JULY 2022

COMMUNITY FOREST MANAGEMENT PLAN

SCHENECTADY, NEW YORK

CITY OF SCHENECTADY · INCORPORATED 1798 ·

PLANIT GEO™
mapping a greener future

A plan to guide the care and management of community trees in the "Electric City"

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COMMUNITY FOREST MANAGEMENT PLAN

SCHENECTADY, NY

ACKNOWLEDGMENTS

This Community Forest Management Plan was prepared with funding provided by New York State's Environmental Protection Fund, administered by the Urban and Community Forestry Program within the Department of Environmental Conservation's Division of Lands and Forests.

- THE CITY OF SCHENECTADY, NY –

Mayor Gary R. McCarthy

City of Schenectady Development Department

City of Schenectady Parks Department

Invasive Species Committee of the Schenectady County Environmental Advisory Council

Capital Mohawk Partnership for Regional Invasive Species Management (PRISM)

ReTree Schenectady

- PLANIT GEO, INC –

ACCEPTED IN JULY 2022

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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All other photos unless noted are from the City of Schenectady, NY

Disclaimer: Inventory data provided by PlanIT Geo, Inc. "PlanIT Geo" are based on visual recording of observations and measurements at the time of the inspections. Visual records do not include testing or analysis of any tree component. PlanIT Geo is not responsible for any hidden or otherwise non-observable hazards discovered or identified. The dynamics of inventoried trees may result in data that varies from the current condition or characteristics observed in the field due to deterioration and/or growth of living specimens in a natural environment. PlanIT Geo provides no warranty regarding the function, health, or use of the community forest for any purpose. Recommendations provided by PlanIT Geo may be accepted or disregarded by the city and/or client or the city and/or client may seek additional advice.

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Mission Statement

The City of Schenectady in partnership with the community and urban forestry consultants at PlanIT Geo, completed this Community Forest Management Plan in 2022. This Plan is a guide to maintain, protect, and enhance Schenectady's already extensive community forest. The Community Forest Management Plan extends beyond maintenance and operational guidance to include a variety of long-term goals, strategies, and priorities to achieve optimal levels of community forest management, sustainability, and equity. Achieving the goals set forth in this Plan requires a shared commitment and partnership between the City, its partners, and residents to sustain a rich community forest, thriving economy, and improved well-being for future generations.

Vision Statement

Create a healthy and sustainable community forest that is properly managed and cared for, benefiting all the citizens of Schenectady. The community forest will be thriving and resilient for future generations to ensure continued economic, environmental, and social benefits.

City Leader Statement

We are committed to protecting the health of our environment and our residents. This comprehensive plan will ensure a healthy and sustainable community forest that is properly managed and cared for, benefiting all of Schenectady's residents. Through these efforts we strive to create a lasting impact on the health and vibrancy of our neighborhoods for future generations.

What is Community Forestry?

A Plan for the Community Forest

Defining the Community Forest

Any inhabited area that has trees and vegetation is considered a community forest though more urbanized communities often refer to this resource as an urban forest. Based on Schenectady's population density, tree population, and the public interaction with and received benefits from trees, Schenectady's resource is referred interchangeably as an urban and community forest in this Plan. The Community Forest Management Plan focuses on the City-owned trees in public rights-of-way and parks, but also has implications for the private trees and attention to these are addressed through community outreach and education efforts.

Source: Schenectady Community Facebook

The concept of urban and community forest management developed in the 1960s out of the death and devastation of the elm tree population throughout the United States due to Dutch Elm disease. The discipline of community forestry strongly advocates for species and age diversity in a city's tree population so that the elm tree devastation of the 1960s does not happen again. Unfortunately, native and invasive pests and diseases continue to spread.

During the last three decades, community forestry has evolved as researchers and practitioners learn more about the structure and function of trees and their unique role in providing environmental, economic, and social benefits to urban areas. Community forestry provides each of these benefits in differing circumstances—as infrastructure, as part of design and development, and as efficient and productive providers of economic development.

Residents traditionally have indicated that they consider the trees in the community a priority. In urban environments, the community forest is sometimes the only day-to-day interaction with nature that many residents enjoy.

As Schenectady continues to grow, the community forest needs a strong advocate. This will happen with the education and support of the City's constituency, staff, and elected officials via an approved community forest management plan. The community forest is unique in the array of benefits it provides to the community, and a management plan will effectively collect and showcase these values.

While a management plan is useful in helping educate and ensure future viability, it also will set up useful parameters for the daily operations and care of the community forest. A fresh look at all of the policies currently in place will bring into focus what is necessary for day-to-day activities to ensure long-term viability and safety of the community forest.

Benefits Provided by the Community Forest

The quality of life of the citizens in any community depends on the community forest, as trees make a vital and affordable contribution to the sense of community, pedestrian-friendly neighborhoods, energy savings, and air quality. Community forest management is critical to meeting the City's commitment to climate change, stormwater reduction and improved water quality, carbon sequestration, wildlife habitat enhancement, and water conservation. Trees are one of the few infrastructure investments that grow in value over time. The following data was derived from Alliance for Community Trees.[1]

Reduce Stormwater, Conserve Water and Soil

A tree's fibrous roots, extending into the soil, are premier pollution and soil erosion prevention systems. Intensely urbanized areas are covered with many impermeable surfaces. In contrast to an impervious hardscape, a healthy urban forest can reduce annual storm water runoff up to 7 percent. Highly efficient trees also absorb toxic substances such as lead, zinc, copper, and biological contaminants. Trees reduce the need for additional local stormwater filtration systems.

Reduce Stress and Improve the Quality of Life

Neighborhoods with generous canopies of trees are uplifting and good for public health. Greater contact with natural environments correlates with lower levels of stress, improving performance. Students' concentration levels go up when they are able to look out onto a green landscape. Studies show that children with attention deficit disorder function better after activities in green settings. A green environment also improves worker productivity.

Build Safe Communities and Decrease Crime

Police and crime prevention experts agree that trees and landscaping cut the incidence of theft, vandalism, and violence by enhancing neighborhoods. Thriving trees on well-maintained streets indicate pride of ownership. Public housing residents with nearby trees and natural landscapes reported 25 percent fewer acts of domestic aggression and violence. Apartment buildings with high levels of greenery had 52 percent fewer crimes than those without any trees. Buildings with medium amounts of greenery had 42 percent fewer crimes.

[1] Alliance for Community Trees. 2011. Benefits of trees and urban forests: A research list. http://actrees.org/files/Research/benefits_of_trees.pdf

Positively Influence Climate to Ensure Sustainability

Trees absorb carbon dioxide and store carbon in wood, which helps to reduce greenhouse gases. Carbon emissions from vehicles, industries, and power plants are a primary contributor to increased air temperatures in metropolitan areas. Trees in the United States store 700 million tons of carbon valued at $14 billion with an annual carbon sequestration rate of 22.8 million tons per year valued at $460 million annually.

Clean the Air and Breathe Easier

Shade trees reduce pollution and return oxygen to the atmosphere. In addition to carbon dioxide, trees' leaves or needles absorb pollutants, such as ozone, nitrogen dioxide, sulfur dioxide, and some particulate matter.

Save Energy and Lower Energy Costs for Buildings

As natural screens, trees can insulate homes and businesses from extreme temperatures, keep properties cool, and reduce air conditioning utility bills. A 20 percent canopy of deciduous trees over a house results in annual cooling savings of 8 to 18 percent and annual heating savings of 2 to 8 percent. By planting shade trees on sunny exposures, residents and businesses can save up to 50 percent on hot-day energy bills.

Reduce the Need for Street Maintenance

Shaded streets last longer and require far less pavement maintenance, reducing long- term costs. Canopy diminishes pavement fatigue, cracking, rutting, and other damage. A study from University of California at Davis found that 20 percent shade cover on a street improves pavement condition by 11 percent, which is a 60 percent savings for resurfacing over 30 years.

Raise Property Values

Trees are sound investments, for businesses and residents alike, and their value increases as they grow. Sustainable landscapes can increase property values up to 37 percent. The value of trees appreciates over time because the benefits grow as they do. For businesses, trees have added value, including higher revenues. Shoppers seek out leafy promenades that frame storefronts. Research shows that shoppers spend more—between 9 and 12 percent more—on products in tree-lined business districts.

Cooler Pavement Diminishes Urban Heat Islands

Broad canopy trees lower temperatures by shading buildings, asphalt, and concrete. They deflect radiation from the sun and release moisture into the air. The urban heat island effect is the resulting higher temperature of areas dominated by buildings, roads, and sidewalks. Cities are often 5° to 10°F hotter than undeveloped areas, because hot pavement and buildings have replaced cool vegetated land. In addition, high temperatures increase the volatility of automobile oil and oil within the asphalt itself, releasing the fumes into the atmosphere. Shade trees can reduce asphalt temperatures by as much as 36°F, which diminishes the fumes and improves air quality.

Protect Wildlife and Restore Ecosystems

Planting and protecting trees can provide habitat for hundreds of birds and small animals. Urbanization and the destruction of valuable ecosystems have led to the decline of many of species. Adding trees, particularly native trees, provides valuable habitat for wildlife.

