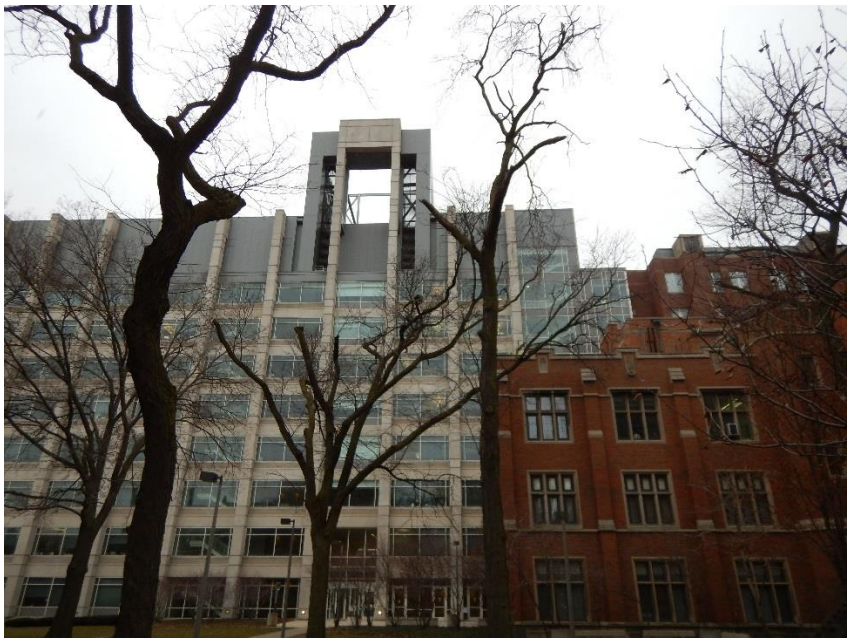
University of Illinois at Chicago
West Campus
Tree Inventory and Management Plan | 2017



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University of Illinois at Chicago - West Campus
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 University of Illinois at Chicago (UIC) – West Campus 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 four 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.

Subject Trees

In this document, the term "subject trees" refers (depending on context) to some or all of the 660 trees (some of them groupings of 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
- **Stand Dynamics Results**
  - Summary information for the entire tree population inventoried including risk ratings assigned during the inventory with corresponding table and map displays with figures if applicable
- **Recommendations**
  - Summary of all recommendations made during the inventory including associated table and map displays, explanations and examples, and figures if applicable
- **Dedicated or Memorial Trees**
  - List of all dedicated or memorial trees observed during the inventory in a table and map display with corresponding 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
- **List of Appended Items**
    - Listing of all appended items for this management plan

EXECUTIVE SUMMARY

In February 2017, the Bartlett Inventory Solutions (BIS) Team from Bartlett Tree Experts conducted an inventory of trees on the UIC West Campus. We identified 660 trees, including 24 groupings, which included 58 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 over the next three-year period are outlined below. All tree work activities will comply with current American National Standards Institute (ANSI) Z133.1 requirements for safety.

Tree Risk Assessments and Mitigation
Perform the recommended tree risk mitigation activities for the 15 trees (2%) which we found defects or concerns that prompted the need to use the International Society of Arboriculture's (ISA) risk matrices in the field. Risk mitigation activities will comply with current ANSI A300 standard practices. Please see the Tree Risk Assessments, Limitations & Glossary section for more information.

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.

Root Collar Excavations
Perform **root collar** excavations to 26 trees (4%) 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 240 trees (36%) for safety, health, structure, and appearance. Pruning will comply with current ANSI A300 standard practices for pruning.

Structural Support
Install a new structural support system in 1 tree (< 1%) to reduce risk of branch or whole tree failure. Structural support system installation will comply with current ANSI A300 standard practices for supplemental support systems.

Removals
Remove 34 trees (5%) due to condition or because of their location in relation to other trees to try and prevent competition or damage to infrastructure.

Advanced Tree Risk Assessments (Level 3)
At the time of inventory, no trees were recommended for advanced assessments to evaluate the impact of wood decay in **stems** or **buttress roots**. However, as trees continue to grow and site changes occur, we recommend continual consultation with your local Bartlett Arborist Representative to determine if advanced assessments are warranted in the future.

INTRODUCTION

In February 2017, the University of Illinois at Chicago retained Bartlett Tree Experts to perform an inventory of trees on the UIC West Campus. Team member William Butler visited the site from February 6-10 to conduct the inventory.

The inventory included:

- identifying trees and attaching to each tree a tag with assigned tag number (Tags ranging from 3189–3194, 3227-3797);
- identifying the trees' condition, health, and vigor;
- recommending risk evaluations and removals of appropriate trees;
- recommending tree care, soil care and fertilization, 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 UIC West Campus.	Using Trimble® Geo GPSr hardware and ArborScope™ Inventory Management Tools, collect data such as tree name, location, size, age class, and condition class.
	Place tag on each tree or group of trees inventoried.
Provide mechanism for managing inventory, recommendations, and related budget planning.	Provide map or maps of the inventoried trees and tree groupings 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.	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 • integrated pest management • soil care and fertilization • maintenance pruning
Manage immediate and long-term risk associated with trees in high-use areas.	Implement recommended risk-management measures that include • 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
- tag number
- diameter at breast height (**DBH**)
- canopy radius
- age class
- height class
- condition class
- root zone infringement, based on **dripline** and estimated **grayscape** (e.g., sidewalks) impact on root zone
- infrastructure interaction (between trees and grayscape that may cause an undesirable condition
- priority of tree and shrub work (based on 3-year management plan)
- pruning
- need for and inspection of existing structural support systems
- need for and inspection of existing lightning protection systems
- need for advanced tree risk assessments (Level 3)
- tree removals
- soil care and fertilization 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 and Shrub Care Priority

Priority class recommendations are based on a three-year management plan that takes into consideration tree species, condition, location, age, and proximity to infrastructure. We intend that this rating system assist decision makers in prioritizing tree pruning, cabling and bracing, and tree lightning protection recommendations. *Trees with a priority of 1 and an Overall 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.

Recommendations for Priorities 1, 2, and 3 are all based on observations by the inventory arborist. The following additional information clarifies each priority class:

Priority 1 To be addressed in years 1 or 2 of the management cycle. Priority 1 may include trees with large dead wood, structural defects, located in exposed sites, high aesthetic value, and/or parts that are currently negatively interacting with infrastructure, such as branches that touch buildings, interfere with signage or lighting, or obstruct pathways.

Priority 2 To be addressed in years 2 or 3 of the management cycle. Priority 2 may include trees with small dead wood, developing structural defects, located in semi-exposed sites, moderate esthetic value, and/or parts that are anticipated to negatively interact with infrastructure, such as branches that touch buildings, interfere with signage or lighting, or obstruct pathways.

Priority 3 To be addressed in year 3 of the management cycle. Priority 3 may include trees with small dead wood, developing structural defects, located in lesser used sites, and/or parts that are anticipated to negatively interact with infrastructure, such as branches that rub on buildings, interfere with signage or lighting, or obstruct pathways.

Pruning

Each of the following is a selective pruning technique to achieve the pruning goal described:

Clean	Remove one or more of dead, diseased, and/or broken branches
Raise	Provide vertical clearance
Thin	Reduce height or spread, sometimes for a particular branch (overextended or co-dominant)
Reduce	Reduce height or spread
Structural	Select live branches and stems to influence orientation, spacing, growth rate, strength of attachment, and ultimate size of branches and stems; possibly to reduce defects or space main branches on mature trees.
Vista	A combination of thinning and reduction pruning to enhance the view from a vantage point to an area of interest while minimizing negative impacts on tree structure and health.

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 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 that a failed tree or tree part may or may not impact a target with equal likelihood; 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.

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:

- **Tree Risk Assessment Report and Mitigation**
- **Subject Trees Summarized According to:**
    - Tree Species Identified
    - Tree Groupings
    - Condition Class
    - Age Class
    - Tree Size per DBH
    - Tree Asset Value

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

Tree Risk Assessment Report and Mitigation

As part of the inventory process, the Inventory Team conducts a basic assessment (Level 2) from the ground. While every tree poses a risk, typically Low, the trees in the following table were assigned *likelihood of failure, likelihood of the failed tree part impacting a target, and consequences* ratings in the field. The Inventory Team found conditions with these trees that posed a hazardous situation, prompting the arborists to go through the steps outlined in the Tree Risk Assessments, Limitations, and Glossary section of this plan. Risk ratings were then assigned to these trees.

The Tree Risk Table below summarizes the inventoried trees that were observed posing a hazardous situation during the course of the inventory. The table is organized first by Overall Risk Rating (highest to lowest), then by Tree Care Priority (ascending order), and finally by Tree ID (ascending order).

TREE RISK ASSESSMENT REPORT AND MITIGATION (15 Trees)

Tree ID	Common Name	DBH	Condition	Overall Risk Rating	Primary Target	Tree Care Priority	Recommendation	Structural Support	Defect(s) or Observation(s)
3697	Hackberry	28.5	Good	Moderate	Building	1	Clean, Reduce, Structural	Cable	• Co-dominant leaders • Included bark • Crack
3757	Honeylocust-Thornless Common	21.2	Poor	Moderate	Walking path	1	Remove	...	• Broken branch(s) • Hanger • Co-dominant leaders • Included bark • Wound-branch • Crack-branch
3189	Elm-Siberian	44.2	Good	Low	Play area	1	Reduce	...	• Wound-root • Included bark • Co-dominant leaders • Wound-stem • Dead branches <=2 • Lion tailing
3445	Honeylocust-Thornless Common	19.2	Fair	Low	Walking path	1	Clean, Structural	...	• Broken branch(s) • Dead branches >2 • Hanger
3468	Honeylocust-Thornless Common	21.9	Poor	Low	Walking path	1	Remove	...	• Fungi/conks • Decay-Root • Cavity-root flare • Lean • Included bark • Wound-branch
3579	Maple-Freeman's	14.6	Poor	Low	Parking	1	Remove	...	• Girdling roots present (severe) • Decay-Stem • Wound-stem

Tree ID	Common Name	DBH	Condition	Overall Risk Rating	Primary Target	Tree Care Priority	Recommendation	Structural Support	Defect(s) or Observation(s)
3606	Honeylocust-Thornless Common	24.4	Poor	Low	Sidewalk	1	Remove	...	• Overextended branch • Lean • Dead branches >2 • Broken branch(s) • Included bark
3684	Honeylocust-Thornless Common	22.9	Poor	Low	Walking path	1	Remove	...	• Decay-Root • Dead branches >2 • Dieback (severe)
3685	Honeylocust-Thornless Common	21.8	Poor	Low	Walking path	1	Remove	...	• Low live crown ratio • Dead branches >2 • Dieback (severe)
3686	Honeylocust-Thornless Common	22.9	Poor	Low	Walking path	1	Remove	...	• Decay-Stem • Lean • Dead branches >2 • Dieback • Cavity-stem • Seam
3248	Honeylocust-Common	19.3	Poor	Low	Building	2	Remove	...	• Fungi/conks • Low live crown ratio • Dieback • Decay-Root
3407	Honeylocust-Thornless Common	16.0	Poor	Low	Walking path	2	Remove	...	• Dead branches >2 • Broken branch(s) • Co-dominant leaders • Included bark • Hanger • Topping/heading cuts
3408	Honeylocust-Thornless Common	16.2	Poor	Low	Walking path	2	Remove	...	• Fungi/conks • Cavity-root flare • Decay-Stem • Hanger • Broken branch(s)

Tree ID	Common Name	DBH	Condition	Overall Risk Rating	Primary Target	Tree Care Priority	Recommendation	Structural Support	Defect(s) or Observation(s)
3550	Pear-Callery	18.6	Fair	Low	Building	2	Remove	...	• Cavity-stem • Co-dominant leaders • Overextended branch • Pavement/curbing damage
3610	Honeylocust-Thornless Common	23.9	Poor	Low	Sidewalk	2	Remove	...	• Topping/heading cuts • Broken branch(s) • Wound-stem • Decay-Stem • Dead branches >2

INVENTORIED TREES ASSIGNED RISK RATINGS AT THE TIME OF DATA COLLECTION

Stand Dynamics

Tree Species Identified

Our inventory revealed 58 species of trees, as detailed in the following table:

TREE SPECIES IDENTIFIED

Genus	Species	Common Name	Count	% Distribution Total
Acer	*ginnala*	Maple-Amur	10	2%
	miyabei	Maple-Miyabei	1	< 1%
	palmatum	Maple-Japanese	4	1%
	platanoides	Maple-Norway	7	1%
	rubrum	Maple-Red	1	< 1%
	saccharinum	Maple-Silver	3	< 1%
	saccharum	Maple-Sugar	4	1%
	x *freemanii*	Maple-Freeman's	10	2%
***Acer* Total**			**40**	**6%**
Aesculus	sp.	Buckeye/Horsechestnut	1	< 1%
Alnus	*glutinosa*	Alder-Common	2	< 1%
Amelanchier	sp.	Serviceberry	63	10%
Betula	*nigra*	Birch-River	5	1%
	populifolia	Birch-Gray	2	< 1%
***Betula* Total**			**7**	**1%**
Catalpa	*speciosa*	Catalpa-Northern	1	< 1%
Celtis	*occidentalis*	Hackberry	9	1%
Cercis	*canadensis*	Redbud-Eastern	19	3%
Cornus	*florida*	Dogwood-Flowering	2	< 1%
	mas	Dogwood-Corneliancherry	5	1%
***Cornus* Total**			**7**	**1%**
Cotinus	*coggygria*	Smoketree-Common	2	< 1%
Crataegus	sp.	Hawthorn	62	9%
Euonymus	*alatus*	Burning Bush	2	< 1%
Fagus	*sylvatica*	Beech-European	1	< 1%
Fraxinus	*americana*	Ash-White	7	1%
	pennsylvanica	Ash-Green	1	< 1%
***Fraxinus* Total**			**8**	**1%**
Ginkgo	*biloba*	Ginkgo	8	1%
Gleditsia	*triacanthos*	Honeylocust-Common	2	< 1%
	triacanthos var. inermis	Honeylocust-Thornless Common	113	17%
***Gleditsia* Total**			**115**	**17%**
Gymnocladus	*dioicus*	Coffeetree-Kentucky	11	2%
Hamamelis	*virginiana*	Witchhazel	10	2%
Hydrangea	sp.	Hydrangea	6	1%

Genus	Species	Common Name	Count	% Distribution Total
Liriodendron	*tulipifera*	Tuliptree	1	< 1%
Magnolia	sp.	Magnolia	9	1%
Malus	sp.	Crabapple	90	14%
Morus	*alba*	Mulberry-White	2	< 1%
Ostrya	*virginiana*	Hophornbeam-American	1	< 1%
Phellodendron	*amurense*	Corktree-Amur	1	< 1%
Picea	sp.	Spruce	7	1%
Pinus	*mugo*	Pine-Mugo	3	< 1%
	nigra	Pine-Austrian	21	3%
	parviflora	Pine-Japanese White	3	< 1%
	sylvestris	Pine-Scotch	5	1%
***Pinus* Total**			**32**	**5%**
Platanus	*occidentalis*	Sycamore-American	1	< 1%
	x *acerifolia*	Planetree-London	1	< 1%
***Platanus* Total**			**2**	**< 1%**
Prunus	sp.	Cherry	2	< 1%
Pyrus	*calleryana*	Pear-Callery	39	6%
Quercus	*bicolor*	Oak-Swamp White	1	< 1%
	macrocarpa	Oak-Bur	3	< 1%
	rubra	Oak- Northern Red	1	< 1%
***Quercus* Total**			**5**	**1%**
Rhamnus	*purshiana*	Cascara buckthorn	1	< 1%
Salix	*babylonica*	Willow-Babylon Weeping	1	< 1%
Syringa	*pekinensis*	Lilac-Pekin	4	1%
	reticulata	Lilac-Japanese Tree	5	1%
***Syringa* Total**			**9**	**1%**
Taxus	sp.	Yew	1	< 1%
Tilia	*cordata*	Linden-Littleleaf	16	2%
Ulmus	*pumila*	Elm-Siberian	2	< 1%
	sp.	Elm	25	4%
***Ulmus* Total**			**27**	**4%**
Viburnum	*prunifolium*	Viburnum-Blackhaw	4	1%
	sp.	Viburnum	36	5%
***Viburnum* Total**			**40**	**6%**
Grand Total			**660**	**100%**

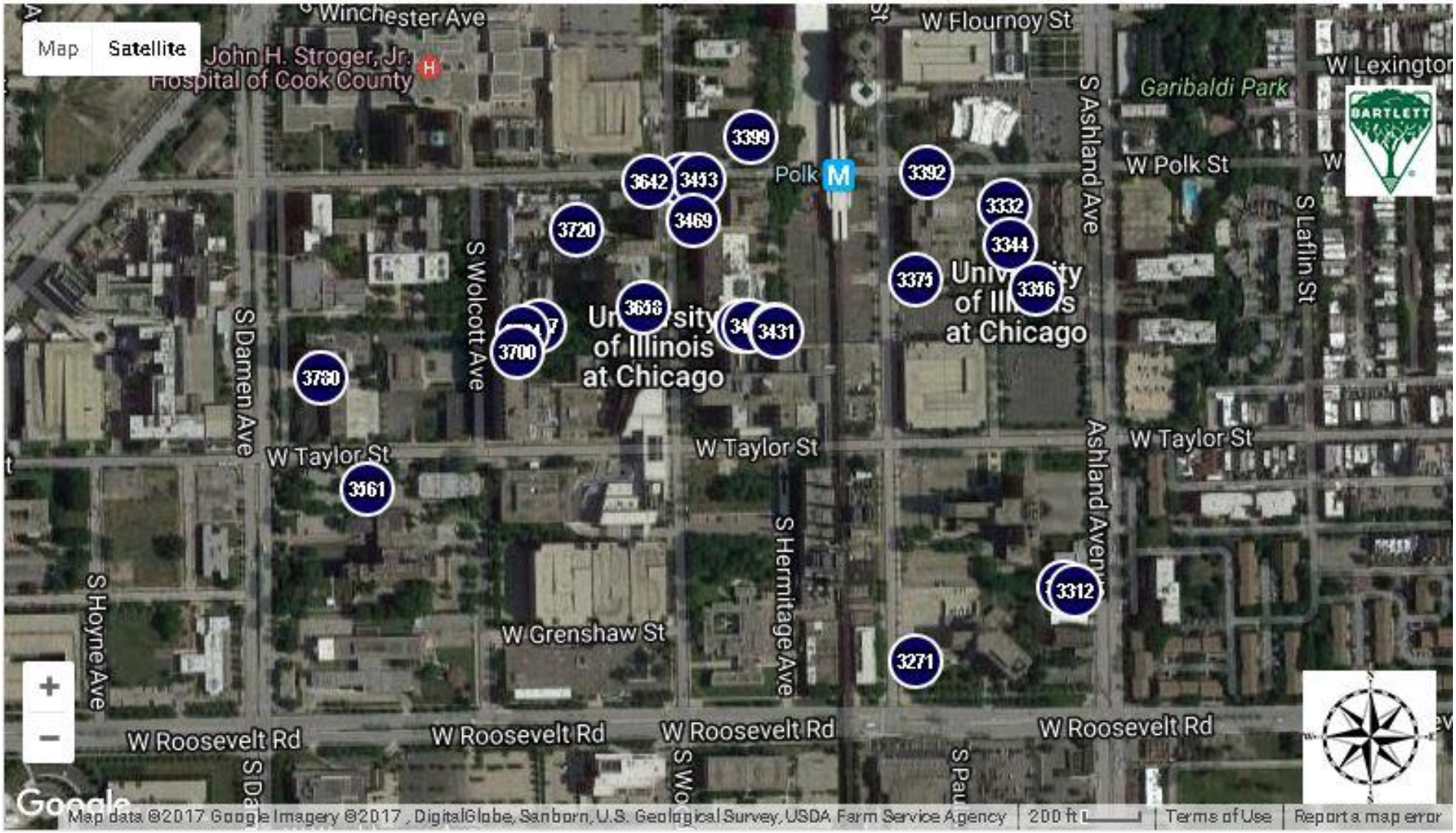
Tree Groupings

The following table displays inventoried trees that were recorded as groupings. Throughout the management plan, those trees recorded as groupings will be displayed with the number of plantings in parentheses after the common name.

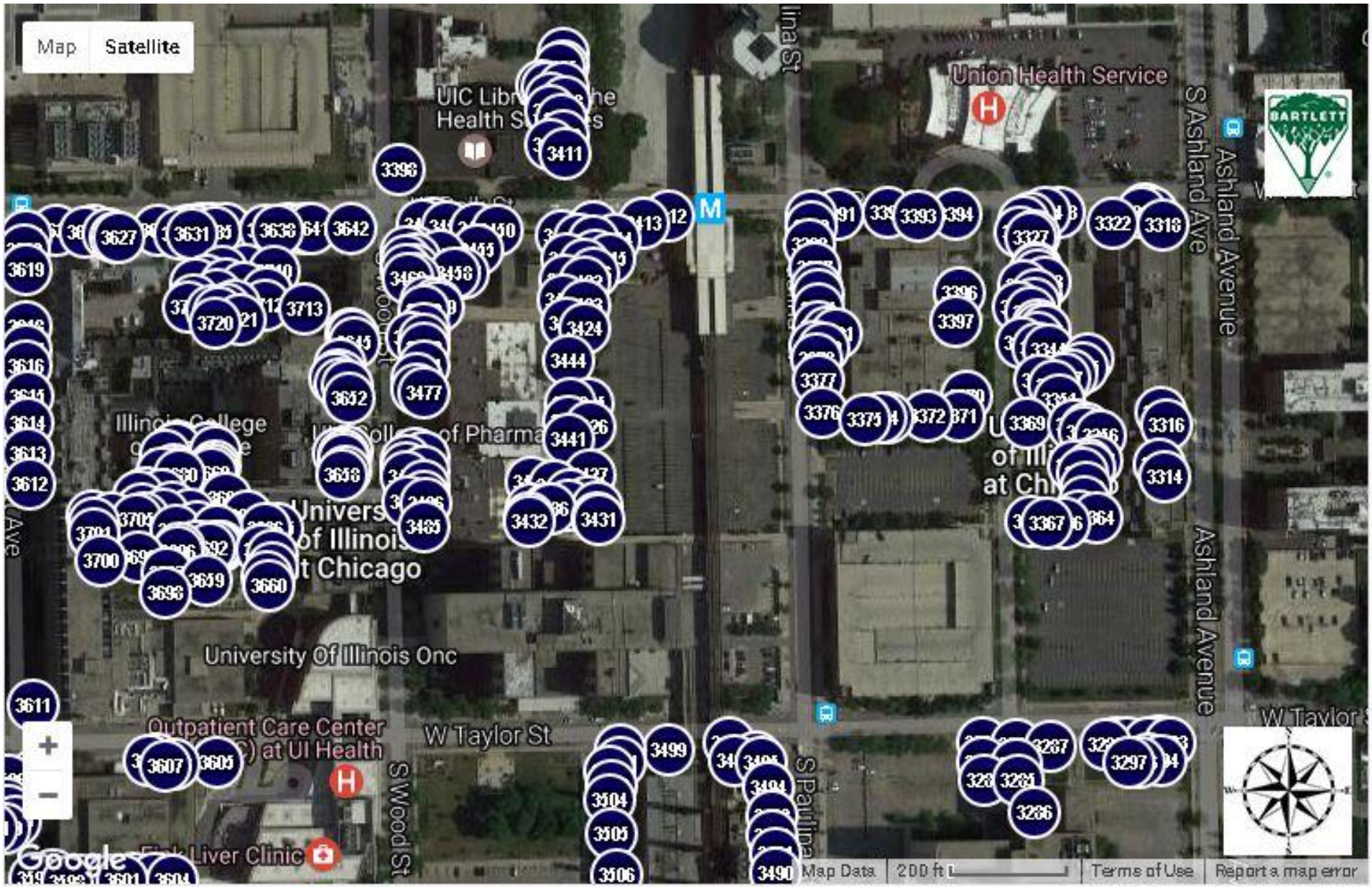
TREE GROUPINGS

Tree ID	Common Name	Total Plants
3271	Magnolia	2
3311	Redbud-Eastern	3
3312	Spruce	5
3332	Viburnum	12
3344	Viburnum	7
3356	Viburnum	10
3375	Serviceberry	2
3392	Serviceberry	4
3399	Viburnum	5
3430	Serviceberry	3
3431	Viburnum-Blackhaw	2
3434	Witchhazel	2
3435	Maple-Japanese	3
3452	Witchhazel	2
3453	Viburnum-Blackhaw	2
3469	Serviceberry	2
3561	Smoketree	2
3642	Serviceberry	5
3658	Pine-Mugo	2
3700	Serviceberry	7
3704	Serviceberry	13
3707	Lilac-Pekin	4
3720	Hydrangea	6
3780	Witchhazel	2

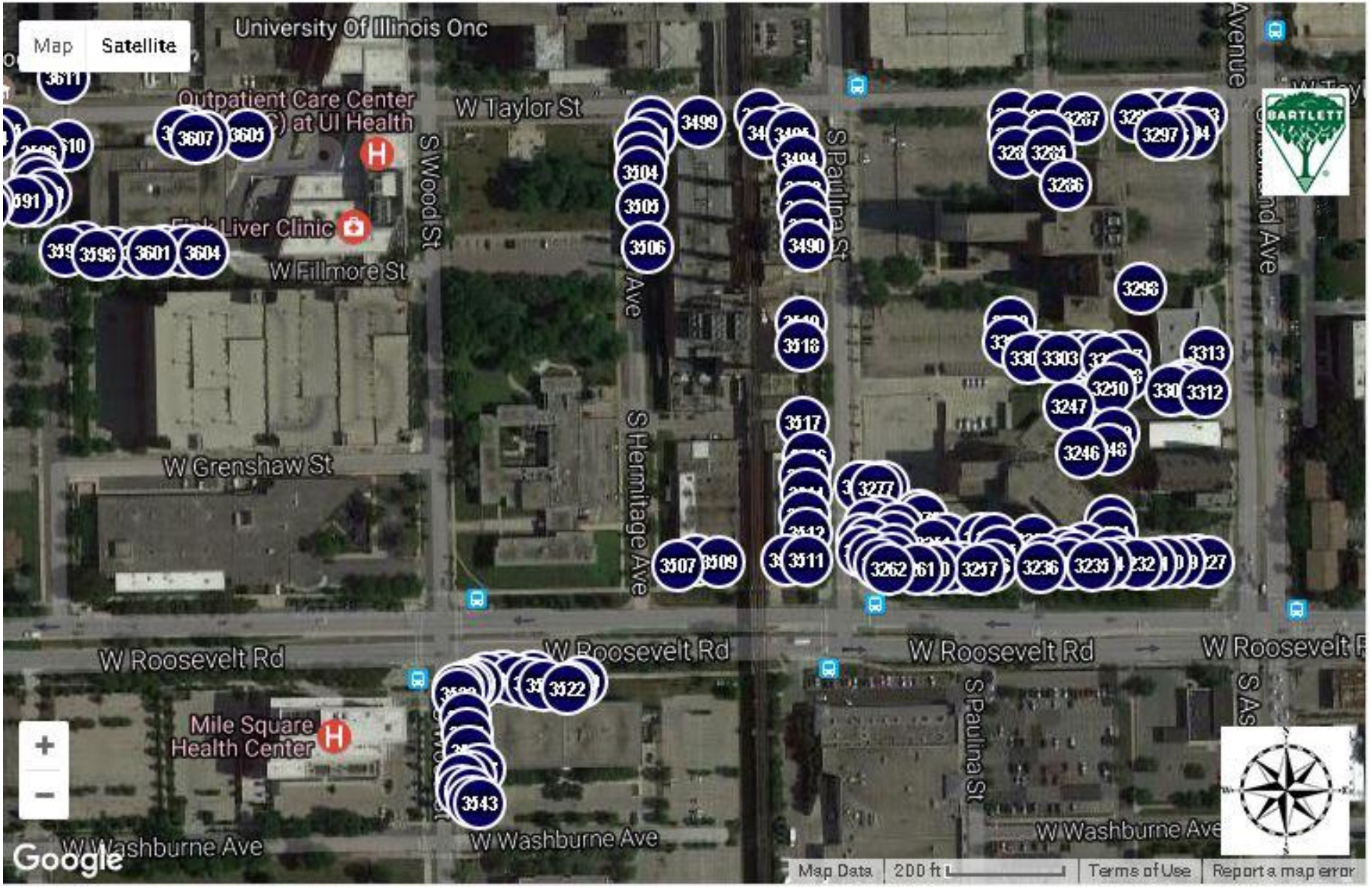
INVENTORIED TREES RECORDED AS GROUPINGS



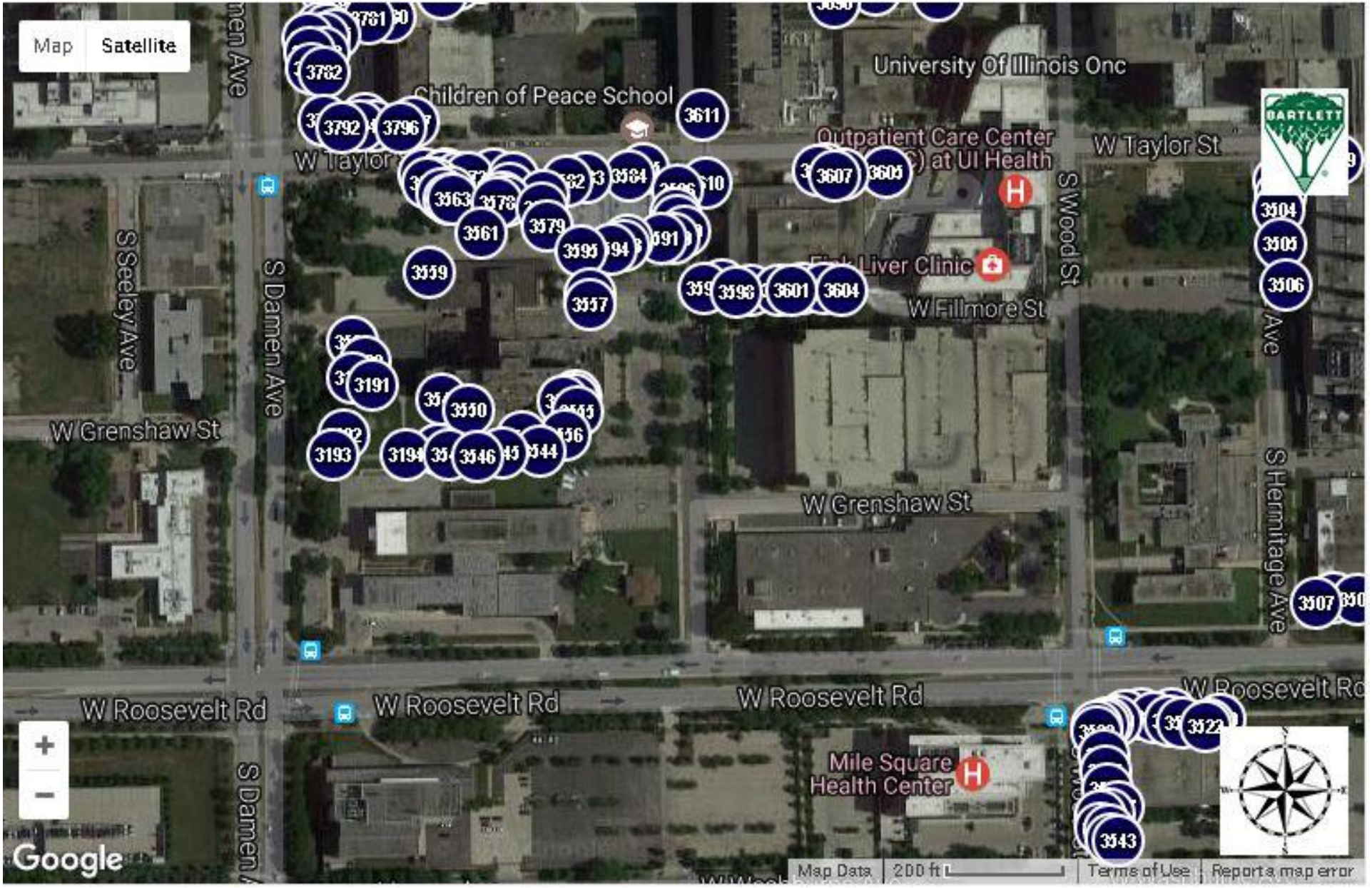
2017 TREE INVENTORY (NORTHEAST)



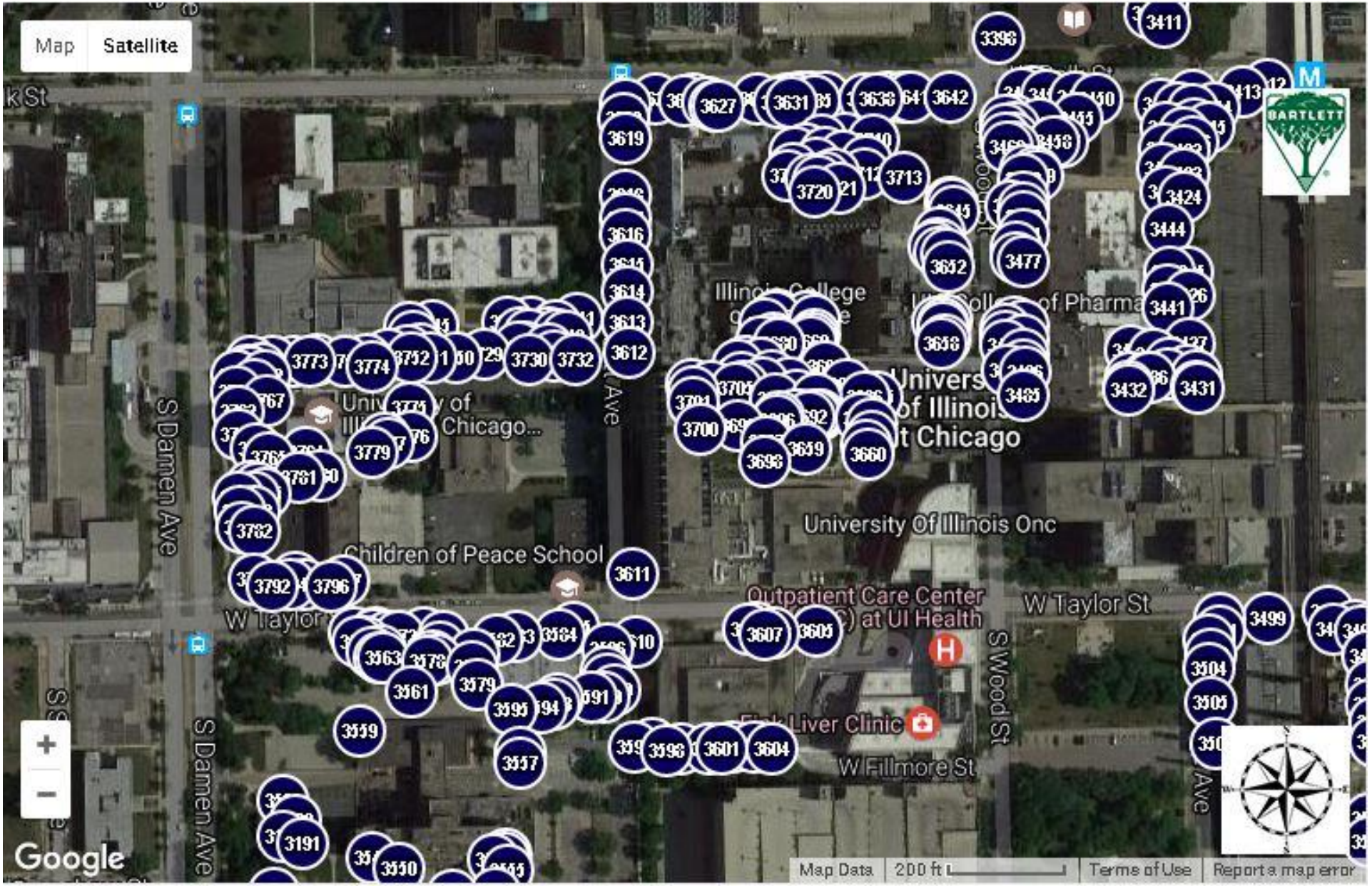
2017 TREE INVENTORY (SOUTHEAST)



2017 TREE INVENTORY (SOUTHWEST)



2017 TREE INVENTORY (NORTHWEST)

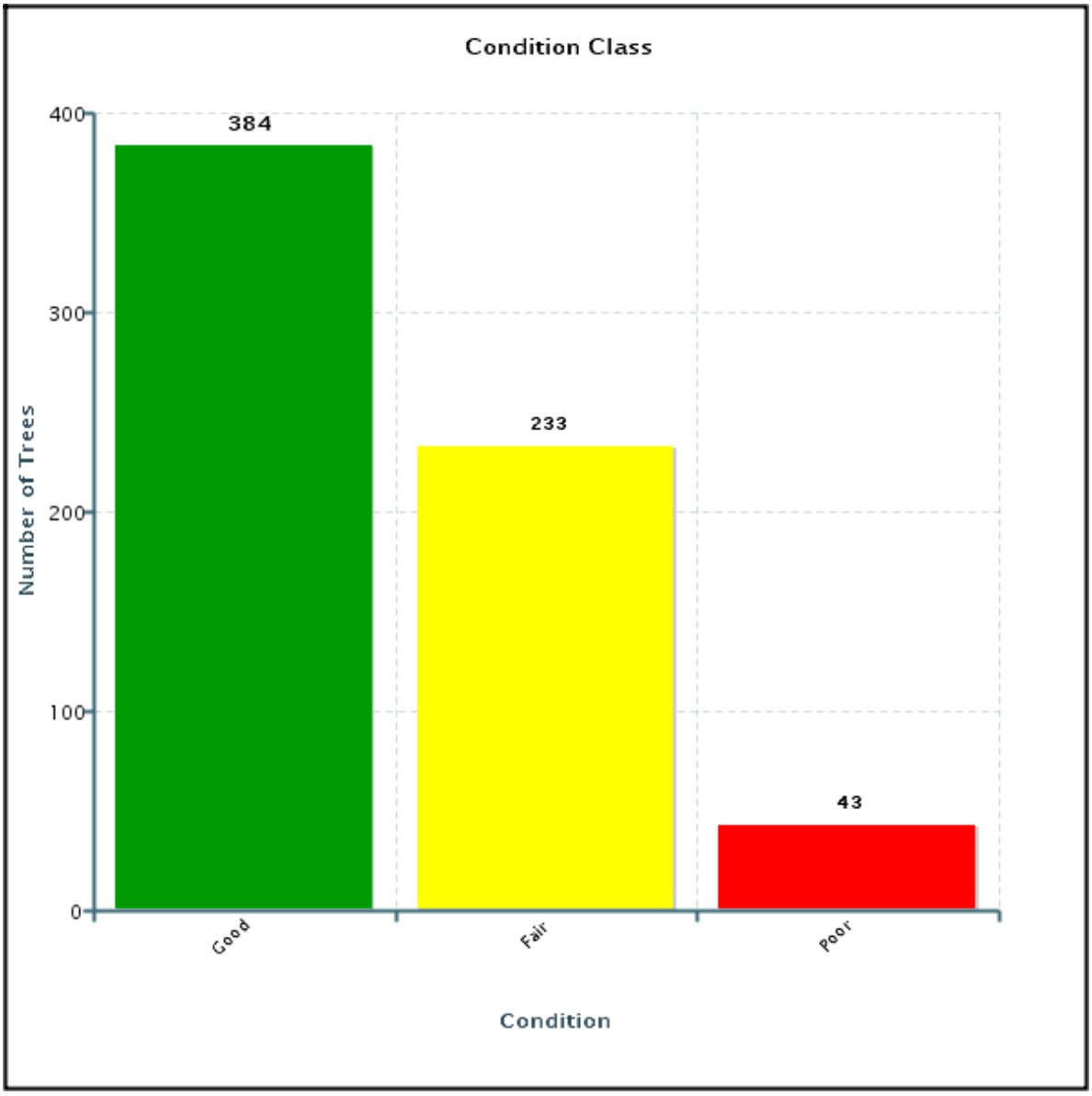


Condition Class

The breakdown of tree condition follows:

