

Town of Shelburne Public Tree Management and Shade Tree Preservation Plan

April 2026



Approved by Shelburne Selectboard on 4/14/2026

*Developed collaboratively by the Shelburne Tree Committee and
the Vermont Urban & Community Forestry Program*

Introduction

The Town of Shelburne recognizes the aesthetic, functional and ecological value of trees. Try to imagine the Parade Ground as an open field of grass without the shade and scenic beauty of the trees that presently grow there. Imagine our residential streets or our parks or Shelburne Beach without the shade, scenic variety, color, and beauty that the trees growing there provide to those areas within our community. Our town trees add variety to our landscape, provide wildlife habitat and nesting sites, create oxygen, sequester carbon, filter pollutants, dampen noise, soak up stormwater, provide shade, reduce solar heating in the summer, and add beauty which enhances property values.

Trees are an important part of our community infrastructure and heritage. Most of our mature urban trees were planted purposefully by previous generations planning for the future. Their planning and foresight created the town environment we all enjoy today. We need to continue this practice for the benefit of future generations.

In the same way that the Town of Shelburne plans and maintains the built infrastructure of roads, bridges, water, and sewer lines; our trees require this same planning and maintenance. Trees must be chosen and placed properly, must be maintained, and eventually will need to be replaced. This is not an accidental process. The maintenance of a living infrastructure of trees in our community is a process that requires consistent attention, ongoing planning, and funding.

This document is a synthesis of existing plans, policies, and documented activities relating to Shelburne's urban and community forest. The goals of this document are to:

1. Serve as Shelburne Shade Tree Preservation Plan, an established optional component of the Vermont Tree Warden statutes, V.S.A. 24, chapter 67, amended October 2020.
2. Provide clear specifications for the planting, care, and management of Shelburne's public tree resource.
3. Establish a plan for the Shelburne Tree Committee that will be regularly referenced and updated.
4. Establish a comprehensive plan that collects and links all existing documents and guidance related to public trees in Shelburne.

5. Serve as guidance for Town departments and citizen committees who oversee public spaces and town rights-of-way, and for the Planning Commission and Selectboard for policy and maintenance of public trees.

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Section 1: Shelburne's Urban & Community Forest

Summary of Tree Inventories

Public Tree Inventories

The Shelburne Public Tree Inventory was conducted in August 2014 by the University of Vermont Land Stewardship Program, with guidance from the Vermont Urban & Community Forestry Program. This inventory covered a defined area within the Village proper and collected basic data on trees within the public right of way along 23 streets and several municipal properties. Key findings from the inventory include:

- 722 trees were documented.
- 49 different tree species are represented.
- The top five most common species were Norway maple (12.6%), apple (8.2%), red maple (8.0%), sugar maple (5.5%), and white ash (4.8%). Together these species made up 39.1% of the total population.
- Approximately half of the inventoried trees are ash (*Fraxinus*) or maple (*Acer*) species and are threatened by the emerald ash borer (EAB) or the Asian long horned beetle (ALB), both non-native invasive forest pests.
- \$43,471 in annual benefits are attributed to the inventoried trees, based on an analysis using iTree (www.itreetools.org).

The full report developed through this inventory effort is linked in Section 4 of this document. Additionally, a web-based *Urban Tree Editor Tool* was developed for the Shelburne Tree Committee to enable members to update the inventory and run simple reports.

In the summer of 2017, members of the Shelburne Tree Committee expanded the extent of the public tree inventory to include the Hullcrest and Deer Run neighborhood. An additional 73 trees were inventoried.

Rural Roadside Ash Inventory

In 2019 the Shelburne Tree Committee received a grant to conduct a complete inventory of its roadside ash trees to prepare for the arrival and impact of EAB. The inventory was conducted by Tree Committee members, students from the University of Vermont's Rubenstein School of Environment & Natural Resources, and staff from the VT Urban & Community Forestry Program.

766 ash trees were inventoried within the right-of-way of 39 roads throughout the Town of Shelburne. An online [Ash Tree Inventory dashboard](#) was created by the Chittenden County Regional Planning Commission. Additionally, the inventory informed the development of the Shelburne EAB Management Plan, linked in Section 4 of this document.

Town of Shelburne Municipal Roles Related to Tree Management and Maintenance

Town Leadership

Town Manager / Selectboard

Has general and statutory authority for overall municipal governance, determining and managing budget, setting strategic direction for the Town; the Town Manager plays a key role in implementing the Board's policies. Requests for budget and commitment of staff time go through these channels. Approves grant applications. Funding for tree planning, planting, maintenance, replacement may come from multiple sources capital improvement plan, annual operating budget, grants, private donations (such as the Memorial Tree program).

Tree Warden

Has clear statutory authority and responsibilities, which ideally are carried out in a manner consistent with this Plan. Clarify how these statutory duties/responsibilities relate to Committee roles and define potential areas of collaboration. The Tree Committee and Tree Warden can create synergy in support of each other's work.

Other Municipal Departments

- *Buildings and Ground*
Oversees maintenance and upkeep of town owned sites and buildings that often include trees.
- *Planning Department - Stormwater*
Management of the town's stormwater system that may impact and/or include trees.
- *Highway Department*
'Front line' of observation; often involved with or responsible for tree trimming, maintenance, or removal work within Town highway rights of way.
- *Parks & Recreation Department*
Manages public parks and recreation land, including trees on these public lands; overlaps with Tree Warden's authority and responsibilities.
- *Police Department*
Filing crash report and insurance claim if trees are harmed or destroyed by vandalism, motor vehicle accidents, or other incidents.

Citizen Committees

- *Tree Committee*
Has oversight and recommendations for management and maintenance of trees within town road rights-of-way and public spaces. Section 3 of this document details the mission, membership, activities, and goals of the Shelburne Tree Committee.
- *Natural Resources and Conservation Commission*
Has statutory authority for management of natural areas within the town.
- *Cemetery Commission*
Has statutory authority for the care and maintenance of Town owned cemeteries which include trees.
- *Planning Commission*
Has statutory authority to create a municipal plan and other implementation

strategies. Land use or landscaping plans, or bylaw requirements, should be consistent with this Plan and reference this Plan as an authoritative guideline.

- *Development Review Board*
Has statutory authority for reviewing proposed development projects; decisions made, and conditions attached to those projects should reference this Plan and be consistent with it. Development projects have tree planting plans with species selection and planting requirements.
- *Historic Preservation and Design Review Commission*
Has statutory authority for historic sites that likely also have mature, historic trees that are important parts of the Village landscape.

Section 2: Town of Shelburne Shade Tree Preservation Plan

The Town of Shelburne recognizes the amendments to the Vermont Tree Warden statutes as made effective on Nov. 1, 2020. [Bill H.673](#) passed in the house and the senate as Act 171 in September of 2020 and was signed into law on Oct. 8, 2020. The bill amended [24 V.S.A. § 871](#), 24 V.S.A. chapter 67, and 19 V.S.A chapter 9.

For consistency and clarity, the Shelburne Shade Tree Preservation Plan references legal definitions as provided in [24 V.S.A. §2501](#) and referenced below:

- 1) "**Public place**" means municipal property, including a municipal park, a recreation area, or a municipal building. "Public place" shall not include any municipal forestland, cemetery, or property that is subject to any ownership interest held by the Agency of Transportation.
- 2) "**Public way**" means a right-of-way held by a municipality, including a town highway.
- 3) "**Shade tree**" means a shade, evergreen, or ornamental tree located in whole or in part within the limits of a public way or public place, provided that the tree:
 - A. was planted by the municipality; or
 - B. is designated as a shade tree pursuant to a municipal shade tree preservation plan pursuant to section 2502 of this title. (Added 2019, No. 171 (Adj. Sess.), § 2, eff. Nov. 1, 2020.)

The Shelburne Shade Tree Preservation Plan as follows is pursuant to [24 V.S.A. §2502](#) and is composed of five required elements and two optional elements. The Town of Shelburne adopts the following Shade Tree Preservation Plan that expands the duties of the Tree Warden in the municipality and specifies the processes by which municipal shade trees are managed and governed.

Planting of New Trees and Shrubs

The Tree Warden shall have the right to plant shade trees as may be necessary to ensure a resilient, diverse, and healthy shade tree population, or to preserve or enhance the symmetry and beauty of public ways and public places as set forth in the following guidelines.

Pursuant to the [Town of Shelburne Tree Policy](#), tree planting specifications are as follows:

- a) Trees to be planted within public ways and on public places should be appropriate for the site, meet the intended planting functions and increase the overall tree diversity of the town. To help assure that appropriate trees are selected, trees shall be chosen by a licensed landscape architect, Certified Arborist, or other appropriate professional staff with concurrence of the Tree Committee and the Tree Warden.
- b) The quality of shade trees to be planted must conform to the most current version of the American Standard for Nursery Stock for landscape trees.
- c) All shade trees shall be planted in accordance with the most current version of American National Standards Institute (ANSI) A300 Standards for Tree Care Operations.
- d) Shade trees should be sited based on above and below ground site conditions. Minimum offsets from the tree trunk for intrusion elements should be as follows:

Light standard: 18 feet

Utility pole: 10 – 18 feet depending on cross arm size

Hydrant: 15 feet

Driveway: 10 feet

Cross walk: 5 feet

Transformer, connection box: 6 feet

Underground utility connection: 15 feet

Street sign: 6 feet

Exceptions may be granted only by approval of the Tree Warden.

DigSafe shall be called prior to digging.

Maintenance of Shade Trees

The Tree Warden shall have the right to maintain and protect shade trees as may be necessary to ensure public safety and a resilient, healthy shade tree population along public ways and public places as set forth in the following guidelines.

Pursuant to the [Town of Shelburne Tree Policy](#), the maintenance specifications for the town are as follows:

- a) The care of all shade trees shall be in accordance with the current version of ANSI A300 Standards for Tree Care Operations.
- b) All contractors who work on shade trees shall have a Certified Arborist on staff or in their employ.
- c) Any construction within 10 lateral feet of the drip line of shade trees requires consultation with the Tree Committee and Tree Warden who may provide specific written requirements for additional protections of trees.

Additionally, the Shelburne Tree Committee has developed specifications for the protection and maintenance of trees during construction, included in form in Appendix A of this document. These specifications apply to all construction work done in the town public right-of-way or on town property to ensure protection of existing trees and other plants during construction projects.

Removal of Shade Trees

The Shelburne Tree Warden shall have the right to remove shade trees as may be necessary to ensure public safety and a healthy shade tree population along public ways and public places as set forth in the following guidelines. The Town of Shelburne's shade tree removal processes are consistent with [24 V.S.A. chapter 67](#).

The tree removal specifications for the town are as follows:

- a) The Tree Warden, in consultation with the Tree Committee, may remove or cause to be removed, any shade tree or part thereof which:
 - 1. are infested with or infected by, or at risk to become infested with or infected by, a tree pest and are located in an infestation area designated by the Agency of Agriculture, Food and Markets and Department of Forests, Parks and Recreation,
 - 2. are a hazard to public safety; or
 - 3. must be removed for the municipality to comply with State or federal law or permitting requirements.

- b) If, in the opinion of the Tree Committee and the Tree Warden, a shade tree constitutes no hazard to public safety and/or is determined to be healthy but needs to be removed, then the Tree Warden will warn a public hearing, giving a minimum 15 days of notice, and shall be held in accordance with 24 VSA §2509. Written appeals must be submitted to the Selectboard within 15 days. The Selectboard's decision is final.

Apportionment of Costs for Tree Warden Services Provided to Other Municipal Corporations

The Shelburne Tree Warden will not provide services to any other municipal corporations unless there is a request and agreement by the Selectboard.

Approval Requirements for Tree Maintenance or Removal on Specific Municipal Property as Granted by Municipal Officers or Legislative Bodies Other than the Tree Warden

There are no approval requirements for tree maintenance or removal of trees in natural areas.

Schools

The Shelburne Tree Warden can act as a resource to the CSWD School District related to the Shelburne Community School and other school owned properties.

Cemeteries

The Shelburne Tree Warden can act as a resource for the Cemetery Commission.

Designation of Shade Trees within the Town of Shelburne

The Town of Shelburne designates municipal trees as shade trees as follows:

A shade tree is any tree in whole or in part within a public road rights-of-way and town public spaces, provided that the Tree Warden and legislative body of the municipality find that the tree is critical to the cultural, historical, or aesthetic character of the municipality.

Shade trees that are 6" diameter at breast height (dbh) and larger are designated under the Tree Warden's jurisdiction as defined as follows.

- Shade trees within public road rights-of-way.

- Shade trees located within the following public spaces: Hullcrest Park, Davis Park, and Shelburne Beach.
- Shade trees within municipally owned natural areas overseen by the Conservation Commission are excluded. The Tree Warden can act as a resource to the Conservation Commission.

Section 3: The Shelburne Tree Committee

Mission

The Shelburne Tree Committee's mission is to help assure that the Town plans for, plants, and maintains shade trees in the Town's public spaces and public rights-of-ways. For the purposes of this document, public right-of-way and public way shall be interchangeable.

The responsibilities of the Committee are to:

- Develop a comprehensive plan for planting and maintaining diversity of species and ages of trees in public places and public ways,
- Provide a plan to maintain shade trees in public places and public ways in a healthy and safe condition,
- Develop tree planting specifications and details,
- Develop a tree fund from private and public sources and recommend an annual budget to the Selectboard for the use of those funds,
- Seek opportunities to apply for grants for the purposes of developing a master shade tree planting plan and to provide funds for planting trees, and
- Develop a plan to provide an educational program to the residents of Shelburne regarding the benefits of shade trees and trees in general.

Membership

The Shelburne Tree Committee was established in 2013. As stated in the Shelburne Tree Policy,

The Selectboard may appoint a Tree Committee for specific purposes outlined in the Tree Committee's Charter. In general, the Committee shall develop a written plan to include an inventory of all Town trees and for the planting and care of additional trees. They shall also educate the citizens of Shelburne about the benefits and care of this resource. In concert with Town staff, the Committee may apply for

grant funds to accomplish the Tree Inventory and Plan, to plant and care for Town trees and other similar purposes.

The current membership of the Shelburne Tree Committee is seven members, serving staggered 3-year terms. The members are listed on the [Tree Committee webpage on the Town's website](#).

Accomplishments

Notable accomplishments of the Shelburne Tree Committee include:

Funding

The Shelburne Tree Committee has received numerous grants through the VT Urban and Community Forestry Program since 2014. They regularly seek out opportunities for grants and other sources of funding for trees and tree work within the town.

Tree City USA

The Town of Shelburne applied for and was designated as a Tree City USA community for the first time in 2017. Tree City USA is a program of the Arbor Day Foundation and to be eligible, a municipality must have four baseline components: a tree board or department, a tree care ordinance, a forestry program with annual budget of at least \$2/capita, and an Arbor Day observance and proclamation. The Tree Committee continues to participate in the Tree City USA program.