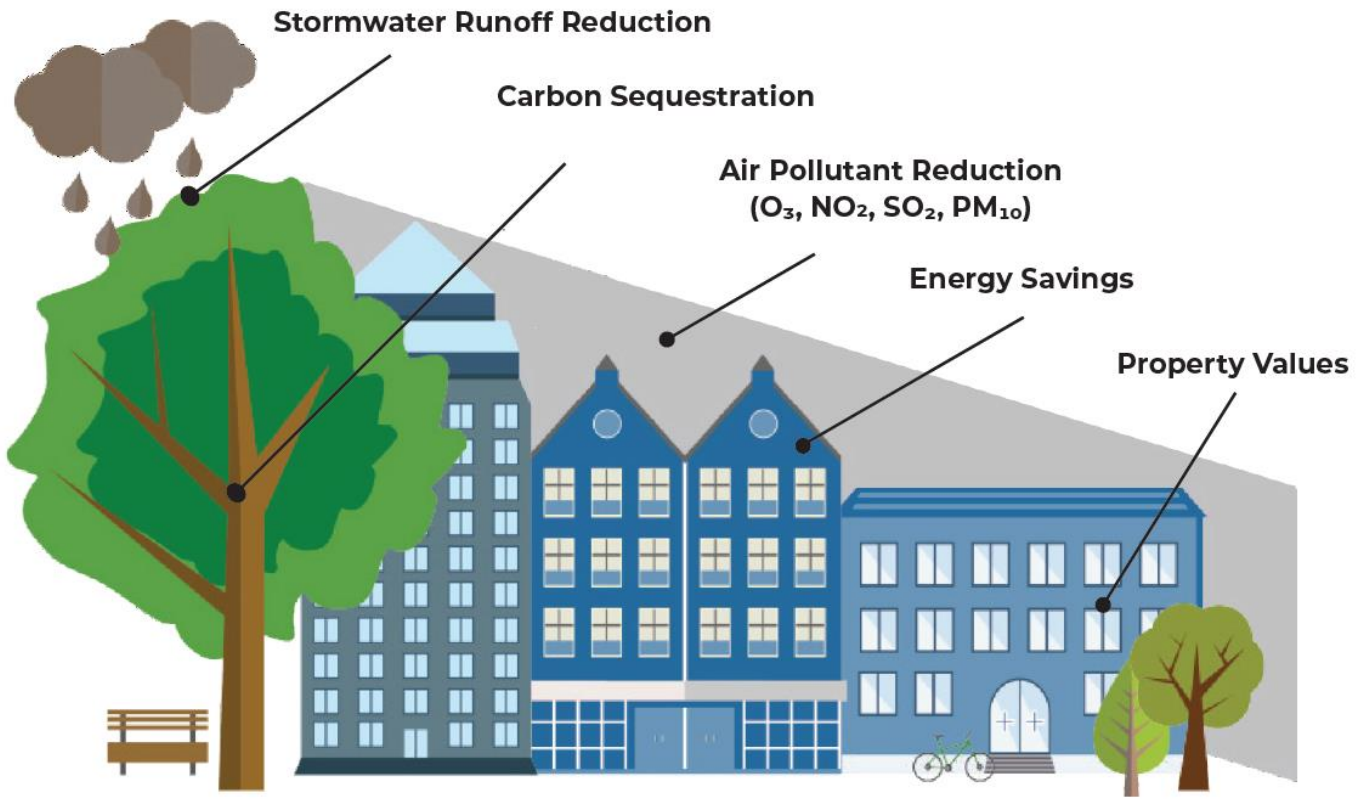
Calm Traffic and Make Neighborhoods Safer and Quieter

People drive more slowly and carefully through tree-lined streets because trees create the illusion of narrower streets. One study found a 46 percent decrease in crash rates across urban arterial and highway sites after landscape improvements were installed. The presence of trees in a suburban landscape reduced the cruising speed of drivers by an average of 3 miles per hour. Faster drivers and slower drivers both drove at decreased speeds in the presence of trees.

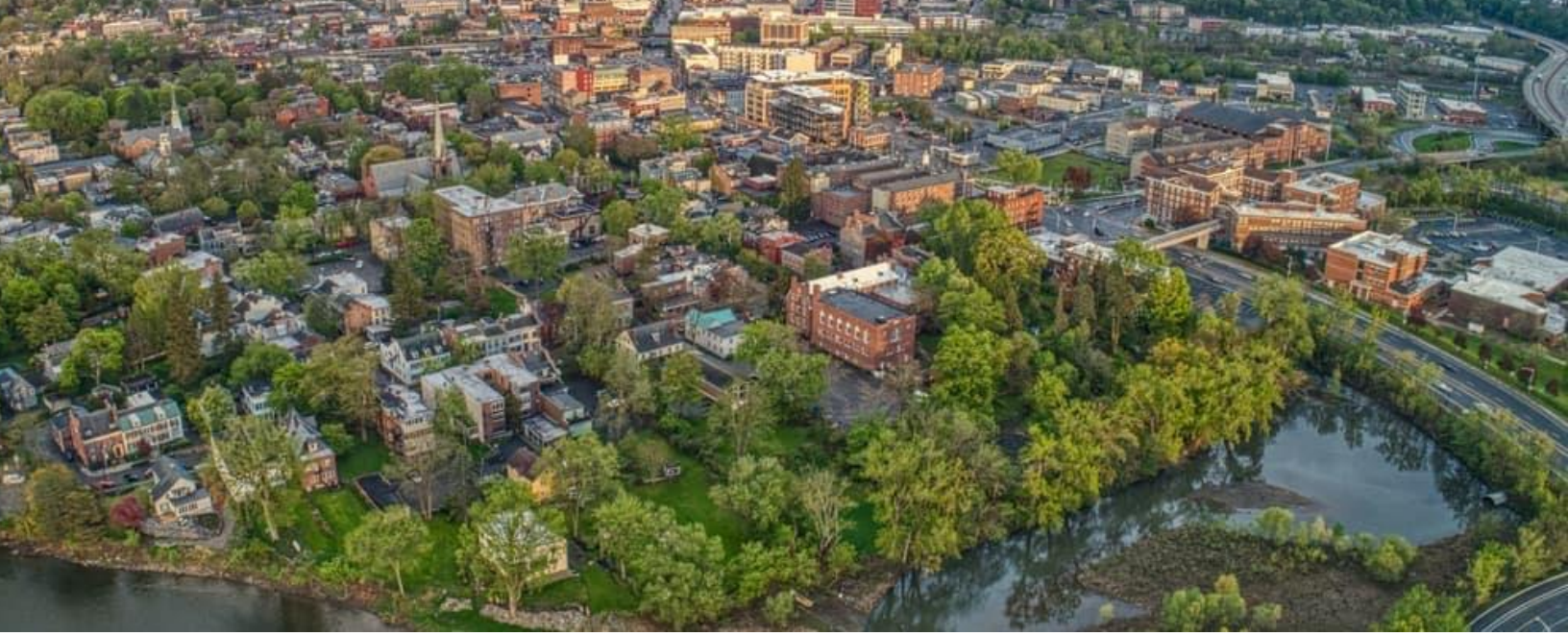
Trees reduce noise pollution, buffering as much as half of urban noise. By absorbing sounds, a belt of trees 100 feet wide and 50 feet tall can reduce highway noise by 6 to 10 decibels. Buffers composed of trees and shrubs can reduce 50 percent of noise.

More information about the benefits of trees, links to the latest research papers, and other research regarding urban forestry can be found at the Invest From the Ground Up resource web page (http://investfromthegroundup.org/resources/research/).

A comprehensive analysis of the ecosystem services and benefits provided by the trees inventoried in 2021 are provided in the Value and Benefits of Schenectady's Tree section later in this document.



Executive Summary



The City of Schenectady is dedicated to building a thriving urban and community forest for a healthy and vibrant place to live, work, and play. The more than 10,000 City Street and park trees throughout Schenectady are an asset that brings value and benefits to the community. Furthermore, trees on private property provide added benefits. Together, these public and private trees constitute an "urban and community forest". This resource provides environmental benefits, adds to property values, and contributes to an enhanced quality of life for all Schenectady residents.

Realizing the community forest is a valued asset, Schenectady, herein referred to as "the Electric City", invested in a collaborative planning process with support from the New York State Department of Environmental Conservation. The planning process involved extensive resource and program analysis to develop a clear, concise and timeline-oriented Community Forest Management Plan. The overall goal of the planning process was to develop a sustainable Community Forestry Program for the preservation and expansion of the community forest to serve the public interest by improving the community's physical, social, cultural, and economic environment. This effort was led by the Development Department is committed to this measured, monitored, and strategic long-term investment. The strategic planning process evaluated all aspects of a comprehensive community forestry program. Together, this team developed goals and actions to guide the City's Community Forestry Program over the next 8 years.

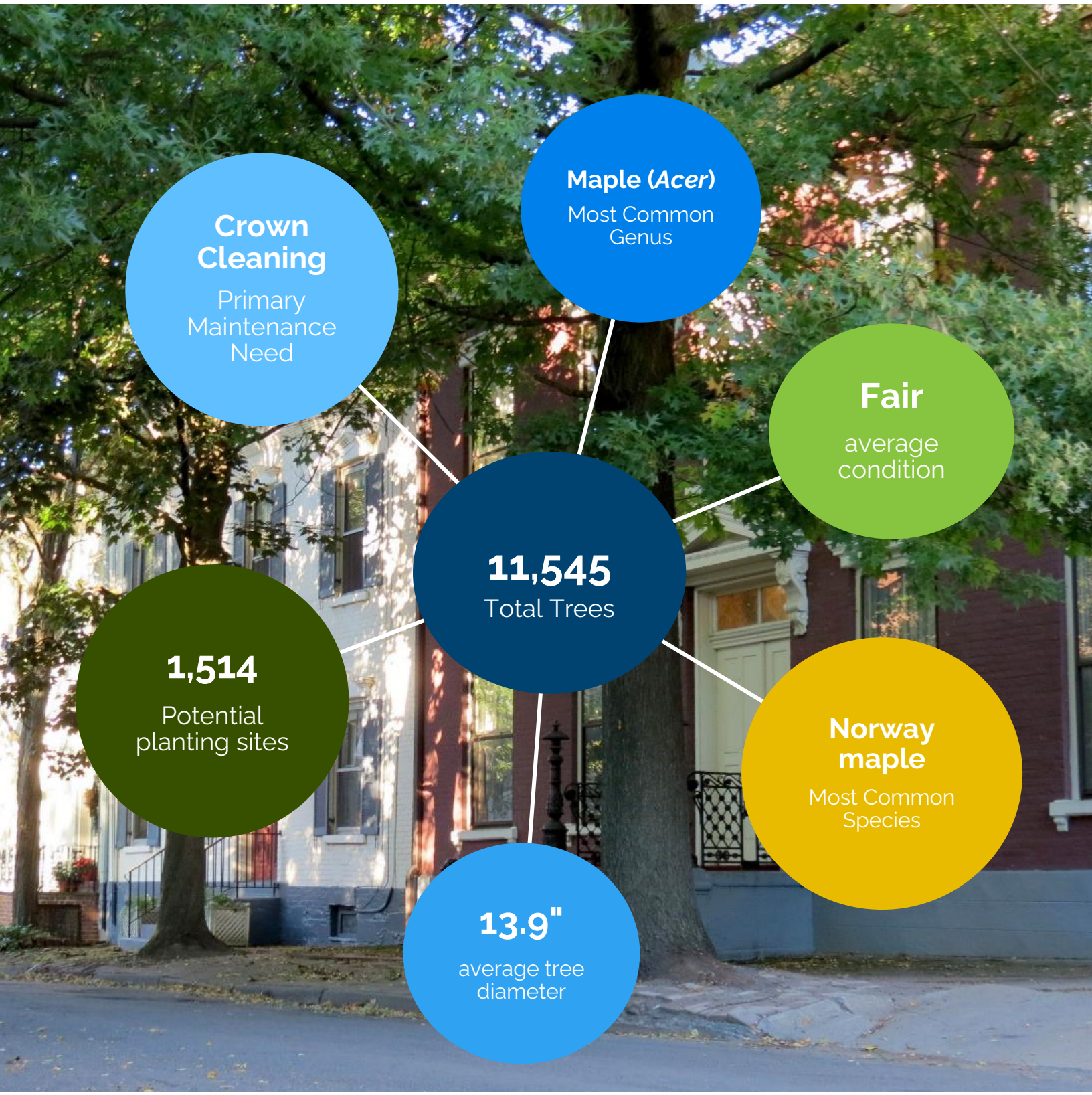
The development of a comprehensive Community Forest Management Plan included an analysis of the 2021 public tree and "vacant site"—i.e. potential planting sites—inventory along rights-of-way and in City parks. This Plan complements and supports the objectives of the City's adopted 2008 Comprehensive Plan, *Reinventing the City of Invention*, and serves as a guide to future investment in the urban and community forest resource. As stated in the Comprehensive Plan 2020 Vision:

Schenectady is and will continue to be a place of beauty, character, and heritage whose parks, rose garden, greenhouse, open spaces, and historic resources are linked by greenways within the city and across the region.

