

Stantec - Keene NH
Tree Inventory and Management Plan | 2022



Stantec

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Stantec - Keene NH Tree Inventory and Management Plan

MAKING THE MOST OF YOUR INVENTORY MANAGEMENT PLAN

Those who operate a large business or institution understand how inventory impacts operations and budgeting. One must know what's there, how much or how many, and where it all is. But the task doesn't end there. To obtain the greatest benefit from inventory, owners or their designees must manage it. Are a company's tools, for example, old and defective, in need of repair, in short supply, or useless and taking up space that could be better occupied? A good management plan will address these issues and keep the inventory current, in good condition, and functioning for the benefit and safety of those involved.

Managing trees on a large property can seem like an overwhelming task, but the same principles of inventory management apply. This inventory and management plan should provide managers the data they need to develop realistic budgets for their tree maintenance needs, and it will help make the Stantec - Keene NH a safer and more beautiful environment.

The following tips will assist you in making the most of this document:

Who's Who

Those who conducted the inventory and prepared this document are members of the Bartlett Inventory Solutions team. They are also employees of Bartlett Tree Experts. The Bartlett Inventory Solutions team is overseen by Technical Advisors out of the Bartlett Tree Research Laboratories in Charlotte, North Carolina. The advisors are primarily charged with client support, coordination, quality control, and documentation of inventories and the related data. Extensively trained Regional Inventory Arborists from local Bartlett Tree Experts offices are the primary data collectors and authors of the management plans. Readers may interpret the terms "Bartlett Tree Experts," "Bartlett," "the Inventory Team," "the team," "we," and "our" as the Bartlett company and those who conducted the inventory and prepared this management plan. In addition to the primary author(s) listed on the cover page, Team Member(s) involved in this project included:

Technical Advisor

Christopher Breedlove, Consulting Advisor

ISA Tree Risk Assessment Qualified

Data Collection

Timothy Armstrong, Regional Inventory Arborist

Massachusetts Certified Arborist #2464, ISA Board Certified Master Arborist #NE-7132B
ISA Tree Risk Assessment Qualified, Certified Treecare Safety Professional #953

Subject Trees

In this document, the term "subject trees" refers (depending on context) to some or all of the 156 trees included in the inventory.

Definitions & Bolded Terms

Some definitions or specifications are detailed within a given section to explain how readers should interpret certain terms or classifications. We have also appended a Glossary for other terms that appear throughout the document. The first reference to each of these terms appears in **bold** for the reader's convenience.

How This Document is Organized

An outline appears below that introduces the order in which the sections of the management plan will appear. The management plan layout is as follows:

- **Table of Contents**
 - Road map for the management plan
- **Making the Most of Your Inventory Management Plan**
 - Explanations for how to efficiently and effectively understand and navigate this management plan document
- **Executive Summary**
 - Synopsis of the major findings and recommendations
- **Introduction**
 - Brief explanation of the inventory and what was included
- **Goals & Objectives**
 - Explanation of the specific goals and objectives for this inventory
- **Data Collection & Tree Inspection Methodology**
 - Lists, explanations, and definitions of all data collected during the inventory
- **Tree Risk Assessment and Mitigation**
 - Summary of *overall tree risk ratings* assigned during the inventory with corresponding table and map displays with figures if applicable
 - Summary of *Level 3 Advanced assessments* recommended during the inventory (summarized in the *overall tree risk ratings* table) with a map display and figures if applicable
- **Stand Dynamics Results**
 - Summary information for the entire tree population inventoried

- **Recommendations**
 - Summary of all recommendations made during the inventory including associated table and map displays, explanations and examples, and figures if applicable
- **Defects or Observations**
 - List of all trees observed to have defects in the field in a table view with associated descriptive figures and maps if applicable
- **Entire Inventory**
 - List of all trees collected in a table display
- **Additional Resources**
 - Listing of all appended items for this management plan

EXECUTIVE SUMMARY

In July 2022, the Bartlett Inventory Solutions (BIS) Team from Bartlett Tree Experts conducted an inventory of trees on the Keene NH site. We identified 156 trees which included 24 species. The attributes that we collected include tree latitude and longitude, size, age and condition class, and a visual assessment of tree structure, health, and **vigor**.

We conducted the attribute collection using a sub-meter accuracy Global Positioning Satellite Receiver (GPSr) device with an error-in-location potential of not greater than three meters. Our recommendations for the subject trees are based on the number of desired management cycles. All tree work activities will comply with current American National Standards Institute (ANSI) Z133.1 requirements for safety.

Soil Sampling

Taking soil samples throughout planting beds and actively managed areas. Soil analysis provides information on the presence of soil nutrients, pH, organic matter, and cation exchange capacity.

Bulk Density Sampling

Taking bulk density samples throughout planting beds and actively managed areas to determine the amount of soil compaction.

Mulching

Wherever possible, apply 2-4 inches of mulch within the root zone to help moderate soil temperatures, reduce soil moisture loss, reduce soil compaction, provide nutrients, improve soil structure, and keep mowers and string trimmers away from tree trunks. The best mulch materials are wood chips, bark nuggets, composted leaves, or pine needles. To avoid potential disease problems, mulch should not be placed directly against the trunk.

Root Collar Excavations

Perform **root collar** excavations to 65 trees (42%) to lower risk of damaging conditions such as **girdling roots**, basal cankers, masking of root decay and lower-stem decay, and predisposing trees to various insect and disease pests.

Plant Health Care (PHC)

Implement Bartlett's PHC program to monitor pests and diseases on the subject trees. Treatments are therapeutic and preventive, and treatment timing is based on pest life cycle.

Pruning

Prune 26 trees (17%) for safety, health, structure, and appearance. Pruning will comply with current ANSI A300 standard practices for pruning.

Structural Support

There are structural support system recommendations for 7 trees (4%) to reduce risk of branch or whole tree failure. All structural support systems will comply with current ANSI A300 standard practices for supplemental support systems.

Lightning Protection

At the time of inventory, no trees were recommended for lightning protection systems. However, as trees continue to grow and site changes occur, we recommend continual consultation with your local Bartlett Arborist Representative to determine if lightning protection systems are warranted in the future.

Removals

Remove 12 trees (8%) due to condition or because of their location in relation to other trees to try and prevent competition or damage to infrastructure.

INTRODUCTION

In July 2022, Stantec in Boston, MA retained Bartlett Tree Experts to perform an inventory of trees on the Main St Keene NH site. Team member Tim Armstrong visited the site on June 27th to conduct the inventory.

The inventory included:

- identifying trees and assigning a Tree ID number (Tree ID numbers ranging from 1-100 and 201-256);
- identifying the trees' condition, health, and vigor;
- recommending risk evaluations and removals of appropriate trees;
- recommending tree care, soil care, structural support, and pest management treatments to promote tree safety, health, appearance, and longevity; and
- mapping the trees using GPSr hardware and Geographic Information System (GIS) software, and Bartlett Tree Experts' ArborScope™ web-based management system

The methods and procedures we used to make the above determinations and recommendations are detailed in the following sections.

GOALS & OBJECTIVES

An effective management plan communicates clear goals and the specific objectives designed to carry out those goals. We intend "goal" to mean the overall aim or result we expect to achieve for the client in producing the inventory and management plan. The objectives are the specific actions taken or recommended to support goal completion. The table below describes each goal and its corresponding objective(s).

GOALS & OBJECTIVES

GOAL	OBJECTIVES TO ACCOMPLISH GOAL
Establish the tree inventory (per numbers agreed) on the Keene NH site.	<ul style="list-style-type: none"> • Using Trimble® Geo GPSr hardware and ArborScope™ Inventory Management Tools, collect data such as tree name, location, size, age class, and condition class. • Assign a Tree ID number to each tree inventoried.
Provide mechanism for managing inventory, recommendations, and related budget planning.	<ul style="list-style-type: none"> • Provide map or maps of the inventoried trees to assist the client in managing property areas. • Submit a comprehensive management plan that documents and organizes findings and provides other resources to assist the client in efficient use of the information.
Maximize client understanding and implementation of management plan.	<ul style="list-style-type: none"> • Include in management plan specific explanations and visuals related to plan recommendations. • Provide appended resources that address health, procedures, and standards related to tree care. • Make periodic contact with client to follow up and answer any questions about the management plan's contents.
Maximize immediate and long-term tree health and aesthetics.	Implement recommended plant-health-care program that uses <ul style="list-style-type: none"> • integrated pest management • soil care • maintenance pruning
Manage immediate and long-term risk associated with trees in high-use areas.	Implement recommended risk-management measures that include <ul style="list-style-type: none"> • risk-reduction pruning • required removals • tree structure evaluations

DATA COLLECTION & TREE INSPECTION METHODOLOGY

In conducting the inventory, we used specialized equipment and software and followed specific procedures to determine tree characteristics, risk evaluations, and recommendations. The following explanation will assist the reader in interpreting the findings of this management plan.

Data Collection Equipment & Attribute Data

The Inventory Team used Trimble® Geo GPSr hardware units, TerraSync® and GPS Pathfinder® Office GIS software, and Bartlett Tree Experts' ArborScope™ web-based management system to inventory the trees. The attribute data we collected on site are listed below.

- botanical name and regional common name according to local ISA Chapter Tree Species List
- tree location based on GPS coordinate system
- tree ID number
- diameter at breast height (**DBH**)
- canopy radius
- age class
- height class
- condition class
- root zone infringement, based on **dripline** and estimated **grayscale** (e.g., sidewalks) impact on root zone
- infrastructure interaction (between trees and grayscale that may cause an undesirable condition)
- documented *Level 2 Basic assessment* for tree risk where defects or concerns were observed that prompted the need to use the ISA risk matrices in the field resulting in an *overall tree risk rating*
- Tree & Shrub Work phase (based on number of desired management cycles)
- pruning category
- need for and inspection of existing structural support systems
- need for and inspection of existing lightning protection systems
- need for *Level 3 Advanced assessment* for tree risk
- tree removals
- soil care recommendations
- plant health care recommendations
- noted defects/observations
- observed pests/diseases

Specifications/Definitions

Age Class

New Planting	Tree not yet established
Young	Established tree but not in the landscape for many years
Semi-mature	Established tree but has not yet reached full growth potential
Mature	Tree within its full growth potential
Over-mature	Tree that is declining or beginning to decline due to its age

Height Class

Small	Less than 15 feet
Medium	15 to 40 feet
Large	Greater than 40 feet

Condition Class

Dead

Poor Most of the canopy displays dieback and undesirable leaf color, inappropriate leaf size or inadequate new growth. Tree or parts of tree are in the process of failure.

Fair Parts of canopy display undesirable leaf color, inappropriate leaf size, and inadequate new growth. Parts of the tree are likely to fail.

Good Tree health and condition are acceptable.

Tree & Shrub Work Phase

Tree & Shrub Work phase takes into consideration tree species, condition, location, age, and proximity to infrastructure. We intend for this rating system to assist decision makers in prioritizing risk mitigation, tree pruning, cabling and bracing, and tree lightning protection recommendations. *Trees with an ASAP and an overall tree risk rating of extreme or high (see definitions in the next section) should be addressed immediately.* Prioritization does not take into account any budgetary or financial considerations.

Phase 1, 2, 3, 4, and 5 are all based on observations by the inventory arborist according to the manager's goals. The following additional information clarifies each priority:

- ASAP** Trees with recommendations that should be addressed As Soon As Possible.
- Phase 1** Typically addressed in the first management cycle. Trees located in high-use sites, have a high aesthetic value, have an elevated *overall tree risk rating*, and/or parts that are currently in conflict with infrastructure.
- Phase 2** Typically addressed in the second management cycle. Trees with moderate aesthetic value, don't have an elevated *overall tree risk rating*, and/or parts that are anticipated to be in conflict with infrastructure.
- Phase 3** Typically addressed in the third management cycle. Tree parts that are anticipated to be in conflict with infrastructure and/or recommendations based on anticipated growth.
- Phase 4** Typically addressed in the fourth management cycle. Recommendations are for future consideration and anticipated growth.
- Phase 5** Typically addressed in the fifth management cycle. Recommendations are for future consideration and anticipated growth.

Pruning Category

All trees identified in this management plan that have tree care recommendations are listed within a specific pruning category. Trees within each pruning category can be prioritized by the specific goals of the manager. It is recommended that specific goals be discussed prior to any pruning.

Risk Mitigation	This goal requires pruning of any tree where risk mitigation should take precedence over other pruning goals. Typically aims to reduce the <i>overall tree risk rating</i> by branch removal and/or branch reduction.
Maintenance	This goal typically requires routine pruning of large/mature trees. Includes branch removal and/or branch reduction to help reduce <i>likelihood of failure</i> and/or conflict with infrastructure. Trees with this goal are typically climbed or require the use of aerial lifts and/or other specialized equipment.
Developmental	This goal typically requires routine pruning of small/young trees. Includes structural pruning to develop a strong central stem, establish proper branch spacing, and/or develop branch structure.
Ornamental	This goal typically requires pruning of small trees. Includes reduction and/or shearing to its desired shape, size, and/or structure.
Specialized	Trees with this goal require a unique treatment that may include, but not limited to, targeted pruning cuts, removal of nuisance fruit/parasitic plants, and/or rejuvenation/internodal pruning.

* The listed descriptions of goals, tools, and/or techniques are not limited to these definitions. Specific individual goals and species profiles should guide the pruning recommendations.

Tree Risk Assessments, Limitations & Glossary

In accordance with industry standards, tree risk ratings are derived from a combination of three factors: the *likelihood of failure*, the *likelihood of the failed tree part impacting a target*, and the *consequences* of the target being struck. The guidelines used to classify each of these factors are presented in the *ISA's BMP for Tree Risk Assessment* and guidelines developed by the Bartlett Tree Research Laboratories. *These factors are then used to categorize tree risk as Extreme, High, Moderate or Low.* The factors used to define your risk ratings are identified in this report. An explanation of terms used in this report appears in the glossary located in the appendix. The information provided in this report is based on the conditions identified at the time of inspection. Tree conditions do change over time so reassessment is recommended annually and after major storm events.