Tree Plantings

The Tree Committee has focused on planting trees especially considering the ash trees that will be removed because of Emerald Ash Borer. The goal of the committee is to diversify the tree species in town.

Tree Inventory Efforts

An initial tree inventory of shade trees located on public spaces and in Town road rights-of-way in Shelburne Village, Shelburne Beach, School Street neighborhoods, and Hullcrest neighborhoods was completed in 2018. The inventory of Ash trees on public

spaces and in Town owned rights-of-way throughout the town completed in summer 2020.

Tree Policy Adoption and Update

The first Tree Policy was originally adopted September 28, 2010. It was amended February 27, 2018, and September 8, 2020.

Memorial Tree Policy

The Memorial Tree Policy adopted February 27, 2018. A memorial tree application and procedures have been developed and implemented. Photos and dedication information is noted on the Tree Committee's webpage on the Town of Shelburne website.

Public Tree and Street Tree Management Plan

A Public Tree and Street Tree Management Plan was prepared with assistance from the Chittenden County Regional Planning Commission and adopted in April 2016. It is included as part of this document in Appendix A.

Miscellaneous

The Tree Committee established a Tree Fund in 2014 with an initial donation from a group of Wake Robin residents.

The Select board designated a Tree Committee in 2019: a change from an Advisory Tree Committee.

Annual Activities of the Tree Committee

1. Tree City USA application in February
2. Arbor Day celebration typically in May coordinated with Vermont Arbor Day date which is the first Friday in May
3. Education and Outreach Activities: workshops about trees, articles, materials about trees for Town website, and public presence at Shelburne Day
4. Monthly meetings the first Tuesday of each month.

Budget

The Town of Shelburne supports the Shelburne Tree Committee's activities and municipal tree management through:

1. Annual funding for a Tree Conservation line item and an Emerald Ash Borer Tree Management line item.
2. Annual funding in respective town departments for tree maintenance on town properties and in town road rights-of-way.
3. Annual funding for educational activities for Town staff, residents, and committee members.

Long-Term Goals of the Tree Committee

1. Continue to execute the EAB Management Plan. Develop specific priorities for removals, recommended species for planting.
2. Identify other plant diseases to plan for and determine what measures are needed for implementation.
3. Expand tree inventory to include all trees in town ROWs and on public spaces.
4. Establish an annual tree contest.
5. Continue the tree fund and program for planting trees on town road rights-of-way, in public spaces, and the town beach.
6. Continue public education regarding local threats and accomplishments. This could include handouts and other materials available for public use.
7. Identify areas for additional tree plantings in town by creating a Tree Master Plan.
8. Maintain the [Shelburne Tree Committee webpage](#) on the Town website with current materials and education.
9. Update the Cultural Resources Walking Brochure for Shelburne Village.
10. Determine resource opportunities and constraints toward further review/evaluation of the 77 trees identified in the 2014 tree inventory.

Section 4: Related Documents and Links

This section includes all relevant Town of Shelburne documents, plans, and forms related to the activities of the Shelburne Tree Committee and the Shelburne Tree Warden. These documents are described and listed below and are also available on the Shelburne Tree Committee webpage at: <http://www.shelburnevt.org/235/Shelburne-Tree-Committee>.

Town of Shelburne Specifications for Tree Protection during Construction

These specifications are related to the protection of existing trees and other plants during all construction projects within the Town of Shelburne's public right-of-way or on Town-owned properties. These specifications shall be followed and are included in Appendix B.

Town of Shelburne Tree Policy

The purpose of the Town of Shelburne Tree Policy is to promote, protect, and enhance public health, safety, and general welfare by providing a policy governing the planting, maintenance, protection, and removal of trees, shrubs, and other woody plant material within public rights-of-ways and public places with the Town. The most current version of this policy is available here:

<http://www.shelburnevt.org/DocumentCenter/View/3422/Shelburne-Tree-Policy-2020>

Public Tree and Street Tree Management Plan

The goals of the Public Tree and Street Tree Management Plan are to provide a vision, structure, and foundation for the care and management of Shelburne's public and street trees, now and for the future health and wellbeing of the Shelburne community. This document shall be the guidance for tree planting and maintenance for the town and is included as part of this document in Appendix A.

Shelburne Emerald Ash Borer Preparedness Plan (2020)

Developed by a group of University of Vermont students in the spring of 2020, this purpose of the plan is to address important information regarding the invasive emerald ash borer insect as it specifically relates to the Town of Shelburne. The plan summarizes

the town's ash tree inventory efforts and includes management considerations and recommendations. The plan is available here:

<http://www.shelburnevt.org/DocumentCenter/View/4824/Shelburne-EAB-Management-Plan-2020>

Shelburne Ash Tree Inventory Dashboard

Developed by the Chittenden County Regional Planning Commission and based on roadside ash tree inventory data collected by UVM students and members of the Shelburne Tree Committee (supported by the Vermont Urban & Community Forestry Program), this interactive website summarizes data on all public roadside ash trees in the Town of Shelburne. The dashboard is available here:

<https://ccrpc.maps.arcgis.com/apps/dashboards/757bf3123e0e4fa1956b57e6c51609f1Shelburne>

Memorial Tree Policy (2018)

The purpose of the Town of Shelburne Memorial Tree Policy is to implement a process for planting memorial trees on municipal property, provide a list of recommended trees and applicable fees for this service, establish the limits of the Town's obligations in planting and maintaining memorial trees, and establish a formal record of memorial trees. the policy is available here:

<http://www.shelburnevt.org/DocumentCenter/View/2402/Shelburne-Memorial-Tree-Policy-2018>

Shelburne Memorial Tree Planting Application

The application for Shelburne Memorial Tree Planting is regularly updated and is available here:

<https://www.shelburnevt.org/DocumentCenter/View/2397/Memorial-Tree-Planting-Application->

Public Tree Inventory Report (2014)

This report summarizes the 2014 public tree inventory conducted in partnership with the Vermont Urban & Community Forestry Program and interns from the University of Vermont's Land Stewardship Program. The report presents information on the data

collected on over 700 village trees, as well as management considerations and recommendations. The report is available here:

<http://www.shelburnevt.org/DocumentCenter/View/386/Shelburne-Public-Tree-Inventory-2014>

Section 5: Additional Resources

The following resources are relevant to the activities of the Shelburne Tree Committee and have guided, advanced, or supported the Committee's goals.

Vermont Tree Warden Statutes

<https://vtcommunityforestry.org/sites/default/files/2022-10/tree-warden-and-tree-statutes.pdf>

VT Invasives Webpage

EAB page

<https://vtinvasives.org/>

VT Urban & Community Forestry Program

Tree Selection

EAB Municipal Preparedness

Funding

<https://vtcommunityforestry.org/>

Cornell University horticulture resources:

<http://www.hort.cornell.edu/commfor/resources/index.html>

International Society of Arboriculture resources:

<http://www.treesaregood.com/treeowner/treeownerinformation.aspx>

US Forest Service

Vibrant Cities Lab

S&P Forestry, Urban

<https://www.fs.usda.gov/>

Arbor Day Foundation

Tree City USA

<https://shop.arborday.org/>

Appendix A:

Town of Shelburne, Vermont Public Tree and Street Tree Management Plan, April 2016

TOWN OF SHELBURNE, VERMONT PUBLIC TREE AND STREET TREE MANAGEMENT PLAN

April 2016



Created by the Shelburne Tree Advisory Committee,
with funding and strategic guidance provided by the
Vermont Urban & Community Forestry Program, and with assistance
from the Chittenden County Regional Planning Commission

TREES

by Joyce Kilmer

I think that I shall never see
A poem lovely as a tree.

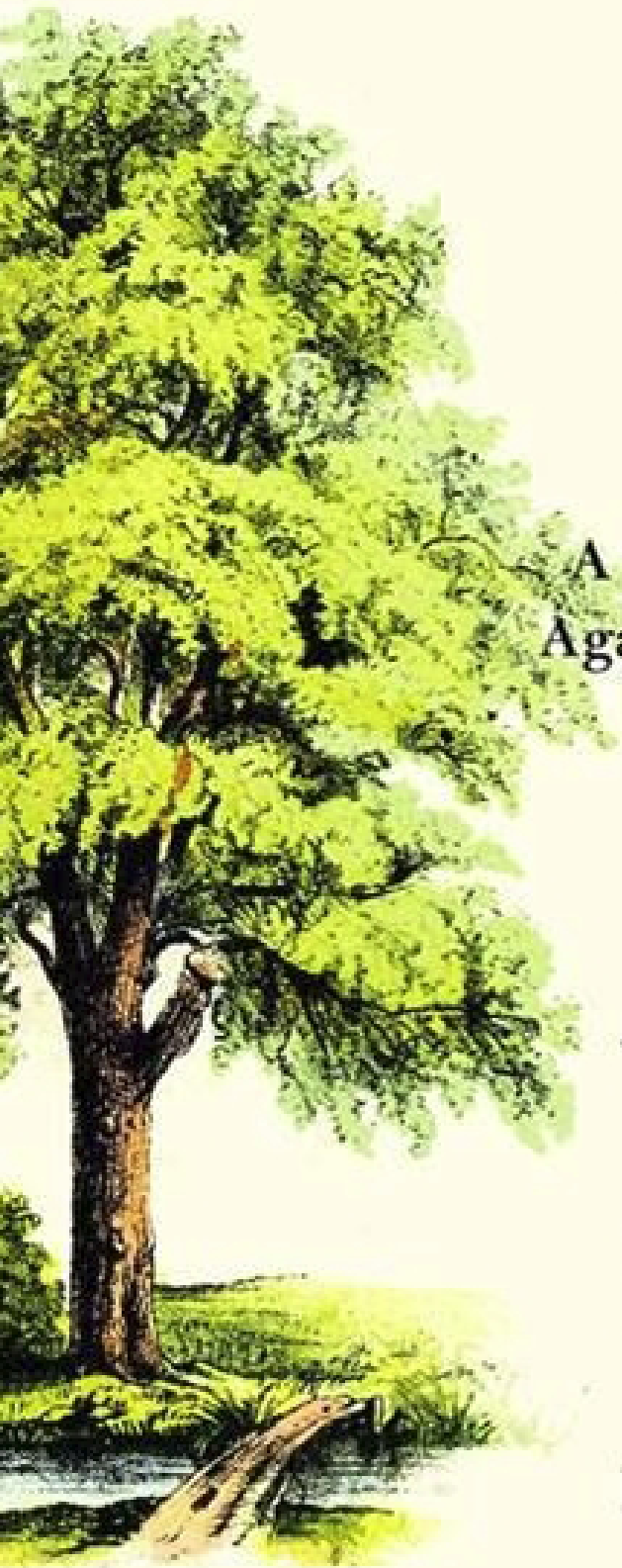
A tree whose hungry mouth is prest
Against the earth's sweet flowing breast;

A tree that looks at God all day,
And lifts her leafy arms to pray;

A tree that may in summer wear
A nest of robins in her hair;

Upon whose bosom snow has lain;
Who intimately lives with rain.

Poems are made by fools like me,
But only God can make a tree.



INTRODUCTION

The Town of Shelburne values its trees for the wide array of aesthetic, functional, and ecological values they add to the community. Imagine the Parade Ground as just an open field of grass, without the shade and beauty that the trees provide. Imagine our residential streets and views without trees adding beauty, providing habitat and nesting spots, creating oxygen, sequestering carbon, filtering pollutants, dampening noise, soaking up stormwater, providing shade and reducing solar heating in the summer, and enhancing property values.

Trees are an important part of the fabric of our community, part of the infrastructure that supports our community and that makes it a special place. Most of these trees were planted purposefully by previous generations looking to the future, beyond their own lifetimes, and creating a heritage that we all enjoy today.

Just as the Town of Shelburne plans for and maintains its built infrastructure of roads, bridges, or water and sewer lines, trees must also be part of our short and long range planning. Trees must be placed properly and carefully, cared for and maintained over time, and eventually replaced. Nothing in this process happens by accident -- it requires ongoing planning, time, attention, and funding; perhaps more so than with other infrastructure, as trees are living things, not inanimate objects.

The goals of this management plan are to provide a vision, structure, and foundation for the care and management of our public and street trees, now and for the future health and well-being of our community. Many of these ideas and concepts will also be relevant and applicable to privately owned land and trees, which are the overwhelmingly dominant portion of Shelburne's overall landscape.

Funded by the Vermont Urban & Community Forestry Program, this Plan is one part of a three-phase project intended to:

- Help the Town gain a clearer understanding of the current conditions of its street trees and urban forest through a tree inventory (conducted in 2014);
- Create this management plan for present and future care of this the Town's public street trees and urban forest; and to
- Teach local volunteers and staff key techniques for tree planting and pruning/maintenance (workshop held in the fall of 2015 with tree expert Mark Duntemann of Natural Path Urban Forestry Consultants - <http://naturalpathforestry.com>).

EXISTING CONDITIONS

Understanding our landscape – *what does the 2014 Shelburne Tree Inventory tell us?*

The Shelburne Tree Inventory, completed in August 2014, was conducted by the University of Vermont Land Stewardship Program, with guidance from the Vermont Urban & Community Forestry Program. As shown on the following maps, this inventory covered a defined area within the Village proper. Due to time and resource constraints, the inventory did not cover the broader Town road network. While the conclusions drawn here are specific to the inventoried area, the ideas and concepts discussed are applicable townwide.

Key findings from the inventory (*please also see graphics on page 6, 7, and 9*):

- 23 public streets were surveyed
- 722 trees were studied
- 49 different tree species were identified
- \$49,585 in annual monetary benefits were attributed to these trees
- 65 potential new planting locations were identified

Although 49 different tree species were identified, half of these public trees are either ash or maple, both potentially at risk of infestation with emerald ash borer (EAB) or Asian longhorned beetle (ALB). In order to avoid a sudden, dramatic, and expensive loss of such a large portion of the Town's street trees (such has happened in many communities in the 1900s with Dutch Elm disease), it is important to plan ahead now. This may involve gradual replacement of these trees with other, hardy species, and also considering different species in new planting locations. General invasive pest information:

<http://www.vtcommunityforestry.org/community-planning/tree-pests>

Emerald Ash Borer: <http://www.vtinvasives.org/invaders/emerald-ash-borer>

Asian Longhorn Beetle: <https://www.aphis.usda.gov/aphis/resources/pests-diseases/asian-longhorned-beetle/About-ALB>

Over time, a wider range of tree species and age classes of trees will strengthen Shelburne's urban forest, as it will be less susceptible to sudden, dramatic loss of any particular species, type, or size of tree, whether due to a forest pest, storm, or disease. Appendix A of this Plan offers guidance for site and species selection.

At this point in time, most of the public trees evaluated in the inventory are in good condition. Of the 722 trees surveyed, 84 are in fair or poor condition; and only five are already dead. The five dead trees should be scheduled for removal and/or replacement in the near term, and the 84 trees known to be in only fair or poor condition should be monitored closely and evaluate for further treatment or removal as may be warranted. 77 trees were questioned as needing further review, and part of the long-term plan described below should include monitoring and evaluation of these trees.