This Community Forest Management Plan supports the goals established in *Reinventing the City of Invention*—Protect Sensitive Natural, Scenic, and Environmental Areas and Permanently Preserve Open Spaces; Develop and Maintain Excellent Park and Recreation Resources, and Become a Model "Healthy Community"; Employ Best Practices and Creative Land Use Tools to Shape Development, and Promote Beautification Program and Efforts City-wide. The Comprehensive Plan specifies planning, regulatory, and enforcement policies that the City will engage to encourage the preservation and expansion of the urban forest on public land in order to maximize the City's benefits.

Tree Inventory Summary

The inventory completed in 2021 by International Society of Arboriculture Certified Arborists included trees, stumps, and planting sites along public street rights-of-way (ROW) and in specified parks and public facilities. The results of the inventory analysis include the following:



The Benefits and Value of Schenectady's Community Forest

The 11,545 public trees in Schenectady provide value in terms of improved well-being and increased property values, air quality improvements, reduction in stormwater volumes and an improvement in water quality, energy savings from the shade of their canopy and protection from cool winds, and their ability to sequester and store carbon. These values, originating from research conducted by the U.S. Forest Service and implemented in i-Tree software, equate to:

- $1.4 million total annual value of benefits
- $122 in annual benefits per tree
- $22 in benefits per capita

Approach & Framework

The Community Forest Management Plan Approach

Understanding the benefits and functions of the community forest, the City has developed this Community Forest Management Plan ("Plan").

> *"Without a plan, the governments and individuals responsible for taking care of an urban forest will not be effective in meeting the true needs of the trees and the community. A plan establishes a clear set of priorities and objectives related to the goal of maintaining a productive and beneficial community forest."* | American Public Works Association, 2007

Plan Purpose

Many different City planning and management actions, especially those that occur during redevelopment, have a large impact on the character and condition of the urban and community forest. A thriving and well-maintained urban forest provides a wide variety of benefits to the community. To help ensure that Schenectady's urban forest will continue to prosper, the City has developed this long-term plan to account for the needs of trees in the urban environment. To develop and maintain desired urban forest resource and program conditions, necessary management actions need to be executed in a timely manner. This Plan provides an overall strategy that will help the City maximize the benefits the urban forest will provide in the years to come.

- ✓ Establish a baseline for the state of the community forest resource, resource management, community framework, and institutional framework.
- ✓ Provide recommendations for a more healthy, vibrant, and sustainable urban forest.
- ✓ Be a living document by providing the framework and guidance for adaptive management.

Plan Framework

The best approach to managing a community forest is to develop an organized, proactive program using information (such as data gathered from a tree inventory and outlined in a tree management plan) to set goals and measure progress. This information can be utilized to establish tree care priorities, build strategic planting plans, draft cost-effective budgets based on projected needs, and ultimately minimize the need for costly, reactive solutions to crises or urgent risk mitigation.

In December 2021, Schenectady's tree and vacant planting site inventory was completed. At the same time, development of this Community Forest Management Plan was underway. This Plan considers the diversity, distribution, and general condition of the inventoried trees, but also provides a prioritized system for managing public trees. The following outline provides the framework of this Plan:

Tasks:

1. Inventory of trees, stumps, and planting sites along public rights-of-way (ROW) and within the City's 16 parks, 2 athletic fields, 1 educational field, gateway plaza, and Steinmetz Memorial.
2. Analysis of tree inventory data.
3. Development of a plan that prioritizes the recommended tree maintenance.

This plan is divided into the following sections:

A. State of the Community Forest Resource (Tree and Vacant Site Inventory Analysis):

- Summarizes the tree inventory data and presents trends, results, and observations.
- Summarizes the economic, environmental, and social benefits that trees provide to the community.

B. State of the Community Forest Program:
   - Provides the tree management program recommendations, schedules, and budgets regarding tree removals, maintenance, and planting.

C. Tree Maintenance and Planting Recommendations, Work Plan and Budget:
   - Utilizes the inventory data to develop a prioritized maintenance schedule and projected budget for the recommended tree maintenance over a 7-year period.

D. Storm Preparedness and Response Plan
   - Provides the community forest management guidance and protocols to effectively plan, respond, and recover from storms and extreme weather events.

E. Planting Plan
   - Details the strategies to grow a healthy, diverse, and resilient community forest by planting trees where trees are removed and where there are vacant planting sites.

F. Community Forestry Goals:
   - In addition to maintenance recommendations, this section provides the road map for Schenectady to establish a thriving, healthy, and sustainable community forest.

The Guiding Principles of the Community Forest Management Plan

Implementation of this Community Forest Management Plan will adhere to the following guiding principles:

- ✓ Recognize that the trees of the community forest are more than aesthetic enhancements.
- ✓ Trees are the backbone of the urban ecosystem and an essential part of the community's green infrastructure.
- ✓ Promote the health and growth of the community forest by following scientifically established best practices for tree selection, planting, watering, and pruning.
- ✓ Promote a robust community forest through policies and practices that reduce its vulnerability to known diseases or pest infestations, and future threats, including the anticipated effects of climate change.
- ✓ Engage in a continuous process of long-range planning for the growth and maintenance of the community forest.
- ✓ Promote public appreciation of the community forest through educational outreach programs.
- ✓ Support local businesses, institutions, organizations and individuals in their efforts to grow and maintain the community forest through community education.
- ✓ Proceed in a manner that is inclusive and transparent Framework of the Community Forest Management Plan

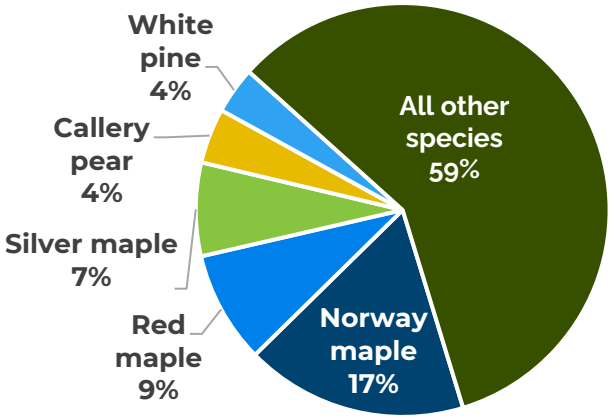
The City is devoted to sustaining and enhancing the benefits trees provide to the community by developing and following this strategic Community Forest Management Plan. At the same time, stresses from the urban environment including air pollution, pests and diseases such as emerald ash borer, invasive species, climate change, damage by vehicles, increased impervious surface, infrastructure conflicts, and soil compaction reduce the diversity and magnitude of these benefits and may lead to tree-related problems. Compounding these issues are the concerns regarding current City staffing levels, budgets necessary for adequate community forest management, and absent or outdated policies and ordinances for tree protection. With this understanding, it was imperative that the City develop a Community Forest Management Plan to be a 7-year roadmap answering the questions of *What do we have? What do we want? How do we get what we want?* and, *How are we doing?* The following will provide an overview of the outcomes of this process to develop the Plan's recommendations.

What Do We Have?

The first step in the planning process included a baseline assessment of the community forest resource. In 2021, the City completed an inventory of all City-owned trees and potential planting spaces within the public rights-of-way and parks. An analysis of the tree inventory data was conducted to identify trends in characteristics and maintenance needs for City-owned trees.

The inventory recorded 11,545 live trees across the City, of which 80% are street trees. citywide, there are 163 unique tree species, with the top five shown in the chart (right) consisting of Norway maple, red maple, silver maple, Callery pear, and eastern white pine. There is concern about biodiversity for the 33% of trees consisting of maples (*Acer*) in addition to the abundance of the unfavorable Callery pear which is discussed in this Plan.

Figure 1. Species diversity of citywide trees



The tree inventory analysis determined that the structure of all City-owned trees consists of 24% young trees (diameter of 1-6 inches) but the established age class (6-12 inches) has the highest distribution with 25%. The most mature tree age class (>30 inches) contains the least number of trees with 929 trees (8%).

The table below summarizes the recommended maintenance approach based on the 2021 tree inventory. A total of 1,446 trees were identified for removal. Of the 11,545 live trees, 5,820 street trees are recommended for a 7-year routine pruning cycle and 1,703 park trees for the same cycle. There are 2,473 young trees that should be training pruned every three years, resulting in 824 trees per year. To compensate for tree loss and to increase canopy citywide, it is recommended that at least 124 trees be planted per year with more ideal numbers around 207 trees per year.

Table 1. Summary and schedule of maintenance priority needs

PRIORITY 1 REMOVALS	**66** **47** **19**	Total Trees Street Trees Park Trees	**Year 1-3**
PRIORITY 2 REMOVALS	**1,380** **1,064** **316**	Total Trees Street Trees Park Trees	**Year 1-3**
PRIORITY 3 ROUTINE **STREET** TREE PRUNING CYCLE	**5,820** **831**	Street Trees Trees Per Year	**7-year cycle @ Year 3**
PRIORITY 3 ROUTINE **PARK** TREE PRUNING CYCLE	**1,703** **243**	Park Trees Trees Per Year	**7-year cycle @ Year 3**
PRIORITY 4 YOUNG TREE TRAINING CYCLE	**2,473** **824**	Young Trees Trees Per Year	**3-year cycle @ Year 1**
TREE PLANTING RECOMMENDATION	**124** **207**	Trees Per Year (no-net loss) Trees Per Year (Replacement of P1 and P2 Removal Trees)	**Year 1-7**

What Do We Want?

Using the information gathered during the tree inventory data analysis, along with the information gathered from City staff meetings, the community forest program and the resource itself was analyzed using U.S. Forest Service auditing systems and community forest planning resources. Based on the audit, community forest management and sustainability gaps were identified to develop the following goals and action strategies in this Plan.

