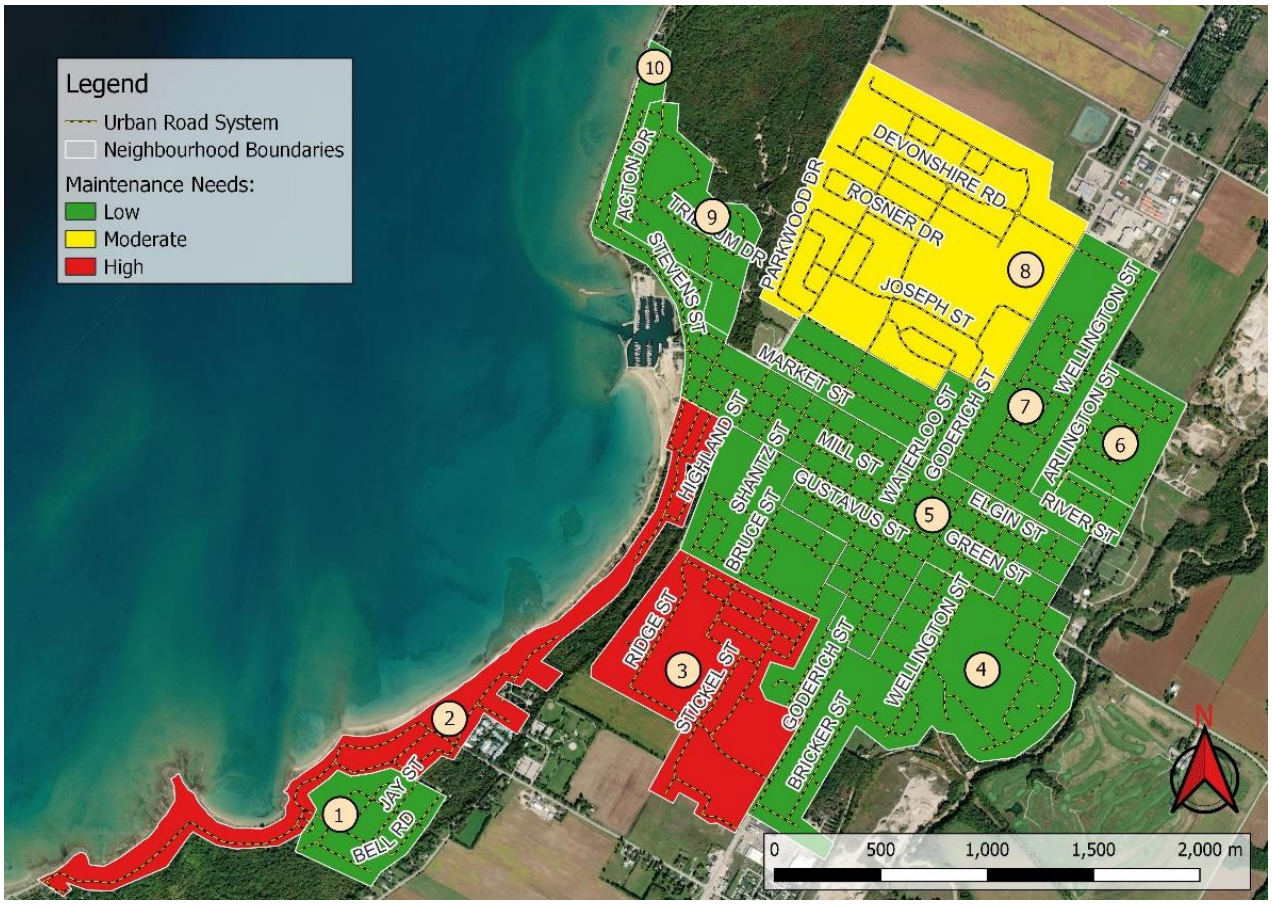

Figure 4.1 Maintenance needs ratings for Port Elgin

4.1.2 Findings

General Neighbourhood Descriptions:

<u>Pre-1945 Neighbourhoods (Zone 5 & 13, Figures 2.2 & 2.3):</u>

These neighbourhoods make up the core of the urban areas of Port Elgin and Southampton and generally have smaller houses with larger, older trees. The most common tree species were Norway maple, sugar maple, and eastern white cedar. The average diameter at breast height (DBH) is 59 cm (Saugeen Shores Tree Inventory). The primary maintenance considerations observed were deadwood removal, mostly noted within the crowns of older maple trees.

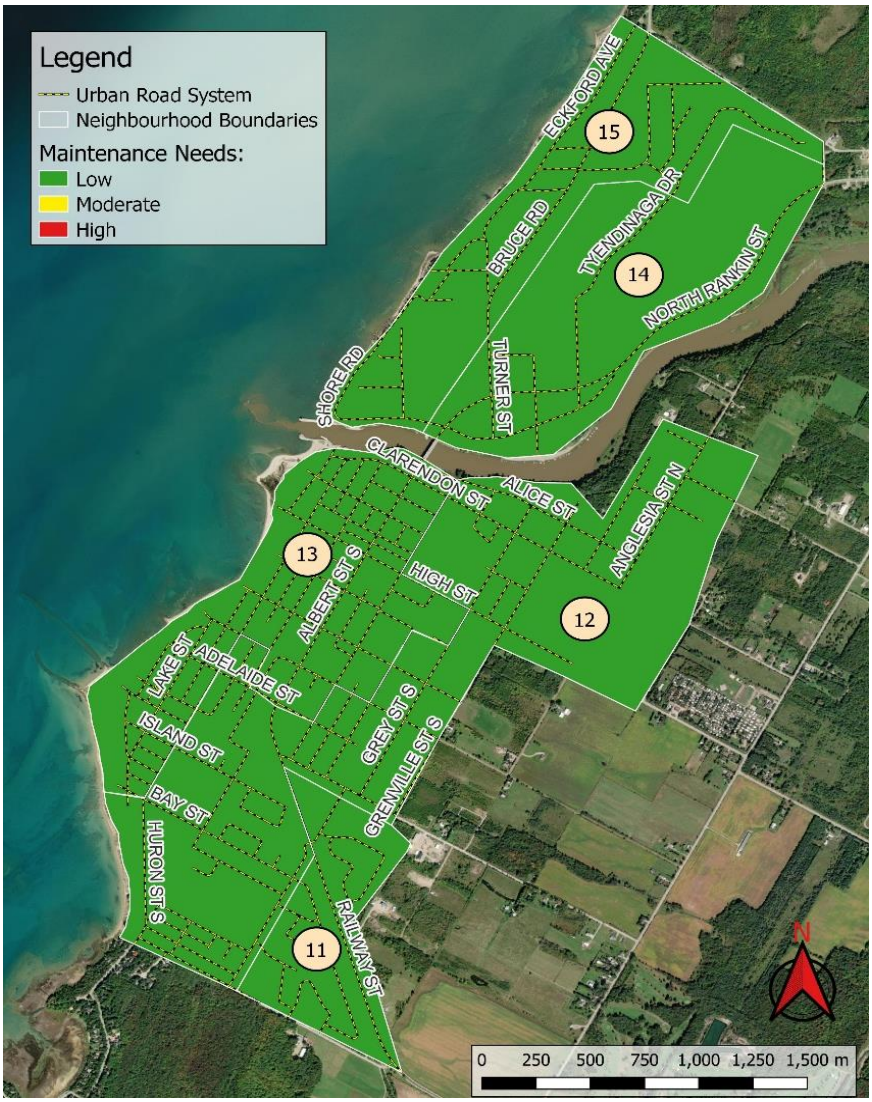

Figure 4.2 Maintenance needs ratings for Southampton

1946-1990 Neighbourhoods (Zones 1, 4, 7, 12 & 14; Figures 2.2 & 2.3):

These neighbourhoods developed around the core urban areas in Port Elgin and Southampton and have medium-sized houses with larger trees. The most common species were sugar maple, Norway maple, and eastern white cedar. The average DBH is 62cm. The primary maintenance considerations observed were corrective pruning and tree planting.

1991-Present Neighbourhoods (Zones 3, 6, 8, 9 & 11; Figures 2.2 & 2.3):

These neighbourhoods have developed at the edges of the urban areas in Port Elgin and Southampton and some are currently under construction. The houses are generally larger in this area with smaller sized trees and some are under construction. The most common species were sugar maple, and Norway maple. The average DBH is 32 cm. The primary maintenance considerations observed were tree planting and corrective pruning.

Lakeshore neighbourhoods (Zones 2, 10 & 15; Figures 2.2 & 2.3):

These neighbourhoods are primarily made up of cottages built at variable times, with associated natural woodlands along the lakeshore. The most common species were eastern white cedar, trembling aspen,

and white ash. The average DBH was 62 cm (Saugeen Shores Tree inventory). The primary maintenance considerations observed were tree removal and crown raising.

4.1.3 Degree of Maintenance Needs of Municipal Trees:

Low Maintenance Needs (Zones 1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14 & 15; Figures 2.2 & 2.3):

- Zone 1 (1946-1990) had no maintenances needs observed during the survey.
- Zone 4 (1946-1990) a single observation on Stafford Street in Port Elgin was noted as a result of a crab apple tree growing into utility lines and required a crown raising (Figure 2.4).
- Zone 5 (pre-1945) in Port Elgin had recommendation for deadwood removal, crown raising, and corrective pruning, mainly applying to occasional older maples along Elgin and Mill St (Figures 2.5 & 2.6). An opportunity to plant additional urban trees was also noted along Highland Street.

Figure 4.3 Crab apple with low crown growing into utility line

Figure 4.4, 2.6: Older maples requiring dead wood pruning on Mill St. and Elgin St.

- Zone 6 in Port Elgin had minor opportunities for tree planting noted on Maplewood Dr., with other spots scattered throughout the zone. A pocket of corrective pruning on Oakwood Dr. was noted among smaller maples with codominant stems (Figures 2.7 & 2.8)

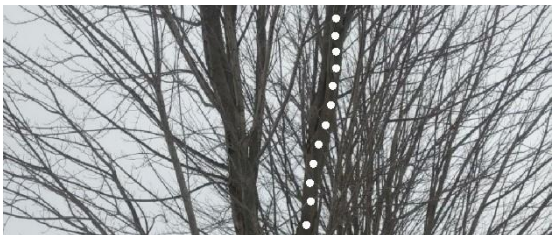

Figure 4.7, 2.8: Maple requiring corrective pruning, (left) example of corrective pruning (right) on Oakwood Dr.

- Zone 7 (1946-1990) in Port Elgin had occasional opportunities for tree planting, specifically noted on Richard St., Bricker St., and Parkwood Dr.
- Zone 10 (Lakeshore) had minor crown raising needs, particularly in cedar-heavy Geddes St.
- Zone 11 (1991-Present) in Southampton had occasional opportunities for tree planting noted on boulevards between sidewalks and the road on Lakeforest Dr. and associated residential developments.
- Zone 12 (1946-1990) in Southampton had corrective pruning needs observed in the parking lot at Helliwell Park on juvenile trees with codominant stems. A dead ash on Grey St. S was noted for removal.
- Zone 13 (Lakefront) had two dead ash trees requiring removal on Breadalbane St. and Victoria St. S. A soft maple with codominant stems required corrective pruning on Breadalbane St. Deadwood pruning was noted to be necessary on occasional older maples along Thompson St.
- Zone 14 (1946-1990) had minor deadwood pruning required on some larger maples on Tyendinaga St.
- Zone 15 (Lakeshore) in Southampton had some dead ash and cankered poplar within a woodland edge requiring removal on Copway Rd.

<u>Moderate Maintenance Needs (Zone 8, Figure 2.2):</u>

- Zone 8 (1991- Present) in Port Elgin contained some trees requiring corrective pruning on Parkwood Dr, Sandy Acres Rd, and Picadilly Dr. Opportunities for tree planting were common throughout the newer subdivisions surrounding Devonshire Blvd. Most plantable areas were located on boulevards between the sidewalk and the road.

<u>High Maintenance Needs (Zones 2 & 3, Figure 2.2):</u>

- Zone 2 in Port Elgin had several ash along Shipley Rd and Saugeen Beach Rd dead due to Emerald Ash Borer and should be removed.

- Zone 3 in Port Elgin had several opportunities to increase the urban canopy through tree planting. Large areas with plantable spaces were noted on Stickel St, Bruce St, Ray St, and Ridge St with opportunities for tree planting present throughout the zone.

4.1.4 Saugeen Rail Trail

Portions of the Saugeen Rail Trail were surveyed in Southampton, Port Elgin and in between. Trees along the trail were mainly poplar, ash, and cedar in Southampton. In Port Elgin, large sugar maples were occasionally noted in the more residential areas, with patches of early successional hardwoods (mainly poplar and ash, Figures 2.9 & 2.10) and the occasional Manitoba maple (Figure 2.11). Small areas with scattered buckthorn stems, garlic mustard seedheads and patches of phragmites were noted in wetter areas.

Figures 4.9, 2.10 Poplar with occasional buckthorn (left) and Sprouting ash stumps (right)

Figure 4.11 Garlic mustard seedheads (foreground) Manitoba maple (background)

4.1.5 Comments and Recommendations:

In general, the Town of Saugeen Shores has a good tree maintenance program. During a survey of various neighbourhoods with the Town Arborist, it was apparent that most outstanding tree maintenance issues (removals of dead trees in particular) were either scheduled to be dealt with or being monitored. Pruning of deadwood and crown raising appears to be regular throughout both Port Elgin and Southampton, and contributes to the overall "Low" maintenance needs of most of the zones discussed above.

Most of the maintenance needs noted during the Windshield Survey were preventative in nature- corrective pruning on juvenile trees to prevent structural issues in the future and tree planting to ensure a continuous urban canopy over time.

The below recommendations will enhance an already active urban forestry program in Saugeen Shores:

Recommendation 1: *Update relevant Town policies regarding planting trees in new developments.*

Recommendation 2: *Diversify the urban forest by planting fewer common species of trees including oaks, sycamore, and hackberry**.***

Recommendation 3: *Perform corrective pruning on younger trees, particularly in removing codominant stems on younger trees.*

Recommendation 4: *Along the Saugeen Rail Trail and in natural areas and on other Town-owned land, control invasive plants such as buckthorn, garlic mustard and Manitoba maple. Additional trees and shrubs should be planted to occupy the open areas created by invasive species control and to replace the ash trees killed by the Ash Borer. Shade tolerant trees should be planted in the understory of areas dominated by poplar to diversify the future forest.*

Recommendation 5: *Remove Town-owned Manitoba maple and ash trees and replaced with native species.*

5.0 Municipal Town Tree Inventory

Saugeen Shores created an inventory of 7080 public trees (i.e. trees growing on Town property; road allowances, parks, facilities in urban areas) before 2016. Kilgour & Associates (2017) documented that in 2016, there were 7,301 trees in the inventory. While the data is currently updated when trees are maintained or removed, it is likely that there are periods when the inventory was not updated to reflect tree maintenance, removals or planting. While most trees have been well maintained, data in the inventory suggests most trees have not received maintenance or removal since 2016. There are inconsistencies in measurements throughout the inventory (e.g., variables include many inconsistencies in measurements (e.g., measurements of diameter in different units). For example, in 2016 the inventory had 486 ash trees (Kilgour & Associates 2017); in 2024 the inventory included 419 ash. Considering that Emerald Ash Borer (EAB) began killing ash in Southampton around 2015, it is likely that 75% or so ash would have been killed and removed by 2024. This suggests that the inventory was not updated to reflect the removals. This further confirms that a more consistent approach should be considered by the Town to ensure frequent and effective tree inventory tracking.

Analysis of the tree inventory (Table 3.1) revealed that by the numbers of trees, eastern white cedar makes up a 24% of the public tree population. However, most of these trees are parts of natural woodlands growing into municipal road allowances. Cedar also grow in denser clusters of smaller stems than other species and therefore represent a higher proportion of the inventoried stems. Sugar maple (16%) and Norway maple (13%) were the next most common species in the street tree inventory. Efforts could be made to decrease the relative abundance of Norway maple, increasing the diversity and resilience of the urban forest.

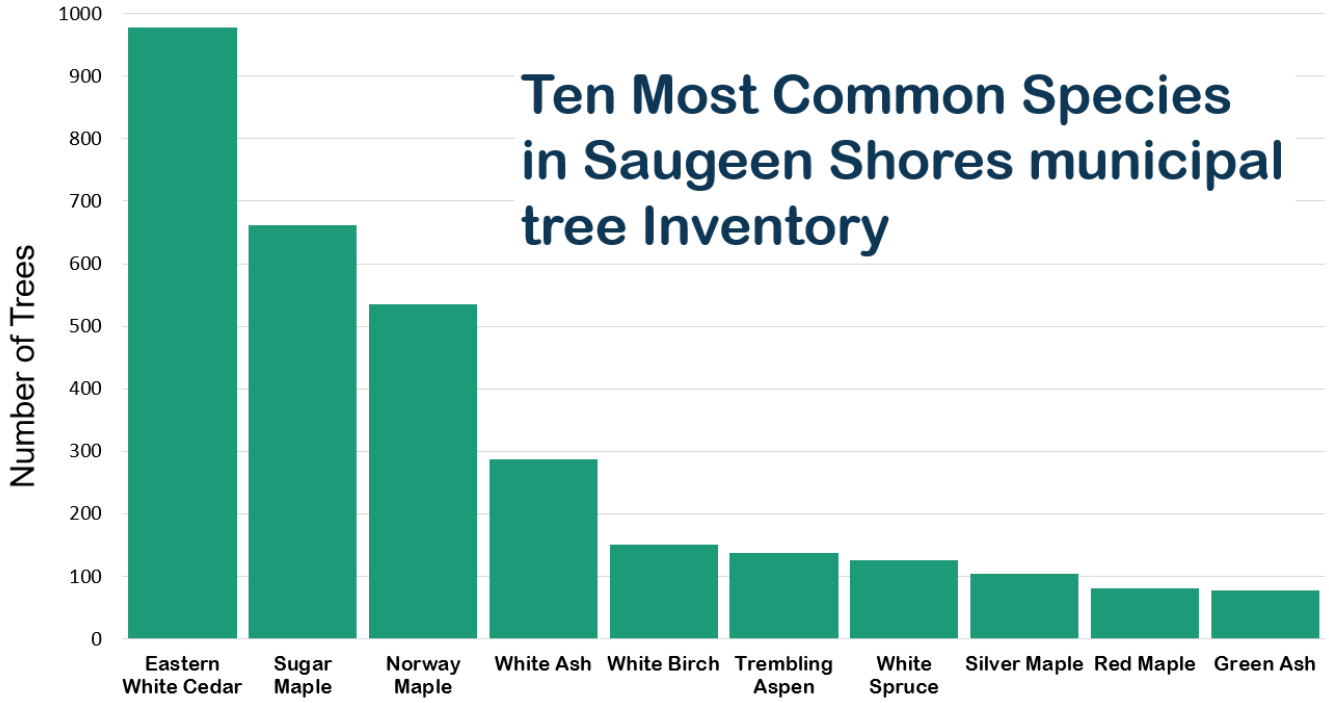

Figure 5.1 Ten most common species and frequencies in Saugeen Shores Public Tree Inventory

The diameter of the trees in different size classes is also important and a desirable distribution is where there are lots of small trees, with numbers dropping as the trees get larger. The inventory analysis (Figure

3.1) showed that 19% of the trees were large (i.e., over 60 cm diameter) and 55% were medium-sized, between 30 and 60 cm.

There were fewer trees between 50 and 60 cm and less than 20 cm dbh. It is speculated that most of the medium-sized trees (i.e., 20 to 50 cm in diameter) were planted during a time of rapid residential development associated with the development of Bruce Nuclear Power plant; and that not many trees have been planted since.

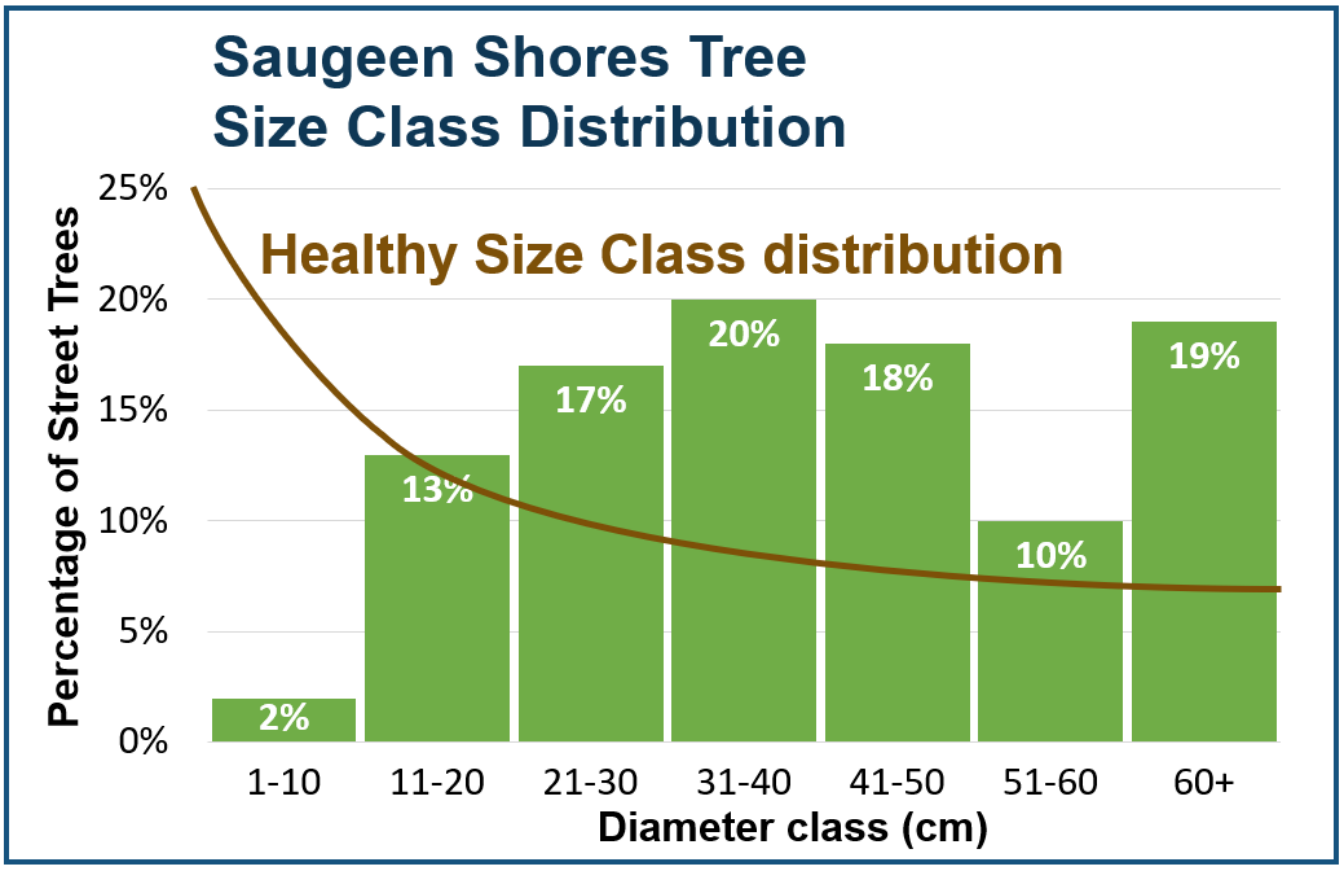

Figure 5.2 Diameter class distributions and with line showing an "ideal" distribution

As previously mentioned, it was also found that measurements in the inventory were inconsistent where the measurement for tree height and diameter varied (i.e., it appeared that for some trees the measure was in centimeters or meters). It was also unclear whether tree management had been updated since 2015 as 419 out of 465 ash were still included in the inventory after most ash were likely killed during the EAB infestation since 2016.

Recommendation 6: *Update the Public Tree inventory to provide a database that can be updated in live time to support tree management and inclusion of trees as green infrastructure in the Town Asset Management Plan.*

6.0 Urban Canopy Cover/Plantable Spaces Assessment

The view from the air helps provide a better understanding of an urban forest. From this perspective, a pattern emerges: the density of the urban forest varies with patterns of land use in urban areas.

With the fastest growing population in Bruce County, the Town of Saugeen Shores has seen a growth in commercial and residential development, resulting in a perceived loss of tree canopy by the public. This Urban Canopy Cover/Plantable Areas analysis will serve as an indicator to be monitored over time to track changes over time and identify opportunities for planting trees to increase canopy cover within the municipality.

Canopy Cover (CC) includes tree canopy and shrub canopy, including woodlands and other natural areas. W&A conducted a Canopy Cover/Plantable Areas Assessment of the Town using an online tool used by communities around the globe called i-Tree Canopy 7.0 https://canopy.itreetools.org/. The assessment included a general estimate of CC within the municipal boundary (i.e., urban and rural areas), and more detailed assessments of the urban areas of Port Elgin and Southampton, and the two urban areas combined.

6.1 Methodology

i-Tree Canopy was created through a partnership lead by the United States Forest Service, providing a peer reviewed science-based methodology for users to measure tree canopy cover in communities. This will establish base line data for goal setting. It can also compare tree canopy cover between neighbourhoods, school districts, political wards, and communities & determine priority tree planting areas. It can also monitor changes over time due to such impacts as emerald ash borer and land development.

Users must follow three steps to configure the *i-Tree Canopy* Tool:

(1) Step 1- Define the study area you want to survey; for the purposes of these analyses are the Town's municipal Project the Town's Urban Settlement Areas were used.

(2) Step 2- Define the Cover Classes; for the purposes of this Project, the cover classes dictated for this project are shown in Table 4.1 below

(3) Step 3- Set Regional Settings and begin the photo interpretation; for the purposes of this project, regional settings were used from Alpena, Michigan on the West side of Lake Huron, a similar-sized community with similar growing conditions to Saugeen Shores.