(Please see maps included in the Tree Inventory for further details and locations).

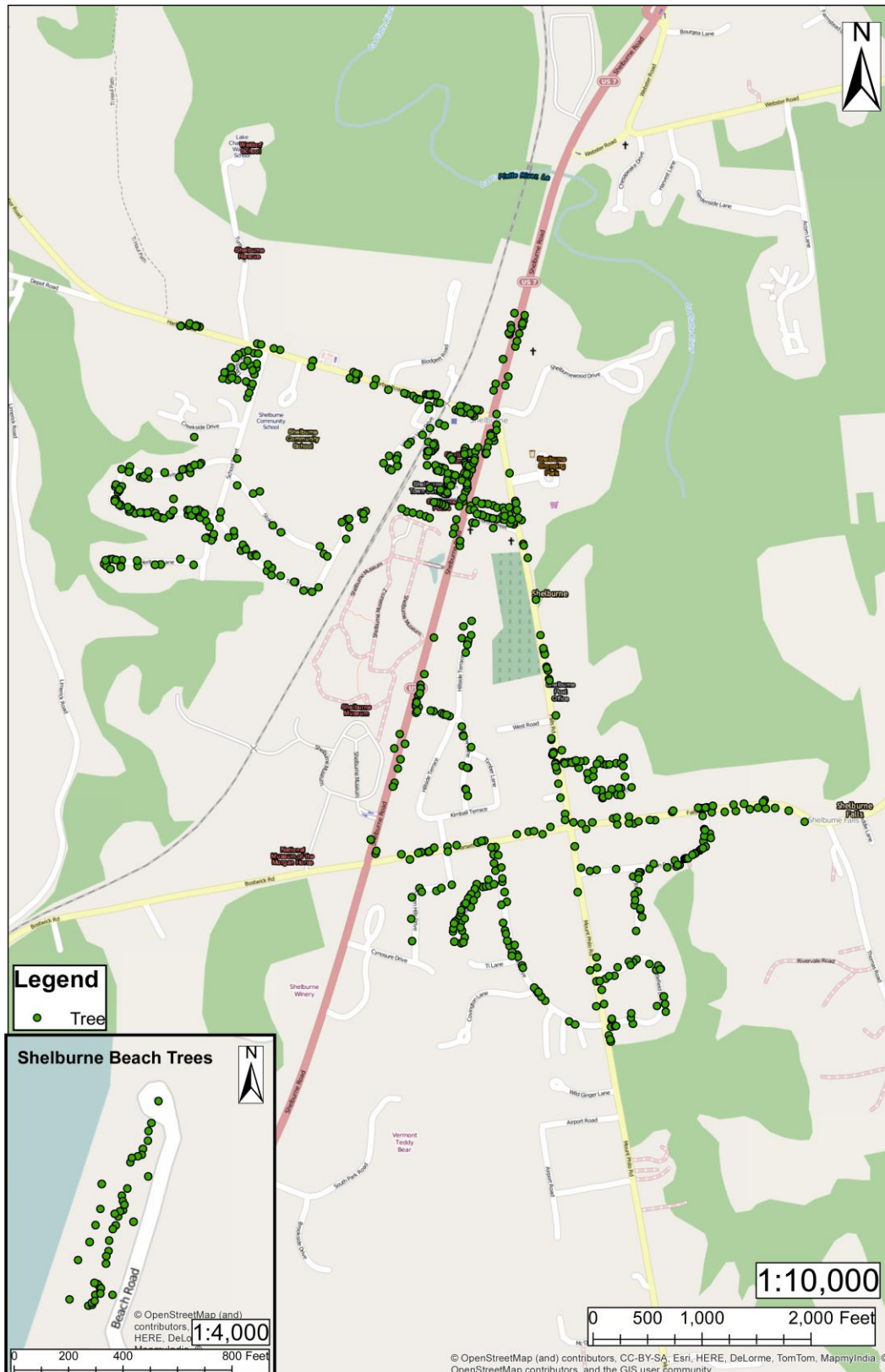


Figure 1: Trees surveyed in the 2014 tree inventory

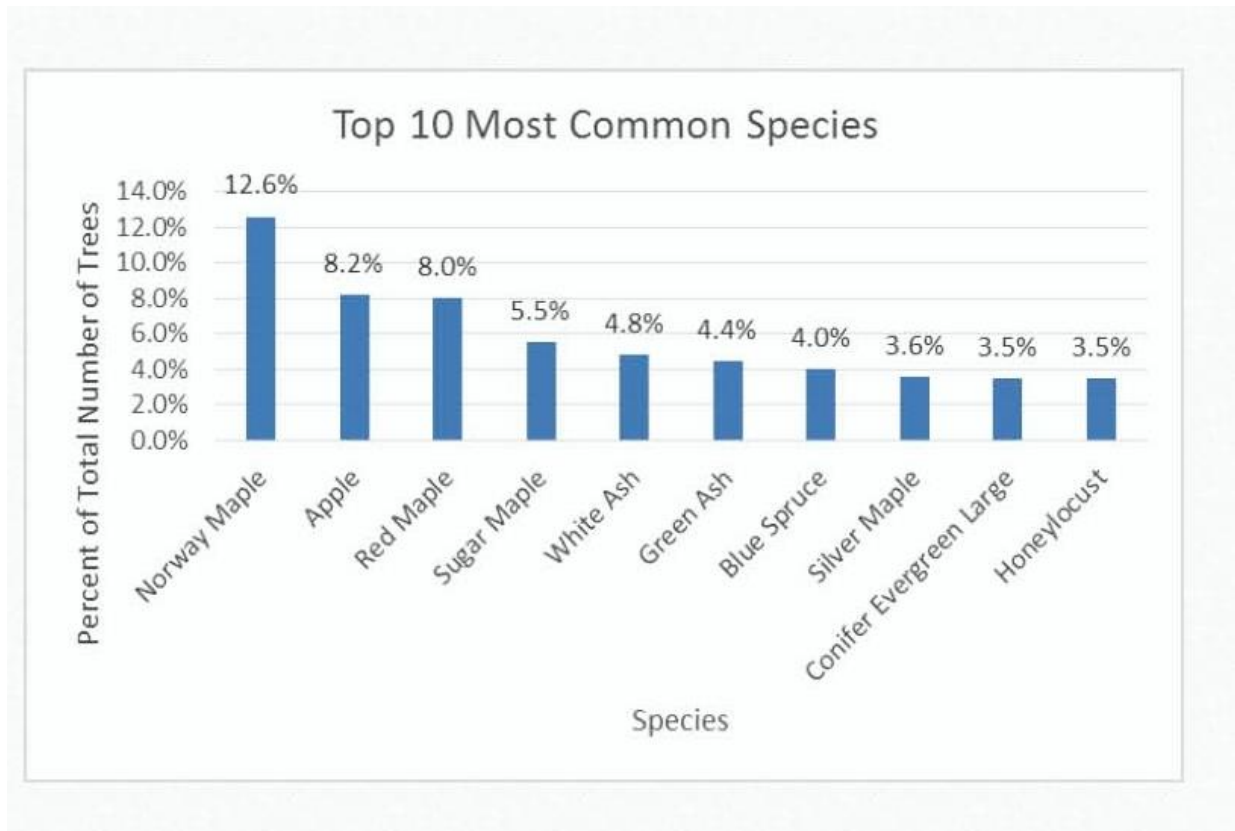


Figure 2: Summary of findings of the 2014 tree inventory

Recommendations

- No Emerald Ash Borer!
- Continued Monitoring
- The Invasive Norway Maple
- Diversify the Urban Forest
- The Future? Not just the ROW

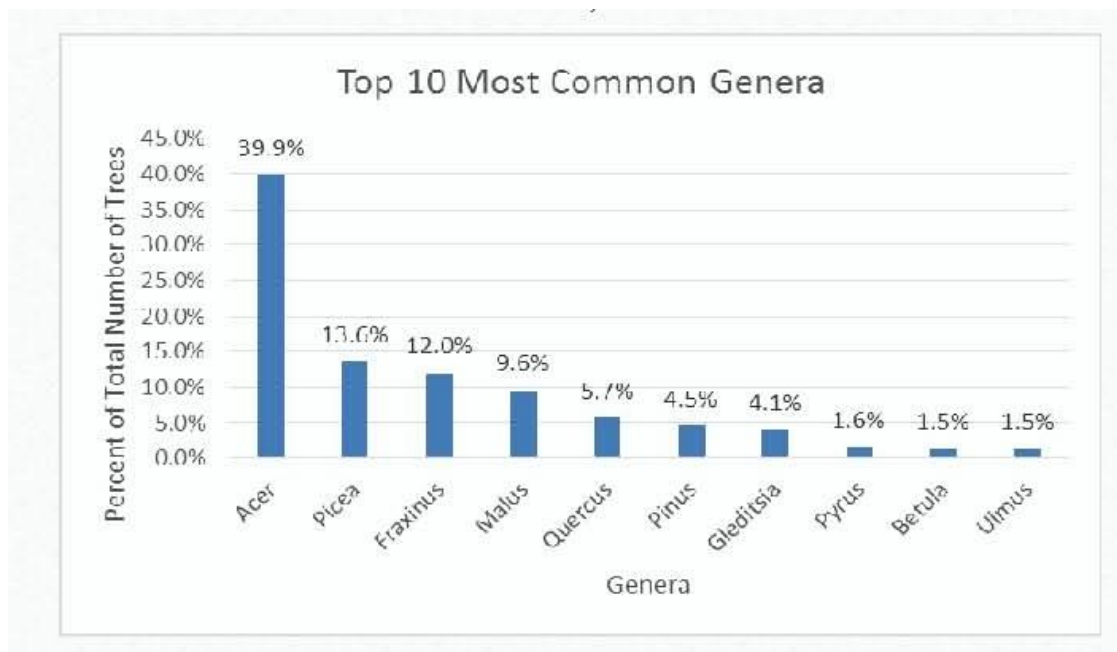
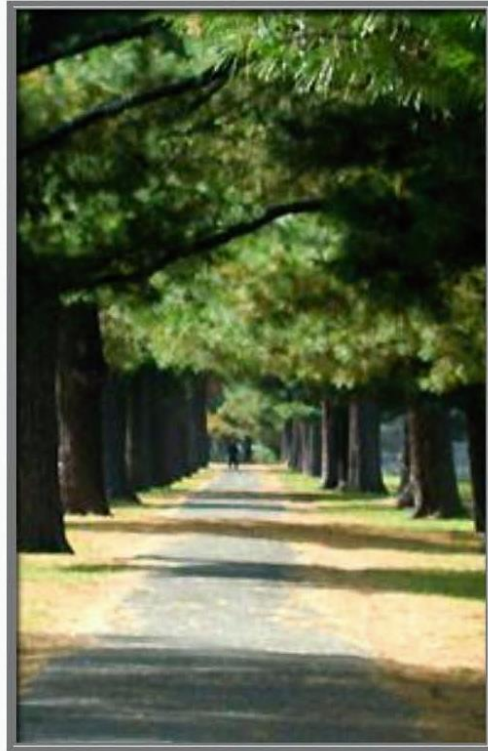


Figure 3: Recommendations from the 2014 tree inventory



Figure 4: Potential new planting locations within the village area
Surveyed in the 2014 tree inventory

Value of Urban Trees

- Aesthetics
- Ecosystem Services



Figure 5: Calculated financial value of urban trees

CONCEPT TREE MANAGEMENT PLAN/SCHEDULE

A key purpose of this document is to create a foundation for a strategic plan and approach to the Town's street trees and public trees; collectively, its urban forest. This requires

- Understanding current conditions, present and future opportunities and constraints;
- Thoughtful approaches to both improving future conditions and managing risk; and
- Identifying needs, priorities, and sources of funding to accomplish essential and desired tasks.

With these, and through cooperation of and collaboration with other interested and responsible parties, the Shelburne Tree Advisory Committee can fulfill a vision of a strong, healthy, dynamic, and beautiful urban forest.

Key issues are discussed in more detail below, and in the attached appendices, or online sources. These include:

- 'Big picture' planning: with over half of the inventoried trees being only two species, diversifying the types and ages of trees in Shelburne's urban forest will create greater resiliency and long-term health by lessening the risk of major tree loss due to disease, pests, or storms.
- Site selection and site-specific needs: for example, Shelburne has widely varying soil types, ranging from clay to sand to loam to ledge. Site-specific micro-climate also varies widely: consider the differences between the undeveloped, exposed, windy shoreline of Lake Champlain, as compared with the along more urban environment along Shelburne Road. Tree health and vigor can relate directly to the right "match" of species for site specific conditions. Important aspects to consider include:
 - o wind exposure,
 - o moisture levels,
 - o solar exposure,
 - o salt tolerance, and
 - o soil types and drainage patterns.

Other site conditions or needs affecting species selection include:

- Desire for shade or screening, as well as seasonal or year-round growth,
- Sight distances and visibility at driveways or intersections,
- Visibility of buildings and signs,

- Growth patterns related to presence or future likelihood of overhead or underground utilities,
- Seasonal flowering patterns, fruiting habits, or seed production,
- Soil compaction caused by pedestrian or vehicular traffic,
- Brittleness of wood, or breakage of branches, and
- Desire or need for stormwater management.

These are neither singular, nor simple ‘yes’ or ‘no’ decisions. Often, multiple needs can be satisfied simultaneously. For example: commercial businesses often want an unobstructed view of buildings and signs, yet Town standards may require landscaping. A tree with appropriate growth habit may be ‘limbed up’ by a skilled arborist, allowing for visibility and light, while maintaining a healthy branching structure and keeping intact the aesthetic/ecological benefits that trees provide.