CONDITION CLASS BREAKDOWN

Condition Class	Quantity	% of Total
Good	384	58%
Fair	233	35%
Poor	43	7%

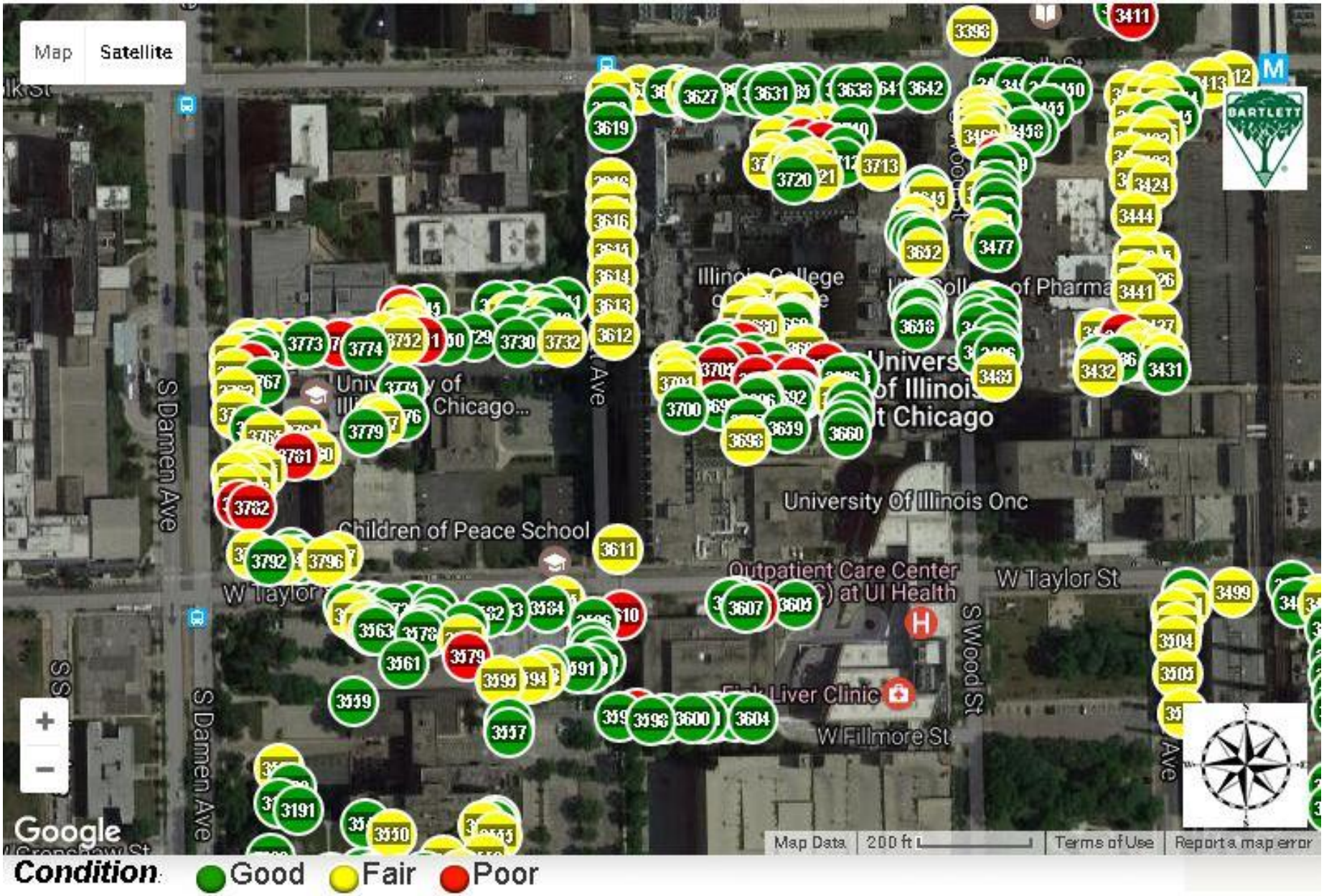


INVENTORIED TREES BY CONDITION CLASS (NORTHEAST)

INVENTORIED TREES BY CONDITION CLASS (SOUTHEAST)

INVENTORIED TREES BY CONDITION CLASS (SOUTHWEST)

INVENTORIED TREES BY CONDITION CLASS (NORTHWEST)

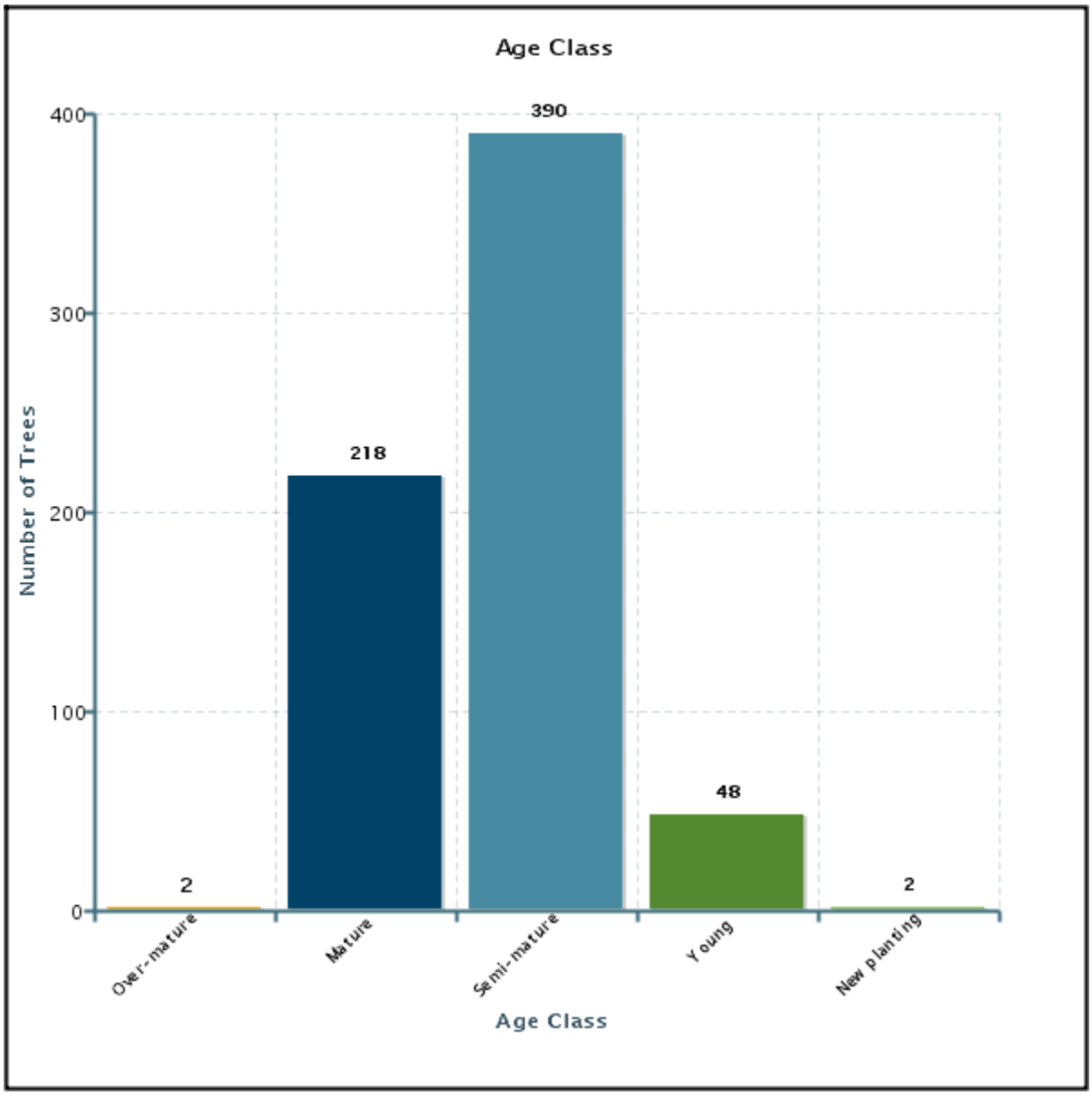


Age Class

The breakdown of tree age class follows:

AGE CLASS BREAKDOWN

Age Class	Quantity	% of Total
Over-mature	2	< 1%
Mature	218	33%
Semi-mature	390	59%
Young	48	7%
New planting	2	< 1%

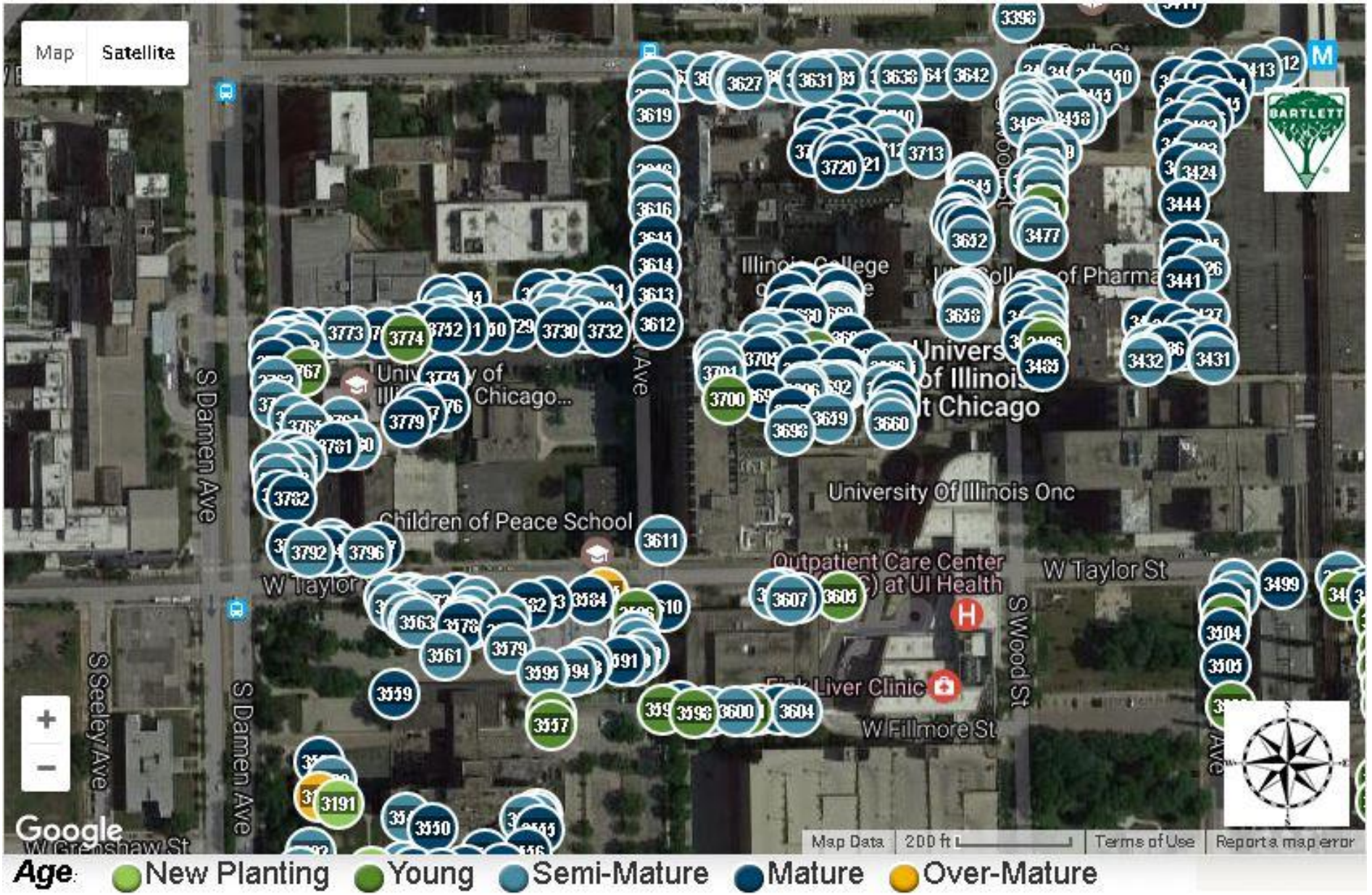


INVENTORIED TREES BY AGE CLASS (NORTHEAST)

INVENTORIED TREES BY AGE CLASS (SOUTHEAST)

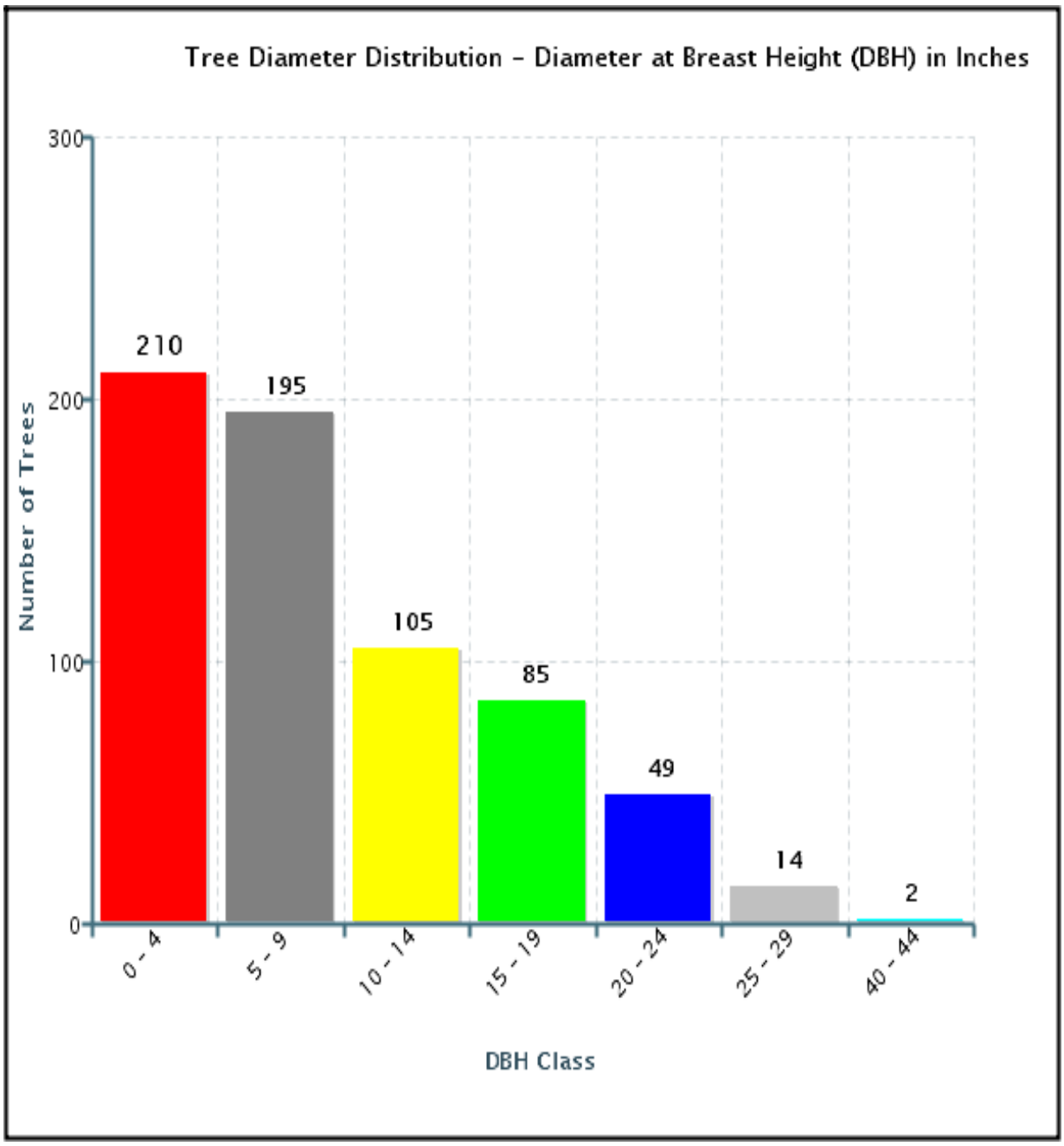
INVENTORIED TREES BY AGE CLASS (SOUTHWEST)

INVENTORIED TREES BY AGE CLASS (NORTHWEST)



Tree Size (DBH)

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



Tree Asset Value

As part of the Bartlett inventory process, we have included a Tree Asset Value for each tree and a cumulative total for all trees inventoried. To calculate the Tree Asset Value, we use a modified version* of the Trunk Formula Method published by the Council of Tree and Landscape Appraisers in The Guide for Plant Appraisal, 9th Edition (CTLA, 2000).

The following data fields are used in this formula:

Data Field	Description
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%

Tree Asset Value = Size*Species Factor*Condition Factor*Location Factor

The estimated cumulative total value for all trees inventoried is **$1,658,505.86**. The following table lists the ten trees with the highest Tree Asset Values:

TOP TEN TREES - HIGHEST TREE ASSET VALUE

Tree ID	Common Name	Genus	Species	DBH	Tree Asset Value
3189	Elm-Siberian	*Ulmus*	*pumila*	44.2	$21,240.60
3697	Hackberry	*Celtis*	*occidentalis*	28.5	$20,495.54
3318	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	29.1	$18,696.64
3699	Hackberry	*Celtis*	*occidentalis*	27.0	$18,394.89
3309	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	28.5	$17,933.59
3306	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	26.8	$15,857.96
3585	Elm-Siberian	*Ulmus*	*pumila*	43.9	$15,034.83
3415	Birch-River	*Betula*	*nigra*	14.4	$13,876.37
3744	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.2	$11,883.75
3743	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.0	$11,679.74

*This version does not consider cost of purchase and installation of the largest available "like tree."

TOP TEN TREES - HIGHEST TREE ASSET VALUE

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 and Fertilization
- Plant Health Care
- Tree Pruning
- Structural Support Systems
- Tree Removal
- Advanced Tree Risk Assessments (Level 3)

Soil Care and Fertilization

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 recommendations are intended to correct these concerns and improve or maintain overall plant health.

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 fertilization program, aims to correct nutrient deficiencies and optimize soil conditions for designated trees.

Root Invigoration™

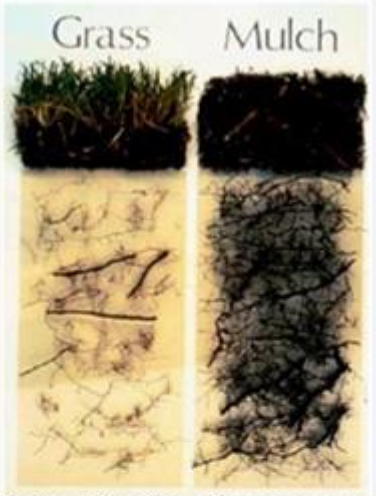
The aim of Bartlett's patented Root Invigoration™ Program is to improve soil conditions by addressing soil compaction and promoting efficient root growth, especially for high-value trees in disturbed areas. The process includes taking soil samples to determine what nutrients are deficient, performing a root collar excavation, "air-tilling" a portion of the root zone to find fine roots, incorporating organic matter, fertilizing (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.

At the time of inventory, no trees were directly recommended for soil care or fertilization. However, we recommend soil sampling across maintained areas with prominent landscape plantings to identify opportunities to optimize soil conditions moving forward.

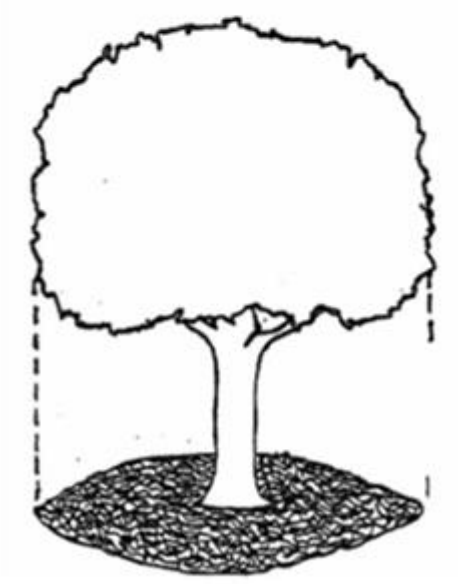
Mulch Application

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".

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.

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 will significantly impact the condition 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 (26 Trees)

Tree ID	Common Name	DBH	Girdling Roots
3244	Oak- Northern Red	24.0	...
3251	Pine-Japanese White	13.0	...
3254	Pine-Japanese White	13.0	...
3255	Pine-Japanese White	6.0	...
3259	Elm	15.5	Girdling roots present
3261	Elm	15.0	Girdling roots present
3262	Elm	15.0	Girdling roots present
3263	Elm	12.4	...
3264	Elm	14.0	Girdling roots present
3366	Maple-Freeman's	11.8	Girdling roots present
3420	Honeylocust-Thornless Common	5.6	...
3422	Linden-Littleleaf	7.3	Girdling roots present
3424	Linden-Littleleaf	12.5	...
3425	Linden-Littleleaf	9.5	...
3426	Linden-Littleleaf	9.8	...
3428	Linden-Littleleaf	12.5	...
3429	Catalpa-Northern	22.5	Girdling material
3432	Honeylocust-Thornless Common	14.6	Girdling material
3459	Pear-Callery	8.0	...
3461	Pear-Callery	10.5	...
3462	Pear-Callery	13.0	...
3463	Pear-Callery	8.0	...
3464	Pear-Callery	11.4	...
3465	Pear-Callery	6.3	...
3466	Pear-Callery	9.5	...
3664	Maple-Sugar	13.0	Girdling roots present

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. 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

Tree #3277 with bagworms present.

We identified pests or diseases on the following inventoried trees at the time of the inventory:

INVENTORIED TREES IDENTIFIED WITH PESTS OR DISEASES (43 Trees)

Tree ID	Common Name	DBH	Pest(s) or Disease(s)
3277	Maple-Miyabei	3.0	• Bagworms
3312	Spruce (5)	4.5	• Needlecast
3350	Oak-Bur	3.5	• Bagworms
3378	Hawthorn	6.3	• Rust
3400	Pine-Austrian	16.8	• Diplodia tip blight
3401	Pine-Austrian	11.0	• Diplodia tip blight
3402	Pine-Austrian	12.2	• Diplodia tip blight
3403	Pine-Austrian	11.0	• Diplodia tip blight
3497	Crabapple	5.8	• Bagworms
3506	Maple-Red	4.0	• Cankers
3526*	Ash-White	7.0	• Borers
3527*	Ash-White	7.8	• Borers
3534*	Ash-Green	6.5	• Borers
3535*	Ash-White	11.2	• Borers
3536*	Ash-White	10.2	• Borers
3537*	Ash-White	10.0	• Borers
3538*	Ash-White	10.0	• Borers
3616	Hawthorn	4.1	• Rust
3617	Hawthorn	8.0	• Rust
3618	Hawthorn	6.4	• Rust
3669	Hawthorn	6.9	• Sooty mold
3670	Hawthorn	8.0	• Sooty mold
3671	Hawthorn	7.7	• Sooty mold
3672	Hawthorn	10.5	• Sooty mold
3673	Hawthorn	9.2	• Sooty mold
3674	Hawthorn	7.2	• Sooty mold
3675	Hawthorn	11.1	• Sooty mold
3676	Hawthorn	9.0	• Sooty mold
3677	Hawthorn	10.5	• Sooty mold
3678	Hawthorn	9.8	• Sooty mold
3679	Hawthorn	9.4	• Sooty mold
3680	Hawthorn	9.5	• Sooty mold
3766	Hawthorn	7.0	• Rust
3777	Pine-Austrian	18.5	• Diplodia tip blight
3778	Pine-Austrian	10.2	• Diplodia tip blight
3785	Pine-Austrian	11.5	• Diplodia tip blight
3786	Pine-Austrian	15.6	• Diplodia tip blight
3787	Pine-Austrian	12.0	• Diplodia tip blight

Tree ID	Common Name	DBH	Pest(s) or Disease(s)
3794	Pine-Austrian	15.0	• Diplodia tip blight

* Trees that are recommended for removal in the Tree Removal Section

INVENTORIED TREES IDENTIFIED WITH PESTS OR DISEASES (NORTHEAST)

INVENTORIED TREES IDENTIFIED WITH PESTS OR DISEASES (SOUTHEAST)

INVENTORIED TREES IDENTIFIED WITH PESTS OR DISEASES (WEST)

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.

Correct Pruning Practices

For specific standards on pruning practices, readers will find ANSI Standards on this topic in the Appendix. We have, however, included below some key pruning categories and diagrams to illuminate the goal of each.

Cleaning
Selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches.

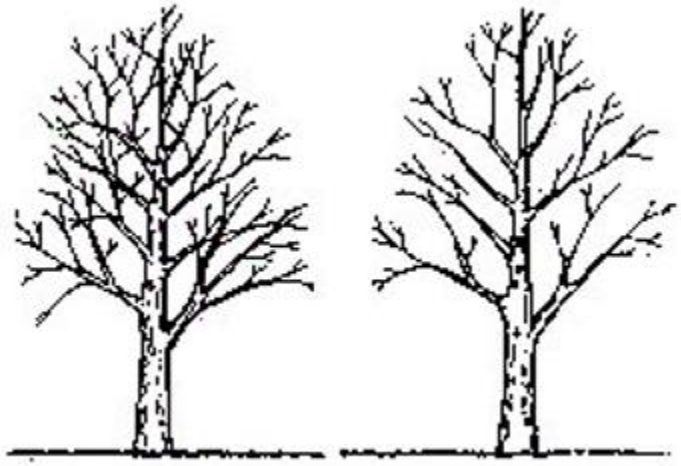


Illustration of crown cleaning.

Raising
Selectively pruning to provide vertical clearance.

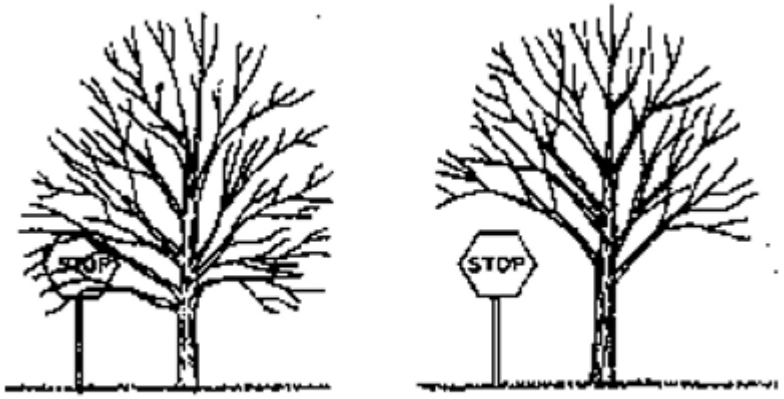


Illustration of crown raising.

Thinning
Selective pruning to reduce density of live branches.

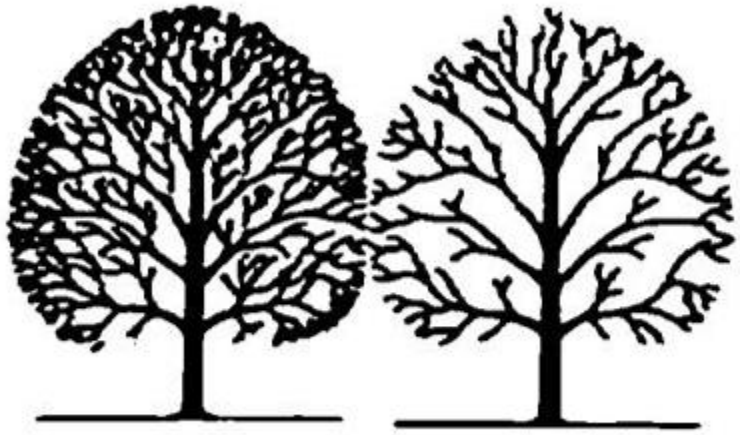


Illustration of thinning.

Reducing (Reduction Pruning)
Selective pruning to reduce height or spread.

Illustration of reduction pruning.

Structural
Selective pruning of live branches and stems to influence orientation, spacing, growth rate, strength of attachment, and ultimate size of branches and stems.

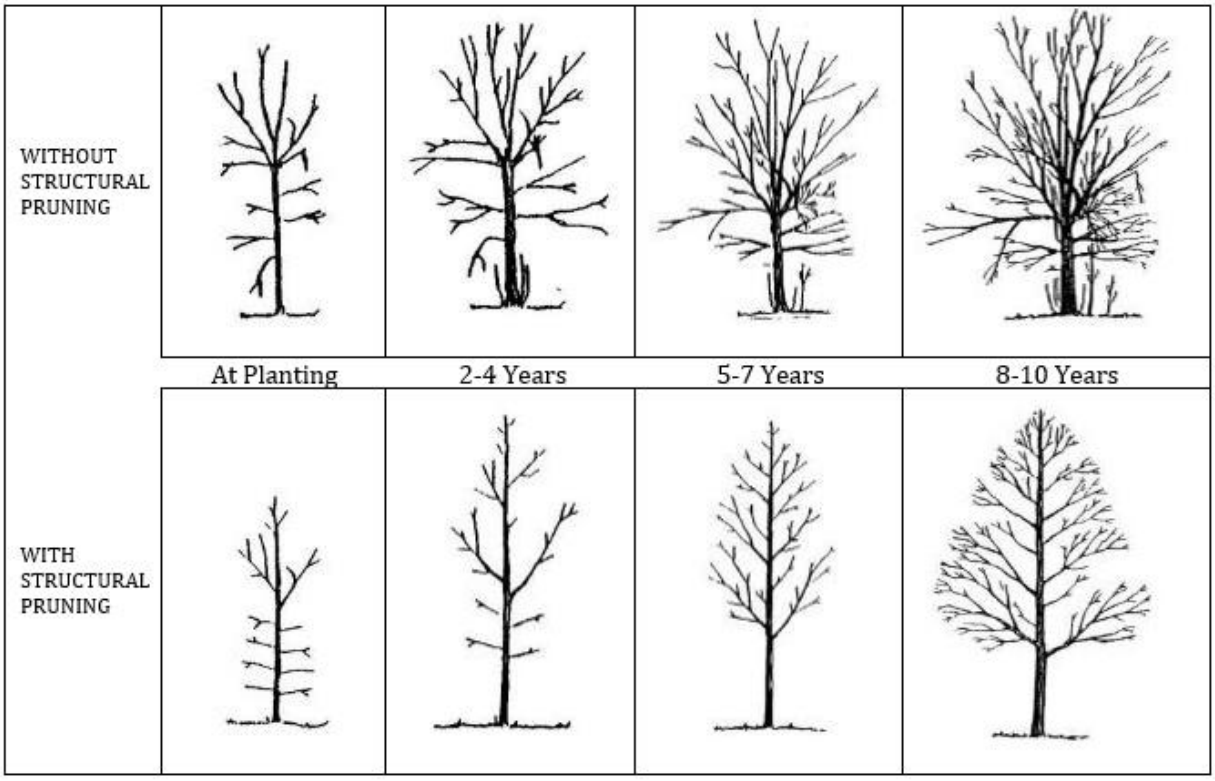


Illustration of structural pruning.

Vista Pruning
Vista pruning is a combination of thinning and reduction pruning to enhance the view from a vantage point to an area of interest while minimizing negative impacts on tree structure and health.

We recommended pruning on the following trees:

INVENTORIED TREES RECOMMENDED FOR PRUNING (240 Trees)

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3697	Hackberry	28.5	Moderate	1	• Clean • Reduce: Branch weight • Structural
3189	Elm-Siberian	44.2	Low	1	• Reduce: Branch weight
3445	Honeylocust-Thornless Common	19.2	Low	1	• Clean • Structural
3318	Honeylocust-Thornless Common	29.1	...	1	• Clean • Reduce: Branch weight • Structural
3364	Maple-Freeman's	15.0	...	1	• Structural
3365	Maple-Freeman's	14.4	...	1	• Structural
3366	Maple-Freeman's	11.8	...	1	• Structural
3367	Maple-Freeman's	12.5	...	1	• Structural
3368	Maple-Freeman's	12.8	...	1	• Structural
3388	Alder-Common	9.8	...	1	• Clean • Structural
3416	Honeylocust-Thornless Common	19.9	...	1	• Clean • Structural
3417	Honeylocust-Thornless Common	15.2	...	1	• Clean • Structural
3418	Honeylocust-Thornless Common	17.8	...	1	• Clean • Structural
3419	Honeylocust-Thornless Common	18.0	...	1	• Clean • Structural
3436	Honeylocust-Thornless Common	19.0	...	1	• Clean • Structural
3438	Honeylocust-Thornless Common	21.0	...	1	• Clean • Structural
3499	Honeylocust-Thornless Common	22.4	...	1	• Clean • Structural
3502	Honeylocust-Thornless Common	18.5	...	1	• Clean • Structural
3504	Hackberry	21.2	...	1	• Clean • Structural
3505	Honeylocust-Thornless Common	18.5	...	1	• Clean • Structural
3584	Honeylocust-Thornless Common	16.0	...	1	• Clean • Structural

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3585	Elm-Siberian	43.9	...	1	• Clean • Raise: Lighting • Reduce: Building • Structural
3683	Honeylocust-Thornless Common	19.5	...	1	• Clean • Structural
3727	Honeylocust-Thornless Common	16.2	...	1	• Clean • Structural
3728	Honeylocust-Thornless Common	15.9	...	1	• Clean • Structural
3753	Honeylocust-Thornless Common	19.0	...	1	• Clean • Structural
3754	Honeylocust-Thornless Common	20.0	...	1	• Clean • Structural
3756	Honeylocust-Thornless Common	20.4	...	1	• Clean • Structural
3758	Honeylocust-Thornless Common	20.4	...	1	• Clean • Structural
3759	Honeylocust-Thornless Common	22.0	...	1	• Clean • Structural
3190	Ginkgo	13.5	...	2	• Structural
3192	Ginkgo	13.0	...	2	• Structural
3232	Elm	15.4	...	2	• Clean
3233	Elm	15.0	...	2	• Clean
3234	Elm	15.0	...	2	• Clean
3235	Elm	16.8	...	2	• Clean
3236	Elm	15.2	...	2	• Clean • Structural
3244	Oak- Northern Red	24.0	...	2	• Structural
3249	Honeylocust-Common	24.6	...	2	• Clean • Structural
3250	Honeylocust-Thornless Common	22.5	...	2	• Clean • Structural
3251	Pine-Japanese White	13.0	...	2	• Structural
3255	Pine-Japanese White	6.0	...	2	• Structural
3257	Elm	16.3	...	2	• Clean
3259	Elm	15.5	...	2	• Clean
3260	Elm	15.3	...	2	• Clean • Structural
3261	Elm	15.0	...	2	• Clean • Structural
3262	Elm	15.0	...	2	• Clean
3264	Elm	14.0	...	2	• Clean • Structural

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3309	Honeylocust-Thornless Common	28.5	...	2	• Clean • Structural
3310	Honeylocust-Thornless Common	21.5	...	2	• Clean • Structural
3311	Redbud-Eastern (3)	4.0	...	2	• Raise: Lighting
3314	Crabapple	9.0	...	2	• Reduce: Building
3315	Crabapple	9.0	...	2	• Reduce: Building
3316	Crabapple	9.0	...	2	• Reduce: Building
3324	Crabapple	8.0	...	2	• Reduce: Building • Structural
3327	Crabapple	6.0	...	2	• Reduce: Building
3331	Birch-River	9.6	...	2	• Reduce: Building
3334	Crabapple	5.1	...	2	• Reduce: Building
3341	Crabapple	4.5	...	2	• Clean • Reduce: Building
3353	Pear-Callery	15.0	...	2	• Structural
3354	Crabapple	6.0	...	2	• Clean • Reduce: Lighting
3360	Pear-Callery	15.0	...	2	• Structural
3361	Pear-Callery	17.3	...	2	• Structural
3369	Honeylocust-Thornless Common	22.5	...	2	• Clean • Structural
3385	Hawthorn	6.4	...	2	• Reduce: Building • Structural
3386	Elm	4.6	...	2	• Structural
3391	Crabapple	13.5	...	2	• Clean • Structural
3400	Pine-Austrian	16.8	...	2	• Clean • Reduce: Building
3404	Honeylocust-Thornless Common	17.0	...	2	• Clean • Structural
3406	Honeylocust-Thornless Common	10.0	...	2	• Structural
3414	Linden-Littleleaf	13.5	...	2	• Reduce: Branch weight • Structural
3415	Birch-River	14.4	...	2	• Reduce: Building • Structural
3427	Linden-Littleleaf	11.5	...	2	• Structural
3428	Linden-Littleleaf	12.5	...	2	• Structural
3429	Catalpa-Northern	22.5	...	2	• Reduce: Branch weight • Structural
3432	Honeylocust-Thornless Common	14.6	...	2	• Clean • Reduce: Building • Structural

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3434	Witchhazel (2)	4.0	...	2	• Reduce: Building
3439	Honeylocust-Thornless Common	19.0	...	2	• Clean • Structural
3441	Honeylocust-Thornless Common	18.0	...	2	• Clean • Structural
3444	Honeylocust-Thornless Common	20.0	...	2	• Clean • Structural
3446	Honeylocust-Thornless Common	14.8	...	2	• Clean • Structural
3450	Elm	9.0	...	2	• Structural
3473	Pine-Austrian	12.9	...	2	• Reduce: Building
3496	Honeylocust-Thornless Common	24.1	...	2	• Clean • Structural
3497	Crabapple	5.8	...	2	• Raise: Sidewalk
3507	Honeylocust-Thornless Common	20.0	...	2	• Structural
3508	Honeylocust-Thornless Common	23.0	...	2	• Structural
3509	Honeylocust-Thornless Common	14.0	...	2	• Reduce: Overhead lines • Structural
3510	Honeylocust-Thornless Common	16.5	...	2	• Structural
3511	Honeylocust-Thornless Common	18.3	...	2	• Clean • Structural
3512	Honeylocust-Thornless Common	15.3	...	2	• Clean • Structural
3513	Honeylocust-Thornless Common	15.3	...	2	• Clean • Structural
3514	Honeylocust-Thornless Common	11.2	...	2	• Clean • Structural
3515	Honeylocust-Thornless Common	17.0	...	2	• Clean • Structural
3516	Honeylocust-Thornless Common	15.4	...	2	• Clean • Structural
3517	Honeylocust-Thornless Common	13.3	...	2	• Clean • Structural
3520	Pear-Callery	12.0	...	2	• Reduce: Building • Structural
3522	Pear-Callery	11.0	...	2	• Structural
3523	Pear-Callery	12.5	...	2	• Structural
3524	Pear-Callery	8.2	...	2	• Structural
3525	Pear-Callery	8.0	...	2	• Structural
3544	Honeylocust-Thornless Common	21.5	...	2	• Clean • Structural

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3547	Honeylocust-Thornless Common	24.5	...	2	• Clean • Structural
3551	Maple-Silver	29.2	...	2	• Reduce: Branch weight • Structural
3555	Maple-Silver	22.0	...	2	• Clean • Reduce: Branch weight • Structural
3556	Maple-Silver	27.5	...	2	• Reduce: Branch weight • Structural
3559	Crabapple	8.0	...	2	• Reduce: Building • Structural
3560	Honeylocust-Thornless Common	21.5	...	2	• Clean • Structural
3562	Honeylocust-Thornless Common	28.0	...	2	• Clean • Structural
3591	Hackberry	20.6	...	2	• Reduce: Building • Structural
3597	Honeylocust-Thornless Common	24.2	...	2	• Clean • Structural
3600	Coffeetree-Kentucky	12.4	...	2	• Structural
3604	Crabapple	8.0	...	2	• Reduce: Building • Structural
3612	Linden-Littleleaf	18.0	...	2	• Structural
3615	Linden-Littleleaf	15.0	...	2	• Structural
3619	Crabapple	6.0	...	2	• Reduce: Building • Structural
3620	Crabapple	6.0	...	2	• Reduce: Building • Structural
3622	Hawthorn	8.3	...	2	• Structural
3643	Magnolia	6.0	...	2	• Reduce: Building • Structural
3682	Pear-Callery	5.2	...	2	• Structural
3699	Hackberry	27.0	...	2	• Structural
3701	Pear-Callery	5.0	...	2	• Structural
3702	Pear-Callery	7.5	...	2	• Structural
3703	Pear-Callery	10.2	...	2	• Structural
3714	Hophornbeam-American	7.5	...	2	• Clean • Structural
3715	Honeylocust-Thornless Common	17.5	...	2	• Clean • Structural
3760	Honeylocust-Thornless Common	14.2	...	2	• Clean • Structural
3761	Honeylocust-Thornless Common	15.6	...	2	• Clean • Structural