1) Maximize the efficiencies in maintaining trees

2) Using planning, legislation, and enforcement to integrate trees more fully

3) Implement best management practices for the benefits of trees

4) Foster support for the community forest

How Do We Get What We Want?

The following recommendations were developed to achieve the goals:

- ✓ Address the critical and immediate tree removals and tree pruning needs.
- ✓ Establish a routine 7-year pruning cycle for public trees and 3-year cycle for young trees.
- ✓ Continue to plant trees according to best practices in appropriate locations for increased tree canopy and added ecosystem benefits.
- ✓ Strategize a plan of action for storm damage recovery and procedure.
- ✓ Update the Street Tree Ordinance for tree planting, protection, and preservation of City trees.
- ✓ Explore and adopt shared maintenance responsibility for street trees.
- ✓ Establish a Tree Board that includes volunteers conducting activities to support this Plan and the community forest.
- ✓ Engage community stewards to actively plant and maintain trees throughout the City.
- ✓ Acquire and maintain Tree City USA status.

Are We Getting What We Want?

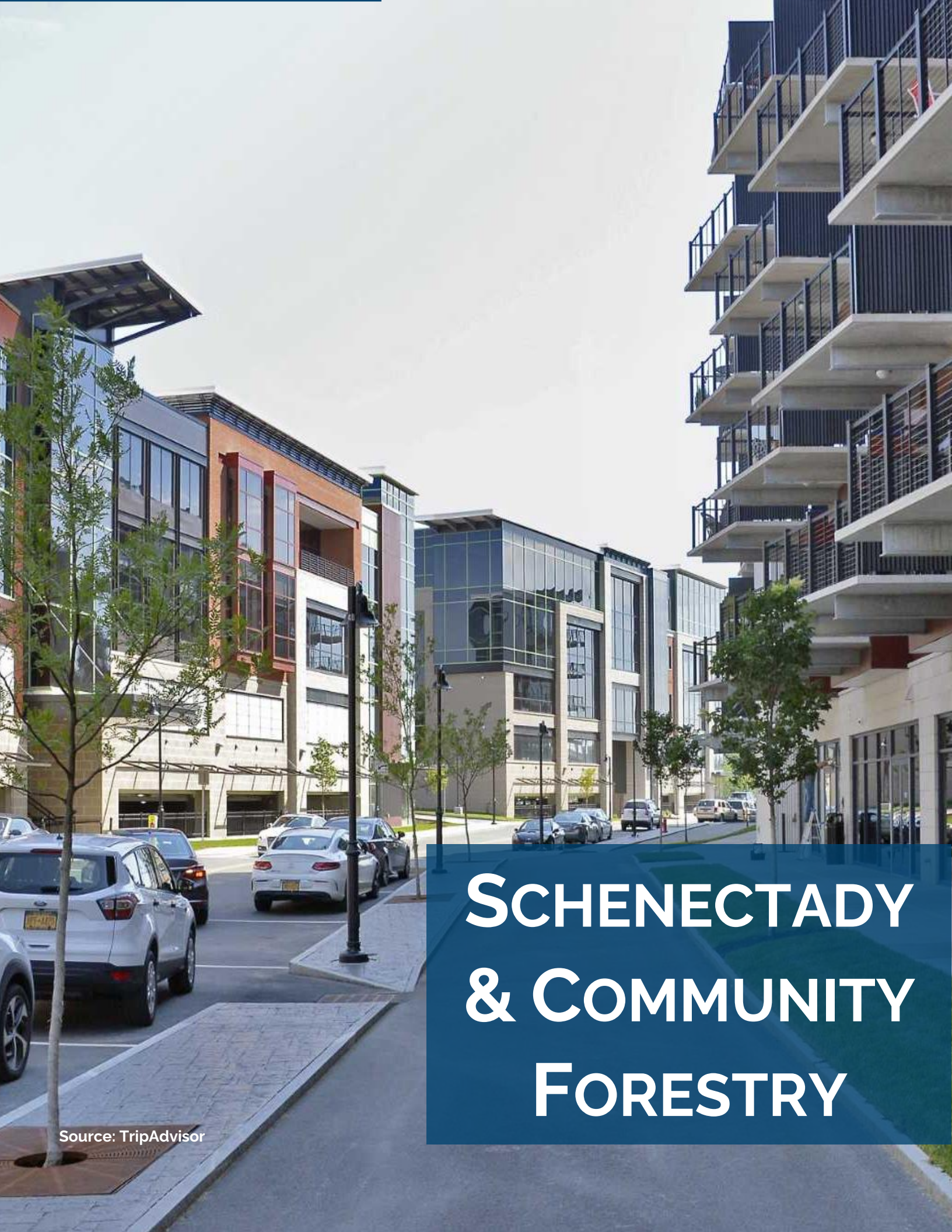
Using an adaptive management approach will require the consistent monitoring of all the City's criteria for community forest sustainability. The City will be able to judge if the new approaches to community forest conservation are being effective, develop relationships between management actions and outcomes, and identify significant trends. This will allow the City to adjust management actions over time as changes occur both in the physical/biological environment and in the expectations of the City's residents.

Work plans will enable the City to effectively monitor progress towards goals and the overall vision for the community forest. A team consisting of City staff, partners, and community members dedicated to the Plan will ensure the actions are implemented, monitored, reported, and adapted over time to support updates to the Plan after the 7-year planning term.

"Urban trees and forests are considered integral to the sustainability of cities as a whole. Yet, sustainable urban forests are not born, they are made. They do not arise at random, but result from a community-wide commitment to their creation and management."

| Clark et al.: Urban Forest Sustainability

Source: Pat Yeaman



Schenectady & Community Forestry

Source: TripAdvisor

Introduction to Schenectady's Community Forest Management Plan

Geographically, the City of Schenectady is situated in the Northwestern edge of Schenectady County and along the confluence of the Mohawk and Hudson River. Schenectady, with an estimated population of 65,279 (2019), has close ties to Albany, Troy, and Saratoga areas, forming a region called the Capital District, with a population of 1.2 million people.

Schenectady's rich history led the way for innovation in the electric and locomotive industries. Schenectady has also been called "The City that Lights and Hauls the World" due to the founding of the General Electric Company (GE) and the prominent American Locomotive Company (ALCO). The ability to transport and provide electric innovation powered early industrial and manufacturing growth. Additionally, the use of the Mohawk River and the Erie Canal as water highways connected the City to growing markets to the north, south and west.

Changes in transportation and shipping, communication, and information technology, and the emergence of globalization in the 20th century resulted in the decline of manufacturing in many American cities, including Schenectady. Industrial decline has left behind many derelict and underutilized industrial areas. In response to this shift, efforts were made to preserve Schenectady's cultural past and heritage and in 2008, the City updated it's Comprehensive Plan for the first time since 1971.

Revitalization efforts have amplified as a result of the Comprehensive Plan, added 2020 Vision Plan, Smart Cities Plan, and a multitude of other planning commitments made by the City and its residents. In turn, the City has a growing concern for the protection and enhancement of City assets such as the community forest.

Schenectady is a community that recognizes its trees as one of its most valuable resources and with this Community Forest Management Plan, has dedicated itself to the preservation, proper maintenance, and continued enhancement of the community forest. The trees throughout Schenectady are an asset that bring value and benefits to the community. The community forest provides environmental benefits, adds to property values, and contributes to an enhanced quality of life for all of Schenectady's residents. These community forest efforts along with the transformation of the river's edge are a tremendous opportunity to bolster the City as a whole.

Unfortunately, the trees comprising the community forest in Schenectady suffer from the rigors of urban life, including pests and diseases, the current and changing climate, air pollution, compacted soils, limited growing spaces, and limited resources. To overcome such rigorous conditions for the City's trees and reap the benefits of these, our most valuable assets, the care of the community forest must be strategically and efficiently planned and cared for.

This Community Forest Management Plan seeks to secure adequate tree management levels and garner the enabling support through staffing, funding, the community, and policy. Adequate tree management includes efficient and effective tree care, bolstered tree plantings to maintain age and species diversity in the public tree population, the equitable preservation and enhancement of canopy coverage citywide to enhance the character and aesthetics of neighborhoods, and exemplary stewardship of the forest from all who live and work in Schenectady. The Community Forest Management Plan must be regarded as both a long-range policy guide and a living document that will respond to changing conditions over its life. It requires a close partnership between policy makers, staff, and the community. Adoption of this Community Forest Management Plan enables the City to accomplish these objectives.


Source: Peter Barber

Schenectady's Community Forestry Background

Schenectady is situated among an abundant natural environment that includes an expansive waterfront and a wide array of open spaces. The City is directly tied to its natural environment and Schenectady's residents value these assets. As stated in the City's Comprehensive Plan, *Reinventing the City of Invention*, Conserving natural and cultural resources allows biological diversity to remain intact and the community to remain healthy. Parks and open spaces are fundamental to livable and enjoyable communities and they can help to redefine the community as livable.

Regarding growth of the urban forest canopy, it is the City's responsibility to maintain trees within the public rights-of-way and on City-owned parks, open spaces, and facilities. Schenectady's Development Department leading this Community Forest Management Plan effort, is responsible for the planning, development, coordination and promotion of the physical, social, and economic well-being of the City. A multifaceted approach is implemented in Schenectady for the care and enhancement of community forestry. In addition to the Development Department, the Invasive Species Committee of the Schenectady County Environmental Advisory Council, Capital Mohawk Partnership for Regional Invasive Species Management and ReTree Schenectady will contribute to the management plan to ensure long-term success.

Though it is the City's responsibility for tree care within public rights-of-way, the preservation and growth of citywide community forest canopy should be the concern of both the City and the community residents. Currently, the City has an ordinance for street trees from 1998, that will be reviewed and assessed for revisions. Through assessment of this ordinance and the community forestry program structure, the Forest Management Plan was developed to provide recommendations for tree maintenance priorities, the sharing of the tree maintenance responsibility, strengthened tree management and guidance for the creation of Community Tree Board, a defined planting plan and storm preparedness plan and enhanced community engagement and stewardship. Schenectady has maintained the Arbor Day Foundation's Tree City USA award for 19 years and knows that this plan will provide the tools to build an even stronger community forest program.

Existing City plans and efforts impact and influence Schenectady's community forest. In addition to the 2008 Comprehensive Plan, the City adopted the Craig-Main Connection Project Final Report (2019), the Historic Stockade District Comprehensive Streetscape Plan (2018), the Smart City Project (2016) and more community space enhancing initiatives. In 2003, the City established the Stormwater Management Program (SWMP) to comply with the New York State Department of Environmental Conservation (NYSDEC) Municipal Separate Storm Sewer System (MS4) program.