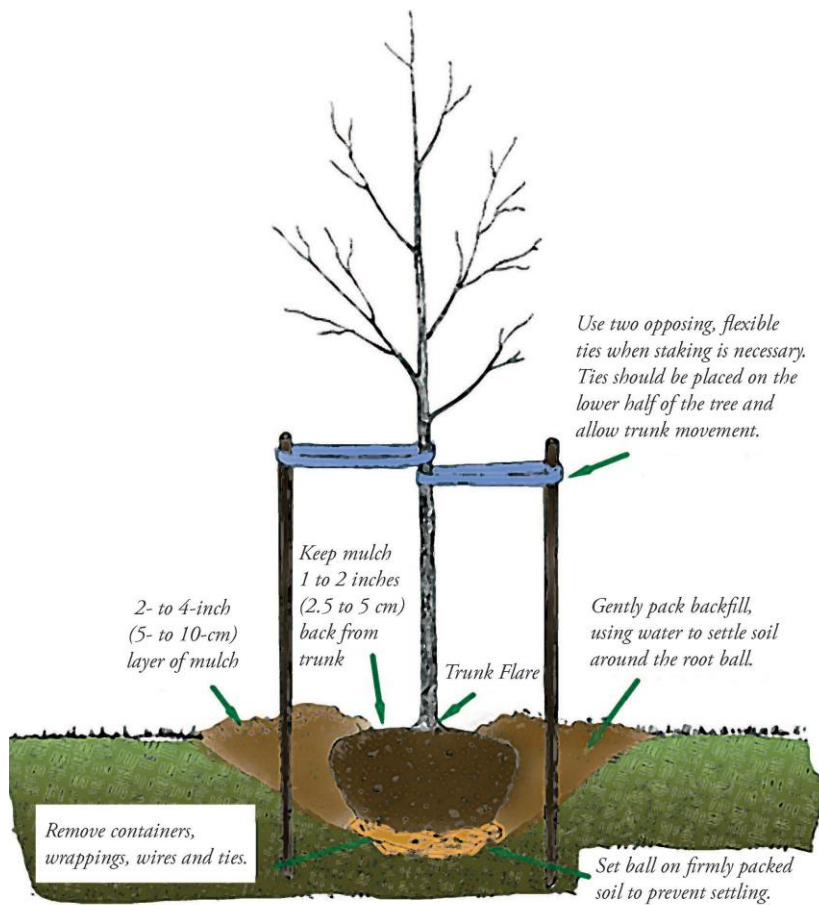
Yet planning and site/species selection are meaningless unless trees are planted properly, and maintained over time. Keys to successful tree planting include:

- Proper site preparation,
- Proper planting depth,
- Initial and subsequent watering,
- Mulching around the tree, but keeping mulch away from the trunk

It is essential that a tree’s root flare, where the trunk broadens at its base into the root structure, be kept exposed and not buried into the soil at time of planting. Then, mulch must not be piled up against the trunk with each spring’s landscaping. Keeping the lower trunk and root flare exposed allows a tree to ‘breathe’ properly, keeps mice or other small creatures from nesting there and eating the bark, and helps the roots to grow outward instead of encircling the trunk. Keeping a mulched area around trees helps minimize or prevent damage caused by “weed whackers” or lawnmowers.

Please see the information and illustrations below for more information about proper planting techniques and maintenance strategies.

NEW TREE PLANTING



SOURCE: www.isa-arbor.com

Tree Maintenance

A full featured tree maintenance plan requires funding, staffing, and time. For example, with even just the 722 public trees identified in the Tree Inventory (*and this is not a complete inventory of all trees on all Town roads or properties*), it's clear that a regular cycle of review, inspection, and maintenance should be instituted as soon as possible. Otherwise, proper maintenance is left to chance, trees may not mature in an optimal manner, and preventable problems may become hazards that are only discovered too late or after the fact. While not every possible issue is discoverable in advance, a regular cycle of inspection and maintenance may lessen risk, liability, and cost.

The 77 priority trees identified in the Tree Inventory should be the first priority. If roughly that many trees are inspected each year, it would create a ten-year inspection cycle for the current tree inventory; yet as noted, this would not cover trees within other Town highway rights of way outside of the core area inventoried. Acknowledging limited resources, it will still benefit the Town to clarify and create an achievable strategy for inspection and maintenance of its street trees, including a plan for who is responsible for this work (including but not limited to inspection, maintenance, decisionmaking, site/species selection, and tree replacement), guidelines for that work, and a funding mechanism to ensure consistent action; no different than that already in place for other types of municipal infrastructure. This is important for the health of the trees themselves, and to help lessen municipal liability for any incidents that may occur.

PRUNING YOUNG TREES

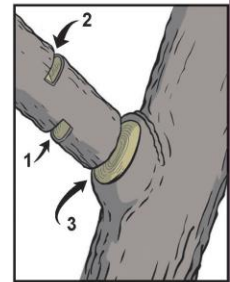
Keep these few simple principles in mind before pruning a tree:

- Always have a purpose in mind before making a cut. Each cut has the potential to change the growth of the tree.
- Poor pruning can cause damage that lasts for the life of the tree. Learn where and how to make the cuts before picking up the pruning tools.
- Trees do not heal the way people do. When a tree is wounded, it must grow over the damage. As a result, the wound is contained within the tree forever.
- Small cuts do less damage to the tree than large cuts. Correcting issues when a tree is young will reduce the need for more drastic pruning later.

Making the Cut

Pruning cut location is critical to a tree's growth and wound closure response. Make pruning cuts just outside the branch collar to avoid damaging the trunk and compromising wound responses. Improper pruning cuts may lead to permanent internal decay.

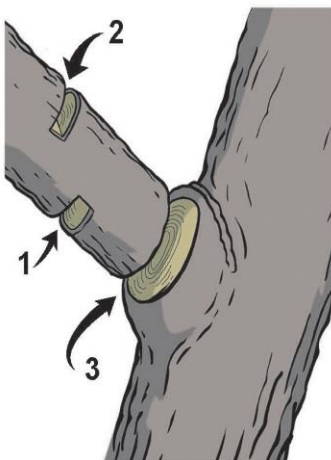
If a large branch must be shortened, prune it back to a secondary branch or a bud. Cuts made between buds or branches may lead to stem decay, sprout production, and misdirected growth.



SOURCE: www.isa-arbor.com

PRUNING MATURE TREES

Making Proper Pruning Cuts



Pruning cuts should be made just outside the branch collar. The branch collar contains trunk or parent branch tissue and should not be damaged or removed. If the trunk collar has grown out on a dead limb to be removed, make the cut just beyond the collar. Do not cut the collar.

If a large limb is to be removed, its weight should first be reduced. This is done by making an undercut about 12 to 18 inches (30 to 46 cm) from the limb's point of attachment. Make a second cut from the top, directly above or a few inches farther out on the limb. Doing so removes the limb, leaving the 12- to 18-inch (30- to 46-cm) stub. Remove the stub by cutting back to the branch collar. This technique reduces the possibility of tearing the bark.

SOURCE: www.isa-arbor.com

LONG RANGE PLANNING

The Tree Advisory Committee sets forth below a strategic plan for actions and timeframes, understanding that some needs or tasks may overlap in time, others are ongoing, and not all of these may be within the Tree Advisory Committee's jurisdiction or control. A strategic plan is subject to review and revision as needed.

Year 1: Complete management plan and gain approval by Selectboard; work with Town to remove the five dead trees identified in the inventory; consider site conditions for potential replacement; determine resource opportunities and constraints toward further review/evaluation of the 77 trees identified in the inventory; use inventory and management plan to build support for funding. Review the Memorial Tree program to make sure that current costs are accounted for. Expand Memorial Tree program: increase publicity, celebrate recent or current gifts/plantings, identify likely or appropriate locations and species in advance so it is part of an overall municipal beautification plan, and not a more random approach to species and site selection at the time of donor inquiry.

Year 2: Consider how and whether the tree inventory might be expanded along other Town roads. Strengthen relationships, trainings, and collaboration with others, including but not limited to:

Town Manager/Selectboard: Seek annual meeting to share information and build support; seek recurring, dedicated funding for actual needs, and in anticipation of applying for Tree City USA recognition in year 4. Has general and statutory authority for overall municipal governance, determining and managing budget, setting strategic direction for the Town; the Town Manager plays a key role in implementing the Board's policies. Requests for budget and commitment of staff time go through these channels. Approves grant applications. Funding for tree planning, planting, maintenance, replacement may come from multiple sources capital improvement plan, annual operating budget, grants, private donations (such as the Memorial Tree program). Typically, a successful program will benefit from a multi-pronged approach, within the context of a strategic, long range approach such as this Plan. Purchasing of goods or services should be handled in a manner consistent with the Town's adopted procurement procedures.

Tree Warden: Has clear statutory authority and responsibilities, which ideally are carried out in a manner consistent with this Plan. Clarify how these statutory duties/responsibilities relate to Committee roles, and define potential areas of

collaboration. The Tree Advisory Committee and Tree Warden can create synergy in support of each other's work.

Recreation Committee: Manages public parks and recreation land, including trees on these public lands; overlaps with Tree Warden's authority and responsibilities.

Highway Department: 'Front line' of observation; often involved with or responsible for tree trimming, maintenance, or removal work within Town highway rights of way.

Planning Commission: Has statutory authority to create a municipal plan and other implementation strategies. Land use or landscaping plans, or bylaw requirements, should be consistent with this Plan and reference this Plan as an authoritative guideline.

Development Review Board: Has statutory authority for reviewing proposed development projects; decisions made and conditions attached to those projects should reference this Plan and be consistent with it. Species selection should consider both site-specific needs and conditions, as well as broader municipal corridor, land use, or tree planting plans. Standard conditions should be attached to all zoning permits, ensuring proper care is taken to protect trees and their root zones from disruption, damage, and soil compaction.

Historic Preservation and Design Review Commission: Explore areas of mutual concern; historic sites likely also have mature, historic trees that are important parts of the Village landscape.

Natural Resource and Conservation Commission: Explore areas of mutual interest and concern; seek synergy in funding and programs to achieve mutual goals.

Police Department: Filing crash report and insurance claim if trees are harmed or destroyed by vandalism, motor vehicle accidents, or other incidents (*Please see Appendix C for basic documents. The complete State of Vermont Uniform Crash Report and instructions may be found at* www.claimspages.com/documents/download/8451F.pdf

VTrans: Has legal jurisdiction within State highway rights of way. With RT 7 as the primary and highly visible highway corridor serving residents, visitors, and through traffic, building a shared sense of care, duty, and approaches to tree planting and maintenance will be a great benefit to the Town.

Utility Companies: Electric utilities often hire contractors to trim trees growing within and around overhead power lines; permission of the Tree Warden is required for any work performed within Town highway rights of way (which by definition and legal right is where most overhead utility lines run). Equal care is also needed for any installation or maintenance work done below ground anywhere near trees and their root structures, including water or sewer lines, sidewalks, driveways, drainage culverts, and the like. Building working relationships with both public and private utilities can help create a collaborative approach, and avoid risk of irreversible harm. Utility companies may include Green Mountain Power, Comcast, Vermont Gas, municipal water and sewer, and the like; calling these utilities and/or DigSafe (dial 811) is prudent before commencing work that may affect or involve underground utilities.

Media: Increase awareness of the Committee, its activities, and value added to the Town. This may include municipal media (Town Report, Town Manager's weekly email summaries, other Town activities); or external media such as the Shelburne News and local cable access TV. Celebrate successes, publicize memorial contributions and tree plantings, participate in community events such as parades, the farmer's market, collaborate with allies such as those involved in streambank stabilization/restoration programs, hold an Arbor Day celebration at the School.

Year 3: Clarify and confirm a plan for cyclical review/evaluation of inventoried trees. Identify new individual planting locations, as well as longer term landscaping/street plans, especially along major corridors (for example, in the new Form Based Code overlay district along Shelburne Road). Consider participating in the State's "First Detector" program to keep close watch on potential arrival of disease, infestation, or pests (such as Asian Longhorned Beetle, Emerald Ash Borer, and Hemlock Woolly Adelgid). Consider participating in Master Gardener and/or Stewardship of the Urban Landscape (SOUL) programs; determine how past graduates of these programs may be helpful to the Committee.

Year 4: Consider applying for "Tree City USA" recognition. Information, and the application are all available at <http://www.arboday.org/programs/treecityusa/index-become.cfm>

Year 5: Evaluate progress to date; adjust/expand/contract work plan and program as appropriate or warranted, and given time, resources, and interest. As progress is evaluated, consider how best to manage existing conditions, and how to take a strategic approach to new opportunities or planting plans/locations. While much of this Plan covers the former, the attached or linked appendices or resources provide much useful information for the latter, offering key issues to consider in site and species selection.

REFERENCES

There are many excellent references on tree-related topics; this is just a sampling of helpful resources.

Vermont Urban & Community Forestry Program: <http://www.vtcommunityforestry.org/resources>

Recommended Trees for Vermont Communities: A guide to selecting and purchasing street, park, and landscape trees. Vermont Urban & Community Forestry Program, 2001. www.vtcommunityforestry.org

Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance. Urban Horticultural Institute, Department of Horticulture, Cornell University, Ithaca, NY. Bassuk, et al, 2009.

Cornell University horticulture resources:
<http://www.hort.cornell.edu/commfor/resources/index.html>

International Society of Arboriculture resources:
<http://www.treesaregood.com/treeowner/treeownerinformation.aspx>

Online Tree Selection Tool:
<http://www.vtcommunityforestry.org/resources/tree-care/tree-selection>

Tree planting and maintenance:
http://www.vtcommunityforestry.org/sites/default/files/pictures/protecting_your_investment_tree_planting_maintenance.pdf

“Tree Owners’ Manual”:
<http://www.vtcommunityforestry.org/sites/default/files/pictures/treeowners.pdf>

Street Tree Factsheets, Elmendorf and Kuhns, 2001. Pennsylvania State University.

The Law of Trees, Vermont Institute for Government, 1998

Vermont State Statutes:

Tree Wardens: 24 VSA 67 2502 - 2511:
<http://legislature.vermont.gov/statutes/fullchapter/24/067>

Cutting of Trees: 13 VSA 77 3601 - 3609:
<http://legislature.vermont.gov/statutes/fullchapter/13/077>

Town of Shelburne, Vermont Tree Policy, adopted September 28, 2010, and amended May 13, 2014
(Included in this Plan as Appendix B).

Sample State of Vermont Uniform Crash Report form, and appraisal/insurance claim for a tree destroyed in a motor vehicle accident, City of Burlington Arborist Warren Spinner, 2006. (Included in this Plan as Appendix C).

Mark Duntemann - Natural Path Urban Forestry Consultants (<http://naturalpathforestry.com>)

Tree City USA Program: <http://www.arboday.org/programs/TreeCityUSA/index.cfm>

Urban Tree Risk Management: A Community Guide to Program Design and Implementation. Jill D. Pokorny, Plant Pathologist, USDA Forest Service, Northeastern Area, St. Paul, MN. Undated; available on CD.

APPENDICES

Appendix A

Site Assessment and Species Selection

Section 2.

Site Assessment & Species Selection

The conditions of the urban environment, no matter how large or small, are often harsh and unsuitable for trees. From the moment they are planted until the time of their death, urban trees are subjected to a variety of stresses, from both above and below ground, that are not found in a natural setting. This is the simple reality of growing trees in the urban ecosystem. However, the vast majority of these problems can be avoided through proper site assessment and species selection.

There are very few conditions under which trees are absolutely unable to grow; it is just a matter of finding the right species. Far too often, the decision of which tree to plant precedes the decision of exactly where and under what conditions it will be planted. The result is a stressed tree that is more susceptible to secondary agents, such as insects and disease. Identifying the critical limiting factors of the site and then determining which species can tolerate them is the most important step in planting a tree that will remain healthy and productive for many years. This section is designed to guide you through the assessment of several important site characteristics. Use the information provided to complete the Site Assessment and Species Selection Worksheet (pg. 5) which can then be kept as a reference for selecting and purchasing trees for that site. It is also a good idea to have this information on hand when visiting the nursery or seeking other professional advice

Below Ground Site Assessment

Roughly 80 percent of the health problems associated with trees in the urban ecosystem originate from unsuitable conditions below ground. A tree is supported both structurally and nutritionally by its roots, and any limitations placed thereon will result, directly or indirectly, in future health problems. There are several below ground factors that are critical in determining the ability of a given tree to survive at a particular site.