The boundaries of the study area are imported into *i-Tree Canopy* and randomly located points are generated in the study area using leaf-on imagery from Google Earth. The most current available imagery was for 2021. The user assesses the cover class at each point. The more points surveyed the lower the standard error (SE) of the estimate of Cover Classes across the Study area. The Cover Class at each point is assessed and entered into the database.

i-Tree Canopy then estimates the economic and environmental benefits of the tree canopy. This includes estimates of air pollution reduction, runoff avoided and carbon storage, based on regional average conditions and then translates them into monetary value.

Using the *i-Tree Canopy* software, Williams & Associates staff performed canopy analyses of four areas of

Saugeen Shores. The map of the Study area is shown in Figure 4.1.

1. An analysis of the general canopy cover within the municipal boundary of Saugeen Shores (i.e., including urban and rural areas). This study had the fewest cover classes and provides a general assessment of Canopy Cover over the entire Town.
2. A more detailed analysis for the urban areas of Saugeen Shores (Port Elgin and Southampton combined), using the combined sampling points from both urban areas.
3. The Urban Tree Canopy within the Port Elgin urban area.
4. The Urban Tree Canopy within the Southampton urban area

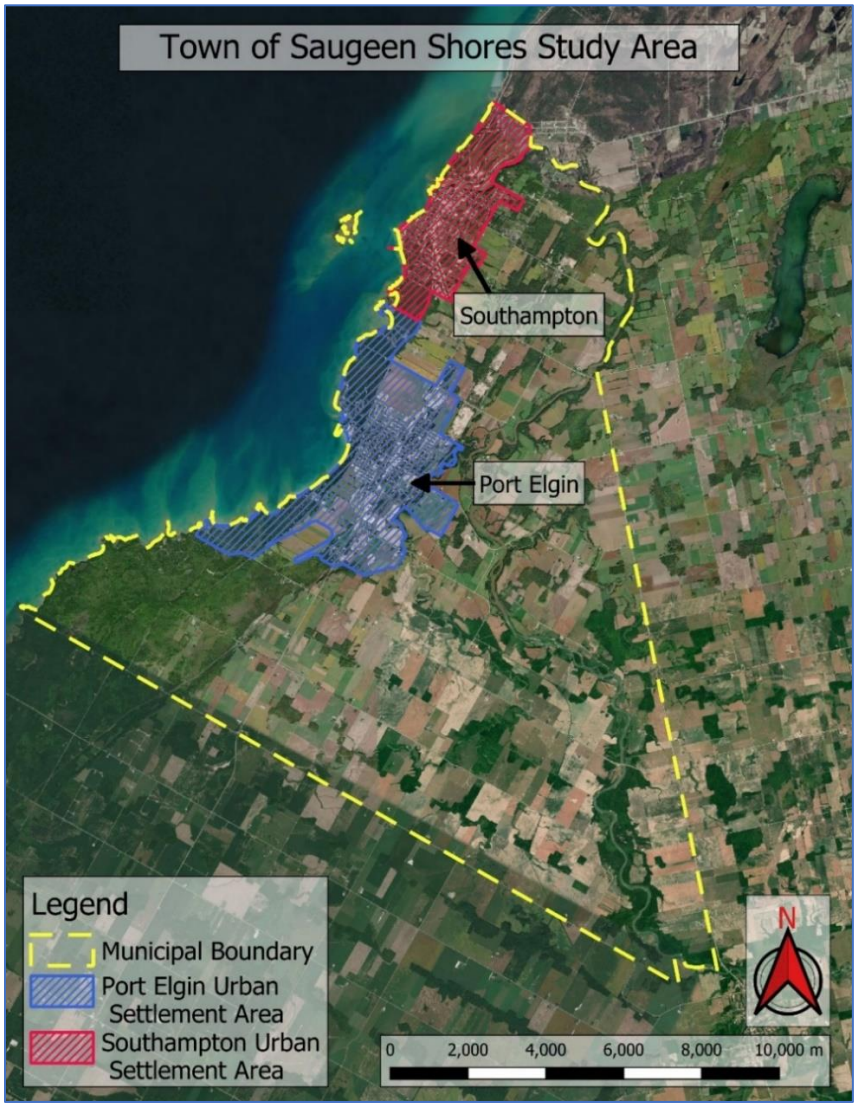

Figure 6.1 Map of Saugeen Shores showing study area

6.2 Canopy Cover within Saugeen Shores Municipal Boundary

The Canopy Cover of Saugeen Shores' municipal boundary (17,339 ha) was assessed using 1000 randomly-distributed points in total provided by i-Tree Canopy. Figure 4.2 shows the points assessed in the CC analysis and the CC/Plantable Areas analysis, the canopy cover class (Table 4.1) was assessed for each point.

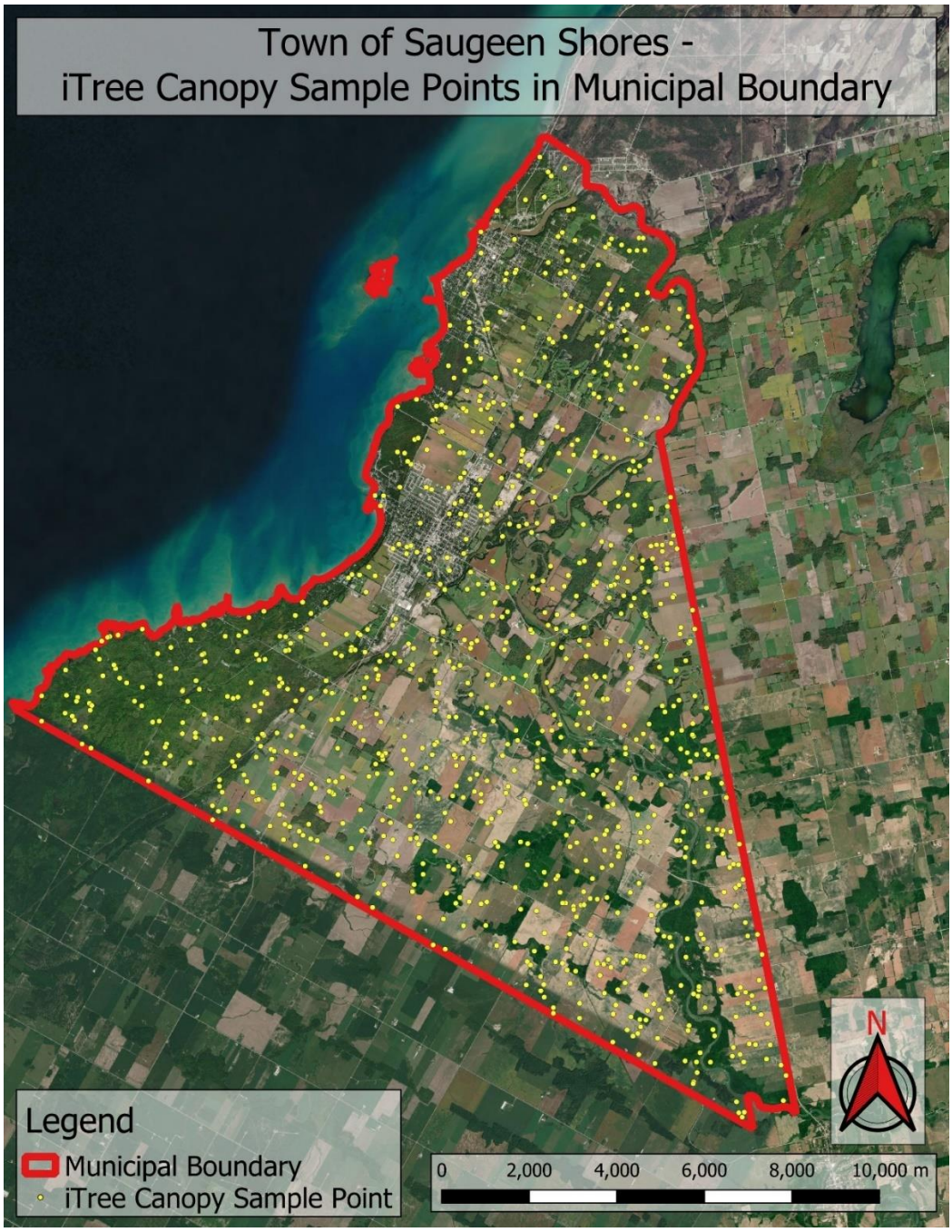

Figure 6.2 Points sampled using i-Tree Canopy. The analysis included 1000 points over the 17,334 ha area of the municipal boundary.

Table 6.1 Cover class categories and descriptions for the 1000-point canopy assessment of the entire municipal boundary.

Category	Cover Class	Description
Canopy	Canopy – Tree	Single or small group of trees on residential lots, street trees or middle of field
	Canopy – Shrub or Thicket	Shrub, thicket, or early successional forest
	Canopy – Woodlot	Woodlots and forests
Plantable	Plantable – Grass/ Herbaceous	Residential lawn, open park, open space, municipal right of ways, schools, hospitals, regenerating meadow, grassy strips in parking lots or gravel boulevards

Non-Plantable	Non-Plantable Permeable Surface	Cultivated agriculture, sports fields, cemetery, golf course fairway, driving range, open water, wetlands, gravel parking, waste management/disposal area, quarry, other areas meant to be devoid of trees
	Impervious Surfaces	Buildings, roads, concrete, structures, sidewalks, driveways

6.2.1 Urban Tree Canopy in Saugeen Shores Municipal Boundary

The results of the Cover Class analysis (i.e., assessment of points) is provided for the municipal boundary in Table 4.2. The analysis estimated that the canopy cover for the entire municipality to be 36.1% when including individual trees (3.8%), shrubs and thickets (5.8%), and woodlots (26.5%).
Non-plantable areas including impervious surfaces (3.8%) and permeable surfaces (55.9%) made up 58% of the municipality. Most of this non-plantable area came from agricultural fields.
An estimated 4.2% of the municipality was assessed to be plantable.

Table 6.2 Cover class percentages for the entire urban settlement area

Cover Class	% Cover
Canopy - Shrub or Thicket	5.8%
Canopy - Tree	3.8%
Canopy - Woodlot	26.5%
Impervious Surfaces	3.8%
Non-Plantable Permeable Surface	55.9%
Plantable Space	4.2%
Total	100.0%

6.3 Tree Canopy Assessment of Saugeen Shores Urban Area

The Canopy Cover of Saugeen Shores' urban areas was assessed using 3200 randomly-distributed points in total provided by *i-Tree Canopy*; 2,000 points were assessed in Port Elgin (1800 ha) and 1,200 were assessed in Southampton (854 ha). The points were assessed as per their location within the zoning categories (Table 4.3) and its canopy cover class (Table 4.4) within each of the Port Elgin and Southampton urban areas.

The data from the two urban areas was aggregated and a canopy analysis for the total urban area was conducted (Section 4.1) and shown in Figure 4.3. The data from Port Elgin and Southampton was analyzed separately and reported in Sections 4.2 and 4.3

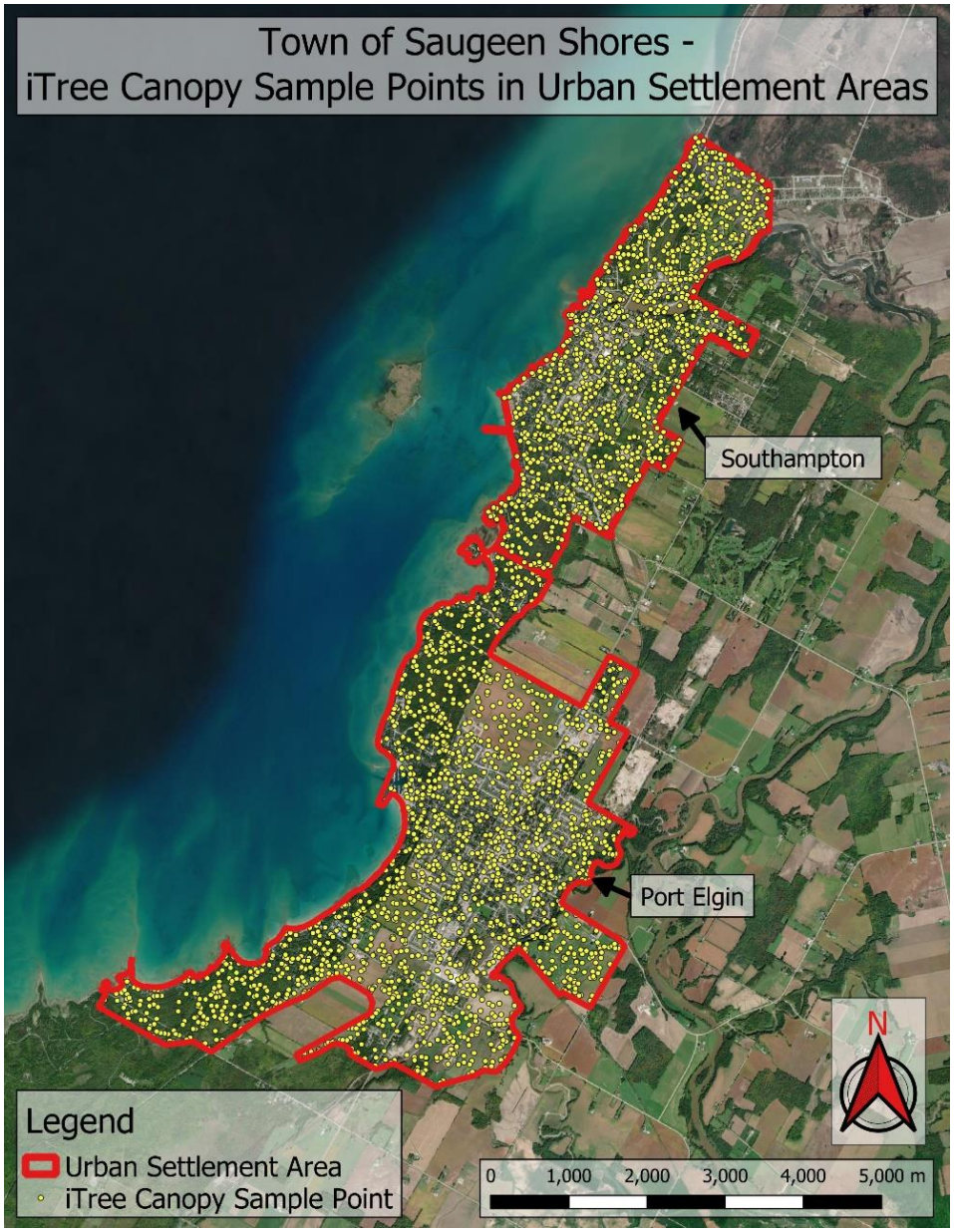

Figure 6.3 Points sampled using i-Tree Canopy included a total of 3200 points included, 1200 in Southampton and 2000 in Port Elgin.

Table 6.3 Zoning categories and descriptions for canopy assessment of the urban settlement areas.

Category	Description
Privately owned Residential, agricultural, open space and environmental protection-Zoned lands	Includes all residential, agricultural, open space, and environmental protection zones as defined in Saugeen Shores Zoning By-Law No. 75-2006 unless a property was identified as being owned by the municipality by Town of Saugeen Shores.
Private Commercial and	Includes all industrial and commercial zones as defined in Saugeen Shores Zoning By-Law No. 75-2006 unless a property was identified as being owned by the municipality by the Town of Saugeen Shores.

Employment Lands?	
Municipal lands and Institutional	Includes all properties identified as being owned by the municipality by Town of Saugeen Shores and all institutional zones as defined in Saugeen Shores Zoning By-Law No. 75-2006.

Table 6.4 Cover class categories and descriptions for canopy assessment of the urban settlement areas.

Category	Cover Class	Description
Canopy	Canopy – Tree	Single or small group of trees on residential lots, street trees or middle of field.
	Canopy – Shrub or Thicket	Shrub, thicket, or early successional forest.
	Canopy – Woodlot	Woodlots and forests.
Plantable	Plantable Space	Residential lawn, open space, schools, hospitals, regenerating meadow, grassy strips in commercial parking lots or boulevards.
	Road Allowance	Open areas in unopened road allowances, grassy strips on roadsides or boulevards.
	Parks and Facilities	Any plantable space on a property identified as being owned by the municipality by the Town of Saugeen Shores, school properties, institutional properties.
Non-Plantable	Non-Plantable Permeable Surface	Cultivated agriculture, sports fields, cemetery, golf course fairway, driving range, open water, wetlands, gravel parking, waste management/disposal area, quarry, other areas meant to be devoid of trees.
	Impervious Surfaces	Buildings, roads, concrete, structures, sidewalks, driveways.

6.4 Tree Canopy Assessment of Saugeen Shores Urban Area

The results of the Cover Class analysis estimated the canopy cover for the entire urban settlement area of the Town of Saugeen Shores to be 39.6% when including individual trees (9.5%), shrubs and thickets (3.7%), and woodlots (26.4%) (Table 4.4). The largest contribution to the canopy came from the Private zoning category (28.7%), followed by Municipal canopy (8.6%), with Commercial canopy contributing the least (2.6%). Private woodlands made up most of the canopy cover (28.7%).

Non-plantable areas including impervious surfaces (19%) and permeable surfaces (25.8%) made up 34.8% of the urban settlement area. Most of this non-plantable area came from agricultural fields within the Port Elgin urban settlement area.

An estimated 15.5% of the total urban settlement area was assessed to be plantable. On municipal properties, 2.5% of the plantable spaces were located on road allowances and 1.7% were located within parks and facilities. Most plantable spaces came from the private zoning category (9.1%).

Table 6.5 Cover class percentages for the entire urban settlement area.

Cover Class	Zoning Category						
	Commercial		Municipal		Private		Total
	% of Urban Settlement Area	*% of Zone*	% of Urban Settlement Area	*% of Zone*	% of Urban Settlement Area	*% of Zone*	% of Urban Settlement Area
Canopy - Shrub or Thicket	0.7%	*5.1%*	0.7%	*2.4%*	2.4%	*4.1%*	3.7%
Canopy - Tree	0.6%	*4.4%*	1.8%	*6.2%*	7.2%	*12.4%*	9.5%
Canopy - Woodlot	1.3%	*9.2%*	6.1%	*21.4%*	19.1%	*33.0%*	26.4%
Impermeable Surface	2.3%	*16.8%*	7.8%	*27.5%*	8.8%	*15.3%*	19.0%
Non-Plantable Permeable Surface	6.7%	*48.4%*	7.9%	*27.7%*	11.3%	*19.4%*	25.8%
Parks and Facilities (Plantable)	-	-	1.7%	*6.0%*	-		1.7%
Plantable Space	2.2%	*16.1%*	-	-	9.1%	*15.8%*	11.3%
Road Allowance (Plantable)	-	-	2.5%	*8.8%*	-		2.5%
Total	13.8%	*100.0%*	28.4%	*100.0%*	57.9%	*100.0%*	100.0%

It is also worth noting that the Town's forest cover in the Urban Settlement Boundary had a canopy cover of 35.8%. Most of this canopy cover comes from woodlands along waterbodies and wet areas throughout the municipality. The majority of the area is in agricultural production with most of the plantable spaces occurring in marginal agricultural areas, with the remain located on road allowances and private lawns.

6.5 Tree Canopy Assessment of Port Elgin Urban Area

The results of the Cover Class analysis estimated the canopy cover for Port Elgin's urban area to be 35.3% when including individual trees (8.1%), shrubs and thickets (3.1%), and woodlots (24.1%) (Table 4.5). The largest contribution to the canopy came from the Private zoning category (24.8%), followed by Municipal canopy (8.3%), with Commercial canopy contributing the least (2.3%). Private woodlands make up most of the canopy cover (16.8%).

Non-plantable areas in Port Elgin included impervious surfaces (19.1%) and permeable surfaces (30%). Most of this non-plantable permeable area are agricultural fields.

The community of Port Elgin exceeds the health benefit threshold and is on its way to meeting the cooling benefit threshold at 35.3% canopy cover. Port Elgin had the lowest canopy cover out of the assessed areas, mainly due to a higher proportion of agricultural fields with the urban boundaries. Non-plantable surfaces within the commercial zoning class also contribute to the lower canopy cover, but to a much smaller extent. Some of the unforested area on these commercial properties represent opportunities to increase the canopy cover, as discussed in Section 5.3.1.

Figure 6.4 Heavily treed area along shore of Lake Huron.

An estimated 11.7% of the Port Elgin's urban area was assessed as plantable space. On municipal properties, 2.0% of the plantable space was found on road allowances and 2.0% was in parks and facilities. The majority of plantable space was in private lands (9.0%).

Table 6.6 Cover class percentages for Port Elgin.

Cover Class	Zoning Category						
	Commercial		Municipal		Private		Total
	% of Port Elgin Urban Area	*% of Zone*	% of Port Elgin Urban Area	*% of Zone*	% of Port Elgin Urban Area	*% of Zone*	% of Port Elgin Urban Area
Canopy - Shrub or Thicket	0.6%	*3.6%*	0.6%	*2.0%*	2.0%	*3.5%*	3.1%
Canopy - Tree	0.5%	*3.3%*	1.6%	*5.9%*	6.0%	*10.3%*	8.1%
Canopy - Woodlot	1.2%	*7.9%*	6.1%	*22.1%*	16.8%	*29.2%*	24.1%
Impermeable Surface	2.7%	*17.9%*	7.4%	*27.1%*	9.0%	*15.6%*	19.1%
Non-Plantable Permeable Surface	7.4%	*49.0%*	7.8%	*28.3%*	14.9%	*25.8%*	30.0%
Parks and Facilities (Plantable)	-	-	2.0%	*7.3%*	-	-	2.0%
Plantable Space	2.8%	*18.2%*	-	-	9.0%	*15.6%*	11.7%
Road Allowance (Plantable)	-	-	2.0%	*7.3%*	-	-	2.0%
Total	15.1%	*100.0%*	27.4%	*100.0%*	57.5%	*100.0%*	100.0%

6.6 Tree Canopy Assessment of Southampton Urban Area

The results of the Cover Class analysis estimated the canopy cover for Southampton's urban area to be 49.2% when including individual trees (12.7%), shrubs and thickets (5.1%), and woodlots (31.4%). The largest contribution to the canopy came from the Private zoning category (36.9%), followed by Municipal canopy (9.1%), with Commercial canopy contributing the least (3.4%). Private woodlands made up most of the canopy cover (23.9%).

Non-plantable areas including impervious surfaces (19.1%) and permeable surfaces (30%) made up 49.1% of the Port Elgin's urban area. Most of this non-plantable area came from agricultural fields.

An estimated 15.3% of the Southampton's urban area was assessed to be plantable. On municipal properties, 3.6% of the plantable spaces were located on road allowances and 1.1% were located within parks and facilities. Most plantable spaces came from the private zoning category (9.5%).

The community of Southampton exceeds both the health benefit and cooling thresholds with 49.2% canopy cover. This high canopy cover is related to lower levels of commercial development and fewer agricultural fields within the boundaries of the urban settlement area than in Port Elgin. Additionally, Southampton tended to have a denser canopy of street trees within the most developed core of the community and the patch of private woodland along the shores of Lake Huron made up a slightly larger proportion of the settlement area.

Table 6.7 Cover class percentages for Southampton.

Cover Class	Zoning Category						
	Commercial		Municipal		Private		Total
	% of Southampton Urban Area	*% of Zone*	% of Southampton Urban Area	*% of Zone*	% of Southampton Urban Area	*% of Zone*	% of Southampton Urban Area
Canopy - Shrub or Thicket	1.0%	*9.2%*	0.9%	*3.0%*	3.2%	*5.4%*	5.1%
Canopy - Tree	0.8%	*7.6%*	2.1%	*6.8%*	9.8%	*16.6%*	12.7%
Canopy - Woodlot	1.4%	*13.0%*	6.1%	*19.9%*	23.9%	*40.8%*	31.4%
Impermeable Surface	1.5%	*13.7%*	8.7%	*28.4%*	8.6%	*14.7%*	18.8%
Non-Plantable Permeable Surface	5.1%	*46.6%*	8.1%	*26.5%*	3.7%	*6.3%*	16.8%
Parks and Facilities (Plantable)	-	-	1.1%	*3.6%*	-		1.1%
Plantable Space	1.1%	*9.9%*	-		9.5%	*16.2%*	10.6%
Road Allowance (Plantable)	-	-	3.6%	*11.7%*	-		3.6%
Total	10.9%	*100.0%*	30.5%	*100.0%*	58.6%	*100.0%*	100.0%

6.7 Ecological Services and Benefits

The total annual value of the ecological services generated from the Urban Forest Canopy was estimated to be $2,073,330, with an additional $20,564,391 of added cumulative carbon sequestration value. Table 4.8 provides the *i*-Tree Canopy outputs that estimate ecological services from Town of Saugeen Shores' canopy cover and estimates of the annual monetary value they provide.

Table 6.8 Air pollution, hydrological services, and carbon sequestration values.

Air Pollution	Removal Rate ($g/m^2/yr$)	$/t/yr	$
CO	0.071	$1,987.85	$1,485.59
NO_2	0.026	$410.32	$112.29
O_3	5.228	$4,424.46	$243,473.86
Particulate Matter (10 µm)	0.788	$9,344.35	$77,505.37
Particulate Matter (2.5 µm or less)	0.223	$187,994.88	$441,273.02
SO_2	0.197	$157.59	$326.78

Hydrological	Tree effects ($L/m^2/yr$)	$/$m^3$/yr	$
Avoided Run-off	21.456	$3.19	$720,436.87

Carbon	Carbon Rate (t/ha/yr)	Carbon price ($/t)	$
	2.200	$254.23	$588,716.17
		Total Annual	$2,073,329.96

Carbon Stored in Trees	Carbon Rate (t/ha)	Carbon price ($/t)	$
(not annual rate)	76.848	$254.23	$20,564,391.15

6.8 Urban Plantable Spaces

Plantable spaces from the above analysis are displayed by cover class in Table 4.7. The majority of plantable spaces occurred in the private zoning category, at 9.1% of the total urban settlement area. Most private plantable spaces occurred on residential lawns.