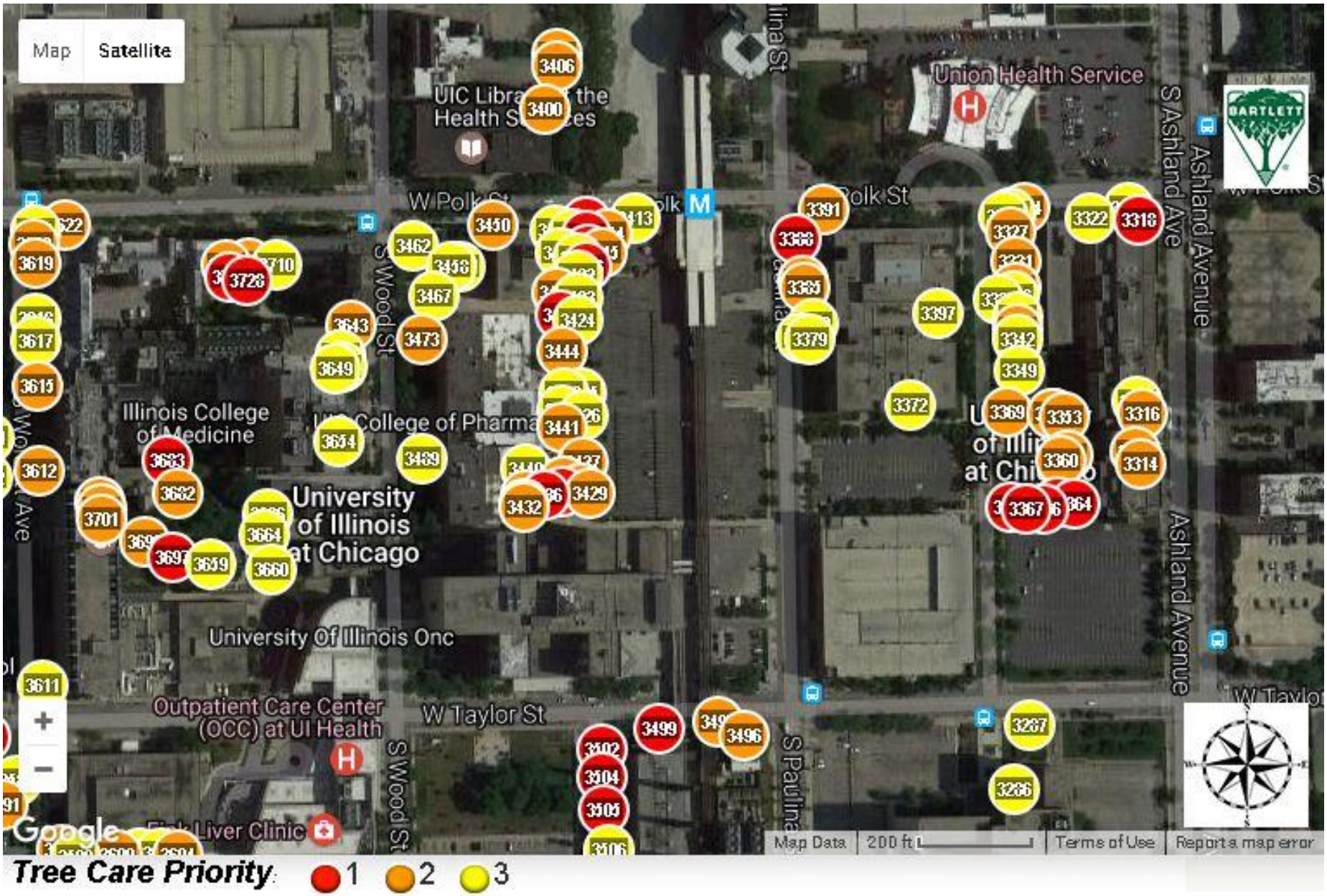
Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3762	Honeylocust-Thornless Common	14.2	...	2	• Clean • Structural
3763	Honeylocust-Thornless Common	12.3	...	2	• Structural
3768	Elm	17.0	...	2	• Clean • Structural
3775	Maple-Norway	22.0	...	2	• Clean • Structural
3776	Maple-Norway	24.0	...	2	• Clean • Reduce: Branch weight • Structural
3791	Honeylocust-Thornless Common	20.9	...	2	• Clean • Structural
3191	Pear-Callery	4.0	...	3	• Structural
3194	Pear-Callery	4.8	...	3	• Structural
3227	Elm	16.7	...	3	• Clean
3228	Elm	13.4	...	3	• Clean
3229	Elm	13.6	...	3	• Clean
3230	Elm	13.0	...	3	• Clean
3231	Elm	12.3	...	3	• Clean
3256	Elm	14.7	...	3	• Clean • Structural
3258	Elm	15.3	...	3	• Clean
3286	Redbud-Eastern	6.3	...	3	• Reduce: Building
3287	Planetree-London	25.3	...	3	• Structural
3299	Honeylocust-Thornless Common	22.4	...	3	• Clean • Structural
3300	Honeylocust-Thornless Common	20.0	...	3	• Clean • Structural
3301	Honeylocust-Thornless Common	20.8	...	3	• Structural
3302	Honeylocust-Thornless Common	19.4	...	3	• Structural
3303	Honeylocust-Thornless Common	20.8	...	3	• Structural
3304	Honeylocust-Thornless Common	18.0	...	3	• Clean • Structural
3305	Honeylocust-Thornless Common	19.0	...	3	• Structural
3306	Honeylocust-Thornless Common	26.8	...	3	• Structural
3307	Honeylocust-Thornless Common	25.0	...	3	• Clean • Structural

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3308	Honeylocust-Thornless Common	18.0	...	3	• Structural
3317	Crabapple	10.0	...	3	• Reduce: Building
3319	Crabapple	7.0	...	3	• Reduce: Building
3322	Honeylocust-Thornless Common	12.6	...	3	• Structural
3325	Crabapple	8.0	...	3	• Structural
3326	Crabapple	6.0	...	3	• Structural
3335	Crabapple	5.0	...	3	• Clean
3336	Crabapple	6.9	...	3	• Reduce: Building
3338	Crabapple	7.1	...	3	• Reduce: Building • Structural
3342	Crabapple	9.5	...	3	• Reduce: Building • Structural
3349	Oak-Bur	3.0	...	3	• Structural
3352	Pear-Callery	14.7	...	3	• Structural
3372	Crabapple	7.5	...	3	• Reduce: Building
3379	Pear-Callery	4.8	...	3	• Structural
3380	Pear-Callery	4.6	...	3	• Structural
3382	Pear-Callery	4.5	...	3	• Structural
3397	Hackberry	21.1	...	3	• Reduce: Building • Structural
3413	Lilac-Japanese Tree	5.0	...	3	• Reduce: Building
3420	Honeylocust-Thornless Common	5.6	...	3	• Structural
3421	Linden-Littleleaf	11.3	...	3	• Structural
3422	Linden-Littleleaf	7.3	...	3	• Structural
3423	Linden-Littleleaf	8.0	...	3	• Structural
3424	Linden-Littleleaf	12.5	...	3	• Structural
3425	Linden-Littleleaf	9.5	...	3	• Structural
3426	Linden-Littleleaf	9.8	...	3	• Structural
3433	Ginkgo	9.6	...	3	• Structural
3440	Dogwood-Flowering	2.0	...	3	• Reduce: Building
3442	Honeylocust-Thornless Common	17.8	...	3	• Structural
3443	Honeylocust-Thornless Common	18.2	...	3	• Clean • Structural
3448	Honeylocust-Thornless Common	16.8	...	3	• Structural
3449	Honeylocust-Thornless Common	16.5	...	3	• Structural
3457	Birch-Gray	5.6	...	3	• Structural
3458	Birch-Gray	4.9	...	3	• Structural
3462	Pear-Callery	13.0	...	3	• Structural

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3467	Honeylocust-Thornless Common	18.4	...	3	• Structural
3489	Pine-Austrian	10.2	...	3	• Reduce: Building
3506	Maple-Red	4.0	...	3	• Structural
3521	Pear-Callery	8.0	...	3	• Structural
3545	Honeylocust-Thornless Common	16.5	...	3	• Structural
3546	Honeylocust-Thornless Common	17.2	...	3	• Structural
3552	Linden-Littleleaf	13.0	...	3	• Structural
3565	Serviceberry	3.0	...	3	• Clean
3573	Coffeetree-Kentucky	15.0	...	3	• Structural
3578	Honeylocust-Thornless Common	18.7	...	3	• Structural
3582	Linden-Littleleaf	19.5	...	3	• Reduce: Building • Structural
3587	Serviceberry	3.0	...	3	• Clean
3593	Maple-Norway	16.0	...	3	• Structural
3594	Maple-Norway	13.0	...	3	• Clean
3595	Maple-Norway	12.6	...	3	• Clean
3598	Maple-Freeman's	3.0	...	3	• Structural
3602	Crabapple	12.5	...	3	• Reduce: Building • Structural
3603	Crabapple	11.5	...	3	• Structural
3611	Serviceberry	4.0	...	3	• Reduce: Building • Structural
3617	Hawthorn	8.0	...	3	• Structural
3618	Hawthorn	6.4	...	3	• Structural
3621	Crabapple	6.6	...	3	• Structural
3646	Pine-Scotch	16.5	...	3	• Structural
3648	Redbud-Eastern	8.0	...	3	• Structural
3649	Redbud-Eastern	8.0	...	3	• Structural
3654	Redbud-Eastern	7.7	...	3	• Structural
3659	Lilac-Japanese Tree	4.0	...	3	• Structural
3660	Crabapple	9.0	...	3	• Structural
3664	Maple-Sugar	13.0	...	3	• Clean • Structural
3666	Maple-Sugar	10.1	...	3	• Structural
3710	Alder-Common	7.0	...	3	• Reduce: Building • Structural
3729	Honeylocust-Thornless Common	19.7	...	3	• Clean • Structural
3730	Honeylocust-Thornless Common	19.8	...	3	• Clean • Structural

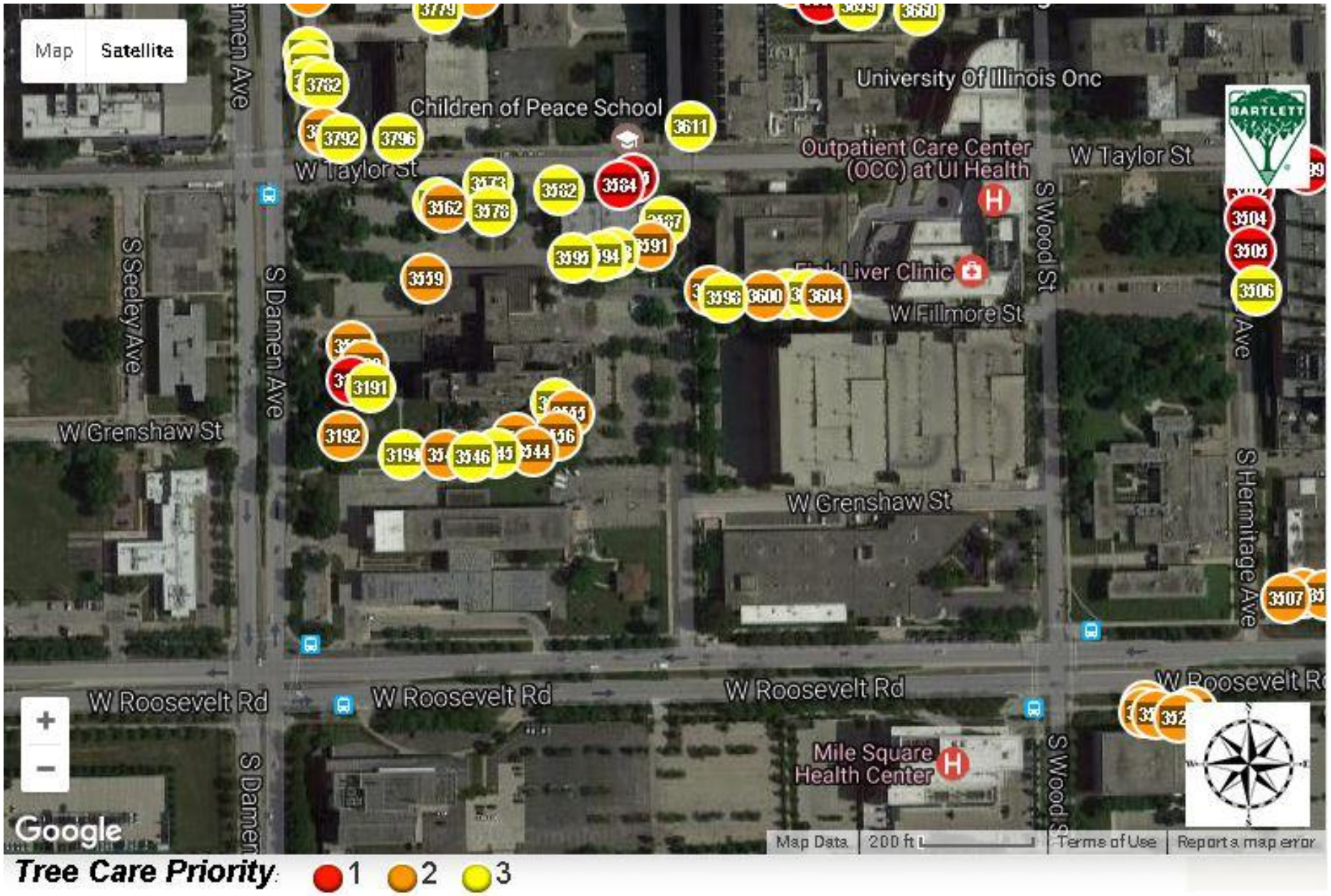
Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Pruning Recommended
3731	Honeylocust-Thornless Common	17.9	...	3	• Clean • Structural
3732	Honeylocust-Thornless Common	17.8	...	3	• Clean • Structural
3741	Honeylocust-Thornless Common	19.9	...	3	• Clean • Structural
3742	Honeylocust-Thornless Common	22.9	...	3	• Clean • Structural
3743	Honeylocust-Thornless Common	23.0	...	3	• Clean • Structural
3744	Honeylocust-Thornless Common	23.2	...	3	• Clean • Structural
3745	Honeylocust-Thornless Common	21.0	...	3	• Clean • Structural
3750	Honeylocust-Thornless Common	18.0	...	3	• Clean • Structural
3752	Honeylocust-Thornless Common	21.0	...	3	• Clean • Structural
3779	Maple-Norway	17.2	...	3	• Clean • Structural
3782	Honeylocust-Thornless Common	21.0	...	3	• Clean • Structural
3788	Honeylocust-Thornless Common	8.5	...	3	• Structural
3789	Honeylocust-Thornless Common	12.2	...	3	• Clean • Structural
3790	Honeylocust-Thornless Common	15.0	...	3	• Clean • Structural
3792	Ginkgo	9.6	...	3	• Structural
3796	Ginkgo	10.5	...	3	• Structural

INVENTORIED TREES RECOMMENDED FOR PRUNING (NORTHEAST)

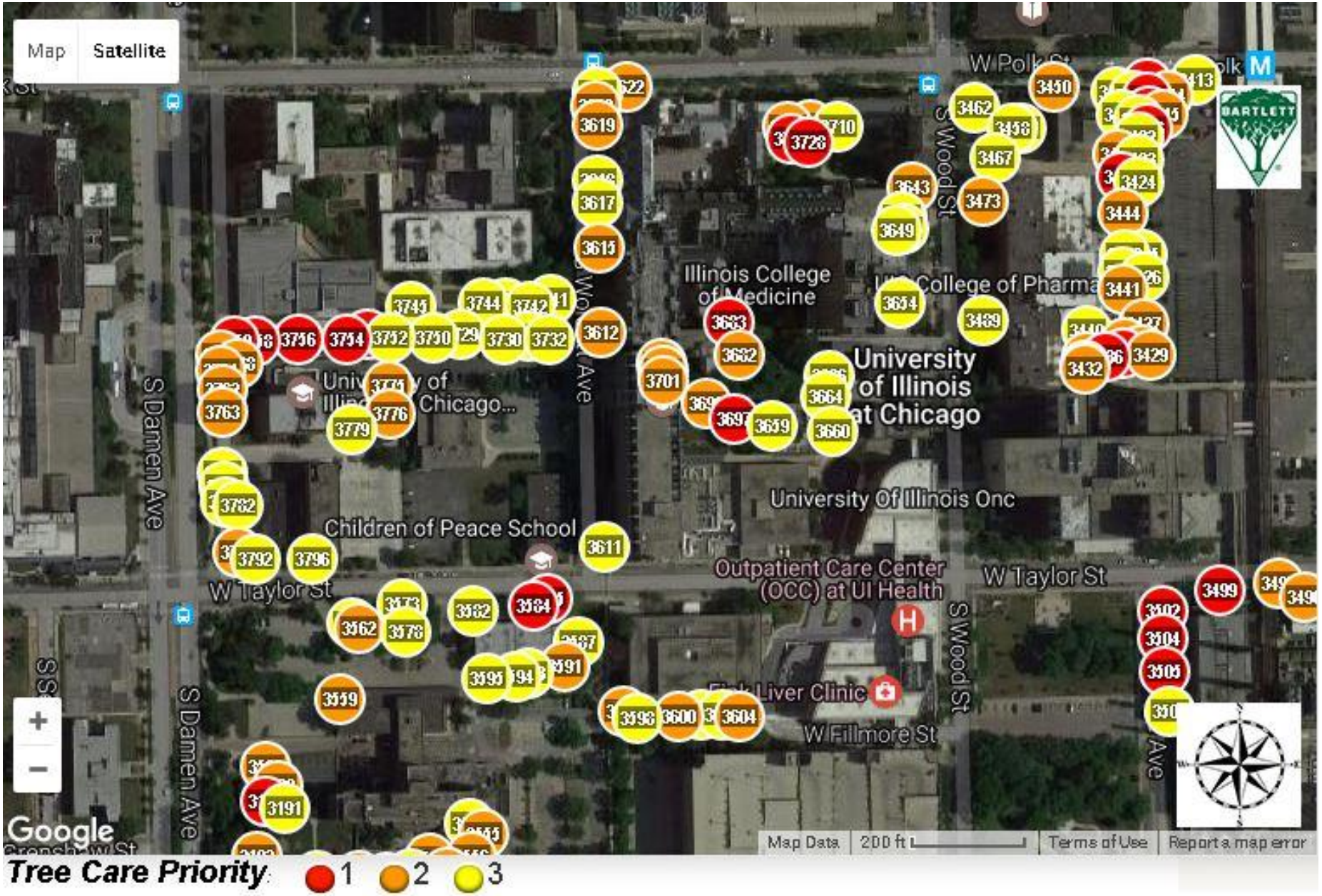


INVENTORIED TREES RECOMMENDED FOR PRUNING (SOUTHEAST)

INVENTORIED TREES RECOMMENDED FOR PRUNING (SOUTHWEST)



INVENTORIED TREES RECOMMENDED FOR PRUNING (NORTHWEST)



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. For specific standards on structural support systems, readers will find an ANSI A300 standard practice document in the Appendix.

Cabling

Cabling is the process of connecting two or more upright stems or leaders 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 codominant leaders or 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.

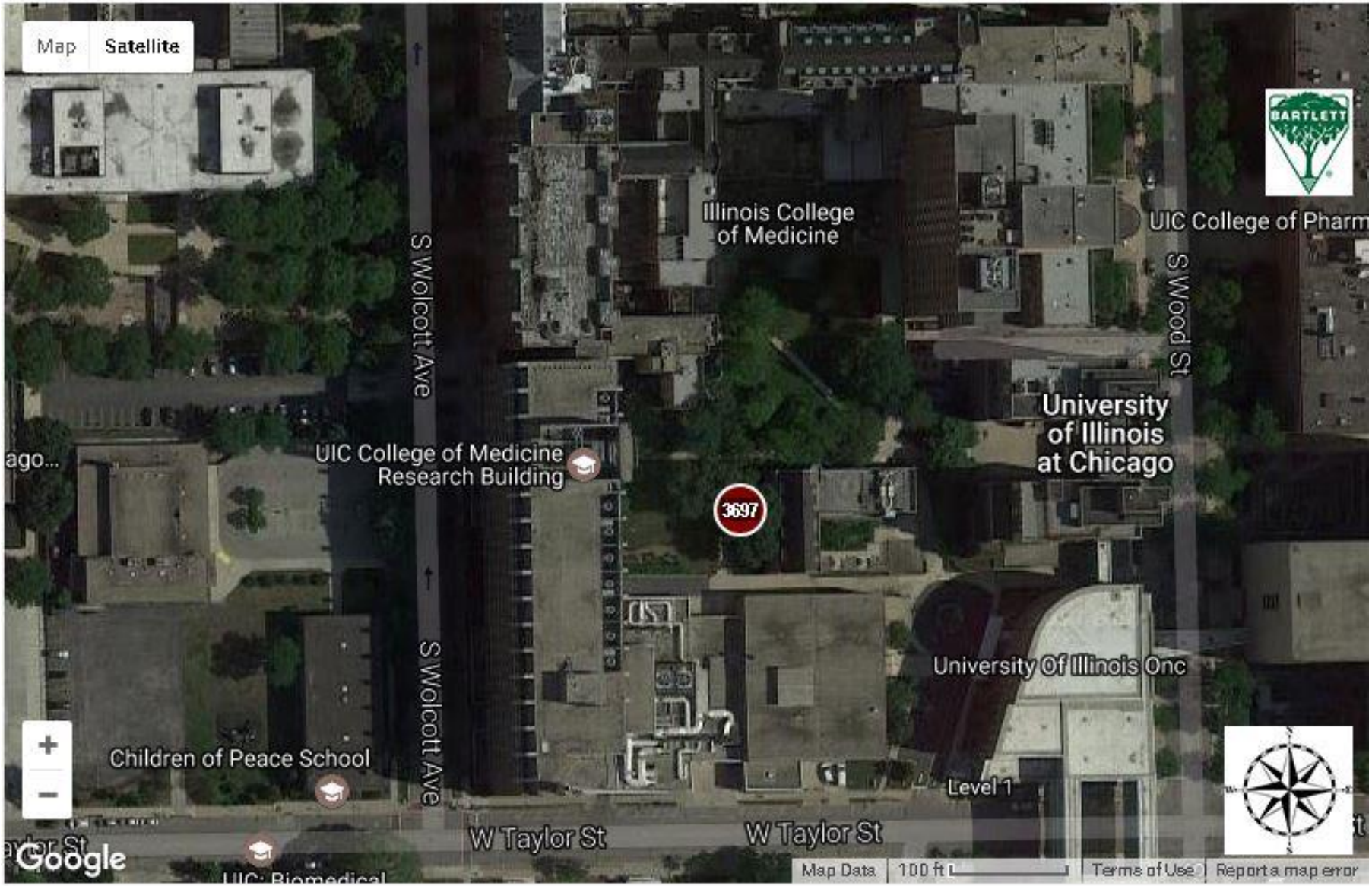
Tree #3697 recommended for cabling due to the crack between co-dominant leaders.

We recommend that the following inventoried tree has a structural support system installed:

INVENTORIED TREE RECOMMENDED FOR A NEW STRUCTURAL SUPPORT SYSTEM (1 Tree)

Tree ID	Common Name	DBH	Tree Care Priority	Cable
3697	Hackberry	28.5	1	New 2 (Replace 1 old system)

INVENTORIED TREE RECOMMENDED FOR A NEW STRUCTURAL SUPPORT SYSTEM



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.

Trees #3685 (right) and 3705 (left) recommended for removal because of major dieback.

The tree(s) listed in the table below are recommended for removal:

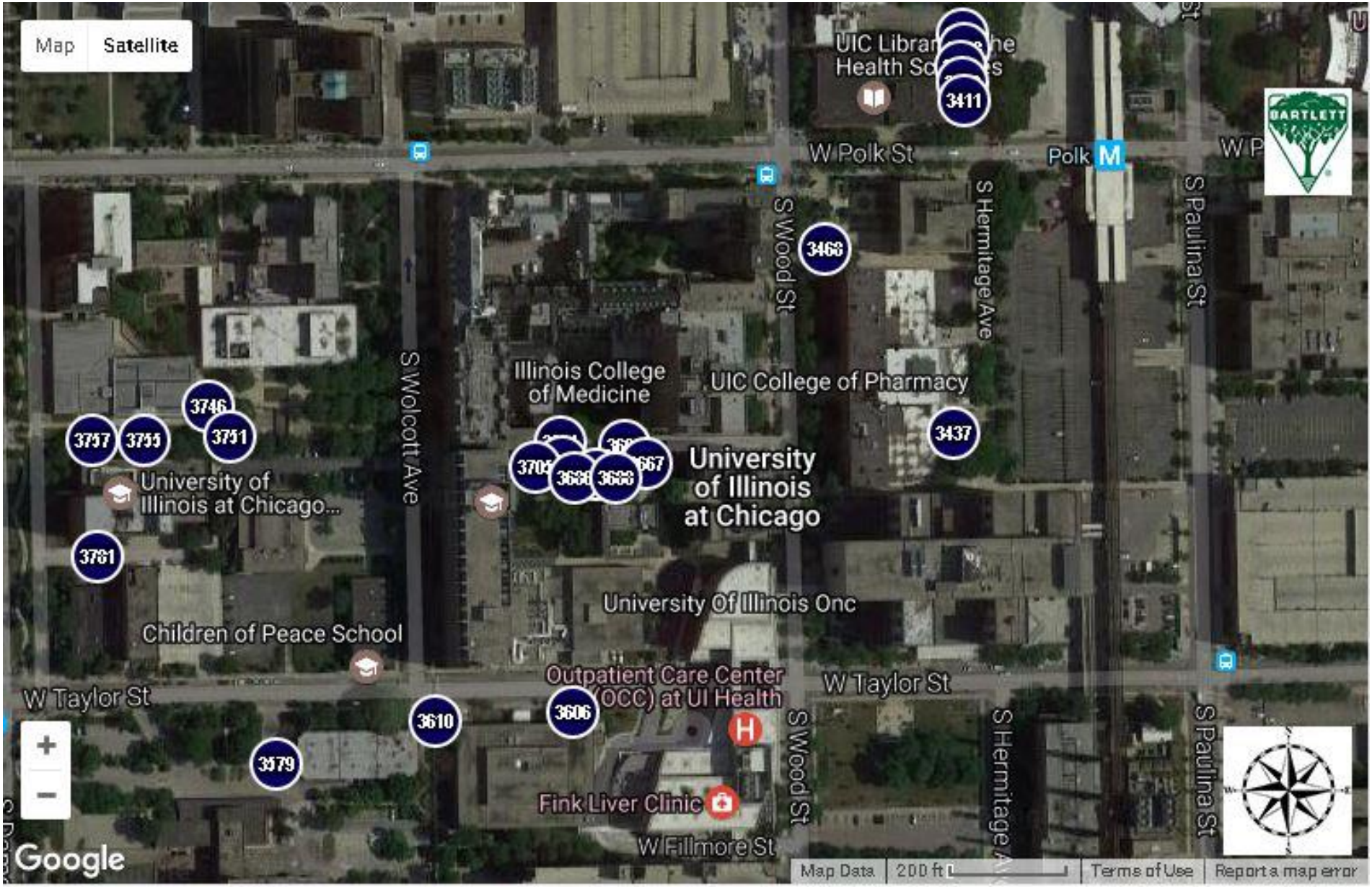
INVENTORIED TREES RECOMMENDED FOR REMOVAL (34 Trees)

Tree ID	Common Name	DBH	Overall Risk Rating	Condition	Tree Care Priority	Defect(s) or Observation(s)
3757	Honeylocust-Thornless Common	21.2	Moderate	Poor	1	• Broken branch(s) • Hanger • Co-dominant leaders • Included bark • Wound-branch • Crack-branch
3468	Honeylocust-Thornless Common	21.9	Low	Poor	1	• Fungi/conks • Decay-Root • Cavity-root flare • Lean • Included bark • Wound-branch
3579	Maple-Freeman's	14.6	Low	Poor	1	• Girdling roots present (severe) • Decay-Stem • Wound-stem
3606	Honeylocust-Thornless Common	24.4	Low	Poor	1	• Overextended branch • Lean • Dead branches >2 • Broken branch(s) • Included bark
3684	Honeylocust-Thornless Common	22.9	Low	Poor	1	• Decay-Root • Dead branches >2 • Dieback (severe)
3685	Honeylocust-Thornless Common	21.8	Low	Poor	1	• Low live crown ratio • Dead branches >2 • Dieback (severe)
3686	Honeylocust-Thornless Common	22.9	Low	Poor	1	• Decay-Stem • Lean • Dead branches >2 • Dieback • Cavity-stem • Seam
3248	Honeylocust-Common	19.3	Low	Poor	2	• Fungi/conks • Low live crown ratio • Dieback • Decay-Root

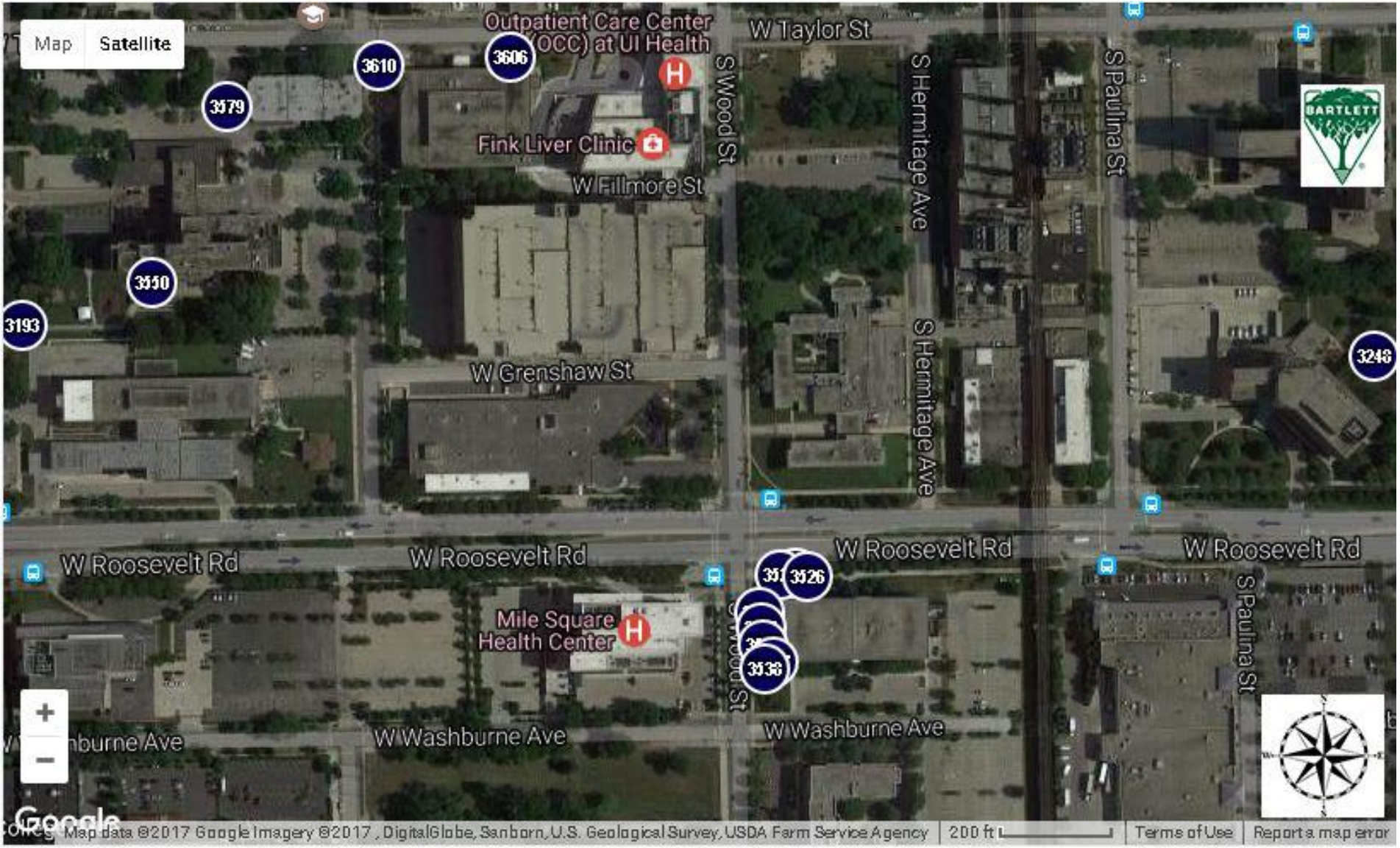
Tree ID	Common Name	DBH	Overall Risk Rating	Condition	Tree Care Priority	Defect(s) or Observation(s)
3407	Honeylocust-Thornless Common	16.0	Low	Poor	2	• Dead branches >2 • Broken branch(s) • Co-dominant leaders • Included bark • Hanger • Topping/heading cuts
3408	Honeylocust-Thornless Common	16.2	Low	Poor	2	• Fungi/conks • Cavity-root flare • Decay-Stem • Hanger • Broken branch(s)
3550	Pear-Callery	18.6	Low	Fair	2	• Cavity-stem • Co-dominant leaders • Overextended branch • Pavement/curbing damage
3610	Honeylocust-Thornless Common	23.9	Low	Poor	2	• Topping/heading cuts • Broken branch(s) • Wound-stem • Decay-Stem • Dead branches >2
3409	Honeylocust-Thornless Common	16.7	...	Poor	1	• Decay-Stem • Dieback (moderate) • Flush cuts
3526	Ash-White	7.0	...	Poor	1	• Dieback
3527	Ash-White	7.8	...	Poor	1	• Dieback
3528	Ash-White	6.0	...	Poor	1	• Dieback
3534	Ash-Green	6.5	...	Poor	1	• Dieback
3535	Ash-White	11.2	...	Poor	1	• Dieback
3536	Ash-White	10.2	...	Poor	1	• Dieback
3537	Ash-White	10.0	...	Poor	1	• Dieback
3538	Ash-White	10.0	...	Poor	1	• Dieback
3667	Honeylocust-Thornless Common	21.8	...	Poor	1	• Decay-Stem • Dead branches >2 • Dieback (moderate) • Wound-branch
3705	Honeylocust-Thornless Common	26.0	...	Poor	1	• Topping/heading cuts • Dieback (moderate) • Co-dominant leaders • Dead branches >2
3193	Maple-Norway	13.4	...	Fair	2	• Girdling roots present (severe) • Co-dominant leaders • Included bark

Tree ID	Common Name	DBH	Overall Risk Rating	Condition	Tree Care Priority	Defect(s) or Observation(s)
3410	Honeylocust-Thornless Common	18.4	...	Poor	2	• Decay-Branch • Co-dominant leaders • Included bark • Poor branch structure • Dead branches >2
3411	Honeylocust-Thornless Common	17.8	...	Poor	2	• Decay-Stem • Topping/heading cuts • Wound-branch • Dead branches >2
3687	Honeylocust-Thornless Common	26.5	...	Poor	2	• Dieback
3688	Honeylocust-Thornless Common	23.4	...	Poor	2	• Broken branch(s) • Storm damage • Uneven crown • Fungi/conks
3746	Honeylocust-Thornless Common	23.0	...	Poor	2	• Broken branch(s) • Storm damage • Dead branches >2
3751	Honeylocust-Thornless Common	19.0	...	Poor	2	• Fungi/conks • Decay-Root • Decay-Stem • Dead branches >2
3755	Honeylocust-Thornless Common	16.8	...	Poor	2	• Co-dominant leaders • Included bark • Dead branches >2
3437	Crabapple	9.0	...	Poor	3	• Dieback
3668	Honeylocust-Thornless Common	26.6	...	Fair	3	• Overextended branch • Flush cuts • Dead branches >2
3781	Honeylocust-Thornless Common	17.6	...	Poor	3	• Dieback

INVENTORIED TREES RECOMMENDED FOR REMOVAL (NORTH)



INVENTORIED TREES RECOMMENDED FOR REMOVAL (SOUTH)



Advanced Tree Risk Assessments (Level 3)

As part of the inventory process, the Inventory Team conducts a *basic assessment* (Level 2) from the ground. During this assessment the inspector can determine whether some aspect of tree structure or health indicates that a more comprehensive tree structure evaluation (Level 3 *advanced assessment*) is needed to more thoroughly evaluate tree condition and risk of failure.

In such cases, we may recommend Level 3 *advanced assessments* of the roots, stem, or crown. These assessments may include climbing inspections, examination of the root system using a compressed-air tool (that avoids damage to roots and underground utilities), or one or more of the following: resistance drilling; using the resistograph (a precision drilling instrument that provides graphical output); or sonic tomography that produces a visual representation of internal conditions based on how sound moved through the tree. The goal is to use the appropriate method to evaluate impact of wood decay in stems and buttress roots that show potential for failure and to determine presence and condition of the root system.

Once we complete such *advanced assessments*, we can then recommend appropriate measures, such as remediation, maintenance, or removal.

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

DEDICATED OR MEMORIAL TREES

DEDICATED OR MEMORIAL TREES

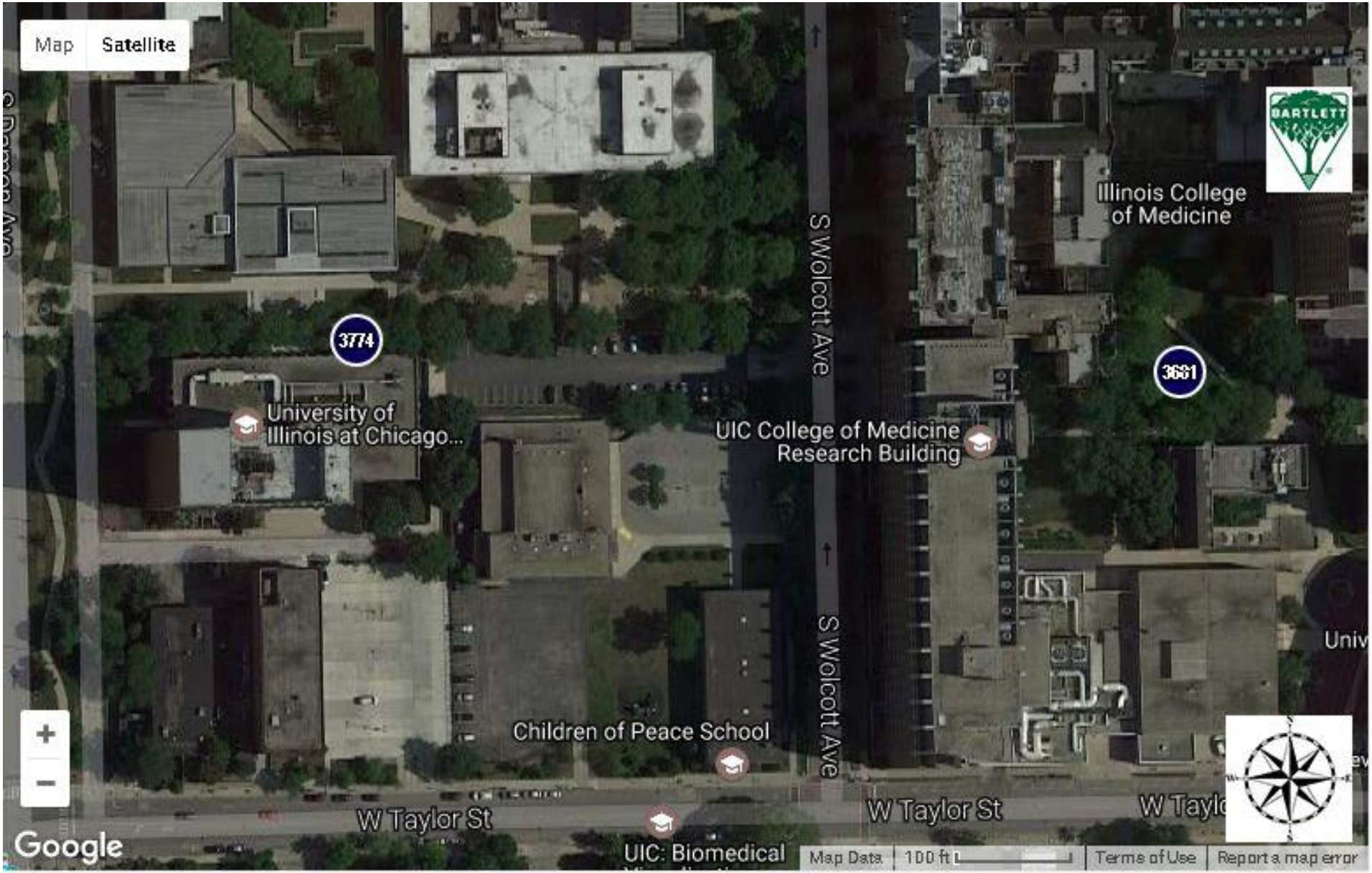
The following table displays the inventoried dedicated trees on the UIC West Campus. The following image shows a dedicated tree on the site.

Dedicated tree #3681.

INVENTORIED DEDICATED TREES ON THE UIC WEST CAMPUS (2 Trees)

Tree ID	Common Name	Dedication Notes
3681	Pear-Callery	"Tree of Knowledge" This tree was planted in honor of Leslie J. Sandlow, MD Senior Associate Dean for Educations College of Medicine 1993-2009 Donated by the College & Chicago Committees on Continuing Medical Education Dedicated on April 30, 2010
3774	Redbud-Eastern	In appreciation to the College of Nursing from the Class of 1996-1997

INVENTORIED DEDICATED TREES



DEFECTS OR OBSERVATIONS

DEFECTS OR OBSERVATIONS

The following table lists inventoried trees for which we noted defects, observations, or other structural issues. The image below provides an example of fungal fruiting bodies.

Tree #3751 exhibiting fungal fruiting bodies.

INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES (232 Trees)

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3189	Elm-Siberian	44.2	• Wound-root • Included bark • Co-dominant leaders • Wound-stem • Dead branches <=2 • Lion tailing
3190	Ginkgo	13.5	• Broken branch(s) • Wound-root • Co-dominant leaders
3191	Pear-Callery	4.0	• Co-dominant leaders • Dead branches <=2
3192	Ginkgo	13.0	• Co-dominant leaders
3193	Maple-Norway	13.4	• Girdling roots present (severe) • Co-dominant leaders • Included bark
3194	Pear-Callery	4.8	• Co-dominant leaders
3227	Elm	16.7	• Wound-branch
3228	Elm	13.4	• Wound-branch
3229	Elm	13.6	• Dead branches <=2
3230	Elm	13.0	• Wound-branch • Dead branches <=2
3231	Elm	12.3	• Wound-branch • Dead branches <=2
3232	Elm	15.4	• Wound-branch • Dead branches >2
3233	Elm	15.0	• Wound-branch • Dead branches >2
3234	Elm	15.0	• Wound-branch • Dead branches >2
3235	Elm	16.8	• Wound-branch • Dead branches >2
3236	Elm	15.2	• Wound-branch • Dead branches >2
3240	Hawthorn	7.0	• Cavity-stem
3244	Oak- Northern Red	24.0	• Dieback • Buried root collar
3246	Sycamore-American	27.0	• Poor branch structure
3248	Honeylocust-Common	19.3	• Fungi/conks • Low live crown ratio • Dieback • Decay-Root

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3249	Honeylocust-Common	24.6	• Dead branches >2 • Co-dominant leaders • Included bark
3250	Honeylocust-Thornless Common	22.5	• Dead branches >2
3251	Pine-Japanese White	13.0	• Buried root collar • Co-dominant leaders
3255	Pine-Japanese White	6.0	• Co-dominant leaders • Buried root collar
3256	Elm	14.7	• Girdling roots present • Dead branches <=2
3257	Elm	16.3	• Dead branches <=2
3258	Elm	15.3	• Wound-branch • Dead branches <=2
3259	Elm	15.5	• Girdling roots present • Dead branches <=2
3260	Elm	15.3	• Dead branches <=2
3261	Elm	15.0	• Girdling roots present • Dead branches <=2
3262	Elm	15.0	• Girdling roots present • Dead branches <=2
3263	Elm	12.4	• Buried root collar • Wound-branch
3264	Elm	14.0	• Girdling roots present
3273	Hawthorn	7.5	• Cavity-stem
3287	Planetree-London	25.3	• Cavity-root flare • Wound-stem • Flush cuts
3288	Hawthorn	11.0	• Dead branches <=2 • Cavity-stem
3295	Hawthorn	7.0	• Cavity-stem
3296	Hawthorn	12.0	• Wound-stem
3300	Honeylocust-Thornless Common	20.0	• Flush cuts • Dead branches >2 • Poor branch structure
3302	Honeylocust-Thornless Common	19.4	• Co-dominant leaders • Included bark
3303	Honeylocust-Thornless Common	20.8	• Flush cuts • Uneven crown • Poor branch structure
3304	Honeylocust-Thornless Common	18.0	• Co-dominant leaders • Dead branches >2
3306	Honeylocust-Thornless Common	26.8	• Overextended branch • Co-dominant leaders • Wound-stem

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3307	Honeylocust-Thornless Common	25.0	• Overextended branch • Poor branch structure • Dead branches <=2
3309	Honeylocust-Thornless Common	28.5	• Broken branch(s) • Dead branches >2 • Co-dominant leaders • Flush cuts
3310	Honeylocust-Thornless Common	21.5	• Flush cuts • Co-dominant leaders • Overextended branch • Dead branches >2
3318	Honeylocust-Thornless Common	29.1	• Hanger • Broken branch(s) • Co-dominant leaders • Included bark • Girdling roots present • Dead branches <=2
3323	Ginkgo	13.3	• Lean • Poor branch structure
3328	Birch-River	10.0	• Co-dominant leaders • Included bark
3329	Birch-River	11.2	• Co-dominant leaders • Included bark
3330	Birch-River	9.9	• Co-dominant leaders • Included bark
3331	Birch-River	9.6	• Co-dominant leaders • Included bark
3335	Crabapple	5.0	• Dead branches <=2
3343	Honeylocust-Thornless Common	20.2	• Co-dominant leaders • Included bark • Poor branch structure • Overextended branch
3352	Pear-Callery	14.7	• Co-dominant leaders • Girdling roots present • Flush cuts
3353	Pear-Callery	15.0	• Co-dominant leaders • Flush cuts
3360	Pear-Callery	15.0	• Co-dominant leaders • Storm damage
3361	Pear-Callery	17.3	• Storm damage • Co-dominant leaders • Wound-stem
3364	Maple-Freeman's	15.0	• Co-dominant leaders • Included bark
3365	Maple-Freeman's	14.4	• Co-dominant leaders

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3366	Maple-Freeman's	11.8	• Girdling roots present • Co-dominant leaders
3367	Maple-Freeman's	12.5	• Co-dominant leaders
3368	Maple-Freeman's	12.8	• Wound-stem • Co-dominant leaders
3369	Honeylocust-Thornless Common	22.5	• Cavity-root flare • Seam • Dead branches >2
3376	Redbud-Eastern	8.4	• Fungi/conks • Cavity-branch • Poor branch structure
3384	Redbud-Eastern	10.0	• Lean • Wound-stem
3386	Elm	4.6	• Co-dominant leaders • Included bark
3387	Hawthorn	7.5	• Girdling material • Wound-root flare
3388	Alder-Common	9.8	• Cavity-stem • Lean • Pavement/curbing damage • Dead branches <=2
3390	Pear-Callery	11.5	• Co-dominant leaders
3391	Crabapple	13.5	• Dead branches <=2 • Overextended branch
3397	Hackberry	21.1	• Dead branches <=2 • Lean • Buried root collar
3400	Pine-Austrian	16.8	• Co-dominant leaders • Girdling roots present • Dead branches <=2
3401	Pine-Austrian	11.0	• Girdling material
3404	Honeylocust-Thornless Common	17.0	• Wound-root flare • Lean • Dead branches >2
3406	Honeylocust-Thornless Common	10.0	• Co-dominant leaders • Included bark
3407	Honeylocust-Thornless Common	16.0	• Dead branches >2 • Broken branch(s) • Co-dominant leaders • Included bark • Hanger • Topping/heading cuts

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3408	Honeylocust-Thornless Common	16.2	• Fungi/conks • Cavity-root flare • Decay-Stem • Hanger • Broken branch(s)
3409	Honeylocust-Thornless Common	16.7	• Decay-Stem • Dieback (moderate) • Flush cuts
3410	Honeylocust-Thornless Common	18.4	• Decay-Branch • Co-dominant leaders • Included bark • Poor branch structure • Dead branches >2
3411	Honeylocust-Thornless Common	17.8	• Decay-Stem • Topping/heading cuts • Wound-branch • Dead branches >2
3414	Linden-Littleleaf	13.5	• Girdling roots present • Co-dominant stems • Included bark • Broken branch(s)
3415	Birch-River	14.4	• Co-dominant stems
3416	Honeylocust-Thornless Common	19.9	• Broken branch(s) • Dead branches >2
3417	Honeylocust-Thornless Common	15.2	• Co-dominant leaders • Dead branches <=2
3418	Honeylocust-Thornless Common	17.8	• Dead branches >2
3419	Honeylocust-Thornless Common	18.0	• Broken branch(s) • Dead branches <=2
3420	Honeylocust-Thornless Common	5.6	• Co-dominant leaders • Wound-root flare • Buried root collar
3422	Linden-Littleleaf	7.3	• Girdling roots present • Suppressed • Co-dominant leaders
3424	Linden-Littleleaf	12.5	• Cavity-stem
3427	Linden-Littleleaf	11.5	• Co-dominant leaders • Included bark
3428	Linden-Littleleaf	12.5	• Cavity-stem • Included bark
3429	Catalpa-Northern	22.5	• Girdling material • Wound-stem • Dead branches <=2 • Broken branch(s)

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3432	Honeylocust-Thornless Common	14.6	• Girdling material • Buried root collar • Co-dominant leaders • Seam • Dead branches <=2
3433	Ginkgo	9.6	• Included bark
3436	Honeylocust-Thornless Common	19.0	• Dead branches >2 • Broken branch(s)
3438	Honeylocust-Thornless Common	21.0	• Poor branch structure • Cavity-stem • Dead branches <=2
3441	Honeylocust-Thornless Common	18.0	• Poor branch structure • Hanger • Dead branches <=2
3443	Honeylocust-Thornless Common	18.2	• Co-dominant leaders • Included bark • Hanger
3444	Honeylocust-Thornless Common	20.0	• Broken branch(s) • Dead branches <=2 • Seam
3445	Honeylocust-Thornless Common	19.2	• Broken branch(s) • Dead branches >2 • Hanger
3446	Honeylocust-Thornless Common	14.8	• Co-dominant leaders • Broken branch(s)
3447	Honeylocust-Thornless Common	17.3	• Low live crown ratio • Flush cuts • Storm damage
3448	Honeylocust-Thornless Common	16.8	• Co-dominant leaders • Included bark • Cavity-stem
3449	Honeylocust-Thornless Common	16.5	• Uneven crown
3459	Pear-Callery	8.0	• Dead branches <=2 • Buried root collar
3460	Pear-Callery	5.5	• Co-dominant leaders
3461	Pear-Callery	10.5	• Wound-root flare • Buried root collar • Co-dominant leaders
3462	Pear-Callery	13.0	• Co-dominant leaders • Buried root collar
3463	Pear-Callery	8.0	• Wound-root flare • Buried root collar
3464	Pear-Callery	11.4	• Buried root collar
3465	Pear-Callery	6.3	• Buried root collar
3466	Pear-Callery	9.5	• Buried root collar

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3468	Honeylocust-Thornless Common	21.9	• Fungi/conks • Decay-Root • Cavity-root flare • Lean • Included bark • Wound-branch
3480	Hawthorn	7.5	• Wound-stem
3482	Crabapple	12.2	• Wound-stem
3483	Crabapple	12.0	• Wound-stem
3485	Honeylocust-Thornless Common	24.9	• Fungi/conks • Topping/heading cuts • Uneven crown • Wound-branch • Broken branch(s)
3496	Honeylocust-Thornless Common	24.1	• Broken branch(s) • Dead branches <=2
3497	Crabapple	5.8	• Girdling roots present
3499	Honeylocust-Thornless Common	22.4	• Dead branches >2 • Broken branch(s) • Crack-branch
3500	Corktree-Amur	10.5	• Girdling roots present
3503	Pine-Austrian	4.5	• Buried root collar • Girdling material
3504	Hackberry	21.2	• Overextended branch • Poor branch structure • Lean • Dead branches <=2 • Broken branch(s)
3505	Honeylocust-Thornless Common	18.5	• Overextended branch • Co-dominant leaders • Included bark • Broken branch(s)
3506	Maple-Red	4.0	• Dieback
3510	Honeylocust-Thornless Common	16.5	• Poor branch structure • Lion tailing
3514	Honeylocust-Thornless Common	11.2	• Wound-branch
3520	Pear-Callery	12.0	• Girdling material • Co-dominant leaders • Included bark
3521	Pear-Callery	8.0	• Co-dominant leaders • Included bark
3522	Pear-Callery	11.0	• Co-dominant leaders • Included bark • Girdling material

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3523	Pear-Callery	12.5	• Girdling material • Co-dominant leaders • Included bark
3524	Pear-Callery	8.2	• Co-dominant leaders • Included bark
3525	Pear-Callery	8.0	• Girdling material • Co-dominant leaders • Included bark • Girdling roots present
3544	Honeylocust-Thornless Common	21.5	• Flush cuts • Dead branches >2
3547	Honeylocust-Thornless Common	24.5	• Dead branches >2 • Hanger • Broken branch(s)
3550	Pear-Callery	18.6	• Cavity-stem • Co-dominant leaders • Overextended branch • Pavement/curbing damage
3551	Maple-Silver	29.2	• Co-dominant stems • Included bark
3552	Linden-Littleleaf	13.0	• Wound-root flare • Decay-Stem • Topping/heading cuts
3555	Maple-Silver	22.0	• Wound-stem • Lean • Dead branches <=2 • Uneven crown • Cavity-stem
3556	Maple-Silver	27.5	• Co-dominant leaders • Included bark • Lean
3560	Honeylocust-Thornless Common	21.5	• Cut roots • Decay-Root • Pavement/curbing damage • Dead branches >2
3562	Honeylocust-Thornless Common	28.0	• Topping/heading cuts • Storm damage • Uneven crown
3565	Serviceberry	3.0	• Crack-branch • Dead branches <=2
3566	Crabapple	5.3	• Fungi/conks
3573	Coffeetree-Kentucky	15.0	• Co-dominant leaders
3579	Maple-Freeman's	14.6	• Girdling roots present (severe) • Decay-Stem • Wound-stem

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3584	Honeylocust-Thornless Common	16.0	• Lean • Dead branches >2 • Co-dominant leaders
3585	Elm-Siberian	43.9	• Co-dominant leaders • Included bark • Dead branches >2 • Overextended branch • Broken branch(s)
3593	Maple-Norway	16.0	• Pavement/curbing damage • Sidewalk lifting-minor • Uneven crown • Wound-branch • Overextended branch
3595	Maple-Norway	12.6	• Dead branches <=2 • Cavity-stem
3597	Honeylocust-Thornless Common	24.2	• Topping/heading cuts • Pavement/curbing damage • Poor branch structure • Dead branches >2
3598	Maple-Freeman's	3.0	• Co-dominant leaders
3600	Coffeetree-Kentucky	12.4	• Co-dominant leaders • Included bark
3606	Honeylocust-Thornless Common	24.4	• Overextended branch • Lean • Dead branches >2 • Broken branch(s) • Included bark
3610	Honeylocust-Thornless Common	23.9	• Topping/heading cuts • Broken branch(s) • Wound-stem • Decay-Stem • Dead branches >2
3617	Hawthorn	8.0	• Cavity-branch
3618	Hawthorn	6.4	• Cavity-branch
3646	Pine-Scotch	16.5	• Co-dominant leaders • Girdling roots suspected • Dead branches <=2
3647	Redbud-Eastern	10.8	• Lean
3648	Redbud-Eastern	8.0	• Crack-branch
3652	Crabapple	6.8	• Flush cuts • Dieback
3655	Redbud-Eastern	5.0	• Wound-root flare • Lean
3659	Lilac-Japanese Tree	4.0	• Girdling roots present • Poor branch structure

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3664	Maple-Sugar	13.0	• Girdling roots present
3666	Maple-Sugar	10.1	• Girdling roots present (moderate)
3667	Honeylocust-Thornless Common	21.8	• Decay-Stem • Dead branches >2 • Dieback (moderate) • Wound-branch
3668	Honeylocust-Thornless Common	26.6	• Overextended branch • Flush cuts • Dead branches >2
3672	Hawthorn	10.5	• Cavity-root flare
3674	Hawthorn	7.2	• Cavity-root flare
3678	Hawthorn	9.8	• Suppressed
3679	Hawthorn	9.4	• Suppressed
3682	Pear-Callery	5.2	• Co-dominant leaders • Included bark • Poor branch structure
3684	Honeylocust-Thornless Common	22.9	• Decay-Root • Dead branches >2 • Dieback (severe)
3685	Honeylocust-Thornless Common	21.8	• Low live crown ratio • Dead branches >2 • Dieback (severe)
3686	Honeylocust-Thornless Common	22.9	• Decay-Stem • Lean • Dead branches >2 • Dieback • Cavity-stem • Seam
3688	Honeylocust-Thornless Common	23.4	• Broken branch(s) • Storm damage • Uneven crown • Fungi/conks
3691	Serviceberry	4.0	• Wound-root flare
3694	Serviceberry	4.0	• Wound-stem
3697	Hackberry	28.5	• Co-dominant leaders • Included bark • Crack
3701	Pear-Callery	5.0	• Co-dominant leaders • Included bark
3702	Pear-Callery	7.5	• Co-dominant leaders • Included bark
3703	Pear-Callery	10.2	• Co-dominant leaders • Included bark

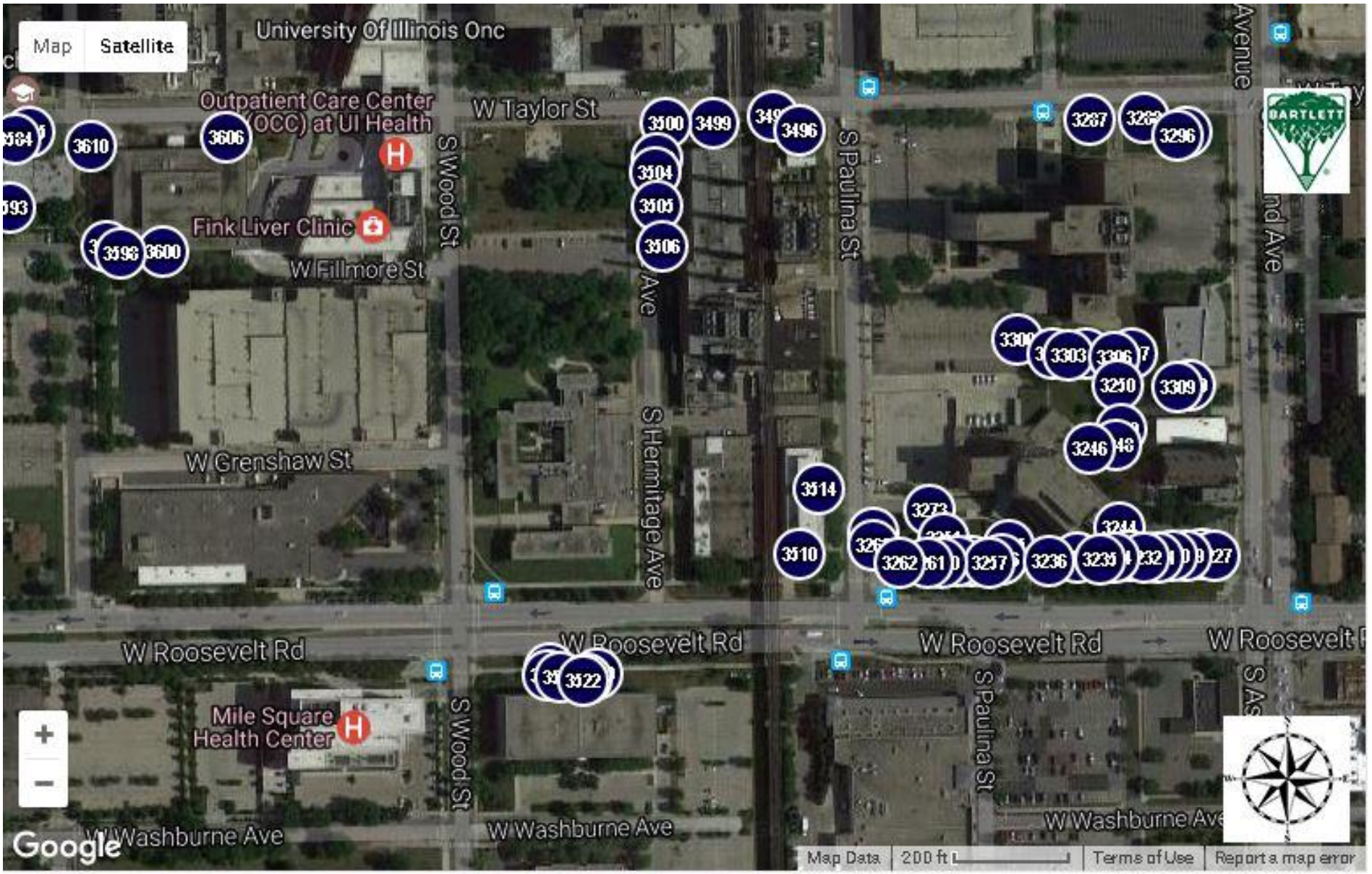
Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3705	Honeylocust-Thornless Common	26.0	• Topping/heading cuts • Dieback (moderate) • Co-dominant leaders • Dead branches >2
3714	Hophornbeam-American	7.5	• Dead branches <=2
3715	Honeylocust-Thornless Common	17.5	• Co-dominant leaders • Dead branches <=2
3719	Serviceberry	6.3	• Cavity-root flare
3721	Crabapple	8.2	• Low live crown ratio • Wound-stem
3722	Crabapple	12.0	• Girdling material
3723	Redbud-Eastern	6.5	• Decay-Stem
3724	Redbud-Eastern	9.6	• Wound-branch • Co-dominant stems
3727	Honeylocust-Thornless Common	16.2	• Broken branch(s) • Dead branches >2 • Poor branch structure
3728	Honeylocust-Thornless Common	15.9	• Uneven crown • Topping/heading cuts • Dead branches <=2
3729	Honeylocust-Thornless Common	19.7	• Dead branches <=2
3731	Honeylocust-Thornless Common	17.9	• Broken branch(s) • Dead branches <=2 • Overextended branch
3732	Honeylocust-Thornless Common	17.8	• Dead branches >2 • Girdling roots suspected
3739	Crabapple	6.0	• Decay-Stem • Topping/heading cuts
3741	Honeylocust-Thornless Common	19.9	• Co-dominant leaders • Included bark
3742	Honeylocust-Thornless Common	22.9	• Co-dominant leaders • Dead branches >2 • Included bark
3743	Honeylocust-Thornless Common	23.0	• Co-dominant leaders • Dead branches <=2
3744	Honeylocust-Thornless Common	23.2	• Seam • Co-dominant leaders • Included bark
3745	Honeylocust-Thornless Common	21.0	• Co-dominant leaders • Included bark
3746	Honeylocust-Thornless Common	23.0	• Broken branch(s) • Storm damage • Dead branches >2
3750	Honeylocust-Thornless Common	18.0	• Dead branches <=2

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3751	Honeylocust-Thornless Common	19.0	• Fungi/conks • Decay-Root • Decay-Stem • Dead branches >2
3752	Honeylocust-Thornless Common	21.0	• Broken branch(s) • Wound-root flare • Storm damage
3753	Honeylocust-Thornless Common	19.0	• Dieback • Hanger
3754	Honeylocust-Thornless Common	20.0	• Dead branches >2
3755	Honeylocust-Thornless Common	16.8	• Co-dominant leaders • Included bark • Dead branches >2
3756	Honeylocust-Thornless Common	20.4	• Dead branches >2 • Overextended branch • Co-dominant leaders
3757	Honeylocust-Thornless Common	21.2	• Broken branch(s) • Hanger • Co-dominant leaders • Included bark • Wound-branch • Crack-branch
3758	Honeylocust-Thornless Common	20.4	• Dead branches >2 • Co-dominant leaders
3759	Honeylocust-Thornless Common	22.0	• Broken branch(s) • Dead branches >2 • Wound-stem • Seam
3760	Honeylocust-Thornless Common	14.2	• Dead branches >2 • Poor branch structure
3761	Honeylocust-Thornless Common	15.6	• Broken branch(s) • Dead branches <=2
3762	Honeylocust-Thornless Common	14.2	• Broken branch(s) • Poor branch structure
3763	Honeylocust-Thornless Common	12.3	• Flush cuts • Poor branch structure
3764	Cherry	9.0	• Crack-branch • Co-dominant leaders
3765	Cherry	7.0	• Co-dominant leaders • Included bark
3768	Elm	17.0	• Cavity-branch • Dead branches >2
3771	Crabapple	6.0	• Wound-stem
3775	Maple-Norway	22.0	• Dead branches <=2 • Seam

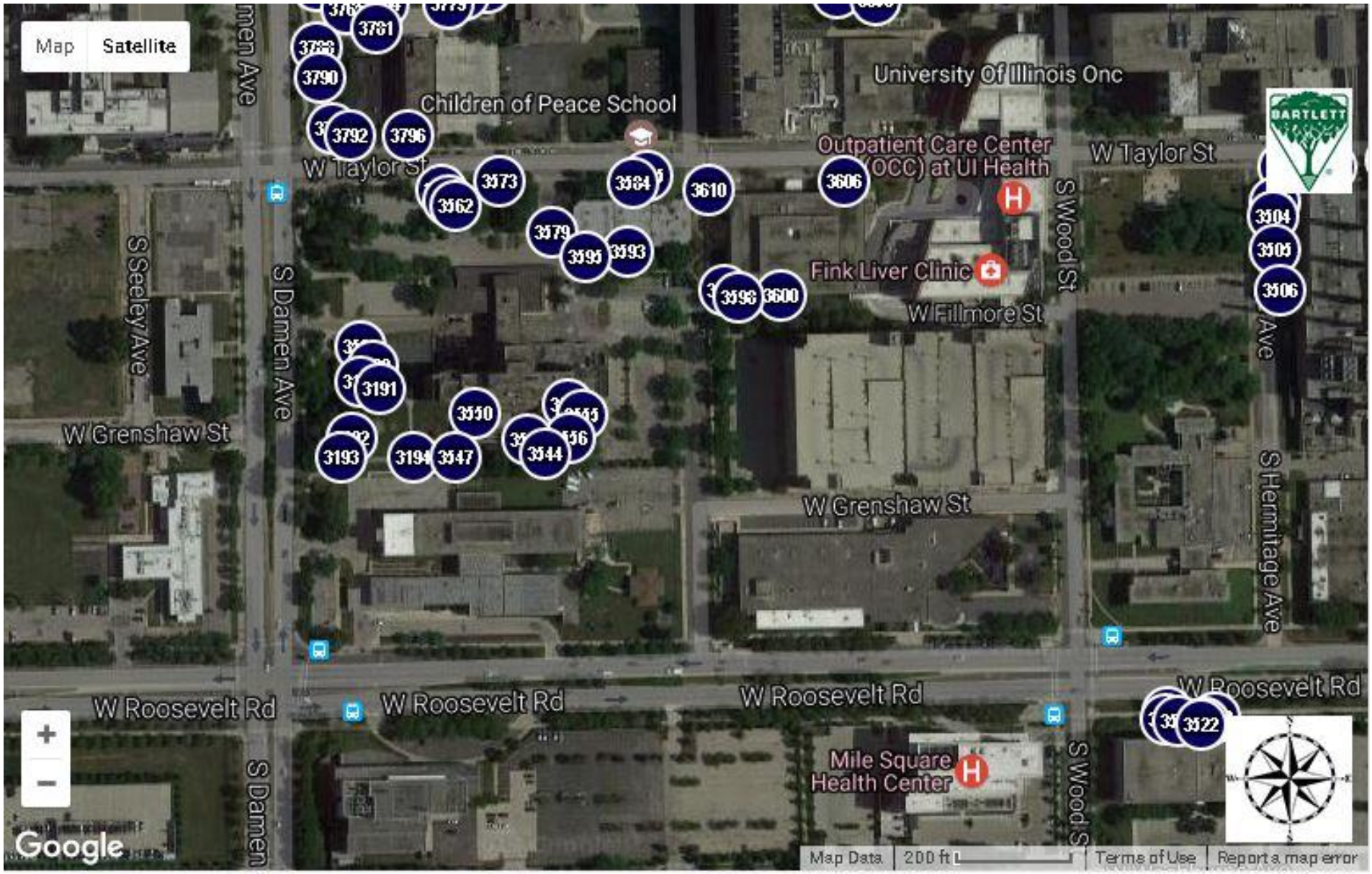
Tree ID	Common Name	DBH	Defect(s) or Observation(s)
3776	Maple-Norway	24.0	• Overextended branch • Included bark • Dead branches <=2 • Hanger
3777	Pine-Austrian	18.5	• Co-dominant leaders • Included bark
3778	Pine-Austrian	10.2	• Dead branches <=2
3779	Maple-Norway	17.2	• Broken branch(s) • Dead branches <=2
3781	Honeylocust-Thornless Common	17.6	• Dieback
3788	Honeylocust-Thornless Common	8.5	• Wound-stem • Poor branch structure • Decay-Stem
3790	Honeylocust-Thornless Common	15.0	• Dieback • Wound-root flare
3791	Honeylocust-Thornless Common	20.9	• Poor branch structure • Wound-stem • Decay-Stem • Dead branches >2
3792	Ginkgo	9.6	• Co-dominant leaders
3796	Ginkgo	10.5	• Co-dominant leaders

INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES (NORTHEAST)

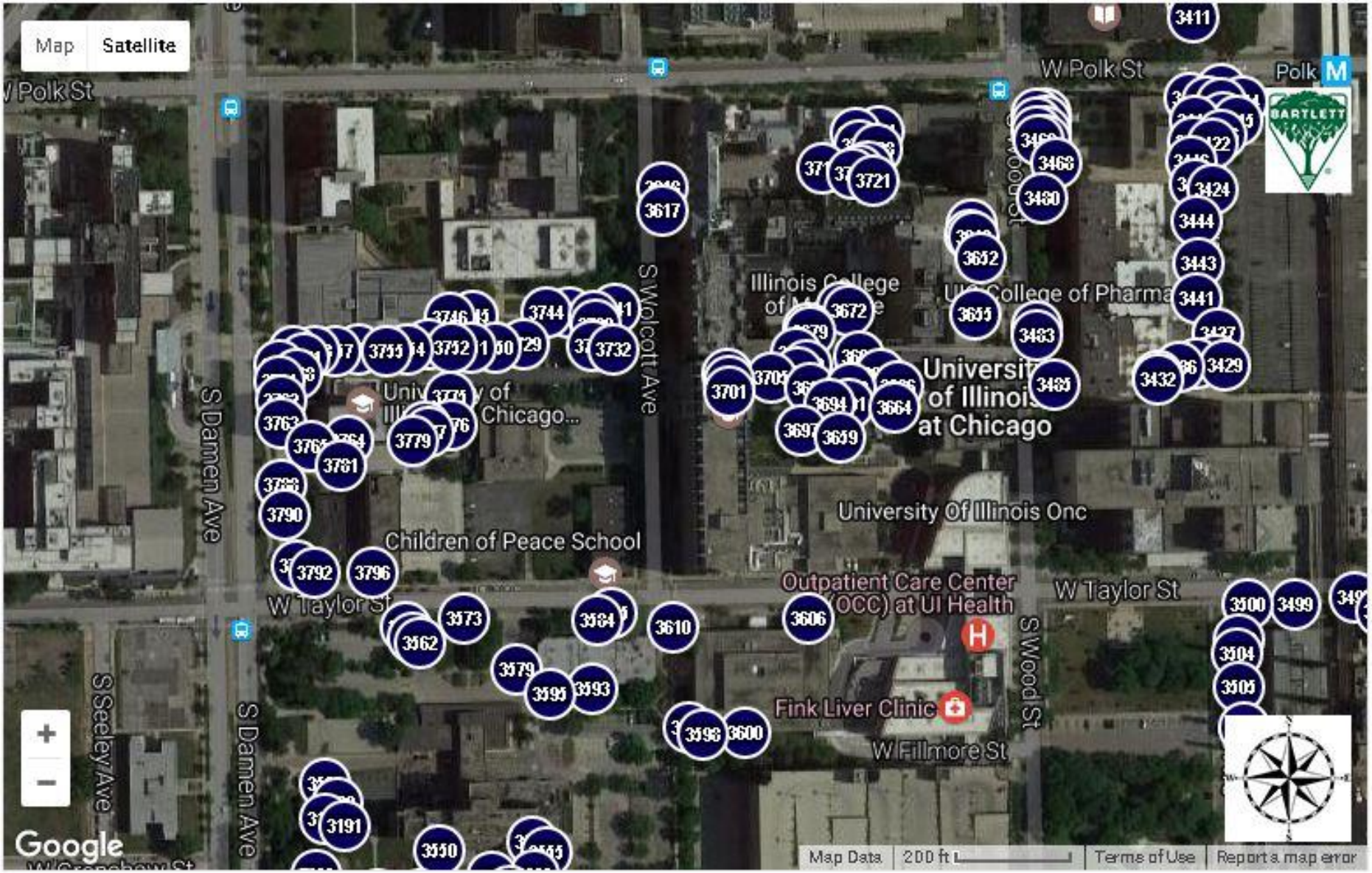
INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES (SOUTHEAST)



INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES (SOUTHWEST)



INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES (NORTHWEST)



ENTIRE INVENTORY

ENTIRE INVENTORY (660 Trees)

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3189	Elm-Siberian	*Ulmus*	*pumila*	44.2	Large	Over-mature	Good	1	$21,240.60
3190	Ginkgo	*Ginkgo*	*biloba*	13.5	Medium	Semi-mature	Good	2	$4,023.88
3191	Pear-Callery	*Pyrus*	*calleryana*	4.0	Small	New planting	Good	3	$353.26
3192	Ginkgo	*Ginkgo*	*biloba*	13.0	Medium	Semi-mature	Good	2	$3,731.34
3193	Maple-Norway	*Acer*	*platanoides*	13.4	Medium	Semi-mature	Fair	2	$2,427.24
3194	Pear-Callery	*Pyrus*	*calleryana*	4.8	Small	New planting	Good	3	$508.70
3227	Elm	*Ulmus*	sp.	16.7	Medium	Mature	Fair	3	$4,398.28
3228	Elm	*Ulmus*	sp.	13.4	Medium	Semi-mature	Fair	3	$2,831.78
3229	Elm	*Ulmus*	sp.	13.6	Medium	Semi-mature	Fair	3	$2,916.94
3230	Elm	*Ulmus*	sp.	13.0	Medium	Semi-mature	Fair	3	$2,665.24
3231	Elm	*Ulmus*	sp.	12.3	Medium	Semi-mature	Fair	3	$2,385.94
3232	Elm	*Ulmus*	sp.	15.4	Medium	Mature	Fair	2	$3,740.17
3233	Elm	*Ulmus*	sp.	15.0	Medium	Mature	Fair	2	$3,548.40
3234	Elm	*Ulmus*	sp.	15.0	Medium	Mature	Fair	2	$3,548.40
3235	Elm	*Ulmus*	sp.	16.8	Medium	Mature	Fair	2	$4,451.11
3236	Elm	*Ulmus*	sp.	15.2	Medium	Mature	Fair	2	$3,643.65
3237	Crabapple	*Malus*	sp.	5.0	Small	Semi-mature	Good	...	$1,551.04
3238	Hawthorn	*Crataegus*	sp.	7.8	Small	Semi-mature	Good	...	$2,447.23
3239	Hawthorn	*Crataegus*	sp.	7.0	Small	Semi-mature	Good	...	$2,163.73
3240	Hawthorn	*Crataegus*	sp.	7.0	Small	Semi-mature	Good	...	$1,633.84
3241	Hawthorn	*Crataegus*	sp.	9.8	Small	Semi-mature	Good	...	$2,120.46
3242	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	...	$1,148.10
3243	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Good	...	$4,261.23
3244	Oak- Northern Red	*Quercus*	*rubra*	24.0	Medium	Mature	Fair	2	$9,083.89
3245	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	13.0	Medium	Semi-mature	Good	...	$3,731.34
3246	Sycamore-American	*Platanus*	*occidentalis*	27.0	Large	Mature	Good	...	$11,496.80
3247	Crabapple	*Malus*	sp.	8.0	Small	Mature	Good	...	$2,759.86
3248	Honeylocust-Common	*Gleditsia*	*triacanthos*	19.3	Large	Mature	Poor	2	$4,028.17
3249	Honeylocust-Common	*Gleditsia*	*triacanthos*	24.6	Large	Mature	Fair	2	$10,907.16
3250	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.5	Large	Mature	Fair	2	$7,983.89
3251	Pine-Japanese White	*Pinus*	*parviflora*	13.0	Medium	Mature	Good	2	$3,731.34
3252	Maple-Sugar	*Acer*	*saccharum*	11.6	Medium	Semi-mature	Good	...	$3,395.36

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3253	Maple-Sugar	*Acer*	*saccharum*	12.6	Medium	Semi-mature	Good	...	$4,006.00
3254	Pine-Japanese White	*Pinus*	*parviflora*	13.0	Medium	Semi-mature	Good	...	$3,731.34
3255	Pine-Japanese White	*Pinus*	*parviflora*	6.0	Medium	Semi-mature	Good	2	$1,501.37
3256	Elm	*Ulmus*	sp.	14.7	Medium	Mature	Fair	3	$3,407.88
3257	Elm	*Ulmus*	sp.	16.3	Medium	Mature	Fair	2	$4,190.10
3258	Elm	*Ulmus*	sp.	15.3	Medium	Mature	Fair	3	$3,691.75
3259	Elm	*Ulmus*	sp.	15.5	Medium	Mature	Fair	2	$3,788.90
3260	Elm	*Ulmus*	sp.	15.3	Medium	Mature	Fair	2	$3,691.75
3261	Elm	*Ulmus*	sp.	15.0	Medium	Mature	Fair	2	$3,548.40
3262	Elm	*Ulmus*	sp.	15.0	Medium	Mature	Fair	2	$3,548.40
3263	Elm	*Ulmus*	sp.	12.4	Medium	Semi-mature	Fair	...	$2,424.90
3264	Elm	*Ulmus*	sp.	14.0	Medium	Semi-mature	Fair	2	$3,091.05
3265	Crabapple	*Malus*	sp.	8.0	Small	Mature	Good	...	$5,144.39
3266	Crabapple	*Malus*	sp.	10.0	Small	Mature	Good	...	$4,945.68
3267	Crabapple	*Malus*	sp.	8.0	Small	Mature	Good	...	$3,267.68
3268	Crabapple	*Malus*	sp.	8.0	Small	Mature	Good	...	$1,413.05
3269	Crabapple	*Malus*	sp.	8.0	Small	Mature	Good	...	$1,413.05
3270	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Fair	...	$567.74
3271	Magnolia (2)	*Magnolia*	sp.	3.0	Small	Semi-mature	Good	...	$397.42
3272	Hawthorn	*Crataegus*	sp.	8.0	Small	Semi-mature	Fair	...	$1,009.32
3273	Hawthorn	*Crataegus*	sp.	7.5	Small	Semi-mature	Fair	...	$1,281.37
3274	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	13.0	Medium	Semi-mature	Good	...	$3,731.34
3275	Serviceberry	*Amelanchier*	sp.	2.0	Small	Semi-mature	Good	...	$331.18
3276	Hackberry	*Celtis*	*occidentalis*	3.5	Small	Young	Good	...	$309.10
3277	Maple-Miyabei	*Acer*	*miyabei*	3.0	Small	Young	Good	...	$227.10
3278	Hackberry	*Celtis*	*occidentalis*	3.0	Small	Young	Good	...	$227.10
3279	Ginkgo	*Ginkgo*	*biloba*	2.5	Small	Young	Good	...	$137.99
3280	Pear-Callery	*Pyrus*	*calleryana*	3.0	Small	Young	Good	...	$198.71
3281	Pear-Callery	*Pyrus*	*calleryana*	3.0	Small	Young	Good	...	$198.71
3282	Pear-Callery	*Pyrus*	*calleryana*	3.0	Small	Young	Good	...	$198.71
3283	Pear-Callery	*Pyrus*	*calleryana*	3.0	Small	Young	Good	...	$198.71
3284	Pear-Callery	*Pyrus*	*calleryana*	3.0	Small	Young	Good	...	$198.71
3285	Pear-Callery	*Pyrus*	*calleryana*	3.0	Small	Young	Good	...	$198.71
3286	Redbud-Eastern	*Cercis*	*canadensis*	6.3	Small	Semi-mature	Good	3	$1,229.57
3287	Planetree-London	*Platanus*	x *acerifolia*	25.3	Large	Mature	Fair	3	$8,652.54
3288	Hawthorn	*Crataegus*	sp.	11.0	Small	Mature	Fair	...	$2,302.51

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3289	Hawthorn	*Crataegus*	sp.	8.5	Small	Mature	Fair	...	$1,139.43
3290	Hawthorn	*Crataegus*	sp.	6.0	Small	Mature	Fair	...	$2,097.50
3291	Hawthorn	*Crataegus*	sp.	8.0	Small	Mature	Poor	...	$1,286.88
3292	Hawthorn	*Crataegus*	sp.	12.0	Small	Mature	Fair	...	$2,270.97
3293	Hawthorn	*Crataegus*	sp.	6.0	Small	Mature	Fair	...	$1,703.23
3294	Hawthorn	*Crataegus*	sp.	7.0	Small	Mature	Fair	...	$2,006.82
3295	Hawthorn	*Crataegus*	sp.	7.0	Small	Mature	Fair	...	$2,113.27
3296	Hawthorn	*Crataegus*	sp.	12.0	Small	Mature	Fair	...	$2,270.97
3297	Hawthorn	*Crataegus*	sp.	8.0	Small	Mature	Fair	...	$2,586.39
3298	Hawthorn	*Crataegus*	sp.	13.0	Small	Mature	Good	...	$3,731.34
3299	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.4	Large	Mature	Fair	3	$7,913.08
3300	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.0	Large	Mature	Fair	3	$6,308.26
3301	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.8	Large	Mature	Good	3	$9,552.22
3302	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.4	Large	Mature	Good	3	$8,309.62
3303	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.8	Large	Mature	Fair	3	$6,823.01
3304	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.0	Large	Mature	Good	3	$7,153.57
3305	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.0	Large	Mature	Good	3	$7,970.49
3306	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	26.8	Large	Mature	Good	3	$15,857.96
3307	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	25.0	Large	Mature	Fair	3	$9,856.66
3308	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.0	Large	Mature	Fair	3	$5,109.69
3309	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	28.5	Large	Mature	Good	2	$17,933.59
3310	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.5	Large	Mature	Fair	2	$7,289.98
3311	Redbud-Eastern (3)	*Cercis*	*canadensis*	4.0	Small	Semi-mature	Good	2	$2,119.58
3312	Spruce (5)	*Picea*	sp.	4.5	Small	Semi-mature	Fair	...	$1,596.78
3313	Dogwood-Flowering	*Cornus*	*florida*	2.5	Small	Semi-mature	Fair	...	$136.87

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3314	Crabapple	*Malus*	sp.	9.0	Medium	Semi-mature	Good	2	$3,930.05
3315	Crabapple	*Malus*	sp.	9.0	Medium	Semi-mature	Good	2	$4,791.12
3316	Crabapple	*Malus*	sp.	9.0	Medium	Semi-mature	Good	2	$3,731.34
3317	Crabapple	*Malus*	sp.	10.0	Medium	Semi-mature	Good	3	$4,791.12
3318	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	29.1	Large	Mature	Good	1	$18,696.64
3319	Crabapple	*Malus*	sp.	7.0	Small	Semi-mature	Good	3	$1,081.87
3320	Crabapple	*Malus*	sp.	6.4	Small	Semi-mature	Good	...	$904.35
3321	Crabapple	*Malus*	sp.	4.5	Small	Semi-mature	Poor	...	$191.61
3322	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	12.6	Medium	Semi-mature	Fair	3	$2,503.75
3323	Ginkgo	*Ginkgo*	*biloba*	13.3	Medium	Semi-mature	Fair	...	$2,789.67
3324	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Good	2	$2,406.60
3325	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Good	3	$2,561.15
3326	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	3	$2,053.34
3327	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	2	$1,501.37
3328	Birch-River	*Betula*	*nigra*	10.0	Medium	Semi-mature	Good	...	$4,200.51
3329	Birch-River	*Betula*	*nigra*	11.2	Medium	Semi-mature	Good	...	$3,645.89
3330	Birch-River	*Betula*	*nigra*	9.9	Medium	Semi-mature	Good	...	$2,958.79
3331	Birch-River	*Betula*	*nigra*	9.6	Medium	Semi-mature	Good	2	$2,856.35
3332	Viburnum (12)	*Viburnum*	sp.	3.0	Small	Semi-mature	Good	...	$2,554.85
3333	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	...	$1,192.26
3334	Crabapple	*Malus*	sp.	5.1	Small	Semi-mature	Good	2	$1,041.46
3335	Crabapple	*Malus*	sp.	5.0	Small	Semi-mature	Good	3	$1,258.50
3336	Crabapple	*Malus*	sp.	6.9	Small	Semi-mature	Good	3	$1,492.76
3337	Crabapple	*Malus*	sp.	5.6	Small	Semi-mature	Good	...	$1,399.80
3338	Crabapple	*Malus*	sp.	7.1	Small	Semi-mature	Good	3	$3,534.61
3339	Crabapple	*Malus*	sp.	5.1	Small	Semi-mature	Good	...	$772.98
3340	Crabapple	*Malus*	sp.	2.0	Small	Semi-mature	Poor	...	$37.85
3341	Crabapple	*Malus*	sp.	4.5	Small	Semi-mature	Good	2	$1,197.78
3342	Crabapple	*Malus*	sp.	9.5	Small	Semi-mature	Good	3	$4,272.05
3343	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.2	Large	Mature	Fair	...	$6,435.06
3344	Viburnum (7)	*Viburnum*	sp.	3.0	Small	Semi-mature	Good	...	$2,980.65
3345	Pine-Austrian	*Pinus*	*nigra*	11.6	Medium	Semi-mature	Good	...	$2,122.10
3346	Pine-Austrian	*Pinus*	*nigra*	11.0	Small	Semi-mature	Good	...	$1,908.25