Soil Texture

The texture of the soil determines its water- and nutrient-holding capacity. Some species are adapted to grow on dry, sandy soils while others tolerate poorly drained clays. The texture of the soil also dictates its resistance to compaction, which greatly affects oxygen availability and the moisture- and nutrient-holding capacity. To determine soil texture, pick up a small handful and rub it between your fingers. Does the texture feel coarse and dry (sand), wet and slick (clay), or moist but gritty (loam)?

Drainage

Drainage is highly dependent on the soil texture. Fine clays that are easily compacted will not allow water to drain freely, which limits the availability of oxygen to the roots. Sandy soils that don't hold water at all are often too dry for many trees and they will suffer from drought if not watered regularly. Obstacles such as bedrock and other impermeable objects beneath the soil can also inhibit drainage. To see how your soil drains, dig a hole one foot deep and fill it with water. See the Site Assessment Worksheet to classify your soil as excessively drained, moderately drained, or poorly drained.

pH

Many tree species are only adapted to grow within a limited range of pH, generally under slightly acidic conditions. Urban soils often tend to be slightly alkaline from limestone containing materials, such as concrete, commonly found in urban environments. Kits and meters are widely available to test for pH.

Road Salt

Excessive amounts of salt spread on roadways can cause severe injury to salt intolerant trees. This damage is generally most severe within 25 feet of the road. Planting tolerant species further away from or above the grade of the roadway can help reduce problems associated with road salt. Also, pay close attention to the typical speed of the traffic moving adjacent to the planting site. Faster moving traffic increases the area of salt spray and may require you to plant further from the road.

Rooting Space

Trees planted in an urban setting often suffer from a lack of rooting space. Underground obstacles such as underground utilities, sewer and water lines, sidewalks, and pavement can prevent the roots from spreading and limit their nutrient-, water-, and oxygen-gathering capacity. Heavily compacted soil can also be an obstacle for expanding tree roots and, although some species may be more tolerant to this than others, it is a good idea to include only uncompacted soils in your determination of available rooting space.

In this booklet we list the recommended rooting space (i.e. soil volume) for each species. Keep in mind that these recommendations are under ideal circumstances, and in many cases you will be forced to plant in much tighter areas. Compensating for this by planting in longer, narrow strips is generally acceptable, but always make sure that the root system can spread far enough in all directions to keep the tree windfirm when fully grown.

Above Ground Site Assessment

Just as trees require healthy roots to grow, so do they require a healthy stem and crown. The ability of a tree crown to capture light and manufacture food for the tree dictates the overall success of that tree, so long as the roots are able to support the crown with water and nutrients. Once you have identified all potential limitations of the soil, look at the above ground conditions to make sure that nothing will prevent your tree from developing a full, healthy crown.

Plant Hardiness Zone

Plant hardiness zones were developed by the USDA to map areas according to their average minimum annual temperature. Vermont is included in three hardiness zones. To see which zone you are in, check the VT Plant Hardiness Zone Map (see Appendix A).

Exposure

The exposure of a site can significantly modify the general climatic conditions, potentially resulting in several distinct micro-climates within a seemingly uniform area. Direct exposure to harsh wind and sun for example, can increase your tree's susceptibility to drought and winter injury so you may need to select a species rated for a lower hardiness zone. Similarly, sheltered sites may offer the opportunity to plant a less cold-hardy species than your zone generally requires. Thoroughly examine the site and its exposure to the elements while thinking about how they may potentially affect the overall climatic conditions. Always remember to look ahead at how a tree will be exposed at full maturity.

Overhead Hazards

Overhead hazards such as wires, buildings, or any other existing or planned structures may interfere with crown development. Repetitive pruning to accommodate overhead obstacles is costly and results in frequent wounding and unbalanced crowns. Open wounds invite wood decay while deformed or strongly asymmetrical crowns can lead to structural failure of large limbs or windthrow. Always remember to consider the size and shape of the crown at full maturity.

Circulation/Site Use

Human activities can also impact site conditions significantly. For roadside plantings, select trees that are tolerant to road salt. Spread mulch around trees in parks or town greens to protect against soil compaction from pedestrian traffic and damage from lawnmowers. Always be aware of potential conflicts such as low hanging branches in pedestrian areas or excessive fruit production along roads.

Legal Concerns

Always check on ownership or easement locations as well as historical or landmark status that may prohibit you from planting in a certain area. Also be sure to check local ordinances that may prohibit the planting of certain species with malodorous fruit or those that pose leaf or fruit litter problems.

Importance of Species Diversity

Maintaining a high level of species diversity in our urban ecosystems is as important, if not more so, than in our natural forests. Besides providing the aesthetic appeal of a variety of shapes and sizes along streets or in town greens and parks, increasing diversity can also help safeguard against species-specific insect or disease outbreaks. Simply selecting the right tree for every site should in itself create diversity, yet we often rely far too heavily on one seemingly ideal species, as was the case with the American elm.

It is important to recognize that species diversity is **not** only a function of how **many** species are present, but also depends on the **proportion of each species relative to others and their overall spatial distribution**. In other words, planting a single tree of one species for every hundred trees of another species scarcely improves your diversity. Similarly, diversity is only improved significantly if all species are growing together, intermingled over an entire area as opposed to having each species in a separate area. Maintaining a predetermined level of diversity, such as specifying that no one species should comprise more than 5 percent of the community tree population, is a good way to help prevent some of these situations from occurring.

Potentially Invasive Species

Always be sure to check the potential for any species to become invasive when planting in or around natural areas. Several exotic species, most notably barberry, buckthorn, and honeysuckle, have overtaken many natural areas in Vermont and are preventing the natural regeneration of native species. Although few of the trees we recommend are known to be invasive in Vermont, we have identified several that have such potential. Norway maple in particular has already become naturalized in areas of southern New England and has begun to spread at the expense of several native maples, drastically altering the forest structure and preventing the regeneration of native species. While still appropriate for some locations, **we strongly advise against planting Norway maple, amur maple, and amur corktree near field edges, wooded areas, or other natural habitats that they could invade**. The use of these species should be limited only to streetside or isolated urban locations. Always remember that no species should ever be planted where it has the potential to spread where it is unwanted.

Site Assessment and Species Selection Worksheet

PART I: Site Assessment

1. Hardiness Zone: _____ 2. Type of Planting Space: (greenbelt, setback, park, raised bed, sidewalk cutout, container, etc.) _____	Limiting Factor (✓)
3. Below Ground Conditions pH (note pH reading) _____ acid (5.0 - 6.8) _____ neutral (6.8 - 7.2) _____ alkaline (7.2 - 8.0)	_____
Drainage (<i>Percolation Test Results</i>): ☐ Poorly Drained: < 1" per hour ☐ Moderately Drained: 1" to 6" per hour ☐ Excessively Drained: > 6" per hour	_____ _____ _____
Soil Texture ☐ Clay ☐ Loam ☐ Sand	_____ _____ _____
Salt ☐ Low ☐ Medium ☐ High	_____ _____ _____
Root Space (pavement, buildings, etc.) _____	_____
Underground Utilities _____	_____
Depth to Bedrock (inches) _____	_____
Compaction Current ☐ Uncompacted ☐ Moderately Compacted ☐ Severely Compacted Future ☐ Uncompacted ☐ Moderately Compacted ☐ Severely Compacted	_____ _____ _____ _____ _____ _____
Soil Quality (note if poor) _____	_____

4. Above Ground Conditions (may affect trunk/crown)		Limiting Factor (✓)
Exposure		
Sun		
☐	Full Sun	
☐	Part Shade	
☐	Shade	_____
Wind		
☐	Low	
☐	Medium	
☐	High	_____
Crown Space		
Overhead Wire Height (20', 30', 40')		_____
Structural Limitations		
(Buildings, Lights, Signs & Other Trees)		_____
Distance from Road (potential for trucks to brush branches?)		_____
Air Born Salt Spray		
☐	No	
☐	Yes	_____

Part II: Species Selection

Choose Desirable Tree Attributes

1. Function (screen, shade, etc.) _____
2. Mature Size _____
3. Form _____
4. Longevity _____
5. Canopy Density _____
6. Deciduous vs. Evergreen _____
7. Growth Rate _____
8. Wood Strength _____
9. Ornamental Traits
(fall color, flowers, fruit, bark, etc.) _____

Identify Desired Attributes of Landscaped Area

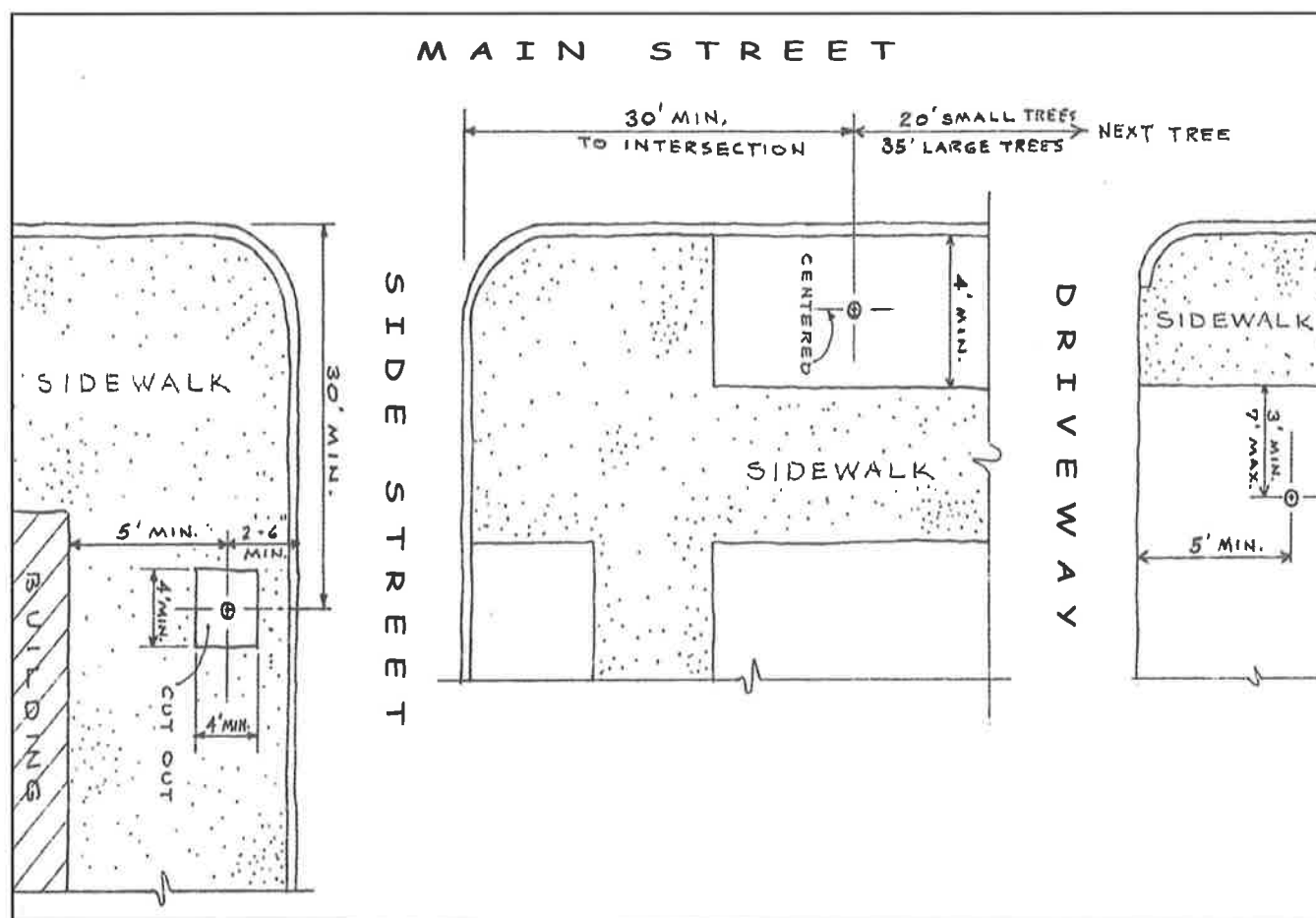
1. Species Diversity _____
2. Spacing _____

Season of Planting

Trees can be most successfully planted at two times during the year—spring and fall. Regardless of the season, planting is best done while the tree is dormant and physiological activity is very low. Fall planting may be beneficial for some species because it allows for new root development earlier in the spring, but always check the requirements of the species you are considering. Many species can only be transplanted in the spring and will not do well following a fall transplant.

Street Tree Spacing

In urban areas there are many constraints which are generally not recognized in other forestry applications. Careful placement is necessary to maintain lines of sight for traffic and clearance around buildings and power lines. Proper spacing also helps prevent unnecessary injury to the tree caused by parked or moving cars while maintaining adequate room for the crown to develop unobstructed by buildings and other trees. The following diagram illustrates some spacing guidelines for planting along streets, driveways and sidewalks. Bear in mind that this is a very generalized diagram, and you may have to make special accommodations depending on the species you choose to plant.



Appendix B

Town of Shelburne, VT Tree Policy

TOWN OF SHELBURNE TREE POLICY

I. Purpose

The purpose of this policy to promote, protect, and enhance public health, safety, and general welfare by providing a policy governing the planting, maintenance, protection, and removal of trees, shrubs, and other woody plant material within public rights-of- ways and public places within the Town of Shelburne.

II. Authority

The Select Board shall appoint a Tree Warden, under 24 V.S.A. § 871. The Tree Warden may appoint a Deputy Tree Warden under 24 V.S.A. § 2505. Through its Tree Warden, the Town shall have control of all Public Trees and shall have the authority to plant, maintain, protect and remove such trees. The Tree Warden, where possible, should be a person skilled or trained in forestry, horticulture or other closely related field.

No Public Tree shall be pruned, removed or harmed in any way without the written permission of the Tree Warden.

No person shall plant any tree within town right-of-ways or on town property without written permission of the Tree Warden.

III. Applicable Regulations

The Town of Shelburne Public Works Specifications and Zoning Bylaws both address the planting of trees within the Town. Shelburne's Subdivision Regulations require the planting of trees along both sides of streets (Section 810(4)), although the precise location of plantings relative to the right-of-way is not specified. This policy is consistent with and provides supplemental detail to both documents.

IV. Definitions

Certified Arborist: A person certified by the International Society of Arboriculture as having specialized knowledge, experience, and training related to arboriculture.

Diameter at Breast Height (DBH): The diameter of a tree measured in inches at a height of four (4) feet five (5) inches from the finished grade at the base of the tree.