Municipal plantable spaces had the second highest coverage, representing 4.2% of the urban settlement area. Road allowances (2.5%) had slightly higher plantable space than parks and facilities (1.7%). Commercial plantable spaces were least common, at 2.2% of the urban settlement area.

When analyzed separately, percent coverage for each type of plantable space is similar between Port Elgin and Southampton

Table 6.9 Percent Plantable space by community.

Planting Space Cover Class	Area (ha)	Port Elgin (%) Plantable	Southampton (%) Plantable	Total Urban Settlement Area (%) Plantable
Municipal Road Allowance	754	2.0	3.6	2.5
Municipal Parks & Facilities		2.0	1.1	1.7
Private Plantable		9.0	9.5	9.1
Commercial Plantable		2.8	1.1	2.2
Total	**2700**	**15.8**	**15.3**	**15.5**

6.9 The Towns Urban Settlement Area Canopy Cover

Overall, the Town of Saugeen Shores has a robust canopy due primarily to several private and municipal woodlots. At 30% canopy cover, mental and physical health benefits begin to increase substantially. At 40% canopy cover, daytime cooling effects increase (Konijnendijk, 2022). With an estimated average canopy cover of 39.6%, Saugeen Shores has exceeded the health benefit threshold and has nearly reached the cooling threshold. A major contributor to the high canopy cover within the urban settlement area is the strip of heavily treed area that runs along the shore of Lake Huron (Figure 4.4). Intensification of development in this area could contribute to a significant decline in canopy over time. A subsequent analysis with these shoreline areas excluded revealed that the canopy cover of the urban settlement area would be an estimated average of 25.9%.

6.10 Plantable Spaces

6.10.1 Saugeen Shores Urban Settlement Area Plantable Spaces

The canopy cover analysis estimated that 15.5% of the urban settlement area is plantable. Municipal plantable spaces, at 4.2% coverage, represent the most direct area that the Town can influence canopy cover through tree planting. The majority of plantable spaces occur on private lands (9.1%), predominantly on residential lawns. The remaining 2.2% is in the commercial zone, mostly located along property edges in marginal areas. Specific strategies for prioritizing tree planting in the urban areas of Port Elgin and Southampton are discussed below in Sections 5.3.2 and 5.3.3

6.10.2 Port Elgin Urban Settlement Area Municipal Plantable Spaces

The canopy cover analysis estimated that 15.8% of the urban area of Port Elgin is plantable space. Municipal plantable spaces were evenly split between road allowances and parks & facilities, with 2% coverage for each category. Planting on road allowances should be focused primarily on newer developments on the edge of town where canopy cover is lower.

The closed landfill in Port Elgin presents a notable opportunity for reforestation. In parks with limited space, a strategy of planting high-density patches of various tree species, known as micro-forests or Miyawaki forests, can be used. These patches involve planting 2 to 7 trees per square meter, fostering competition and accelerating growth compared to individual planting. The cooperative elements within ecosystems are also believed to enhance tree health and promote growth (Manuel, 2020).

Commercial plantable spaces were higher in Port Elgin (2.8%) than in Southampton (1.1%). These spaces were mainly found in marginal areas at the Golf Club at Westlinks and aggregate pits on the edge of the urban area. There are also minor opportunities to plant trees on lawns of commercial properties on the edge of the urban area.

Private plantable spaces represent the most significant opportunity to increase the urban canopy, at 9% of the urban area. These spaces were predominantly on residential lawns. Tree planting on private lands can be supported by encouraging and enabling tree planting with communications, financial, and logistical support, and through policies. Communications about the value of tree planting and Tree Canopy to the community and supporting landowners with technical and material support or supplying trees will

encourage some landowners to plant and maintain more trees.

6.10.3 Southampton Urban Settlement Area Municipal Plantable Spaces

The canopy cover analysis estimated that 15.3% of the urban area is plantable in Southampton. Municipal plantable spaces were more common in road allowances (3.6%) than parks & facilities (1.1%). Plantable spaces on road allowances tended to be scattered throughout the residential areas. Generally, there were fewer parks and facilities available for tree planting in Southampton. Much of the plantable spaces were at the back of the Town of Saugeen Shores Works Yard in open areas among scattered trees and shrubs.

Southampton also had fewer plantable spaces in commercial zones (1.1%) than Port Elgin (3.6%). Most of these plantable spaces were on commercial properties with larges lawns on North Rankin Street. There were also minor opportunities to plant trees at the Southampton Golf and Country Club, but the property was relatively well-treed compared to the Westlinks golf course.

In Port Elgin, private plantable spaces represented the highest plantable area in Southampton at 9.5% coverage. Private planting programs should proceed as discussed in Section 5.3.2

6.11 Development in the Urban Settlement Area

Municipal policy can require new and replacement tree planting as part of development, building permits, municipal consent or other processes. Tree-planting requirements are required through policy during the approvals process in Saugeen Shores. Increasing the compensation rate for trees to be removed to levels shown in Table 6.2 would result in more trees being planted or replaced on municipal or private property.

As development pressures increase in Saugeen Shores, it will be important to prioritize woodland retention in development proposals to maintain canopy cover, particularly in the heavily treed areas along the shore of Lake Huron, and to increase canopy in developed areas. Policies to maintain canopy cover in urban areas (e.g., Urban Tree Conservation By-law) should be developed and implemented.

An increase in canopy cover will result in an increase in the total value of ecological services. Trees are assets whose value appreciates over time and offer an array of monetary and social benefits. Many other benefits are derived from an increased canopy cover such as “promoting health and social well-being by removing air pollution, reducing stress, encouraging physical activity, and promoting social ties and community” (Turner-Skoff & Cavender, 2019)

Recommendation 7: *Develop an objective in the Official Plan to maintain Urban Tree Canopy Cover, Section 2.6 Environmental Features.*

Recommendation 8: *Strengthen policies to ensure tree cover is maintained through the development process, particularly the woodlands/heavily treed areas along the shores of Lake Huron and Saugeen River, shown in Figure 5.3.*

Recommendation 9: *Specifications for compensation requirements for tree removals should be included in planning documents. The ratio of planted trees to removed trees should increase with tree diameter as shown in Table 6.2.*

Recommendation 10: *The Town should continue to develop plans to plant trees on municipal properties, such as road allowances, parks, and facilities.*

Recommendation 11: *Develop and implement a plan to reforest the closed landfill in Port Elgin could be developed to contribute to a more substantial increase in canopy cover. Small high-density patches (i.e. Miyawaki or micro forests) of trees.*

Recommendation 12: *In addition to the annual tree sale, The Town should engage with and support private and commercial landowners to plant trees where sensible, on their properties through communications campaigns, logistical/technical support and access to funding.*

7.0 Engagement and Communication

7.1 Introduction

A community engagement was identified as being of prime importance in the planning process. This resulted in the writing and updating of a Communications Strategy in Support of the Development of Saugeen Shores's Urban Tree Canopy Plan (UTCP). The goals of this Strategy were to:

- Articulate the status of Saugeen Shores's urban forest and its management.
- Generate ideas about how to manage this forest going forward.
- Use those ideas to help choose a vision and strategies to improve the urban forest as Saugeen Shores continues to grow.

Williams & Associates have met with key municipal contacts, keeping them apprised regarding UTCP developments. This included the elaboration of a Windshield Survey a Team exercise with the municipality to look at the criteria & performance indicators for urban forest sustainability, and a of the municipality's existing urban forest program.

7.2 Indigenous and First Nation Consultation

The Town of Saugeen Shores is located on the traditional lands and treaty territory of the Saugeen Ojibway Nation (SON) and within the settlement areas of the Historic Saugeen Métis (HSM).

Williams & Associates and the Town of Saugeen Shores contacted both SON and HSM for input in the development of the UTCP. Both groups expressed an interest in discussing the projects, however, only the Historic Saugeen Métis (HSM) was met with. The meeting with HSM included discussions regarding the objectives, processes, and communications aspects of the UTCP. The meeting was seen as productive, and it was agreed that the UTCP project was very positive in nature and should result in many improvements to the way Saugeen Shores's urban forest is managed as well as many positive social and environmental benefits. The representatives of each participating group were asked if and how they would like to participate in the review of the UTCP project:

- The **Saugeen Ojibway Nation** requested a meeting to discuss the UTCP project.
- The **Historic Saugeen Metis** requested a remote meeting to discuss the project. Discussions during the meeting were very positive about the objectives of the project. The importance of using native plant materials was discussed and the HSM agreed to provide a list of trees that were important to the community.

The HSM offered to provide a list of tree species important to them that was incorporated into the planting list in Appendix C2.

Both SON and HSM were circulated the Draft UTCP with request for comments, but no comments were received.

7.3 Urban Forest Community Survey

An on-line survey was conducted in April and May of 2024 on the Town's website using Social Pinpoint software. Nine questions were asked to get a better understanding of what the community wanted out of

the UTCP. In addition, respondents were asked to prioritize the draft vision and goals of the plan. Opportunities for additional comments were also included. The survey was advertised on multiple social media platforms (Instagram, LinkedIn, Towns Website) to coincide with the Towns Tree Sale Day. The survey received a total number of 86 responses and an additional 7 surveys were completed at the public open house with a total of 93 surveys received. The data was summarized and compiled into charts displaying the survey results in Appendix A.1.

Key findings from the survey indicated:

- A majority of respondents agreed with the proposed draft vision and goals of the UTCP (92.47%);
- In ranking the importance of draft goals:
    - Respondents ranked the protection of existing public trees and encouragement of private trees as most important; and
    - Respondents ranked the understanding of the economic role of tree canopy and enhancing economic activity of least importance.
- A majority of respondents supported the measuring and tracking of tree canopy coverage in Saugeen Shores (90%);
- Respondents were equally split on their support of a by-law addressing tree cutting on private property (34.1% and 34.1%);
- Respondents praised the Towns Tree Sale and made suggestions for mass plantings in the form of memorial forests, arboretums and microforests to support residents in tree planting; and
- Respondents also expressed concern over the protection of heritage street trees, the maintenance and tending of newly planted trees and clearcutting as a result of new development.

Other suggestions from the survey included implementing a Tree By-law, creating incentives for planting and removal (dead or hazardous trees), support services for tree planting and care and further community engagement including tree planting events, creating tree ambassador programs and expanding the Towns Tree Sale into fall.

7.4 UTCP Public Meeting

On May 23, 2024, a public meeting was held at the Bruce County Museum and Cultural Centre to discuss the UTCP. Four displays were set up to showcase various aspects of the UTCP including:

1. Vision Statement and Goals
2. Tree Health Assessment, Tree Inventory Summary, and Canopy Cover Analysis
3. Tree Bylaw and Policy
4. Tree Awareness

Town staff and the Williams & Associates Team were present at each of the displays to describe each station and answer any questions. A presentation was also held in the Bruce Power Theatre to discuss definitions and objectives of the UTCP, and to explain the future direction of the plan. The presentation was followed by a Q&A session.

Areas of concern expressed by Attendees at the Public Meeting and responses are below in Section 7.4.1.

7.4.1 UTCP Public Meeting Q&A

1) A question was asked seeking information and/or contacts regarding best practices, options, and realistic expectations regarding street-tree vaults and alternatives (including synthetic soils) for creating canopy cover from High St. in Southampton down to Lake Huron.
Specifications for Tree Planting, tree locations, synthetic soils and other are provided in Appendix 1of the UTCP.

2) Information on Proper Planting and maintenance practices for planting on Town property or for trees supported by Town Tree Planting support programs was sought.
Specifications for Tree Planting, tree locations, synthetic soils and other are provided in Appendix 1of the UTCP.

3) A question regarding what qualifications are required for staff or consultants for Arborist Reports and their implementation. Including - tree respectful engineering and construction, and/or info on Policy, By-law, training for staff, consequences to Town for damaging or destroying trees, and qualifications to identify and protect heritage trees and trees worth drilling underneath to protect.
Recommendations for staff qualifications for Arborist reports and planning for tree protection and heritage trees are in the Tree Canopy Plan – Arborist Report authors - Certified Arborist (or higher-level arboricultural qualification (i.e., not Landscape Architect, Planner or Engineer) or Registered Professional Forester with urban forestry practice.

Recommendations were also made that work on municipal trees and in accordance with the Proposed By-law be conducted in accordance with good arboricultural practice.

4) Address Guelph by-law limitations and positives
Guelph By-law requires permits, compensation for tree removals, Arborist reports for development projects and tree protection during construction projects.

However, it does not apply to properties less than 0.2 ha (0.5 acres). Therefore, it does not regulate cutting trees on 85% or so of the lots in the Town.

The Guelph By-law has no considerations for woodland management, or applications of good forestry practice – for example if to thin a plantation for tree/forest health they require tree compensation for the harvested trees. The Guelph By-law requires that 1 or more trees, or $500 each be planted/paid for each cut tree. So, if 200 trees were thinned from 1 acre of a plantation (total revenue for wood would be about $300) the compensation payment to the City would be $10,000 or more.

This By-law is in the process of being revised.

5) Can boulevards be forced to be wider to accommodate trees?

Boulevard specifications are part of the design guidelines for the Town. It is recommended that those policies be reviewed to include more plantable space for trees.

Town considerations

6) Policy/by-law for specific tree protection construction standards (public and private)
Recommended in UTCP

7) Consider leaf pick up program
Should be discussed with staff and Council

8) Attendee suggestion: Educate people in how to maintain their trees:
The Town should sponsor workshops, seminars, communications like below -
"Did you know, or Healthy Tree tips" segment in newsletter or as part of social media posts (e.g. cutting vines at the base of trees to stop vines from smothering them; tips on staking and removing stakes; tips on pruning; tips regarding soil compaction and staying off roots).

9) Suggestion: Educate people in how to maintain their trees:
Workshops, seminars, communications like below -

1) Who/where do citizens report concerns regarding Town staff removing/damaging trees? (answer: website "Report a concern")
2) Use Town influence on utility companies/board to respectfully push for better pruning around power lines and better construction practices.

8.0 Policy and By-law Review Regarding Urban Tree Canopy

Williams & Associates (WA) has reviewed relevant policies affecting the management of Saugeen Shores' UTC. These included Federal, Provincial and Conservation Authority, County and Town policies. WA also conducted a limited search and review of policies and regulations of other agencies that would apply to trees in Saugeen Shores, listed below:

- Federal Policies and Legislation
- Province of Ontario Policies & Legislation
- Saugeen Valley Conservation Authority Policies
- County of Bruce Plans, Polices & By-laws
- Town Policies, Plans and Reports
- The Town of Saugeen Shores's applicable Ordinances (By-laws)

Elements of each policy or ordinance that affects urban forestry/tree management are described below.

8.1 Federal Policies and Legislation

Federal government regulations and policy regarding urban tree canopy are limited and mostly indirect. The Migratory Birds Convention Act (1994) prohibits disturbance to active nests of migrating birds, the Canadian Forest Service monitors and regulates some pest management issues, and the Canadian Food Inspection Agency (CFIA) monitors, regulates and attempts to control the spread of invasive pests, the most important of which currently include Asian Long-horned Beetle and Emerald Ash Borer. Recently Oak Wilt, Spotted Lanternfly and Hemlock Wooly Adelgid have been regulated by the CFIA. The federal Species at Risk Act (S.C. 2002, c. 29) for the most part overlaps with the Ontario Endangered Species Act 2007.

8.1.1 Migratory Birds Convention Act (1994)

The Migratory Birds Convention Act, 1994 (1994, c.22) regulates activities that affect migrating birds particularly - disturbing nesting birds. and has direct impacts on some urban forestry activities. This limits tree maintenance and removal near nesting birds. While this is not a total restriction of activities, managers and crews need to be aware of it and ensure activities do not disturb nesting migratory birds.

8.2 Province of Ontario Policies and Legislation

Ontario provides limited direction in urban forestry matters, delegating some to municipalities and Conservation Authorities. There are a number of provincial statutes, policies, and plans that directly or indirectly affect municipal Urban Tree Canopy and is further described in Appendix B of this Plan.

8.3 Saugeen Valley Conservation Authority Policies

The Town lies within the jurisdiction of the SVCA, Under Section 28 of the *Conservation Authorities Act, 1990 (amended April 1, 2024),* and Ontario Regulation 172/06, each Conservation Authority regulates designated hazard lands within and adjacent to watercourses, wetlands and shorelines; and regulates alterations to wetlands in order to protect the natural environment from damaging activities. The Town consults with the Conservation Authority in the development of plans and policies affecting the environment.

8.4 County of Bruce By-Law

In 2004, the County of Bruce enacted By-law 4071, a By-law to prohibit or regulate the harvesting, destruction or injuring of trees in woodlands. The by-law applies to:

- All Woodlands having an area of one (1) hectare or more; and could regulate
- All Woodlands having an area of less than one (1) hectare, upon delegation of such authority by an Area Municipality to the County; and

As there are ongoing urbanization and agricultural pressures, this By-law is important in preventing arbitrary clearing for different sorts of development.

8.5 Town Policies and Ordinances (By-Laws)

8.5.1 Official Plan

The Town of Saugeen Shores's Official Plan (OP) was approved in 2014 and provides Town policy for tree protection and retention in developments. Significant Woodlands, and Life Sciences Areas of Natural and Scientific Interest are protected as are lands shown as Environmental Protection. It requires Tree Planting and Retention Plans and replanting Plans (i.e., replanting at a compensation rate of 2:1) that incorporate appropriate native species based on Environmental Impact Studies for woodlands. Special Policy Area #2 requires special woodlands management policies should development proceed in this area. Special policies require tree replacement of a ratio 2:1. It also suggests that the preservation of trees be done through the use of site plan control or subdivision agreements or through the use of a Tree Conservation By-law.

Saugeen Shores should consider enhance its existing OP Policy on green infrastructure with provincial Asset Management Plan regulations (O. Reg. 588/17) under the *Infrastructure for Jobs and Prosperity*. The enhancements should include the public tree as green infrastructure.

8.5.2 Zoning By-law

The Town's zoning by-law contains provisions for protecting Environmental Protection lands through the EP. This zone is applied to hazardous lands (from flooding or erosion, etc.) and for lands identified in Environmental Impact Studies for protection. The EP zone does not permit development. In some cases, additional provisions are added to prohibit vegetation removal when recommended through subdivisions of through site plan control processes.

8.5.3 Plans of Subdivision

When required through an EIS, the process to approve plans of subdivision may contain provisions for the development of tree retention plans or other measures to protect significant woodlands and wildlife habitat. When approved, these plans are integrated into agreements which compel landowners to comply with the retention plans.

Additionally, plans of subdivision are required to plant one tree per lot following construction of a dwelling.

8.5.4 Site Plan Control

In cases where trees have been identified for protection and where site plan control is the recommended implementation tool, tree retention plans are created for inclusion in site plan agreements. These agreements require landowners to preserve the identified treed areas. To date, only the Woodlands subdivision in the area of Action Drive/Fenton Drive have these tree retention plans regulated through site plan control.

8.5.5 The Town of Saugeen Shores Strategic Asset Management Policy (2019) and Asset Management Plan

The Town's Asset Management Policy planning (AMP), approved in 2019 and reviewed in 2024 to address the intent of the Urban Tree Canopy Plan. and to comply with the O. Reg. 588/17 requirement that an Asset Management Plan (AMP) = be completed by July 1, 2024. The regulation on asset management planning (AMP) under the *Infrastructure for Jobs and Prosperity Act*, *2015*, requires that: For the purposes of AMP, municipal urban forests (street & park/facility trees and woodland parks) are considered green infrastructure assets.

The uniqueness of trees in asset management planning is that where traditional "grey infrastructure" (e.g., streets, buildings, sewers, sidewalks) decline in value over time, trees increase in value over time as they get larger and provide greater economic, environmental and social benefits. The Town of Saugeen Shores recognizes the importance of including trees as "Green Infrastructure Assets" or non-core assets in Asset Management Plans and has since updated this Plan to identify and outline the Urban Tree Canopy Plan. Saugeen Shores will amend the Asset Management Plan once the Urban Tree Canopy Plan has been implemented. This will include the updating of its Urban Tree Inventory and mechanisms to attribute values to each tree.

The *ANSI A300 Standards* developed by the Tree Care Industry Association are the generally accepted industry standards for tree care practices: (http://www.tcia.org/TCIA/Build_Your_Business/A300_Standards/A300_Standards.aspx?hkey=96ef3b27-af56-4ada-8670-d848787d1e30&WebsiteKey=b9a41e1f-978d-4585-9172-c411c78c5c14). The standards cover such details as *tree pruning*, tree *management* and *tree risk management*.

8.5.6 Parks and Trails Master Plan (2004)

The creation of Saugeen Shores through the amalgamation of the 3 municipalities and the consolidation of their physical assets, demographic composition of the community, and current and emerging parks and trails needs and expectations created a need to integrate and update Town of Saugeen Shores' parks and trails strategies and policies. The Parks and Trails Master Plan assesses the Town's parks and recreation services, human resources, policies, and infrastructure, and recommends a framework of priorities for future decision making. The Parks & Trails Master Plan recommends that the Town consider a Forest

Management Strategy to encourage new growth and replacement of native trees to address the general health of the Town's wooded areas.

The Town is working with a consultant in preparing individual Master Plans for Jubilee and Helliwell Parks in Southampton and North Shore Park in Port Elgin. Public engagement sessions were held to provide input into the plans and establish priorities to provide a park-wide coordinated approach to park development. The plans provide cost estimates for park amenities and recommends phases to implement the plan over the next 10 years and beyond.

Additionally, it was recommended that the North Shore Park Master Plan include restoration of damaged trees and landscaping as a high priority. In response, a sample tree, shrub, and pollinator-friendly planting plan has been prepared in addition to the Master Plan.

8.5.7 Tree Canopy Policy (2019)

Saugeen Shores passed a Tree Canopy Policy as required Section 270(1)(7) of the Municipal Act. The Policy describes the benefits of Tree Canopy, Environmental Impact Statements (EIS) are required for developments; trees required for planting in the site plan approval or special development projects; andrecommending restoration of the woodland features during or following construction.

8.5.8 Property Standards By-law

This by-law plays a supporting role to urban forestry: Section 2.02 requires that Yards including Vacant Lots be free of (2.11) Rubbish or debris and objects or conditions that may create a health, fire, and (2.6) dead, decayed or damaged trees or other natural growth. It does not deal with hazardous trees in Treed Areas that may be threatening adjacent properties.

Some wording from another municipality. "All trees or parts thereof that have expired shall be removed or maintained in a condition which is not hazardous to persons expected to be on or about the property." This by-law is expected to be helpful to address unsafe private ash trees.
"hazardous trees (as determined by the Town) near Property Lines that could damage adjacent properties"

8.5.9 Policy and By-law Summary

In addition to the Policy and By-law documents described in previous sections, additional policy and reports as, listed below, were reviewed to assess how trees and canopy were considered. S.S. Subdivision and Site Plan Development Guide (2020)

- S.S. Strategic Plan (2023)
- S.S. Urban Forest Management Plan (2016) (not adopted)
- S.S. Tree Canopy Policy (2019)
- S.S. Env. S. Ad hoc Committee TOR (2022)
- ESAC Report (2022) – Canopy Cover Plan Recommendation, Section 2.2; p 48-54
- S.S. Guide to ordering trees on-line (2022)
- S.S. Subdivision and Site Plan Development Guide (2020)

Trees and Tree Canopy received good support and consideration in policy documents and reports. Requirements for tree assessment, protection and replacement were required during the planning stages from municipal and private projects. Some processes require the use of native trees and shrubs. However, it is suggested that the Town amend policies and By-laws as discussed below

- While most policy required replacement of trees required for construction or development projects, the requirements were that trees be replaced by up to 2 trees planted for each to be removed (2:1 replacement ratio

Trees and Tree Canopy received good support and consideration in policy documents and reports. Requirements for tree assessment, protection and replacement were required during the planning stages from municipal and private projects. Some processes require the use of native trees and shrubs. However, it is suggested that the Town amend policies and By-laws as discussed below.

While most policy required replacement of trees required for construction or development projects, the requirements were that trees be replaced by up to 2 trees planted for each to be removed (2:1 replacement ratio). As trees provide exponentially greater benefits as they get bigger and they take up to 100 years to mature, it suggests that a number of replacement trees should be planted to replace trees removed as the size of the tree to be removed increases. Table 6.2 provides a proposed tree compensation ratio that could be used in all Town policy and By-Law documents.

Table 8.1 Minimum Tree Protection Zones.

Trunk Diameter (DBH)	Minimum Tree Protection Zone (MTPZ) Distances Required[1]	Root Protection Zone (RPZ) Distances Required
<10 cm	1.8 m	1.8 m
11 – 40 cm	2.4 m	4.0 m
41 – 50 cm	3.0 m	5.0 m
51 – 60 cm	3.6 m	6.0 m
61 – 70 cm	4.2 m	7.0 m
71 – 80 cm	4.8 m	8.0 m
81 – 90 cm	5.4 m	9.0 m
91 – 100+ cm	6.0 m	10.0 m

1. For trees over 100 cm. DBH, add 10 cm. to the TPZ for each centimeter of DBH

Table 8.2 Proposed Replacement Tree - Compensation Ratios

Diameter at Breast Height (cm)	Compensation Ratio
<10	Not Applicable
10-20	1:1
21-35	2:1
36-50	3:1
51-65	4:1
>65	5:1

Policies often require Tree Protection, Tree Retention Plans, or hazardous tree without specifying the qualifications of the professional preparing or approving the plans. Town Policies should require that such reports be prepared or approved. Policies should be amended to ensure that appropriately qualified professionals are providing input to projects and activities.

Tree Protection Plans and Retention Plans should be authored or approved by a Qualified Tree Professional, which means a professional who has gained recognized certifications, qualifications and expertise in the care and management of trees. Recognized certifications and qualifications for qualified tree professionals include:

(a) Registered Consulting Arborist (RCA) with the American Society of Consulting Arborists (ASCA);

(b) Certified Arborist, Board Certified Master Arborist, or Arborist Municipal Specialist with the International Society of Arboriculture (ISA); or

(c) Registered Professional Forester (RPF) as defined in the *Professional Foresters Act, 2000*, S.O. 2000, c.18, with urban forestry experience;
Hazard-Tree Assessment should be conducted by persons with the Tree Risk Assessment Qualification (TRAQ - ISA Designation) or one of the above with considerable tree risk assessment experience.