Of the supporting plans mentioned above, the Historic Stockade District Comprehensive Streetscape Plan contains the strongest ties with community forest enhancement and management. This plan adheres to five main principles. Each of these principles reinforces the fact that trees are necessary infrastructure for the health, safety, and livability of the City of Schenectady. These principles, in conjunction with the Streetscape Plan's standards and guidelines for street trees, directly assist in implementation of the Community Forest Management Plan. In the table below, the principles of the Stockade Plan and the goals of the CFMP and are compared to demonstrate their shared purpose.

Implementation of the Community Forest Management Plan, Stockade Streetscape Plan, along with the above listed plans, will provide valuable guidance to Schenectady to achieve the goals necessary for a thriving, healthy, and sustainable community forest.

STOCKADE PLAN PRINCIPLES	CFMP GOALS
Improve the walkability of the Stockade by installing sidewalks, curbing, and accents that are consistent with the historic character of the surrounding neighborhood	Maximize the efficiencies in maintaining trees
Continuously maintain the Stockade's street trees to ensure a healthy urban forest	Use planning, legislation, and enforcement to integrate trees more fully
Create a welcoming daytime and nighttime environment for all users	Implement best management practices for the health and benefits of trees
Work with the City of Schenectady to make vehicular transportation improvements, with a focus on pedestrian and bicycle safety, through the installation of traffic calming measures	Foster support for the community forest
Enhance stormwater management efforts through the installation of green infrastructure, where feasible	Maximize the efficiencies in maintaining trees

Historic Stockade District 2018 Inventory Summary

In 2018, the City of Schenectady took part in a Cornell Cooperative Extension of Schenectady County tree inventory. More specifically, inventory data was collected for the Historic Stockade District. This inventory included an inventory and assessment of trees, stumps, and planting sites in the rights-of-way. Davey Resource Group completed the inventory and analyzed the data. To view the complete Historic Stockade District Comprehensive Streetscape Plan click here.

The 2018 inventory of 383 sites included 355 trees, 9 stumps, and 19 proposed planting sites. Of these 355 trees, 74% were comprised of ten species, the three most common being Norway maple (19%), cherry/plum (13%), and red maple (10%). The trees in Stockade are primarily in the 0-8-inch diameter class with a total of 156 trees or 44%, which closely aligns with the ideal distribution (Richards, 1983). All other size classes are within 5% of the ideal distribution. Most of the trees are in fair condition, though 18% of the Stockade trees are in poor condition.

The Stockade District trees are distinct from the City's general tree inventory, but in the big picture they make up a very valuable portion of the Citywide community forest. The Stockade District is known for its history and charm, but without the care of its street trees, the area will decrease its livability, walkability, and sustainability. One of the core obstacles in the Stockade District includes the conflict between sidewalks and trees. In this plan, more specifically Appendix G, best practices for proper planting techniques and planning will be discussed to avoid these conflicts in the future. It is imperative that the Community Forest Management Plan is used to address management in this area to ensure a thriving community forest for Schenectady's residents.

Table 2. Historic Stockade District 2018 inventory counts

Count	Type
383	sites inventoried
355	trees
9	stumps
19	proposed planting sites

Figure 4. Stockade tree condition

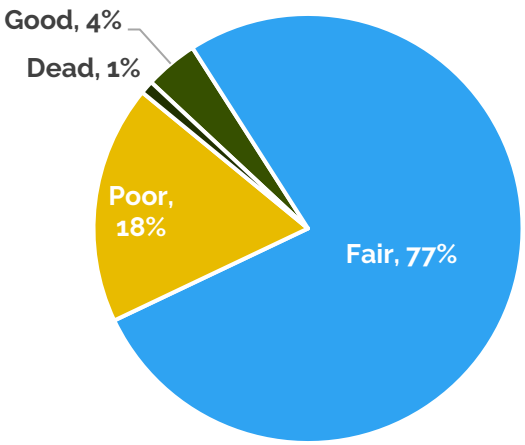
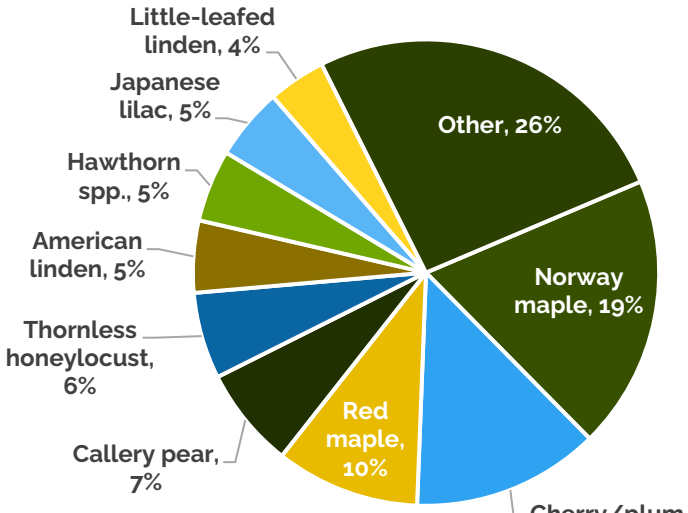


Figure 2. Most common tree species in the Historic Stockade District



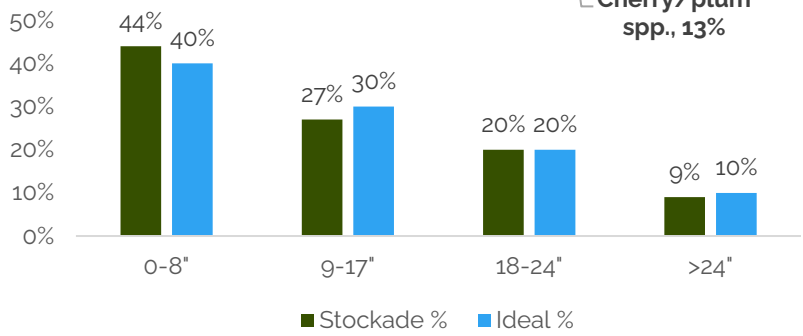
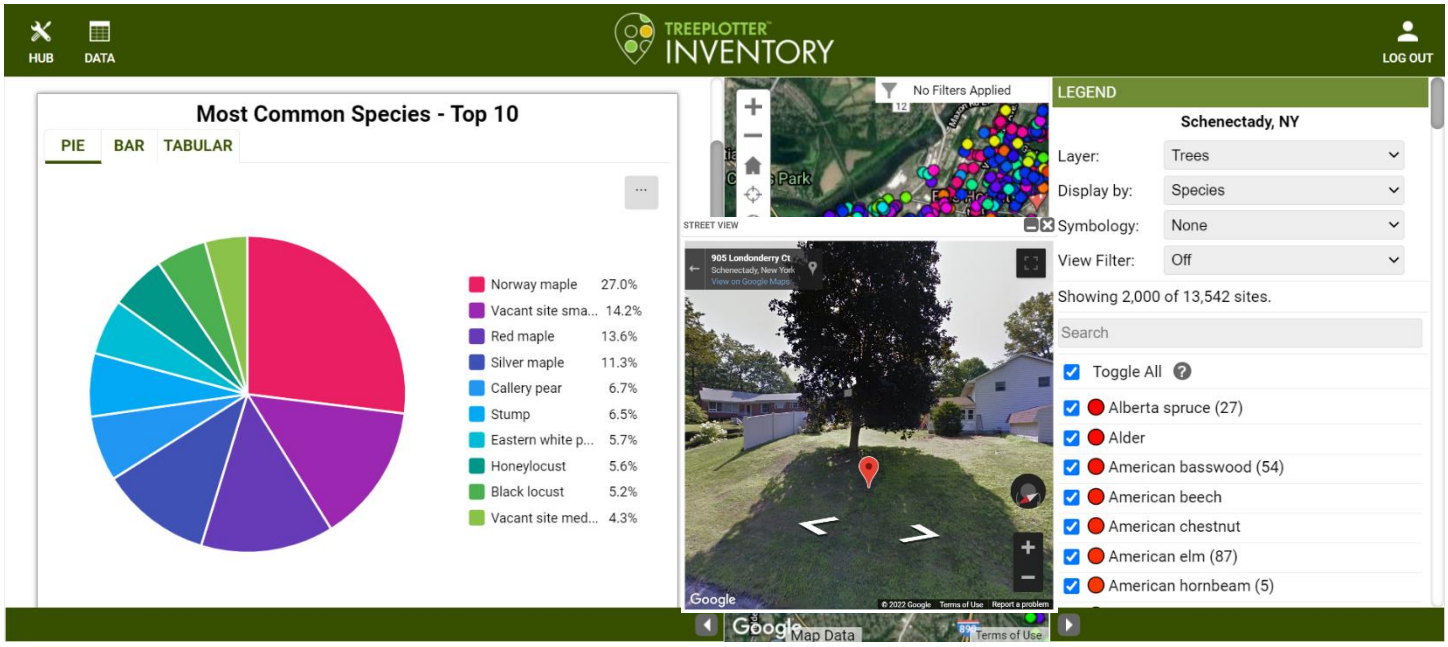


Figure 3. Stockade tree diameter classes compared to ideal distribution

2021 Summary of Schenectady's Public Trees

In order to build on the 2018 inventory, a comprehensive inventory of Schenectady's city trees was performed in October 2021. PlanIT Geo's Inventory Arborists, certified by the International Society of Arboriculture, assessed and inventoried trees, stumps, and possible planting sites ("vacant sites") within the public rights-of-way (ROW), all trees within the City's 16 parks, Gateway Plaza, Steinmetz Memorial, two athletic fields, and the Steinmetz Education Center fields.

The following summaries were completed using the data available in the City's tree inventory management software, TreePlotter, to inform the Community Forest Management Plan recommendations. The data can be viewed at www.pg-cloud.com/SchenectadyNY. Additional features and functionality are available to users with an account.



Summary of the Tree Inventory Analysis

It should be noted that the tree inventory analysis was completed in December of 2021 and conditions and values may have changed since the completion of this analysis and Plan. As of December 2021, the tree inventory consisted of the following:

13,542	Data points	9,241	Live street trees (80%)
11,545	Total live trees	2,304	Live park trees (20%)
1,514	Potential planting sites	163	Unique tree species
71	Unique genera	40%	Maple (*Acer*) trees
13.9"	Average diameter	92"	Largest diameter
30%	Good condition	66	Priority removals

The Structure of Public Trees

The structure of the public trees in rights-of-way and parks describes the tree population in terms of its distribution, number of trees, species composition, growing space, and size classes. These summaries assist urban forest managers in strategic tree management, planting, and community outreach to ensure long lasting canopy and benefits distributed equally across the City. The following summaries include both street and park trees unless otherwise noted.