Public Tree: All trees and shrubs for which any part of the trunk at DBH is located within the town right-of-way or on town property.

V. Tree Advisory Committee

The Selectboard may appoint a Tree Advisory Committee for specific purposes as outlined in the Tree Advisory Committee's Charter. In general the Committee shall develop a written plan to include an inventory of all Town trees and for the planting and care of additional trees. They shall also educate the citizens of Shelburne about the benefits and care of this resource. In concert with Town staff, the Committee may apply for grant funds to accomplish the Tree Inventory and Plan, to plant and care for Town trees and other similar purposes.

VI. Construction in the Vicinity of Public Trees

Any construction within 10 lateral feet of the drip line of Public Trees requires consultation with the Tree Advisory Committee and Tree Warden who may provide specific written requirements for additional protections of trees.

VII. Public Tree Planting, Maintenance and Removal

The Town is supportive of planting and maintaining trees along its streets, roads and on other Town and private property. The benefits of street trees are well documented and this policy is consistent with and recognizes those benefits.

The Town shall have the right to plant, maintain and remove Public Trees as may be necessary to insure public safety, or to preserve or enhance the symmetry and beauty of public ways and places as set forth in the following guidelines.

1) Planting Specifications

- a.** Trees to be planted within town right-of-ways and on town property should be appropriate for the site, meet the intended planting functions and increase the overall tree diversity of the town. To help assure that appropriate trees are selected, trees shall be chosen by a licensed landscape architect, certified arborist or other appropriate professional staff with concurrence of the Tree Advisory Committee and the Tree Warden.
- b.** The quality of Public Trees to be planted must conform to American Standard for Nursery Stock for landscape trees.
- c.** All public trees shall be planted in accordance with the current American National Standards Institute (ANSI) Standards for Tree Care Operations.
- d.** Trees should be sited based on above and below ground site condition.
 - Minimum offsets for intrusion elements should be as follows:
 - Light standard: 18 feet
 - Utility pole: 10 – 18 feet depending on cross arm size
 - Hydrant: 15 feet Driveway: 10 feet
 - Cross walk: 5 feet
 - Transformer, connection box: 6 feet
 - Underground utility connection: 15 feet
 - Street sign: 6 feet
 - Exceptions may be granted only by approval of the Tree Warden.
 - Dig Safe shall be called prior to digging.

2) Maintenance

- a.** The Care of all Public Trees shall be in accordance with current ANSI Standards for Tree Care Operations.
- b.** All contractors who work on Public Trees shall have a certified arborist on staff or in their employ.

3) Removal

a. The Town, in consultation with the Tree Advisory Committee and Tree Warden, may remove or cause to be removed, any Public Tree or part thereof which is in an unsafe condition or which by reason of its nature is injurious to the municipal infrastructure or other public improvements, or is affected with any injurious disease, insect, or other pest.

b. If, in the opinion of the Tree Advisory Committee and the Tree Warden, a Public Tree constitutes no hazard to public safety and is determined to be healthy but needs to be removed, then the Tree Warden will warn a public hearing, giving two weeks notice, and shall be held in accordance with 24 VSA §2509. Written appeals must be submitted to the Tree Warden and Selectboard within two weeks. The Selectboard's decision is final.

VIII. Obstruction of Streets and Sidewalks

It shall be the responsibility of each property owner of any tree overhanging any town right-of-way or property to ensure the trees and shrubs on that property are maintained in a manner that will not obstruct: street lights from illuminating street level; the passage or visibility of vehicles or pedestrians; vision of traffic signs and signals; or the view of any intersection. If said owners fail to comply, the Town shall have the right to prune any tree or shrub on private property.

IX. Tree Removal on Private Property

The town shall have the right to cause the removal of any dead, diseased or hazard trees on private property within the Town, when such trees constitute a hazard to life and property, or harbor insects or disease which constitutes potential threat to other trees within the Town. The Tree Warden will notify in writing the owners of such trees. Removal shall be done by said owners at their own expense within sixty (60) days after the date of service of notice. In the event of failure of the owners to comply with such provision, the town shall have the authority to remove such trees and charge the owner for the cost of removal.

X. Street Trees in the Village

The Village is a densely settled portion of Town that includes a large portion of publicly owned property. Within the Village, buildings are closer together and closer to the street than in most other areas of Shelburne. The Village Plan includes streetscapes for the streets and roads within the village with trees planted in proposed green belts and in other areas. In this instance, consideration should be given to plant trees along the street and possibly within a green belt next to the street.

Adopted this 28th day of September, 2010 and amended on May 13, 2014.

Gary von Stange, Chair

Tim Pudvar

Toni Supple

Allison Cranmer, vice Chair

Colleen Parker

Appendix C

Replacement Cost Method Worksheet

Replacement Cost Method Work Sheet

Appraised Value = \$ 800 —

[Installed Plant Cost × Species % × Condition % × Location %] +
Removal and Cleanup Cost (if needed)

Installed Plant Cost = Replacement Plant Cost + Installation Cost

Case # _____ Property 42 No. WINDOSKI AVE Date 2/6/06

Appraiser WARREN SPINNER

Field Observations

1. Species TATARIAN MAPLE - ACER TATARICUM
2. Condition 70 %
3. Trunk Circumference _____ in./cm and/or Diameter 5 in./cm or
Shrub or Vine Size (height/spread/volume) _____
4. Location % = [Site 65% + Contribution 85% + Placement 60%] ÷
3 = 70 %
5. Removal and Cleanup Costs for appraised
plant or plant that will be replaced = \$ 160 —

Regional Plant Appraisal Committee and/or Appraiser-Developed or -Modified Information

6. Species rating 65 %
7. Replacement Plant Size (diameter) 5 in./cm
8. Replacement Plant Cost = \$ 675 —
9. Installation Cost = \$ 1350 —
10. Other Regional Information _____

Calculations by Appraiser Using Field and/or Regional Information

11. Installed Plant Cost = Plant Cost (#8) \$ 675
+ Installation Cost (#9) \$ 1350 = \$ 2,025 —
12. Adjusted Installed Plant Cost = Installed Plant
Cost (#11) \$ 2,025 × Species rating (#6) 65 % ×
Condition (#2) 70 % × Location (#4) 70 % = \$ 645 —
13. Add Removal and Cleanup Costs (#5) (if appraised
plant is replaced). \$ 160 — = \$ 805 —
14. The Appraised Value is either #12 or #13. = \$ 805 —
15. If the Appraised Value (#14) is \$5,000 or more, round
it to the nearest \$100; if it is less, round to nearest \$10.
16. Appraised Value (#14) = \$ 800 —

*A median cost is the most appropriate cost to use because there are an equal number of costs greater than and less than the median. Equally important, plants and installation are available at those specific costs.

Appendix B:

Tree and Plan Protection Specifications

015639
TREE AND PLANT PROTECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. It is not the Town of Shelburne's intent that this Section be a complete set of specifications. This specification is designed to be used in conjunction with standard General Requirements specifications, which cover project general conditions and project wide contract elements. Important issues of project ownership, liability, insurance, contract language, project controls, instructions to bidders, change orders and review and approval of the work are covered in the General Requirements specifications.

All construction project work done in the Town public right-of-way or on Town property shall comply with this section. All items included shall be acceptable to the Shelburne Tree Warden and Public Works Department. Any item not listed will require acceptance by the Shelburne Tree Warden and Public Works Director before installation. Failure to receive approval of the materials and methods prior to their installation shall leave the person having the said work done liable for the replacement of those substandard materials with acceptable materials at his/her cost.

- B. The scope of work includes all labor, materials, tools, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with protection of existing trees and other plants during construction as shown on the drawings and as specified herein.
1. Provide preconstruction evaluations, including the arborist report.
 2. The arborist report shall include the following:
 - Provide tree and plant protection fencing.
 - Provide protection of tree root zones and above ground trees and plants.
 - Provide root pruning.
 - Provide pruning of existing trees and plants.
 - Provide information on modifications to the soil within the root zone of existing trees and plants.
 - Provide all insect and disease control.
 - Provide maintenance of existing trees and plants including irrigation during the construction period and warranty period as recommended by the arborist report.
 - Provide maintenance of existing trees and plants including irrigation during the post construction plant warranty period.
 - Remove tree protection fencing and other protection from around and under trees and plants post construction.
 - Clean up and proper disposal of all excess and surplus material.

- Provide fertilization as necessary.

1.2 **CONTRACT DOCUMENTS**

- A. The Contract Documents shall consist of specifications, general conditions and the drawings associated with the project. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work.
- B. It is the intent of this section that the requirements apply to all sections of the project specification such that any Contractor/Subcontractor must comply with the restrictions on work within designated Tree Protection Zones.

1.3 **RELATED DOCUMENTS AND REFERENCES**

A. Related Documents:

1. Drawings

Contract Documents that consist of the general provisions of contract including General and Supplementary Conditions, and specifications that apply to work of this section.

- a. Specification Section - Planting Soil
- b. Specification Section - Irrigation
- c. Specification Section – Tree, Shrub and Perennial Planting
- d. Specification Section - Lawn

- B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section, the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail.

- 1. ANSI A 300 (Part 5) – Standard Practices for Tree, Shrub and other Woody Plant Maintenance, most current editions.
- 2. Pruning practices shall conform with recommendations “Structural Pruning: A Guide for The Green Industry”; Published by Urban Tree Foundation, Visalia, California; most current edition.
- 3. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign Il, most current edition.
- 4. Town of Shelburne Tree Policy, most current edition.

1.4 VERIFICATION

- A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities and shall immediately inform the Tree Warden/Owner's Representative of any discrepancies between the information on the drawings and the actual conditions and refraining from doing any work in said areas until given approval to do so by the Tree Warden/Owner's Representative.

1.5 PERMITS AND REGULATIONS

- A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the Contract or General Conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the Contract Documents, the Contractor shall promptly notify the Tree Warden/Owner's Representative in writing including a description of any necessary changes including changes to the contract price resulting from changes in the work.
- B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply, unless otherwise expressly set forth.
- C. In case of conflict among any referenced standards or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply, or Tree Warden/Owner's Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

- A. The Contractor shall protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to his/her actions.

1.7 CHANGES IN THE WORK

- A. The Tree Warden/Owner's Representative may order changes in the work, and the contract sum should be adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

1.8 CORRECTION OF WORK

- A. The Contractor shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Tree Warden/Owner's Representative, at the soonest possible time that can be coordinated with other work and seasonal weather demands.

1.9 DEFINITIONS

All terms in this specification shall be as defined in the "Glossary of Arboricultural Terms" or as modified below.

- A. Tree Warden/Owner's Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor.
- B. Reasonable and reasonably: When used in this specification is intended to mean that the conditions cited will not affect the establishment or long-term stability, health or growth of the plant. This specification recognizes that plants are not free of defects, and that plant conditions change with time. This specification also recognizes that some decisions cannot be totally based on measured findings and that professional judgment is required. In cases of differing opinion, the Tree Warden/Owner's Representative expert shall determine when conditions within the plant are judged as reasonable.
- C. Shrub: Single and multi-stemmed deciduous and evergreen plants with mature height approximately less than 25 feet.
- D. Tree Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and defined by a circle centered on the trunk of each tree with a radius equal to the crown dripline unless otherwise indicated by the Tree Warden/Owner's Representative.
- E. Tree: Single and multi-stemmed deciduous and evergreen plants, with anticipated mature height approximately greater than 25 feet or any plant identified on the plans as a tree.

1.10 SUBMITTALS

- A. ARBORIST REPORT: Prior to the start of construction, submit, for approval by the Tree Warden/Owner's Representative, the report of a consulting arborist who is a registered Consulting Arborist® (RCA) with American Society of Consulting Arborists or an ISA Board Certified Master Arborist, which details the following information for all trees

and/or shrubs to remain within the area designated on the drawings as the Tree Protection Zone. The report shall include the following:

1. A description of each tree and/or shrub to remain indicating its genus and species, condition including any visible damage to the root system or soil within the root zone, tree diameter at breast height (dbh) and approximate height, size and any visible disease, insect infestations and or branch and trunk structural deficiencies.
 2. The report shall note all trees or parts of trees, which are considered a hazard or significant or extreme risk level. Include the International Society of Arboriculture hazard evaluation sheet for each tree, which may reasonably be identified as a potential hazard tree.
 3. Recommendations as to treatment of all insect, disease and structural problems encountered.
 4. Recommendations for fertilizer treatments, root pruning and root invigoration, if any.
 5. A plan of the site showing the location of all trees included in the report.
- B. **PRODUCT DATA:** Submit manufacturer product data and literature describing all products required by this section to the Tree Warden/Owner's Representative for approval. Provide submittal four weeks before the start of any work at the site unless otherwise noted.
- C. **QUALIFICATIONS SUBMITTAL:** For each applicable person expected to work on the project, provide copies of the qualifications and experience of the Consulting arborist, proof of either the registered Consulting Arborist® (RCA) with American Society of Consulting Arborists or an ISA Board Certified Master Arborist and any required Herbicide/Pesticide license to the Tree Warden/Owner's Representative, for review prior to the start of work.

1.11 OBSERVATION OF THE WORK

- A. The Tree Warden/Owner's Representative may inspect the work at any time.

1.12 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction meeting with the Tree Warden/Owner's Representative at least seven (7) days before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.
1. The following Contractors shall attend the preconstruction conference:

- a. General Contractor.
 - b. Consulting Arborist.
 - c. Subcontractor assigned to install Tree and Plant Protection measures.
 - d. Earthwork Contractor.
 - e. All site utility Contractors that may be required to dig or trench into the soil.
 - f. Landscape subcontractor.
 - g. Irrigation subcontractor
- B. Prior to this meeting, the Contractor shall mark all trees and plants to remain and or be removed as described in this specification for review and approval by the Tree Warden/Owner's Representative.

1.13 QUALITY ASSURANCE

- A. Contractor qualifications:
- 1. All pruning, branch tie back, tree removal, root pruning, and fertilizing required by this section shall be performed by or under the direct supervision of ISA Certified Arborist. Submit the ISA Certified Arborist qualifications for approval by the Tree Warden/Owner's Representative.
 - 2. All applications of pesticide or herbicide shall be performed by a person maintaining a current state license to apply chemical pesticides valid in the jurisdiction of the project. Submit copies of all required state licensing certificates including applicable chemical applicator licenses.

PART 2 – PRODUCTS

2.1 MULCH

- A. Mulch shall be coarse, ground, from tree and woody brush sources. The minimum range of fine particles shall be 3/8 inch or less in size and a maximum size of individual pieces shall be approximately 1 to 1-1/2 inch in diameter and maximum length of approximately 4 to 8 inches. No more than 25% of the total volume shall be fine particles and no more than 20% of total volume be large pieces.
- B. Submit supplier's product data that product meets the requirements and two gallon sample for approval.