8.6 Proposed Policy

8.6.1 Tree Management Policy

Saugeen Shores does not currently have a Tree Management Policy. A Tree Management Policy should outline specifications for tree inventory and inspection procedures and the care of existing trees, including pruning, removals and tree protection. It provides requirements for the establishment of 'new trees' including infilling and new development, consistent with other Town policies and By-laws. It could also require the homeowner or planting agency to provide water during the establishment period. Information regarding the best practices to help ensure successful establishment and consequent growth of the tree should be provided. The policy should also list prohibited activities like planting trees on public property without a permit.

A Tree Management Policy should also include specifications for:

(a) Pruning Trees
(b) Tree Protection (e.g., during construction or other projects)
(c) Planting Guidelines

Municipal Best Practices reference generally recognized technical standards in their policies & procedures for tree planting, protection, and pruning.

- For Planting they include such technical guidelines as tree planting diagrams, standards for nursery stock, planting standards and conditions and maintenance guidelines for newly planted trees.
- Best Practices for pruning reference generally recognized industry standards in their policies & procedures for tree pruning; including details such as pruning objectives, pruning systems, and pruning specifications
- For tree protection, they reference generally recognized technical standards for tree protection which cover details about the writing of Plans (Arborist Reports) for trees during site planning, development and construction, performing site inspections, determining tree protection criteria, determining a 'tree protection zone' with methods(s) to fence it, creating a tree permit system, linking the tree permit system with existing municipal permit system(s) such as a road occupancy permit to provide harmonization for utilities and other agencies, referencing tree valuation and the appropriate securities to put in place during construction.
- For construction projects affecting trees, front-ending engineering design requirements for capital

projects to consider the impacts more fully on the public tree would further support the Town's Tree Management Policy. An example would be requiring local utilities to render the Town's street tree inventory and the appropriate tree protection measures, to the satisfaction of the Town, prior to receiving a Municipal Consent (MC).
- The Policy should also require that for every [tree] removal there will be replacement planting(s) with compensation rates consistent with other policies and By-laws.
- Municipal Best Practices reference generally recognized technical standards in their policies & procedures for tree planting, protection, and pruning.

8.6.2 Interdepartmental Urban Forest Management Committee

It is proposed that an Interdepartmental Urban Forest Management Committee be established, chaired by the Town Forest Manager or other staff involved with urban forest management. The committee should be comprised of staff with a business interest in trees/urban forests. This would include key staff involved with tree management, planning, policy development, By-law enforcement and others. and stakeholders with similar interest. This would be an internal Board to facilitate communications among departments to break down the "silo" mentality and help ensure that goals, policy and implementation are coordinated.

8.6.3 Proposed Urban Tree Conservation By-Law

The Terms of Reference for the UTCP project included developing a draft Private Tree By-Law. As the project developed, it was noted that the Town's public trees did not have protection and that most municipalities have a public tree By-law that prohibits pruning, injuring or destroying trees on Town property (public trees), requires a permit or permission to plant trees on public land and requires compensation for trees injured, damaged or removed during construction projects.

A By-law that protects Public Trees would support the maintenance of trees in the Town Asset Management plan as Green Infrastructure, and their asset value as green infrastructure. This is required by the Province for Asset Management Planning for non-core biologic assets in the Town's Asset Management Program (see Recommendations 6.1, 3.1) and provide an efficient internal solution to address issues such as vandalism or other damage to Town trees.

The UTCP Project Management Team agreed that the Draft By-law should include protection for both Private and Public Trees. The consultant examined by-laws of twenty (20) municipalities (including Kitchener, Guelph, Oakville and more local by-laws including Kincardine and Huron-Kinloss) that protected trees on either Private or Public lands. Only one By-law covered Public and Private Trees in a single By-Law. Using several By-laws as models, a framework for an Urban Tree Conservation By-law was developed that provided protection for both Public and Private Trees. In addition, the framework developed would complement and strengthen protections in by-law so the Town can achieve the vision of this Plan.

Section 3.0 describes the process and findings of the Urban Tree Canopy Assessment Their principal findings included that Saugeen Shores had a good level of UTC (33%), but the Canopy Cover was at risk because of three factors:

- a significant proportion of the UTC was in woodlots, which were under increasing pressure from new and infill developments, and
- increasing amounts of infill and new developments.

A principal goal of this project is to develop an understanding of the Urban Tree Canopy in Saugeen Shores, and how it might be protected or improved. As there is currently limited regulation of tree removals, it was deemed important that there should be tools to prevent arbitrary tree removals without going through some assessment and perhaps replacement processes, while not interfering with reasonable property-management. The objectives of the By-law framework were to:

- Limit the removal of significant trees that are large and of desirable species
  - By requiring a permit and planting replacement trees for the removal of significant trees that are healthy
  - This is important because large trees provide the greatest aesthetic environmental and economic benefits.
- Limit the removal of large numbers of smaller trees
  - By requiring a permit and planting replacement trees for removing of larger numbers of small trees *(e.g., more than 10 trees/year over a certain size)*
  - This is important because much of Saugeen Shores' Urban Canopy is in residential, forest-like treed areas.
  - To maintain canopy cover, it is important to protect that canopy from unrestricted tree-clearing.

By-law framework was developed to limit the scope of the regulation and reduce enforcement and administrative costs, while providing reasonable protection to large trees, and treed/forest communities from uncontrolled tree cutting/clearing.

An example: removing a few small trees would not require a permit, but clearing a denser treed/forest area would. Removing a healthy large tree would require a permit, but a hazardous tree would require only an inspection to assess whether it was hazardous or not. In most cases, removing a regulated tree would require compensation, the rate depending on the tree's size.

Recommendation 13: The Town should consider a Tree Conservation By-law to protect both public and private trees.

8.6.4 Resources needed to support a Tree Conservation By-law

The resources required to administer a Tree Conservation By-law would include staff from various departments, depending on whether the support is for a permitting and auditing situation or a report of a potential violation which may involve discussions, investigations, charges and prosecution.

- By-Law Enforcement Officer (estimated 30% salary cost),
- Certified Arborist or Registered Professional Forester (staff ((30% Salary cost or contractor) to collect data that would support charges and subsequent legal proceedings (employee or contracted),
- Office staff for handling communications and paperwork

- Administrative Staff to handle permits and enforcement.
- Legal (staff or contracted) to file charges and prosecutions

Much of the initial contact regarding tree removal could be accomplished with existing resources. As long as the work went according to a permit, there would be limited required staff-time. Assuming that work went as planned, the permit fees could cover the basic costs.

However, when the Town must respond to a potential violation, the costs can increase significantly. The process would often involve a stop-work order, investigation by a By-law Officer, often supported by a professional Arborist or Forester. Then higher-level administration, legal professionals and court costs may be involved (there could be cost-recovery through prosecutions.)

Revenue from replacement trees that cannot be planted at a site may be used to plant on municipal property as well, or through partnership with other landowners. This would also help achieve Canopy Cover goals.

Recommendation 14: *The Town should amend its Official Plan to recognize the public tree as green infrastructure and inclusion in the Asset Management Policy as non-core, biologic assets.*

Recommendation 15: *The Town consider amending the Property Standards By-law (or Clean Yards By-law) to include hazardous trees in Treed Areas that may be threatening adjacent properties*

Recommendation 16: *The Town should document the qualifications for professionals who author or approve Tree Protection Plans, Tree Retention Plans and Hazard Tree Assessment reports.*

Recommendation 17: *Designate staff person as the Town Urban Forest Manager to review and coordinate urban forest management, Chair community and interdepartmental committees that foster communications among departments, the community and Council.*

Recommendation 18: *Establish an Urban Forest Management Committee to guide Town tree establishment, removal and management procedures.*

Recommendation 19: *The Town update its tree management practices to guide tree establishment, maintenance and removal. ANSI A300 Standards developed by the Tree Care Industry Association are standard and generally accepted industry standards for tree care practice.*

Recommendation 20: *Develop an Interdepartmental Urban Forest Management Committee that includes representatives from all administrative units that affect the Urban Tree Canopy to help harmonize planning for trees in developments/construction, planting, tending, protecting, replacing and benefitting from trees.*

9.0 Tree Policy Review and Recommendations

9.1 Saugeen Shores Annual Tree Sale

Saugeen Shores has sponsored the Annual Tree Sale since 2013, working with community groups and local nurseries. The program offers trees for sale to residents for planting on private land at a subsidized rate for pickup at a local nursery. Delivery and planting assistance is provided by community groups for a donation. Suggestions to improve the program, received in the engagement process suggest that this Annual Tree Sale should consider limiting the species of trees available to native and selected non-invasive exotic species which is further outline in Appendix B of this Plan.

Public comments suggested that the Tree Sale support 20 to 40L (5 to 10 gallon) potted trees rather than the larger, wire basket of balled and burlapped stock. That is because the potted trees are lighter (easier to move around) and easier to plant than the larger stock with a root ball. They would also be cheaper per tree and the vendor/nursery should be able to re-use the pots.

9.2 Municipal Tree Planting

Since 2000, the Town has planted relatively few trees on road allowances and other Town property. This observation is supported through the analysis of the Public Tree Inventory, which showed that while Saugeen Shores had good numbers of the medium and largest trees, there were fewer smaller trees. A lot of smaller trees are required for there to be some larger trees in 60 or 100 years. The larger numbers of mid-sized trees likely resulted from the rapid increase in residential development.

Because trees grow in trunk diameter each year, the numbers of trees in diameter classes reflects the tree ages in the tree population (i.e., trunk diameter is a proxy for tree age). Figure 3.2 shows that 15% of the trees in the Inventory were less than 0 to 20 cm in diameter, much fewer than the numbers of larger trees. A recommended tree population structure is larger numbers of smaller trees, with numbers dropping as the trees get bigger.

It is estimated that the plantable public space on urban municipal property would accommodate approximately 11,000 trees. It is suggested that Saugeen Shores implement a municipal tree planting program that would start by planting 100 trees in the first year on road allowances and maintained areas of parks and facilities, increasing over time. The number of trees planted could increase annually to 200 trees/year. Tree planting using reforestation strategies on open, unmaintained land would be economical and help to increase woodland CC. This breakdown for planting on municipal land assists in planning for the 10,000 trees being proposed in the long range plans of the Town.

Increased tree planting can be implemented on municipal road allowances and facilities as recently demonstrated in the development of three new Parks Master Plans with a focus on tree planting. The Plans for North Shore Park in Port Elgin and Jubilee and Helliwel Parks in Southampton. Priorities of the plan are tree planting/landscaping, seating, and facilities.

The cost for planting 100 trees in the first year at $650 per tree would be estimated at $65,000/year. The

number of trees planted could be increased or the direct costs of planting reduced if the Town allowed replacement trees (i.e., trees required to be planted to replace trees removed for construction or other purposes) to be planted on municipal property. The number of trees planted per year should increase as Saugeen Shores develops the infrastructure and expertise to manage the tree planting process.

Funding for tree planting may be available from programs such as the new Growing Canada's Community Canopies (GCCC) through Tree Canada. This program will fund large scale tree planting programs for communities.

9.3 Tree Species Lists

A list of trees and varieties that are commonly planted in southern Ontario and would do well in Saugeen Shores is in Appendix B1. Appendix B1 includes information as to whether they are native to Ontario, Canada, the US, or exotic; and their size, stature and the type of planting spots (e.g., roadside, park) they are suited to, their stature and size.

Appendix B2 includes the invasive species from appendix B1. These species have been found to invade and dominate natural areas and their planting should not be planted on Town property or supported by planting support programs like the Annual Tree Sale.

Recommendation 21: *To diversify the tree age and size profile of the Annual Tree Planting, should add 20 to 40L (5 to 10 gallon) potted trees to the list of available trees.*

Recommendation 22: *As per the Towns Annual Tree Sale program, trees available for purchase shall be limited to native trees and selected non-invasive exotic species. Tress shall be planted according to specifications as indicated in Appendix A.*

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Appendix A:

A.1 Urban Tree Canopy Community Survey and Consultation

An on-line survey was conducted in April and May of 2024 on the Town's website using Social Pinpoint software. Nine questions were asked to get a better understanding of what the community wanted out of the UTCP. In addition, respondents were asked to prioritize the draft vision and goals of the plan. Opportunities for additional comments were also included. The survey was advertised on multiple social media platforms (Instagram, LinkedIn, Towns Website) to coincide with the Towns Tree Sale Day. The survey received a total number of 86 responses, which is considered to be quite good by the Project Team.

An additional 7 surveys were completed at the public open house. The total numbers of surveys returned was 93. The data was summarized and compiled into charts displaying the survey results in Section 5.3.1

A.1 Part A: Survey Results

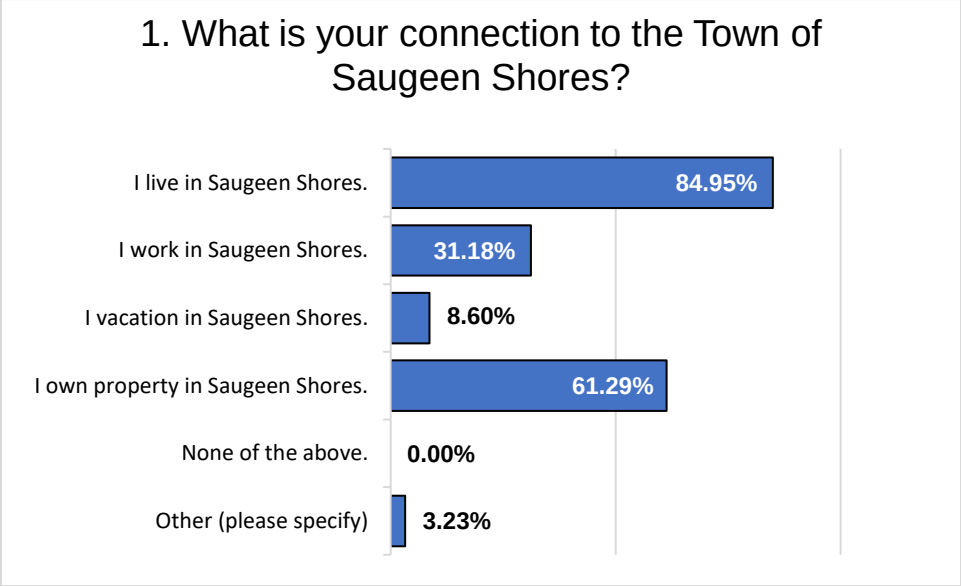

Figure A.1 Survey Question 1

Figure A.1 shows that most of the respondents **live and own property** in Saugeen Shores. Respondents could select multiple answers for this question, resulting in a total greater than 100%.

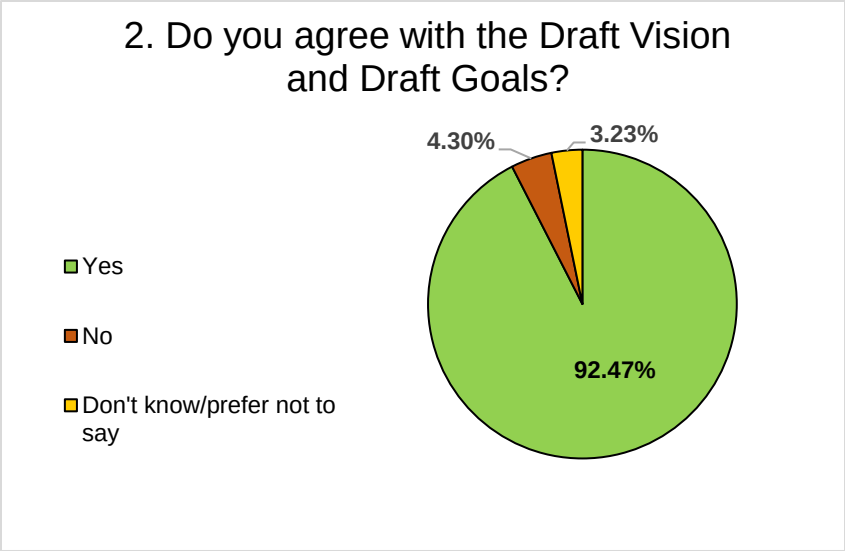

Figure A.2 Survey Question 2

Figure A.2 shows that **most respondents agree** with the Draft Vision and Draft Goals for Saugeen Shores' UTCP.

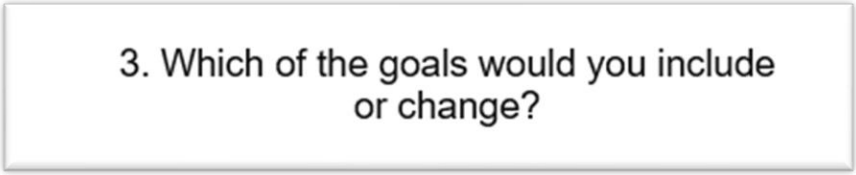

Figure A.3 Survey Question 3

Question 3 allowed for typed/written suggestions from respondents.; 8 answers to this question were recorded. Most comments were neutral in sentiment and provided suggestions for additional draft goals, including regular budget considerations for street trees, general land management to ensure planting spaces continue to be available. Some comments expressed concern over the regulation of trees on private land. The general lack of responses confirms that most respondents agree with the Draft Goals and Vision

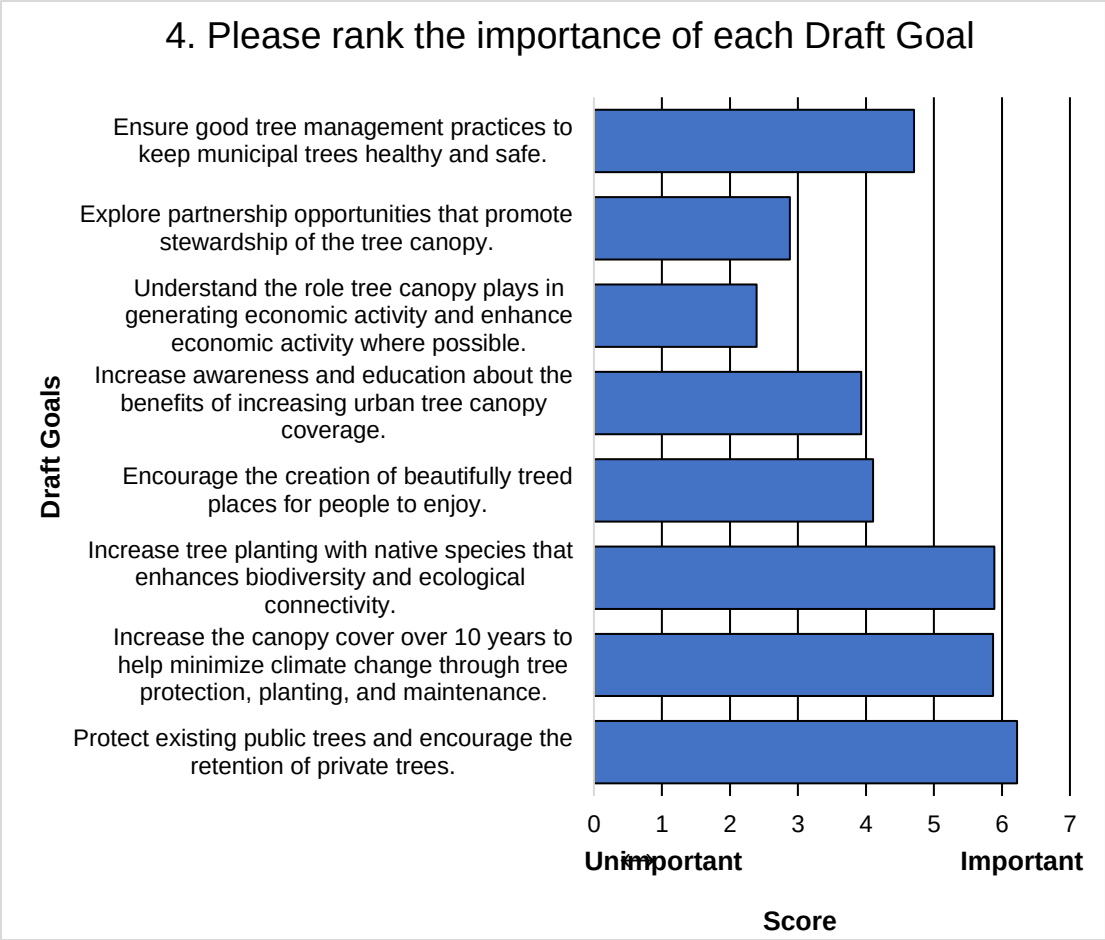

Figure A.4 Survey Question 4

Question 4 asked respondents to rank the draft goals on a scale of 1 to 8. Figure A.4 shows the score of each of the draft goals based on these ranks. A higher score indicates a more important objective.

- Respondents ranked the protection of existing public trees and encouragement of private trees as most important,
- Increasing tree planting with native species and increasing canopy cover over 10 years were the next important goals, with a near-equal ranking of importance,
- Ensuring good tree management practices, the creation of beautiful, treed places and increasing awareness about the benefits of increasing Tree Canopy were somewhat important,
- Exploring partnership opportunities to promote stewardship of the TC was less important, and
- Understanding the economic role of tree canopy and enhancing economic activity were ranked least important by most respondents.

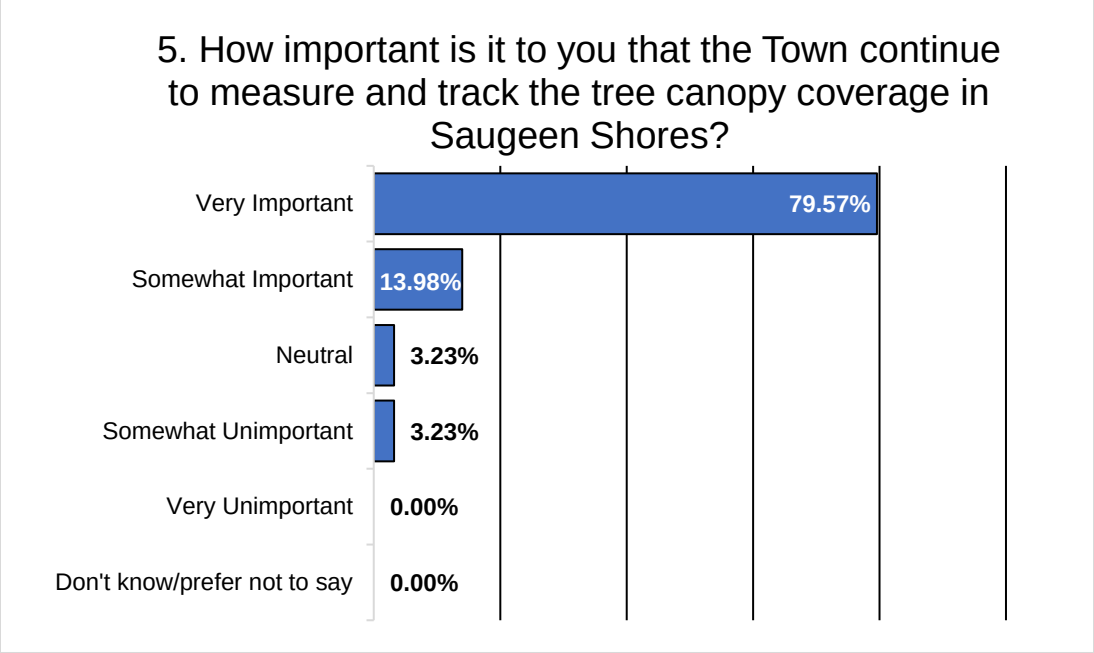

Figure A.5 Survey Question 5

Figure A.5 shows over 90% support for the measuring and tracking of tree canopy coverage in Saugeen Shores.

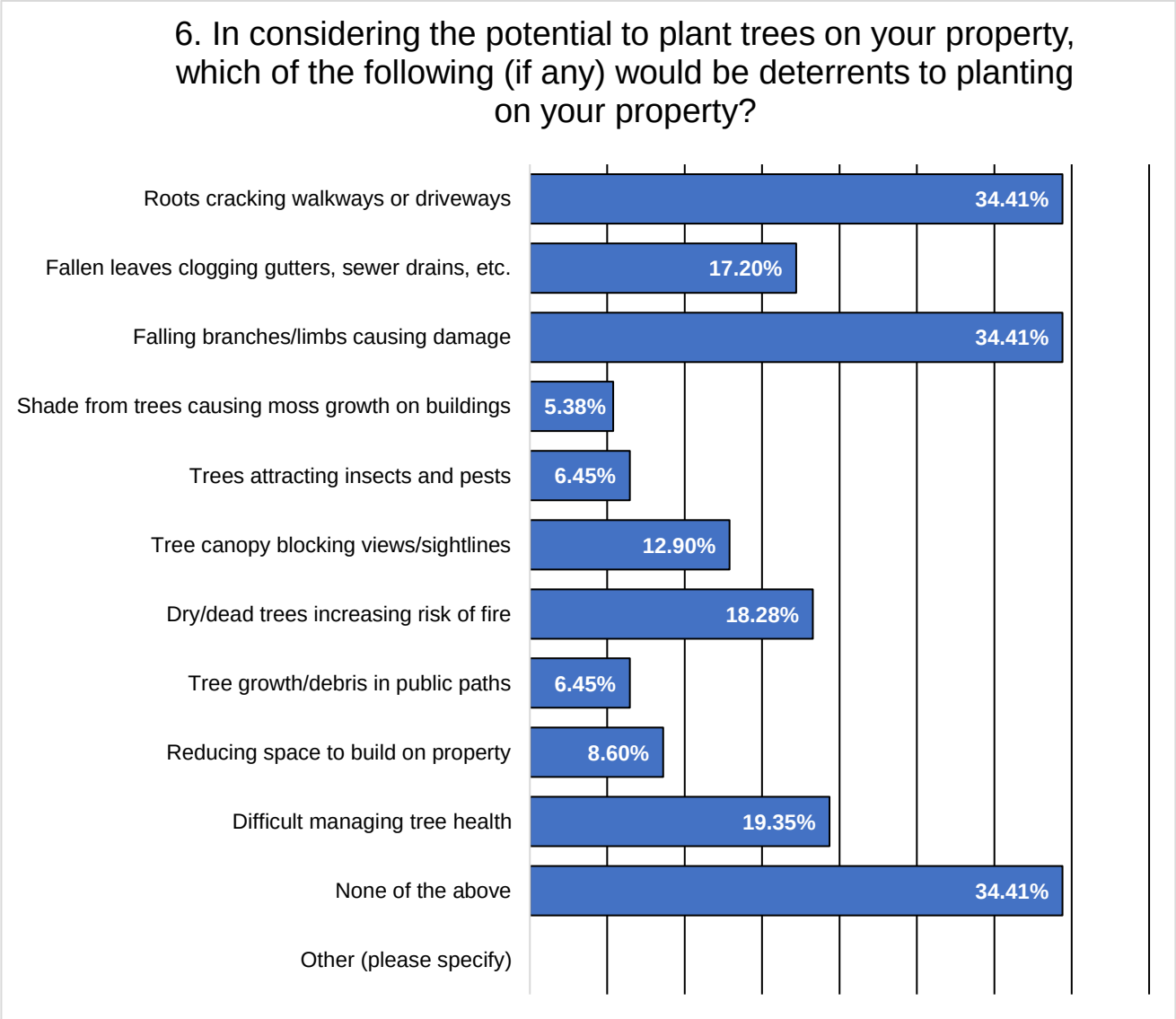

Figure A.6 Survey Question 6

Figure A.6 shows that roughly one-third of respondents were concerned about roots cracking their driveways or falling branches/limbs causing damage when considering deterrents to planting trees on their properties. Another third of respondents had no concern for any of the listed issues. Respondents were least concerned about shade from trees causing moss growth on buildings.