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3347	Pine-Austrian	*Pinus*	*nigra*	9.0	Medium	Semi-mature	Good	...	$1,277.42
3348	Dogwood-Corneliancherry	*Cornus*	*mas*	3.0	Small	Young	Good	...	$227.10
3349	Oak-Bur	*Quercus*	*macrocarpa*	3.0	Small	Young	Good	3	$198.71
3350	Oak-Bur	*Quercus*	*macrocarpa*	3.5	Small	Young	Good	...	$270.47
3351	Oak-Bur	*Quercus*	*macrocarpa*	3.0	Small	Young	Good	...	$198.71
3352	Pear-Callery	*Pyrus*	*calleryana*	14.7	Medium	Mature	Fair	3	$3,407.88
3353	Pear-Callery	*Pyrus*	*calleryana*	15.0	Medium	Mature	Fair	2	$3,548.40
3354	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Fair	2	$1,103.95
3355	Crabapple	*Malus*	sp.	3.0	Small	Semi-mature	Poor	...	$170.32
3356	Viburnum (10)	*Viburnum*	sp.	3.0	Small	Semi-mature	Good	...	$2,129.04
3357	Crabapple	*Malus*	sp.	4.0	Small	Semi-mature	Fair	...	$536.20
3358	Crabapple	*Malus*	sp.	4.0	Small	Semi-mature	Fair	...	$567.74
3359	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Fair	...	$1,387.82
3360	Pear-Callery	*Pyrus*	*calleryana*	15.0	Medium	Mature	Fair	2	$3,548.40
3361	Pear-Callery	*Pyrus*	*calleryana*	17.3	Medium	Mature	Fair	2	$4,720.00
3362	Spruce	*Picea*	sp.	3.0	Small	Young	Fair	...	$141.94
3363	Spruce	*Picea*	sp.	3.0	Small	Young	Good	...	$198.71
3364	Maple-Freeman's	*Acer*	x freemanii	15.0	Large	Semi-mature	Good	1	$4,967.75
3365	Maple-Freeman's	*Acer*	x freemanii	14.4	Large	Semi-mature	Good	1	$4,578.28
3366	Maple-Freeman's	*Acer*	x freemanii	11.8	Large	Semi-mature	Good	1	$3,074.27
3367	Maple-Freeman's	*Acer*	x freemanii	12.5	Large	Semi-mature	Good	1	$3,449.83
3368	Maple-Freeman's	*Acer*	x freemanii	12.8	Large	Semi-mature	Good	1	$3,617.41
3369	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.5	Large	Mature	Fair	2	$7,983.89
3370	Hawthorn	*Crataegus*	sp.	7.2	Small	Semi-mature	Good	...	$1,144.57
3371	Crabapple	*Malus*	sp.	7.5	Small	Semi-mature	Good	...	$3,052.41
3372	Crabapple	*Malus*	sp.	7.5	Small	Semi-mature	Good	3	$2,323.81
3373	Crabapple	*Malus*	sp.	7.5	Small	Semi-mature	Good	...	$2,174.77
3374	Magnolia	*Magnolia*	sp.	2.0	Small	Semi-mature	Fair	...	$141.94
3375	Serviceberry (2)	*Amelanchier*	sp.	2.0	Small	Semi-mature	Fair	...	$315.41
3376	Redbud-Eastern	*Cercis*	*canadensis*	8.4	Small	Semi-mature	Fair	...	$2,137.87
3377	Oak-Swamp White	*Quercus*	*bicolor*	3.0	Small	Young	Good	...	$227.10
3378	Hawthorn	*Crataegus*	sp.	6.3	Small	Semi-mature	Fair	...	$945.29
3379	Pear-Callery	*Pyrus*	*calleryana*	4.8	Small	Semi-mature	Good	3	$508.70
3380	Pear-Callery	*Pyrus*	*calleryana*	4.6	Small	Semi-mature	Good	3	$467.19

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3381	Witchhazel	*Hamamelis*	*virginiana*	3.0	Small	Semi-mature	Good	...	$236.56
3382	Pear-Callery	*Pyrus*	*calleryana*	4.5	Small	Semi-mature	Good	3	$447.10
3383	Hawthorn	*Crataegus*	sp.	5.2	Small	Semi-mature	Good	...	$1,269.10
3384	Redbud-Eastern	*Cercis*	*canadensis*	10.0	Small	Mature	Good	...	$2,207.89
3385	Hawthorn	*Crataegus*	sp.	6.4	Small	Semi-mature	Fair	2	$1,331.83
3386	Elm	*Ulmus*	sp.	4.6	Small	Young	Good	2	$467.19
3387	Hawthorn	*Crataegus*	sp.	7.5	Small	Semi-mature	Fair	...	$887.10
3388	Alder-Common	*Alnus*	*glutinosa*	9.8	Medium	Semi-mature	Fair	1	$1,514.61
3389	Pear-Callery	*Pyrus*	*calleryana*	10.0	Medium	Semi-mature	Fair	...	$1,577.06
3390	Pear-Callery	*Pyrus*	*calleryana*	11.5	Medium	Semi-mature	Fair	...	$2,085.67
3391	Crabapple	*Malus*	sp.	13.5	Medium	Mature	Fair	2	$6,059.87
3392	Serviceberry (4)	*Amelanchier*	sp.	3.0	Small	Semi-mature	Good	...	$1,501.37
3393	Dogwood-Corneliancherry	*Cornus*	*mas*	2.0	Small	Semi-mature	Good	...	$151.40
3394	Dogwood-Corneliancherry	*Cornus*	*mas*	2.0	Small	Semi-mature	Good	...	$151.40
3395	Hawthorn	*Crataegus*	sp.	6.8	Medium	Semi-mature	Good	...	$1,876.27
3396	Hawthorn	*Crataegus*	sp.	6.6	Medium	Semi-mature	Good	...	$1,408.86
3397	Hackberry	*Celtis*	*occidentalis*	21.1	Large	Mature	Fair	3	$8,024.29
3398	Lilac-Japanese Tree	*Syringa*	*reticulata*	3.0	Small	Semi-mature	Fair	...	$268.10
3399	Viburnum (5)	*Viburnum*	sp.	2.0	Small	Semi-mature	Good	...	$2,483.88
3400	Pine-Austrian	*Pinus*	*nigra*	16.8	Medium	Mature	Fair	2	$3,179.36
3401	Pine-Austrian	*Pinus*	*nigra*	11.0	Medium	Semi-mature	Fair	...	$1,363.03
3402	Pine-Austrian	*Pinus*	*nigra*	12.2	Medium	Semi-mature	Fair	...	$1,676.65
3403	Pine-Austrian	*Pinus*	*nigra*	11.0	Medium	Semi-mature	Poor	...	$817.82
3404	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.0	Medium	Mature	Fair	2	$4,557.72
3405	Mulberry-White	*Morus*	*alba*	8.0	Medium	Semi-mature	Good	...	$807.46
3406	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	10.0	Medium	Semi-mature	Fair	2	$1,577.06
3407	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.0	Medium	Mature	Poor	2	$2,422.37
3408	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.2	Large	Mature	Poor	2	$2,483.31
3409	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.7	Medium	Mature	Poor	1	$2,638.97

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3410	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.4	Medium	Mature	Poor	2	$3,203.59
3411	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.8	Medium	Mature	Poor	2	$2,998.06
3412	Magnolia	*Magnolia*	sp.	3.0	Small	Semi-mature	Fair	...	$141.94
3413	Lilac-Japanese Tree	*Syringa*	*reticulata*	5.0	Small	Semi-mature	Fair	3	$1,013.26
3414	Linden-Littleleaf	*Tilia*	*cordata*	13.5	Large	Mature	Good	2	$11,227.13
3415	Birch-River	*Betula*	*nigra*	14.4	Large	Mature	Good	2	$13,876.37
3416	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.9	Large	Mature	Fair	1	$6,245.34
3417	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	15.2	Large	Mature	Fair	1	$3,643.65
3418	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.8	Large	Mature	Fair	1	$4,996.77
3419	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.0	Large	Mature	Fair	1	$5,109.69
3420	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	5.6	Small	Semi-mature	Fair	3	$494.57
3421	Linden-Littleleaf	*Tilia*	*cordata*	11.3	Medium	Semi-mature	Good	3	$2,819.26
3422	Linden-Littleleaf	*Tilia*	*cordata*	7.3	Medium	Semi-mature	Fair	3	$840.42
3423	Linden-Littleleaf	*Tilia*	*cordata*	8.0	Medium	Semi-mature	Fair	3	$1,009.32
3424	Linden-Littleleaf	*Tilia*	*cordata*	12.5	Medium	Semi-mature	Fair	3	$2,464.16
3425	Linden-Littleleaf	*Tilia*	*cordata*	9.5	Medium	Semi-mature	Fair	3	$1,423.30
3426	Linden-Littleleaf	*Tilia*	*cordata*	9.8	Medium	Semi-mature	Fair	3	$1,514.61
3427	Linden-Littleleaf	*Tilia*	*cordata*	11.5	Medium	Semi-mature	Fair	2	$2,085.67
3428	Linden-Littleleaf	*Tilia*	*cordata*	12.5	Medium	Semi-mature	Fair	2	$2,464.16
3429	Catalpa-Northern	*Catalpa*	*speciosa*	22.5	Large	Mature	Fair	2	$5,702.78
3430	Serviceberry (3)	*Amelanchier*	sp.	3.0	Small	Semi-mature	Good	...	$728.60
3431	Viburnum-Blackhaw (2)	*Viburnum*	*prunifolium*	3.0	Small	Semi-mature	Good	...	$971.47
3432	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	14.6	Medium	Semi-mature	Fair	2	$3,361.67
3433	Ginkgo	*Ginkgo*	*biloba*	9.6	Medium	Semi-mature	Good	3	$2,034.79
3434	Witchhazel (2)	*Hamamelis*	*virginiana*	4.0	Medium	Semi-mature	Good	2	$2,270.97
3435	Maple-Japanese (3)	*Acer*	*palmatum*	4.5	Small	Semi-mature	Good	...	$958.07
3436	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.0	Large	Mature	Good	1	$7,970.49
3437	Crabapple	*Malus*	sp.	9.0	Small	Mature	Poor	3	$766.45

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3438	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.0	Large	Mature	Fair	1	$6,954.86
3439	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.0	Large	Mature	Fair	2	$5,693.20
3440	Dogwood-Flowering	*Cornus*	*florida*	2.0	Small	Mature	Fair	3	$101.38
3441	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.0	Large	Mature	Fair	2	$5,109.69
3442	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.8	Large	Mature	Fair	3	$4,996.77
3443	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.2	Large	Mature	Fair	3	$5,223.87
3444	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.0	Large	Mature	Fair	2	$6,308.26
3445	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.2	Large	Mature	Fair	1	$5,813.69
3446	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	14.8	Large	Mature	Fair	2	$3,454.40
3447	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.3	Large	Mature	Fair	...	$4,720.00
3448	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.8	Large	Mature	Fair	3	$4,451.11
3449	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.5	Large	Mature	Fair	3	$4,293.56
3450	Elm	*Ulmus*	sp.	9.0	Large	Semi-mature	Good	2	$1,788.39
3451	Ginkgo	*Ginkgo*	*biloba*	8.5	Large	Semi-mature	Good	...	$1,595.20
3452	Witchhazel (2)	*Hamamelis*	*virginiana*	3.0	Small	Semi-mature	Good	...	$1,608.61
3453	Viburnum-Blackhaw (2)	*Viburnum*	*prunifolium*	3.0	Small	Semi-mature	Good	...	$574.05
3454	Cascara Buckthorn	*Rhamnus*	*pershiana*	4.0	Medium	Semi-mature	Good	...	$772.76
3455	Willow-Babylon Weeping	*Salix*	*babylonica*	4.0	Medium	Semi-mature	Good	...	$353.26
3456	Hawthorn	*Crataegus*	sp.	5.0	Small	Semi-mature	Good	...	$551.97
3457	Birch-Gray	*Betula*	*populifolia*	5.6	Medium	Semi-mature	Good	3	$746.90
3458	Birch-Gray	*Betula*	*populifolia*	4.9	Medium	Semi-mature	Good	3	$630.98
3459	Pear-Callery	*Pyrus*	*calleryana*	8.0	Medium	Semi-mature	Fair	...	$1,009.32
3460	Pear-Callery	*Pyrus*	*calleryana*	5.5	Medium	Semi-mature	Good	...	$667.89
3461	Pear-Callery	*Pyrus*	*calleryana*	10.5	Medium	Semi-mature	Fair	...	$1,738.71
3462	Pear-Callery	*Pyrus*	*calleryana*	13.0	Medium	Semi-mature	Fair	3	$2,665.24

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3463	Pear-Callery	*Pyrus*	*calleryana*	8.0	Medium	Semi-mature	Fair	...	$1,009.32
3464	Pear-Callery	*Pyrus*	*calleryana*	11.4	Medium	Semi-mature	Fair	...	$2,049.55
3465	Pear-Callery	*Pyrus*	*calleryana*	6.3	Medium	Semi-mature	Fair	...	$625.94
3466	Pear-Callery	*Pyrus*	*calleryana*	9.5	Medium	Semi-mature	Fair	...	$1,423.30
3467	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.4	Large	Mature	Fair	3	$5,339.31
3468	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.9	Large	Mature	Poor	1	$4,538.26
3469	Serviceberry (2)	*Amelanchier*	sp.	2.0	Small	Semi-mature	Good	...	$706.53
3470	Elm	*Ulmus*	sp.	5.2	Small	Semi-mature	Good	...	$597.01
3471	Pine-Austrian	*Pinus*	*nigra*	9.0	Medium	Semi-mature	Good	...	$1,277.42
3472	Pine-Austrian	*Pinus*	*nigra*	11.3	Medium	Semi-mature	Good	...	$2,013.75
3473	Pine-Austrian	*Pinus*	*nigra*	12.9	Medium	Semi-mature	Good	2	$2,624.39
3474	Pine-Scotch	*Pinus*	*sylvestris*	3.5	Small	Young	Good	...	$154.55
3475	Hawthorn	*Crataegus*	sp.	6.0	Medium	Semi-mature	Fair	...	$1,135.49
3476	Hawthorn	*Crataegus*	sp.	6.0	Medium	Semi-mature	Fair	...	$1,098.27
3477	Pine-Austrian	*Pinus*	*nigra*	9.6	Medium	Semi-mature	Good	...	$1,453.42
3478	Pine-Austrian	*Pinus*	*nigra*	11.5	Medium	Semi-mature	Good	...	$2,085.67
3479	Hawthorn	*Crataegus*	sp.	6.9	Medium	Semi-mature	Fair	...	$1,396.81
3480	Hawthorn	*Crataegus*	sp.	7.5	Medium	Semi-mature	Fair	...	$1,454.84
3481	Crabapple	*Malus*	sp.	9.8	Medium	Mature	Good	...	$5,150.79
3482	Crabapple	*Malus*	sp.	12.2	Medium	Mature	Good	...	$3,286.22
3483	Crabapple	*Malus*	sp.	12.0	Medium	Mature	Good	...	$3,179.36
3484	Crabapple	*Malus*	sp.	11.0	Medium	Mature	Good	...	$2,671.55
3485	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	24.9	Large	Mature	Fair	...	$9,777.96
3486	Pine-Scotch	*Pinus*	*sylvestris*	3.5	Small	Young	Good	...	$154.55
3487	Pine-Scotch	*Pinus*	*sylvestris*	3.0	Small	Young	Good	...	$113.55
3488	Pine-Austrian	*Pinus*	*nigra*	6.5	Small	Semi-mature	Good	...	$666.31
3489	Pine-Austrian	*Pinus*	*nigra*	10.2	Medium	Semi-mature	Good	3	$1,640.78
3490	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	3.0	Small	Young	Good	...	$198.71
3491	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	3.0	Small	Young	Good	...	$198.71
3492	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	3.0	Small	Young	Good	...	$198.71
3493	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	3.0	Small	Young	Good	...	$198.71
3494	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	3.0	Small	Young	Good	...	$198.71
3495	Burning Bush	*Euonymus*	*alatus*	6.1	Small	Mature	Fair	...	$586.83

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3496	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	24.1	Large	Mature	Fair	2	$9,159.75
3497	Crabapple	*Malus*	sp.	5.8	Small	Semi-mature	Good	2	$1,294.71
3498	Hackberry	*Celtis*	*occidentalis*	3.5	Small	Young	Good	...	$309.10
3499	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.4	Large	Mature	Fair	1	$7,913.08
3500	Corktree-Amur	*Phellodendron*	*amurense*	10.5	Medium	Semi-mature	Good	...	$2,086.46
3501	Burning Bush	*Euonymus*	*alatus*	3.0	Small	Semi-mature	Fair	...	$141.94
3502	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.5	Large	Mature	Fair	1	$5,397.50
3503	Pine-Austrian	*Pinus*	*nigra*	4.5	Small	Young	Fair	...	$228.11
3504	Hackberry	*Celtis*	*occidentalis*	21.2	Large	Mature	Fair	1	$8,100.53
3505	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.5	Large	Mature	Fair	1	$5,397.50
3506	Maple-Red	*Acer*	*rubrum*	4.0	Small	Young	Fair	3	$216.28
3507	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.0	Large	Mature	Good	2	$8,831.56
3508	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.0	Large	Mature	Good	2	$11,679.74
3509	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	14.0	Medium	Semi-mature	Good	2	$4,327.47
3510	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.5	Medium	Mature	Good	2	$6,010.98
3511	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.3	Medium	Mature	Good	2	$7,394.01
3512	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	15.3	Medium	Mature	Good	2	$5,168.45
3513	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	15.3	Medium	Mature	Good	2	$5,168.45
3514	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	11.2	Medium	Semi-mature	Fair	2	$1,978.27
3515	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.0	Medium	Mature	Good	2	$6,380.81
3516	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	15.4	Medium	Mature	Good	2	$5,236.23
3517	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	13.3	Medium	Semi-mature	Good	2	$3,905.54

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3518	Elm	*Ulmus*	sp.	4.0	Small	Young	Good	...	$353.26
3519	Tuliptree	*Liriodendron*	*tulipifera*	3.0	Small	Young	Good	...	$170.32
3520	Pear-Callery	*Pyrus*	*calleryana*	12.0	Medium	Semi-mature	Fair	2	$2,270.97
3521	Pear-Callery	*Pyrus*	*calleryana*	8.0	Medium	Semi-mature	Fair	3	$1,009.32
3522	Pear-Callery	*Pyrus*	*calleryana*	11.0	Medium	Semi-mature	Fair	2	$1,908.25
3523	Pear-Callery	*Pyrus*	*calleryana*	12.5	Medium	Semi-mature	Fair	2	$2,464.16
3524	Pear-Callery	*Pyrus*	*calleryana*	8.2	Medium	Semi-mature	Fair	2	$1,060.42
3525	Pear-Callery	*Pyrus*	*calleryana*	8.0	Medium	Semi-mature	Fair	2	$1,009.32
3526	Ash-White	*Fraxinus*	*americana*	7.0	Medium	Semi-mature	Poor	1	$397.42
3527	Ash-White	*Fraxinus*	*americana*	7.8	Medium	Semi-mature	Poor	1	$493.45
3528	Ash-White	*Fraxinus*	*americana*	6.0	Medium	Semi-mature	Poor	1	$291.98
3529	Maple-Amur	*Acer*	*ginnala*	6.0	Small	Semi-mature	Good	...	$1,346.81
3530	Maple-Amur	*Acer*	*ginnala*	4.5	Small	Semi-mature	Good	...	$1,153.62
3531	Maple-Amur	*Acer*	*ginnala*	6.0	Small	Semi-mature	Good	...	$1,545.52
3532	Maple-Amur	*Acer*	*ginnala*	5.0	Small	Semi-mature	Good	...	$905.24
3533	Maple-Amur	*Acer*	*ginnala*	6.0	Small	Semi-mature	Good	...	$1,148.10
3534	Ash-Green	*Fraxinus*	*pennsylvanica*	6.5	Medium	Semi-mature	Poor	1	$399.79
3535	Ash-White	*Fraxinus*	*americana*	11.2	Medium	Semi-mature	Poor	1	$1,017.40
3536	Ash-White	*Fraxinus*	*americana*	10.2	Medium	Semi-mature	Poor	1	$843.83
3537	Ash-White	*Fraxinus*	*americana*	10.0	Medium	Semi-mature	Poor	1	$811.06
3538	Ash-White	*Fraxinus*	*americana*	10.0	Medium	Semi-mature	Poor	1	$811.06
3539	Maple-Amur	*Acer*	*ginnala*	6.0	Small	Semi-mature	Good	...	$2,097.50
3540	Maple-Amur	*Acer*	*ginnala*	5.0	Small	Semi-mature	Good	...	$1,258.50
3541	Maple-Amur	*Acer*	*ginnala*	4.0	Small	Semi-mature	Good	...	$551.97
3542	Maple-Amur	*Acer*	*ginnala*	6.0	Small	Semi-mature	Good	...	$2,031.26
3543	Maple-Amur	*Acer*	*ginnala*	6.0	Small	Semi-mature	Good	...	$1,942.94
3544	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.5	Large	Mature	Fair	2	$7,289.98
3545	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.5	Large	Mature	Good	3	$6,010.98
3546	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.2	Large	Mature	Good	3	$6,531.82
3547	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	24.5	Large	Mature	Fair	2	$9,466.33
3548	Serviceberry	*Amelanchier*	sp.	2.0	Small	Semi-mature	Good	...	$331.18
3549	Crabapple	*Malus*	sp.	5.0	Small	Semi-mature	Good	...	$551.97

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3550	Pear-Callery	*Pyrus*	*calleryana*	18.6	Large	Mature	Fair	2	$5,456.01
3551	Maple-Silver	*Acer*	*saccharinum*	29.2	Large	Mature	Fair	2	$9,604.78
3552	Linden-Littleleaf	*Tilia*	*cordata*	13.0	Medium	Semi-mature	Fair	3	$2,665.24
3553	Crabapple	*Malus*	sp.	3.0	Small	Semi-mature	Good	...	$198.71
3554	Crabapple	*Malus*	sp.	3.0	Small	Semi-mature	Good	...	$198.71
3555	Maple-Silver	*Acer*	*saccharinum*	22.0	Large	Mature	Fair	2	$5,452.14
3556	Maple-Silver	*Acer*	*saccharinum*	27.5	Large	Mature	Fair	2	$8,518.97
3557	Pear-Callery	*Pyrus*	*calleryana*	4.0	Small	Young	Good	...	$353.26
3558	Pear-Callery	*Pyrus*	*calleryana*	4.0	Small	Young	Good	...	$353.26
3559	Crabapple	*Malus*	sp.	8.0	Small	Mature	Good	2	$5,321.02
3560	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.5	Large	Mature	Fair	2	$7,289.98
3561	Smoketree	*Cotinus*	*coggygria*	4.0	Small	Semi-mature	Good	...	$1,477.06
3562	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	28.0	Large	Mature	Poor	2	$7,418.51
3563	Hawthorn	*Crataegus*	sp.	5.0	Small	Semi-mature	Good	...	$750.68
3564	Hawthorn	*Crataegus*	sp.	6.5	Small	Semi-mature	Good	...	$1,727.67
3565	Serviceberry	*Amelanchier*	sp.	3.0	Small	Semi-mature	Fair	3	$488.89
3566	Crabapple	*Malus*	sp.	5.3	Small	Semi-mature	Fair	...	$443.00
3567	Crabapple	*Malus*	sp.	4.1	Small	Semi-mature	Fair	...	$265.10
3568	Serviceberry	*Amelanchier*	sp.	6.0	Small	Semi-mature	Good	...	$2,406.60
3569	Hawthorn	*Crataegus*	sp.	8.0	Small	Semi-mature	Good	...	$1,413.05
3570	Hawthorn	*Crataegus*	sp.	8.0	Small	Semi-mature	Good	...	$2,207.89
3571	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	10.7	Medium	Semi-mature	Good	...	$2,527.81
3572	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	10.2	Medium	Semi-mature	Good	...	$2,297.09
3573	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	15.0	Medium	Mature	Good	3	$4,967.75
3574	Hawthorn	*Crataegus*	sp.	5.0	Small	Semi-mature	Good	...	$1,965.02
3575	Hawthorn	*Crataegus*	sp.	6.0	Small	Semi-mature	Good	...	$1,501.37
3576	Hawthorn	*Crataegus*	sp.	7.0	Small	Semi-mature	Good	...	$1,081.87
3577	Hawthorn	*Crataegus*	sp.	4.0	Small	Semi-mature	Good	...	$1,302.66
3578	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.7	Large	Mature	Good	3	$7,720.77
3579	Maple-Freeman's	*Acer*	*x* freemanii	14.6	Medium	Semi-mature	Poor	1	$2,017.00
3580	Linden-Littleleaf	*Tilia*	*cordata*	18.0	Large	Mature	Fair	...	$5,109.69
3581	Viburnum	*Viburnum*	sp.	3.0	Small	Semi-mature	Good	...	$544.09
3582	Linden-Littleleaf	*Tilia*	*cordata*	19.5	Large	Mature	Good	3	$8,395.51

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3583	Hackberry	*Celtis*	*occidentalis*	13.9	Medium	Mature	Good	...	$4,875.28
3584	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.0	Medium	Mature	Good	1	$5,652.20
3585	Elm-Siberian	*Ulmus*	*pumila*	43.9	Large	Over-mature	Fair	1	$15,034.83
3586	Serviceberry	*Amelanchier*	sp.	2.0	Small	Young	Good	...	$331.18
3587	Serviceberry	*Amelanchier*	sp.	3.0	Small	Semi-mature	Good	3	$772.76
3588	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	...	$794.84
3589	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Good	...	$1,413.05
3590	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Good	...	$1,413.05
3591	Hackberry	*Celtis*	*occidentalis*	20.6	Large	Mature	Good	2	$10,707.89
3592	Viburnum	*Viburnum*	sp.	3.0	Small	Semi-mature	Good	...	$922.58
3593	Maple-Norway	*Acer*	*platanoides*	16.0	Medium	Mature	Fair	3	$3,460.53
3594	Maple-Norway	*Acer*	*platanoides*	13.0	Medium	Semi-mature	Fair	3	$2,284.49
3595	Maple-Norway	*Acer*	*platanoides*	12.6	Medium	Semi-mature	Fair	3	$2,146.07
3596	Maple-Freeman's	*Acer*	*x* freemanii	4.3	Small	Young	Good	...	$408.24
3597	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	24.2	Large	Mature	Poor	2	$5,541.55
3598	Maple-Freeman's	*Acer*	x freemanii	3.0	Small	Young	Good	3	$198.71
3599	Maple-Freeman's	*Acer*	x freemanii	6.5	Medium	Semi-mature	Good	...	$932.83
3600	Coffeetree-Kentucky	*Gymnocladus*	*dioicus*	12.4	Medium	Semi-mature	Good	2	$3,394.85
3601	Maple-Freeman's	*Acer*	x freemanii	3.0	Small	Young	Good	...	$198.71
3602	Crabapple	*Malus*	sp.	12.5	Medium	Mature	Good	3	$3,449.83
3603	Crabapple	*Malus*	sp.	11.5	Medium	Mature	Good	3	$2,919.94
3604	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Good	2	$1,413.05
3605	Elm	*Ulmus*	sp.	4.0	Small	Young	Good	...	$353.26
3606	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	24.4	Large	Mature	Poor	1	$5,633.53
3607	Crabapple	*Malus*	sp.	5.0	Small	Semi-mature	Good	...	$1,302.66
3608	Crabapple	*Malus*	sp.	5.0	Small	Semi-mature	Good	...	$551.97
3609	Crabapple	*Malus*	sp.	5.0	Small	Semi-mature	Good	...	$1,457.21
3610	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.9	Large	Mature	Poor	2	$5,405.01
3611	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Fair	3	$725.45
3612	Linden-Littleleaf	*Tilia*	*cordata*	18.0	Medium	Mature	Fair	2	$5,109.69
3613	Linden-Littleleaf	*Tilia*	*cordata*	17.3	Medium	Mature	Fair	...	$2,022.86
3614	Linden-Littleleaf	*Tilia*	*cordata*	16.1	Medium	Mature	Fair	...	$1,751.96

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3615	Linden-Littleleaf	*Tilia*	*cordata*	15.0	Medium	Mature	Fair	2	$3,548.40
3616	Hawthorn	*Crataegus*	sp.	4.1	Small	Semi-mature	Fair	...	$265.10
3617	Hawthorn	*Crataegus*	sp.	8.0	Medium	Semi-mature	Fair	3	$2,038.99
3618	Hawthorn	*Crataegus*	sp.	6.4	Medium	Semi-mature	Fair	3	$1,495.85
3619	Crabapple	*Malus*	sp.	6.0	Medium	Semi-mature	Good	2	$3,444.31
3620	Crabapple	*Malus*	sp.	6.0	Medium	Semi-mature	Good	2	$2,252.05
3621	Crabapple	*Malus*	sp.	6.6	Medium	Semi-mature	Fair	3	$686.97
3622	Hawthorn	*Crataegus*	sp.	8.3	Medium	Semi-mature	Fair	2	$1,086.44
3623	Hawthorn	*Crataegus*	sp.	7.2	Medium	Semi-mature	Good	...	$1,144.57
3624	Serviceberry	*Amelanchier*	sp.	5.5	Medium	Semi-mature	Good	...	$667.89
3625	Witchhazel	*Hamamelis*	*virginiana*	3.0	Small	Semi-mature	Fair	...	$152.07
3626	Serviceberry	*Amelanchier*	sp.	5.0	Small	Semi-mature	Good	...	$551.97
3627	Witchhazel	*Hamamelis*	*virginiana*	3.0	Small	Semi-mature	Good	...	$449.46
3628	Hawthorn	*Crataegus*	sp.	5.5	Small	Semi-mature	Good	...	$1,219.86
3629	Serviceberry	*Amelanchier*	sp.	3.0	Small	Semi-mature	Good	...	$375.34
3630	Serviceberry	*Amelanchier*	sp.	3.0	Small	Semi-mature	Good	...	$375.34
3631	Lilac-Japanese Tree	*Syringa*	*reticulata*	5.5	Medium	Semi-mature	Good	...	$667.89
3632	Serviceberry	*Amelanchier*	sp.	4.0	Medium	Semi-mature	Good	...	$640.29
3633	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$1,258.50
3634	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$1,103.95
3635	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$1,545.52
3636	Hawthorn	*Crataegus*	sp.	8.0	Medium	Semi-mature	Good	...	$2,010.06
3637	Hawthorn	*Crataegus*	sp.	6.3	Small	Semi-mature	Good	...	$1,229.57
3638	Serviceberry	*Amelanchier*	sp.	6.5	Small	Semi-mature	Good	...	$932.83
3639	Serviceberry	*Amelanchier*	sp.	4.9	Small	Semi-mature	Good	...	$530.11
3640	Serviceberry	*Amelanchier*	sp.	3.5	Small	Semi-mature	Fair	...	$193.19
3641	Witchhazel	*Hamamelis*	*virginiana*	2.0	Small	Semi-mature	Good	...	$212.90
3642	Serviceberry (5)	*Amelanchier*	sp.	2.0	Small	Semi-mature	Good	...	$1,766.31
3643	Magnolia	*Magnolia*	sp.	6.0	Medium	Semi-mature	Good	2	$1,934.33
3644	Magnolia	*Magnolia*	sp.	5.5	Medium	Semi-mature	Good	...	$667.89
3645	Magnolia	*Magnolia*	sp.	4.0	Small	Semi-mature	Fair	...	$394.27
3646	Pine-Scotch	*Pinus*	*sylvestris*	16.5	Medium	Mature	Fair	3	$2,453.46
3647	Redbud-Eastern	*Cercis*	*canadensis*	10.8	Medium	Mature	Good	...	$2,575.28
3648	Redbud-Eastern	*Cercis*	*canadensis*	8.0	Medium	Mature	Fair	3	$1,403.59
3649	Redbud-Eastern	*Cercis*	*canadensis*	8.0	Medium	Mature	Good	3	$3,576.78
3650	Redbud-Eastern	*Cercis*	*canadensis*	6.0	Small	Mature	Good	...	$794.84

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3651	Redbud-Eastern	*Cercis*	*canadensis*	6.5	Medium	Mature	Good	...	$2,152.69
3652	Crabapple	*Malus*	sp.	6.8	Small	Semi-mature	Fair	...	$729.23
3653	Crabapple	*Malus*	sp.	9.0	Small	Semi-mature	Good	...	$1,788.39
3654	Redbud-Eastern	*Cercis*	*canadensis*	7.7	Medium	Semi-mature	Good	3	$2,185.37
3655	Redbud-Eastern	*Cercis*	*canadensis*	5.0	Medium	Semi-mature	Good	...	$1,103.95
3656	Redbud-Eastern	*Cercis*	*canadensis*	7.0	Medium	Semi-mature	Good	...	$1,633.84
3657	Pine-Scotch	*Pinus*	*sylvestris*	12.7	Medium	Semi-mature	Good	...	$2,034.92
3658	Pine-Mugo (2)	*Pinus*	*mugo*	3.0	Small	Semi-mature	Good	...	$971.47
3659	Lilac-Japanese Tree	*Syringa*	*reticulata*	4.0	Medium	Semi-mature	Good	3	$1,655.92
3660	Crabapple	*Malus*	sp.	9.0	Small	Semi-mature	Good	3	$1,788.39
3661	Crabapple	*Malus*	sp.	11.0	Small	Semi-mature	Good	...	$2,671.55
3662	Crabapple	*Malus*	sp.	12.0	Medium	Mature	Good	...	$3,179.36
3663	Crabapple	*Malus*	sp.	11.0	Medium	Mature	Good	...	$2,671.55
3664	Maple-Sugar	*Acer*	*saccharum*	13.0	Medium	Semi-mature	Fair	3	$3,045.99
3665	Crabapple	*Malus*	sp.	10.0	Medium	Semi-mature	Good	...	$2,207.89
3666	Maple-Sugar	*Acer*	*saccharum*	10.1	Medium	Semi-mature	Good	3	$2,574.02
3667	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.8	Large	Mature	Poor	1	$4,496.91
3668	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	26.6	Large	Mature	Fair	3	$11,158.68
3669	Hawthorn	*Crataegus*	sp.	6.9	Medium	Semi-mature	Good	...	$1,051.18
3670	Hawthorn	*Crataegus*	sp.	8.0	Small	Semi-mature	Fair	...	$1,009.32
3671	Hawthorn	*Crataegus*	sp.	7.7	Small	Semi-mature	Fair	...	$935.04
3672	Hawthorn	*Crataegus*	sp.	10.5	Medium	Mature	Fair	...	$2,405.02
3673	Hawthorn	*Crataegus*	sp.	9.2	Medium	Mature	Fair	...	$2,990.12
3674	Hawthorn	*Crataegus*	sp.	7.2	Small	Mature	Fair	...	$817.55
3675	Hawthorn	*Crataegus*	sp.	11.1	Medium	Mature	Fair	...	$3,249.07
3676	Hawthorn	*Crataegus*	sp.	9.0	Medium	Mature	Fair	...	$2,322.23
3677	Hawthorn	*Crataegus*	sp.	10.5	Medium	Mature	Fair	...	$2,698.20
3678	Hawthorn	*Crataegus*	sp.	9.8	Medium	Mature	Fair	...	$1,514.61
3679	Hawthorn	*Crataegus*	sp.	9.4	Medium	Mature	Fair	...	$1,393.49
3680	Hawthorn	*Crataegus*	sp.	9.5	Medium	Mature	Fair	...	$3,157.44
3681	Pear-Callery	*Pyrus*	*calleryana*	3.3	Small	Young	Good	...	$240.44
3682	Pear-Callery	*Pyrus*	*calleryana*	5.2	Medium	Semi-mature	Good	2	$597.01
3683	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.5	Large	Mature	Fair	1	$5,996.79

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3684	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.9	Large	Mature	Poor	1	$4,962.17
3685	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.8	Large	Mature	Poor	1	$4,496.91
3686	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.9	Large	Mature	Poor	1	$4,962.17
3687	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	26.5	Large	Mature	Poor	2	$6,644.96
3688	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.4	Large	Mature	Poor	2	$5,181.23
3689	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$353.26
3690	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$353.26
3691	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$353.26
3692	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$353.26
3693	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Good	...	$353.26
3694	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Fair	...	$252.33
3695	Serviceberry	*Amelanchier*	sp.	4.0	Small	Semi-mature	Fair	...	$252.33
3696	Serviceberry	*Amelanchier*	sp.	5.0	Small	Semi-mature	Good	...	$551.97
3697	Hackberry	*Celtis*	*occidentalis*	28.5	Large	Mature	Good	1	$20,495.54
3698	Lilac-Japanese Tree	*Syringa*	*reticulata*	3.0	Small	Semi-mature	Fair	...	$457.35
3699	Hackberry	*Celtis*	*occidentalis*	27.0	Large	Mature	Good	2	$18,394.89
3700	Serviceberry (7)	*Amelanchier*	sp.	3.0	Small	Young	Good	...	$2,627.39
3701	Pear-Callery	*Pyrus*	*calleryana*	5.0	Small	Semi-mature	Fair	2	$394.27
3702	Pear-Callery	*Pyrus*	*calleryana*	7.5	Medium	Semi-mature	Fair	2	$887.10
3703	Pear-Callery	*Pyrus*	*calleryana*	10.2	Medium	Semi-mature	Fair	2	$1,640.78
3704	Serviceberry (13)	*Amelanchier*	sp.	3.0	Small	Semi-mature	Good	...	$4,879.44
3705	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	26.0	Large	Mature	Poor	1	$6,396.58
3706	Magnolia	*Magnolia*	sp.	4.5	Small	Semi-mature	Good	...	$447.10
3707	Lilac-Pekin (4)	*Syringa*	*pekinensis*	3.0	Small	Semi-mature	Good	...	$883.16
3708	Magnolia	*Magnolia*	sp.	5.2	Medium	Semi-mature	Good	...	$597.01
3709	Maple-Japanese	*Acer*	*palmatum*	4.8	Small	Semi-mature	Good	...	$363.36
3710	Alder-Common	*Alnus*	*glutinosa*	7.0	Medium	Semi-mature	Good	3	$2,141.65
3711	Hawthorn	*Crataegus*	sp.	9.0	Medium	Semi-mature	Good	...	$2,583.23
3712	Hawthorn	*Crataegus*	sp.	10.5	Medium	Semi-mature	Good	...	$3,229.04
3713	Buckeye/Horsechestnut	*Aesculus*	sp.	14.0	Medium	Semi-mature	Fair	...	$3,091.05

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3714	Hophornbeam-American	*Ostrya*	*virginiana*	7.5	Medium	Semi-mature	Fair	2	$1,013.83
3715	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.5	Large	Mature	Fair	2	$4,829.76
3716	Yew	*Taxus*	sp.	8.0	Small	Mature	Good	...	$1,413.05
3717	Dogwood-Corneliancherry	*Cornus*	*mas*	6.0	Small	Mature	Fair	...	$1,225.60
3718	Dogwood-Corneliancherry	*Cornus*	*mas*	6.0	Small	Mature	Fair	...	$1,225.60
3719	Serviceberry	*Amelanchier*	sp.	6.3	Small	Mature	Fair	...	$625.94
3720	Hydrangea (6)	*Hydrangea*	sp.	3.0	Small	Mature	Good	...	$1,192.26
3721	Crabapple	*Malus*	sp.	8.2	Medium	Mature	Fair	...	$1,060.42
3722	Crabapple	*Malus*	sp.	12.0	Medium	Mature	Fair	...	$2,270.97
3723	Redbud-Eastern	*Cercis*	*canadensis*	6.5	Medium	Mature	Fair	...	$666.31
3724	Redbud-Eastern	*Cercis*	*canadensis*	9.6	Medium	Mature	Fair	...	$3,235.51
3725	Redbud-Eastern	*Cercis*	*canadensis*	6.0	Small	Mature	Fair	...	$567.74
3726	Crabapple	*Malus*	sp.	10.0	Small	Mature	Good	...	$2,207.89
3727	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.2	Large	Mature	Poor	1	$2,483.31
3728	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	15.9	Large	Mature	Poor	1	$2,392.19
3729	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.7	Medium	Mature	Good	3	$8,568.60
3730	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.8	Large	Mature	Good	3	$8,655.82
3731	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.9	Medium	Mature	Good	3	$7,074.30
3732	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.8	Medium	Mature	Fair	3	$4,996.77
3733	Crabapple	*Malus*	sp.	9.0	Medium	Semi-mature	Good	...	$1,788.39
3734	Crabapple	*Malus*	sp.	7.6	Medium	Semi-mature	Good	...	$1,275.28
3735	Crabapple	*Malus*	sp.	8.0	Medium	Semi-mature	Good	...	$1,413.05
3736	Crabapple	*Malus*	sp.	7.0	Small	Semi-mature	Fair	...	$772.76
3737	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	...	$794.84
3738	Crabapple	*Malus*	sp.	7.0	Small	Semi-mature	Fair	...	$772.76
3739	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Fair	...	$567.74
3740	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	...	$794.84