2.2 WOOD CHIPS

- A. Wood Chips from an arborist chipping operation with less than 20% by volume green leaves. Chips stockpiled from the tree removal process may be used.

It is understood that Mulch and Wood Chips quality will vary significantly from supplier to supplier and region to region. The above requirements may be modified to conform to the source material from locally reliable suppliers as approved by the Tree Warden/Owner's Representative.

2.3 TREE PROTECTION BARRIERS

All tree protection barriers shall be a minimum of four feet high. Options for tree protection barriers are identified below.

- A. **PLASTIC MESH FENCE:** Heavy duty orange plastic mesh fencing fabric 48 inches wide. Fencing shall be attached to metal "U" or "T" post driven into the ground of sufficient depth to hold the fabric solidly in place without sagging or attached to a wood 2" x 4" frame securely anchored. The fabric shall be attached to the post using attachment ties of sufficient number and strength to hold up the fabric without sagging. The Tree Warden/Owner's Representative may request, at any time, additional post, deeper post depths and or additional fabric attachments if the fabric begins to sag, lean or otherwise not present a sufficient access barrier.
- B. **PLYWOOD FENCE:** Plywood shall be securely attached to a wood 2" x 4" frame. Where plywood only is used, provide a viewing window covered with plastic webbing.
- C. **GATES:** For each fence type and in each separate fenced area, provide a minimum of one 3-foot wide gate. Gates shall be lockable. The location of the gates shall be approved by the Tree Warden/Owner's Representative.
- D. Submit supplier's product data that product meets the requirements for approval.

2.4 TREE PROTECTION SIGN

- A. Tree protection signage shall be required to be attached on all sides of a Tree Protection Barrier for trees to be protected. The sign shall be a minimum of 15 inches x 24 inches and be constructed of heavy duty card board, wood or equivalent material with a white colored background with black 2-inch high or larger block letters. The signs shall be attached to the tree protection fence every 50 feet o.c. The tree protection sign shall read "Tree Protection Zone (TPZ) No grade change, storage of materials or equivalent is permitted

within this TPZ. Tree protection barrier must not be removed without the written authorization of the Town of Shelburne Tree Warden.”.

2.5 MATTING

- A. Matting for vehicle and work protection shall be heavy duty matting designed for vehicle loading over tree roots, Alturnamats as manufactured by Alturnamats, Inc. Franklin, PA 16323 or approved equal.
- B. Submit supplier’s product data that product meets the requirements for approval.

2.6 GEOGRID

- A. Geogrid shall be woven polyester fabric with PVC coating, Uni-axial or biaxial geogrid, inert to biological degradation, resistant to naturally occurring chemicals, alkalis, and acids.
 - 1. Geogrid shall be Miragrid 2XT as manufactured by Ten Cate Nicolon, Norcross, GA. <http://www.tencate.com> or approved equal.
- B. Submit supplier’s product data that product meets the requirements for approval.

2.7 FILTER FABRIC

- A. Filter Fabric shall be nonwoven polypropylene fibers, inert to biological degradation and resistant to naturally occurring chemicals, alkalis and acids.
 - 1. Mirafi 135 N as manufactured by Ten Cate Nicolon, Norcross, GA. <http://www.tencate.com> or approved equal.
- B. Submit supplier’s product data that product meets the requirements for approval.

PART 3 – EXECUTION

3.1 SITE EXAMINATION

- A. Examine the site, tree, plant and soil conditions. Notify the Tree Warden/Owner’s Representative in writing of any conditions that may impact the successful Tree and Plant Protection that is the intent of this section.

3.2 COORDINATION WITH PROJECT WORK

- A. The Contractor shall coordinate with all other work that may impact the completion of the work.
- B. Prior to the start of Work, prepare a detailed schedule of the work for coordination with other trades.
- C. Coordinate the relocation of any irrigation lines currently present on the irrigation plan, heads or the conduits of other utility lines or structures that conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Tree Warden/Owner's Representative of any conflicts encountered.

3.3 TREE PROTECTION ZONE

The Tree Protection Zone is defined as all areas indicated on the tree protection plan. Where no limit of the Tree Protection Zone is defined on the drawings, the limit shall be the drip line (outer edge of the branch crown) of each tree.

3.4 PREPARATION

- A. Prior to the preconstruction meeting, the Contractor shall lay out the limits of the Tree Protection Zone and the alignments of required Tree Protection Zone Fencing and root pruning. The Contractor shall obtain the Tree Warden/Owner's Representative's approval of the limits of the protection area and the alignment of all fencing and root pruning.
- B. The Contractor shall flag all trees and shrubs to be removed by wrapping red plastic ribbon around the trunk and obtain the Tree Warden/Owner's Representative's approval of all trees and shrubs to be removed prior to the start of tree and shrub removal. After approval, mark all trees and shrubs to be removed with red paint in a band completely around the base of the tree or shrub 4.5 feet above the ground.
- C. The Contractor shall flag all trees and shrubs to remain with green plastic ribbon tied completely around the trunk of each tree and on a prominent branch of each shrub. The Contractor shall obtain the Tree Warden/Owner's Representative's approval of all trees and shrubs to remain prior to the start of tree and shrub removal.
- D. Prior to any construction activity at the site including utility work, grading, storage of materials, or installation of temporary construction facilities, the Contractor shall install all

tree protection fencing, filter fabric, silt fence, tree protection signs, geogrid, mulch and/or wood chips as shown on the drawings.

3.5 SOIL MOISTURE

- A. Volumetric soil moisture level, in all soils within the Tree Protection Zone shall be maintained above permanent wilt point to a depth of at least 8 inches. No soil work or other activity shall be permitted within the Tree Protection Zone when the volumetric soil moisture is above field capacity. The permanent wilt point and field capacity for each type of soil texture shall be defined as follows (numbers indicate percentage volumetric soil moisture).

Soil type	Permanent wilt point v/v	Field capacity v/v
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

- Volumetric soil moisture shall be measured with a digital, electric conductivity meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent meter.
- B. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend operations until the soil moisture drains to below field capacity.

3.6 ROOT PRUNING

- A. Prior to any excavating into the existing soil grade within 25 feet of the limit of the Tree Protection Zone or trees to remain, the Contractor shall root prune all existing trees to a depth of 24 inches below existing grade in alignments following the edges of the Tree Protection Zone or as directed by the Tree Warden/Owner's Representative. Root pruning shall be in conformance with ANSI A300 (part 8) latest edition.
- Using a rock saw, chain trencher or similar trenching device, make a vertical cut within two feet of the limit of grading.

2. After completion of the cut, make clean cuts with a lopper, saw or pruner to remove all torn root ends on the tree side of the excavation, and backfill the trench immediately with existing soil, filling all voids.

3.7 **INSTALLATION OF GEOGRIDS, FILTER FABRIC, MATTING, WOOD CHIPS AND/OR MULCH**

- A. The Contractor shall install geogrids, filter fabric, matting, wood chips and/or mulch in areas and depths shown on the plans and details or as directed by the Tree Warden/Owner's Representative. In general, it is the intent of this specification to provide the following levels of protection:
 1. All areas within the Tree Protection Zone provide a minimum of 5 inches of wood chips or mulch.
 2. Areas where foot traffic or storage of lightweight materials is anticipated to be unavoidable provide a layer of filter fabric under the 5 inches of wood chips or mulch.
 3. Areas where occasional light vehicle traffic is anticipated to be unavoidable provide a layer of geogrids under 8 inches of wood chips or mulch.
 4. Areas where heavy vehicle traffic is unavoidable provide a layer of geogrids under 8 - 12 inches of wood chips or mulch and a layer of matting over the wood chips or mulch.
- B. The Tree Warden/Owner's Representative shall approve the appropriate level of protection.
- C. In the above requirements, light vehicle is defined as a track skid steer with a ground pressure of 4 psi or lighter. A heavy vehicle is any vehicle with a tire or track pressure of greater than 4 psi. Lightweight materials are any packaged materials that can be physically moved by hand into the location. Bulk materials such as soil, or aggregate shall never be stored within the Tree Protection Zone.

3.8 **PROTECTION**

- A. Protect the Tree Protection Zone at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves and roots of all plants; and contamination of the soil, bark or leaves with construction materials, debris, silt, fuels, oils, and any chemical substance.

Within the Tree Protection Zone, there shall be:

- no construction,
- no altering of grade by adding fill, excavating, trenching, scraping, dumping or disturbance of any kind.

- no storage of construction materials, equipment, soil, construction waste or debris,
- no disposal of any liquids i.e. concrete slurry, gas, oil, paint, etc.,
- no movement of vehicles, equipment or pedestrians,
- no parking of vehicles or machinery,
- open face cuts outside a Tree Protection Zone that are consistent with an approved plan and that require root pruning, require the services of a qualified arborist or approved tree professional. An exploratory dig, either by hand or using a low water pressure hydro vac method, must be completed prior to commencing with open face cuts outside the Tree Protection Zone.

- B. Notify the Tree Warden/Owner's Representative of any spills, compaction or damage and take corrective action immediately using methods approved by the Tree Warden/Owner's Representative.

3.9 **GENERAL REQUIREMENTS AND LIMITATIONS FOR OPERATIONS WITHIN THE TREE PROTECTION ZONE**

- A. The Contractor shall not engage in any construction activity within the Tree Protection Zone without the approval of the Tree Warden/Owner's Representative including: operating, moving or storing equipment; storing supplies or materials; locating temporary facilities including trailers or portable toilets and shall not permit employees to traverse the area to access adjacent areas of the project or use the area for lunch or any other work breaks. Permitted activity, if any, within the Tree Protection Zone may be indicated on the drawings along with any required remedial activity as listed below.
- B. In the event that construction activity is unavoidable within the Tree Protection Zone, notify the Tree Warden/Owner's Representative and submit a detailed written plan of action for approval. The plan shall include: a statement detailing the reason for the activity including why other areas are not suited; a description of the proposed activity; the time period for the activity, and a list of remedial actions that will reduce the impact on the Tree Protection Zone from the activity. Remedial actions shall include but not be limited to the following:
1. In general, demolition and excavation within the drip line of trees and shrubs shall proceed with extreme care either by the use of hand tools, directional boring and or air knife excavation where indicated or with other low impact equipment that will not cause damage to the tree, roots or soil.
 2. When encountered, exposed roots one inch and larger in diameter shall be worked around in a manner that does not break the outer layer of the root surface (bark). These roots shall be covered in wood chips and be maintained above permanent wilt point at all times. Roots one inch and larger in diameter shall not be cut without the approval of

- the Owner's Representative. Excavation shall be tunneled under these roots without cutting them. In the areas where roots are encountered, work shall be performed and scheduled to close excavations as quickly as possible over exposed roots.
3. Tree branches that interfere with the construction may be tied back or pruned to clear only to the point necessary to complete the work. Other branches shall only be removed when specifically indicated by the Tree Warden/Owner's Representative. Tying back or trimming of all branches and the cutting of roots shall be in accordance with accepted arboricultural practices (ANSI A300, part 8) and be performed under supervision of the arborist.
 4. Matting: Install temporary matting over the Wood Chips or Mulch to the extent indicated. Do not permit foot traffic, scaffolding or the storage of materials within the Tree Protection Zone to occur on the temporary matting.
 5. Trunk Protection: Protect the trunk of each tree to remain by covering it with a ring of 8-foot long 2-inch x 6 - inch planks loosely banded onto the tree with three steel bands. Staple the bands to the planks as necessary to hold them securely in place. Trunk protection must be kept in place no longer than 12 months. If construction requires work near a particular tree to continue longer than 12 months, the steel bands shall be inspected every six months and loosened if they are found to have become tight. See attached detail.
 6. Air Excavation Tool: If excavation for footings or utilities is required within the Tree Protection Zone, air excavation tool techniques shall be used where practical or as designed on the drawings.
 - a. Remove the Wood Chips from an area approximately 18 inches beyond the limits of the hole or trench to be excavated. Cover the Wood Chips for a distance of not less than 15 feet around the limit of the excavation area with Filter Fabric or plastic sheeting to protect the Wood Chips from silt. Mound the Wood Chips so that the plastic slopes towards the excavation.
 - b. Using a sprinkler or soaker hose, apply water slowly to the area of the excavation for a period of at least 4 hours, approximately 12 hours prior to the work so that the ground water level is at or near field capacity at the beginning of the work. For excavations that go beyond the damp soil, rewet the soil as necessary to keep soil moisture near field capacity.
 - c. Using an air excavation tool specifically designed and manufactured for the intended purpose, and at pressures recommended by the manufacturer of the equipment, fracture the existing soil to the shape and the depths required. Work at

rates and using techniques that do not harm tree roots. Air pressure shall be a maximum of 90-100 psi.

- 1.) The air excavation tool shall be “Air-Spade” as manufactured by Concept Engineering Group, Inc. or Air Knife as manufactured by Easy Use Air Tools, Inc. or approved equal.
- d. Using a commercial, high-powered vacuum truck if required, remove the soil from the excavation produced by the Air Knife excavation. The vacuum truck should generally operate simultaneously with the hose operator, such that the soil produced is picked up from the excavation hole, and the exposed roots can be observed and not damaged by the ongoing operation. Do not drive the vacuum truck into the Tree Protection Zone unless the area is protected from compaction as approved in advance by the Tree Warden/Owner’s Representative.
- e. Remove all excavated soil and excavated Wood Chips, and contaminated soil at the end of the excavation.
- f. Schedule the work so that foundations or utility work is completed immediately after the excavation. Do not let the roots dry out. Mist the roots several times during the day. If the excavated area must remain open overnight, mist the roots and cover the excavation with black plastic.
- g. Dispose of all soil in a manner that meets local laws and regulations.
 1. Restore soil within the trench as soon as the work is completed. Utilize soil of similar texture to the removed soil and lightly compact with hand tools. Leave soil mounded over the trench to a height of approximately 10% of the trench depth to account for settlement.
 2. Restore any Geogrids, Filter Fabric, Wood Chips or Mulch and or matting that was previously required for the area.

3.10 TREE REMOVAL

- A. Remove all trees indicated by the drawings and specifications, as requiring removal, in a manner that will not damage adjacent trees or structures or compact the soil.
- B. Remove trees that are adjacent to trees or structures to remain, in sections, to limit the opportunity of damage to adjacent crowns, trunks, ground plane elements and structures.

- C. Do not drop trees with a single cut unless the tree will fall in an area not included in the Tree Protection Zone. No tree to be removed in the Tree Protection Zone shall be pushed over or up-rooted using a piece of grading equipment.
- D. Protect adjacent remaining pavement, soil, trees, shrubs, ground cover plantings and understory plants from damage during all tree removal operations, and from construction operations. Protection shall include the root system, trunk, limbs, and crown of trees from breakage or scarring, and the soil from compaction.
- E. After removing trees, remove stumps and immediate root plate. Grind trunk bases and large buttress roots to a depth of the largest buttress root or at least 18 inches below the top most roots whichever is less and over the area of three times the diameter of the trunk (DBH).
 - 1. In areas where the tree location is to be a planting bed or lawn, remove all woodchips and backfill stump holes with planting soil as defined in Specification Section Planting Soil, in maximum of 12-inch layers and compact to 80 - 85% of the maximum dry density standard proctor.