Limitations of Tree Risk Assessments

It is important for the tree owner or manager to know and understand that all trees pose some degree of risk from failure or other conditions. The information and recommendations within this report have been derived from the level of tree risk assessment identified in this report, using the information and practices outlined in the *International Society of Arboriculture's Best Management Practices for Tree Risk Assessment*, as well as the information available at the time of the inspection. However, the *overall tree risk rating*, the mitigation recommendations, or any other conclusions do not preclude the possibility of failure from undetected conditions, weather events, or other acts of man or nature. Trees can unpredictably fail even if no defects or other conditions are present. It is the responsibility of the tree owner or manager to schedule repeat or *Advanced assessments*, determine actions, and implement follow up recommendations, monitoring and/or mitigation.

Bartlett Tree Experts can make no warranty or guarantee whatsoever regarding the safety of any tree, trees, or parts of trees, regardless of the level of tree risk assessment provided, the risk rating, or the residual risk rating after mitigation. The information in this report should not be considered as making safety, legal, architectural, engineering, landscape architectural, land surveying advice or other professional advice. This information is solely for the use of the tree owner and manager to assist in the decision making process regarding the management of their tree or trees. Tree risk assessments are simply tools which should be used in conjunction with the owner or tree manager's knowledge, other information and observations related to the specific tree or trees discussed, and sound decision making.

Glossary

Tree risk assessment has a unique set of terms with specific meanings. Definitions of all specific terms may be found in the *International Society of Arboriculture's Best Management Practice for Tree Risk Assessment*. Definitions of some of these terms used in this report are as follows:

The *likelihood of failure* may be categorized as imminent meaning that failure has started or could occur at any time; probable meaning that failure may be expected under normal weather conditions within the next 3 years; possible meaning that failure could occur, but is unlikely under normal weather conditions during that time frame; and improbable meaning that failure is not likely under normal weather conditions, and may not occur in severe weather conditions during that time frame.

The likelihood of the failed tree part impacting a target may be categorized as high meaning that a failed tree or tree part will most likely impact a target; medium meaning the failed tree or tree part could impact the target, but is not expected to do so; low meaning that the failed tree or tree part is not likely to impact a target; and very low meaning that the chance of a failed tree or tree part impacting the target is remote.

The likelihood of failure and impact is defined by the Likelihood Matrix below.

LIKELIHOOD OF FAILURE AND IMPACT

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

The *consequences* of a known target being struck may be categorized as severe meaning that impact could involve serious personal injury or death, damage to high value property, or disruption to important activities; significant meaning that the impact may involve personal injury, property damage of moderate to high value, or considerable disruption; minor meaning that impact could cause low to moderate property damage, small disruptions to traffic or a communication utility, or minor injury; and negligible meaning that impact may involve low value property damage, disruption that can be replaced or repaired, and do not involve personal injury.

Targets are people, property, or activities that could be injured, damaged or disrupted by a tree failure.

Levels of assessment 1) *Limited visual assessments* are conducted to identify obvious defects. 2) *Basic assessments* are visual inspections done by walking around the tree looking at the site, buttress roots, trunk and branches. It may include the use of simple tools to gain information about the tree or defects. 3) *Advanced assessments* are performed to provide detailed information about specific tree parts, defects, targets of site conditions. Drilling to detect decay is an advanced assessment technique.

Tree Risk Ratings are terms used to communicate the level of risk rating. They are defined in defined in the Risk Matrix below as a combination of Likelihood and Consequences:

ISA RISK MATRIX

Likelihood of Failure & Impact	Consequences of the Tree Failure			
	Negligible	Minor	Significant	Severe
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Overall tree risk rating is the highest individual risk identified for the tree. The *residual risk* is the level of risk the tree should pose after the recommended mitigation.

Bartlett Tree Experts can inventory trees that have ropes courses, zip lines, swings, tree houses, or any other life support system attached for several different attributes; however, Bartlett Tree Experts is unable to provide tree risk assessment information on such trees, nor is Bartlett Tree Experts able to determine whether the correct hardware has been used, the systems are attached to the trees correctly, or whether the trees can withstand the additional forces that are placed on the tree or trees from such systems or structures. Bartlett Tree Experts does not recommend that any hardware or structures, other than those recommended by and installed by qualified arborists to aid the tree in structural support or protections from lightning, be installed in or attached to any tree(s). Bartlett Tree Experts recommends removing, or discontinuing the use of, any such system or recreational structure until the Client hires or consults with an engineer/specialist that deals specifically with ropes courses, zip lines, swings, tree houses, or any other life support systems and how they attach to and impact trees to determine if the trees can handle the forces being placed on them.

In the event that Bartlett Tree Experts observes an immediate safety issue with a tree with any such device attached, such as the presence of a dead, dying, or broken limb that could fall and injure a person or damage property, Bartlett Tree Experts may make a recommendation to remove or prune such a limb or otherwise mitigate the obvious safety issue. However, the Client should not infer that following such a recommendation and mitigating the immediate safety issue makes the tree in question safe for the use of the attached device or feature.

STAND DYNAMICS RESULTS



STAND DYNAMICS RESULTS

In reviewing the results and recommendations, the reader will find useful the specifications and definitions detailed in the preceding methodology above. We used the following categories to organize the stand dynamics results, which are displayed in tables:

- **Subject Trees Summarized According to:**
 - Tree Species Identified
 - Condition Class
 - Age Class
 - Tree Size per DBH
 - Estimated Tree Asset Value
 - Tree Location Value

Where appropriate, we have included explanations, photos, drawings, or other information to illuminate the table contents.

Stand Dynamics

Tree Species Identified

Our inventory revealed 24 species of trees, as detailed in the following table:

TREE SPECIES IDENTIFIED

Genus	Species	Common Name	Count	% Distribution Total
<i>Acer</i>	<i>negundo</i>	Maple-Boxelder	1	1%
	<i>platanoides</i>	Maple-Norway	4	3%
	<i>rubrum</i>	Maple-Red	9	6%
	<i>saccharum</i>	Maple-Sugar	3	2%
	<i>x freemanii</i>	Maple-Freeman's	5	3%
Acer Total			22	14%
<i>Celtis</i>	<i>occidentalis</i>	Hackberry	1	1%
<i>Cercis</i>	<i>canadensis</i>	Redbud-Eastern	3	2%
<i>Chamaecyparis</i>	<i>nootkatensis</i>	Falsecypress-Nootka	1	1%
<i>Cladrastis</i>	<i>kentukea</i>	Yellowwood	1	1%
<i>Crataegus</i>	sp.	Hawthorn	1	1%
<i>Fraxinus</i>	<i>pennsylvanica</i>	Ash-Green	18	12%
<i>Ginkgo</i>	<i>biloba</i>	Ginkgo	5	3%
<i>Gleditsia</i>	<i>triacanthos</i>	Honeylocust-Common	8	5%
<i>Koelreuteria</i>	<i>paniculata</i>	Goldenraintree-Panicled	1	1%
<i>Malus</i>	sp.	Crabapple	7	4%
<i>Prunus</i>	<i>serrulata</i>	Cherry-Flowering	1	1%
<i>Pyrus</i>	<i>calleryana</i>	Pear-Callery	19	12%
<i>Quercus</i>	<i>palustris</i>	Oak-Pin	24	15%
	<i>rubra</i>	Oak-Northern Red	9	6%
Quercus Total			33	21%
<i>Stewartia</i>	<i>pseudocamellia</i>	Stewartia-Japanese	1	1%
<i>Syringa</i>	<i>reticulata</i>	Lilac-Japanese Tree	2	1%
<i>Tilia</i>	<i>cordata</i>	Linden-Littleleaf	13	8%
<i>Ulmus</i>	<i>americana</i>	Elm-American	4	3%
<i>Zelkova</i>	<i>serrata</i>	Zelkova-Japanese	15	10%
Grand Total			156	100%

2022 TREE INVENTORY

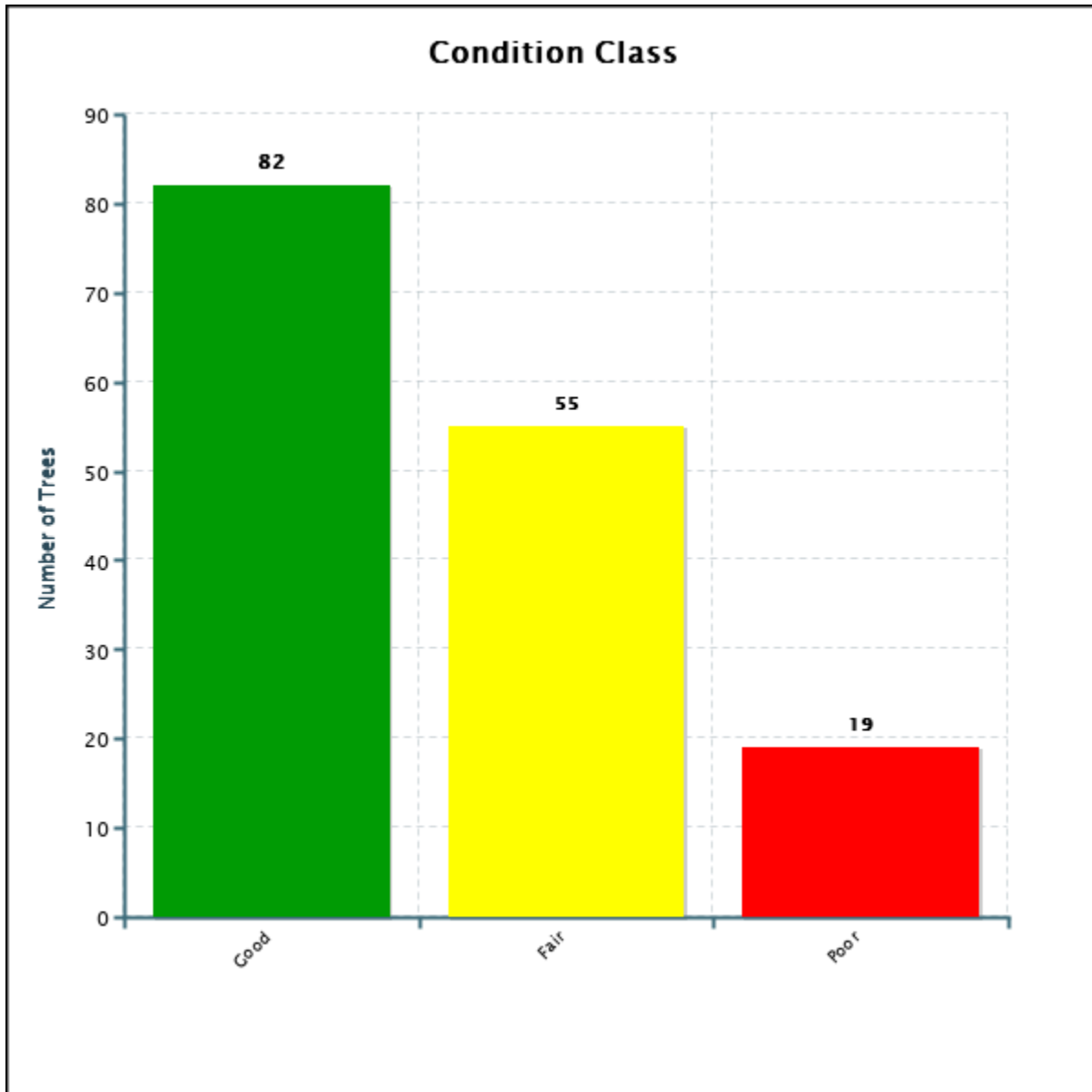


Condition Class

The breakdown of tree condition follows:

CONDITION CLASS BREAKDOWN

Condition Class	Quantity	% of Total
Good	82	53%
Fair	55	35%
Poor	19	12%



INVENTORIED TREES BY CONDITION CLASS

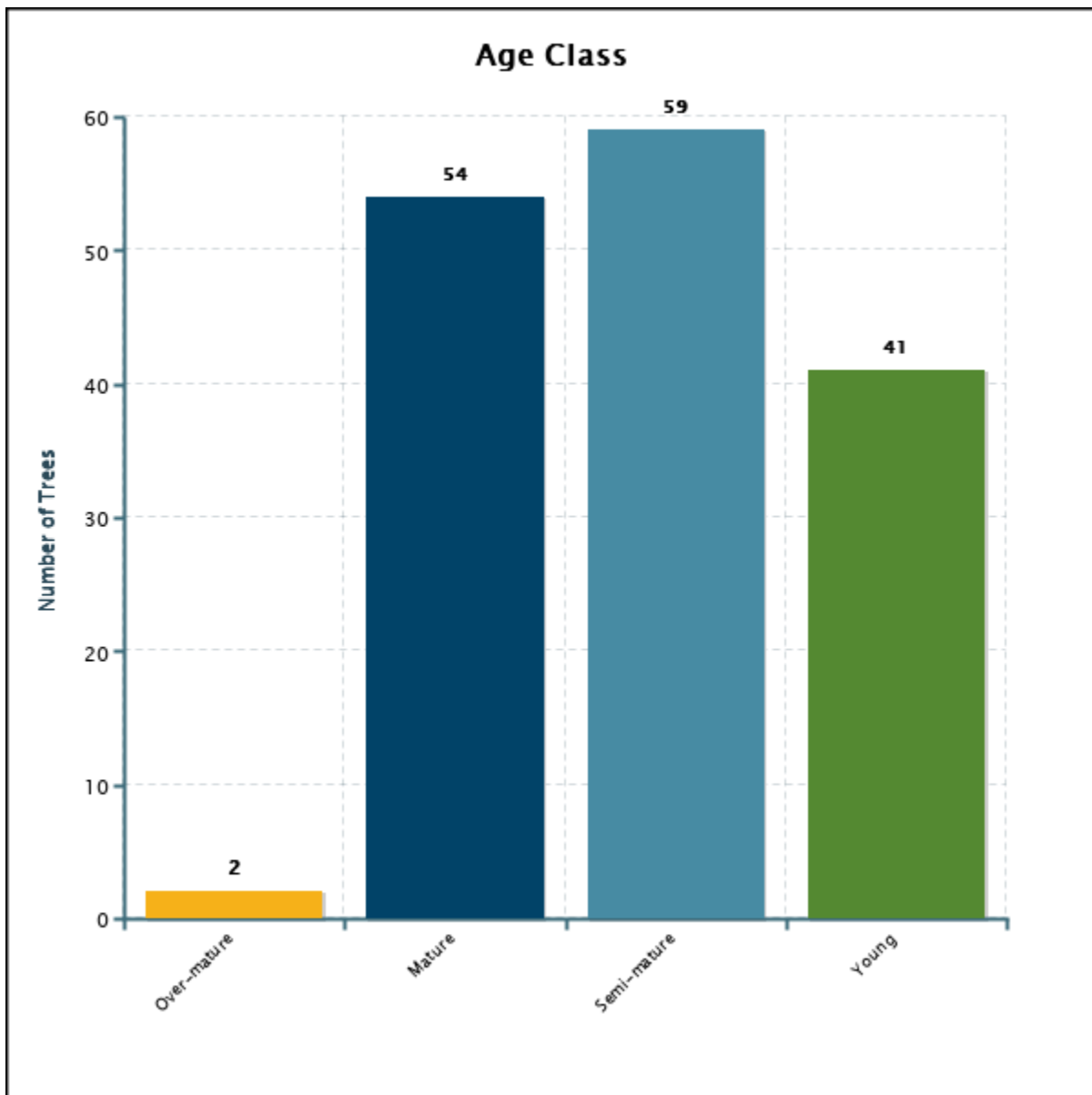


Age Class

The breakdown of tree age class follows:

AGE CLASS BREAKDOWN

Age Class	Quantity	% of Total
Over-mature	2	1%
Mature	54	35%
Semi-mature	59	38%
Young	41	26%

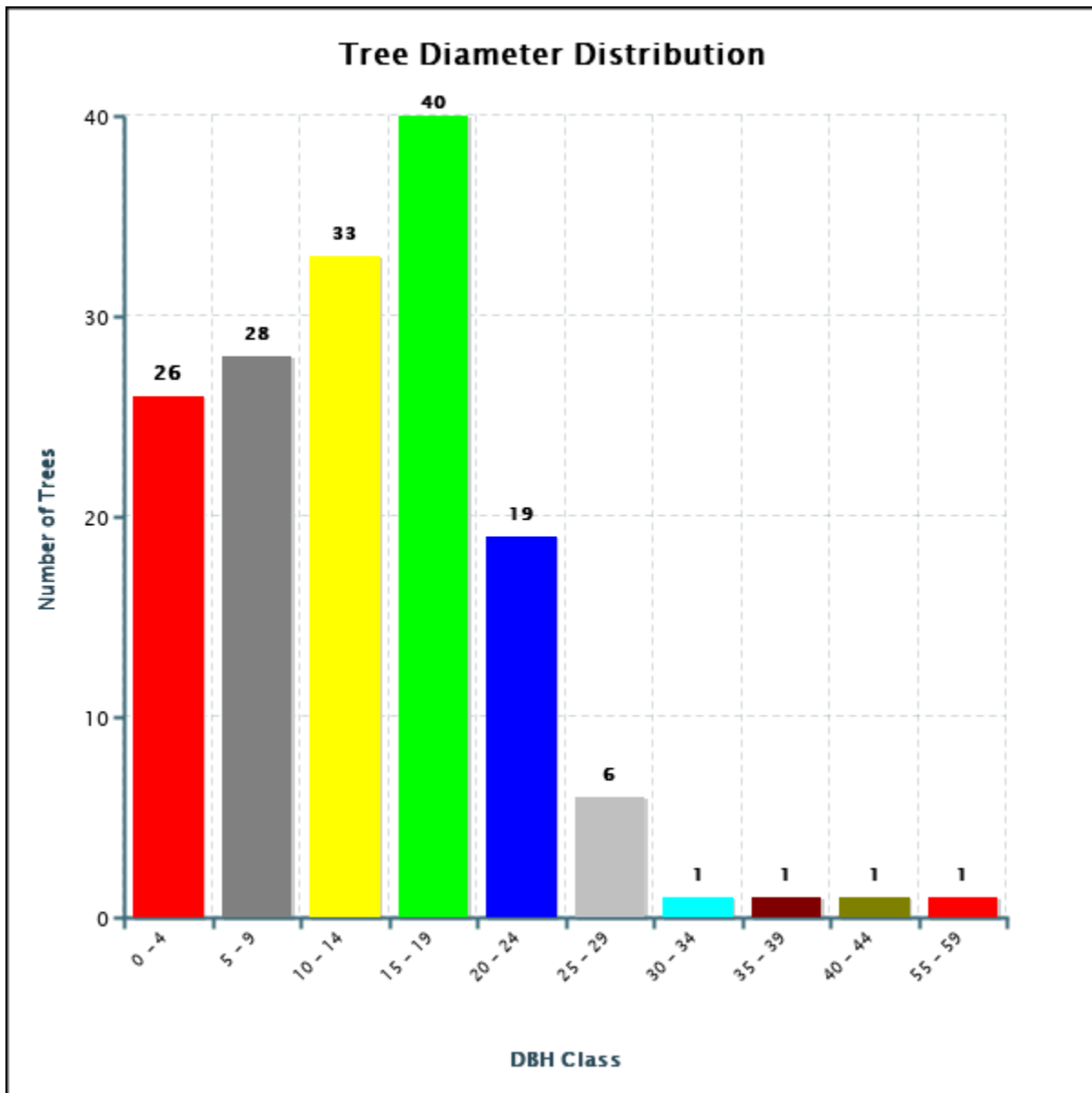


INVENTORIED TREES BY AGE CLASS



Tree Size (DBH)

The following chart illustrates numbers of trees according to size per DBH:



Estimated Tree Asset Value

As part of the Bartlett inventory process, we have included an Estimated Tree Asset Value for each tree and a cumulative total for all trees inventoried. We use an average per square inch nursery price, size (DBH), species factor, condition factor, and location factor to estimate the tree asset value. This is not intended to replace a tree appraisal.

The following data fields are used in this formula:

Data Field	Description
Average Per Square Inch Nursery Price	Based on the average nursery prices for two common tree species and one exotic tree species within a region, then taking the average of those three as the average per square inch price for the region
Size	Based on tree DBH (4.5 feet above grade)
Species Factor	Relative species desirability based on 100% for the tree in that geographical location. In most cases, species desirability ratings, published by the International Society of Arboriculture, are used for adjustment.
Condition Factor	Rating of the tree's structure and health based on 100%
Location Factor	Average rating for the site and the tree's contribution and placement, based on 100%

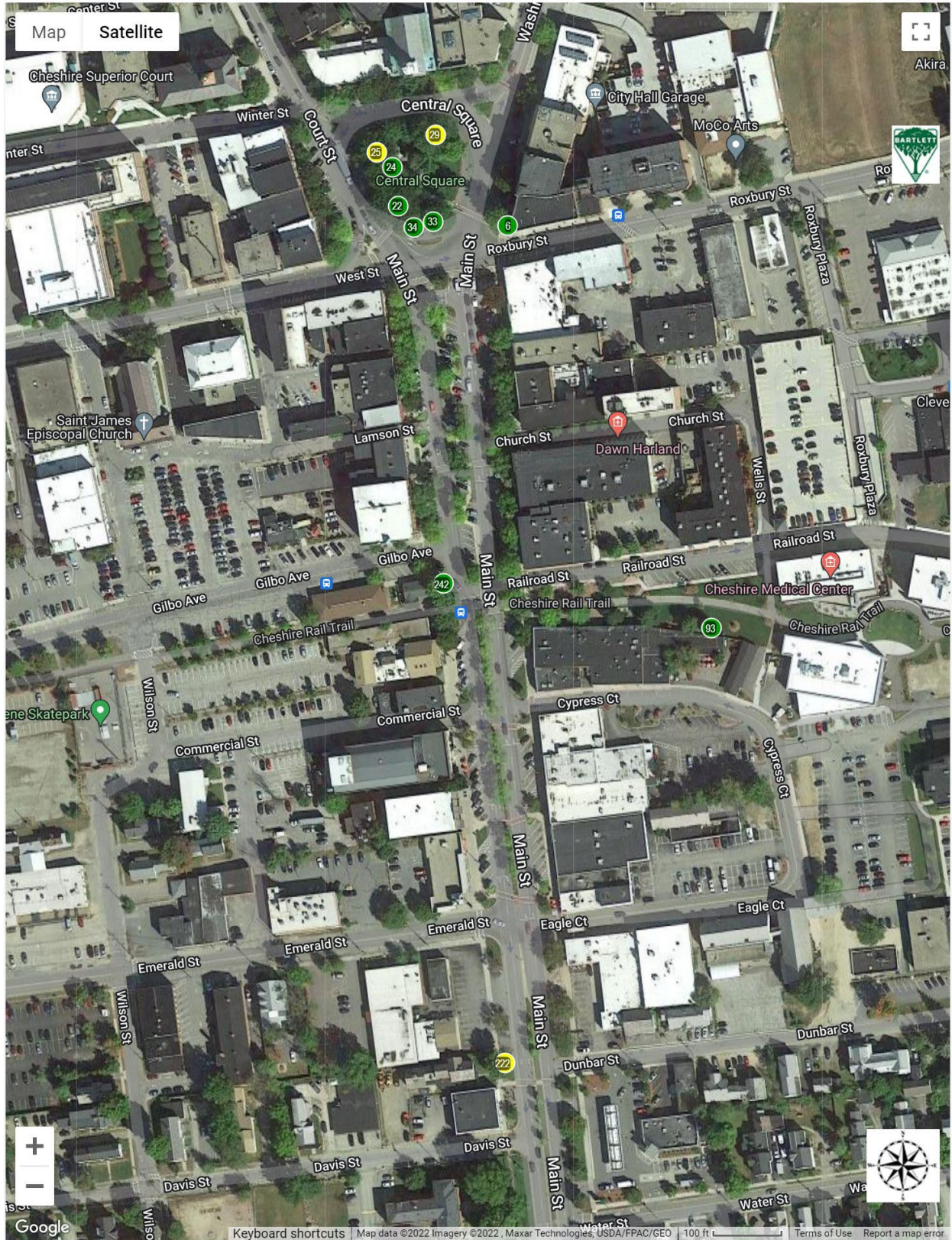
$$\text{Estimated Tree Asset Value} = (\text{Average Per Square Inch Nursery Price} * \text{Size}) * \text{Species Factor} * \text{Condition Factor} * \text{Location Factor}$$

The estimated cumulative total value for all trees inventoried is **\$739,454.00**. The following table lists the ten trees with the highest Tree Asset Values:

TOP TEN TREES - HIGHEST ESTIMATED TREE ASSET VALUE

Tree ID	Common Name	Genus	Species	DBH	Tree Asset Value
29	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	55	\$45,515.00
22	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	42	\$41,072.00
24	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	38	\$39,573.00
25	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	30	\$18,792.00
6	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	25	\$16,347.00
222	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	27	\$15,222.00
242	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	23	\$13,836.00
34	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	26	\$13,521.00
93	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	24	\$13,293.00
33	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	25	\$12,501.00

TOP TEN TREES - HIGHEST TREE ASSET VALUE



RECOMMENDATIONS



RECOMMENDATIONS

In reviewing the results and recommendations, the reader will find useful the specifications and definitions detailed in the preceding methodology. We used the following categories to organize the results and recommendations, which are displayed in tables:

Recommendations

- Soil Care
- Root Collar Excavation
- Plant Health Care
- Tree Pruning
- Structural Support Systems
- Lightning Protection Systems
- Tree Removal

Soil Care

Healthy soil is critical to the health and longevity of trees. Soil provides trees with the essential nutrients required for their growth. Many secondary problems such as reduced vigor, inadequate growth, branch dieback, and pest or disease concerns are related to the primary stress of poor soil conditions. Undisturbed, native forest soils generally contain adequate levels of organic matter, soil microbes, and nutrients. Urban, suburban, and landscape soils (as opposed to forest soils) usually lack these qualities, and are often compacted. In many cases, trees in a landscaped environment suffer from inadequate soil fertility, soil compaction, root zone competition with turf grasses, and inadequate total soil volume. Soil Care treatments should be applied as soon as possible, therefore they do not have a Tree & Shrub Work phase.

Bartlett Tree Experts recommends several procedures and treatments that address soil quality. Taking soil samples is perhaps the most important. Proper tree care cannot be initiated unless it is known what type of soil environment the trees are growing in. Soil testing results can help to create a path forward for improved tree health. We address some of these below.

Soil Sampling

Collecting soil samples and having them tested helps determine nutrients that may be lacking, unfavorable soil pH values, and adequacy of soil organic matter. Laboratory tests and analyses can determine the need for soil amendments.

Bulk Density

Compacted soils are regrettably common in the urban setting. A bulk density test, which requires an undisturbed core sample, measures the level of soil compaction. Arborists can use the results to diagnose problems or to determine what size holes to dig for planting. If soil density exceeds a measured threshold for a given soil type and tree species, we recommend Bartlett's Root Invigoration™ program.

Soil Rx®

Bartlett's Soil Rx® program, which is a prescription soil amendment program, aims to correct nutrient deficiencies and optimize soil conditions for designated trees.

Root Invigoration™

The aim of Bartlett's patented Root Invigoration™ Program is to improve soil conditions by addressing soil compaction and promoting efficient root growth, especially for high-value trees in disturbed areas. The process includes taking soil samples to determine what nutrients are deficient, performing a root collar excavation, "air-tilling" a portion of the root zone to find fine roots, incorporating organic matter, applying soil amendments (based on soil sample), and applying mulch. The area of the root system treated can vary by tree. For the Root Invigoration™ Program to be successful, proper watering techniques must be employed after the process is complete.