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3741	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.9	Large	Mature	Good	3	$8,743.47
3742	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.9	Large	Mature	Good	3	$11,578.40
3743	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.0	Large	Mature	Good	3	$11,679.74
3744	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.2	Large	Mature	Good	3	$11,883.75
3745	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.0	Large	Mature	Good	3	$9,736.80
3746	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	23.0	Large	Mature	Poor	2	$5,005.60
3747	Crabapple	*Malus*	sp.	7.0	Small	Semi-mature	Fair	...	$772.76
3748	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Fair	...	$1,009.32
3749	Crabapple	*Malus*	sp.	8.0	Small	Semi-mature	Fair	...	$1,009.32
3750	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	18.0	Large	Mature	Good	3	$7,153.57
3751	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.0	Large	Mature	Poor	2	$3,415.92
3752	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.0	Large	Mature	Fair	3	$6,954.86
3753	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	19.0	Large	Mature	Fair	1	$5,693.20
3754	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.0	Large	Mature	Fair	1	$6,308.26
3755	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	16.8	Large	Mature	Poor	2	$2,670.66
3756	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.4	Large	Mature	Fair	1	$6,563.11
3757	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.2	Large	Mature	Poor	1	$4,252.78
3758	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.4	Large	Mature	Fair	1	$6,563.11
3759	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	22.0	Large	Mature	Fair	1	$7,632.99
3760	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	14.2	Medium	Semi-mature	Fair	2	$3,179.99

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3761	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	15.6	Medium	Mature	Fair	2	$3,837.95
3762	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	14.2	Medium	Semi-mature	Fair	2	$3,179.99
3763	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	12.3	Medium	Semi-mature	Fair	2	$2,385.94
3764	Cherry	*Prunus*	sp.	9.0	Medium	Semi-mature	Fair	...	$2,239.43
3765	Cherry	*Prunus*	sp.	7.0	Medium	Semi-mature	Fair	...	$1,340.51
3766	Hawthorn	*Crataegus*	sp.	7.0	Small	Semi-mature	Good	...	$1,633.84
3767	Beech-European	*Fagus*	*sylvatica*	3.0	Small	Young	Good	...	$198.71
3768	Elm	*Ulmus*	sp.	17.0	Large	Mature	Poor	2	$2,734.63
3769	Crabapple	*Malus*	sp.	3.0	Small	Semi-mature	Good	...	$242.87
3770	Crabapple	*Malus*	sp.	3.0	Small	Semi-mature	Good	...	$375.34
3771	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	...	$794.84
3772	Crabapple	*Malus*	sp.	6.0	Small	Semi-mature	Good	...	$794.84
3773	Redbud-Eastern	*Cercis*	*canadensis*	7.0	Medium	Semi-mature	Good	...	$1,528.96
3774	Redbud-Eastern	*Cercis*	*canadensis*	3.0	Small	Young	Good	...	$287.03
3775	Maple-Norway	*Acer*	*platanoides*	22.0	Medium	Mature	Good	2	$9,159.59
3776	Maple-Norway	*Acer*	*platanoides*	24.0	Medium	Mature	Good	2	$10,900.67
3777	Pine-Austrian	*Pinus*	*nigra*	18.5	Medium	Mature	Fair	...	$3,855.36
3778	Pine-Austrian	*Pinus*	*nigra*	10.2	Medium	Mature	Fair	...	$1,171.98
3779	Maple-Norway	*Acer*	*platanoides*	17.2	Medium	Mature	Good	3	$5,598.71
3780	Witchhazel (2)	*Hamamelis*	*virginiana*	3.0	Small	Semi-mature	Fair	...	$337.94
3781	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	17.6	Medium	Mature	Poor	3	$2,931.07
3782	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	21.0	Large	Mature	Poor	3	$4,172.91
3783	Hawthorn	*Crataegus*	sp.	6.7	Medium	Semi-mature	Fair	...	$707.94
3784	Hawthorn	*Crataegus*	sp.	7.0	Medium	Semi-mature	Fair	...	$1,845.17
3785	Pine-Austrian	*Pinus*	*nigra*	11.5	Medium	Semi-mature	Fair	...	$1,489.76
3786	Pine-Austrian	*Pinus*	*nigra*	15.6	Medium	Mature	Fair	...	$2,741.39
3787	Pine-Austrian	*Pinus*	*nigra*	12.0	Small	Semi-mature	Fair	...	$1,622.12
3788	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	8.5	Medium	Semi-mature	Fair	3	$1,139.43
3789	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	12.2	Medium	Semi-mature	Fair	3	$2,347.30

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
3790	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	15.0	Medium	Mature	Poor	3	$2,129.04
3791	Honeylocust-Thornless Common	*Gleditsia*	*triacanthos* var. inermis	20.9	Large	Mature	Fair	2	$6,888.78
3792	Ginkgo	*Ginkgo*	*biloba*	9.6	Medium	Semi-mature	Good	3	$2,034.79
3793	Pine-Mugo	*Pinus*	*mugo*	8.0	Small	Mature	Good	...	$3,002.73
3794	Pine-Austrian	*Pinus*	*nigra*	15.0	Small	Mature	Fair	...	$2,534.57
3795	Mulberry-White	*Morus*	*alba*	6.0	Medium	Semi-mature	Good	...	$454.19
3796	Ginkgo	*Ginkgo*	*biloba*	10.5	Medium	Semi-mature	Fair	3	$1,738.71
3797	Crabapple	*Malus*	sp.	12.0	Medium	Mature	Fair	...	$4,179.22

APPENDIX


BARTLETT
BARTLETT
TREE EXPERTS
SCIENTIFIC TREE CARE SINCE 1907

BIBLIOGRAPHY

Council of Tree and Landscape Appraisers (CTLA). 2000. *Guide for Plant Appraisal*, 9th Edition. International Society of Arboriculture, Champaign, IL. 143 pp.

LIST OF APPENDED ITEMS

Technical Reports

ANSI A300 (Part 1) – 2008 Pruning

ANSI A300 (Part 3) – 2013 Supplemental Support Systems

Girdling Roots

Maintenance Pruning Program

Monitor IPM Program

Mulch Application Guidelines

Tree Risk Assessments

Tree Structure Evaluation

Glossary

American National Standard

for Tree Care Operations —
Tree, Shrub, and Other Woody Plant Management — Standard Practices (Pruning)

ANSI A300 (Part 1)-2008 Pruning
Revision of ANSI A300 (Part 1)-2001

TCIA®
VOICE OF TREE CARE

Approved American National Standard
ANSI

ANSI®
A300 (Part 1)-2008

for Tree Care Operations —

Tree, Shrub, and Other Woody Plant Management — Standard Practices *(Pruning)*

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American National Standard

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Web: www.tcia.org

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Contents

* The term pruning type is replaced with the term pruning method. The purpose of this is to label the processes detailed in section 6 with greater accuracy.

Foreword This foreword is not part of American National Standard A300 (Part 1)-2008 *Pruning*

ANSI A300 Standards are divided into multiple parts, each focusing on a specific aspect of woody plant management (e.g. Pruning, Fertilization, etc).

These standards are used to develop written specifications for work assignments. They are not intended to be used as specifications in and of themselves. Management objectives may differ considerably and therefore must be specifically defined by the user. Specifications are then written to meet the established objectives and must include measurable criteria.

ANSI A300 standards apply to professionals who provide for or supervise the management of trees, shrubs, and other woody landscape plants. Intended users include businesses, government agencies, property owners, property managers, and utilities. The standard does not apply to agriculture, horticultural production, or silviculture, except where explicitly noted otherwise.

This standard has been developed by the Tree Care Industry Association (TCIA), an ANSI-accredited Standards Developing Organization (SDO). TCIA is secretariat of the ANSI A300 standards, and develops standards using procedures accredited by the American National Standards Institute (ANSI).

Consensus for standards writing was developed by the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Management Operations – Standard Practices, A300 (ASC A300).

Prior to 1991, various industry associations and practitioners developed their own standards and recommendations for tree care practices. Recognizing the need for a standardized, scientific approach, green industry associations, government agencies and tree care companies agreed to develop consensus for an official American National Standard.

The result – ANSI A300 standards – unify and take authoritative precedence over all previously existing tree care industry standards. ANSI requires that approved standards be developed according to accepted principles, and that they be reviewed and, if necessary, revised every five years.

TCIA was accredited as a standards developing organization with ASC A300 as the consensus body on June 28, 1991. ASC A300 meets regularly to write new, and review and revise existing ANSI A300 standards. The committee includes industry representatives with broad knowledge and technical expertise from residential and commercial tree care, utility, municipal and federal sectors, landscape and nursery industries, and other interested organizations.

Suggestions for improvement of this standard should be forwarded to: A300 Secretary, c/o Tree Care Industry Association, Inc., 136 Harvey Road - Suite B101-B110, Londonderry, NH, 03053.

ANSI A300 (Part 1)-2008 Pruning was approved as an American National Standard by ANSI on May 1, 2008. ANSI approval does not require unanimous approval by ASC A300. The ASC A300 committee contained the following members at the time of ANSI approval:

Tim Johnson, Chair
(Artistic Arborist, Inc.)

Bob Rouse, Secretary
(Tree Care Industry Association, Inc.)

(Continued)

Organizations Represented	*Name of Representative*
American Nursery and Landscape Association	Warren Quinn
	Craig J. Regelbrugge (Alt.)
American Society of Consulting Arborists	Donald Zimar
American Society of Landscape Architects	Ron Leighton
Asplundh Tree Expert Company	Geoff Kempter
	Peter Fengler (Alt.)
Bartlett Tree Expert Company	Peter Becker
	Dr. Thomas Smiley (Alt.)
Davey Tree Expert Company	Joseph Tommasi
	R.J. Laverne (Alt.)
International Society of Arboriculture	Bruce Hagen
	Sharon Lilly (Alt.)
National Park Service	Robert DeFeo
	Dr. James Sherald (Alt.)
Professional Grounds Management Society	Thomas Shaner
Professional Land Care Network	Preston Leyshon
Society of Municipal Arborists	Gordon Mann
	Andy Hillman (Alt.)
Tree Care Industry Association	Dane Buell
	James McGuire (Alt.)
USDA Forest Service	Ed Macie
	Keith Cline (Alt.)
Utility Arborist Association	Matthew Simons
	Jeffrey Smith (Alt.)

Additional organizations and individuals:

American Forests (Observer)
Mike Galvin (Observer)
Peter Gerstenberger (Observer)
Dick Jones (Observer)
Myron Laible (Observer)
Beth Palys (Observer)
Richard Rathjens (Observer)
Richard Roux (NFPA-780 Liaison)

ASC A300 mission statement:

Mission: To develop consensus performance standards based on current research and sound practice for writing specifications to manage trees, shrubs, and other woody plants.

American National Standard
for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Management – Standard Practices *(Pruning)*

1 ANSI A300 standards

1.1 Scope

ANSI A300 standards present performance standards for the care and management of trees, shrubs, and other woody plants.

1.2 Purpose

ANSI A300 performance standards are intended for use by federal, state, municipal and private entities including arborists, property owners, property managers, and utilities for developing written specifications.

1.3 Application

ANSI A300 performance standards shall apply to any person or entity engaged in the management of trees, shrubs, or other woody plants.

2 Part 1 – Pruning standards

2.1 Purpose

The purpose of Part 1 – *Pruning* is to provide performance standards for developing written specifications for pruning.

2.2 Reasons for pruning

The reasons for tree pruning may include, but are not limited to, reducing risk, managing tree health and structure, improving aesthetics, or achieving other specific objectives. Pruning practices for agricultural, horticultural production, or silvicultural purposes are exempt from this standard unless this standard, or a portion thereof, is expressly referenced in standards for these other related areas.

2.3 Implementation

2.3.1 Specifications for pruning should be written and administered by an arborist.

2.3.1.1 Specifications should include location of tree(s), objectives, methods (types), and extent of pruning (location, percentage, part size, etc).

2.3.2 Pruning specifications shall be adhered to.

2.4 Safety

2.4.1 Pruning shall be implemented by an arborist, familiar with the practices and hazards of pruning and the equipment used in such operations.

2.4.2 This performance standard shall not take precedence over applicable industry safe work practices.

2.4.3 Performance shall comply with applicable Federal and State Occupational Safety and Health standards, ANSI Z133.1, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and other Federal Environmental Protection Agency (EPA) regulations, as well as state and local regulations.

3 Normative references

The following standards contain provisions, which, through reference in the text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard shall apply the most recent edition of the standards indicated below.

ANSI Z60.1, Nursery stock
ANSI Z133.1, Arboriculture – Safety requirements
29 CFR 1910, General industry [1)]
29 CFR 1910.268, Telecommunications [1)]
29 CFR 1910.269, Electric power generation, transmission, and distribution [1)]
29 CFR 1910.331 - 335, Electrical safety-related work practices [1)]

4 Definitions

4.1 arboriculture: The art, science, technology, and business of commercial, public, and utility tree care.

1) Available from U.S. Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210

4.2 arborist: 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 plants.

4.3 arborist trainee: An individual undergoing on-the-job training to obtain the experience and the competence required to provide for or supervise the management of trees and other woody plants. Such trainees shall be under the direct supervision of an arborist.

4.4 branch: A shoot or stem growing from a parent branch or stem (See Fig. 4.4).

4.4.1 codominant branches/codominant leaders: Branches or stems arising from a common junction, having nearly the same size diameter (See Fig. 4.4).

4.4.2 lateral branch: A shoot or stem growing from another branch (See Fig. 4.4).

4.4.3 parent branch or stem: A tree trunk or branch from which other branches or shoots grow (See Fig. 4.4).

4.4.4 scaffold branch: A primary branch that forms part of the main structure of the crown (See Fig. 4.4).

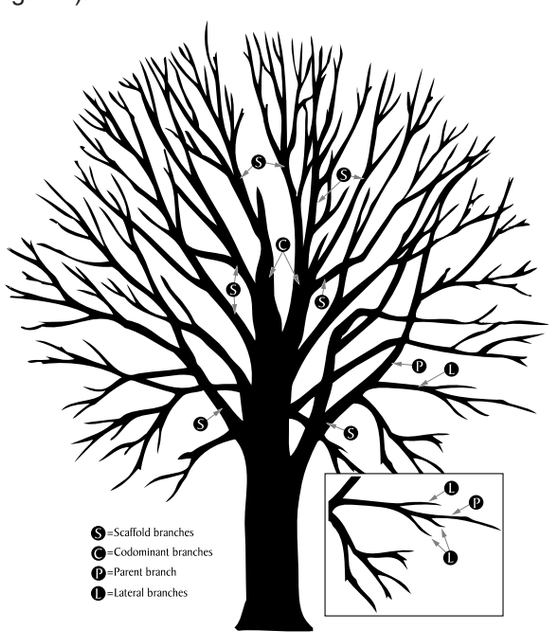


Figure 4.4 Standard branch definitions.

4.5 branch bark ridge: The raised area of bark in the branch crotch that marks where the branch and parent stem meet. (See Figs. 5.3.2 and 5.3.3).

4.6 branch collar: The swollen area at the base of a branch.

4.7 callus: Undifferentiated tissue formed by the cambium around a wound.

4.8 cambium: The dividing layer of cells that forms sapwood (xylem) to the inside and inner bark (phloem) to the outside.

4.9 clean: Selective pruning to remove one or more of the following non-beneficial parts: dead, diseased, and/or broken branches (7.2).

4.10 climbing spurs: Sharp, pointed devices strapped to a climber's lower legs used to assist in climbing trees. (syn.: gaffs, hooks, spurs, spikes, climbers)

4.11 closure: The process in a woody plant by which woundwood grows over a pruning cut or injury.

4.12 crown: Upper part of a tree, measured from the lowest branch, including all the branches and foliage**.**

4.13 decay: The degradation of woody tissue caused by microorganisms.

4.14 espalier: The combination of pruning, supporting, and training branches to orient a plant in one plane (6.5).

4.15 establishment: The point after planting when a tree's root system has grown sufficiently into the surrounding soil to support growth and anchor the tree.

4.16 facility: A structure or equipment used to deliver or provide protection for the delivery of an essential service, such as electricity or communications.

4.17 frond: A leaf structure of a palm.

4.18 heading: The reduction of a shoot, stem, or branch back to a bud or to a lateral branch not large enough to assume the terminal role.

4.19 interfering branches: Crossing, rubbing, or upright branches that have the potential to damage tree structure and/or health.

4.20 internode: The area between lateral branches or buds.

4.21 job briefing: The communication of at least the following subjects for arboricultural operations: work specifications, hazards associated with the job, work procedures involved, special precautions, electrical hazards, job assignments, and personal protective equipment.

4.22 leader: A dominant, typically upright, stem – usually the main trunk. There can be several leaders in one tree.

4.23 lion's tailing: The removal of an excessive number of inner and/or lower lateral branches from parent branches. Lion's tailing is not an acceptable pruning practice (6.1.7).

4.24 live crown ratio: Crown height relative to overall plant height.

4.25 mechanical pruning: A pruning technique where large-scale power equipment is used to cut back branches (9.3.2).

4.26 method: A procedure or process for achieving an objective.

4.27 peeling: The removal of dead frond bases without damaging living trunk tissue at the point they make contact with the trunk. (syn.: shaving)

4.28 petiole: A stalk of a leaf or frond.

4.29 pollarding: Pruning method in which tree branches are initially headed and then reduced on a regular basis without disturbing the callus knob (6.6).

4.30 pruning: The selective removal of plant parts to meet specific goals and objectives.

4.31 qualified line-clearance arborist: An individual who, through related training and on-the-job experience, is familiar with the equipment and hazards in line clearance and has demonstrated the ability to perform the special techniques involved. This individual may or may not be currently employed by a line-clearance contractor.

4.32 qualified line-clearance arborist trainee: An individual undergoing line-clearance training under the direct supervision of a qualified line-clearance arborist. In the course of such training, the trainee becomes familiar with the equipment and hazards in line clearance and demonstrates ability in the performance of the special techniques involved.

4.33 raise: Pruning to provide vertical clearance (7.3).

4.34 reduce: Pruning to decrease height and/or spread (7.4).

4.35 remote area: As used in the utility pruning section of this standard, an unpopulated area.

4.36 restoration: Pruning to redevelop structure, form, and appearance of topped or damaged trees (6.3).

4.37 rural area: As used in the utility pruning section of this standard, a sparsely populated place away from large cities, suburbs, or towns but distinct from remote areas.

4.38 shall: As used in this standard, denotes a mandatory requirement.

4.39 shoot: Stem or branch and its leaves, especially when young.

4.40 should: As used in this standard, denotes an advisory recommendation.

4.41 specifications: A document stating a detailed, measurable plan or proposal for provision of a product or service.

4.42 sprouts: New shoots originating from epicormic or adventitious buds, not to be confused with suckers. (syn.: watersprouts, epicormic shoots)

4.43 standard, ANSI A300: The performance parameters established by industry consensus as a rule for the measure of extent, quality, quantity, value or weight used to write specifications.

4.44 stem: A woody structure bearing buds, foliage, and giving rise to other stems.

4.45 structural pruning: Pruning to improve branch architecture (6.2).

4.46 stub: Portion of a branch or stem remaining after an internodal cut or branch breakage.

4.47 subordination: Pruning to reduce the size and ensuing growth rate of a branch or leader in relation to other branches or leaders.

4.48 sucker: Shoot arising from the roots.

4.49 thin: pruning to reduce density of live branches (7.5).

4.50 throw line: A small, lightweight line with a weighted end used to position a climber's rope in a tree.

4.51 topping: Reduction of tree size using internodal cuts without regard to tree health or structural integrity. Topping is not an acceptable pruning practice (6.1.7).

4.52 tracing: The removal of loose, damaged tissue from in and around the wound.

4.53 trunk: The main woody part of a tree beginning at and including the trunk flare and extending up into the crown from which scaffold branches grow.

4.54 trunk flare: 1. The area at the base of the plant's trunk where it broadens to form roots. 2. The area of transition between the root system and trunk (syn.: root flare).

4.55 urban/residential areas: Populated areas including public and private property that are normally associated with human activity.

4.56 utility: A public or private entity that delivers a public service, such as electricity or communications.

4.57 utility space: The physical area occupied by a utility's facilities and the additional space required to ensure its operation.

4.58 vista/view prune: Pruning to enhance a specific view without jeopardizing the health of the tree (6.4).

4.59 wound: An opening that is created when the bark of a live branch or stem is cut, penetrated, damaged, or removed.

4.60 woundwood: Partially differentiated tissue responsible for closing wounds. Woundwood develops from callus associated with wounds.

5 Pruning practices

5.1 Tree inspection

5.1.1 An arborist or arborist trainee shall visually inspect each tree before beginning work.

5.1.2 If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

5.1.3 Job briefings shall be performed as outlined in ANSI Z133.1, subclause 3.1.4.

5.2 Tools and equipment

5.2.1 Equipment, tools, and work practices that damage living tissue and bark beyond the scope of normal work practices shall be avoided.

5.2.2 Climbing spurs shall not be used when entering and climbing trees for the purpose of pruning.

Exceptions:
- when branches are more than throw-line distance apart and there is no other means of climbing the tree;
- when the outer bark is thick enough to prevent damage to the inner bark and cambium;
- in remote or rural utility rights-of-way.

5.3 Pruning cuts

5.3.1 Pruning tools used in making pruning cuts shall be sharp.

5.3.2 A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent branch without cutting into the branch bark ridge or branch collar or leaving a stub (see Figure 5.3.2).

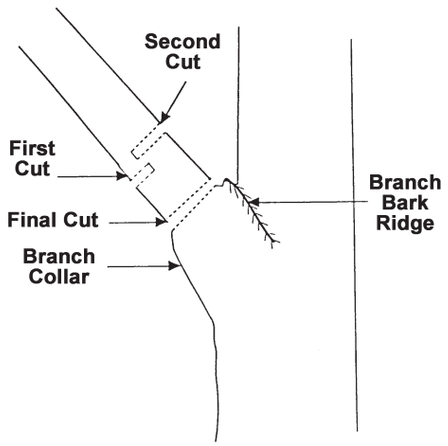


Figure 5.3.2. A cut that removes a branch at its point of origin. (See Annex A – Pruning cut guideline).

5.3.3 A pruning cut that reduces the length of a branch or parent stem shall be made at a slight downward angle relative to the remaining stem and not damage the remaining stem. Smaller cuts shall be preferred (see Fig. 5.3.3).

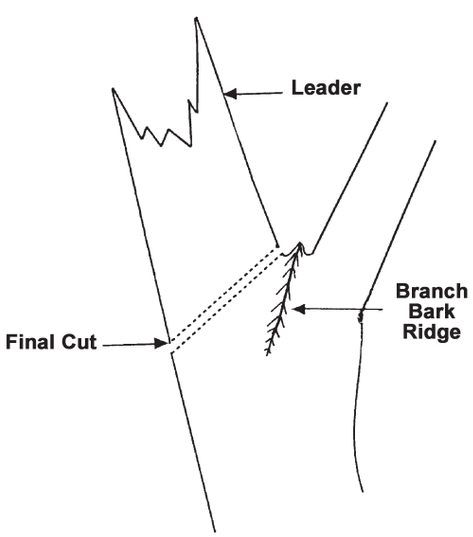


Figure 5.3.3. A cut that reduces the length of a branch or parent stem.

5.3.4 When pruning to a lateral, the remaining lateral branch should be large enough to assume the terminal role.

5.3.5 The final cut should result in a flat surface with adjacent bark firmly attached.

5.3.6 When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

5.3.7 Tree branches shall be removed in such a manner so as to avoid damage to other parts of the tree or to other plants or property. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 5.3.2). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

5.3.8 A cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent branch (see Figure 5.3.8).

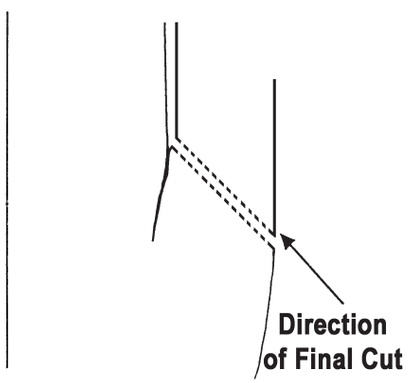


Figure 5.3.8. A cut that removes a branch with a narrow angle of attachment.

5.3.9 Severed branches shall be removed from the crown upon completion of the pruning, at times when the tree would be left unattended, or at the end of the workday.

5.4 Wound treatment

5.4.1 Wound treatments shall not be used to cover wounds or pruning cuts, except when necessary for disease, insect, mistletoe, or sprout control, or for cosmetic reasons.

5.4.2 Wound treatments that are damaging to tree tissues shall not be used.

5.4.3 When tracing wounds, only loose, damaged tissue shall be removed.

6 Pruning objectives

6.1 Pruning objectives shall be established prior to beginning any pruning operation.

6.1.1 Objectives should include, but are not limited to, one or more of the following:

- Risk reduction
- Manage health
- Clearance
- Structural improvement/correction
- View improvement/creation
- Aesthetic improvement
- Restoration

6.1.2 Established objectives should be specified in writing (See Annex B – *Specification writing guideline*).

6.1.3 To obtain the defined objective, the growth cycles, structure, species, and the extent of pruning to be performed shall be considered.

6.1.4 Not more than 25 percent of the foliage should be removed within an annual growing season. The percentage and distribution of foliage to be removed shall be adjusted according to the plant's species, age, health, and site.

6.1.5 When frequent excessive pruning is necessary for a tree to avoid conflicts with elements such as infrastructure, view, traffic, or utilities, removal or relocation of the tree shall be considered.

6.1.6 Pruning cuts should be made in accordance with section 5.3 *Pruning cuts*.

6.1.7 Topping and lion's tailing shall be considered unacceptable pruning practices for trees.

6.2 Structural: Structural pruning shall consist of selective pruning to improve tree and branch architecture primarily on young- and medium-aged trees.

6.2.1 Size and location of leaders or branches to be subordinated or removed should be specified.

6.2.2 Dominant leader(s) should be selected for development as appropriate.

6.2.3 Strong, properly spaced scaffold branch structure should be selected and maintained by reducing or removing others.

6.2.4 Temporary branches should be retained or reduced as appropriate.

6.2.5 Interfering, overextended, defective, weak, and poorly attached branches should be removed or reduced.

6.2.6 At planting, pruning should be limited to cleaning (7.2).

6.3 Restoration: Restoration shall consist of selective pruning to redevelop structure, form, and appearance of severely pruned, vandalized, or damaged trees.

6.3.1 Location in tree, size range of parts, and percentage of sprouts to be removed should be specified.

6.4 Vista/view: Vista/view pruning shall consist of the use of one or more pruning methods (types) to enhance a specific line of sight.

6.4.1 Pruning methods (types) shall be specified.

6.4.2 Size range of parts, location in tree, and percentage of foliage to be removed should be specified.

6.5 Espalier

6.5.1 Branches that extend outside the desired plane of growth shall be pruned or tied back.

6.5.2 Ties should be replaced as needed to prevent girdling the branches at the attachment site.

6.6 Pollarding

6.6.1 Consideration shall be given to the ability of the individual tree to respond to pollarding.

6.6.2 Management plans shall be made prior to the start of the pollarding process for routine removal of sprouts.

6.6.3 Heading cuts shall be made at specific locations to start the pollarding process. After the initial cuts are made, no additional heading cuts shall be made.

6.6.4 Sprouts growing from the cut ends of branches (knuckles) should be removed annually during the dormant season.

7 Pruning methods (types)

7.1 One or more of the following methods (types) shall be specified to achieve the objective.

7.2 Clean: Cleaning shall consist of pruning to remove one or more of the following non-beneficial parts: dead, diseased, and/or broken branches.

7.2.1 Location of parts to be removed shall be specified.

7.2.2 Size range of parts to be removed shall be specified.

7.3 Raise: Raising shall consist of pruning to provide vertical clearance.

7.3.1 Clearance distance shall be specified.

7.3.2 Location and size range of parts to be removed should be specified.

7.3.3 Live crown ratio should not be reduced to less than 50 percent.

7.4 Reduce: Reducing shall consist of pruning to decrease height and/or spread.

7.4.1 Consideration shall be given to the ability of a species to tolerate this type of pruning.

7.4.2 Location of parts to be removed or clearance requirements shall be specified.

7.4.3 Size of parts should be specified.

7.5 Thin: Thinning shall consist of selective pruning to reduce density of live branches.

7.5.1 Thinning should result in an even distribution of branches on individual branches and throughout the crown.

7.5.2 Not more than 25 percent of the crown should be removed within an annual growing season.

7.5.3 Location of parts to be removed shall be specified.

7.5.4 Percentage of foliage and size range of parts to be removed shall be specified.

8 Palm pruning

8.1 Palm pruning should be performed when fronds, fruit, or loose petioles may create a dangerous condition.

8.2 Live healthy fronds should not be removed.

8.3 Live, healthy fronds above horizontal shall not be removed. Exception: Palms encroaching on electric supply lines (see Fig. 8.3a and 8.3b).

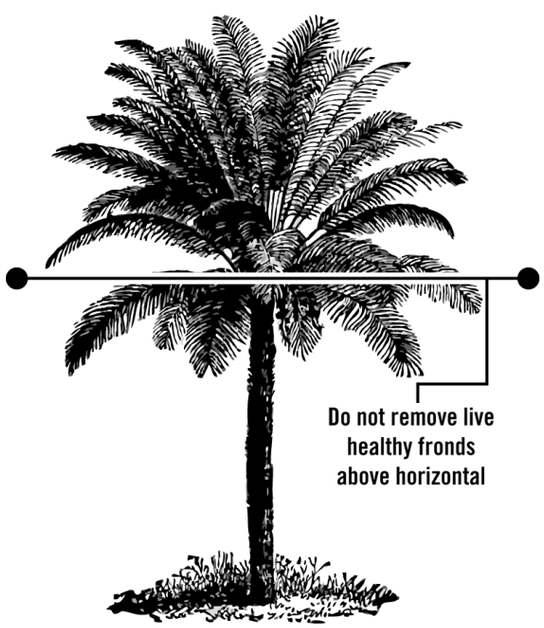


Figure 8.3a Frond removal location.

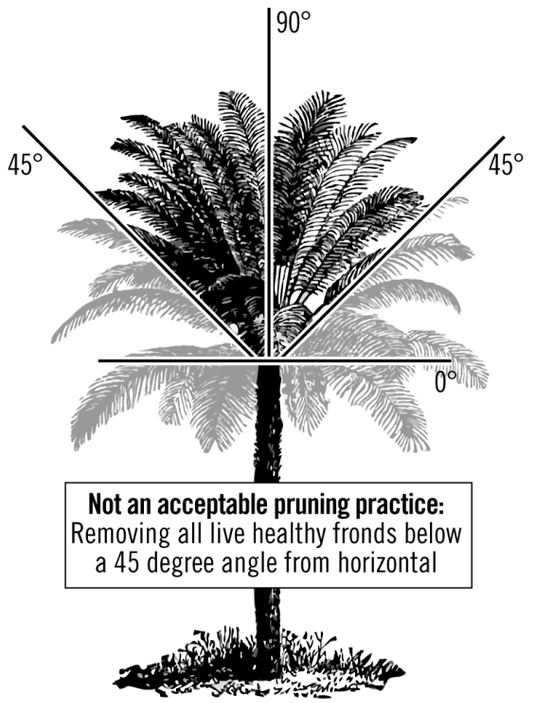


Figure 8.3b An overpruned palm (not an acceptable pruning practice).

8.4 Fronds removed should be severed close to the petiole base without damaging living trunk tissue.

8.5 Palm peeling (shaving) should consist of the removal of only the dead frond bases at the point they make contact with the trunk without damaging living trunk tissue.

9 Utility pruning

9.1 Purpose

The purpose of utility pruning is to prevent the loss of service, comply with mandated clearance laws, prevent damage to equipment, maintain access, and uphold the intended usage of the facility/utility space while adhering to accepted tree care performance standards.

9.2 General

9.2.1 Only a qualified line-clearance arborist or line-clearance arborist trainee shall be assigned to line clearance work in accordance with ANSI Z133.1, 29 CFR 1910.331 – 335, 29 CFR 1910.268 or 29 CFR 1910.269.

9.2.2 Utility pruning operations are exempt from requirements in subclause 5.1, *Tree Inspection*, for conditions outside the utility pruning scope of work.

9.2.3 Job briefings shall be performed as outlined in ANSI Z133.1, subclause 3.1.4.

9.3 Utility crown reduction pruning

9.3.1 Urban/residential areas

9.3.1.1 Pruning cuts should be made in accordance with subclause 5.3, *Pruning cuts*. The following requirements and recommendations of 9.3.1.1 are repeated from subclause 5.3 *Pruning cuts*.

9.3.1.1.1 A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent branch, without cutting into the branch bark ridge or collar, or leaving a stub (see Figure 5.3.2).

9.3.1.1.2 A pruning cut that reduces the length of a branch or parent stem shall be made at a slight downward angle relative to the remaining stem and not damage the remaining stem. Smaller cuts shall be preferred (see Fig. 5.3.3).

9.3.1.1.3 The final cut shall result in a flat surface with adjacent bark firmly attached.

9.3.1.1.4 When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

9.3.1.1.5 Tree branches shall be removed in such a manner so as not to cause damage to other parts of the tree or to other plants or property. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 5.3.2). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

9.3.1.1.6 A cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent branch (see Figure 5.3.8).

9.3.1.2 A minimum number of pruning cuts should be made to accomplish the purpose of facility/utility pruning. The structure and growth habit of the tree should be considered.

9.3.1.3 Trees directly under and growing into facility/utility spaces should be removed or pruned. Such pruning should be done by removing entire branches or leaders or by removing branches that have laterals growing into (or once pruned, will grow into) the facility/utility space.

9.3.1.4 Trees growing next to, and into or toward, facility/utility spaces should be pruned by reducing branches to laterals (5.3.3) to direct growth away from the utility space or by removing entire branches. Branches that, when cut, will produce sprouts that would grow into facilities and/or utility space should be removed.

9.3.1.5 Branches should be cut to laterals or the parent branch and not at a pre-established clearing limit. If clearance limits are established, pruning cuts should be made at laterals or parent branches outside the specified clearance zone.

9.3.2 Rural/remote locations – mechanical pruning

Cuts should be made close to the main stem, outside of th branch bark ridge and branch collar. Precautions should be taken to avoid stripping or tearing of bark or excessive wounding.

9.4 Emergency service restoration

During a utility-declared emergency, service must be restored as quickly as possible in accordance with ANSI Z133.1, 29 CFR 1910.331 – 335, 29 CFR 1910.268, or 29 CFR 1910.269. At such times, it may be necessary, because of safety and the urgency of service restoration, to deviate from the use of proper pruning techniques as defined in this standard. Following the emergency, corrective pruning should be done as necessary.

Annex A
Pruning cut guideline

A-1 Three-cut method

Multiple cutting techniques exist for application of a three-cut method. A number of them may be used to implement an acceptable three-cut method.

A-1.1 The technique depicted in *Figure 5.3.2* demonstrates one example of a three-cut method that is common to hand-saw usage. It is not intended to depict all acceptable three-cut method techniques.

Annex B
Specification writing guideline

A300 (Part 1)-2008 *Pruning* standards are performance standards, and shall not be used as job specifications. Job specifications should be clearly detailed and contain measurable criteria.

The words “should” and “shall” are both used when writing standards. The word “shall” is used when writing specifications.

Writing specifications can be simple or complex and can be written in a format that suits your company/the job. The specifications consist of two sections.

I. General:

This section contains all aspects of the work to be performed that needs to be documented, yet does not need to be detailed.

Saying under the General section that “all work shall be completed in compliance with A300 Standards” means the clauses covering safety, inspections, cuts, etc. will be adhered to. There is no need to write each and every clause into every job specification.

Other items that may be covered in the General section could be: work hours and dates, traffic issues, disposal criteria, etc.

The second section under Job Specifications would be:

II. Details:

This section provides the clear and measurable criteria; the deliverables to the client.

This section, to be written in compliance with A300 standards, shall contain the following information:

1. **Objective – Clause 6**
   These objectives originate from/with the tree owner or manager. The arborist shall clearly state what is going to be done to achieve the objective(s).

   Objectives can be written for the entire job or individual trees. Rarely can one or two words clearly convey an objective so that all parties involved (client, sales, crew, etc.) can visualize the outcome.
2. **Method – Clause 7**
   Here the method(s) to be used to achieve the objective are stated. Again, depending on the type of job, this can be stated for the individual tree or a group of trees.
3. **Location – Clause 7.2.1, 7.3.2, 7.4.2, 7.5.3**
   This is the location in the tree(s) that the work methods are to take place.
4. **Density – Clause 7.3.1, 7.3.3, 7.5.1, 7.5.2, 7.5.4**
   This is the amount or volume of parts that are to be removed and can be stated exactly or in ranges.
5. **Size – Clause 7.2.2, 7.3.2, 7.4.3, 7.5.4**
   This is the size or range of sizes of cut(s) utilized to remove the volume specified.

   NOTE: Items # 4 & 5 are directly related to resource allocation, staffing and dollars.

SAMPLE PRUNING SPECIFICATIONS

#1. **Scope:** Large live oak on west side of pool

Objectives: Increase light penetration through east side of tree. Reduce risk potential of 1-inch-diameter branches falling.

Specifications: All broken branches and 1-inch-plus diameter dead branches shall be removed from the crown.

The three lowest 8-inch-plus diameter branches on the east side shall be thinned 25 percent with 1-inch- to 3-inch-diameter cuts.

NOTE: All work shall be completed in compliance with ANSI A300 and Z133.1 Standards.

Annex B
Specification writing guideline

#2. **Scope:** 1 Arizona ash

Objective: Enhance structure/structural development.

Specifications: General:

All pruning shall be completed in compliance with A300 Standards.

Detail:

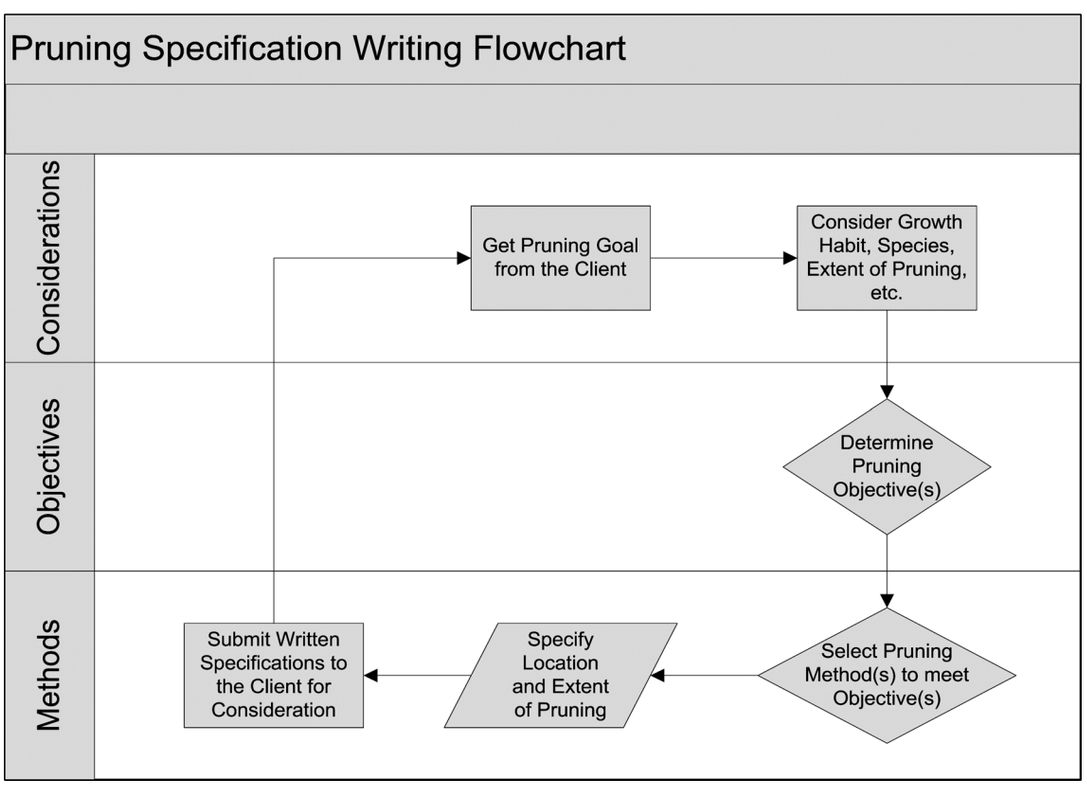
Thin crown 20-25 percent with 1-inch- to 4-inch-diameter cuts. Reduce west codominant leader by approximately 12 feet.

#3. **Scope:** Twenty-three newly installed evergreen elms

Objective: Maximize establishment – reduce nuisance while enhancing natural growth habit.

All work shall be completed in compliance with A300 Standards and the following specifications.