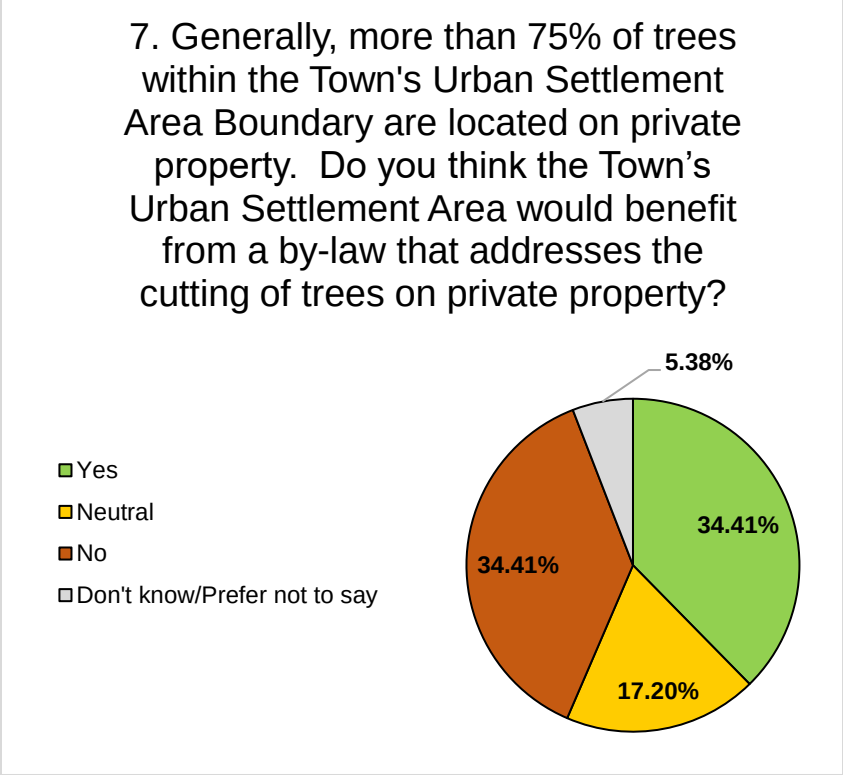

Figure A.7 Survey Question 7

Figure A.7 shows that respondents were split on their support of a bylaw addressing tree cutting on private property. Roughly one-third of respondents were in favour and one-third opposed.

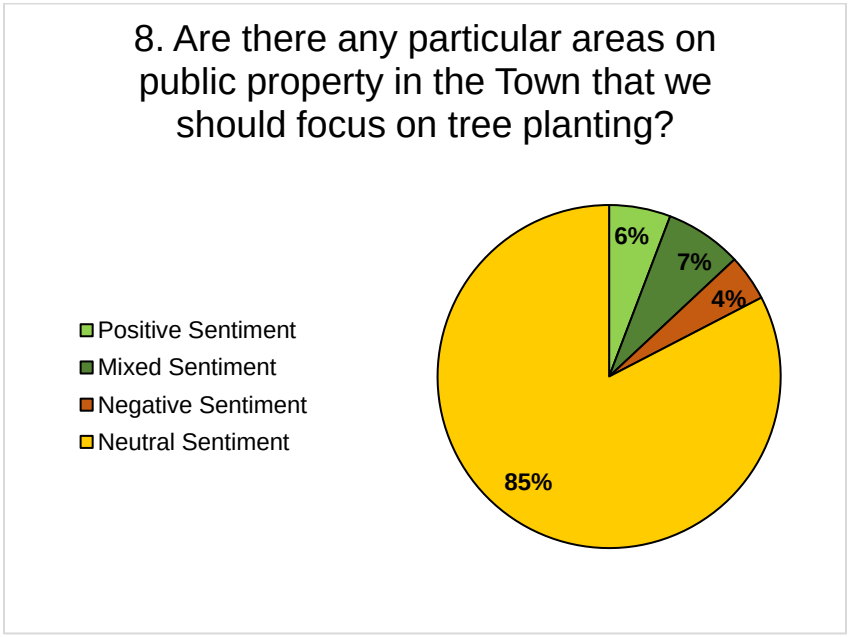

Figure A.8 Survey Question 8

Question 8 allowed respondents to suggest areas on public property throughout Saugeen Shores. Figure A.8 shows the general sentiment of the comments, which were mostly neutral suggestions for suitable locations. Common recommendations include:

- Public parks and facilities
- Road allowances, boulevards, and parking lots – particularly in new developments and in core

business areas.

- Areas along Lake Huron, Saugeen River and other waterbodies to stabilize banks, reduce erosion and stormwater runoff, and provide shade.

Additionally, concerns were expressed over the protection of heritage street trees and the maintenance and tending of newly planted trees. Suggestions for mass plantings in the form of memorial forests, arboretums and microforests were also included in the responses.

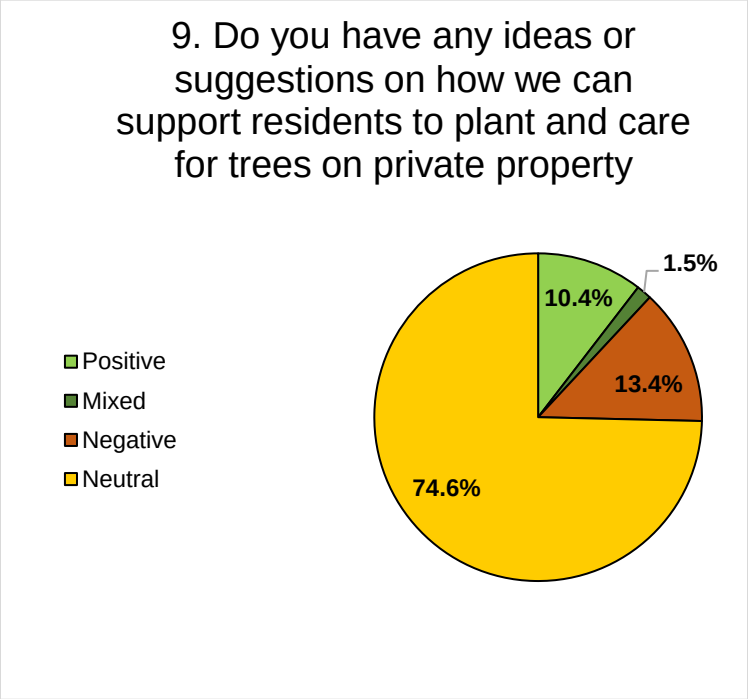

Figure A.9 Survey Question 9

Question 9 allowed responds to suggest ways that the Town can support residential tree planting. Figure A.9 shows the general sentiment of the suggestions. Most of the comment were neutral, offering general suggestions to support residents. Most positive comments praised the Town's Tree Sale, while comments with a negative sentiment lamented the loss of heritage trees and clearcutting by developers.

Suggestions from the survey included:

- Regulation: Create a tree bylaw requiring compensation, require developers to include tree planting in new builds
- Incentives: Tax rebates, offer subsidized seedlings, offer financial assistance for removals of dead or hazardous trees
- Community engagement: encourage neighbourhood tree planting events, create tree ambassador programs, partner with schools to plant trees with students, improve communication and advertisement for the Tree Sale, expanding the Tree Sale into the fall.
- Support services: Offer tree planting services for those with limited mobility, provide education on tree care, offer water and maintenance services for seasonal residents.

Appendix B:

Table B.1 Provincial Statutes and Policies that affect Urban Forestry

Statute or Policy	Relevance
Planning Act, 1990	Establishes the framework for municipal planning in the province. It provides municipalities with the power to develop official plans and regulate development, including requiring landscaping with trees and shrubs on the site and parkland dedication.
Provincial Policy Statement (PPS), 2014	This companion to the *Planning Act* provides guidance for land use planning, protection for significant woodlands, and encourages jurisdictions to integrate green infrastructure, including the urban forest.
Municipal Act, 2001	Allows any municipality to regulate the injury or destruction of trees on public and private lands. It allows the municipality to enter land along its highway to inspect trees and remove trees if they pose a hazard. An upper-tier municipality may delegate all or part of its power to pass a by-law respecting the destruction or injuring of trees in woodlands to one or more of its lower-tier municipalities. An upper-tier municipality may enter into an agreement with any of its lower-tier municipalities for the upper-tier municipality to designate one or more of its officers to enforce by-laws passed by the lower-tier municipality and vice-versa. Section 270 (1) of the *Municipal Act*: A municipality shall adopt and maintain policies with respect to the following matters: On March 1, 2019, subsection 270 (1) of the Act was amended by adding: (see: 2017, c. 10, Sched. 1, s.32): *The manner in which the municipality will protect and enhance the tree canopy and natural vegetation*
Ontario Heritage Act, 1990	Allows for the designation of heritage properties and/or cultural heritage landscapes in the Province, including trees on such lands that may have heritage value.
Forestry Act, 1990	Provides a legal definition for “woodlands” based on stem densities, and “good forestry practices” for tree by-laws, and certain provisions pertaining to boundary/shared trees.
Conservation Authorities Act (1990)	The Conservation Authorities Act (1990) (CA Act) was amended On April 1, 2024. The CA Act authorizes Conservation Authorities and lays out their responsibilities, which have been significantly reduced since 2020. All of Saugeen Shores is within the jurisdiction of the Saugeen Valley Conservation Authority (SVCA)
Endangered Species Act 2007	Applies to species listed as *Endangered or Threatened in the Act*. There are eight terrestrial species noted in Saugeen Shores that are listed as Threatened or Endangered in Ontario; butternut, four turtles, two birds and one snake.
Infrastructure for Jobs & Prosperity Act, 2015	Asset Management Planning (AMP) requirement. O. Reg. 588/17, the regulation defines trees as “Green Infrastructure Assets” or non-core assets that must be included in Asset Management Plans.

Appendix C: Tree Protection and Planting Guidelines

C.1 Protection of Existing Trees

The *Minimum Tree Protection Zone* (TPZ) is the minimum setback required to maintain the structural integrity of the tree's anchor roots, based on generally accepted arboricultural principles. The *Root Protection Zone* (RPZ), also called *Critical Root Zone*, is defined as a circle on the ground corresponding to the dripline of the tree. While the TPZ (below) will protect a tree's anchor root structure, the protected area should be larger to protect the soils surface and root integrity, protected through the construction project.

A TPZ for individual trees that are isolated from denser treed areas should be established using distances between the minimum MTPZ and the RPZ, both specified below. The appropriate Tree Protection Measures would protect the TPZ with similar hoarding/fencing as discussed above. RPZ is an area slightly larger than crown diameter, which includes the most important rooting area for the tree. Usually, the TPZ fencing is somewhere between the minimum TPZ and RPZ. The best is a larger area, but design specs, affected by construction requirements often encroach on those areas.

No unauthorized activities may take place within the TPZ of a tree covered under any municipal permit process or agreement. The following chart shows the TPZ (Niagara Parks). Some trees and site conditions may require a greater setback at the Town's discretion.

Table C. 1 - Minimum Tree Protection Zones

Trunk Diameter (DBH)	Minimum Tree Protection Zone (MTPZ) Distances Required	Root Protection Zone (RPZ) Distances Required
<10 cm	1.8 m	1.8 m
11 – 40 cm	2.4 m	4.0 m
41 – 50 cm	3.0 m	5.0 m
51 – 60 cm	3.6 m	6.0 m
61 – 70 cm	4.2 m	7.0 m
71 – 80 cm	4.8 m	8.0 m
81 – 90 cm	5.4 m	9.0 m
91 – 100+ cm	6.0 m	10.0 m

For trees over 100 cm. DBH, add 10 cm. to the TPZ for each centimeter of DBH.

1. Roots can extend from the trunk to 2-3 times the distance of the drip line.
2. Diameter at breast height (DBH) trunk diameter at 1.37 meters above ground.
3. Tree Protection Zone distances are to be measured from the outside edge of the tree base towards the drip line and may be limited by an existing paved surface, provided the existing paved surface remains intact throughout the construction work.

C.2 Planting Specifications

Archeological Consideration

An archeological assessment of potential tree planting sites should be considered, especially in new projects, with consideration for Indigenous archaeological importance/interest. This would be especially prudent in areas close to Lake Huron or natural water ways.

C.2.1 Locations Specifications

C.2.1.1 Soil Volume – New Projects

Adequate available soil volume is a critical factor for good tree growth and long-term viability. The soil volume available for root growth must be sufficient to support the expected tree size and, should the provided soil volumes be inadequate, design expectations for mature tree size and longevity must be appropriately reduced.

For new tree plantings, 30.0 m^3 of good quality topsoil, with a minimum depth of 750 mm to a maximum depth of 900 mm, should be provided. Trees in common planting areas may share soil volume to a maximum of 15.0 m^3 each.

C.2.1.2 Engineered Soils – CU Structural Soil

CU-Structural Soil™ is a planting medium consisting of 80 percent crushed limestone and 20 percent soil and has been designed for use in areas that need to or will be compacted. Because of the size of the aggregate, engineered soil always provides large soil pore space which is good for tree roots and allows for ready water drainage. Mycorrhizal or other inocula could also be used to enhance soil biology and help with tree establishment and growth.

Engineered soils can also be used with conventional planting techniques. If possible, pavement openings should be expandable (via removable pavers or using a mulched area) for the sake of the anticipated buttress roots of maturing trees. Engineered soils can be used right up to the surface grade down to a minimum of one meter depth. One problem that has been attributed to engineered soil is that it lacks real soil volume to sustain tree growth over an expected life span because it is 20 percent soil and 80 percent crushed limestone by volume. However, engineered soil is also an option for creating break-out zones under pavement for trees in narrow tree lawns to allow roots to travel to adjacent soft landscapes. Anecdotal evidence suggests that coarse aggregate used as backfill around utility trenches or subdrains functions similarly to engineered soil in that it provides a rooting environment or allows roots to travel to other soil volumes. For these reasons, it would be appropriate to use under sidewalks to create a break-out zone for boulevard trees to access soil volumes in front yard areas. Due to the large amount of aggregate contained in engineered soil, only 20% of its total volume will be credited towards the minimum soil volume requirements.

C.2.1.3 Soil Cells

Soil cells is designed to secure adequate tree habitat, support sidewalks and other hard surface treatments and provide on-site stormwater management. Soil cell systems are installed below grade, backfilled with topsoil, and are capped with a hard surface. For example, a sidewalk becomes, in effect, a floating roof over the rooting space. The modular framework provides uncompacted soil volumes for large tree growth and (potentially) unlimited access to healthy soil - a critical component of tree growth in urban environments - allowing them to manage stormwater, reduce heat-island effect, and improve air quality. In some situations, “caged/PVC” structures (like Silva Cell) use may be prescribed for use only under sidewalks or driveways, as a bridge or link for tree roots to grow into ‘breakout’ areas with greater soil volumes such as lawns or other soft surface areas.

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Gray, Meet Green: Silva Cell 2 Seminar

This seminar will review existing Silva Cell installations to demonstrate how the system can provide adequate volumes of soil for street trees and on-site stormwater management underneath sidewalks, plazas, parking lots, and parking lay-bys – all while meeting engineering requirements for vehicle loading and utilities infrastructure.

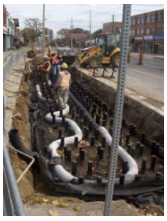
You need approx. 28 m^3 (1,000 ft^3) of soil to grow a 40cm (16"DBH-35' canopy) tree. Such a tree can provide significant environmental benefits and cost savings by cleaning the air, reducing heat-island effect, and shading buildings. The 28 m^3 of soil in which the tree grows can also store 5.6 m^3 of water, meaning that the Silva Cell system can be designed to treat all the stormwater from a 3.8 cm, 24 hour storm event directly on-site.

Silva Cell 2

At this seminar you will learn:

- How the Silva Cell system can be designed to treat water quality, retention, and detention
- Target soil volumes for mature tree growth and on-site stormwater management
- The importance of soil to healthy tree growth
- How to bring "green infrastructure" to your project using the Silva Cell
- Setting Performance Standards for Soil Cells

The TRCA has approved the Silva Cells as a equivalency to bioretention



2009

2013

Silva Cell installation at the Queensway in Toronto, ON.
For more information visit www.deeproot.com

Figure C.1 - Silva Cell Caged/PVC Structures

C.2.1.4 Setbacks and Inter-Tree Spacing

Setbacks when siting plant material on streets and active parks should ensure adequate space be provided to accommodate normal long-term growth both above and below ground. Consider the potential negative impacts of providing insufficient space, such as injury to pedestrians, damage to property, increased maintenance expenses, and poor landscape performance.

Tree spacing should reflect the projected canopy size based on the species selected and its growing environment:

Table C.2. Tree species stature and minimum spacing for street trees

Stature Size	Minimum Spacing (m)	Stature Adjacent
Large Stature	8m	Large Stature

Large Stature	6m	Medium Stature
Large Stature	6m	Small Stature
Medium Stature	6m	Large Stature
Medium Stature	6m	Medium Stature
Medium Stature	6m	Small Stature
Small Stature	6m	Large Stature
Small Stature	6m	Medium Stature
Small Stature	6m	Small Stature

To accommodate the base of the tree, space should be provided for tree openings that are at least:

A. 3.0 m wide for a large stature tree
B. 2.5 m wide for a medium stature tree
C. 2.0 m wide for a small stature tree

These minimums could be reduced if enhanced rooting techniques are employed that mitigate possible damage to the surrounding landscape while providing for the long-term growth of the tree.

Where underground services or utilities are present/proposed, consider the potential negative impacts to the base of the tree should future maintenance require soil excavation near the tree.

To mitigate this and other risks, trees should not be planted within:

A. 1.0 m of the edge of a utility or service easement that is 3.0 m in width or greater.
B. 2.5 m of any underground utility or service, where space permits. However, at a main and lateral intersection a 2.0 m setback should be maintained.
C. 3.0 m of a transformer or hydrant

Local utility companies should be contacted for further information when planting, or proposing other works, near utilities.

To respect the crown of the tree, trees should not be planted:

A. within 10 m of a stop sign
B. where the growing canopy may contact buildings, structures, or fencing.
C. where growing canopy may come within 3.0 m of a primary power line or within 1.0 m of a secondary power line or communication asset.
D. overhanging pedestrian areas if it is a species that drop fruit or seed pods/nuts.

Table C.3 – Tree Setbacks

TREE SETBACKS	
FACILITY	***DISTANCE (M)***

DRIVEWAYS	***1.0 - 1.5***
STORM/ SANITARY CONNECTIONS	***1***
RLCB LEADS	***1***
CURB OR WALKWAY	***1***
FIRE HYDRANTS	***3***
PAD MOUNTED TRANSFORMERS	***3***
STREETLIGHTS	***5 FOR LARGE STATURE, 3 FOR SMALL STATURE***
BUS STOPS	***3***
REGULATORY SIGNS	***3***
STOP SIGNS	***10***

Daylight Triangle Maintain the 10m distance from corner of intersection to respect the Daylight Triangle and ensure proper clearance for traffic.

Hydro Lines Species selection under hydro lines is critical to avoid long term management challenges and higher than average pruning requirements. Refer to Appendix A for estimated heights at maturity per species.

Heights at maturity should leave at least a 1m buffer from lowest electrical line height, unless offset from under the line by half the mature canopy width.

C.2.2 Layout

The final planting location is to be marked on site for “field approval” by the Town. With utility or development project, it is the Constructor’s responsibility to obtain utility locates prior to marking final planting locations.

C.3 Planting Materials Specifications

3.3.1 Species and Standards of Trees

Species and cultivars of trees, as well as the standard for that species and cultivar, should conform to the Canadian Standards for Nursery Stock, Canadian Nursery Landscape Association, as revised.

C.3.2 Species Selection (Diversity)

The amount of species variation will depend on the number of trees to be planted.

Utilize the 5-10-15 guideline to increase species diversity. No more than 5% of any one species, 10% of any one genus, or 15% of any family.

A minimum of 30% of the trees planted on a site should be native tree species. Refer to Appendix A. Locally rare native species may be accepted on a case-by-case basis. Cultivars of native trees should not be credited towards the minimum 30% requirement.

Invasive species should not be planted, especially near natural areas. Refer to Appendix B.

Species selection should reflect the site conditions, such as soil and light conditions, drainage, slope, aspect, moisture level and salt exposure. Use of locally sourced plant material is recommended.

Species selection and arrangement should consider ecosystem function and health and provide visual interest through diversity and seasonal variety.

Artificial plant materials are not recommended.

C.3.3 Stature

Tree stature (i.e., small, medium, large) by species is based on projected canopy spread. This does not account for differing forms, such as columnar or fastigiate, that are being increasing used on the landscape. This can result in an over- or under-estimate of potential canopy contribution, because of not fully recognizing the species characteristics.

Appendix A includes the stature value assigned to species and cultivars/varieties when appropriate. This value assigned is based on estimated canopy volume.

C.3.4 Origin and Hardiness Zones

The geographical origin (seed zone) of where seed or cuttings used to produce the trees should be considered when developing planting plans. If the plant material is from an area that is climatically different than Port Colborne, it should be refused.

C.3.5 Planting Specifications

Planting spots should be marked two-weeks in advance to allow for required locates.

Consideration for Indigenous archaeological importance/interest. This would be especially prudent in areas close to current or historical navigable water ways.

C.3.5.1 Residential Street Trees

Large-stature trees should not be planted in boulevards with less than 1.75 m between sidewalk and curb.

Trees should be planted house side of the road allowance, midway between the sidewalk and property line or 1-m from the property line.

Planting locations should be marked by the Project Manager or designate with spray paint in the form of a "T" or "T2" etc., on the sidewalk and an “X” where the tree is to be.

"T2" indicates a distance of 2.0 meters etc. from the mark for tree planting.

- On streets without sidewalks, planting locations should be indicated with spray paint in the form of a “T” or T2” etc. on the curb.

- If there is no sidewalk or curb, the planting locations should be marked with "T" indicates on the spot for the tree to be planted.

C.3.5.2 Park Trees / Naturalization Planting

Planting location maps to be supplied, and locations marked in the field with the appropriate method. Trees to be planted in the parks, pond and retention pond, woodlot rehabilitation plantings etc. should be on a GIS map and given to the planting foreman planting. Planting locations of caliper stock should be spray painted with an “X” for each tree location.

C.3.5.3 Planting Holes

For residential street trees, the planting hole must be at least 30 cm from the edge of

the ball/container.

- The depth of the hole should be dependent not only on the depth of the ball/container, but also on soil conditions.
- For park trees / naturalization planting, the planting hole must be at least 60 cm from the edge of the ball/container.
- The depth of the hole should be dependent not only on the depth of the ball/container, but also on soil conditions.

Planting diagrams for conifer and broadleaf trees are in Figures A.2 and A.3.

C.3.5.4 Excavation

Remove subsoil, rocks, roots, debris, and toxic material from excavated material that should be used as planting soil for trees. Dispose of excess material. Scarify sides of planting hole to allow water flow and rooting access.

All Hydro-vac operations must be compliant with the safe practices prescribed for such equipment as published by the Electrical and Utilities Safety Association. The contractor is responsible for sub-contracting this function if required. The Town may make an exception and allow for sub-contracting of the trenchless technology; however, the sub-contractor is not permitted to plant trees.

Note: Regardless of the method used to dig, under no circumstances should equipment be permitted to be set up on residential driveways and front lawns. Access to planting sites is to be from the public boulevard or road.

C.3.5.5 Tree Placement

Place supplied trees within the excavated hole in the upright position.

- When clay subsoil or firmly packed subsoil (compacted and/or poorly drained) is encountered, at least 20 cm of excavated subsoil must be left between the bottom of the ball and the bottom of the planting hole.

- In moist, well-drained soils, set the root ball so that the root collar is exactly at finished grade. In sandy or droughty soils, set the root ball so that the root collar is slightly deeper than finished grade.
- The wire basket and burlap should be removed, unless otherwise approved in writing by the Project Manager or designate.

C.3.5.6 Backfilling and Initial Watering

Backfilled soil is to be placed to bring the top level of the root ball 8.0 cm higher than the existing surrounding grade to allow for settling.