Mulch Application

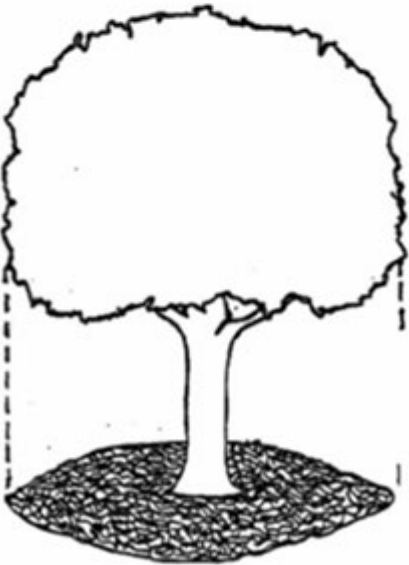
Proper mulching (top left and bottom left) provides many benefits to trees and shrubs. It moderates soil temperatures, reduces soil moisture loss, reduces soil compaction, provides nutrients, and improves soil structure. This practice results in more root growth and healthier plants. The image on the top right illustrates root growth density under grass versus mulch. Mulch is frequently applied incorrectly (bottom right), so we recommend that readers inspect the technical report on mulch application guidelines that appears in the Appendix.



Example of how mulch should be installed, 2-4 inches thick and not against the trunk.



Example of root density under grass versus mulch.



Example of how mulch should be applied from the trunk to the dripline.



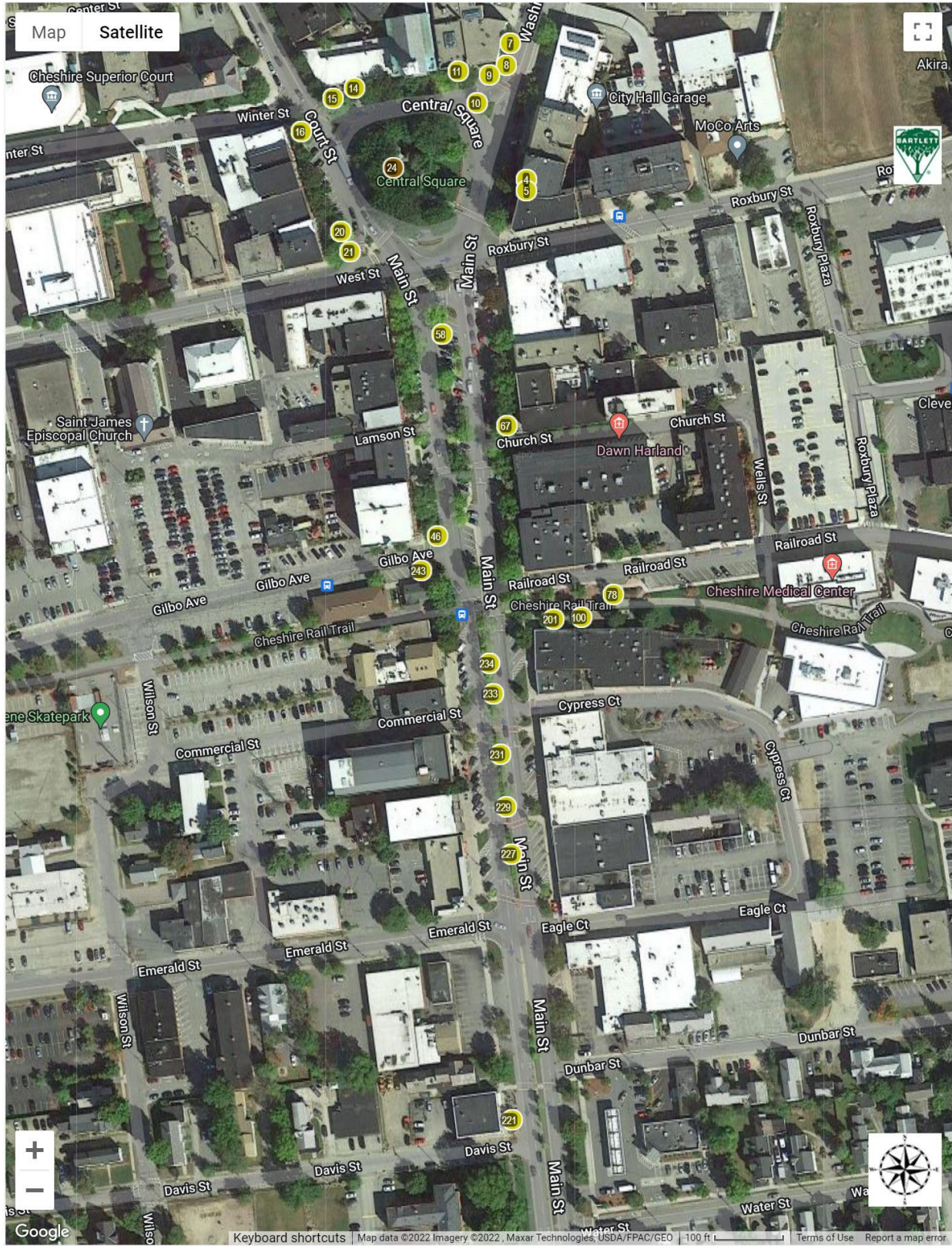
Example of improper mulch application, known as "volcano mulch".

The following inventoried trees are recommended for soil care because of possible nutrient deficiencies, soil compaction, or inadequate soil conditions:

INVENTORIED TREES RECOMMENDED FOR SOIL CARE (26 Trees)

Tree ID	Common Name	DBH	Soil Care	Mulch Recommended
4	Zelkova-Japanese	17	• Other: Fortiphite	...
5	Zelkova-Japanese	18	• Other: Fortiphite	...
7	Linden-Littleleaf	12	• Other: Fortiphite	...
8	Linden-Littleleaf	10	• Other: Fortiphite	...
9	Oak-Pin	18	• Other: Fortiphite	...
10	Oak-Pin	13	• Other: Fortiphite	...
11	Zelkova-Japanese	17	• Other: Fortiphite	...
14	Zelkova-Japanese	19	• Other: Fortiphite	...
15	Oak-Pin	25	• Other: Fortiphite	...
16	Oak-Pin	21	• Other: Fortiphite	...
20	Oak-Pin	19	• Other: Fortiphite	...
21	Oak-Pin	25	• Other: Fortiphite	...
24	Oak-Northern Red	38	• Other: Fortiphite	Yes
46	Oak-Pin	21	• Other: Fortiphite	...
58	Zelkova-Japanese	13	• Other: Fortiphite	...
67	Oak-Pin	19	• Other: Fortiphite	...
78	Linden-Littleleaf	10	• Other: Fortiphite	...
100	Oak-Pin	15	• Other: Fortiphite	...
201	Oak-Pin	15	• Other: Fortiphite	...
221	Pear-Callery	12	• Other: Fortiphite	...
227	Honeylocust-Common	2	• Other: Fortiphite	...
229	Honeylocust-Common	2	• Other: Fortiphite	...
231	Honeylocust-Common	2	• Other: Fortiphite	...
233	Honeylocust-Common	2	• Other: Fortiphite	...
234	Maple-Freeman's	2	• Other: Fortiphite	...
243	Oak-Pin	14	• Other: Fortiphite	...

INVENTORIED TREES RECOMMENDED FOR SOIL CARE



Soil Care: ● Other ● Mulch

Root Collar Excavation

Excavating the root collar is necessary for trees whose buttress roots are covered by excess soil or mulch. Buried root collars can contribute to tree health problems, including girdling roots, basal cankers, and masking root and lower stem decay. Trees in the root collar excavation table do not have a Tree & Shrub Work phase and should be completed as soon as possible. The top image shows a buried root collar and the bottom image shows an exposed root collar.



Example of a buried root collar.



Example of an exposed root collar.

Girdling Roots

Girdling roots (top left and right) restrict water and nutrient movement throughout the tree. If left untreated they can cause the tree to decline, fail (bottom), and eventually die in severe cases. Girdling roots should be removed as soon as possible, unless removal of roots will significantly impact the condition or stability of the tree. In some cases, the presence of significant or severe girdling roots may cause the tree to be recommended for removal.



Examples of girdling roots.



Example of tree failure from girdling roots.

The following trees are recommended for a root collar excavation:

INVENTORIED TREES RECOMMENDED FOR A ROOT COLLAR EXCAVATION (65 Trees)

Tree ID	Common Name	DBH	Root Collar Observation
2	Zelkova-Japanese	14	• Buried root collar
3	Pear-Callery	17	• Buried root collar • Girdling roots suspected
4	Zelkova-Japanese	17	• Buried root collar • Girdling roots suspected
5	Zelkova-Japanese	18	• Buried root collar • Girdling roots present
10	Oak-Pin	13	• Buried root collar
11	Zelkova-Japanese	17	• Buried root collar
12	Zelkova-Japanese	20	• Buried root collar
14	Zelkova-Japanese	19	• Buried root collar
17	Linden-Littleleaf	5	• Buried root collar
19	Linden-Littleleaf	4	• Girdling roots present
31	Pear-Callery	21	• Buried root collar
32	Maple-Red	18	• Buried root collar
40	Crabapple	3	• Buried root collar
41	Ginkgo	9	• Buried root collar
42	Ginkgo	13	• Buried root collar
43	Pear-Callery	14	• Buried root collar
51	Pear-Callery	15	• Buried root collar
53	Ginkgo	12	• Buried root collar
55	Zelkova-Japanese	13	• Buried root collar
56	Zelkova-Japanese	13	• Buried root collar
57	Ash-Green	17	• Buried root collar
58	Zelkova-Japanese	13	• Buried root collar
62	Zelkova-Japanese	19	• Buried root collar
63	Ash-Green	23	• Buried root collar
64	Hackberry	15	• Buried root collar
66	Ash-Green	17	• Buried root collar
70	Ash-Green	15	• Buried root collar
71	Hawthorn	3	• Buried root collar
73	Pear-Callery	17	• Buried root collar
76	Pear-Callery	14	• Buried root collar
77	Yellowwood	13	• Buried root collar
78	Linden-Littleleaf	10	• Buried root collar
80	Maple-Red	7	• Buried root collar
81	Maple-Red	9	• Buried root collar
82	Maple-Red	9	• Buried root collar
83	Crabapple	6	• Buried root collar

Tree ID	Common Name	DBH	Root Collar Observation
84	Crabapple	3	• Buried root collar
85	Lilac-Japanese Tree	2	• Buried root collar
87	Elm-American	6	• Buried root collar
88	Redbud-Eastern	2	• Buried root collar
90	Crabapple	6	• Buried root collar
91	Redbud-Eastern	2	• Buried root collar
92	Falsecypress-Nootka	3	• Buried root collar
94	Crabapple	2	• Buried root collar
95	Linden-Littleleaf	18	• Buried root collar
96	Redbud-Eastern	3	• Buried root collar
201	Oak-Pin	15	• Buried root collar
203	Pear-Callery	11	• Buried root collar
205	Ginkgo	8	• Buried root collar
206	Ginkgo	15	• Buried root collar
207	Maple-Red	8	• Buried root collar
211	Goldenraintree-Panicked	2	• Buried root collar
213	Zelkova-Japanese	10	• Buried root collar
223	Crabapple	5	• Buried root collar
225	Lilac-Japanese Tree	4	• Buried root collar
226	Maple-Red	2	• Buried root collar
230	Maple-Freeman's	3	• Buried root collar
231	Honeylocust-Common	2	• Buried root collar
232	Maple-Freeman's	3	• Buried root collar
234	Maple-Freeman's	2	• Buried root collar
238	Zelkova-Japanese	19	• Buried root collar
240	Pear-Callery	15	• Buried root collar
241	Pear-Callery	19	• Buried root collar
246	Linden-Littleleaf	11	• Buried root collar
250	Maple-Norway	7	• Buried root collar

INVENTORIED TREES RECOMMENDED FOR A ROOT COLLAR EXCAVATION



Plant Health Care

The Inventory Team also recommends Plant Health Care (PHC) programs for trees in the formal landscape. In addition, an Integrated Pest Management (IPM) program monitors for potentially damaging insects, diseases and cultural problems that are often seasonal and may not have been evident during our inventory visit. Plant Health Care treatments should be applied as soon as possible, therefore they do not have a Tree & Shrub Work phase. These pests and diseases include, but are not limited to, the following:

- Anthracnose - on a variety of species
- Aphids - on a variety of species
- Bacterial Leaf Scorch - on trees within red oak group
- Bagworms - on a variety of tree species
- Boring Insects - on a variety of tree species
- Caterpillar Defoliators - on a variety of tree species, especially oak
- Gall Insects - on a variety of species
- Lacebugs - on a variety of species
- Scab and Rust Fungi - on crabapple and apple species.
- Suspected Phytophthora Root Rot and Canker - on a variety of tree species, especially beech species
- Scale Insects - on a variety of tree species, especially oak
- Spider Mites - on a variety of tree species