Tree Distribution

Tree distribution can affect maintenance costs, schedules, and potential risks such as pests or diseases and the effects of climate change such as droughts. Adequate distribution of trees also contributes to the City's pursuit for equitable distribution of tree canopy and associated benefits and equal access to the resource by all residents.

Figure 5. Distribution of live trees

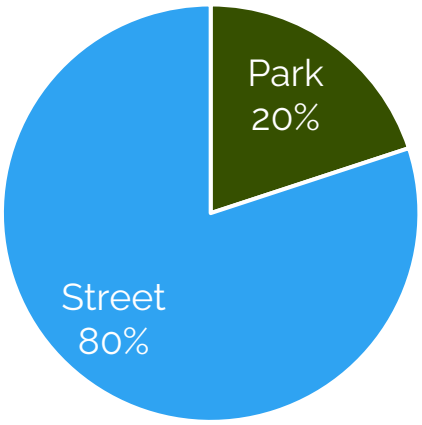
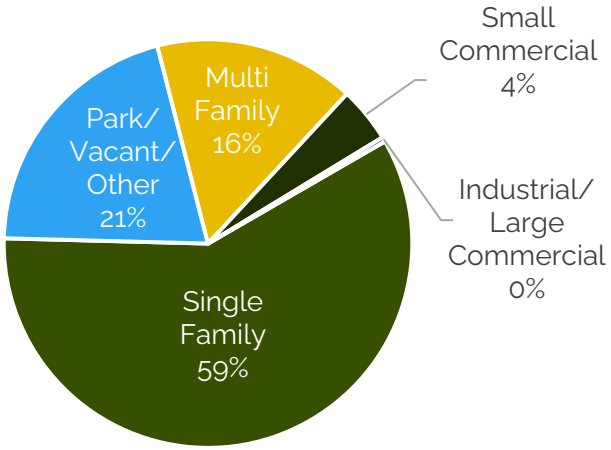


Figure 6. Distribution of live trees by land use



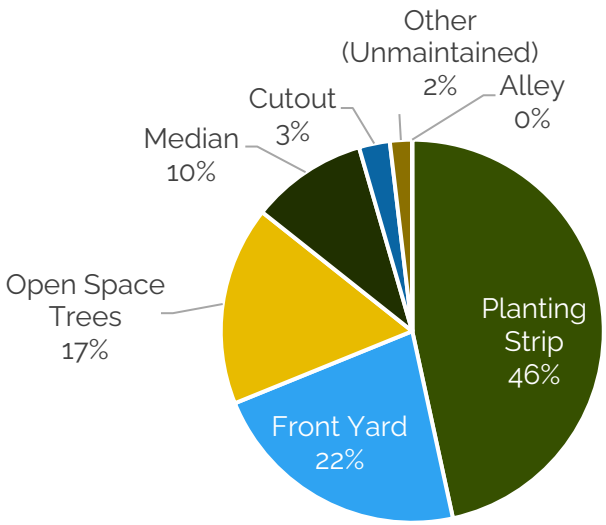


Figure 7. Distribution of live trees by location site

RESULTS

Street trees comprise the majority of the inventory with 80% or 9,241 live trees. Of the street trees, 59% (3,654) are in the public rights-of-way adjacent to Single Family land use. Most trees inventoried are in an "Planting Strip" location site with a total of 3,399 trees (46%).

Discussion/Recommendations

Overall, the distribution of trees is a healthy mix of park-street trees distributed evenly across land uses. It is common for less trees to exist in the dense industrial and large commercial land use areas. The low count of median tree plantings is a result of street design that may change as the City implements a new planting program.

Tree Distribution by Neighborhood

As the City of Schenectady moves forward with planning their community forest, it will be very helpful to know the distribution of public trees within neighborhoods across town. This information provides valuable data for the planning of planting projects, maintenance needs/planning, and equitable distribution of trees.

Results

The majority of public trees in Schenectady are within the Union Street neighborhood (33%), as indicated by the darkest shade of blue in the figure below. The following top neighborhoods include Northside (12%), Woodlawn (11%) and Mount Pleasant (8%). The Stockade neighborhood had the least amount of trees (4%), which outlines the opportunity for more work to be done in this historical area.

Discussion/Recommendations

Overall, the distribution of public trees throughout the neighborhoods is concentrated in the Northeastern part of town. With this in mind, the City can focus planting efforts in the neighborhoods with less trees (lighter areas). Later in this section, the potential planting sites collected during the 2021 inventory will be outlined. Through the use of this data and the TreePlotter application, the City can make informed decisions when managing their trees.

Figure 8. Map of Schenectady's public tree distribution by neighborhood

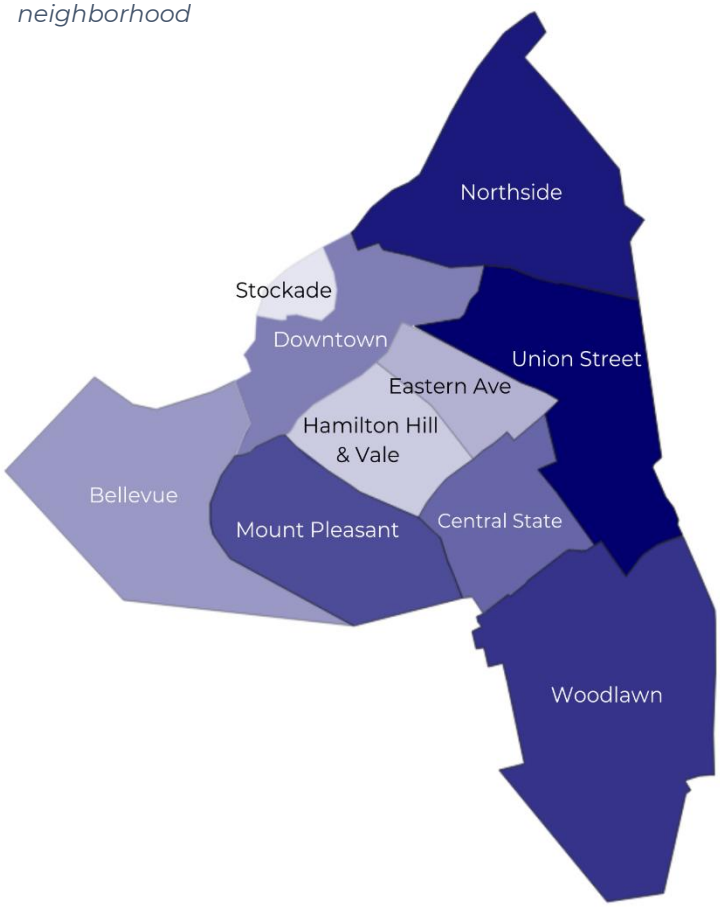


Table 3. Public tree distribution by neighborhood

Neighborhood	Trees Count	% Live
Union Street	3,776	33%
Northside	1,373	12%
Woodlawn	1,299	11%
Mount Pleasant	926	8%
Central State	923	8%
Downtown	889	8%
Bellevue	793	7%
Eastern Avenue	597	5%
Hamilton Hill &Vale	508	4%
Stockade	461	4%
TOTAL	**11,545**	**100%**

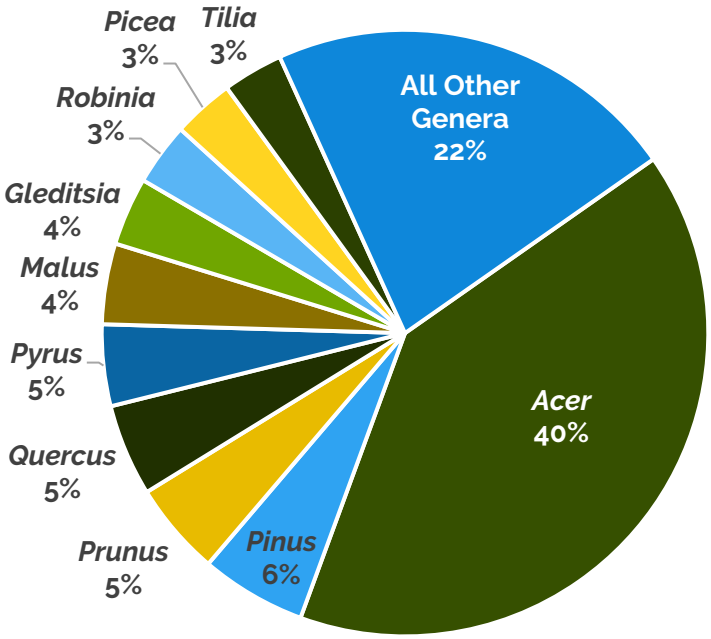
Tree Diversity and Composition

Tree composition data are essential since the types of trees present in a community greatly affect the amount of benefits produced, tree maintenance activities, budgets, planting goals, canopy connectivity, and the City's ability to respond to threats from invasive pests and diseases. Low species diversity (large proportion of the population consisting of trees of the same species) can lead to severe losses in the event of species-specific epidemics such as the devasting results of Dutch elm disease (DED, *Ophiostoma novo-ulmi*) and more recently, emerald ash borer (EAB, *Agrilus planipennis*). Unfortunately, many ash (*Fraxinus)* trees were planted as replacements to elms (*Ulmus*) lost from DED. Asian longhorned beetle (ALB, *Anoplophora glabripennis*) is another potential threat to some of the most prevalent urban shade trees. Tree species diversity is crucial to the resilience of the community forest from these and future unknown threats.

Table 4. Genus diversity of citywide trees

Genus	Count	% Live
Acer	4,655	40%
Pinus	651	6%
Prunus	575	5%
Quercus	566	5%
Pyrus	502	5%
Malus	497	4%
Gleditsia	420	4%
Robinia	384	3%
Picea	377	3%
Tilia	372	3%
All other genera	2,546	22%
TOTAL	**11,545**	**100%**

Figure 9. Genus diversity of citywide trees

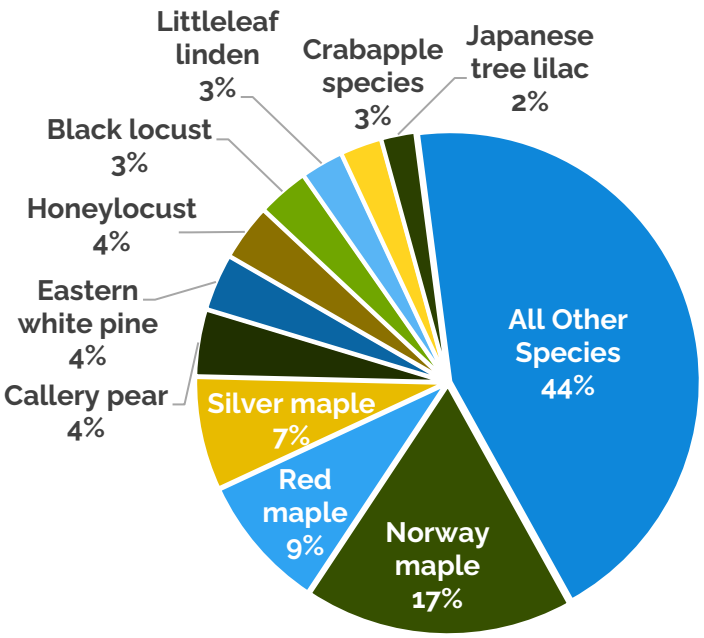


The following provides a summary of the top ten species identified during the 2021 tree inventory data analysis.