- Backfill is to be placed in layers approximately 15 cm in depth and firmly tamped in place in such a manner that the tree retains its vertical position without support.
- Particular care is to be taken to ensure that no air pockets remain under or around roots and that damage does not occur to the root system.
- The fill shall be thoroughly watered immediately after planting. Water plant material thoroughly and in such a way as to prevent surface erosion.

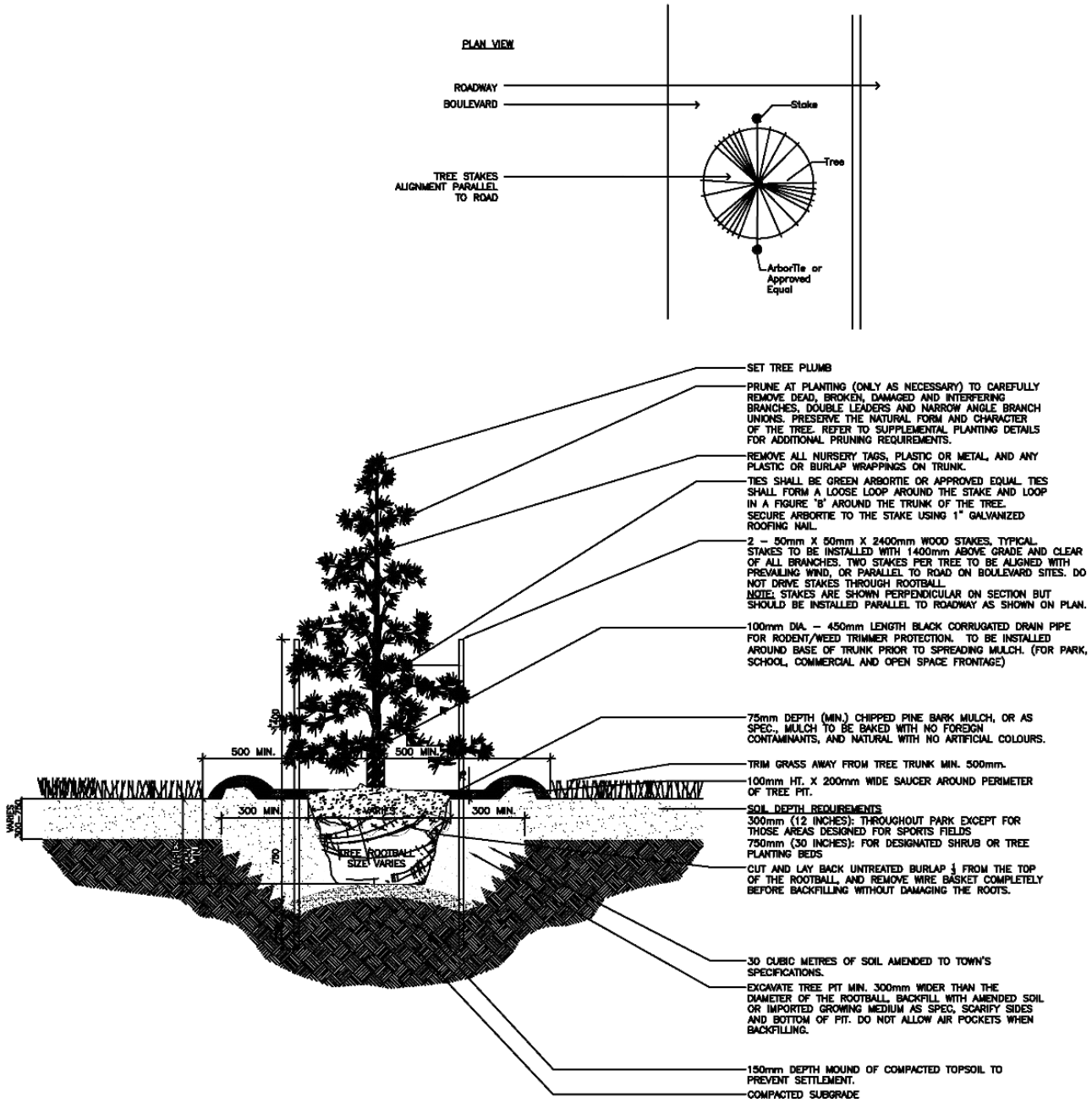


Figure C. 2 - Conifer Planting Diagram

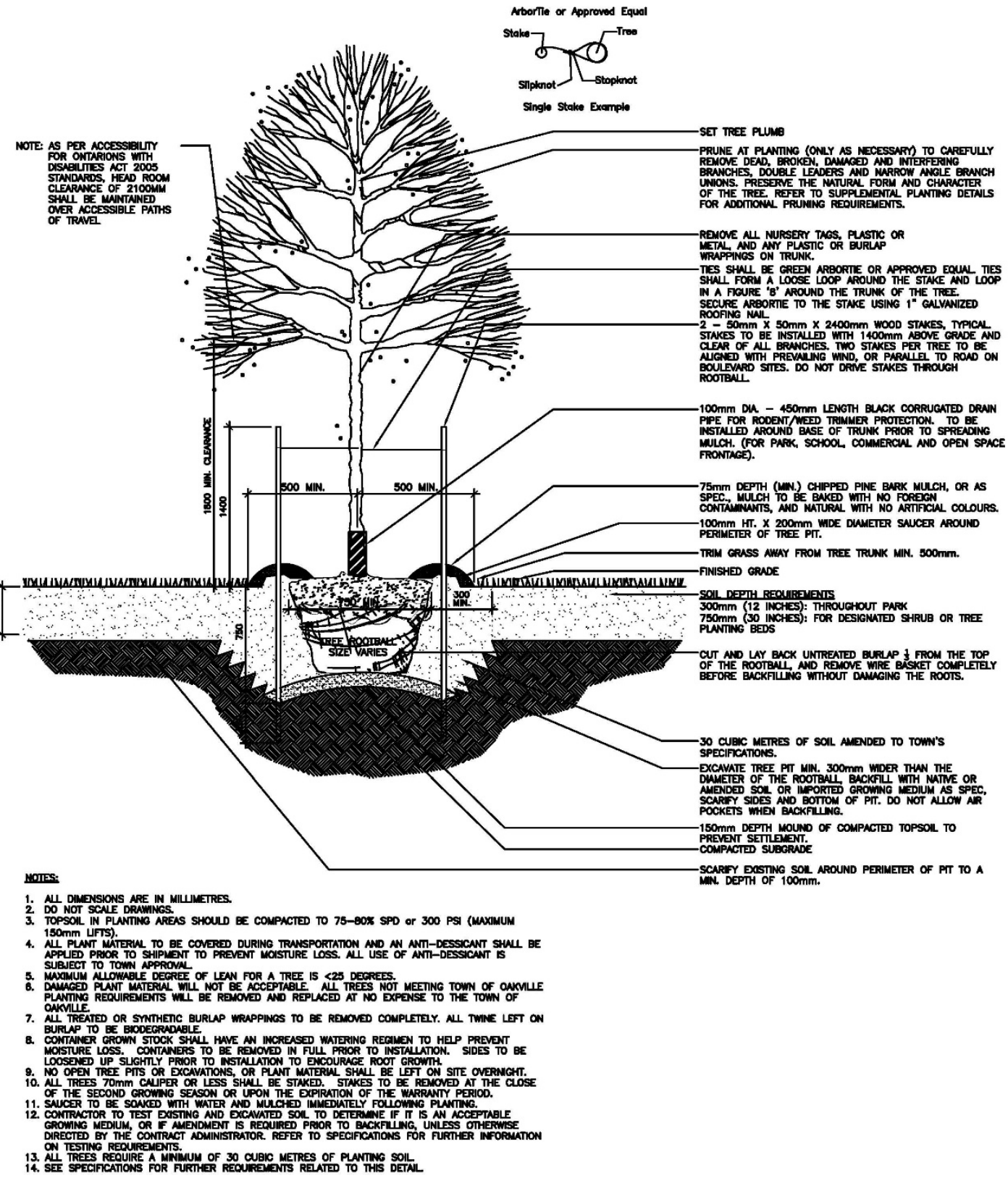


Figure C. 3 - Planting Diagram

- When using backfill, choose the appropriate backfill for the site's soil conditions i.e., in clay soils backfill with the clay-loam specifications, in sandy soils backfill with the sandy-loam specifications as listed below.

- At grade, a ridge of soil located at the edge of the planting hole shall be formed to a height of 9 cm, to act as a catch basin for any subsequent watering's and to retain mulch.
- All non-porous containers shall be removed, including the entire wire basket. If a fiber or peat pot remains, it must not be left above the soil surface as this promotes "wick" evaporation.

Backfill composition specifications are as follows:

Table C. 4 - Backfill Composition Specifications

Soil Texture	**Sand%**	**Silt%**		**Clay%**
Clay-loam	20-46	20 - 50		27- 40
Sandy-loam	55-80	5 - 28		0- 20

Clay soil contains minimum 4% organic matter.
Sandy soil contains minimum 2% organic matter.
Acidity of topsoil mixture to range between 6.0pH to 7.5pH.
Topsoil mixture to be free of sub-soil, stones, roots, and any foreign objects.

C.3.5.7 Pruning

- The crown of the tree shall be pruned from the bottom up at the time of planting to remove all dead and damaged branches.
- The terminal or leader is not to be pruned unless broken, leader shall not be removed. All cuts shall be made using approved standards and Guidelines for pruning set out by the ANSI A300 pruning standards (2001 Edition) as updated from time to time, and the Illustrated Guide to Pruning, 2nd Edition (2002 ISA) as updated from time to time, leaving no stubs.
- On all cuts over 2 cm in diameter and bruises or scars on the bark, the injured cambium shall be traced back to living tissue and removed.
- Pruning wounds shall be smoothed and shaped so as not to retain water. Only clean, sharp tools shall be used. All cuts shall be clean. Branches should be cut at the branch-collar, leaving no stubs.
- Large wounds produced by any means other than branch pruning may render the tree unacceptable, requiring replacement subject to the directions of the Project Manager or designate.
- Planted material may be found unacceptable and require replacement upon inspection by Project Manager or designate.

C.3.5.8 Staking

All balled and burlapped trees shall, immediately after planting, be supported by two wooden stakes, pointed on one end 5 cm x 5 cm x 15 cm (2 in x 2 in x 6 in) driven outside the ball parallel to the road.

- When staking in parks they must be in line with the direction of the prevailing wind (**west to east**).
- For balled and burlap trees, this type of tree, B/B, the stakes are to be driven at least 70 cm below grade line.
- The stakes must be driven deep enough that there is at least 5 cm between the top of the stakes and the first branch.
- Stake placement shall be such that no main roots are severed by the stake being driven into the ground. Metal stakes are prohibited.

C.3.5.9 Tree Ties (Guying Material)

- Ties shall be made from a flat polypropylene material (tree guying cable), approved by the Project Manager, or designate prior to the contract commencing.
- The guying must be intertwined around the tree and must be firmly secured to the wooden stake in a way to prevent them from coming loose or moving down the tree.
- An approved equivalent guying material can be utilized at the sole discretion of the Project Manager or designate.
- For B/B and container stock trees where the two stakes are driven into the ground outside the root ball, the tension must be such that the tree is firmly, but not too tightly, supported, remaining in a vertical position.

C.3.5.10 Mulching

- Non-shredded woodchips from tree and woody brush sources measuring between 2.5 cm and 5.0 cm in width and placed to a depth of between 5.0 cm to 7.5 cm spread the following distance from the root collar:
- Caliper (mm) Average radius from root collar (cm) 50 and greater 110 cm
- Mulch should form a flattened donut around the tree rather than a cone. Woodchips must be close, but not in contact with the tree trunk.
- Mulch must be applied no later than 48 hours after planting.
- Mulch should be a consistent and natural colour.

C.3.5.11 Tree Wrapping and Tree Guards

- The contractor is to remove all tree wrapping upon planting of the tree. The Contractor should:
- Install a plastic tree guard (in parks, median, berms and Blvd.) that is the appropriate height to prevent damage to the base of the tree i.e., from grass cutters and mowers.
- These tree guards should be made of plastic (black perforated corrugated drainpipe 15 cm diameter 30 cm in height (6-inch diameter 12 inches in height)) and be cut from one end to the other to allow the stem to grow.
- Tree guards are not required when planting on house side of the sidewalk.

C.3.5.12 Removal of excess tags and other material

All excess materials, such as nursery tags or other items attached to planting stock, should be removed immediately after planting.

C.3.5.13 Restoration

Any site damage should be restored to pre-construction condition to the satisfaction of the Project Manager or designate.

- All disposal of excess material, off site in an approved disposal site.
- Broom cleaning of pavement, concrete and sidewalks.
- Raking grass to ensure it is free of planting materials and/or loam.
- Leave site in a neat condition.

C.3.5.14 Disposal

Woody materials should be disposed of within Halton Region to limit the spread of Emerald Ash Borer (EAB) or other insect or disease pests.

C.3.6 Post Plant Care

C.3.6.1 Post Plant Watering

Watering shall be carried out when required and with enough water to prevent plants and underlying growing medium from drying out, until such time as approved by the Project Manager or designate.

C.3.6.2 Fertilizing

The Contractor should be required to add granular fertilizer before the mulch layer is applied. A granular fertilizer mixture (slow release) with a blend of 6-15-23 A.19 Mg 0.13B 0.5Zn should be used, unless approved by the Project Manager.

C.3.6.3 Additional Watering

The Project Manager may require that a watering schedule be implemented to supplement the work done by Town forestry staff using the following specification:

- 10 gallons of water per tree every week for trees located on sandy soils.
- Every 2 weeks for trees located on clay soils.
- Surface watering should be used rather than a watering probe.
- For additional watering over and above the scope of work outlined within this tender, additional watering requirements should be made to group to provide a reasonable daily volume of work.

Appendix D1: Tree Planting List and Species Preference

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Apple, common		*Malus*	*pumila*	No	X	Y	7	7	Small
Aspen, Large-toothed		*Populus*	*grandidentata*	Yes	X	Y	18	12	Large
Aspen, Trembling		*Populus*	*tremuloides*	Yes	X	Y	10	5	Small
Basswood		*Tilia*	*americana*	Yes	X	Y	27	13	Large
Beech, Blue		*Carpinus*	*caroliniana*	Yes	X	Y	8	6	Small
Beech, Dawyck Gold	'Dawyck Gol	*Fagus*	*sylvatica*	No	X	Y	16	2	Small
Beech, Dawyck Purple	'Dawyck Pur	*Fagus*	*sylvatica*	No	X	Y	8	2	Small
Beech, European		*Fagus*	*sylvatica*	No	X	Y	15	12	Large
Beech, Purple Fountain	'Purple Foun	*Fagus*	*sylvatica*	No	X	Y	6	4	Small
Beech, Red Obelisk	'Red Obelisk	*Fagus*	*sylvatica*	No	X	Y	13	4	Small
Beech, Tri-colour	'Rosea-Marg	*Fagus*	*sylvatica*	No	X	Y	13.5	8	Medium
Birch, Cherry		*Betula*	*lenta*	Yes	X	Y	15	12	Large
Birch, European White		*Betula*	*pendula*	No	X	Y	15	10	Medium
Birch, Gray		*Betula*	*populifolia*	Yes	X	Y	10	6	Small
Birch, River		*Betula*	*nigra*	Yes	X	Y	13	10	Medium
Birch, White (Paper)		*Betula*	*papyrifera*	Yes	X	Y	18	10	Large
Birch, Yellow		*Betula*	*alleghaniensis*	Yes	X	Y	18	15	Large
Black Gum		*Nyssa*	*sylvatica*	Yes	v	Y	13.5	8.5	Medium
Buckeye, Ohio		*Aesculus*	*glabra*	Yes	v	Y	13.5	13.5	Large
Catalpa, Northern		*Catalpa*	*speciosa*	Y-USA	X	Y	12	6	Small
Cedar, Black	'Nigra'	*Thuja*	*occidentalis*	Yes	X	Y	5	1.5	Small
Cedar, Eastern Red Hills	'Hillspire'	*Juniperus*	*virginiana*	Yes	X	Y	12	4	Small
Cedar, Eastern White		*Thuja*	*occidentalis*	Yes	X	Y	20	3	Small
Cedar, Emerald	'Emerald'	*Thuja*	*occidentalis*	Yes	X	Y	4	1	Small
Cherry, Black		*Prunus*	*serotina*	Yes	X	Y	15	6	Medium
Cherry, Choke		*Prunus*	*virginiana*	Yes	X	Y	5	5	Small
Cherry, Kwanzan	'Kwanzan'	*Prunus*	*serrulata*	No	X	Y	7	5	Small
Cherry, Pin		*Prunus*	*pensylvanica*	Yes	X	Y	8	8	Medium
Chestnut, Amercian		*Castanea*	*dentata*	Yes	X	Y	18	18	Large
Cottonwood, Black		*Populus*	*trichocarpa*	Y-USA	X	Y	27	21	Large
Cottonwood, Eastern		*Populus*	*deltoides*	Yes	X	Y	27	21	Large
Crabapple	'Prairie Fire'	*Malus*		No	X	Y	7	7	Small
Crabapple	'Royal Raind	*Malus*		No	X	Y	7	7	Small
Crabapple	'Sargent'	*Malus*		No	X	Y	7	7	Small
Crabapple	'White Angel'	*Malus*		No	X	Y	7	7	Small
Cucumber Tree		*Magnolia*	*acuminata*	Yes	X	Y	16	16	Large
Cypress, Bald		*Taxodium*	*distichum*	Y-USA	X	Y	20	8	Medium
Elm, Accolade	wilsoniana	*Ulmus*	*japonica*	No	v	Y	23	20	Large
Elm, White	'Princeton'	*Ulmus*	*americana*	Yes	v	Y	21	15	Large
Elm, White	'Valley Forge	*Ulmus*	*americana*	Yes	v	Y	21	21	Large

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Fir, Balsam		*Abies*	*balsamea*	Yes	X	Y	15	6	Medium
Fir, Douglas		*Pseudotsuga*	*menziesii*	Y-BC	v	Y	20	5	Medium
Fir, White		*Abies*	*concolor*	Y-USA	v	Y	14	6	Medium
Ginkgo (Maidenhair)		*Ginkgo*	*biloba*	No	v	Y	17	11	Large
Ginkgo, Autumn Gold	'Autumn Gol	*Ginkgo*	*biloba*	No	v	Y	10	10	Medium
Ginkgo, Golden Colonac	'JFS-UGA2'	*Ginkgo*	*biloba*	No	v	Y	13	7.5	Medium
Ginkgo, Princeton Sentry	'Princeton Se	*Ginkgo*	*biloba*	No	v	Y	13	5	Small
Hackberry		*Celtis*	*occidentalis*	Yes	v	Y	20	18	Large
Hazelnut, Turkish		*Corylus*	*colurna*	No	v	Y	15	8	Medium
Hemlock, Eastern		*Tsuga*	*canadensis*	Yes	X	Y	20	5	Medium
Hickory, Bitternut		*Carya*	*cordiformis*	Yes	X	Y	25	20	Large
Hickory, Pignut		*Carya*	*glabra*	Yes	X	Y	17	8	Medium
Hickory, Shellbark		*Carya*	*laciniosa*	Yes	X	Y	23	15	Large
Hop tree		*Ptelea*	*trifoliata*	Yes	X	Y	5	5	Small
Hornbeam, Euro. Pyram	'Fastigiata'	*Carpinus*	*betulus*	No	X	Y	12	5	Small
Hornbeam, European		*Carpinus*	*betulus*	No	X	Y	17	12	Large
Horsechestnut		*Aesculus*	*hippocastanum*	No	Y	Y	12	12	Medium
Horsechestnut, Double		*Aesculus*	*baumannii*	No	Y	Y	15	12	Large
Horsechestnut, Red	'Briotii'	*Aesculus*	*x carnea*	No	Y	Y	12	12	Medium
Ironwood (hop-hornbeam)		*Ostrya*	*virginiana*	Yes	Y	Y	12	8	Medium
Katsura, Japanese		*Cercidiphyllum*	*japonicum*	No	X	Y	15	4	Small
Kentucky Coffee Tree	'Expresso'	*Gymnocladus*	*dioicus*	Yes	Y	Y	15	10	Medium
Kentucky Coffee Tree		*Gymnocladus*	*dioicus*	Yes	Y	Y	17	13	Large
Larch, European		*Larix*	*decidua*	No	X	Y	15	7	Medium
Lilac, Japanese Tree	'Ivory Silk'	*Syringa*	*reticulate*	No	Y	Y	8	4	Small
Linden, Little-leaf		*Tilia*	*cordata*	No	X	Y	17	20	Large
Locust, Honey	Streetkeeper	*Gleditsia*	*triacanthos*	Yes	Y	Y	15	7	Medium
Locust, Honey	Shademaster	*Gleditsia*	*triacanthos*	Yes	Y	Y	17	10	Medium
Locust, Honey	Skylilne	*Gleditsia*	*triacanthos*	Yes	Y	Y	15	13	Large
Locust, Honey	Sunburst	*Gleditsia*	*triacanthos*	Yes	Y	Y	15	13	Large
Locust, Honey		*Gleditsia*	*triacanthos*	Yes	Y	Y	17	10	Medium
Maple, Amur	Ruby Slipper	*Acer*	*ginnala*	No	Y	Y	6	6	Small
Maple, Armstrong	'Armstrong'	*Acer*	*rubrum*	Yes	Y	Y	20	5	Medium
Maple, Autumn Spire	'Autumn Spi	*Acer*	*rubrum*	Yes	Y	Y	16	8	Medium
Maple, Black		*Acer*	*nigrum*	Yes	Y	Y	20	15	Large
Maple, Celebration	'Celebration'	*Acer*	*x Freemanii*	Yes	Y	Y	14	6	Medium
Maple, 'Columnar'	'Columnare'	*Acer*	*rubrum*	Yes	Y	Y	15	5	Small
Maple, Freemanii		*Acer*	*x Freemanii*	Yes	Y	Y	16	13	Large
Maple, Freemanii	'Jeffersred'	*Acer*	*x Freemanii*	Yes	Y	Y	16	13	Large
Maple, Hedge		*Acer*	*campestre*	No	Y	Y	10	10	Medium
Maple, Paperbark		*Acer*	*griseum*	No	Y	Y	7	5	Small
Maple, Red	'Brandywine'	*Acer*	*rubrum*	Yes	Y	Y	10	4	Small
Maple, Red		*Acer*	*rubrum*	Yes	Y	Y	16	15	Large
Maple, Red Sunset	'Red Sunset'	*Acer*	*rubrum*	Yes	Y	Y	18	12	Large

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Maple, Scarlet Sentinal	'Scarlet Sent	*Acer*	*rubrum*	Yes	Y	Y	15	8	Medium
Maple, Silver	'Silver Queen	*Acer*	*Saccharinum*	Yes	Y	Y	16	13	Large
Maple, Silver		*Acer*	*saccharinum*	Yes	Y	Y	18	15	Large
Maple, Sugar	'Green Mour	*Acer*	*saccharum*	Yes	Y	Y	22	17	Large
Maple, Sugar		*Acer*	*saccharum*	Yes	Y	Y	20	15	Large
Maple, Sugar 'Columnar	'Columnare'	*Acer*	*saccharum*	Yes	Y	Y	20	4	Small
Maple, Tartarian		*Acer*	*tataricum*	No	Y	Y	5	6	Small
Maple, Tartarian	Hotwings'	*Acer*	*tataricum*	No	Y	Y	7	6	Small
Mountain-Ash, American		*Sorbus*	*americana*	Yes	X	Y	6	6	Small
Mountain-Ash, Showy		*Sorbus*	*decora*	Yes	X	Y	7	6	Small
Mulberry, Red		*Morus*	*rubra*	Yes	X	Y	12	12	Medium
Mulberry, white		*Sorbus*	*alba*	Yes	X	Y	12	12	Medium
Oak, Black		*Quercus*	*velutina*	Yes	Y	Y	20	20	Large
Oak, Bur		*Quercus*	*macrocarpa*	Yes	Y	Y	18	13	Large
Oak, Chinquapin		*Quercus*	*muehlenbergii*	Yes	Y	Y	15	15	Large
Oak, English	'Skinny Gene	*Quercus*	*robur*	No	Y	Y	15	3	Small
Oak, English		*Quercus*	*robur*	No	Y	Y	18	13	Large
Oak, English	'Skyrocket'	*Quercus*	*robur*	No	Y	Y	20	5	Medium
Oak, English Pyramidal	'Fastigiata'	*Quercus*	*robur*	No	Y	Y	15	5	Small
Oak, Pin		*Quercus*	*palustris*	Yes	Y	Y	20	13	Large
Oak, Red		*Quercus*	*rubra*	Yes	Y	Y	16	15	Large
Oak, Red Kindred Spirit	'Bicolor Nadl	*Quercus*	*rubra*	Yes	Y	Y	10	2	Small
Oak, Shumard		*Quercus*	*shumardii*	Yes	Y	Y	12	12	Medium
Oak, Swamp White		*Quercus*	*bicolor*	Yes	Y	Y	15	15	Large
Oak, White		*Quercus*	*alba*	Yes	Y	Y	20	20	Large
Orange, Osage		*Maclura*	*pomifera*	Y-USA	X	Y	12	12	Medium
Orange, Osage	'White Shield	*Maclura*	*pomifera*	Y-USA	X	Y	12	12	Medium
Pagoda Tree, Japanese		*Sophora*	*japonica*	No	X	Y	22	20	Large
Pawpaw		*Asmina*	*triloba*	Yes	X	Y	6	4.5	Small
Pear		*Pyrus*		No	X	y	9	9	Medium
Pine, Austrian		*Pinus*	*nigra*	No	X	Y	18	15	Large
Pine, Eastern White		*Pinus*	*strobus*	Yes	Y	Y	24	11	Large
Pine, Eastern White	Pyramidal 'F	*Pinus*	*strobus*	Yes	X	Y	15	2.5	Small
Pine, Red		*Pinus*	*resinosa*	Yes	Y	Y	20	10	Large
Planetree, Exclamation	'Morton Circle	*Platanus*	*x acerifolia*	No	Y	Y	16	10	Medium
Planetree, London		*Platanus*	*x acerifolia*	No	Y	Y	20	20	Large
Planetree, London	'Bloodgood'	*Platanus*	*x acerifolia*	No	Y	Y	16	13	Large
Poplar, Balsam		*Populus*	*balsamifera*	Yes	X	Y	13	6	Medium
Redbud		*Cercis*	*canadensis*	Yes	Y	Y	9	9	Medium
Redbud, Forest Pansy	'Forest Pans	*Cercis*	*canadensis*	Yes	Y	Y	9	9	Medium
Redbud, Silver Cloud	'Silver Cloud'	*Cercis*	*canadensis*	Yes	Y	Y	8	9	Medium
Redbud, Texas White	'Texas White	*Cercis*	*canadensis*	Yes	Y	Y	8	9	Medium