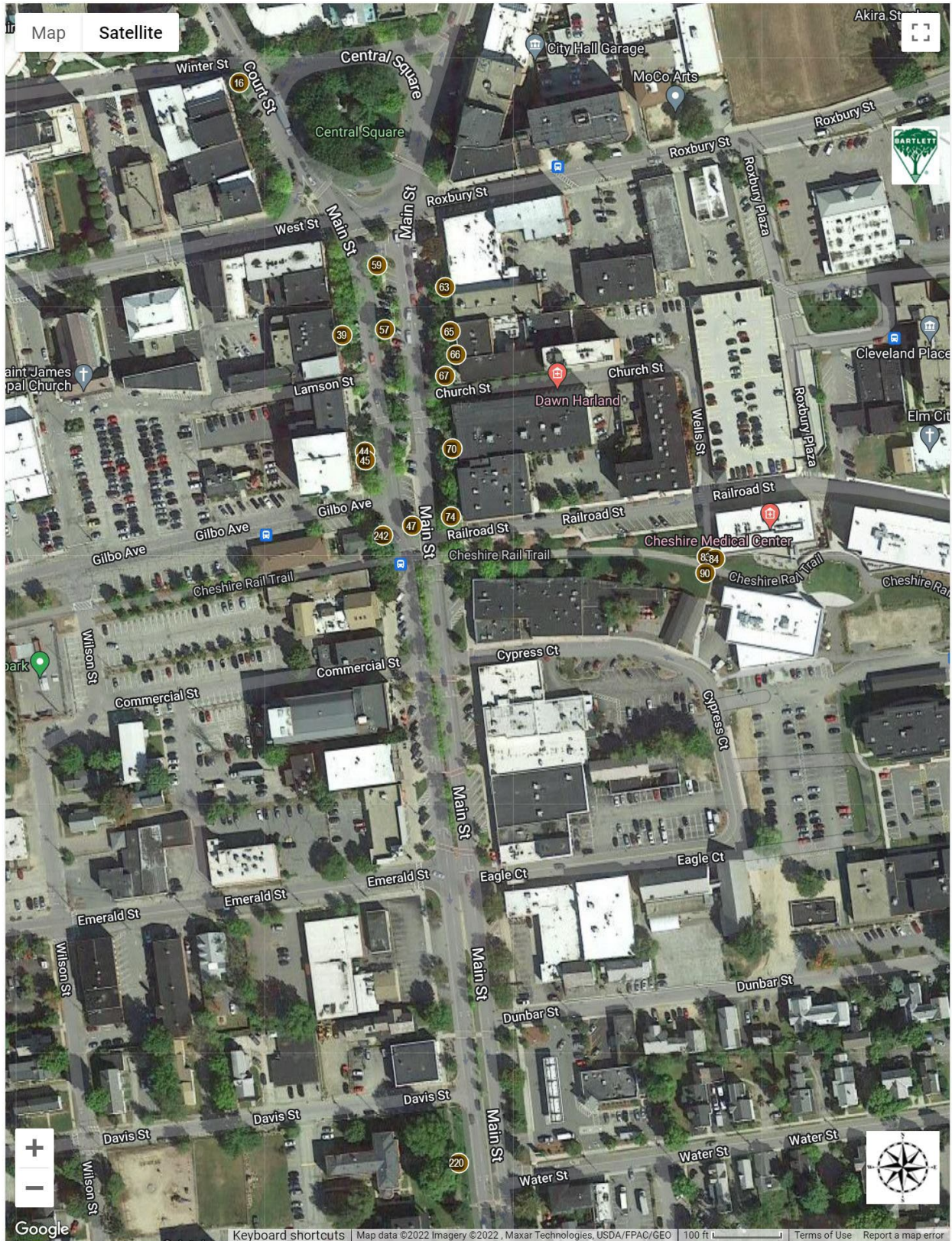
We identified pests or diseases and/or provided plant health care recommendations on the following inventoried trees at the time of the inventory:

INVENTORIED TREES IDENTIFIED FOR PLANT HEALTH CARE (26 Trees)

Tree ID	Common Name	DBH	Plant Health Care	Pest(s) or Disease(s)
16	Oak-Pin	21	• Gall wasp treatment	• Gall wasp
39	Stewartia-Japanese	1	• Adjust irrigation	• Water stress
40	Crabapple	3	• Fungicide treatment	...
44	Ash-Green	17	• EAB treatment	...
45	Ash-Green	17	• EAB treatment	...
47	Ash-Green	19	• EAB treatment	...
57	Ash-Green	17	• EAB treatment	...
59	Ash-Green	16	• EAB treatment	...
63	Ash-Green	23	• EAB treatment	...
65	Ash-Green	18	• EAB treatment	...
66	Ash-Green	17	• EAB treatment	...
67	Oak-Pin	19	• Gall wasp treatment	• Gall wasp
70	Ash-Green	15	• EAB treatment	...

Tree ID	Common Name	DBH	Plant Health Care	Pest(s) or Disease(s)
74	Oak-Pin	21	• Gall wasp treatment	• Gall wasp
83	Crabapple	6	• Fungicide treatment	...
84	Crabapple	3	• Fungicide treatment	...
86	Elm-American	7	• DED treatment	...
87	Elm-American	6	• DED treatment	...
90	Crabapple	6	• Fungicide treatment	...
94	Crabapple	2	• Fungicide treatment	...
97	Crabapple	2	• Fungicide treatment	...
217	Elm-American	8	• DED treatment	...
219	Elm-American	8	• DED treatment	...
220	Ash-Green	22	• EAB treatment	...
223	Crabapple	5	• Fungicide treatment	...
242	Oak-Pin	23	• Gall wasp treatment	• Gall wasp

INVENTORIED TREES IDENTIFIED FOR PLANT HEALTH CARE



Tree Pruning

A commonly offered service among tree companies, pruning trees is one of the most poorly executed practices by tree workers who lack training in the basics of tree biology. "Lion's tailing," topping, and flush cuts are a few examples, and these can lead to hazardous conditions over time.

Because this practice is so misunderstood, and because specific standards exist to perform pruning correctly, the Inventory Team decided to include some explanation in the main body of this management plan.

Tree owners and tree-care practitioners should always keep in mind that any pruning cut is a wound. Informed tree-care professionals have learned to manage that wounding to preserve the health, safety, and integrity of the tree.

Improper Pruning Practices

A few of the most common pruning abuses are:

- Lion's Tailing - pruning that removes interior branches along the stem and scaffold branches. This encourages poor branch taper, poor wind load distribution, and risk of branch failure. It also deprives the tree of foliage it needs to produce **photosynthates**. See next page, top left.
- Topping - pruning cuts that reduce a tree's size by using heading cuts that shorten branches to a predetermined size. Topping substantially reduces the functional benefits a tree is capable of providing and predisposes trees to structural defects that can contribute to failures in the future. It also reduces the value of the trees substantially and deprives the tree of adequate foliage. See next page, top right.
- Flush Cuts - pruning cut through the **branch collar**, flush against the trunk or parent stem, causing unnecessary injury. See next page, bottom.
- Using Climbing Spikes Inappropriately - Using climbing spikes on a healthy tree, for example, wounds healthy stem tissues and can lead to infection by fungal pathogens.



Example of Lion's tailing.



Examples of topping.



Examples of flush cuts.

Pruning with a Goal

Below are illustrations of common pruning goals:



Illustration of improving airflow to reduce disease.



Illustration of branch weight reduction.

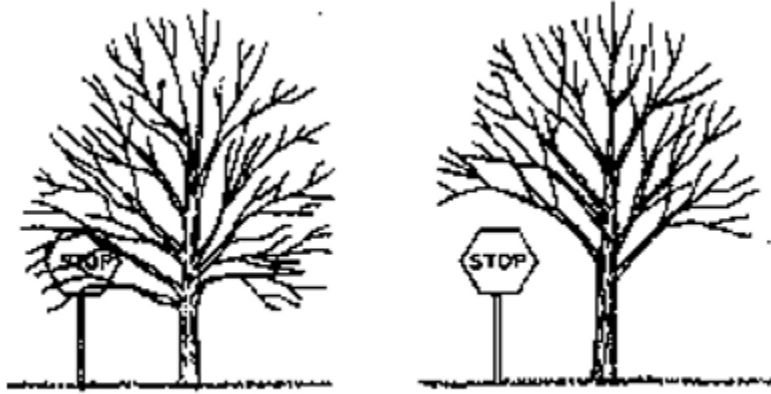


Illustration of raising branch elevation to improve clearance.

Without Development of Central Leader				
	At Planting	2-4 Years	5-7 Years	8-10 Years
With Development of Central Leader				
	At Planting	2-4 Years	5-7 Years	8-10 Years

Illustration of promoting a strong central leader.

Pruning Category

All trees identified in this management plan that have pruning recommendations are listed with a specific pruning category. The listed order of these pruning categories are typical to most managers. Trees within each category are prioritized by the specific goals of most managers. It is recommended that specific goals be discussed with your local Bartlett Arborist Representative. Pruning categories are separated into individual tables below where each table lists specific arboricultural pruning goals and recommendations for each tree.

Risk Mitigation Pruning

Any tree identified with a Risk Mitigation Pruning category to reduce the *Overall Tree Risk Rating*, was previously summarized in the Tree Risk Assessments and Mitigation section earlier in the document.

Maintenance Pruning

This goal typically requires routine pruning of large/mature trees. Includes branch removal and/or branch reduction to help reduce *likelihood of failure* and/or conflict with infrastructure. Trees with these goals are typically climbed or require the use of aerial lifts and/or other specialized equipment.

The trees in this table are recommended for maintenance pruning:

INVENTORIED TREES RECOMMENDED FOR MAINTENANCE PRUNING (21 Trees)

Tree ID	Common Name	DBH	Tree & Shrub Work Phase	Pruning Goal	Defect(s) or Observation(s)
22	Oak-Pin	42	1	• Improve appearance	• Co-dominant stems • Dead branches >2
44	Ash-Green	17	1	• Improve appearance	• Co-dominant stems • Uneven crown
60	Pear-Callery	7	1	• Clearance	• Co-dominant stems
61	Pear-Callery	10	1	• Clearance	...
251	Linden-Littleleaf	14	1	• Clearance	• Poor branch structure
1	Oak-Pin	18	2	• Improve appearance	• Dead branches <=2
6	Oak-Pin	25	2	• Improve appearance	• Dead branches <=2
23	Pear-Callery	15	2	• Reduce weight of branch ends	• Co-dominant stems • Uneven crown

Tree ID	Common Name	DBH	Tree & Shrub Work Phase	Pruning Goal	Defect(s) or Observation(s)
31	Pear-Callery	21	2	<ul style="list-style-type: none"> • Reduce weight of branch ends • Develop branch structure 	<ul style="list-style-type: none"> • Buried root collar • Co-dominant stems • Included bark • Poor branch structure
38	Pear-Callery	12	2	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Buried root collar • Included bark
67	Oak-Pin	19	2	...	<ul style="list-style-type: none"> • Dead branches <=2 • Dieback (moderate)
209	Oak-Northern Red	23	2	<ul style="list-style-type: none"> • Improve appearance 	<ul style="list-style-type: none"> • Dead branches >2
239	Pear-Callery	19	2	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Co-dominant stems • Included bark
240	Pear-Callery	15	2	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Buried root collar • Co-dominant stems • Uneven crown
20	Oak-Pin	19	3	...	<ul style="list-style-type: none"> • Dead branches <=2
43	Pear-Callery	14	3	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Buried root collar • Co-dominant stems • Included bark
50	Pear-Callery	14	3	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Co-dominant stems • Included bark
51	Pear-Callery	15	3	<ul style="list-style-type: none"> • Clearance • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Buried root collar • Co-dominant stems • Included bark
52	Pear-Callery	12	3	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Poor branch structure • Uneven crown
69	Pear-Callery	19	3	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Co-dominant stems • Poor branch structure
73	Pear-Callery	17	3	<ul style="list-style-type: none"> • Reduce weight of branch ends 	<ul style="list-style-type: none"> • Buried root collar • Co-dominant stems • Poor branch structure

INVENTORIED TREES RECOMMENDED FOR MAINTENANCE PRUNING



Developmental Pruning

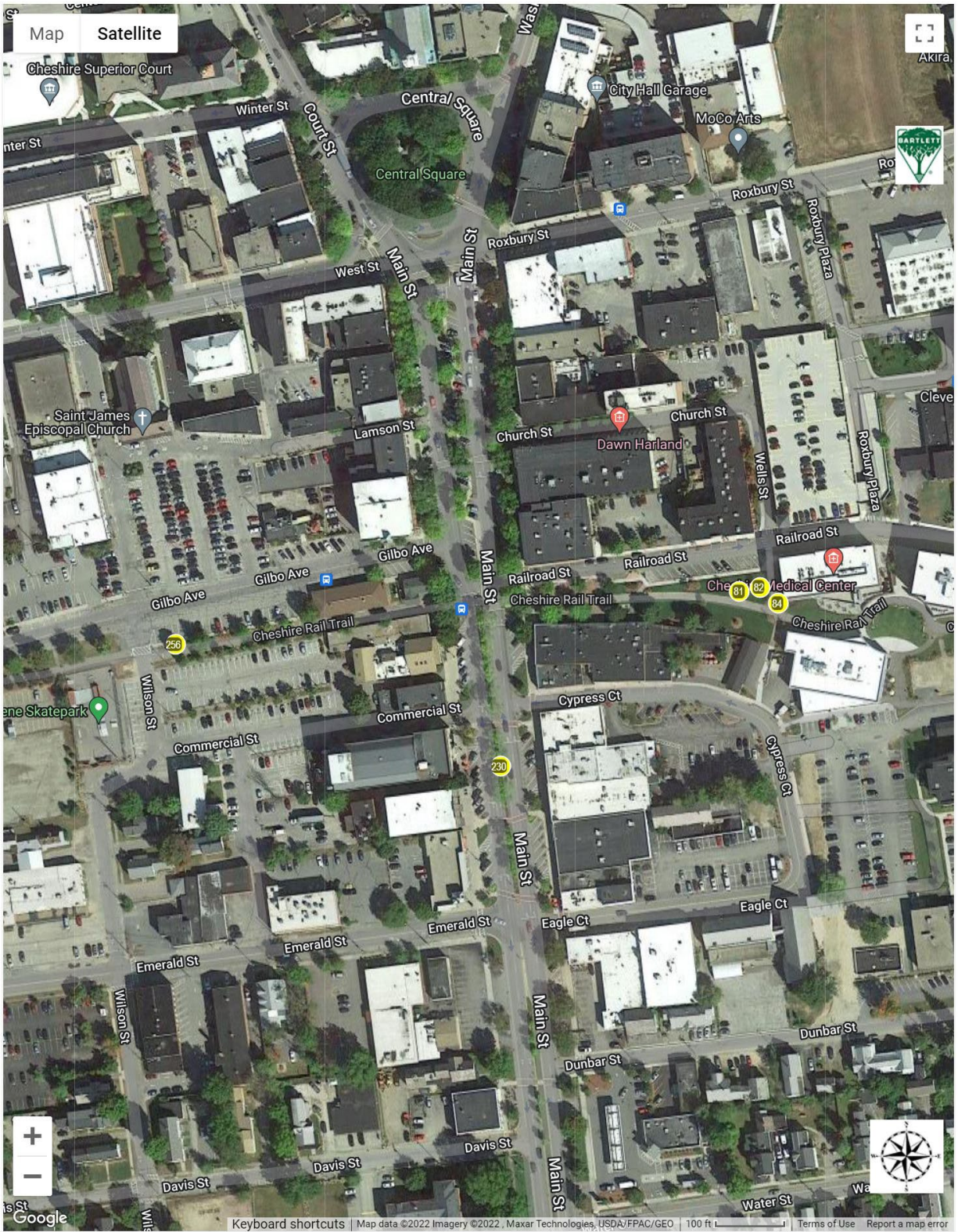
This goal typically requires routine pruning of small/young trees. Includes structural pruning to develop a strong central stem, establish proper branch spacing, and/or develop branch structure.