Table 5. Species diversity of citywide trees

Common Name	Count	% Trees
Norway maple	2,006	17%
Red maple	1,010	9%
Silver maple	843	7%
Callery pear	497	4%
Eastern white pine	422	4%
Honeylocust	420	4%
Black locust	384	3%
Littleleaf linden	318	3%
Crabapple spp	309	3%
Japanese tree lilac	255	2%
All other species	5,081	44%
TOTAL	**11,545**	**100%**

Figure 10. Species diversity of citywide trees



Results

Based on the inventory data there exists a total of 71 unique genera with the top five comprised of *Acer* (40%), *Pinus* (6%), *Prunus* (5%), *Quercus* (5%), and *Pyrus* (5%). The top five genera make up 60% (6,949 trees) of the 11,545 total live trees recorded in the 2021 inventory.

Regarding species diversity, there exists a total of 163 unique tree species. The top ten species comprise just over 55% of the inventory consisting of Norway maple (17%), red maple (9%), silver maple (7%), Callery pear (4%), Eastern white pine (4%), honeylocust (4%), black locust (3%), littleleaf linden(3%), crabapple species (3%), and Japanese tree lilac (2%).

The composition of a tree population should follow the 10-20-30 Rule for species diversity—a single species should represent no more than 10% of the community forest, a single genus no more than 20%, and a single family no more than 30%. Based on this rule, Norway maples (*Acer platanoides*) exceed the recommended 10% maximum for a single species in a population, comprising 17% of the inventoried tree population. Regarding the genus threshold, maples (*Acer*) comprise double the recommended 20% maximum for a single genus in a population, making up 40% of the inventoried trees.

Discussion/Recommendations

Norway maple dominates the street trees at 19% and Eastern white pine dominates the park trees at (14%). The abundance of maple (*Acer*) is a major concern because the abundance of this species in the community forest makes it a limiting species. For a sustainable and resilient community forest, Norway maples, and maples in general, should be limited in new tree installations.

Considering the large quantity of *Acer* (maple) in the City's population, along with its susceptibility to Asian longhorned beetle and granulate ambrosia beetle (*Xylosandrus crassiusculus*), the planting of *Acer* should be extremely limited, if not prohibited, to minimize the potential for loss in the event these pests appear in the City's community forest.

Diameter Size Class Distribution (Relative Age)

The distribution of tree ages influences the structure of the urban forest as well as the present and future costs to the City or property owners. An uneven-age urban forest offers continued flow of benefits and a more uniform workflow allowing managers to more accurately allocate annual maintenance funds. The inventoried trees were categorized into the following diameter size classes: young trees (0-3 and 3-6 inches DBH or diameter at breast height measured at 4.5 feet), established (6-12 inches DBH), maturing (12-18 and 18-24 inches DBH), and mature trees (24-30 and >30 inches). Since tree species have different lifespans and mature at different diameters, heights, and crown spreads, actual tree age cannot be determined from diameter size class alone. However, general classifications of size can be extrapolated into relative age classes.

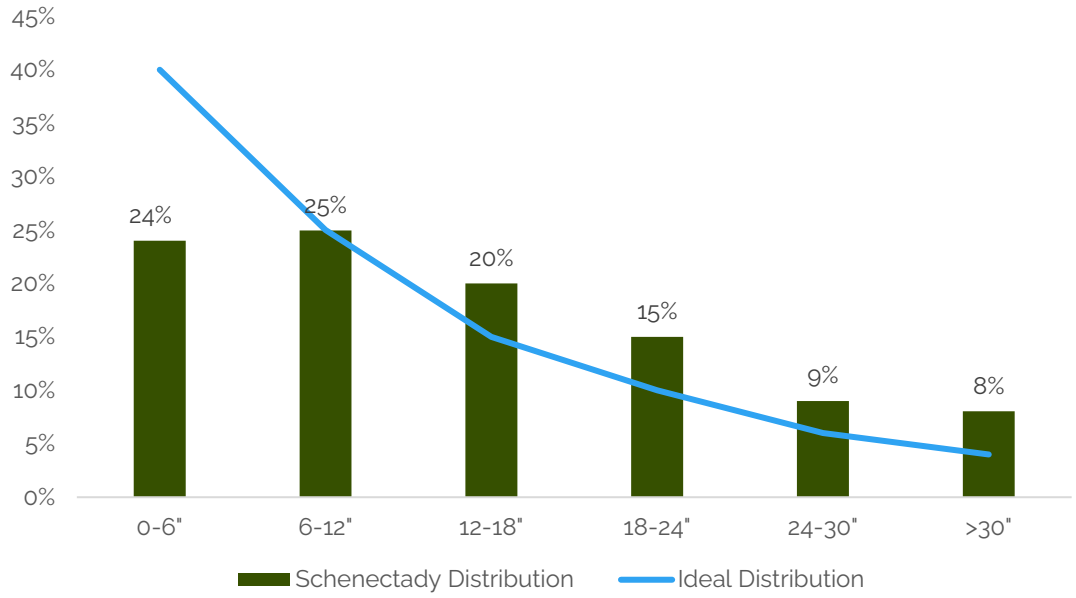


Figure 11. Diameter class distribution in Schenectady compared to Richards' ideal distribution

Results

The diameter classes were chosen so that the tree population could be analyzed according to Richards' ideal distribution (1983).[2] Based on the analysis, the distribution trends towards less ideal; young trees (0-6" DBH) comprise less than the recommended distribution with 24% instead of 40%. For the (6-12" DBH) class, the distribution aligns exactly with the ideal distribution at 25%. Overall, Schenectady's distribution of trees greater than 12 inches DBH exceeds the ideal distribution.

Discussion/Recommendations

Richards proposed an ideal diameter size class distribution for street trees based on observations of well-adapted trees in Syracuse, New York. Richards' ideal distribution suggests that the largest fraction of trees (approximately 40% of the population) should be young (less than 8 inches DBH), while a smaller fraction (approximately 10%) should be in the large-diameter size class (greater than 24 inches DBH). A tree population with an ideal distribution would have an abundance of newly planted and young trees, and lower numbers of established, maturing, and mature trees.

[2] Richards, N. A. 1983. "Diversity and Stability in a Street Tree Population." *Urban Ecology* 7(2):159–171.

Table 6. Summary of Schenectady's tree size distribution compared to the ideal distribution

DBH Class	Rate Compared to Ideal Distribution
0-6in	LOW
6-12in	GOOD
12-18in	HIGH
18-24in	HIGH
24-30in	HIGH
>30in	HIGH

Schenectady has too few young trees (0-6" DBH) and an overabundance of maturing trees (12" and up DBH) suggesting an overly mature tree population. A goal for Schenectady's community forest should be to have an uneven-aged distribution of trees at the street, park, and citywide levels. An aging tree population poses a potential increase in maintenance and removal demands and may leave a void in tree canopy and associated benefits if tree planting levels are not elevated. The City is below the threshold for young trees and it will also suffer a loss of ecosystem services that were provided by the mature trees if tree plantings do not increase.

It is recommended that Schenectady support a strong planting and maintenance program to ensure that young, healthy trees are in place to fill in gaps in tree canopy and replace older declining trees. The City must promote tree preservation and proactive tree care to ensure the long-term survival of older trees. Additionally, tree planting and tree care will allow the distribution to normalize over time.

The distribution of individual tree ages within a tree population influences present and future costs as well as the flow of benefits. If a city assumes responsibility of tree maintenance within public rights-of-way, an ideal age/size distribution in the tree population allows managers to allocate annual maintenance costs uniformly over many years and assures continuity in overall tree canopy coverage and associated benefits which are often dependent on the growing space of individual trees (e.g. open grown versus restricted growing areas)

The Condition and Maintenance Needs of Public Trees

Tree characteristics and outside forces affect the management needs for urban and community trees. An analysis of the condition and maintenance requirements enables managers to plan the community forest and target outreach to property owners and the community as a whole. Tree condition indicates how well trees are managed and how well they perform given site-specific conditions. Tree maintenance needs are inventoried for public safety reasons and for the health and longevity of the trees. Understanding the maintenance needs assists tree managers in establishing daily work plans.

Tree Condition

The condition of individual trees was assessed based on methods defined by the International Society of Arboriculture (ISA). Several factors were considered for each tree, including root characteristics, branch structure, trunk, canopy, foliage condition, and the presence of pests. The condition of each inventoried tree was rated Excellent, Good, Fair, Poor, Critical, or Dead. In this Plan, the general health of the inventoried tree population was characterized by the most prevalent condition assigned during the inventory. Comparing the condition of the inventoried tree population with relative tree age (or size class distribution) can provide insight into the stability of the population.