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Redwood, Dawn		*Metasequoia*	*glyptostroboides*	No	**Y**	**Y**	15	8	Medium
Sassafras		*Sassafras*	*albidum*	Yes	**Y**	**Y**	8	8	Medium
Serviceberry, Downy		*Amelanchier*	*arborea*	Yes	**Y**	**Y**	5	5	Small
Serviceberry, Smooth		*Amelanchier*	*laevis*	Yes	**Y**	**Y**	6	4.5	Small
Spruce, Blue		*Pigea*	*pungens*	Y-USA	**Y**	**Y**	20	4.5	Small
Spruce, Blue Hoopsi	'Hoopsii'	*Pigea*	*pungens*	Y-USA	**Y**	**Y**	15	6	Medium
Spruce, Blue Pyramidal	'Fastigiata'	*Pigea*	*pungens*	Y-USA	**Y**	**Y**	6	2.5	Small
Spruce, Norway		*Picea*	*abies*	No	**Y**	**Y**	25	10	Large
Spruce, White		*Picea*	*glauca*	Yes	**Y**	**Y**	25	4.5	Medium
Sweetgum		*Liquidambar*	*styraciflua*	Y-USA	**Y**	**Y**	16	15	Large
Sweetgum		*Liquidambar*	*styraciflua*	No	**Y**	**Y**	20	4.5	Small
Sweetgum, Moraine	'Moraine'	*Liquidambar*	*styraciflua*	Y-USA	**Y**	**Y**	13	8	Medium
Sweetgum, Slender Silhouette		*Liquidambar*	*styraciflua*	Y-USA	**Y**	**Y**	12	12	Medium
Sycamore		*Platanus*	*occidentalis*	Yes	**Y**	**Y**	27	27	Large
Tamarack		*Larix*	*laricina*	Yes	**Y**	**Y**	12	11	Medium
Tulip Tree		*Liriodendron*	*tulipifera*	Yes	**Y**	**Y**	25	15	Large
Tulip Tree, Arnold	'Arnold'	*Liriodendron*	*tulipifera*	No	**Y**	**Y**	18	6	Medium
Tulip Tree, Pyramidal	'Fastigiatum'	*Liriodendron*	*tulipifera*	No	**Y**	**Y**	16	5	Small
Walnut, Black		*Juglans*	*nigra*	Yes	**X**	**Y**	18	18	Large
Willow, Black		*Salix,*	*nigra*	Yes	**X**	**Y**	10	5	Small
Willow, Corkscrew	'Totuosa'	*Salix,*	*matsudana*	No	**X**	**Y**	10	7	Medium
Willow, Golden Weeping	Tristis'	*Salix*	*alba*	No	**X**	**Y**	20	20	Large
Willow, Peach leaf		*Salix*	*amygdaloides*	Yes	**X**	**Y**	9	6	Small
Yellowwood		*Cladrastis*	*Kentukea*	No	**X**	**Y**	14	14	Large
Zelkova, Japanese	'Gold Falls'	*Zelkova*	*serrata*	No	**X**	**Y**	11	7	Medium
Zelkova, Japanese		*Zelkova*	*serrata*	No	**X**	**Y**	15	15	Large

Appendix D2: Invasive Species -Not to be Planted

Common Name	Cultivars	Genus	Species	Native	Invasive	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Cork, Amur		Phellodendr	amurense	No	Invasive	X	X	13	9	Medium
Locust, Black		Robina	pseudoacacia	Y-USA	Invasive	X	X	13	9	Medium
Maple, Amur		Acer	ginnala	No	Invasive	X	X	6	6	Small
Maple, Manitoba		Acer	negundo	Yes	Invasive	X	X	9	9	Medium
Maple, Norway	'Columnare'	Acer	platanoides	No	Invasive	X	X	14	4	Small
Maple, Norway (all species)		Acer	platanoides	No	Invasive	X	X	15	11	Medium
Maple, sycamore		Acer	pseudoplatanus	No	Invasive	X	X	12	11	Medium
Maple, sycamore	'Regal Petticoat'	Acer	pseudoplatanus	No	Invasive	X	X	12	11	Medium
Mountain-Ash, European		Sorbus	Aucuparia	No	Invasive	X	X	6	6	Small
Olive, autumn		Elaeagnus	umbellata	No	Invasive	X	X	8	6	Small
Olive, Russian		Elaeagnus	angustifolia	No	Invasive	X	X	8	6	Small
Pear, callery		Pyrus	calleryana	No	Invasive	X	X	9	9	Medium
Pine, Scots		Pinus	sylvestris	No	Invasive	X	X	15	9	Medium
Poplar, White		Populus	alba	No	Invasive	X	X	12	12	Medium
Tree of Heaven		Ailanthus	altissima	No	Invasive	X	X	15	11	Medium

Appendix B- Tree Protection and Planting Guidelines

C.1 Protection of Existing Trees

The *Minimum Tree Protection Zone* (TPZ) is the minimum setback required to maintain the structural integrity of the tree's anchor roots, based on generally accepted arboricultural principles. The *Root Protection Zone* (RPZ), also called *Critical Root Zone*, is defined as a circle on the ground corresponding to the dripline of the tree. While the TPZ (below) will protect a tree's anchor root structure, the protected area should be larger to protect the soils surface and root integrity, protected through the construction project.

A TPZ for individual trees that are isolated from denser treed areas should be established using distances between the minimum MTPZ and the RPZ, both specified below. The appropriate Tree Protection Measures would protect the TPZ with similar hoarding/fencing as discussed above. RPZ is an area slightly larger than crown diameter, which includes the most important rooting area for the tree. Usually, the TPZ fencing is somewhere between the minimum TPZ and RPZ. The best is a larger area, but design specs, affected by construction requirements often encroach on those areas.

No unauthorized activities may take place within the TPZ of a tree covered under any municipal permit process or agreement. The following chart shows the TPZ (Niagara Parks). Some trees and site conditions may require a greater setback at the Town's discretion.

Table C. 1 - Minimum Tree Protection Zones

Trunk Diameter (DBH)	Minimum Tree Protection Zone (MTPZ) Distances Required	Root Protection Zone (RPZ) Distances Required
<10 cm	1.8 m	1.8 m
11 – 40 cm	2.4 m	4.0 m
41 – 50 cm	3.0 m	5.0 m
51 – 60 cm	3.6 m	6.0 m
61 – 70 cm	4.2 m	7.0 m
71 – 80 cm	4.8 m	8.0 m
81 – 90 cm	5.4 m	9.0 m
91 – 100+ cm	6.0 m	10.0 m

For trees over 100 cm. DBH, add 10 cm. to the TPZ for each centimeter of DBH.

1. Roots can extend from the trunk to 2-3 times the distance of the drip line.
2. Diameter at breast height (DBH) trunk diameter at 1.37 meters above ground.
3. Tree Protection Zone distances are to be measured from the outside edge of the tree base towards the drip line and may be limited by an existing paved surface, provided the existing paved surface remains intact throughout the construction work.

C.2 Planting Specifications

Archeological Consideration

An archeological assessment of potential tree planting sites should be considered, especially in new projects, with consideration for Indigenous archaeological importance/interest. This would be especially prudent in areas close to Lake Huron or natural water ways.

C.2.1 Locations Specifications

C.2.1.1 Soil Volume – New Projects

Adequate available soil volume is a critical factor for good tree growth and long-term viability. The soil volume available for root growth must be sufficient to support the expected tree size and, should the provided soil volumes be inadequate, design expectations for mature tree size and longevity must be appropriately reduced.

For new tree plantings, 30.0 m^3 of good quality topsoil, with a minimum depth of 750 mm to a maximum depth of 900 mm, should be provided. Trees in common planting areas may share soil volume to a maximum of 15.0 m^3 each.

C.2.1.2 Engineered Soils – CU Structural Soil

CU-Structural Soil™ is a planting medium consisting of 80 percent crushed limestone and 20 percent soil and has been designed for use in areas that need to or will be compacted. Because of the size of the aggregate, engineered soil always provides large soil pore space which is good for tree roots and allows for ready water drainage. Mycorrhizal or other inocula could also be used to enhance soil biology and help with tree establishment and growth.

Engineered soils can also be used with conventional planting techniques. If possible, pavement openings should be expandable (via removable pavers or using a mulched area) for the sake of the anticipated buttress roots of maturing trees. Engineered soils can be used right up to the surface grade down to a minimum of one meter depth. One problem that has been attributed to engineered soil is that it lacks real soil volume to sustain tree growth over an expected life span because it is 20 percent soil and 80 percent crushed limestone by volume. However, engineered soil is also an option for creating break-out zones under pavement for trees in narrow tree lawns to allow roots to travel to adjacent soft landscapes. Anecdotal evidence suggests that coarse aggregate used as backfill around utility trenches or subdrains functions similarly to engineered soil in that it provides a rooting environment or allows roots to travel to other soil volumes. For these reasons, it would be appropriate to use under sidewalks to create a break-out zone for boulevard trees to access soil volumes in front yard areas. Due to the large amount of aggregate contained in engineered soil, only 20% of its total volume will be credited towards the minimum soil volume requirements.

C.2.1.3 Soil Cells

Soil cells is designed to secure adequate tree habitat, support sidewalks and other hard surface treatments and provide on-site stormwater management. Soil cell systems are installed below grade, backfilled with topsoil, and are capped with a hard surface. For example, a sidewalk becomes, in effect, a floating roof over the rooting space. The modular framework provides uncompacted soil volumes for large tree growth and (potentially) unlimited access to healthy soil - a critical component of tree growth in urban environments - allowing them to manage stormwater, reduce heat-island effect, and improve air quality. In some situations, “caged/PVC” structures (like Silva Cell) use may be prescribed for use only under sidewalks or driveways, as a bridge or link for tree roots to grow into ‘breakout’ areas with greater soil volumes such as lawns or other soft surface areas.

deeproot

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Gray, Meet Green: Silva Cell 2 Seminar

This seminar will review existing Silva Cell installations to demonstrate how the system can provide adequate volumes of soil for street trees and on-site stormwater management underneath sidewalks, plazas, parking lots, and parking lay-bys – all while meeting engineering requirements for vehicle loading and utilities infrastructure.

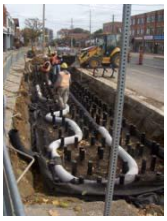
You need approx. 28 m^3 (1,000 ft^3) of soil to grow a 40cm (16"DBH-35' canopy) tree. Such a tree can provide significant environmental benefits and cost savings by cleaning the air, reducing heat-island effect, and shading buildings. The 28 m^3 of soil in which the tree grows can also store 5.6 m^3 of water, meaning that the Silva Cell system can be designed to treat all the stormwater from a 3.8 cm, 24 hour storm event directly on-site.

Silva Cell 2

At this seminar you will learn:

- How the Silva Cell system can be designed to treat water quality, retention, and detention
- Target soil volumes for mature tree growth and on-site stormwater management
- The importance of soil to healthy tree growth
- How to bring "green infrastructure" to your project using the Silva Cell
- Setting Performance Standards for Soil Cells

The TRCA has approved the Silva Cells as a equivalency to bioretention



2009

2013

Silva Cell installation at the Queensway in Toronto, ON.
For more information visit www.deeproot.com

Figure C.1 - Silva Cell Caged/PVC Structures

C.2.1.4 Setbacks and Inter-Tree Spacing

Setbacks when siting plant material on streets and active parks should ensure adequate space be provided to accommodate normal long-term growth both above and below ground. Consider the potential negative impacts of providing insufficient space, such as injury to pedestrians, damage to property, increased maintenance expenses, and poor landscape performance.

Tree spacing should reflect the projected canopy size based on the species selected and its growing environment:

Table C.2. Tree species stature and minimum spacing for street trees

Stature Size	Minimum Spacing (m)	Stature Adjacent
Large Stature	8m	Large Stature

Large Stature	6m	Medium Stature
Large Stature	6m	Small Stature
Medium Stature	6m	Large Stature
Medium Stature	6m	Medium Stature
Medium Stature	6m	Small Stature
Small Stature	6m	Large Stature
Small Stature	6m	Medium Stature
Small Stature	6m	Small Stature

To accommodate the base of the tree, space should be provided for tree openings that are at least:

A. 3.0 m wide for a large stature tree
B. 2.5 m wide for a medium stature tree
C. 2.0 m wide for a small stature tree

These minimums could be reduced if enhanced rooting techniques are employed that mitigate possible damage to the surrounding landscape while providing for the long-term growth of the tree.

Where underground services or utilities are present/proposed, consider the potential negative impacts to the base of the tree should future maintenance require soil excavation near the tree.

To mitigate this and other risks, trees should not be planted within:

A. 1.0 m of the edge of a utility or service easement that is 3.0 m in width or greater.
B. 2.5 m of any underground utility or service, where space permits. However, at a main and lateral intersection a 2.0 m setback should be maintained.
C. 3.0 m of a transformer or hydrant

Local utility companies should be contacted for further information when planting, or proposing other works, near utilities.

To respect the crown of the tree, trees should not be planted:

A. within 10 m of a stop sign
B. where the growing canopy may contact buildings, structures, or fencing.
C. where growing canopy may come within 3.0 m of a primary power line or within 1.0 m of a secondary power line or communication asset.
D. overhanging pedestrian areas if it is a species that drop fruit or seed pods/nuts.

Table C.3 – Tree Setbacks

TREE SETBACKS	
FACILITY	***DISTANCE (M)***

DRIVEWAYS	***1.0 - 1.5***
STORM/ SANITARY CONNECTIONS	***1***
RLCB LEADS	***1***
CURB OR WALKWAY	***1***
FIRE HYDRANTS	***3***
PAD MOUNTED TRANSFORMERS	***3***
STREETLIGHTS	***5 FOR LARGE STATURE, 3 FOR SMALL STATURE***
BUS STOPS	***3***
REGULATORY SIGNS	***3***
STOP SIGNS	***10***

Daylight Triangle Maintain the 10m distance from corner of intersection to respect the Daylight Triangle and ensure proper clearance for traffic.

Hydro Lines Species selection under hydro lines is critical to avoid long term management challenges and higher than average pruning requirements. Refer to Appendix A for estimated heights at maturity per species.

Heights at maturity should leave at least a 1m buffer from lowest electrical line height, unless offset from under the line by half the mature canopy width.

C.2.2 Layout

The final planting location is to be marked on site for “field approval” by the Town. With utility or development project, it is the Constructor’s responsibility to obtain utility locates prior to marking final planting locations.

C.3 Planting Materials Specifications

3.3.1 Species and Standards of Trees

Species and cultivars of trees, as well as the standard for that species and cultivar, should conform to the Canadian Standards for Nursery Stock, Canadian Nursery Landscape Association, as revised.

C.3.2 Species Selection (Diversity)

The amount of species variation will depend on the number of trees to be planted.

Utilize the 5-10-15 guideline to increase species diversity. No more than 5% of any one species, 10% of any one genus, or 15% of any family.

A minimum of 30% of the trees planted on a site should be native tree species. Refer to Appendix A. Locally rare native species may be accepted on a case-by-case basis. Cultivars of native trees should not be credited towards the minimum 30% requirement.

Invasive species should not be planted, especially near natural areas. Refer to Appendix B.

Species selection should reflect the site conditions, such as soil and light conditions, drainage, slope, aspect, moisture level and salt exposure. Use of locally sourced plant material is recommended.

Species selection and arrangement should consider ecosystem function and health and provide visual interest through diversity and seasonal variety.

Artificial plant materials are not recommended.

C.3.3 Stature

Tree stature (i.e., small, medium, large) by species is based on projected canopy spread. This does not account for differing forms, such as columnar or fastigiate, that are being increasing used on the landscape. This can result in an over- or under-estimate of potential canopy contribution, because of not fully recognizing the species characteristics.

Appendix A includes the stature value assigned to species and cultivars/varieties when appropriate. This value assigned is based on estimated canopy volume.

C.3.4 Origin and Hardiness Zones

The geographical origin (seed zone) of where seed or cuttings used to produce the trees should be considered when developing planting plans. If the plant material is from an area that is climatically different than Port Colborne, it should be refused.

C.3.5 Planting Specifications

Planting spots should be marked two-weeks in advance to allow for required locates.

Consideration for Indigenous archaeological importance/interest. This would be especially prudent in areas close to current or historical navigable water ways.

C.3.5.1 Residential Street Trees

Large-stature trees should not be planted in boulevards with less than 1.75 m between sidewalk and curb.

Trees should be planted house side of the road allowance, midway between the sidewalk and property line or 1-m from the property line.

Planting locations should be marked by the Project Manager or designate with spray paint in the form of a "T" or "T2" etc., on the sidewalk and an “X” where the tree is to be.

"T2" indicates a distance of 2.0 meters etc. from the mark for tree planting.

- On streets without sidewalks, planting locations should be indicated with spray paint in the form of a “T” or T2” etc. on the curb.

- If there is no sidewalk or curb, the planting locations should be marked with "T" indicates on the spot for the tree to be planted.

C.3.5.2 Park Trees / Naturalization Planting

Planting location maps to be supplied, and locations marked in the field with the appropriate method. Trees to be planted in the parks, pond and retention pond, woodlot rehabilitation plantings etc. should be on a GIS map and given to the planting foreman planting. Planting locations of caliper stock should be spray painted with an “X” for each tree location.

C.3.5.3 Planting Holes

For residential street trees, the planting hole must be at least 30 cm from the edge of

the ball/container.

- The depth of the hole should be dependent not only on the depth of the ball/container, but also on soil conditions.
- For park trees / naturalization planting, the planting hole must be at least 60 cm from the edge of the ball/container.
- The depth of the hole should be dependent not only on the depth of the ball/container, but also on soil conditions.

Planting diagrams for conifer and broadleaf trees are in Figures A.2 and A.3.

C.3.5.4 Excavation

Remove subsoil, rocks, roots, debris, and toxic material from excavated material that should be used as planting soil for trees. Dispose of excess material. Scarify sides of planting hole to allow water flow and rooting access.

All Hydro-vac operations must be compliant with the safe practices prescribed for such equipment as published by the Electrical and Utilities Safety Association. The contractor is responsible for sub-contracting this function if required. The Town may make an exception and allow for sub-contracting of the trenchless technology; however, the sub-contractor is not permitted to plant trees.

Note: Regardless of the method used to dig, under no circumstances should equipment be permitted to be set up on residential driveways and front lawns. Access to planting sites is to be from the public boulevard or road.

C.3.5.5 Tree Placement

Place supplied trees within the excavated hole in the upright position.

- When clay subsoil or firmly packed subsoil (compacted and/or poorly drained) is encountered, at least 20 cm of excavated subsoil must be left between the bottom of the ball and the bottom of the planting hole.

- In moist, well-drained soils, set the root ball so that the root collar is exactly at finished grade. In sandy or droughty soils, set the root ball so that the root collar is slightly deeper than finished grade.
- The wire basket and burlap should be removed, unless otherwise approved in writing by the Project Manager or designate.

C.3.5.6 Backfilling and Initial Watering

Backfilled soil is to be placed to bring the top level of the root ball 8.0 cm higher than the existing surrounding grade to allow for settling.

- Backfill is to be placed in layers approximately 15 cm in depth and firmly tamped in place in such a manner that the tree retains its vertical position without support.
- Particular care is to be taken to ensure that no air pockets remain under or around roots and that damage does not occur to the root system.
- The fill shall be thoroughly watered immediately after planting. Water plant material thoroughly and in such a way as to prevent surface erosion.

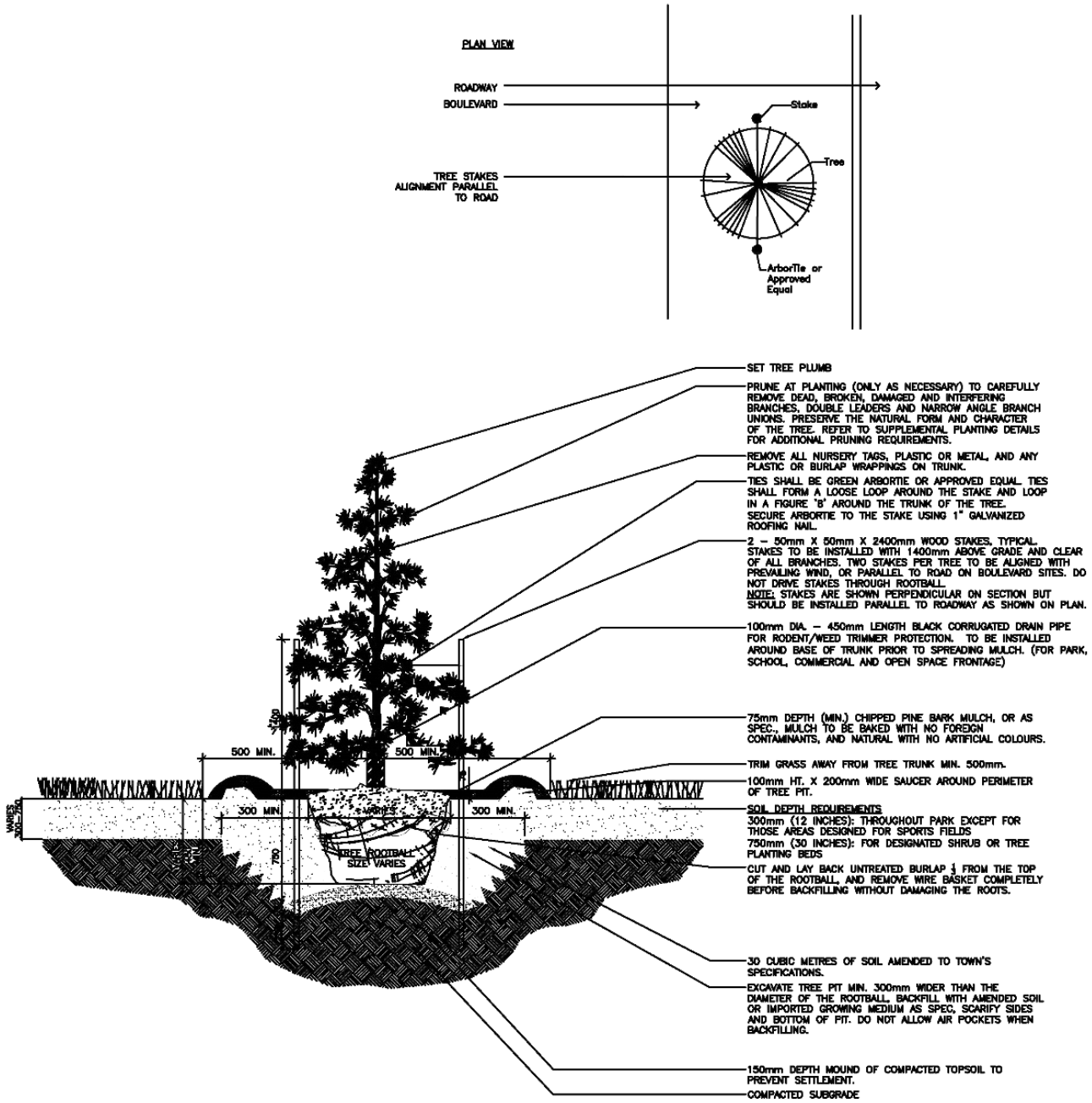


Figure C. 2 - Conifer Planting Diagram

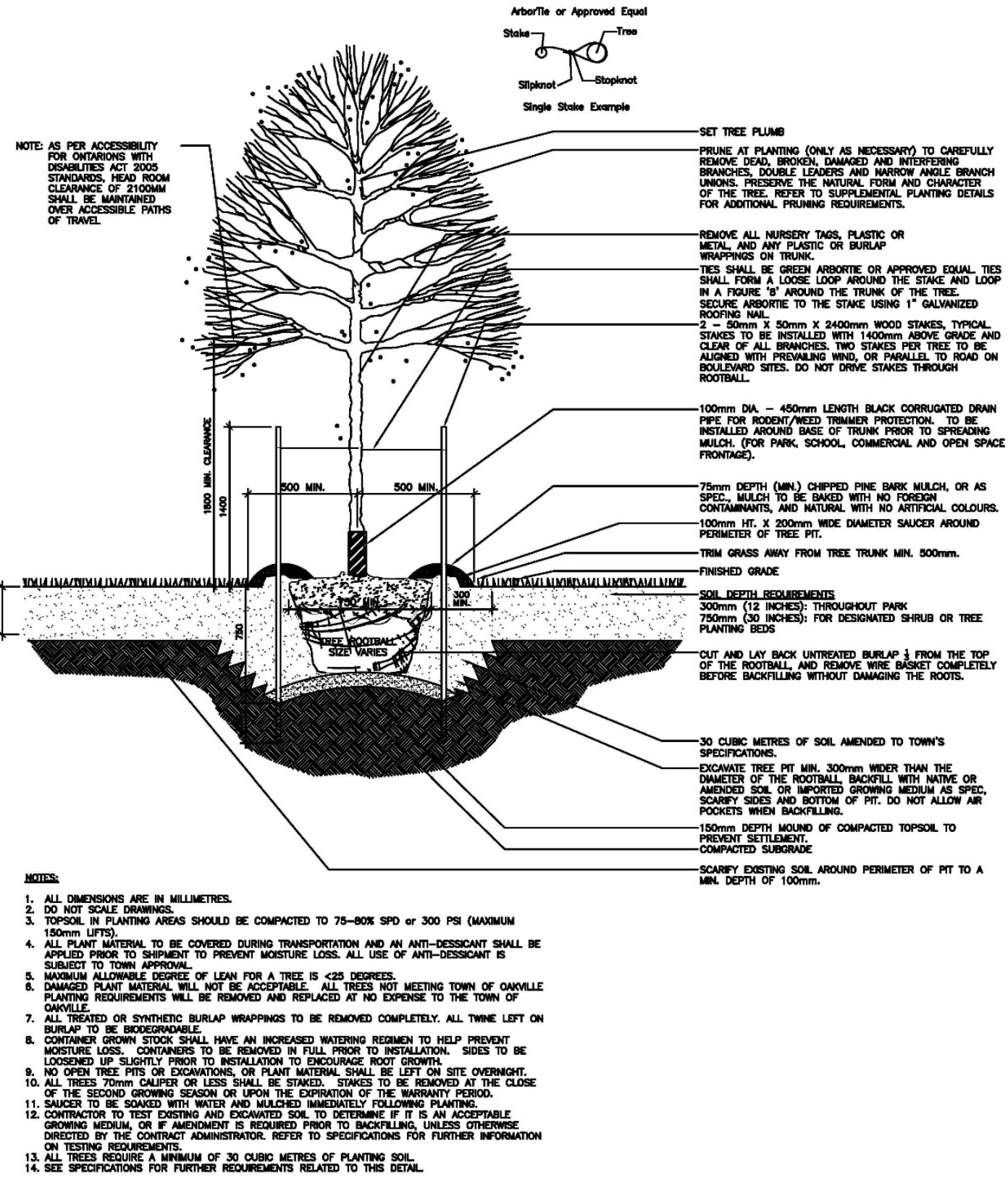


Figure C. 3 - Planting Diagram

- When using backfill, choose the appropriate backfill for the site's soil conditions i.e., in clay soils backfill with the clay-loam specifications, in sandy soils backfill with the sandy-loam specifications as listed below.