The trees in this table are recommended for developmental pruning:

INVENTORIED TREES RECOMMENDED FOR DEVELOPMENTAL PRUNING (5 Trees)

Tree ID	Common Name	DBH	Tree & Shrub Work Phase	Pruning Goal	Defect(s) or Observation(s)
81	Maple-Red	9	3	• Develop branch structure	• Buried root collar • Poor branch structure
82	Maple-Red	9	3	• Develop branch structure	• Buried root collar • Poor branch structure
84	Crabapple	3	3	• Develop branch structure	• Buried root collar • Poor branch structure
230	Maple-Freeman's	3	3	• Develop branch structure	• Buried root collar
256	Maple-Sugar	10	3	• Develop branch structure	• Poor branch structure

INVENTORIED TREES RECOMMENDED FOR DEVELOPMENTAL PRUNING



Tree & Shrub Work Phase: 3

Ornamental Pruning

This goal typically requires pruning of small trees. Includes reduction and/or shearing to its desired shape, size, and/or structure.

At the time of inventory, no trees were recommended for ornamental pruning. However, we recommend close monitoring of trees for changes in condition, especially after weather events not considered normal for the area.

Specialized Pruning

Trees with this goal require a unique treatment that may include, but not limited to, targeted pruning cuts, removal of nuisance fruit/parasitic plants, and/or rejuvenation/internodal pruning.

At the time of inventory, no trees were recommended for specialized pruning. However, we recommend close monitoring of trees for changes in condition, especially after weather events not considered normal for the area.

Structural Support Systems

Structural support systems can reduce risk of tree or tree part(s) failure by limiting movement of stems or branches in certain situations. Examples include co-dominant stems or overextended branches with heavy foliage loads.

Cabling

Cabling is the process of connecting two or more upright stems to one another to add stability and reduce the *likelihood of failure*. In some instances, a lateral branch may be secured to the central leader using a cabling system to support the weight of the branch.

Bracing

Bracing is the process of securing the union of two co-dominant stems using high strength steel rods to alleviate stresses at the union and reduce the *likelihood of failure*. Bracing may also be used to reinforce trees that have a partial failure and are likely to benefit from bracing.

Guying

Guying is the process of anchoring a tree's stem to the ground or another immovable object to reduce the likelihood of root failure. Guying can be temporary or permanent and is most often used for establishing a tree in the landscape.

Propping

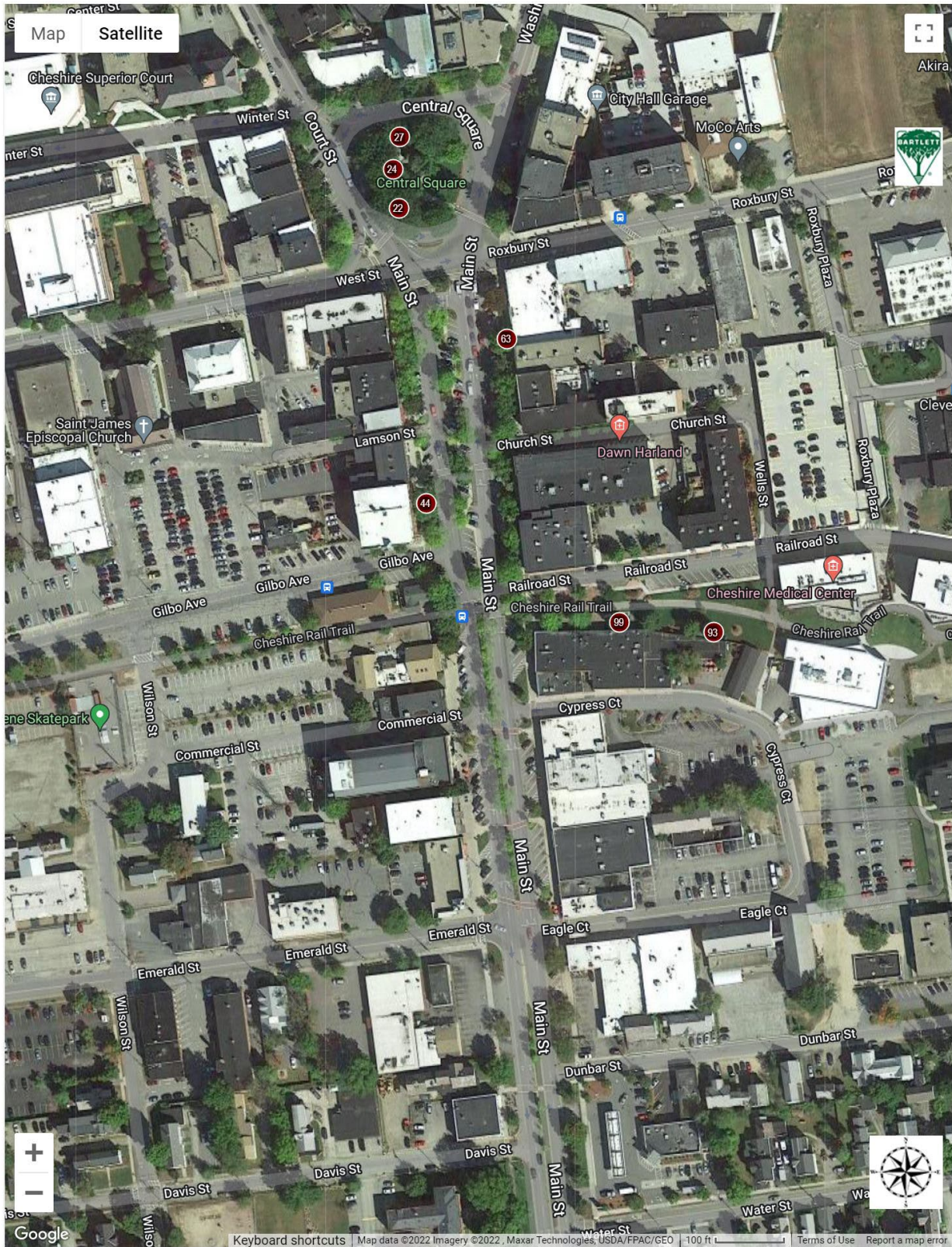
Propping is the process of using rigid structures that are built on or into the ground to help support the trunk or branch(s) that are oriented near the ground in a horizontal position to reduce the *likelihood of failure* from the weight or defect of the tree part being supported.

The following table lists all inventoried trees with structural support system recommendations:

INVENTORIED TREES WITH STRUCTURAL SUPPORT SYSTEM RECOMMENDATIONS (7 Trees)

Tree ID	Common Name	DBH	Tree & Shrub Work Phase	Structural Support
22	Oak-Pin	42	1	• Cable: New 3
24	Oak-Northern Red	38	1	• Cable: New 3
27	Oak-Northern Red	20	1	• Cable: New 1
44	Ash-Green	17	1	• Cable: New 1
63	Ash-Green	23	...	• Cable: New 1
93	Linden-Littleleaf	24	1	• Cable: New 1
99	Linden-Littleleaf	23	1	• Cable: New 1

INVENTORIED TREES WITH STRUCTURAL SUPPORT SYSTEM RECOMMENDATIONS



Lightning Protection Systems

Lightning strikes kill many people each year and can cause significant damage to objects on the property. Lightning protection systems are designed to provide a preferred path for lightning to the ground in a manner that minimizes tree damage; adjacent tree damage; and also to buildings, property, animals, and people near the tree. Tree species that are naturally more susceptible to lightning strikes, valuable to the landscape, and trees that are within 10 feet of, taller than, or have limbs that are extending over a structure are recommended for lightning protection systems due to the possibility of damage, "sideflashes", and step voltage.

At the time of inventory, no trees were recommended for lightning protection systems. However, as trees continue to grow and site changes occur, we recommend continual consultation with your local Bartlett Arborist Representative to determine if lightning protection systems are warranted in the future.

Tree Removal

In some cases, the inspector may determine need for removal while assessing the tree. Trees may be recommended for removal during the inventory for several reasons:

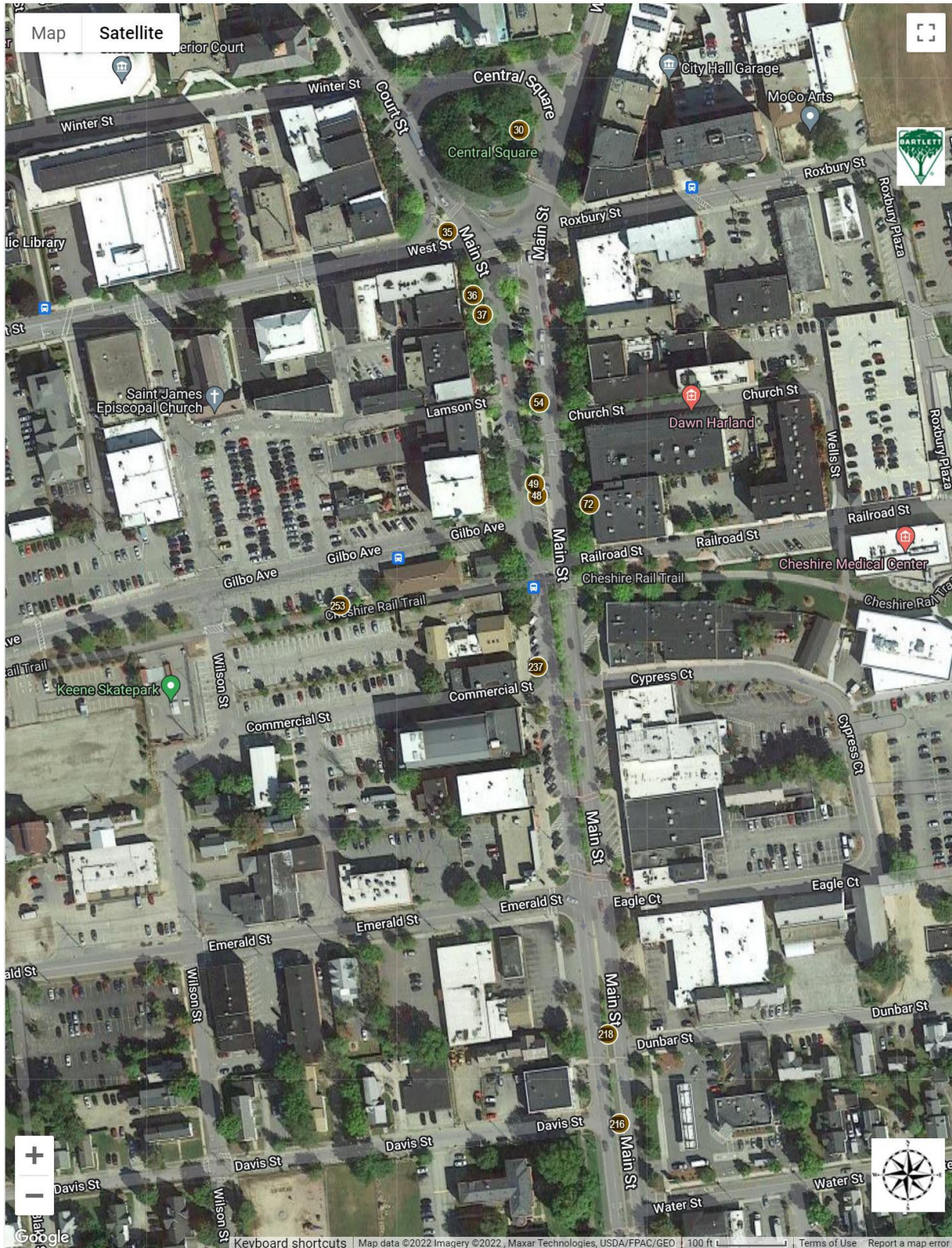
- The tree is dead;
- The tree is in poor condition and thought to be beyond rehabilitation;
- The tree is over-mature and will continue to decline in condition;
- The tree has significant structural weaknesses that cannot be addressed;
- The tree is already or will interfere with infrastructure (overhead lines for example);
- The location value for the tree is poor or unacceptable (for example, large maturing tree growing directly under overhead lines); and/or,
- The tree species has been declared an invasive for the given area or region.