Specifications:
- Retain as much size as possible and 80-90 percent density of foliage.
- Lowest permanent branch will be 6 feet above grade in four to five years.
- Retain all sprout growth originating 18 inches above grade on trunk and 4 inches out from branch attachments throughout crown.
- Remove weakest rubbing branches.
- Remove dead branches.
- Reduce broken branches or branches with dead ends back to live laterals or buds. Heading cuts can be used.
- Maintain 6 inches behind adjacent edge of walks all growth that originates between 1.5 feet (18 inches) and 6 feet (72 inches) above grade. Heading cuts are acceptable.



Annex C
Applicable ANSI A300 interpretations

The following interpretations apply to Part 1 – *Pruning:*

C-1 Interpretation of "should" in ANSI A300 standards

"An advisory recommendation" is the common definition of "should" used in the standards development community and the common definition of "should" used in ANSI standards. An advisory notice is not a mandatory requirement. Advisory recommendations may not be followed when defensible reasons for non-compliance exist.

C-2 Interpretation of "shall" in ANSI A300 standards

"A mandatory requirement" is the common definition of "shall" used in the standards development community and the common definition of "shall" used in ANSI standards. A mandatory requirement is not optional and must be followed for ANSI A300 compliance.

ANSI A300 (Part 3)-2006
Revision of ANSI A300 (Part 3)-2000

American National Standard

Tree, Shrub, and Other Woody Plant Maintenance — Standard Practices (Supplemental Support Systems)

ANSI A300 (Part 3)-2006 Supplemental Support Systems
Revision of ANSI A300 (Part 3)-2000

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A300 (Part 3)-2006

American National Standard
for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices *(Supplemental Support Systems)*

Secretariat

Tree Care Industry Association, Inc.

Approved August 4, 2006
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American National Standard

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Contents

Figures and Tables

* indicates illustration adapted and formatted, with permission, from *Arborist Equipment: A Guide to the Tools and Equipment of Tree Maintenance and Removal*. International Society of Arboriculture Publishing, Champaign, IL.

Foreword (This foreword is not part of American National Standard A300 Part 3-2006)

An industry-consensus standard must have the input of the industry that it is intended to affect. The Accredited Standards Committee A300 was approved June 28, 1991. The committee includes representatives from the residential and commercial tree care industry, the utility, municipal, and federal sectors, the landscape and nursery industries, and other interested organizations. Representatives from varied geographic areas with broad knowledge and technical expertise contributed.

The A300 standards are placed in proper context if one reads the Scope, Purpose, and Application. This document presents performance standards for the care and maintenance of trees, shrubs, and other woody plants. It is intended as a guide in the drafting of maintenance specifications for federal, state, municipal, and private authorities including property owners, property managers, and utilities.

The A300 standards stipulate that specifications for tree work should be written and administered by a professional possessing the technical competence to provide for, or supervise, the management of woody landscape plants. Users of this standard must first interpret its wording, then apply their knowledge of growth habits of certain plant species in a given environment. In this manner, the users ultimately develop their own specifications for plant maintenance.

ANSI A300 Part 3 – *Supplemental Support Systems*, should be used in conjunction with the rest of the A300 standard when writing specifications for tree care operations.

Suggestions for improvement of this standard should be forwarded to: A300 Secretary, c/o Tree Care Industry Association, 3 Perimeter Road – Unit 1, Manchester, NH 03103, USA or e-mail: tcia@treecareindustry.org

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Maintenance Operations – Standard Practices, A300. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the A300 committee had the following members:

Tim Johnson, Chair
(Artistic Arborist, Inc.)
Bob Rouse, Secretary
(Tree Care Industry Association, Inc.)

Organizations Represented	**Name of Representative**
American Nursery and Landscape Association	*Warren Quinn*
	Craig J. Regelbrugge (Alt.)
American Society of Consulting Arborists	*Tom Mugridge*
	Donald Zimar (Alt.)
American Society of Landscape Architects	*Ron Leighton*
Asplundh Tree Expert Company	*Geoff Kempter*
	Peter Fengler (Alt.)
Bartlett Tree Expert Company	*Peter Becker*
	Dr. Thomas Smiley (Alt.)

Davey Tree Expert Company ..... *Joseph Tommasi*
Dick Jones (Alt.)
International Society of Arboriculture ..... *Bruce Hagen*
Sharon Lilly (Alt.)
National Park Service ..... *Robert DeFeo*
Dr. James Sherald (Alt.)
Professional Landcare Network ..... *Preston Leyshon*
Tanya Tolpegin (Alt.)
Professional Grounds Management Society ..... *Tom Shaner*
Society of Municipal Arborists ..... *Andrew Hillman*
Tom Russo (Alt.)
Tree Care Industry Association ..... *Dane Buell*
James McGuire (Alt.)
U.S. Forest Service ..... *Ed Macie*
Keith Cline (Alt.)
Utility Arborist Association ..... *Matthew Simons*
Jeffrey Smith (Alt.)

Additional organizations and individuals:

American Forests (Observer)
Beth Palys (Observer)
Peter Gerstenberger (Observer)
Mike Galvin (Observer)
Myron Laible (Observer)
Richard Rathjens (Observer)

American National Standard for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices *(Supplemental Support Systems)*

Clause 1 excerpted from ANSI A300 (Part 1) – 2001 *Pruning*

1 ANSI A300 standards

1.1 Scope

ANSI A300 standards present performance standards for the care and maintenance of trees, shrubs, and other woody plants.

1.2 Purpose

ANSI A300 standards are intended as guides for federal, state, municipal and private authorities including property owners, property managers, and utilities in the drafting of their maintenance specifications.

1.3 Application

ANSI A300 standards shall apply to any person or entity engaged in the business, trade, or performance of repairing, maintaining, or preserving trees, shrubs, or other woody plants.

1.4 Implementation

Specifications for tree maintenance should be written and administered by an arborist.

30 Part 3 – Supplemental Support Systems standards

30.1 Purpose

The purpose of Part 3 is to provide standards for writing specifications for supplemental support systems.

30.2 Reasons for supplemental support systems

Supplemental support systems are used to provide additional support or limit movement of a tree or tree part.

30.3 Safety

30.3.1 Tree maintenance shall only be performed by an arborist or arborist trainee.

30.3.2 This standard shall not take precedence over arboricultural safe work practices.

30.3.3 Operations shall comply with applicable Occupational Safety and Health Administration (OSHA) standards, ANSI Z133.1, as well as state and local regulations.

31 Normative references

The following standards contain provisions which, through reference in the text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard shall apply the most recent edition of the standards indicated below.

ANSI A300 Part 1 *Pruning*

ANSI A300 Part 4 *Lightning Protection Systems*

ANSI A300 Part 6 *Transplanting*

ANSI B18.12, *Glossary of Terms for Mechanical Fasteners*

ANSI Z60.1, *Nursery stock*

ANSI Z133.1, *Arboricultural operations – safety requirements*

ANSI/UL 96, *Lightning Protection Components*

ASTM A475, *Standard Specification for Zinc-Coated Steel Wire Strand*

Federal Standard: FF-T-276b, *Thimbles, Rope*

29 CFR 1910, *General industry*[1]

[1)] ***Available from U.S. Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210.***

29 CFR 1910.268, *Telecommunications* [1]

29 CFR 1910.269, *Electric power generation, transmission, and distribution* [1]

29 CFR 1910.331 - 335, *Electrical safety-related work practices* [1]

32 Definitions

32.1 amon-eye nut: A drop-forged eye nut.

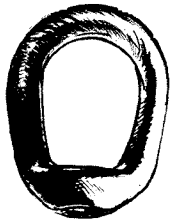


Fig. 32.1 amon-eye nut

32.2 anchor: A cable-to-tree attachment.

32.3 anchor-tree: A tree used as an anchor in guying.

32.4 arborist: 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.

32.5 arborist trainee: An individual undergoing on-the-job training to obtain the experience and the competence required to provide for, or supervise, the management of trees and woody ornamentals. Such trainees shall be under the direct supervision of an arborist.

32.6 bond: An electrical connection between an electrically conductive object and a component of a lightning protection system that is intended to significantly reduce potential differences created by lightning currents.

32.7 brace: Lag- or machine-threaded rods installed in or through limbs, leaders, or trunks used to provide supplemental support.

32.8 bracing: The installation of a brace system.

32.9 cable: 1) Zinc-coated strand per ASTM A475, such as extra-high strength (EHS) and common-grade, 7-strand. 2) Stainless steel or galvanized wire rope, such as aircraft cable. 3) Single strand wire. 4) Synthetic-fiber rope or synthetic-fiber webbing.

32.10 cable grip: A mechanical device that temporarily grasps and holds a wire rope or strand cable during installation.

32.11 cabling: The installation of a cable system between leaders, limbs, and branches within a tree to provide supplemental support.

32.12 connector clamp: A device meeting ANSI/UL-96 standard, used to bond a conductor to a steel cable.

32.13 dead-end brace: A brace formed by threading a lag-thread screw rod directly into the limb, leader, or trunk, but not through the side opposite the installation.

32.14 dead-end grip: A manufactured wire wrap designed to form a termination at the end of 1 X 7, left-hand lay cable that meets the specifications of ASTM A475 for zinc-coated strand.

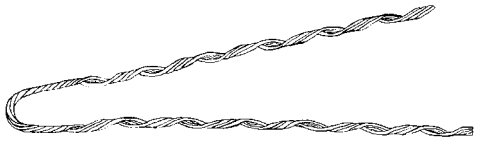


Fig. 32.14 dead-end grip

32.15 dead-end hardware: Anchors or braces that are threaded directly into the limb, leader, or trunk, but not through the side opposite the installation. Dead-end hardware includes but is not limited to: lag hooks, lag eyes, and lag-thread screw rod.

32.16 eye bolt: A drop-forged, closed-eye bolt.

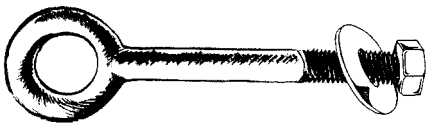


Fig. 32.16 eye bolt

32.17 eye splice: A closed-eye termination.

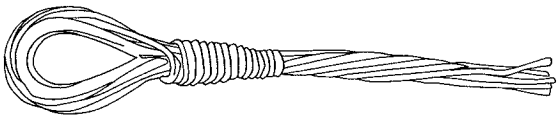


Fig. 32.17 eye splice

[1] *Available from U.S. Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210.*

32.18 ground anchor: A cable to ground attachment.

32.19 guy: A steel cable or synthetic-fiber cable system installed between a tree and an external anchor to provide supplemental support

32.20 guying: The installation of a guy system.

32.21 lag eye: A lag-thread, drop-forged, closed-eye anchor.

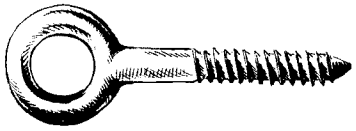


Fig. 32.21 lag eye

32.22 lag hook (J-hook): A lag-thread, J-shaped anchor.

Fig. 32.22 lag hook

32.23 lag thread: A coarse screw thread designed for self-tapping into wood.

32.24 lag-thread hardware: Anchors or braces with lag-threads. Lag-thread hardware includes, but is not limited to, lag eyes, lag hooks, and lag-thread screw rod.

32.25 lag-thread screw rod: A lag-thread, steel rod used for dead-end and through-brace installations.

Fig. 32.25 lag-thread screw rod

32.26 loop anchor: A synthetic fiber termination that serves as an anchor.

32.27 machine thread: A fine screw thread designed for fittings (such as nuts).

32.28 machine-threaded rod: A machine-thread, steel rod used for through-brace installations.

32.29 peen: The act of bending, rounding or flattening the fastening end(s) of through-hardware for the purpose of preventing a nut from “backing-off.”

32.30 prop: Rigid support placed between a trunk, limb, or branch and the ground.

32.31 propping: The installation of a prop to provide supplemental support.

32.32 shall: As used in this standard, denotes a mandatory requirement.

32.33 should: As used in this standard, denotes an advisory recommendation.

32.34 specifications: A document stating a detailed, measurable plan or proposal for provision of a product or service.

32.35 standards, ANSI A300: Performance parameters established by industry consensus as a rule for the measure of quantity, weight, extent, value, or quality.

32.36 supplemental support system: A system designed to provide additional support or limit movement of a tree or tree part.

32.37 taut: Tightened to the point of eliminating visible slack.

32.38 termination: A device or configuration that secures the end of a cable to the anchor in a cabling or guying installation.

32.39 termination hardware: Hardware used to form a termination. Termination hardware includes, but is not limited to, dead-end grips and thimbles used in eye-splice configurations.

32.40 thimble: An oblong galvanized or stainless steel fitting with flared margins and an open-ended base.

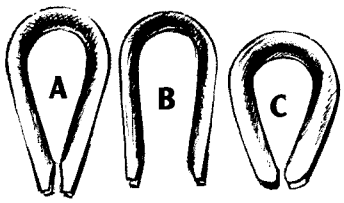


Fig. 32.40 thimble

32.41 through-brace: A brace formed by installing through-hardware into a limb, leader, or trunk completely through the side opposite the installation.

32.42 through-hardware: Anchors or braces that pass completely through a limb, leader, or trunk. Through-hardware includes but is not limited to: eyebolts, lag-thread screw rod, and machine-threaded rod.

32.43 turnbuckle: A drop-forged, closed-eye device for adjusting tension.

Fig. 32.43 turnbuckle

32.44 wire rope clamp: A clamp consisting of a "U" bolt, saddle plate, and fastening nuts.

Fig. 32.44 wire rope clamp

33 Supplemental support systems practices

33.1 Supplemental support systems objectives

Objectives for supplemental support systems shall be clearly defined prior to installation.

33.2 Tree inspection

33.2.1 A qualified arborist or arborist trainee shall visually inspect each tree before beginning work.

33.2.2 Structural integrity and potential changes in tree dynamics shall be considered prior to installing a supplemental support system.

33.2.3 If a condition is observed requiring attention beyond the original scope of work, the condition shall be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

33.3 Tools and equipment

33.3.1 Climbing spurs shall not be used when climbing trees to install supplemental support systems, except in the case of emergencies, such as aerial rescue, or when the tree cannot be climbed safely by other methods.

33.3.2 Equipment and work practices that damage bark, cambium, live palm tissue, or any combination of these, beyond the scope of the work, should be avoided.

33.3.3 Cable grips used to tension the cable shall be designed for use with the type of cable being installed.

33.4 General

33.4.1 System design shall be specified.

33.4.2 When necessary to accomplish the objective, pruning should be performed prior to installing a supplemental support system. Pruning shall be in accordance with ANSI A300 Part 1 – *Pruning*.

33.4.3 Prior to installation, the owner or owner's agent should be notified of the need for periodic inspection of the supplemental support system by an arborist (see subclause 34.1). Scheduling inspections shall be the responsibility of the tree owner.

33.4.4 Anchors and braces shall not be installed into decayed areas where sound wood is less than 30 percent of the trunk or branch diameter (refer to Fig. 33.4.4).

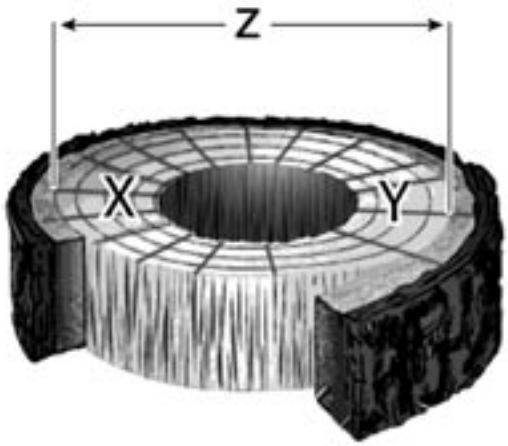


Fig. 33.4.4 Equations for finding the percentage of sound wood.

Symbol Key for Equations:
X = sound wood depth, working side.
Y = sound wood depth, opposite side.
Z = total trunk/branch diameter, bark diameter not included.

Equation for percentage of sound wood for through-bolt applications:

[(X + Y) ÷ Z] x 100 = % of sound wood for through-bolt applications.

Equation for percentage of sound wood for dead-end applications:

(X ÷ Z) x 100 = % of sound wood for dead-end applications.

33.4.5 Steel cables or guys in trees with existing lightning protection conductors shall be bonded to the lightning protection system. A connector clamp, designed for use in lightning protection systems, shall be used to bond steel cables or guys to the lightning protection system. Refer to ANSI A300 Part 4 – *Lightning Protection Systems*.

33.4.6 Supplemental support systems shall be installed in compliance with minimum distance specification in Table 1 in ANSI Z133.1 for overhead, energized conductors.

33.4.7 Steel hardware shall be corrosion resistant. Synthetic fiber cable systems shall be ultra-violet (UV) light resistant.

33.4.8 Wire rope clamps shall not be used to form terminations in cables larger than 1/8 inch (3 mm).

33.4.9 Treatment of cavities by filling shall not be considered to provide support.

33.5 Installation practices

33.5.1 Holes should not be drilled closer together than the diameter of the branch or trunk being drilled or 12 inches (30 cm), whichever is less. The diameter of the hole shall not be greater than one-sixth (1/6) the diameter of the limb, trunk, or branch at the point of installation (see Fig. 33.5.1).

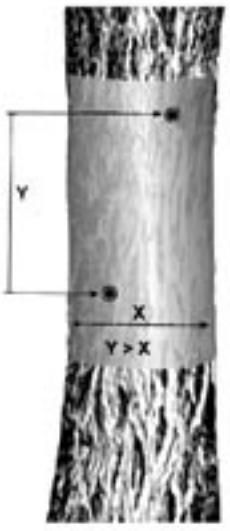


Fig. 33.5.1 Correct brace positioning

33.5.2 Longitudinal alignment of anchors and/or braces should be avoided.

33.5.3 Anchor(s) shall be installed in alignment with the cable and termination hardware, and not be subjected to side loading (see Fig. 33.5.3).

Fig. 33.5.3 Correct cable and hardware alignment

33.5.4 Synthetic cable systems shall have a restraint to prevent movement of the loop anchor and shall not girdle the trunk, limb or branch.

33.5.5 Only one termination shall be attached to an anchor.

33.5.6 Lag-thread hardware shall only be installed in sound wood. The hole shall be 1/16” to 1/8” (1.5-3 mm) smaller than the diameter of the lag-thread hardware.

33.5.7 For through-hardware applications, holes should be no greater than 1/8” (3 mm) larger in diameter than the hardware being installed.

33.5.8 Lag hooks shall only be used when they can be seated to the full length of the threads. If it is not possible to seat the full length of lag hook threads, other hardware shall be selected.

33.5.9 Lag hooks shall be installed to prevent the termination from coming off the hook. Bark should not be damaged beyond the scope of the work during installation.

33.5.10 When installing through-hardware, heavy-duty or heat-treated, heavy-duty round steel washers shall be installed between the nut(s) and the wood or bark (see Fig. 33.5.3).

33.5.11 Washers shall not be countersunk into the wood.

33.5.12 Fasteners for threaded hardware, such as nuts, amon eyes, and turnbuckles, shall be secured to prevent loosening.

33.5.13 Any excess portion of the through-hardware shall be removed.

33.5.14 Terminations shall be specified in the system design specifications.

33.5.15 Termination hardware shall be the appropriate size and type for the cable to be installed.

33.5.16 Terminations formed by eye-splice configurations shall incorporate thimbles.

33.5.17 Dead-end grip terminations shall only be used on cable that meets the specifications of ASTM A475.

33.5.18 Dead-end grip terminations shall incorporate extra heavy-duty wire rope thimbles – Type III, that meet the performance specifications of federal standard FF-T276b.

33.5.19 All hardware within a system shall meet or exceed the minimum strength required to achieve the objective.

33.5.20 Installations shall follow manufacturers' recommendations.

33.6 Cabling

33.6.1 Cabling objectives

Cabling objectives shall be established prior to beginning any cabling operation.

33.6.2 Cabling types

Cabling system specifications should include one or more of the following types:

33.6.2.1 Direct: Direct cabling consists of a single cable between two tree parts (see Fig 33.6.2.1).

33.6.2.1.1 Location of hardware shall be specified.

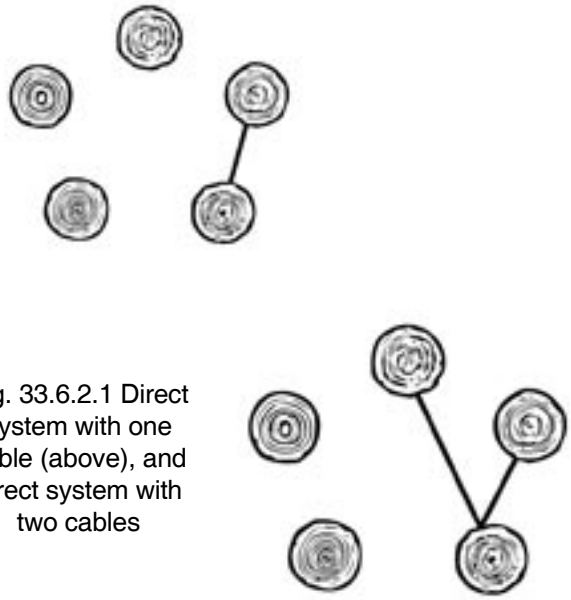


Fig. 33.6.2.1 Direct system with one cable (above), and direct system with two cables

33.6.2.2 Triangular: Consists of connecting tree parts in combination of threes. This method should be applied when maximum direct support is required (see Fig. 33.6.2.2).

33.6.2.2.1 Location of hardware shall be specified.

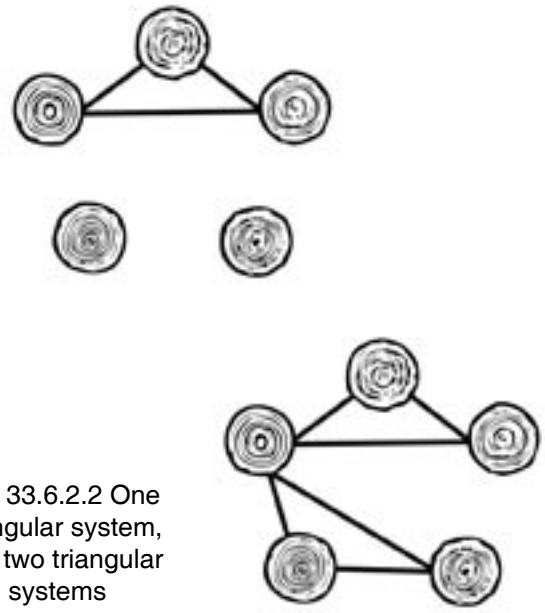


Fig. 33.6.2.2 One triangular system, and two triangular systems

33.6.2.3 Box: Consists of connecting four or more tree parts in a closed series. This system

should be used only when minimal direct support is needed (see Fig. 33.6.2.3).

33.6.2.3.1 Location of hardware shall be specified.

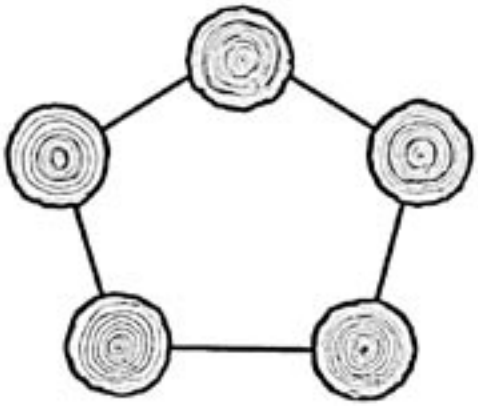


Fig. 33.6.2.3 Box system

33.6.2.4 Hub and Spoke: Consists of a center attachment (hub) with spans (spokes) of cable radiating to three or more leaders. Hub and Spoke cabling should only be used when other installation techniques cannot be installed to achieve the objective (see Fig. 33.6.2.4).

33.6.2.4.1 Location of hardware shall be specified.

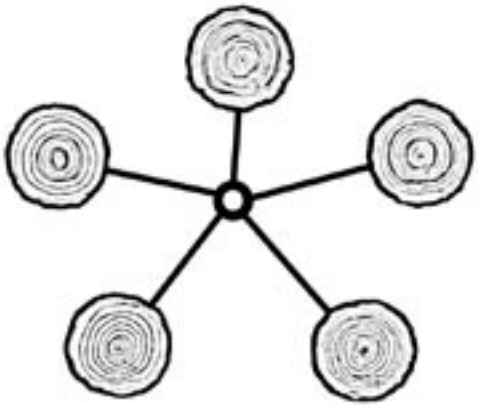


Fig. 33.6.2.4 Hub and spoke system

33.6.3 Cabling installation

33.6.3.1 Steel cables should be taut following installation.

33.6.3.2 Anchor(s) should be installed at or near a point two-thirds (2/3) of the length/height of the limb or leader to be supported (see Fig. 33.6.3.2).

Fig. 33.6.3.2 Correct cable installation

33.6.3.3 The correct angle of cable installation should be perpendicular to an imaginary line bisecting the angle between the tree parts being cabled (see Fig. 33.6.3.2).

33.6.3.4 The continuous support function of existing cables shall be maintained when replacing or upgrading cable systems.

33.7 Bracing

33.7.1 Bracing objectives

Bracing objectives shall be established prior to beginning any bracing operation.

33.7.2 Bracing types

Bracing system specifications should include one or more of the following types:

33.7.2.1 Single: Single bracing consists of one installed rod (see Fig. 33.7.2.1).

Fig. 33.7.2.1 Single brace system

33.7.2.2 Parallel: Parallel bracing consists of two or more rods installed in vertical and directional alignment (see Fig. 33.7.2.2).

Fig. 33.7.2.2 Parallel brace system

33.7.2.3 Alternating: Alternating bracing consists of two or more rods installed in directional alignment but not in vertical alignment (see Fig. 33.7.2.3).

Fig. 33.7.2.3 Alternating brace system

33.7.2.4 Crossing: Crossing bracing consists of two or more rods installed in a non-aligned pattern (see Fig. 33.7.2.4).

Fig. 33.7.2.4 Crossing brace system

33.7.3 Bracing installation

33.7.3.1 A cabling system should be used to provide supplemental support for the limbs forming the crotch being braced.

33.7.3.2 The preferred location for a single rod for a non-split crotch should be one to two times the branch diameter above the crotch.

33.7.3.3 Brace systems using multiple rods should have at least one rod installed above the crotch.

33.7.3.4 Bracing shall be installed in either a through-brace or dead-end brace configuration.

33.7.3.5 The minimum hardware requirements for braces should be in accordance with Table 1 (English and metric equivalent).

33.7.3.6 Through-bracing

33.7.3.6.1 Through-braces shall be used when bracing through decayed wood in trees that are prone to decay, or in trees that have weak wood characteristics.

33.7.3.6.2 Through braces shall be terminated with heavy duty washers and nuts.

33.7.3.7 Dead-end bracing

33.7.3.7.1 Dead-end bracing shall be performed with lag-thread screw rod.

33.7.3.7.2 The brace shall be installed completely through the smaller or equal portion and at least halfway into the other portion (see Fig. 33.7.3.7.2).

33.7.3.7.3 The exposed end of the lag-thread screw rod shall be inside the bark or shall be fastened with a heavy duty or heat-treated washer and a nut (see Fig. 33.7.3.7.2).

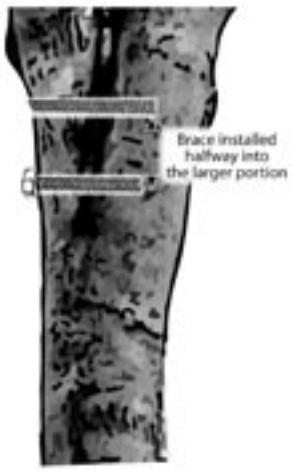


Fig. 33.7.3.7.2 Dead-end brace installation

Table 1 Minimum hardware requirements for bracing trees, English and metric equivalent

Diameter at Brace (in inches)	Brace Rod Diameter (in inches)	Minimum number of rods with split or included bark	Minimum number of rods with no apparent split or included bark
<5	1/4	1	1
5-8	3/8	1	1
8-14	1/2	2	1
14-20	5/8	2	1
20-40	3/4	3 min. with one additional for each 8" in excess of 30"	2 min. with one additional for each 8" in excess of 30"
>40	7/8	4 min. with one additional for each 8" in excess of 40"	3 min. with one additional for each 12" in excess of 40"

Diameter at Brace (in cm)	Brace Rod Diameter (in mm)	Minimum number of rods with split or included bark	Minimum number of rods with no apparent split or included bark
<13	6	1	1
13-20	10	1	1
20-36	12	2	1
36-51	16	2	1
51-102	20	3 min. with one additional for each 20 cm in excess of 76 cm	2 min. with one additional for each 20 cm in excess of 76 cm
>102	22	4 min. with one additional for each 20 cm in excess of 102 cm	3 min. with one additional for each 30 cm in excess of 102 cm

33.8 Propping

33.8.1 Propping objectives

Propping objectives shall be established prior to beginning any propping operation.

33.8.2 Propping installation

33.8.2.1 Props shall be of sufficient strength and durability to meet the objective.

33.8.2.2 Props shall be fastened to the branch in such a manner as to minimize damage and prevent the branch from falling off the prop.

33.8.2.3 Props shall be constructed in a manner so as not to restrict future growth of the branch.

33.8.2.4 Equipment and work practices that damage roots beyond the scope of the work shall be avoided.

33.8.2.5 Props shall be supported by the ground.

33.9 Guying established trees

33.9.1 Guying established trees – objectives

Objectives for guying established trees shall be established prior to beginning any guying operation.

33.9.2 Guying established trees – types

Specifications for guying established trees should include one or more of the following types:

33.9.2.1 Tree-to-ground: Tree-to-ground guying consists of installing at least one cable between a ground anchor and the tree to be guyed (see Fig. 33.9.2.1).

Fig. 33.9.2.1 Tree-to-ground system

33.9.2.2 Tree-to-tree: Tree-to-tree guying consists of installing at least one cable between an anchor-tree and the tree to be guyed (see Fig. 33.9.2.2).

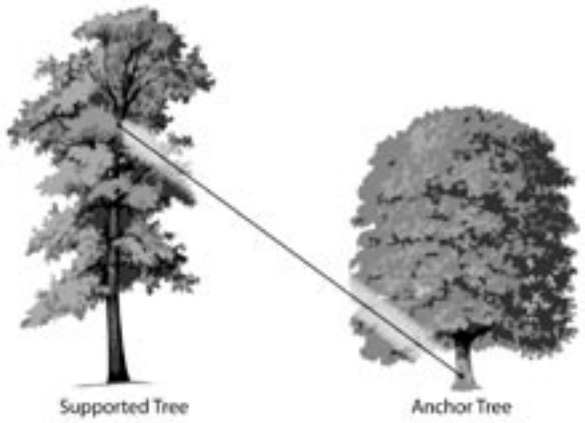


Fig. 33.9.2.2 Tree-to-tree system

33.9.3 Safety

33.9.3.1 The risk of damage or injury due to contact with guying installation components shall be considered.

33.9.4 Guying installation

33.9.4.1 Hardware in the tree shall be installed in alignment with the direction of pull and not be subjected to side loading.

33.9.4.2 Permanent guys shall be attached to the tree with dead-end hardware or through-hardware.

33.9.4.3 Tree-to-ground guying

33.9.4.3.1 Guys shall be secured to a ground-anchor(s) sufficient to achieve the objective.

33.9.4.3.2 Guys should be attached to the tree at or above a point not less than one-half the height of the tree (see Fig. 33.9.4.3.2).

33.9.4.3.3 Ground-anchor(s) should be placed no closer to the trunk than two-thirds the distance from the ground to the height of the lowest point of attachment in the tree, adjusted for slope and site conditions (see Fig. 33.9.4.3.2).

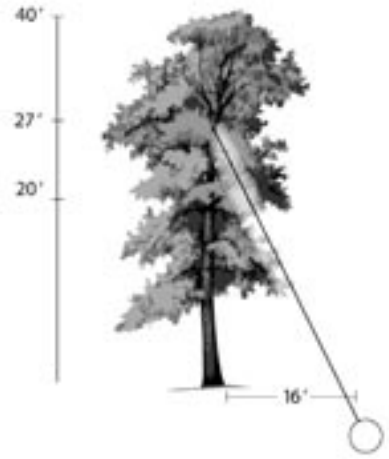


Fig. 33.9.4.3.2 Guy location in tree-to-ground systems

33.9.4.4 Tree-to-tree guying

33.9.4.4.1 Anchor-tree(s) shall be inspected for structural integrity.

33.9.4.4.2 Anchor-tree(s) shall have the ability to meet the objective.

33.9.4.4.3 Anchors shall be attached in the upper half of the tree to be guyed and in the lower half of the anchor-tree(s).

33.10 Guying newly installed landscape plants

33.10.1 Guying newly installed landscape plants – objectives

Guying objectives shall be established prior to beginning any guying operation.

33.10.2 Guying installation

33.10.2.1 Guys shall be attached using a method that minimizes damage to the tree.

33.10.2.2 A minimum of two guys should be installed at an angle sufficient to support the landscape plant.

33.10.2.3 For trees over 10-inch diameter, guys should be installed in accordance with subclause 33.9.

33.10.2.4 Guys shall be secured to a ground anchor(s) sufficient to achieve the objective.

33.10.2.5 Guys should be taut following installation.

33.10.2.6 Guys or other supplemental support systems shall be maintained and be removed when they are no longer needed as part of post planting care practices (see ANSI A300 Part 6 Transplanting).

34 Supplemental support systems inspection and maintenance

34.1 Systems should be inspected periodically for wear, corrosion, degradation of hardware and damage to the tree. The inspection should include the system's condition, position, cable tension, and the tree's structural integrity.

34.2 If problems are detected they should be corrected or the system should be repaired, replaced or modified.

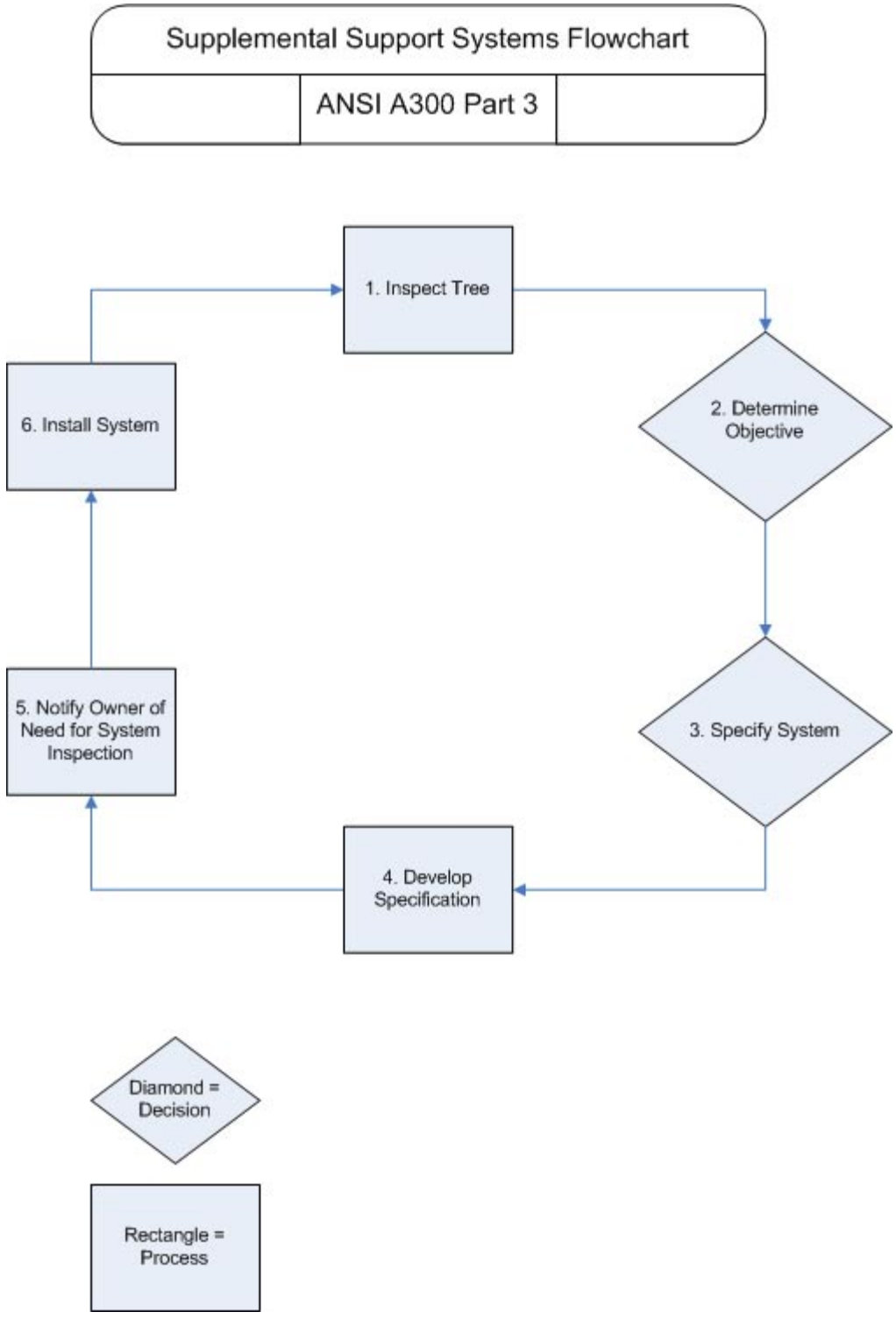
Annex A – Additional hardware information

Table A-1 Minimum hardware size for cabling trees

Maximum Limb Diameter at anchor attachment point in inches	**Estimated Load** in pounds	**Lag Hook** diameter in inches	**Eye Bolt** diameter in inches	**Amon nut / Loop nut** Threaded-rod diameter in inches	**Common Grade Cable** (galvanized, 1 x 7) diameter in inches	**Extra High Strength Cable** (1 x 7) diameter in inches	**Aircraft Cable** (galvanized, 7 x 19) diameter in inches
2	100	1/4	1/4	1/4	1/8	3/16	1/8
3.5	200	5/16	1/4	1/4	3/16	3/16	1/8
5	300	3/8	1/4	1/4	1/4	3/16	1/8
8	600	1/2	5/16	5/16	5/16	3/16	3/16
10	900	5/8	3/8	3/8	3/8	1/4	1/4
15	1000	N/A	3/8	3/8	7/16	1/4	1/4
18	1200	N/A	3/8	3/8	1/2	1/4	1/4
20	1400	N/A	1/2	7/16	1/2	5/16	1/4
24	2200	N/A	1/2	1/2	N/A	5/16	3/8
28	3300	N/A	5/8	5/8	N/A	7/16	1/2
30	3700	N/A	N/A	7/8	N/A	7/16	1/2

* N/A indicates not an acceptable application.

Annex B – Supplemental Support Systems specification flowchart



Annex C – Applicable ANSI A300 interpretations

The following interpretations apply to the ANSI A300 Part 3 Supplemental Support Systems standard.

C-1 Interpretation of "should" and "shall" in ANSI A300 standards

"An advisory recommendation" is the common definition of "should" used in the standards development community and the common definition of "should" used in ANSI standards. An advisory notice is not a mandatory requirement. Advisory recommendations might not be followed when defensible reasons for non-compliance exist.

C-2 Interpretation for compliant lag hooks, ANSI A300 Part 3 – 2000, subclauses 38.5 and 38.7 (see subclause 33.5.6 and 33.5.8 in ANSI A300 Part 3 – 2006)

38.5 Lag-thread hardware shall only be installed in sound wood. The hole for the lag-thread hardware shall be 1/16" to 1/8" (1.5-3 mm) smaller than the diameter of the lag.

38.7 Lag hooks shall not be used if it is not possible to seat the full length of the threads.

Interpretation: Lag hooks that have a thread depth variance greater than 1/16 inch make determination of correct hole size impossible and cannot be installed in a manner compliant with the ANSI A300 Part 3 standard. Lag hooks with threads cut beyond the bent portion of the hook cannot be installed in a manner that allows the full length of the threads to be seated and cannot be installed in a manner compliant with the ANSI A300 Part 3 standard.

C-3 Interpretation for cable selection when using dead-end grip terminations, ANSI A300 Part 3 – 2006 standard

The user of ANSI A300 standards is instructed to cross-reference definition subclauses **32.9 cable** and **32.14 dead-end grip** and subclause **33.5.17**.

Interpretation: Dead-end cable grips that meets the ANSI ASTM A475 standard specification for zinc coated steel wire strand can be used with common grade and extra high strength grade cable that also meets the ANSI ASTM A475 standard when approved by the manufacturer.

BARTLETT TREE RESEARCH LABORATORIES
CHARLOTTE, NC
Technical Report

Girdling Roots

Bruce R. Fraedrich, Ph. D., Plant Pathologist

Girdling roots are usually lateral roots at or slightly below the soil line that cut into at least one side of the main trunk. These roots restrict water and nutrients, which may be translocated to the leaves. Branches will eventually become weakened and the tree may die in five to fifteen years from the girdling roots alone, or in conjunction with environmental stresses or attacks by insects or diseases. Cultural practices like fertilization, irrigation and pruning will not offset the slow growth caused by girdled roots. Once diagnosed, they should be treated promptly.

CAUSES AND PREVENTION

Girdling roots are caused by nursery and transplanting practices, soil obstructions and unknown factors.

When plants are held in containers for too long a period of time, many roots begin to circle around the pot (Figure 1). These eventually can girdle the tree. When planting trees and shrubs with this condition, be sure to loosen these roots from the container root ball and spread them out in the planting hole before back filling. Circling roots two or more years old will be woody and may have to be cut and removed from the root system, because they will have taken the permanent shape of the container and cannot bend enough without breaking. Although this reduces the size of the root system, it will prevent the development of girdling roots in the future.