3.11 PRUNING

- A. Within six months of the estimated date of substantial completion, prune all dead or hazardous branches larger than 2-inch in diameter from all trees to remain.
- B. Implement all pruning recommendations found in the arborist report.
- C. Prune any low, hanging branches and vines from existing trees and shrubs that overhang walks, streets and drives, or parking areas as follows:
 - 1. Walks - within eight feet vertically of the proposed walk elevation.
 - 2. Parking areas - within 14 feet vertically of the proposed parking surface elevation.
 - 3. Streets and drives - within 14 feet vertically of the proposed driving surface elevation.
- D. All pruning shall be done in accordance with ANSI A300 (part 1), ISA BMP Tree Pruning latest edition, and the "Structural Pruning: A Guide for the Green Industry" by the Urban Tree Foundation, Visalia CA.
- E. Perform other pruning tasks as indicated on the drawings or requested by the Tree Warden/Owner's Representative.
- F. Where tree specific disease vectors require, sterilize all pruning tools between the work in individual trees.

3.12 **TREE GROWTH REGULATOR INJECTION (TGR)**

- A. If approved as part of the Tree Protection, at the start of the construction contract period, treat all trees, indicated on the Plan, with Tree Growth Regulator at recommended rates, time of year and methods indicated by the product distributor.

3.13 **WATERING**

- A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants to be preserved during the entire construction period. Adequate water is defined as maintaining soil moisture above the permanent wilt point to a depth of eight inches or greater.
- B. The Contractor shall adjust the automatic irrigation system, if available, and apply additional water, using hoses or water tanks as required.
- C. Periodically test the moisture content in the soil within the root zone to determine the water content.

3.14 **WEED REMOVAL**

- A. During the construction period, control any plants that seed in and around the fenced Tree Protection Zone at least three times a year.
 - 1. All plants that are not shown on the planting plan or on the Tree and Plant Protection Plan to remain shall be considered as weeds.
- B. Integrated Weed Management (IWM) weed control method shall be approved by the Tree Warden.
- C. At the end of the construction period provide one final weeding of the Tree Protection Zone.

3.15 **INSECT AND DISEASE CONTROL**

- A. Monitor all plants to remain for disease and insect infestations during the entire construction period. Provide all disease and insect control required to keep the plants in a healthy state using the principles of Integrated Pest Management (IPM). All pesticides shall be applied by a certified pesticide applicator.

3.16 CLEAN-UP

- A. During construction, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.
 - 1. Immediately clean up any spilled or tracked soil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.
- B. Once tree protection work is complete, wash all soil from pavements and other structures. Ensure that Mulch is confined to planting beds.
- C. Make all repairs to grades, ruts, and damage to the work or other work at the site.
- D. Remove and dispose of all excess Mulch, Wood Chips, packaging, and other material brought to the site by the Contractor.

3.17 REMOVAL OF FENCING AND OTHER TREE AND PLANT PROTECTION

- A. At the end of the construction period or when requested by the Tree Warden/Owner's Representative remove all fencing, wood chips or mulch, geogrids and filter fabric, trunk protection and any other Tree Protection Zone materials.
- B. The Tree Warden shall verify all clean up is completed to his/her satisfaction.

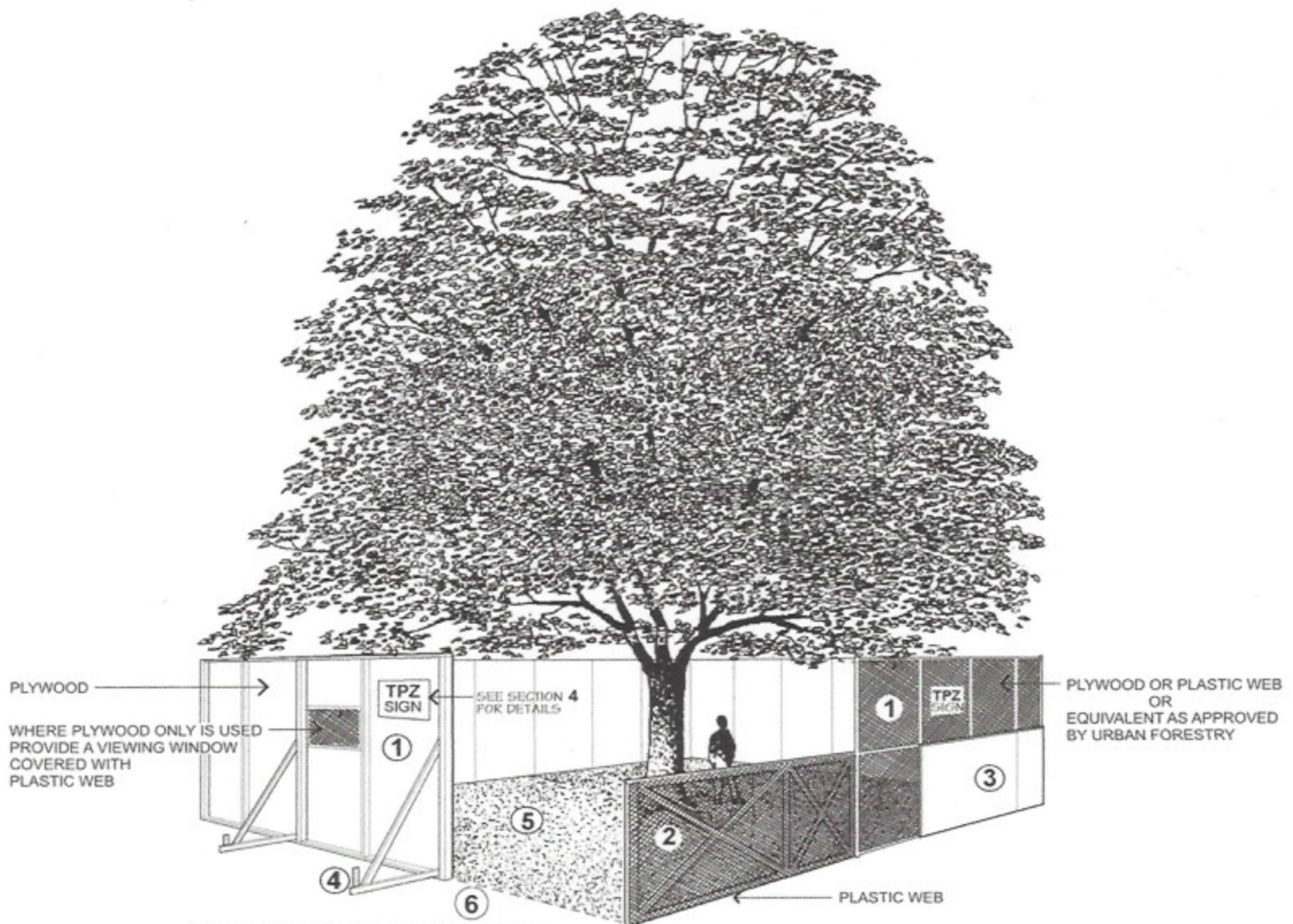
3.18 DAMAGE OR LOSS TO EXISTING PLANTS TO REMAIN

- A. Any trees or plants designated to remain which are damaged by the Contractor shall be replaced in kind by the Contractor at their own expense. Trees shall be replaced with a tree of similar species and of equal size. Shrubs shall be replaced with a plant of similar species and equal size. The Tree Warden/Owner's Representative shall approve the size and quality of all replacement plants.
 - 1. All trees and plants shall be installed per the requirements of Specification Section Planting.
- B. Plants that are damaged shall be considered as requiring replacement or appraisal, if the damage affects more than 25 % of the crown, 25% of the trunk circumference, or root protection area, or the tree is damaged in such a manner that the tree could develop into a

potential hazard. Trees and shrubs to be replaced shall be removed by the Contractor at his own expense.

1. The Tree Warden/Owner's Representative may engage an independent arborist to assess any tree or plant that appears to have been damaged to determine their health or condition at the Contractor's expense.
- C. Any tree that is determined to be dead, damaged or potentially hazardous by the Owner's arborist and upon the request of the Tree Warden/Owner's Representative shall be immediately removed by the Contractor at no additional expense to the owner.
- D. In areas where trees shall be replanted, stump removal shall be required; no stump grinding is allowed. Tree removal shall include all cleanup of all wood parts, stumps and filling and compacting the resulting hole with topsoil.
- E. Any remedial work on damaged existing plants recommended by the consulting arborist shall be completed by the Contractor at no cost to the owner. Remedial work shall include but is not limited to: soil compaction remediation and vertical mulching, pruning and or cabling, insect and disease control including injections, compensatory watering, additional mulching, and could include application of tree growth regulators (TGR).
- F. Remedial work may extend three years following the completion of construction to allow for any requirements of multiple applications or the need to undertake applications at required seasons of the year.

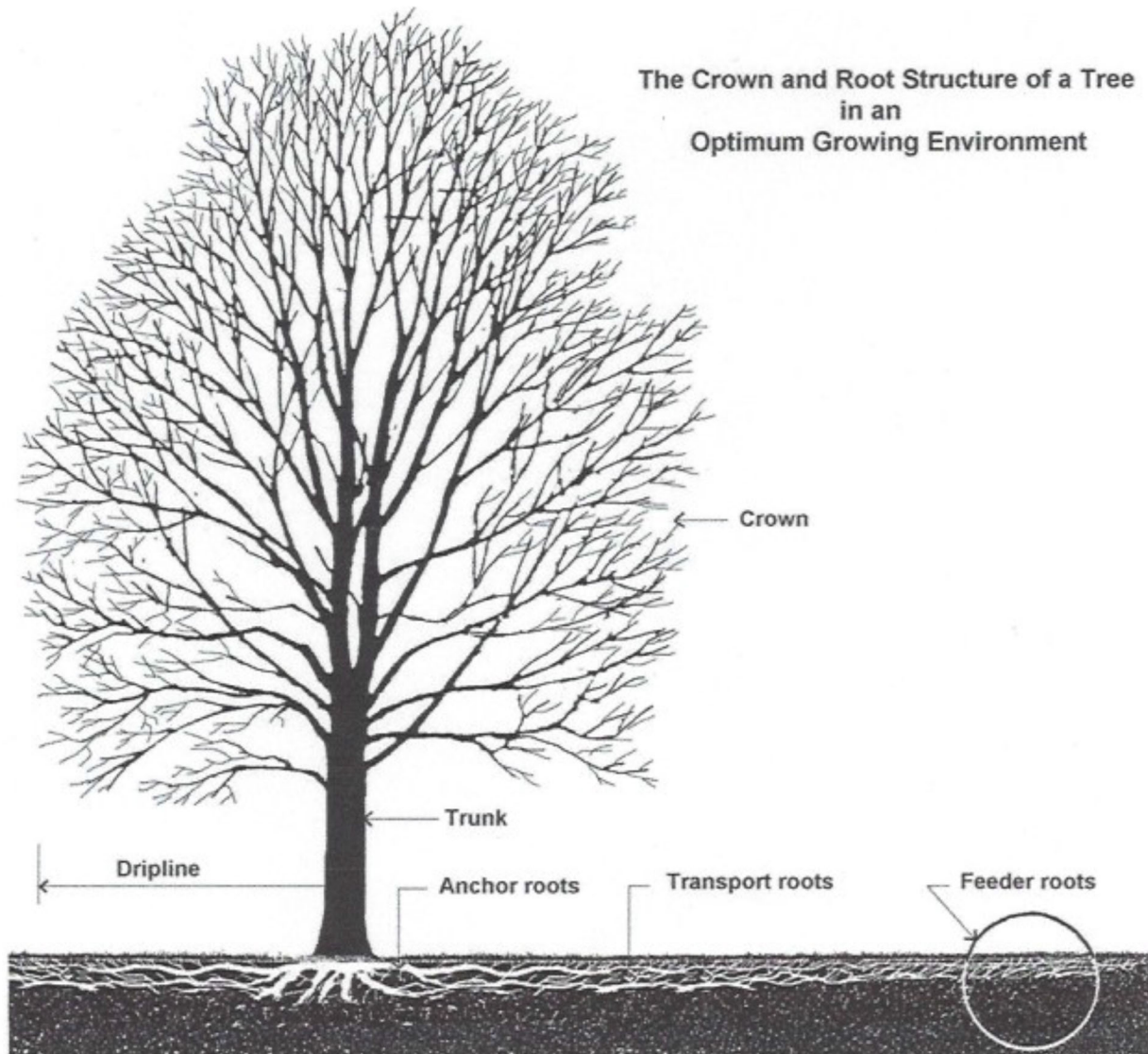
END OF SECTION 015639



Tree Protection Barriers

- ① Tree protection barriers must be a plywood or plastic web hoarding or equivalent as approved by Urban Forestry.
- ② Tree protection barriers for trees situated on the City road allowance where visibility must be maintained can be 1.2m (4ft.) high and consist of orange plastic web snow fencing on a wood frame made of 2"x 4"s.
- ③ Where some excavate or fill has to be temporarily located near a tree protection barrier, plywood must be used to ensure no material enters the Tree Protection Zone.
- ④ All supports and bracing should be outside the Tree Protection Zone. All such supports should minimize damaging roots outside the Tree Protection Barrier.
- ⑤ No construction activity, grade changes, surface treatment or excavations of any kind is permitted within the Tree Protection Zone.
- ⑥ Sediment control fencing shall be installed in locations indicated in an Urban Forestry approved Tree Protection Plan. The sediment control fencing must be installed to Ontario Provincial Standards (OPSD-219.110) and to the satisfaction of Urban Forestry.

Detail 1: Tree Protection Barriers

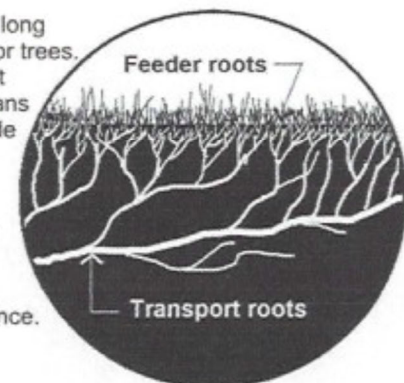


The root system of a tree has three main parts:

Forming the base of the tree are large **anchor roots** from which extend long **transport roots** which together provide the main structural framework for trees. From the transport roots extend a complex network of **feeder roots** that grow outward and upward. These non-woody roots branch out to form fans of thousands of slender roots with fine root hairs. These tiny roots provide the surface where the absorption of air water and nutrients takes place that sustains the life of the tree.

A trees root system grows mainly within the top 60 cm of the surface of good quality, well drained and uncompacted soil.

The root system can extend to more than 2 to 3 times the **dripline** distance.



Detail 2: Tree Crown and Root Structure