The trees listed in the table below are recommended for removal:

INVENTORIED TREES RECOMMENDED FOR REMOVAL (12 Trees)

Tree ID	Common Name	DBH	Condition	Overall Tree Risk Rating	Tree & Shrub Work Phase	Defect(s) or Observation(s)
37	Ash-Green	23	Poor	...	ASAP	<ul style="list-style-type: none"> • Co-dominant stems • Dieback (severe)
48	Ash-Green	12	Poor	...	ASAP	<ul style="list-style-type: none"> • Co-dominant stems • Dead branches >2
49	Ash-Green	13	Poor	...	ASAP	<ul style="list-style-type: none"> • Dieback (severe)
54	Ash-Green	17	Fair	...	ASAP	<ul style="list-style-type: none"> • Buried root collar • Dieback (moderate) • Wound-root flare
72	Ash-Green	16	Poor	...	ASAP	<ul style="list-style-type: none"> • Dieback (severe)
216	Ash-Green	8	Poor	...	ASAP	<ul style="list-style-type: none"> • Dieback (severe)
218	Ash-Green	9	Poor	...	ASAP	<ul style="list-style-type: none"> • Dieback (severe)
30	Maple-Sugar	24	Poor	...	1	<ul style="list-style-type: none"> • Buried root collar • Dieback (severe) • Girdling roots suspected
36	Ash-Green	18	Poor	...	1	<ul style="list-style-type: none"> • Dead branches >2
237	Cherry-Flowering	8	Poor	...	1	<ul style="list-style-type: none"> • Buried root collar • Dead branches >2 • Dieback (severe)
253	Maple-Sugar	9	Poor	...	1	<ul style="list-style-type: none"> • Dieback (severe)
35	Oak-Pin	20	Poor	...	2	<ul style="list-style-type: none"> • Dead branches >2

INVENTORIED TREES RECOMMENDED FOR REMOVAL



DEFECTS OR OBSERVATIONS



DEFECTS OR OBSERVATIONS

The following table lists inventoried trees for which we noted defects, observations, or other structural issues and were not assigned an *overall tree risk rating*, recommended for a *Level 3 Advanced assessment*, or have pruning and/or removal recommendations that were previously reported.

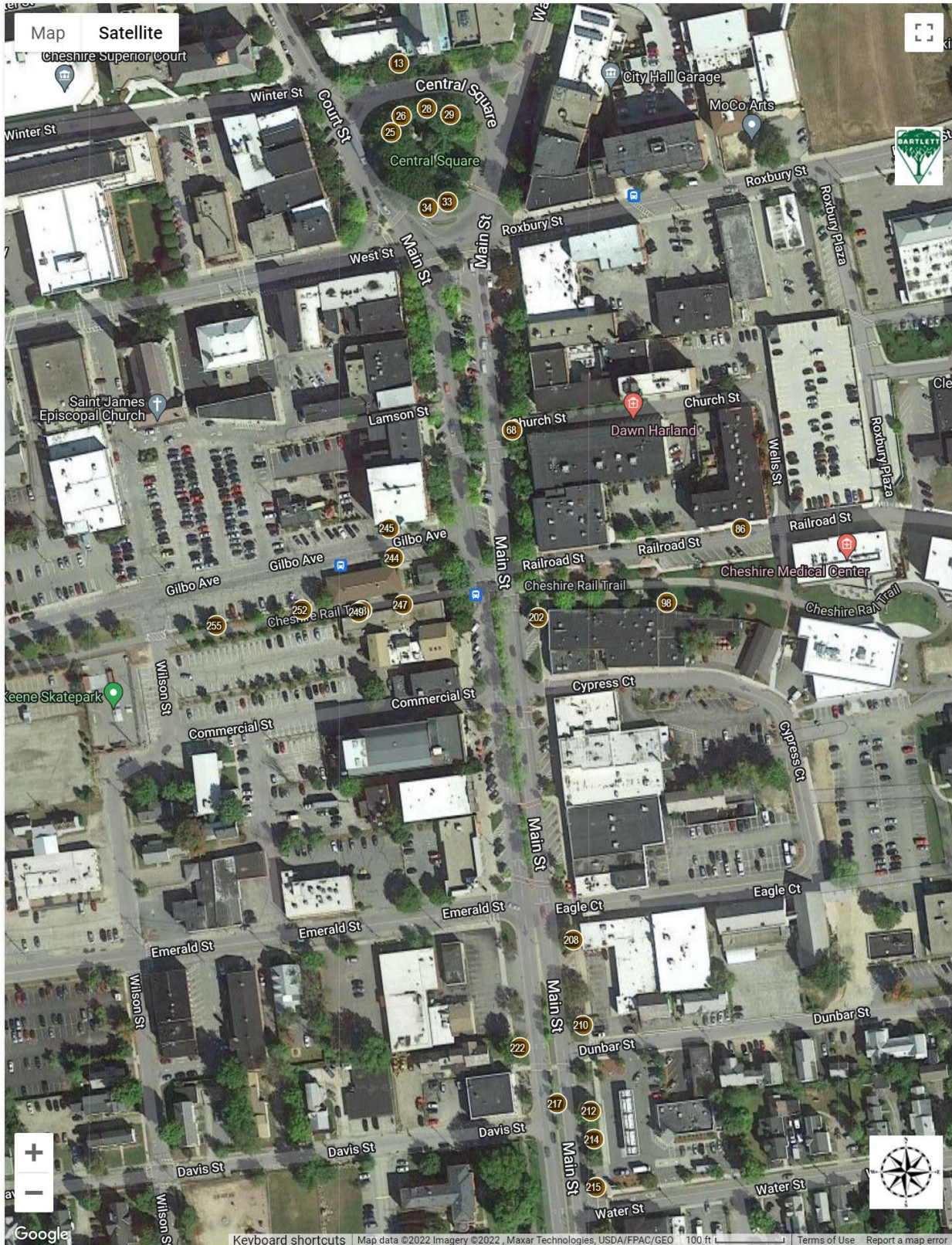


Tree #32 exhibiting a buried root collar.

**INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES
(23 Trees)**

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
13	Zelkova-Japanese	23	<ul style="list-style-type: none"> • Co-dominant stems • Uneven crown
25	Oak-Northern Red	30	<ul style="list-style-type: none"> • Dead branches <=2
26	Pear-Callery	18	<ul style="list-style-type: none"> • Co-dominant stems • Included bark
28	Oak-Northern Red	17	<ul style="list-style-type: none"> • Dead branches <=2
29	Oak-Northern Red	55	<ul style="list-style-type: none"> • Co-dominant stems • Dead branches >2 • Topping/heading cuts
33	Honeylocust-Common	25	<ul style="list-style-type: none"> • Co-dominant stems
34	Honeylocust-Common	26	<ul style="list-style-type: none"> • Co-dominant stems
68	Oak-Pin	14	<ul style="list-style-type: none"> • Dead branches >2
98	Linden-Littleleaf	21	<ul style="list-style-type: none"> • Poor branch structure
202	Zelkova-Japanese	13	<ul style="list-style-type: none"> • Co-dominant stems • Poor branch structure
208	Oak-Northern Red	20	<ul style="list-style-type: none"> • Dead branches <=2
210	Oak-Northern Red	20	<ul style="list-style-type: none"> • Dead branches >2
212	Maple-Red	13,10	<ul style="list-style-type: none"> • Co-dominant stems
214	Zelkova-Japanese	11	<ul style="list-style-type: none"> • Co-dominant stems
215	Maple-Norway	12	<ul style="list-style-type: none"> • Poor branch structure
222	Oak-Northern Red	27	<ul style="list-style-type: none"> • Cavity-suspected
244	Oak-Pin	19	<ul style="list-style-type: none"> • Poor branch structure
245	Linden-Littleleaf	9	<ul style="list-style-type: none"> • Buried root collar • Uneven crown
247	Maple-Norway	11,9	<ul style="list-style-type: none"> • Co-dominant stems • Growing against object
248	Maple-Boxelder	9,8	<ul style="list-style-type: none"> • Co-dominant stems • Growing against object • Uneven crown
249	Maple-Norway	5,4	<ul style="list-style-type: none"> • Co-dominant stems • Growing against object
252	Oak-Pin	9	<ul style="list-style-type: none"> • Co-dominant stems
255	Oak-Pin	15	<ul style="list-style-type: none"> • Co-dominant stems

INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES



ENTIRE INVENTORY



ENTIRE INVENTORY (156 Trees)

Tree ID	Common Name	Genus	Species	DBH	Condition Class	Tree & Shrub Work Phase	Tree Asset Value
1	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	18	Fair	2	\$6,053.00
2	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	14	Good	...	\$4,523.00
3	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	17	Good	...	\$4,001.00
4	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	17	Fair	...	\$4,764.00
5	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	18	Fair	...	\$5,341.00
6	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	25	Good	2	\$16,347.00
7	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	12	Fair	3	\$2,373.00
8	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	10	Poor	...	\$989.00
9	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	18	Fair	...	\$6,053.00
10	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	13	Poor	2	\$1,894.00
11	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	17	Fair	...	\$4,764.00
12	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	20	Good	...	\$9,231.00
13	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	23	Good	...	\$12,208.00
14	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	19	Poor	...	\$3,570.00
15	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	25	Fair	2	\$11,676.00
16	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	21	Fair	...	\$8,239.00
17	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	5	Good	...	\$576.00
18	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	4	Good	...	\$369.00
19	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	4	Good	...	\$369.00
20	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	19	Fair	3	\$6,744.00
21	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	25	Fair	2	\$11,676.00
22	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	42	Good	1	\$41,072.00
23	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	15	Good	2	\$3,115.00
24	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	38	Good	1	\$39,573.00

Tree ID	Common Name	Genus	Species	DBH	Condition Class	Tree & Shrub Work Phase	Tree Asset Value
25	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	30	Fair	...	\$18,792.00
26	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	18	Good	...	\$4,486.00
27	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	20	Good	1	\$11,693.00
28	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	17	Good	3	\$8,448.00
29	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	55	Fair	1	\$45,515.00
30	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	24	Poor	1	\$6,456.00
31	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	21	Good	2	\$6,106.00
32	Maple-Red	<i>Acer</i>	<i>rubrum</i>	18	Good	...	\$7,477.00
33	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	25	Good	...	\$12,501.00
34	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	26	Good	...	\$13,521.00
35	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	20	Poor	2	\$4,483.00
36	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	18	Poor	1	\$3,204.00
37	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	23	Poor	ASAP	\$5,232.00
38	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	12	Good	2	\$1,994.00
39	Stewartia-Japanese	<i>Stewartia</i>	<i>pseudocamellia</i>	1	Good	...	\$26.00
40	Crabapple	<i>Malus</i>	sp.	3	Good	...	\$193.00
41	Ginkgo	<i>Ginkgo</i>	<i>biloba</i>	9	Good	...	\$2,367.00
42	Ginkgo	<i>Ginkgo</i>	<i>biloba</i>	13	Good	...	\$4,940.00
43	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	14	Good	3	\$2,714.00
44	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	17	Fair	1	\$4,764.00
45	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	17	Fair	...	\$4,764.00
46	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	21	Fair	3	\$8,239.00
47	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	19	Good	...	\$8,331.00
48	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	12	Poor	ASAP	\$1,424.00
49	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	13	Poor	ASAP	\$1,671.00
50	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	14	Good	3	\$2,714.00
51	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	15	Good	3	\$3,115.00
52	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	12	Fair	3	\$1,424.00
53	Ginkgo	<i>Ginkgo</i>	<i>biloba</i>	12	Poor	...	\$1,804.00
54	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	17	Fair	ASAP	\$4,764.00
55	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	13	Good	...	\$3,900.00
56	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	13	Fair	3	\$2,785.00
57	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	17	Fair	...	\$4,764.00

Tree ID	Common Name	Genus	Species	DBH	Condition Class	Tree & Shrub Work Phase	Tree Asset Value
58	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	13	Fair	...	\$2,785.00
59	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	16	Fair	2	\$4,220.00
60	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	7	Good	1	\$678.00
61	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	10	Good	1	\$1,384.00
62	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	19	Good	...	\$8,331.00
63	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	23	Good	...	\$12,208.00
64	Hackberry	<i>Celtis</i>	<i>occidentalis</i>	15	Fair	...	\$3,709.00
65	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	18	Good	...	\$7,477.00
66	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	17	Fair	2	\$4,764.00
67	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	19	Fair	2	\$6,744.00
68	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	14	Good	2	\$5,126.00
69	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	19	Good	3	\$4,998.00
70	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	15	Poor	2	\$2,225.00
71	Hawthorn	<i>Crataegus</i>	sp.	3	Good	...	\$193.00
72	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	16	Poor	ASAP	\$2,532.00
73	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	17	Good	3	\$4,001.00
74	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	21	Fair	2	\$8,239.00
75	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	18	Good	...	\$8,474.00
76	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	14	Good	...	\$2,714.00
77	Yellowwood	<i>Cladrastis</i>	<i>kentukea</i>	13	Good	...	\$3,380.00
78	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	10	Good	...	\$2,307.00
79	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	7	Good	...	\$980.00
80	Maple-Red	<i>Acer</i>	<i>rubrum</i>	7	Good	...	\$1,130.00
81	Maple-Red	<i>Acer</i>	<i>rubrum</i>	9	Good	3	\$1,869.00
82	Maple-Red	<i>Acer</i>	<i>rubrum</i>	9	Fair	3	\$1,335.00
83	Crabapple	<i>Malus</i>	sp.	6	Good	...	\$775.00
84	Crabapple	<i>Malus</i>	sp.	3	Good	3	\$193.00
85	Lilac-Japanese Tree	<i>Syringa</i>	<i>reticulata</i>	2	Good	...	\$104.00
86	Elm-American	<i>Ulmus</i>	<i>americana</i>	7	Poor	...	\$355.00
87	Elm-American	<i>Ulmus</i>	<i>americana</i>	6	Poor	...	\$261.00
88	Redbud-Eastern	<i>Cercis</i>	<i>canadensis</i>	2	Fair	...	\$39.00
89	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	6	Good	...	\$941.00
90	Crabapple	<i>Malus</i>	sp.	6	Poor	...	\$332.00
91	Redbud-Eastern	<i>Cercis</i>	<i>canadensis</i>	2	Fair	...	\$39.00