Figure 1. Roots growing in containers frequently begin circling if held in the container for too long.

When a planting hole is not dug wide enough or deep enough, bare-rooted stock can be twisted into the hole in order to make it fit. This undesirable practice can cause root growth encircle the trunk and produce girdling.

Be certain to make planting holes wider than the root area in order to prevent encircling roots from forming.

The third major cause of girdling roots is planting in very compacted soil, where the new roots have difficulty growing out of the planting hole and into the surrounding hard soil. Roots can circle the bottom of the planting hole, not unlike those growing in an undersized container. Eventually, several of these roots can begin girdling the trunk. Other soil obstructions like foundations, curbs or large rocks can deflect roots and may contribute in some cases to the development of girdling roots.

SYMPTOMS AND DETECTION

Trees which leaf out late, have small chlorotic leaves or needles, drop their leaves early, and are dying back should be checked for a girdling root, particularly if the normal flare or buttress swell is absent. This condition is associated with placing too much fill over the roots, a procedure not uncommon in new housing developments.

Probably the most reliable aboveground characteristic of a girdling root is a trunk indentation of flattening or the base of the bole. Non-girdled trees rarely show this abnormal development. Note that not all girdled trees show crown symptoms commonly attributed to girdling roots.

Most girdled trees are not severely girdled, with few roots ever circling more than 50% around the bole. Since most girdled trees are girdled by more than one root, careful examination around the entire circumference may be necessary. Species like sugar, Norway maple, and white pine particularly are prone to forming girdling roots. Soil excavation is often needed to find girdling roots.

A large majority of girdling roots is found in the top several inches of soil, although they can develop at a somewhat greater depth. Frequently they can be seen on the surface where erosion has removed one or two inches of soil from around the base of the trunk. Some girdling roots are present at the soil line.

TREATMENT AND REMOVAL

A girdling root must be removed in a manner that will minimize injury to the trunk cambium beneath the root. First excavate soil from around the root uncovering the entire length to be removed. Using a chisel or saw, cut the root at a point 6 – 12” out from the trunk. The final cut is made where the root attaches to the trunk (figure 2). This prevents the root from being pulled violently away from the embedded area causing extensive cambium injury if the root happens to be under tension. This is important since occasionally it is best to leave the girdled root in the tree after cutting because the trunk and cambium would be damaged severely by gouging out the deeply embedded root so that it does not grow back together. Detach the root if it is not embedded very deeply.

Prune deadwood, and if large roots were removed, thin the crown to compensate for the loss of roots. Very large girdling roots should not be cut or removed.

BARTLETT TREE RESEARCH LABORATORIES
CHARLOTTE, NC
Technical Report

Maintenance Pruning Standard: A Simplified View

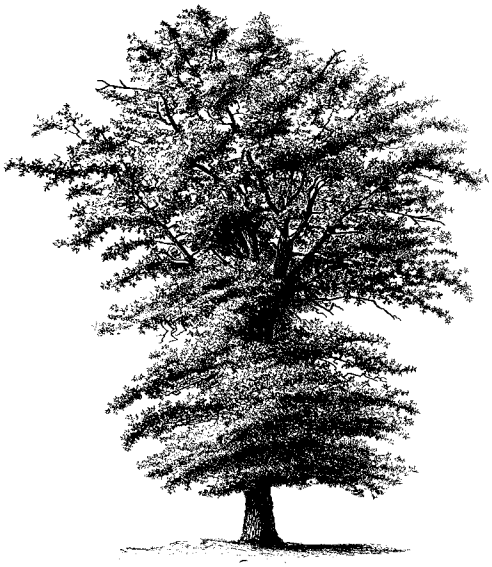
E. Thomas Smiley, Ph. D., Plant Pathologist
Bruce R. Fraedrich, Ph. D., Plant Pathologist

"Correct pruning cuts should be made close to the branch collar. Do not leave stubs and do not injure the collar". For many years, correct removal of branches has been synonymous with proper tree pruning. The new American National Standards Institute (ANSI) A-300 Pruning Standard brings the *tree* back into focus. It places emphasis on developing pruning goals based on specific needs of the plant. The Standard also provides clear, concise and descriptive terminology that arborists, tree workers and consumers can readily understand.

When pruning, arborists must decide which branches to remove. Will only defective limbs be removed or is there a benefit to thinning out live branches? Should the tree remain the same height and spread or are reductions necessary? Are low limbs interfering with traffic and require raising? What is the size limit on branches to be removed?

Before removing any branches, several factors must be considered. What is the condition of the tree? What are the landscape functions provided by the tree? Will pruning maintain or enhance those functions? Are structural defects or storm damage present that should be removed? Are branches interfering with powerlines, houses, and walkways? Is the tree too dense or does it need shaping? Will the tree tolerate removal of live branches? What are the customer's expectations and budget? The answers to these questions will govern how and to what extent the tree is pruned.

Four basic pruning techniques are used to maintain trees. Depending on tree requirements, client expectations and budget, one or more of the techniques will be used to maintain the plant.



Before pruning

Crown thinning is the removal of live, healthy branches on trees with dense crowns. This improves light penetration and air movement, and decreases wind resistance, thus reducing pest infestations and decreasing the risk of storm damage.

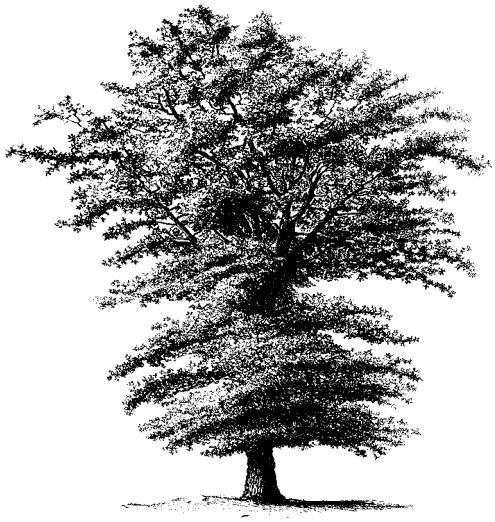
Crown thinning

Thinning can also be used to reduce weight of individual limbs and to slow the growth rate on overly vigorous limbs. This pruning technique is most commonly needed on young, rapidly growing trees.

On slower growing mature trees, thinning is mainly used when weight reduction is needed on individual limbs to compensate for structural defects. Usually, thinning is performed in conjunction with crown cleaning**.**

Virtually all-urban trees benefit from periodic **crown cleaning.** This is the removal of defective limbs including those that are dead, dying, diseased, rubbing, and structurally unsound. Cleaning reduces the risk of branch failures, improves plant health and enhances tree appearance by removing limbs that are unsightly, unhealthy and unsound.

Although removal of healthy branches is technically “thinning”, selective removal of watersprouts is included in the cleaning specification. Before selecting this option, arborists must judge whether sprout removal will benefit the tree. Stripping sprouts is rarely beneficial and may eventually create many more problems for the tree. The Standard also states that **one-half of the foliage should be evenly distributed in the lower two-thirds of the crown and *individual limbs*.**



Crown cleaning

Unnecessary sprout removal and removal of all lower branches would certainly violate this rule. The concept of not removing sprouts must be clearly conveyed to consumers since many homeowners equate proper pruning with removal of interior limbs. There are a few exceptions where removal of watersprouts is beneficial. Removing sprouts on dogwoods in areas where *Discula* anthracnose is present is recommended to reduce risk of cankers in larger branches, for example.

Leaving interior and lower branches on a tree is equally important when thinning the crown. In order not to violate the one-*half the foliage on the lower two-thirds* rule, the majority of thinning cuts are on the outer portion of the crown, not the inside. This means working with pole tools or from an aerial lift. After large deadwood and structural problems have been corrected using a chainsaw, hand or pneumatic tools are used for thinning.

Crown reduction is needed on trees or individual limbs that are growing close to

buildings, other trees, or utility wires. Reduction may also be necessary to prevent or correct storm damage and to shorten errant branches to provide a more desirable shape. This type of pruning involves reducing the height or spread of the crown or individual limbs. Certain species such as beech and sugar maple respond poorly to reductions so consideration must be given to the ability of the species to tolerate this procedure.

When reducing a leader or branch cut back to a lateral branch that is large enough to assume dominance. The size of the remaining lateral is not specified in the Standard since it varies with tree species and tree condition. Typically, a lateral one-third the diameter of the parent limb is selected. If the lateral is smaller, the limb will either dieback or sprout profusely. If the lateral is considerably larger than the one-third guideline, then thinning the remaining lateral should be considered due to the risk of storm damage. The remaining lateral should be growing in a direction that will maintain a desirable shape and not interfere with objects within the pruning cycle.

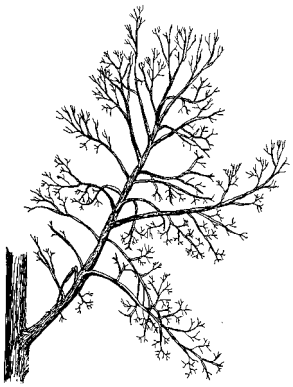
When lower limbs interfere with mowing, traffic, people or utilities, pruning is needed to provide clearance. While removal of lower limbs goes under many names, the one that has been selected is **crown raising**. Limbs can either be removed at

Crowing raising

the trunk or downward growing branches can be removed at the parent limb. Thinning the ends of a heavy limb may accomplish the same goal if the limb raises when weight is removed. When raising is performed, limb levels generally are left at a uniform height around the tree to provide symmetry.

These are the four primary types of maintenance pruning - **thinning, cleaning, reduction and raising.** Other pruning techniques and systems are discussed in the Standard, including **crown restoration, vista pruning, young tree pruning, espalier, pollarding** and **palm pruning**. These techniques are generally performed to achieve specific goals that are separate from maintenance considerations or are oriented to a specific type of tree. Consult the Standard for descriptions of these pruning types.

The majority of established trees can benefit from **one or more** maintenance pruning types. How can you prune a tree in more than one way? Easy! If a tree is



Before pruning

growing next to a house and has deadwood and limbs rubbing against the roof, it needs crown cleaning throughout and reduction or raising of the limbs over the residence. You may use any of the techniques, or combination of techniques, to provide exactly what the tree needs and the customer wants. Choosing the correct

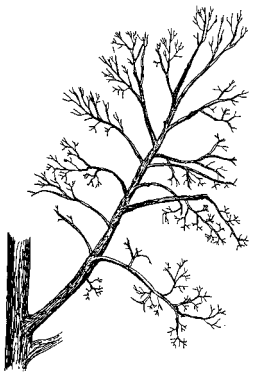
pruning technique(s) is relatively easy, even for an inexperienced arborist, because the tree guides the decision making process. If the tree has deadwood - clean it; if overly thick - thin it; if to tall - reduce it; if too low - raise it. Once the technique(s) have been decided, and then the **size of the smallest limb** to prune is the next consideration. Typically, the sizes that have been used are 1/2", 1", 2" or 4". However, no numbers are specified in the Standard so you can select any size that meets the needs of the specific tree and customer objectives. If 1" minimum is selected, then limbs 1" in diameter at the point of attachment and larger would be removed when the branches meet the requirements of the technique.

The size of the smallest limb to be pruned should be adjusted for the tree and the client's budget. When crown cleaning a small tree such as a Japanese maple, the smallest branch to remove might be specified at 1/2 inch in diameter. This means that dead, dying, diseased or weak branches greater than 1/2 inch are removed. If 1/4" diameter is chosen instead, the time required to complete the task is easily doubled or tripled.

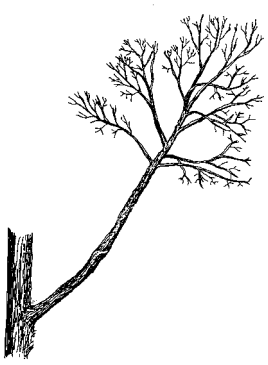
Arborists and consumers must realize that more is **not** always better when it comes to pruning. The amount of foliage that should be pruned from mature trees is now less than before. The Standard specifies that **not more than one quarter of the leaf surface** be removed during a single pruning operation. This will benefit the tree by maintaining a greater leaf surface area for producing photosynthates (energy).

When work is sold, whether to a municipality, commercial account or residential client, the pruning technique and minimum branch size must be specified, explained and discussed. This will foster fair competition and help ensure that both client and arborist understand what is to be accomplished by pruning. There should be no surprises for the client when purchasing tree work. To ensure this, tree workers as well as the arborist must understand the Standard. If a client selects crown cleaning but budget constraints require pruning 2" and larger limbs, then the crew cannot take the time to remove 1/2-inch limbs.

In summary, the new Standard encourages arborists to prune trees based on the tree's need. This is a significant improvement from the days when we tried to "fit" the tree to a predetermined, artificial classification. Basing pruning on the tree's needs make the principles described hold true for hardwoods and conifers, small ornamentals and large shade trees, young trees and mature trees. The terminology in the Standard is a change for most arborists, but it is user friendly and descriptive. Industry professionals as well as consumers should readily adopt the terminology and techniques.



Correct pruning



Improper pruning

BARTLETT TREE RESEARCH LABORATORIES
CHARLOTTE, NC

Technical Report

MoniTor IPM program

Bartlett offers a progressive, effective alternative to conventional landscape pest control that I recommend for your property. This would be the most efficient way to manage the insect and disease pest of the plants throughout the property. Bartlett's Integrated Pest Management (IPM) program is called MoniTor, this program requires a greater investment of time, but dramatically reduces the amount of pesticides used by as much as 90 percent. With MoniTor we optimize suppression while minimizing the use of pesticides through preventive maintenance and early detection of problems.

The MoniTor program consists of scheduled visits to inspect the plants around the property for insects, mites, diseases or cultural problems. Nonchemical interference is given first priority. For example, mulching and the release of beneficial insects can be very effective in some instances. When stronger control is needed, we use horticultural oil, insecticidal soap and several of the synthetic pyrethrums. Chemical control is always the last alternative.

Most MoniTor program are designed as follows:

- Schedule a series of inspections for all the woody plants by a trained IPM monitor.
- During each inspection, the monitor will identify and treat insect and disease problems. Low level, non-harmful insect populations will not be treated unless damage to the plant exceeds a tolerable level. Health and aesthetic appearance will determine this level.
- Identification of beneficial insects also would be performed. When present in sufficient numbers, these predatory insects may help control harmful insects, avoiding the use of chemicals.
- If a spray application is warranted, the most benign product available will be used. These products will usually be naturally occurring materials such as oil, soap, pyrethrums or a synthetic material of similar properties. Such products minimally impact both beneficial insects and the environment.
- Cultural treatments such as soil pH adjustment, root collar inspections and mulch adjustments will be included.
- This program will be limited to trees less than 40 feet in height.
- You will receive a written report from the monitor following each inspection. This report will include: description of problems, treatments applied, observations of plant conditions and recommendations.
- As needed, we will perform soil tests in problem areas to identify pH, nutrient or other soil concerns as well as conduct insect and disease analysis from Bartlett's Research Laboratories when problems cannot be identified on site.

An investment in the MoniTor IPM program is an environmentally sound means to maintain your plants in top condition.

BARTLETT TREE RESEARCH LABORATORIES
CHARLOTTE, NC
Technical Report

Mulch Application Guidelines

E. Thomas Smiley, Ph. D., Plant Pathologist

Mulches provide many benefits for trees and shrubs. They moderate soil temperatures, reduce soil moisture loss, reduce soil compaction, provide nutrients, improve soil structure, keep mowers and string trimmers away from the trunk. These benefits result in more root growth and healthier plants. When applying mulch the following guidelines should be observed:

1. The best mulch materials are wood chips, bark nuggets, composted leaves or pine needles. Plastic, stone, sawdust, finely shredded bark, and grass clippings should be avoided. Do not use redwood or walnut mulch due to allelopathic effects.

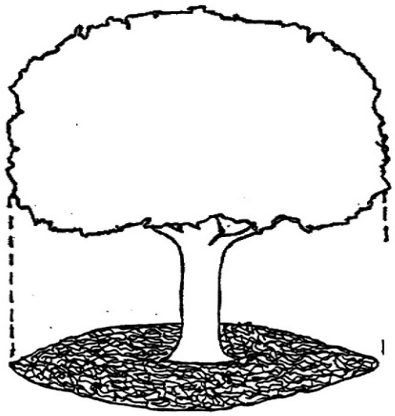


Figure 1. Mulch should be applied from the trunk to the dripline.

2. Mulch should be applied from the dripline to the trunk (Figure 1). If this is not practical, minimum mulch circle radii should be 3 feet for small trees, 8 feet for medium trees and 12 feet for large trees.

3. When applying mulch it is not necessary to kill or remove existing ground cover. However, turf should be mowed very short and clippings removed prior to application. Mulch should be applied directly to the soil surface, do not use landscape fabric to separate the mulch from the soil.

Figure 2. Mulch layer should be 2-4 inches thick and not be against the trunk.

4. Mulch layer should be 2-4 inches thick depending on tree species and mulch (Figure 2).

5. Additional mulch should be added to maintain a 2-4 inch depth.

6. Mulch should not be placed against the trunk (Figure 2). Mulch will retain too much moisture against the trunk, potentially resulting in disease problems.

BARTLETT TREE RESEARCH LABORATORIES
CHARLOTTE, NC

Technical Report

Guidelines for Quantifying and Evaluating Wood Decay in Stems and Branches.

Bruce R. Fraedrich, Ph. D., Plant Pathologist

Introduction

Decay is a leading factor that predisposes branches and stems to failure. The size of the decay column relative to the diameter of the branch or stem can be an important determination to assist in assessing whether a stem or branch poses a severe risk of failure. This Technical Report provides guidelines for measuring and evaluating decay in stems and branches to help assess failure potential.

Measurements

Visually assess stem and crown to determine weakest area due to decay. In some instances, several sites on the stem and/or branch may require evaluation.

D = Stem Diameter

C = Circumference = D X 3.14

W = Width of Cavity Opening

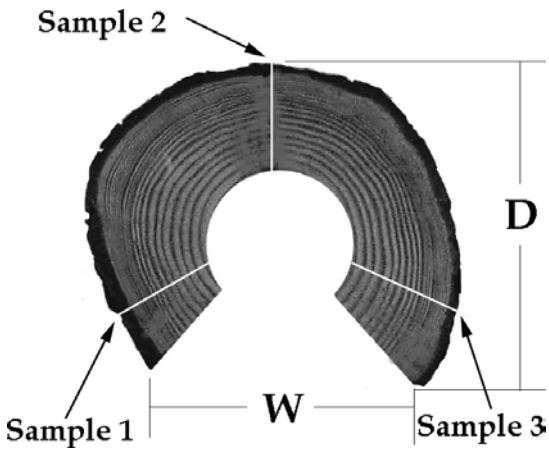
$$\% \text{ Cavity Opening} = \frac{W}{C} \times 100$$

$$\text{Average Thickness of Sound Wood} = \frac{\text{Depth to Decay: Sample 1+2+3}}{3\ *}$$

* Number of Sample Sites

Measure stem/branch diameter (**D**) at weakest point. Subtract twice the bark thickness to obtain the wood diameter at the defect. If a cavity opening is present, then measure width of opening (**W**). Multiply stem/branch diameter (**D**) by 3.14 to obtain circumference (**C**) at weakest point (**C=D** X **3.14**). Determine the percentage of the circumference with cavity opening by dividing the width of the opening (**W**) by circumference (**C**) and multiplying by 100 **(% Cavity Opening = W/C X 100).**

Calculate the average thickness of sound wood surrounding the defect by probing with a 1/8” drill bit (with long flute) and battery operated drill. Drill into sound wood until resistance



significantly decreases, when decay is encountered. Extract drill bit and measure depth to decay. Subtract bark thickness from measurement. Sample a minimum of three sites on all stem/branches with an additional site per 10 inches of wood diameter. Increase sampling when sample depths vary greatly. A Resistograph or an increment borer can be used in lieu of the drill and drill bit.

Add together the sample values and divide by the number of sample sites to obtain an average thickness of sound wood surrounding the defect.

Thresholds

Refer to **Table 1** for the minimum thickness of sound wood surrounding decay columns with and without cavity openings. Corresponding to the size of the cavity opening (left column), multiply the stem/branch diameter by the fraction in the right hand column to obtain the average minimum thickness of sound wood to support the stem or branch. **If the actual** minimum thickness is less than that value, then the stem/branch probably represents a high risk of failure.

Table 1. Minimum thickness of sound wood surrounding decay columns on stems and branches with and without cavity openings.

Cavity opening % of circumference	Minimum Thickness of Sound Wood Surrounding Decay **(Wood Diameter X)**	
	High Risk	**Critical Risk**
0	0.15	0.10
5%	0.17	0.11
10%	0.18	0.12
15%	0.20	0.14
20%	0.23	0.15
25%	0.26	0.17
30%	0.33	0.18

Many factors interact with decay to cause failure of stems and branches. In many instances such as when multiple defect are present, species wood characteristics are weak or prone to failure or decay is present at stress points, the thickness of sound wood surrounding the decay column must be greater than the minimum specified in Table 1. The minimum thickness of sound wood should be increased in the following instances:

- Leaning stems/branches
- Trees with unbalanced crowns or low crown ratios
- Trees with multiple defects
- Decay present at a stress point (such as mid-crown region of stem, bend in stem or limb, decay in reaction wood)
- Tree species with weak or brittle wood characteristics (including red maple, silver maple, poplar, tulip poplar, linden, horsechestnut, and cottonwood)
- Stem/branch with asymmetrical decay columns
- Trees with declining vitality
- Trees in highly exposed locations
- Sensitive target locations / high use site

Figure 1. ***Graphic representation showing minimum thickness of sound wood for decayed stems/branches with and without cavity openings*** *(For Severe Risk).*

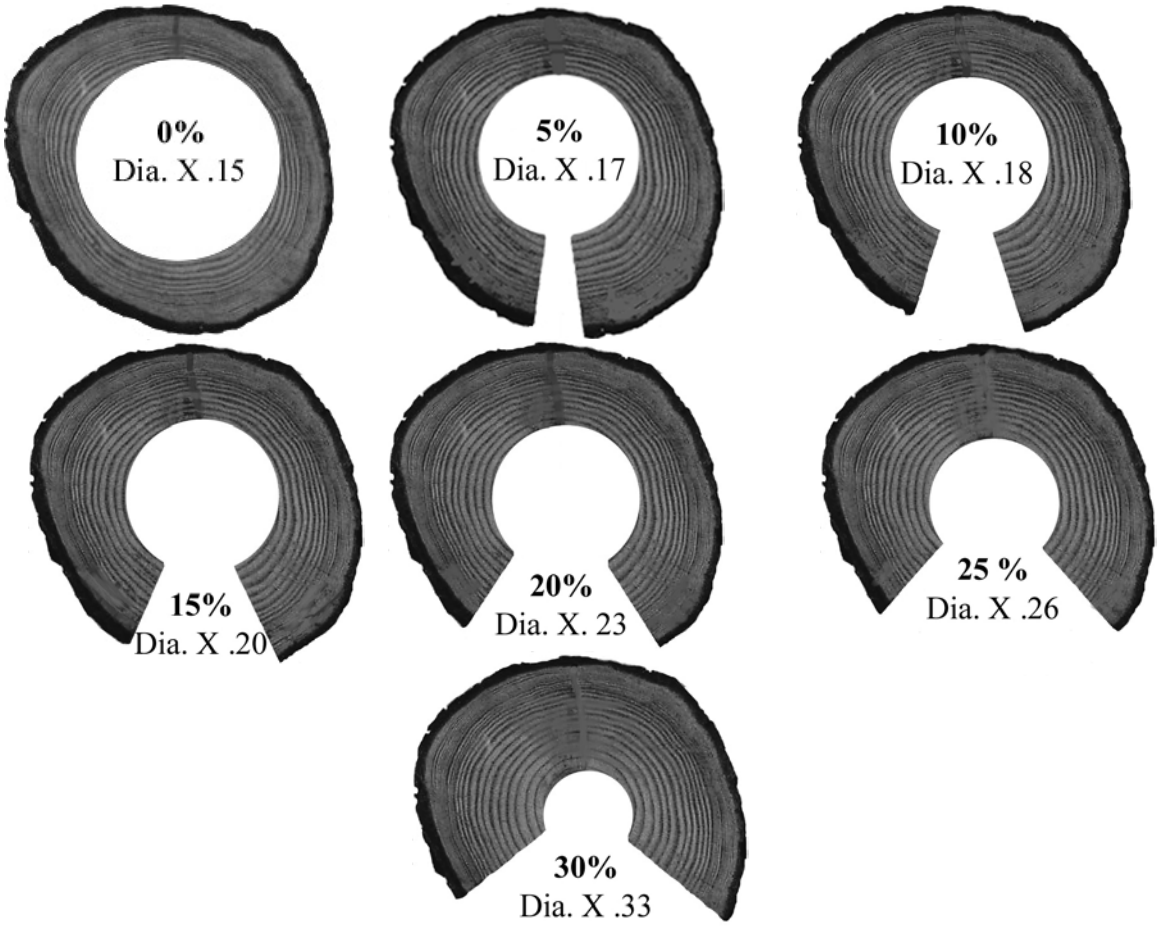


Table 2. Minimum average thickness of sound wood surrounding decay columns with and without cavity opening to be considered a **severe** defect.

	Cavity Opening% Circumference						
	0	**5**	**10**	**15**	**20**	**25**	**30**
Stem Diameter	*(Minimum Thickness (inches) of sound wood)*						
10	1.5	1.7	1.8	2	2.3	2.6	3
15	2.25	2.55	2.7	3	3.45	3.9	4.5
20	3	3.4	3.6	4	4.6	5.2	6
25	3.75	4.25	4.5	5	5.75	6.5	7.5
30	4.5	5.1	5.4	6	6.9	7.8	9
35	5.25	5.95	6.3	7	8.05	9.1	10.5
40	6	6.8	7.2	8	9.2	10.4	12
45	6.75	7.65	8.1	9	10.35	11.7	13.5
50	7.5	8.5	9	10	11.5	13	15
55	8.25	9.35	9.9	11	12.65	14.3	16.5
60	9	10.2	10.8	12	13.8	15.6	18

BARTLETT TREE RESEARCH LABORATORIES
CHARLOTTE, NC
Technical Report

Tree Structure Evaluation

Bruce R. Fraedrich, Ph. D., Plant Pathologist

The urban forest is aging and declining at an increasing rate. At the same time, society is becoming more litigious. As a result, detection, evaluation and management of defective trees now are a major concern for arborists, urban foresters and park managers.

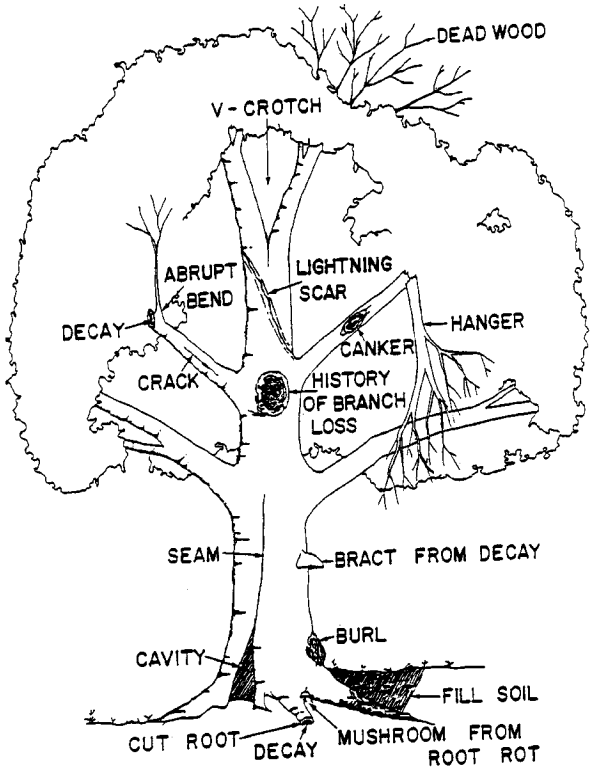
HAZARDOUS TREES DEFINED

A tree is considered hazardous when it has a structural defect that predisposes it to failure and the tree is located near a target (an area where property damage or personal injury could occur if the tree failed). Targets include areas around structures, walkways, roadways, campsites and other areas where there are property and people.

Structurally sound trees also may be hazardous if plant parts interfere with routine activities of people such as obstructing motorists' vision, raising sidewalk, interfering with utilities, roadways or walkways.

LIABILITIES

Property owners/managers have a legal obligation to (1) periodically inspect trees for defects and unsafe conditions and (2) correct defects and unsafe conditions immediately upon detection. If a property owner/manager employs an arborist to perform work on site, the arborist may assume at least some of the responsibility for detecting defective tree conditions and recommending remedial treatments. Arborists are considered "experts" and may be held accountable for uncorrected or unreported tree defects, which are not obvious to the average property owner.



HAZARD TREES DUE TO STRUCTURAL DEFECTS

A thorough inspection of the branches, stem, root crown and area around the root system is essential in detecting hazardous conditions. Binoculars are helpful in detecting defects in the upper crown. In some instances an aerial lift or climber may be needed to provide a detailed evaluation.

Common structural defects include dead trees, dead branches, stubs from topping cuts, broken branches (hangers), abrupt bends in branches, "V" crotches and multiple stems from the root collar (coppice growth). Failure also is more common in trees with an unbalanced crown or leaning stem if there is a defect.

WOOD DECAY DETECTION AND EVALUATION

Many failures in branches and stems result from loss in structural integrity due to wood decay. When evaluating decayed stems and branches, arborists have generally relied on qualitative parameters for formulating recommendations. These parameters include the location and relative size of the defect, tree species characteristics, site exposure, crown size, leaning stems, owner's "attitude" toward the tree and target considerations.

A method is now available that allows the arborist to quantitatively estimate a strength loss value from wood decay which then can be used with the qualitative parameters listed above to determine more precisely if a tree is prone to failure due to wood decay.

Evaluating decay is a four-step process involving:

1. Decay Detection - Symptoms and signs
2. Measuring the size of the decay column
3. Calculating strength loss value due to decay.
4. Selecting a strength loss value "threshold" for wood decay (taking into consideration the strength loss from decay and qualitative factors previously listed).

DETECTION

Symptoms of wood decay can be quite obvious such as open cavities, loose bark/exposed punky wood and fungal fruiting structures growing from the bark or exposed wood. Other symptoms of wood decay can be subtler such as seams, cracks, abnormal flare, burls, stubs and cankers. Decay is often associated with multiple stems from the root collar (coppice growth) and in limbs with abrupt bends. When inspecting trees for decay, make sure the crown and stem is thoroughly examined. Binoculars are helpful for inspecting the crown. In some instances, a climber or aerial lift may be necessary for a satisfactory inspection of the upper crown.

MEASURING THE DECAY COLUMN

The diameter of the decay column is determined by measuring the thickness of sound wood at the weakest point on the stem or branch. The average sound wood thickness is multiplied by 2 and subtracted from the total wood diameter to arrive at the diameter of the decay column. Note wood diameter equals the stem/branch diameter minus twice the bark thickness.

The thickness of the "shell" of sound wood can be rapidly determined with minimum damage using a drill with a 1/8" drill bit. The drill bit is inserted until resistance decreases when decayed tissues are encountered. The inserted portion of the drill is then extracted and measured to determine the thickness of sound wood.

An increment borer also can be used to extract a core of sound wood, which can be measured. This is useful on trees with soft wood where it may be difficult to detect the resistance change between healthy and decayed wood. The increment core is more damaging and slower than the drilling technique.

A Shigometer also can be used to assess healthy, decayed and discolored wood.

A minimum of three sampling sites is used and the values are averaged to calculate the decay column diameter. More sampling is necessary in trees over 30 inches in diameter or when measurements vary greatly.

DETERMINING STRENGTH LOSS VALUES FROM WOOD DECAY IN STANDING TREES

Principally the outer rings of wood provide strength in woody stems and branches. Trees can withstand considerable loss of the inner cylinder without a significant loss in structural integrity. Strength loss resulting from decay in wood tissues can be estimated by comparing the diameter of the decay column to the total diameter of the stem.

This technique is based on engineering formulas used in estimating strength loss in pipes due to corrosion. In pipes, strength loss estimates are as follows:

$$\% \text{ Strength Loss} = \frac{(\text{Inside Diameter (hollow)})^4}{(\text{Total Diameter})^4} \times 100$$

Wagener (1) modified this formula for trees as follows:

$$\text{Strength Loss (SL)} = \frac{(\text{Diameter of Decay Column})^3}{(\text{Diameter of Stem})^3} \times 100$$

$$\text{or } SL = \frac{d^3}{D^3} \times 100$$

Due to the modification, values derived from use of this formula should be viewed as a relative measure of strength loss rather than an actual measure. Values measured against a scale where 0 (zero) equals no strength loss and 100 equals total loss in strength.

When trees have open cavities, the reduction in strength from loss of the outer rings of wood must be entered into the strength loss formula. Loss in strength from open cavities is significant because the outer rings of wood provide most of the structural strength.

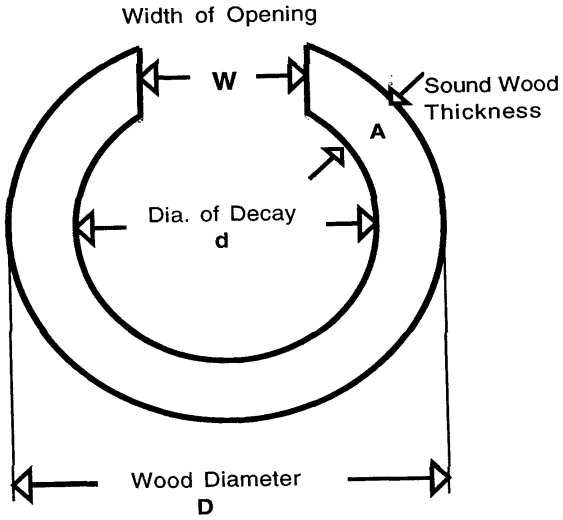
The F.A. Bartlett Tree Expert Co. uses a variation of the formula proposed by Wagener to determine strength loss in stems from open cavities. This formula is as follows:

$$\text{Strength Loss (SL)} = \frac{(\text{Diameter of Decay Column})^3 + \text{Area of Cavity}}{(\text{Diameter of Stem})^3}$$

$$\text{or } SL = \frac{d^3 + R(D^3 - d^3)}{D^3} \times 100$$

SL = Strength Loss
d = Diameter of Decay Column
D = Stem Diameter (inside bark)
R = Ratio of Cavity Opening to Stem Circumference
(R = width of cavity opening)

Values derived from this formula should also be viewed as a relative measure of strength loss as described above.



STRENGTH LOSS VALUE THRESHOLDS

Wagener (1) stated that West Coast conifers could tolerate up to a one-third loss in strength without predisposing the stem to unreasonable risk of failure if the weakening effect is heart rot uncomplicated by other defects. Wagener emphasizes that the one-third-strength loss value is not absolute and is only a general guideline.

Smiley and Fraedrich (2) surveyed hardwood trees that were broken during 1989's Hurricane Hugo in Charlotte, NC. Sustained winds were 69 miles per hour (mph) with gusts to 90 mph during the storm. They found that 52 of the 54 broken trees had internal decay. Using formulas proposed by Wagener and modified by the Bartlett Tree Lab, strength loss values of broken trees with decay varied from one to

90 with an average of 33. This evidence supports the establishment of a threshold value between 30 and 40 depending on local conditions.

The F. A. Bartlett Tree Expert Co. uses a value of 33 as the maximum strength loss to be tolerated. The threshold is reduced in:

- Leaning Trees
- Trees with inherently weak or brittle wood
- Trees in exposed locations
- Trees with large/full crowns
- Declining trees
- Trees with multiple defects
- Trees in high use areas (sensitive target areas)

STRENGTH LOSS VALUE SIMPLIFIED

The minimum thickness of sound wood surrounding heart rot must be at least 15% of the total wood diameter or the tree is considered an unreasonable risk.

The thickness of sound wood must be greater in trees with cavity openings, species with weak wood, trees with multiple defects, relatively large crowns, leaning stems and trees on exposed sites.

Minimum thickness sound wood = Wood diameter x .015

Wood Diameter (inches)	**Minimum Thickness of Sound Wood** (inches)
10”	1.5”
15”	2.3”
20”	3.0”
25”	3.8”
30”	4.5”
35”	5.3”
40”	6.0”
50”	7.5”

ROOT DEFECT EVALUATION

Up to seventy-five percent of all tree failures are due to root problems. The majority of tree failures occur when winds exceed 50 mph (e.g. hurricane, tornado), however, failures may occur under any wind conditions if the roots are sufficiently weakened. Two types of failure have been classified for this occurrence: Root failure and Ground failure.

Ground failure is extremely difficult to predict. Failure occurs when the soil does not have enough strength to keep the roots intact. Soil and roots are exposed when the tree falls over. This type of failure can occur in any soil texture if the soil is wet. Failure is more common on sandy textured and very shallow (<2’ deep) soils. Soil failure also occurs when trees are surrounded by pavement, which does not allow the root system to develop sufficiently to support the tree.

Root failure occurs when roots break, thus do not provide the necessary support. Root failure occurs more readily on trees, which have root decay or other root problems.

Trees growing in stands, recently thinned stands and recently created edge trees are more susceptible to windthrow due to lack of root spread and increased susceptibility to root disease. Root disease can be detected, however, this is a relatively difficult procedure.

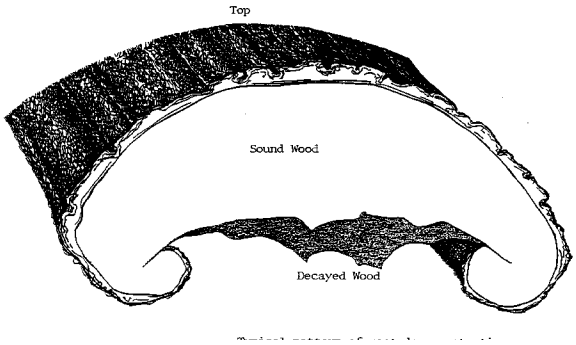
SYMPTOMS OF ROOT FAILURE

Trees with extensive root decay often show little or no symptoms of decline. External indicators of root decay include:

- Dead (loose bark) on the roots, root flare or lower trunk.
- Fungus fruiting structures around the root flare. These include mushrooms, conks and bracts on or immediately adjacent to the tree.
- Oozing from the root flare, lower trunk or wounds on the lower trunk.
- Cuts or fill soil moved beneath the tree.
- Cracks in the soil above or beside major roots.

ASSESSING ROOT DECAY

Root decay is difficult to assess since it starts on the lower section of the root and works its way upward. The most visible section of the root shows the least amount of symptoms. When root decay is present in the buttress or flare roots it is usually much more extensive than anticipated. Where root decay is suspected, the first step is to excavate soil from the root collar. Using a penknife, nick the bark on major root flares and valleys between flares to determine whether the bark is healthy.



Typical pattern of root decay, starting from the lower side working upward

High-risk trees may tolerate a lower percentage of root decay.

High-risk trees include the following:

1. Leaning trees
2. Trees with limited root space
3. Trees at the edge of recently cleared areas where severe windstorms frequently occur
4. Trees with large and/or dense crowns
5. Trees, which have, soil fractures associated with one or more major roots where trees are high risk and any root decay is encountered, always notify the property owner of the increased risk window. Removal may be appropriate.

The next step is to determine if decay is present in the roots or base of the trunk. Using a drill with 1/8" x 8" bit or increment borer, drill downward into each major root issuing from the root collar. Consider the entire root decayed if any defect is encountered. Repeat the same procedures drilling toward the center of the tree in the valleys of the root collar to determine if basal decay is present. Often lower trunk heart rot is associated with root decay. Record the number of healthy and decayed roots.

ROOT DECAY THRESHOLD

Assessing root decay is complicated by the fact that root and basal decay is frequently more severe than detection procedures will indicate. Subsequently, whenever any root/basal decay is encountered the property owner should be advised that root disease might be more severe than anticipated. There is always a risk of failure (windthrow) when root decay is encountered.

The F. A. Bartlett Tree Expert Co. considers that whenever 33% or more of the major roots contain decay, the bark/cambium is dead on more than 33% of the root flare, or when 33% or more of the support root system has been severed, there is high risk of failure. Removal is recommended in the following instances.

INSPECTION AND DOCUMENTATION

Landscape trees should be periodically inspected for defects and other potentially hazardous conditions. Inspections should be performed at least annually and after major storms. Trees growing in high use sites and those with known defects should be inspected more often.

Inspections should be documented in writing whether the trees are considered defective or not. Documentation of inspections (including date), the presence of defects and recommended treatments should be sent to the property owner in writing.

When assessing wood decay and root defects, arborists should not base treatments or removal recommendations

solely on strength loss value or percentage of roots with decay. Document all qualitative parameters that may contribute to the hazard as well as the quantitative measurements. Qualitative parameters include species characteristics, crown size, defect location, multiple defects, tree vitality, site exposure, and intensity of site use (target considerations).

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1. Wagener, W.W. 1963. *Judging Hazards From Native Trees in California Recreation Areas: A Guide for Professional Foresters.* US Forest Service Research Paper PSW-P1. 29 pages.

2. Smiley, E.T. and B.R. Fraedrich. 1992. Determining Strength Loss From Wood Decay. Journal of Arboriculture 18:201-204.

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]

cabling: 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 nonfruiting 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)-2001Pruning] [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 o 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

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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

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 (Part6)-2005 Transplanting]

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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. [ANSA 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]