- At grade, a ridge of soil located at the edge of the planting hole shall be formed to a height of 9 cm, to act as a catch basin for any subsequent watering's and to retain mulch.
- All non-porous containers shall be removed, including the entire wire basket. If a fiber or peat pot remains, it must not be left above the soil surface as this promotes "wick" evaporation.

Backfill composition specifications are as follows:

Table C. 4 - Backfill Composition Specifications

Soil Texture	**Sand%**	**Silt%**		**Clay%**
Clay-loam	20-46	20 - 50		27- 40
Sandy-loam	55-80	5 - 28		0- 20

Clay soil contains minimum 4% organic matter.
Sandy soil contains minimum 2% organic matter.
Acidity of topsoil mixture to range between 6.0pH to 7.5pH.
Topsoil mixture to be free of sub-soil, stones, roots, and any foreign objects.

C.3.5.7 Pruning

- The crown of the tree shall be pruned from the bottom up at the time of planting to remove all dead and damaged branches.
- The terminal or leader is not to be pruned unless broken, leader shall not be removed. All cuts shall be made using approved standards and Guidelines for pruning set out by the ANSI A300 pruning standards (2001 Edition) as updated from time to time, and the Illustrated Guide to Pruning, 2nd Edition (2002 ISA) as updated from time to time, leaving no stubs.
- On all cuts over 2 cm in diameter and bruises or scars on the bark, the injured cambium shall be traced back to living tissue and removed.
- Pruning wounds shall be smoothed and shaped so as not to retain water. Only clean, sharp tools shall be used. All cuts shall be clean. Branches should be cut at the branch-collar, leaving no stubs.
- Large wounds produced by any means other than branch pruning may render the tree unacceptable, requiring replacement subject to the directions of the Project Manager or designate.
- Planted material may be found unacceptable and require replacement upon inspection by Project Manager or designate.

C.3.5.8 Staking

All balled and burlapped trees shall, immediately after planting, be supported by two wooden stakes, pointed on one end 5 cm x 5 cm x 15 cm (2 in x 2 in x 6 in) driven outside the ball parallel to the road.

- When staking in parks they must be in line with the direction of the prevailing wind (**west to east**).
- For balled and burlap trees, this type of tree, B/B, the stakes are to be driven at least 70 cm below grade line.
- The stakes must be driven deep enough that there is at least 5 cm between the top of the stakes and the first branch.
- Stake placement shall be such that no main roots are severed by the stake being driven into the ground. Metal stakes are prohibited.

C.3.5.9 Tree Ties (Guying Material)

- Ties shall be made from a flat polypropylene material (tree guying cable), approved by the Project Manager, or designate prior to the contract commencing.
- The guying must be intertwined around the tree and must be firmly secured to the wooden stake in a way to prevent them from coming loose or moving down the tree.
- An approved equivalent guying material can be utilized at the sole discretion of the Project Manager or designate.
- For B/B and container stock trees where the two stakes are driven into the ground outside the root ball, the tension must be such that the tree is firmly, but not too tightly, supported, remaining in a vertical position.

C.3.5.10 Mulching

- Non-shredded woodchips from tree and woody brush sources measuring between 2.5 cm and 5.0 cm in width and placed to a depth of between 5.0 cm to 7.5 cm spread the following distance from the root collar:
- Caliper (mm) Average radius from root collar (cm) 50 and greater 110 cm
- Mulch should form a flattened donut around the tree rather than a cone. Woodchips must be close, but not in contact with the tree trunk.
- Mulch must be applied no later than 48 hours after planting.
- Mulch should be a consistent and natural colour.

C.3.5.11 Tree Wrapping and Tree Guards

- The contractor is to remove all tree wrapping upon planting of the tree. The Contractor should:
- Install a plastic tree guard (in parks, median, berms and Blvd.) that is the appropriate height to prevent damage to the base of the tree i.e., from grass cutters and mowers.
- These tree guards should be made of plastic (black perforated corrugated drainpipe 15 cm diameter 30 cm in height (6-inch diameter 12 inches in height)) and be cut from one end to the other to allow the stem to grow.
- Tree guards are not required when planting on house side of the sidewalk.

C.3.5.12 Removal of excess tags and other material

All excess materials, such as nursery tags or other items attached to planting stock, should be removed immediately after planting.

C.3.5.13 Restoration

Any site damage should be restored to pre-construction condition to the satisfaction of the Project Manager or designate.

- All disposal of excess material, off site in an approved disposal site.
- Broom cleaning of pavement, concrete and sidewalks.
- Raking grass to ensure it is free of planting materials and/or loam.
- Leave site in a neat condition.

C.3.5.14 Disposal

Woody materials should be disposed of within Halton Region to limit the spread of Emerald Ash Borer (EAB) or other insect or disease pests.

C.3.6 Post Plant Care

C.3.6.1 Post Plant Watering

Watering shall be carried out when required and with enough water to prevent plants and underlying growing medium from drying out, until such time as approved by the Project Manager or designate.

C.3.6.2 Fertilizing

The Contractor should be required to add granular fertilizer before the mulch layer is applied. A granular fertilizer mixture (slow release) with a blend of 6-15-23 A.19 Mg 0.13B 0.5Zn should be used, unless approved by the Project Manager.

C.3.6.3 Additional Watering

The Project Manager may require that a watering schedule be implemented to supplement the work done by Town forestry staff using the following specification:

- 10 gallons of water per tree every week for trees located on sandy soils.
- Every 2 weeks for trees located on clay soils.
- Surface watering should be used rather than a watering probe.
- For additional watering over and above the scope of work outlined within this tender, additional watering requirements should be made to group to provide a reasonable daily volume of work.

Appendix C- Tree Planting List and Species Preference

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Apple, common		*Malus*	*pumila*	No	X	Y	7	7	Small
Aspen, Large-toothed		*Populus*	*grandidentata*	Yes	X	Y	18	12	Large
Aspen, Trembling		*Populus*	*tremuloides*	Yes	X	Y	10	5	Small
Basswood		*Tilia*	*americana*	Yes	X	Y	27	13	Large
Beech, Blue		*Carpinus*	*caroliniana*	Yes	X	Y	8	6	Small
Beech, Dawyck Gold	'Dawyck Gol	*Fagus*	*sylvatica*	No	X	Y	16	2	Small
Beech, Dawyck Purple	'Dawyck Pur	*Fagus*	*sylvatica*	No	X	Y	8	2	Small
Beech, European		*Fagus*	*sylvatica*	No	X	Y	15	12	Large
Beech, Purple Fountain	'Purple Foun	*Fagus*	*sylvatica*	No	X	Y	6	4	Small
Beech, Red Obelisk	'Red Obelisk	*Fagus*	*sylvatica*	No	X	Y	13	4	Small
Beech, Tri-colour	'Rosea-Marg	*Fagus*	*sylvatica*	No	X	Y	13.5	8	Medium
Birch, Cherry		*Betula*	*lenta*	Yes	X	Y	15	12	Large
Birch, European White		*Betula*	*pendula*	No	X	Y	15	10	Medium
Birch, Gray		*Betula*	*populifolia*	Yes	X	Y	10	6	Small
Birch, River		*Betula*	*nigra*	Yes	X	Y	13	10	Medium
Birch, White (Paper)		*Betula*	*papyrifera*	Yes	X	Y	18	10	Large
Birch, Yellow		*Betula*	*alleghaniensis*	Yes	X	Y	18	15	Large
Black Gum		*Nyssa*	*sylvatica*	Yes	v	Y	13.5	8.5	Medium
Buckeye, Ohio		*Aesculus*	*glabra*	Yes	v	Y	13.5	13.5	Large
Catalpa, Northern		*Catalpa*	*speciosa*	Y-USA	X	Y	12	6	Small
Cedar, Black	'Nigra'	*Thuja*	*occidentalis*	Yes	X	Y	5	1.5	Small
Cedar, Eastern Red Hills	'Hillspire'	*Juniperus*	*virginiana*	Yes	X	Y	12	4	Small
Cedar, Eastern White		*Thuja*	*occidentalis*	Yes	X	Y	20	3	Small
Cedar, Emerald	'Emerald'	*Thuja*	*occidentalis*	Yes	X	Y	4	1	Small
Cherry, Black		*Prunus*	*serotina*	Yes	X	Y	15	6	Medium
Cherry, Choke		*Prunus*	*virginiana*	Yes	X	Y	5	5	Small
Cherry, Kwanzan	'Kwanzan'	*Prunus*	*serrulata*	No	X	Y	7	5	Small
Cherry, Pin		*Prunus*	*pensylvanica*	Yes	X	Y	8	8	Medium
Chestnut, Amercian		*Castanea*	*dentata*	Yes	X	Y	18	18	Large
Cottonwood, Black		*Populus*	*trichocarpa*	Y-USA	X	Y	27	21	Large
Cottonwood, Eastern		*Populus*	*deltoides*	Yes	X	Y	27	21	Large
Crabapple	'Prairie Fire'	*Malus*		No	X	Y	7	7	Small
Crabapple	'Royal Raind	*Malus*		No	X	Y	7	7	Small
Crabapple	'Sargent'	*Malus*		No	X	Y	7	7	Small
Crabapple	'White Angel'	*Malus*		No	X	Y	7	7	Small
Cucumber Tree		*Magnolia*	*acuminata*	Yes	X	Y	16	16	Large
Cypress, Bald		*Taxodium*	*distichum*	Y-USA	X	Y	20	8	Medium

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Elm, Accolade	wilsoniana	*Ulmus*	*japonica*	No	v	Y	23	20	Large
Elm, White	'Princeton'	*Ulmus*	*americana*	Yes	v	Y	21	15	Large
Elm, White	'Valley Forge'	*Ulmus*	*americana*	Yes	v	Y	21	21	Large
Fir, Balsam		*Abies*	*balsamea*	Yes	X	Y	15	6	Medium
Fir, Douglas		*Pseudotsuga*	*menziesii*	Y-BC	v	Y	20	5	Medium
Fir, White		*Abies*	*concolor*	Y-USA	v	Y	14	6	Medium
Ginkgo (Maidenhair)		*Ginkgo*	*biloba*	No	v	Y	17	11	Large
Ginkgo, Autumn Gold	'Autumn Gol	*Ginkgo*	*biloba*	No	v	Y	10	10	Medium
Ginkgo, Golden Colonad	'JFS-UGA2'	*Ginkgo*	*biloba*	No	v	Y	13	7.5	Medium
Ginkgo, Princeton Sentry	'Princeton Se	*Ginkgo*	*biloba*	No	v	Y	13	5	Small
Hackberry		*Celtis*	*occidentalis*	Yes	v	Y	20	18	Large
Hazelnut, Turkish		*Corylus*	*colurna*	No	v	Y	15	8	Medium
Hemlock, Eastern		*Tsuga*	*canadensis*	Yes	X	Y	20	5	Medium
Hickory, Bitternut		*Carya*	*cordiformis*	Yes	X	Y	25	20	Large
Hickory, Pignut		*Carya*	*glabra*	Yes	X	Y	17	8	Medium
Hickory, Shellbark		*Carya*	*laciniosa*	Yes	X	Y	23	15	Large
Hop tree		*Ptelea*	*trifoliata*	Yes	X	Y	5	5	Small
Hornbeam, Euro. Pyrami	'Fastigiata'	*Carpinus*	*betulus*	No	X	Y	12	5	Small
Hornbeam, European		*Carpinus*	*betulus*	No	X	Y	17	12	Large
Horsechestnut		*Aesculus*	*hippocastanum*	No	Y	Y	12	12	Medium
Horsechestnut, Double		*Aesculus*	*baumannii*	No	Y	Y	15	12	Large
Horsechestnut, Red	'Briotii'	*Aesculus*	*x carnea*	No	Y	Y	12	12	Medium
Ironwood (hop-hornbeam)	*Ostrya*	*virginiana*	Yes	Y	Y	12	8	Medium	
Katsura, Japanese		*Cercidiphyllum*	*japonicum*	No	X	Y	15	4	Small
Kentucky Coffee Tree	'Expresso'	*Gymnocladus*	*dioicus*	Yes	Y	Y	15	10	Medium
Kentucky Coffee Tree		*Gymnocladus*	*dioicus*	Yes	Y	Y	17	13	Large
Larch, European		*Larix*	*decidua*	No	X	Y	15	7	Medium
Lilac, Japanese Tree	'Ivory Silk'	*Syringa*	*reticulate*	No	Y	Y	8	4	Small
Linden, Little-leaf		*Tilia*	*cordata*	No	X	Y	17	20	Large
Locust, Honey	Streetkeeper	*Gleditsia*	*triacanthos*	Yes	Y	Y	15	7	Medium
Locust, Honey	Shademaste	*Gleditsia*	*triacanthos*	Yes	Y	Y	17	10	Medium
Locust, Honey	Skylilne	*Gleditsia*	*triacanthos*	Yes	Y	Y	15	13	Large
Locust, Honey	Sunburst	*Gleditsia*	*triacanthos*	Yes	Y	Y	15	13	Large
Locust, Honey		*Gleditsia*	*triacanthos*	Yes	Y	Y	17	10	Medium
Maple, Amur	Ruby Slippe	*Acer*	*ginnala*	No	Y	Y	6	6	Small
Maple, Armstrong	'Armstrong'	*Acer*	*rubrum*	Yes	Y	Y	20	5	Medium

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Maple, Autumn Spire	'Autumn Spi	*Acer*	*rubrum*	Yes	**Y**	**Y**	16	8	Medium
Maple, Black		*Acer*	*nigrum*	Yes	**Y**	**Y**	20	15	Large
Maple, Celebration	'Celebration'	*Acer*	*x Freemanii*	Yes	**Y**	**Y**	14	6	Medium
Maple, 'Columnar'	'Columnare'	*Acer*	*rubrum*	Yes	**Y**	**Y**	15	5	Small
Maple, Freemanii		*Acer*	*x Freemanii*	Yes	**Y**	**Y**	16	13	Large
Maple, Freemanii	'Jeffersred'	*Acer*	*x Freemanii*	Yes	**Y**	**Y**	16	13	Large
Maple, Hedge		*Acer*	*campestre*	No	**Y**	**Y**	10	10	Medium
Maple, Paperbark		*Acer*	*griseum*	No	**Y**	**Y**	7	5	Small
Maple, Red	'Brandywine'	*Acer*	*rubrum*	Yes	**Y**	**Y**	10	4	Small
Maple, Red		*Acer*	*rubrum*	Yes	**Y**	**Y**	16	15	Large
Maple, Red Sunset	'Red Sunset'	*Acer*	*rubrum*	Yes	**Y**	**Y**	18	12	Large
Maple, Scarlet Sentinal	'Scarlet Sent	*Acer*	*rubrum*	Yes	**Y**	**Y**	15	8	Medium
Maple, Silver	'Silver Queen	*Acer*	*Saccharinum*	Yes	**Y**	**Y**	16	13	Large
Maple, Silver		*Acer*	*saccharinum*	Yes	**Y**	**Y**	18	15	Large
Maple, Sugar	'Green Mour	*Acer*	*saccharum*	Yes	**Y**	**Y**	22	17	Large
Maple, Sugar		*Acer*	*saccharum*	Yes	**Y**	**Y**	20	15	Large
Maple, Sugar 'Columnar'	'Columnare'	*Acer*	*saccharum*	Yes	**Y**	**Y**	20	4	Small
Maple, Tartarian		*Acer*	*tataricum*	No	**Y**	**Y**	5	6	Small
Maple, Tartarian	Hotwings'	*Acer*	*tataricum*	No	**Y**	**Y**	7	6	Small
Mountain-Ash, American	*Sorbus*	*americana*	Yes	**X**	**Y**	6	6	Small	
Mountain-Ash, Showy		*Sorbus*	*decora*	Yes	**X**	**Y**	7	6	Small
Mulberry, Red		*Morus*	*rubra*	Yes	**X**	**Y**	12	12	Medium
Mulberry, white		*Sorbus*	*alba*	Yes	**X**	**Y**	12	12	Medium
Oak, Black		*Quercus*	*velutina*	Yes	**Y**	**Y**	20	20	Large
Oak, Bur		*Quercus*	*macrocarpa*	Yes	**Y**	**Y**	18	13	Large
Oak, Chinquapin		*Quercus*	*muehlenbergii*	Yes	**Y**	**Y**	15	15	Large
Oak, English	'Skinny Gene	*Quercus*	*robur*	No	**Y**	**Y**	15	3	Small
Oak, English		*Quercus*	*robur*	No	**Y**	**Y**	18	13	Large
Oak, English	'Skyrocket'	*Quercus*	*robur*	No	**Y**	**Y**	20	5	Medium
Oak, English Pyramidal	'Fastigiata'	*Quercus*	*robur*	No	**Y**	**Y**	15	5	Small
Oak, Pin		*Quercus*	*palustris*	Yes	**Y**	**Y**	20	13	Large
Oak, Red		*Quercus*	*rubra*	Yes	**Y**	**Y**	16	15	Large
Oak, Red Kindred Spirit	'Bicolor Nad	*Quercus*	*rubra*	Yes	**Y**	**Y**	10	2	Small
Oak, Shumard		*Quercus*	*shumardii*	Yes	**Y**	**Y**	12	12	Medium
Oak, Swamp White		*Quercus*	*bicolor*	Yes	**Y**	**Y**	15	15	Large
Oak, White		*Quercus*	*alba*	Yes	**Y**	**Y**	20	20	Large
Orange, Osage		*Maclura*	*pomifera*	Y-USA	**X**	**Y**	12	12	Medium
Orange, Osage	'White Shield	*Maclura*	*pomifera*	Y-USA	**X**	**Y**	12	12	Medium

Pagoda Tree, Japanese		*Sophora*	*japonica*	No	**X**	**Y**	22	20	Large
Pawpaw		*Asmina*	*triloba*	Yes	**X**	**Y**	6	4.5	Small
Pear		*Pyrus*		No	**X**	**y**	9	9	Medium
Pine, Austrian		*Pinus*	*nigra*	No	**X**	**Y**	18	15	Large
Pine, Eastern White		*Pinus*	*strobus*	Yes	**Y**	**Y**	24	11	Large
Pine, Eastern White	Pyramidal 'F	*Pinus*	*strobus*	Yes	**X**	**Y**	15	2.5	Small
Pine, Red		*Pinus*	*resinosa*	Yes	**Y**	**Y**	20	10	Large
Planetree, Exclamation	'Morton Circle	*Platanus*	*x acerifolia*	No	**Y**	**Y**	16	10	Medium
Planetree, London		*Platanus*	*x acerifolia*	No	**Y**	**Y**	20	20	Large
Planetree, London	'Bloodgood'	*Platanus*	*x acerifolia*	No	**Y**	**Y**	16	13	Large
Poplar, Balsam		*Populus*	*balsamifera*	Yes	**X**	**Y**	13	6	Medium
Redbud		*Cercis*	*canadensis*	Yes	**Y**	**Y**	9	9	Medium
Redbud, Forest Pansy	'Forest Pans	*Cercis*	*canadensis*	Yes	**Y**	**Y**	9	9	Medium
Redbud, Silver Cloud	'Silver Cloud'	*Cercis*	*canadensis*	Yes	**Y**	**Y**	8	9	Medium
Redbud, Texas White	'Texas White'	*Cercis*	*canadensis*	Yes	**Y**	**Y**	8	9	Medium
Redwood, Dawn		*Metasequoia*	*glyptostroboides*	No	**Y**	**Y**	15	8	Medium
Sassafras		*Sassafras*	*albidum*	Yes	**Y**	**Y**	8	8	Medium
Serviceberry, Downy		*Amelanchier*	*arborea*	Yes	**Y**	**Y**	5	5	Small
Serviceberry, Smooth		*Amelanchier*	*laevis*	Yes	**Y**	**Y**	6	4.5	Small
Spruce, Blue		*Pigea*	*pungens*	Y-USA	**Y**	**Y**	20	4.5	Small
Spruce, Blue Hoopsi	'Hoopsii'	*Pigea*	*pungens*	Y-USA	**Y**	**Y**	15	6	Medium
Spruce, Blue Pyramidal	'Fastigiata'	*Pigea*	*pungens*	Y-USA	**Y**	**Y**	6	2.5	Small
Spruce, Norway		*Picea*	*abies*	No	**Y**	**Y**	25	10	Large
Spruce, White		*Picea*	*glauca*	Yes	**Y**	**Y**	25	4.5	Medium
Sweetgum		*Liquidambar*	*styraciflua*	Y-USA	**Y**	**Y**	16	15	Large
Sweetgum		*Liquidambar*	*styraciflua*	No	**Y**	**Y**	20	4.5	Small
Sweetgum, Moraine	'Moraine'	*Liquidambar*	*styraciflua*	Y-USA	**Y**	**Y**	13	8	Medium
Sweetgum, Slender Silhouette	*Liquidambar*	*styraciflua*	Y-USA	**Y**	**Y**	12	12	Medium	
Sycamore		*Platanus*	*occidentalis*	Yes	**Y**	**Y**	27	27	Large
Tamarack		*Larix*	*laricina*	Yes	**Y**	**Y**	12	11	Medium
Tulip Tree		*Liriodendron*	*tulipifera*	Yes	**Y**	**Y**	25	15	Large
Tulip Tree, Arnold	'Arnold'	*Liriodendron*	*tulipifera*	No	**Y**	**Y**	18	6	Medium
Tulip Tree, Pyramidal	'Fastigiatum'	*Liriodendron*	*tulipifera*	No	**Y**	**Y**	16	5	Small
Walnut, Black		*Juglans*	*nigra*	Yes	**X**	**Y**	18	18	Large
Willow, Black		*Salix,*	*nigra*	Yes	**X**	**Y**	10	5	Small
Willow, Corkscrew	'Totuosa'	*Salix,*	*matsudana*	No	**X**	**Y**	10	7	Medium
Willow, Golden Weeping	Tristis'	*Salix*	*alba*	No	**X**	**Y**	20	20	Large

Common Name	Cultivars	Genus	Species	Native	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Willow, Peach leaf		*Salix*	*amygdaloides*	Yes	X	Y	9	6	Small
Yellowwood		*Cladrastis*	*Kentukea*	No	X	Y	14	14	Large
Zelkova, Japanese	'Gold Falls'	*Zelkova*	*serrata*	No	X	Y	11	7	Medium
Zelkova, Japanese		*Zelkova*	*serrata*	No	X	Y	15	15	Large

Appendix D- Invasive Species Not to be Planted

Common Name	Cultivars	Genus	Species	Native	Invasive	Roads	Parks	Est. Height (m) at Maturity	Est. Width (m) at Maturity	Stature
Cork, Amur		Phellodendr	amurense	No	Invasive	X	X	13	9	Medium
Locust, Black		Robina	pseudoacacia	Y-USA	Invasive	X	X	13	9	Medium
Maple, Amur		Acer	ginnala	No	Invasive	X	X	6	6	Small
Maple, Manitoba		Acer	negundo	Yes	Invasive	X	X	9	9	Medium
Maple, Norway	'Columnare'	Acer	platanoides	No	Invasive	X	X	14	4	Small
Maple, Norway (all species)		Acer	platanoides	No	Invasive	X	X	15	11	Medium
Maple, sycamore		Acer	pseudoplatanus	No	Invasive	X	X	12	11	Medium
Maple, sycamore	'Regal Petticoat'	Acer	pseudoplatanus	No	Invasive	X	X	12	11	Medium
Mountain-Ash, European		Sorbus	Aucuparia	No	Invasive	X	X	6	6	Small
Olive, autumn		Elaeagnus	umbellata	No	Invasive	X	X	8	6	Small
Olive, Russian		Elaeagnus	angustifolia	No	Invasive	X	X	8	6	Small
Pear, callery		Pyrus	calleryana	No	Invasive	X	X	9	9	Medium
Pine, Scots		Pinus	sylvestris	No	Invasive	X	X	15	9	Medium
Poplar, White		Populus	alba	No	Invasive	X	X	12	12	Medium
Tree of Heaven		Ailanthus	altissima	No	Invasive	X	X	15	11	Medium