Tree ID	Common Name	Genus	Species	DBH	Condition Class	Tree & Shrub Work Phase	Tree Asset Value
92	Falsecypress-Nootka	<i>Chamaecyparis</i>	<i>nootkatensis</i>	3	Fair	...	\$148.00
93	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	24	Good	1	\$13,293.00
94	Crabapple	<i>Malus</i>	sp.	2	Good	...	\$86.00
95	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	18	Good	...	\$7,477.00
96	Redbud-Eastern	<i>Cercis</i>	<i>canadensis</i>	3	Good	...	\$124.00
97	Crabapple	<i>Malus</i>	sp.	2	Good	...	\$86.00
98	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	21	Good	...	\$10,177.00
99	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	23	Good	1	\$12,208.00
100	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	15	Fair	...	\$4,203.00
201	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	15	Fair	...	\$4,203.00
202	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	13	Good	...	\$3,900.00
203	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	11	Good	...	\$1,675.00
204	Maple-Red	<i>Acer</i>	<i>rubrum</i>	8	Good	...	\$1,477.00
205	Ginkgo	<i>Ginkgo</i>	<i>biloba</i>	8	Fair	...	\$1,336.00
206	Ginkgo	<i>Ginkgo</i>	<i>biloba</i>	15	Good	...	\$6,577.00
207	Maple-Red	<i>Acer</i>	<i>rubrum</i>	8	Good	...	\$1,477.00
208	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	20	Fair	...	\$8,352.00
209	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	23	Fair	2	\$11,046.00
210	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	20	Fair	...	\$8,352.00
211	Goldenraintree-Paniced	<i>Koelreuteria</i>	<i>paniculata</i>	2	Good	...	\$92.00
212	Maple-Red	<i>Acer</i>	<i>rubrum</i>	13,10	Fair	...	\$4,434.00
213	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	10	Good	...	\$2,307.00
214	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	11	Good	...	\$2,792.00
215	Maple-Norway	<i>Acer</i>	<i>platanoides</i>	12	Good	...	\$2,880.00
216	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	8	Poor	ASAP	\$633.00
217	Elm-American	<i>Ulmus</i>	<i>americana</i>	8	Good	...	\$1,083.00
218	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	9	Poor	ASAP	\$801.00
219	Elm-American	<i>Ulmus</i>	<i>americana</i>	8	Good	...	\$1,083.00
220	Ash-Green	<i>Fraxinus</i>	<i>pennsylvanica</i>	22	Good	...	\$11,170.00

Tree ID	Common Name	Genus	Species	DBH	Condition Class	Tree & Shrub Work Phase	Tree Asset Value
221	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	12	Fair	3	\$1,424.00
222	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	27	Fair	...	\$15,222.00
223	Crabapple	<i>Malus</i>	sp.	5	Good	...	\$538.00
224	Maple-Red	<i>Acer</i>	<i>rubrum</i>	7	Fair	...	\$807.00
225	Lilac-Japanese Tree	<i>Syringa</i>	<i>reticulata</i>	4	Good	...	\$418.00
226	Maple-Red	<i>Acer</i>	<i>rubrum</i>	2	Good	...	\$92.00
227	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	2	Fair	...	\$57.00
228	Maple-Freeman's	<i>Acer</i>	<i>x freemanii</i>	3	Good	...	\$193.00
229	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	2	Fair	...	\$57.00
230	Maple-Freeman's	<i>Acer</i>	<i>x freemanii</i>	3	Good	3	\$193.00
231	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	2	Fair	...	\$57.00
232	Maple-Freeman's	<i>Acer</i>	<i>x freemanii</i>	3	Fair	...	\$138.00
233	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	2	Fair	...	\$57.00
234	Maple-Freeman's	<i>Acer</i>	<i>x freemanii</i>	2	Fair	...	\$61.00
235	Honeylocust-Common	<i>Gleditsia</i>	<i>triacanthos</i>	2	Fair	...	\$57.00
236	Maple-Freeman's	<i>Acer</i>	<i>x freemanii</i>	2	Good	...	\$86.00
237	Cherry-Flowering	<i>Prunus</i>	<i>serrulata</i>	8	Poor	1	\$633.00
238	Zelkova-Japanese	<i>Zelkova</i>	<i>serrata</i>	19	Fair	2	\$5,951.00
239	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	19	Good	2	\$4,998.00
240	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	15	Fair	2	\$2,225.00
241	Pear-Callery	<i>Pyrus</i>	<i>calleryana</i>	19	Good	2	\$4,998.00
242	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	23	Good	1	\$13,836.00
243	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	14	Fair	...	\$3,661.00
244	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	19	Good	...	\$9,442.00
245	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	9	Fair	...	\$1,335.00
246	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	11	Fair	...	\$1,994.00
247	Maple-Norway	<i>Acer</i>	<i>platanoides</i>	11,9	Fair	...	\$1,236.00

Tree ID	Common Name	Genus	Species	DBH	Condition Class	Tree & Shrub Work Phase	Tree Asset Value
248	Maple-Boxelder	<i>Acer</i>	<i>negundo</i>	9,8	Fair	...	\$478.00
249	Maple-Norway	<i>Acer</i>	<i>platanoides</i>	5,4	Fair	...	\$251.00
250	Maple-Norway	<i>Acer</i>	<i>platanoides</i>	7	Fair	...	\$700.00
251	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	14	Good	1	\$4,523.00
252	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	9	Good	...	\$2,118.00
253	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	9	Poor	1	\$907.00
254	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	12	Good	...	\$3,766.00
255	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	15	Good	...	\$5,885.00
256	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	10	Good	3	\$2,615.00

APPENDIX



ADDITIONAL RESOURCES

Bartlett publishes a variety of tree-resource documents, including technical reports, plant health care recommendations, and service brochures. The following technical reports may be pertinent to your inventory. To access these documents and view the complete Bartlett Resource Library online, please follow this URL:

<https://www.bartlett.com/resourcelist.cfm>

Girdling Roots

Maintenance Pruning Program

Monitor IPM Program

Mulch Application Guidelines

Tree Risk Assessments

Tree Structure Evaluation

GLOSSARY OF TERMS

air pollution removal: removal of pollutants from the air by plants through natural processes

arborist: 1. An individual engaged in the profession of arboriculture who, through experience, education and related training, possesses the competence to provide for, or supervise the management of, trees and other woody ornamentals. [ANSI A300 (Part 1, 2, 4, 5, 6)] 2. An individual engaged in the profession of arboriculture. [ANSI Z133.1-2000 Safety Requirements for Arboricultural Operations]

bracing: The installation of lag-thread screw or threaded-steel rods in limbs, leaders, or trunks to provide supplemental support. [ANSI A300 (Part 3)-2000 Support Systems]

branch: An outgrowing shoot, stem or twig that grows from the main stem or trunk. [ANSI Z60.1-2004 Nursery Stock]

buttress roots: Lateral surface roots that aid in stabilizing the tree.

cable: 1) Zinc coated strand per ASTM A-475 for dead-end grip applications. 2) Wire rope or strand for general applications. 3) Synthetic-fiber rope or synthetic-fiber webbing for general applications. [ANSI A300 (Part 3)-2000 Support Systems]

cabbling: The installation of a steel wire rope, steel strand, or synthetic-fiber system within a tree between limbs or leaders to limit movement and provide supplemental support. [ANSI A300 (Part 3)-2000 Support Systems]

canopy: collective branches and foliage of a tree or group of trees' crowns

carbon sequestration: removal of carbon from the air by plants through natural processes

carbon storage: storage of carbon removed from the air in plant tissues

cation exchange capacity (CEC): The ability of soil to absorb nutrients.

cavity: An open wound characterized by the presence of decay and resulting in a hollow.

cleaning: Selective pruning to remove one or more of the following parts: dead, diseased, and/ or broken branches (5.6.1). [ANSI A300 (Part 1)-2001 Pruning]

co-dominant branches: Equal in size and importance, usually associated with either the trunks, stems, or scaffold limbs.

conk: fruiting body or non-fruiting body of a fungus. Often associated with decay.

critical root zone (CRZ): area of soil around a tree trunk where roots are located that provide stability and uptake of water and minerals required for tree survival.

crown: 1. The leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree. [ANSI A300 (Part 1)-2001 Pruning] [ANSI A300 (Part 6)-2005 Transplanting] 2. The portion of a tree comprising the branches. [ANSI Z60.1-2004 Nursery Stock]

D.B.H. [diameter at breast height]: Measurement of trunk diameter taken at 4.5 feet (1.4 m) off the ground. [ANSI A300 (Part 6)-2005 Transplanting]

decay: The degradation of woody tissue caused by microorganisms. [ANSI A300 (Part 1)-2001 Pruning]

Geographic Information System (GIS): is any system for capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to earth.

girdling root: A root that may impede proper development of other roots, trunk flare, and/or trunk. [ANSI A300 (Part 6)-2005 Transplanting]

Global Positioning System (GPS): A constellation of at least 24 Medium Earth Orbit satellites that transmit precise microwave signals, the system enables a GPS receiver to determine its location, speed, direction, and time.

Global Positioning System receiver (GPSr): A receiver that receives its input from GPS satellites to determine location, speed, direction, and time.

heading: cutting a shoot back to a bud or cutting branches back to buds, stubs, or lateral branches not large enough to assume apical dominance. Cutting an older branch or stem back to meet a structural objective

integrated pest management (IPM): A pest control strategy that uses an array of complementary methods: mechanical devices, physical devices, genetic, biological, legal, cultural management, and chemical management. These methods are done in three stages of prevention, Observation, and finally Intervention. It is an ecological approach that has its main goal is to significantly reduce or eliminate the use of pesticides.

lateral branch: A shoot or stem growing from a parent branch or stem. [ANSI A300 (Part 1)-2001 Pruning]

leader: A dominant or co-dominant, upright stem. [ANSI A300 (Part 1)-2001 Pruning]

lean: Departure from vertical of the stem, beginning at or near the base of the trunk.

limb: A large, prominent branch. [ANSI A300 (Part 1)-2001 Pruning]

lion's tailing: The removal of an excessive number of inner, lateral branches from parent branches. Lion's tailing is not an acceptable pruning practice (5.5.7). [ANSI A300 (Part 1)-2001 Pruning]

macronutrient: Nutrient required in relatively large amounts by plants, such as nitrogen (N), phosphorus (P), potassium (K), and sulfur (S). [ANSI A300 (Part 2)-2004 Fertilization]

micronutrient: Nutrient required in relatively small amounts by plants, such as iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), and boron (B). [ANSI A300 (Part 2)-2004 Fertilization]

noise attenuation: reducing sound levels via materials, structures, plants, etc.

nutrient: Element or compound required for growth, reproduction or development of a plant. [ANSI A300 (Part 2)-2004 Fertilization]

organic matter: material derived from the growth (and death) of living organisms. The organic components of soil.

parent branch or stem: A tree trunk, limb, or prominent branch from which shoots or stems grow. [ANSI A300 (Part 1)-2001 Pruning]

pH: unit of measurement that describes the alkalinity or acidity of a solution. Measured on a scale of 0 to 14. Greater than 7 is alkaline, less than 7 is acid, and 7 is neutral (pure water).

pruning: The selective removal of plant parts to meet specific goals and objectives. [ANSI A300 (Part 1)-2001 Pruning]

qualified arborist: An individual who, by possession of a recognized degree, certification, or professional standing, or through related training and on-the-job experience, is familiar with the equipment and hazards involved in arboricultural operations and who has demonstrated ability in the performance of the special techniques involved. [ANSI Z133.1-2000 Safety Requirements for Arboricultural Operations]

raising: Selective pruning to provide vertical clearance (5.6.3). [ANSI A300 (Part 1)-2001 Pruning]

reduction: Selective pruning to decrease height and/or spread (5.6.4). [ANSI A300 (Part 1)-2001 Pruning]

risk assessment: process of evaluating what unexpected things could happen, how likely it is, and what the likely outcomes are. In tree management, the systematic process to determine the level of risk posed by a tree, tree part, or group of trees.

root collar: 1. The transition zone between the trunk and the root system. [ANSI A300

(Part 6)-2005 Transplanting] 2. See COLLAR. [ANSI Z60.1-2004 Nursery Stock]

root flare or trunk flare: The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk. [ANSI Z60.1-2004 Nursery Stock] [ANSI A300 (Part 6)-2005 Transplanting]

root zone: The volume of soil containing the roots of a plant. [ANSI A300 (Part 5)-2005 Management]

secondary nutrient: Nutrient required in moderate amounts by plants, such as calcium (Ca) and magnesium (Mg). [ANSI A300 (Part 2)-2004 Fertilization]

seam: Vertical line that appears where two edges of wound wood or callus ridge meet.

soil amendment: Any material added to soil to alter its composition and structure, such as sand, fertilizer, or organic matter. [ANSI A300 (Part 6)-2005 Transplanting]

soil pH: A measure of the acidity or alkalinity of the soil.

stormwater runoff: water (generally from rain or snow melt) that flows over the ground after storm events.

structural support system: hardware installed in tree, may be; cables, braces, or guys, to provide supplemental support.

sweep: Departure from vertical of the stem, beginning above the base of the trunk.

thinning: Selective pruning to reduce density of live branches (5.6.2). [ANSI A300 (Part 1)-2001 Pruning]

tree risk assessment: Closer inspection of visibly damaged, dead, defected, diseased, leaning or dying tree to determine management needs.

topping: The reduction of a tree's size using heading cuts that shorten limbs or branches back to a predetermined crown limit. Topping is not acceptable pruning practice. (5.5.7). [ANSI A300 (Part 1)-2001 Pruning]

tree inventory: A comprehensive list of individual trees providing descriptive information on all or a portion of the project area. [ANSI A300 (Part 5)-2005 Management during site planning, site development, and construction]

tree protection zone: A space above and belowground within which trees are to be retained and protected. [ANSI A300 (Part 5)-2005 Management during site planning, site development, and construction]

trunk: That portion of a stem or stems of a tree before branching occurs. [ANSI Z60.1-

2004 Nursery Stock]

vigor: Overall health. Capacity to grow and resist stress. [ISA Municipal Specialist Certification Study Guide 2008]

wound: An opening that is created when the bark of a living branch or stem is penetrated, cut, or removed. [ANSI A300 (Part 1)-2001 Pruning]