Figure 13. Condition of all citywide trees

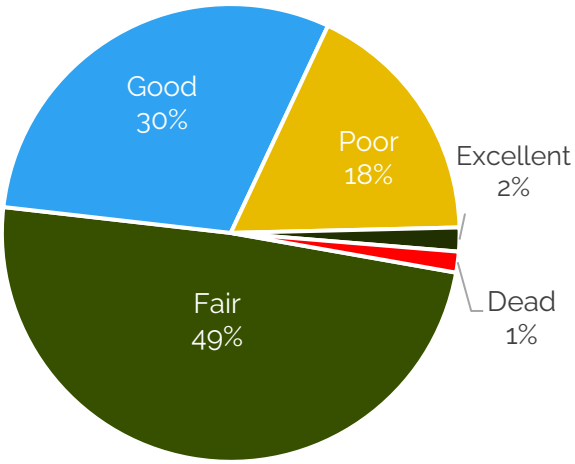


Figure 12. Condition of citywide park trees

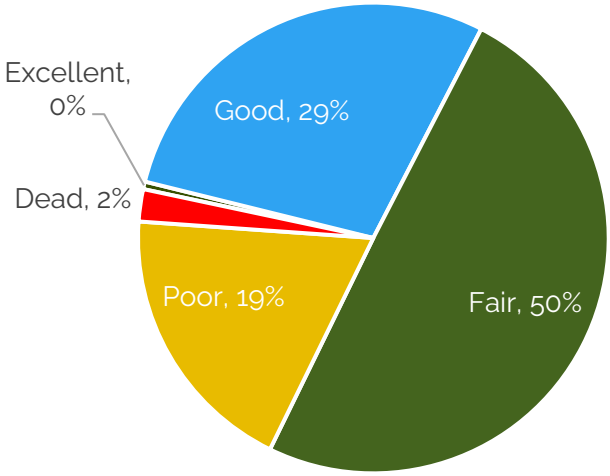


Figure 14. Condition of citywide street trees

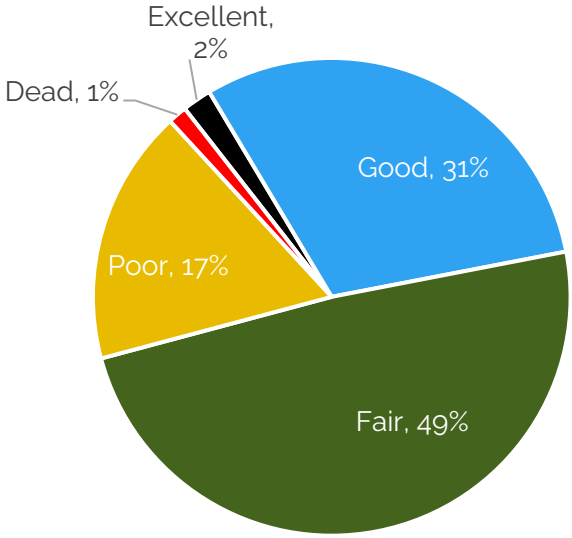
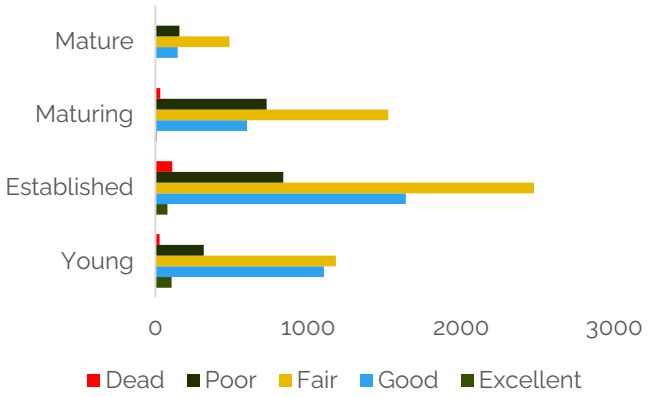


Figure 16. Condition of park trees by relative age

Figure 15. Condition of street trees by relative age

Figure 17. Condition of all trees by relative age



RESULTS

Tree condition was analyzed citywide and by location within City parks or public rights-of-way. The overall condition of all trees (both streets and parks) is split most frequently between Fair (49%) and Good (30%). 18% of all trees are in Poor condition, 2% were rated as Excellent, and 1% were recorded as Dead at the time of the inventory.

In addition, the condition was summarized by relative age classes. Comparing the condition of the inventoried tree population with relative tree age (or size class distribution) can provide insight into the stability of the population. As seen in Figure 13, citywide, most of the young and established trees are in Fair condition with 43% and 48% of each respective age class. Similarly, the majority of maturing and mature trees are in Fair condition with 53% and 91% of each respective age class. When comparing Figure 11 and Figure 12 (street versus park trees), a larger percentage of young and established trees are in Good condition in the public rights-of-way compared to parks; whereas, a larger percentage of maturing and mature trees are in Good condition in parks.

DISCUSSION/RECOMMENDATIONS

The young, established, and maturing trees in the ROW are in better condition overall compared to the same size class in parks. This may be a result of more frequent care and attention placed on street trees compared to parks. It was observed that mature trees are in

better condition in parks compared to the ROW which might be a result of the more abundant growing space commonly available in park settings.

The condition of Schenectady's inventoried tree population is typical for a citywide tree population and specifically for the street and park trees. The data analysis has provided the following insight into maintenance needs and historical maintenance practices.

The similar trend in condition across the tree population reveals that growing conditions and/or past management of trees were consistent.

- Younger trees rated in Fair or Poor condition may benefit from improvements in structure that may improve their health over time. Pruning should follow ANSI A300 (Part 1) standards.[3]
- Poor condition ratings among mature trees were generally due to visible signs of decline and stress, including decay, dead limbs, sparse branching, or poor structure. These trees will require corrective pruning, regular inspections, and possible intensive plant health care to improve their vigor.
- Proper tree care practices are needed for the long-term general health of the community forest. Following guidelines developed by ISA and those recommended by ANSI A300 (Part 5) standards[4] will ensure that tree maintenance practices ultimately improve the health of the community forest

Relative Performance Index

Relative Performance Index (RPI) is a comparison of a species' condition rating of "Good" and the tree population's "Good" rating. Using the percent of Good trees for a given species divided by the tree population percentage of Good trees gives a value of equal to 1, less than 1, or greater than 1. A value equal to 1 means the particular species is as healthy as the overall tree population. A value less than 1 means the species isn't as healthy as the overall tree population. A value greater than 1 means the species is healthier than the overall tree population. RPI answers the question of how well a species is performing in terms of health compared to the entire inventoried population.

Table 7. Relative performance Index (RPI) of the most common tree species

Common Name	Relative Performance Index
Norway maple	0.88
Red maple	1.00
Silver maple	0.92
Callery pear	1.10
Eastern white pine	1.07
Honeylocust	1.01
Black locust	0.85
Littleleaf linden	1.06
Crabapple species	1.04
Japanese tree lilac	1.14

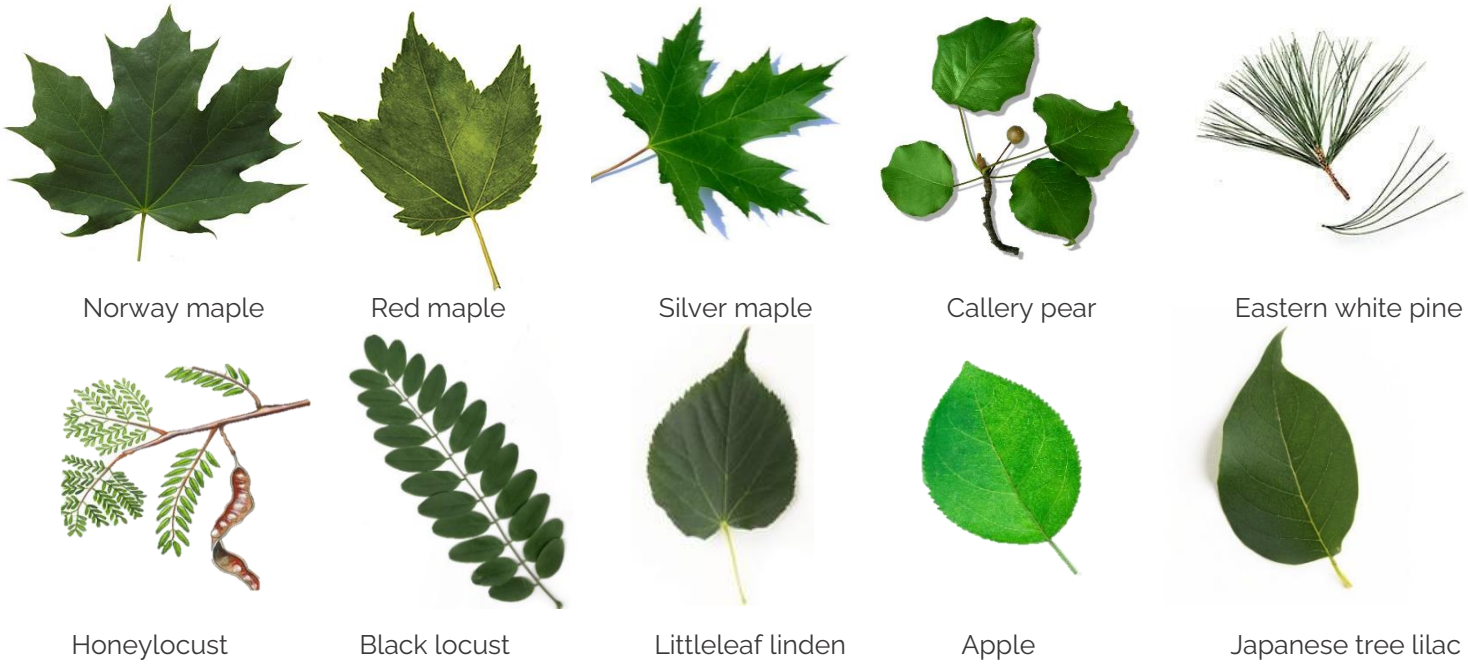
[3] ANSI, American National Standards Institute. 2017. ANSI A300 (Part 1)-2017 Pruning

[4] ANSI A300 (Part 5)-2012: Management of Trees and Shrubs During Site Planning, Site Development, and Construction

Results

The table provides a summary of the RPI's in order of abundance in the tree population. Norway maples are most abundant but have a lower RPI (0.88) compared to Japanese tree lilac (1.14), Eastern white pine (1.07), littleleaf linden (1.06), or Crabapple species (1.04), among others. Though Callery pear has a relatively high RPI (1.1), there is concern for the species due to the species' branching structure prone to limb breaks in winds, heavy snow, and/or heavily-leafed limbs. Black locust has the lowest RPI with 0.85 which may be due to its brittle nature during storm and droughts, along with its susceptibility to canker, verticillium wilt, root rot, and further diseases.

Figure 18. Schenectady's top 10 species



Tree Observations

Tree observations were recorded during the 2021 inventory to further describe a tree's health, structure, or location when more detail was needed.

Table 8. Summary of Schenectady tree inventory observations

Observation	Count	% of all observations
Crown Dieback	3,402	29%
Poor Structure	1,790	15%
Cavity Decay	1,533	13%
Codominant Stems	1,289	11%
Hardscape Damage	1,145	10%
Improperly Pruned	808	7%
Mechanical Damage	472	4%
Serious Decline	331	3%
Poor Root System	231	2%
Canker	182	2%
Included Bark	129	1%
Fungal growth/Fruiting bodies	112	1%
Girdling Roots	103	1%
Poor location	96	1%
Pests	67	1%
Grate/Guard	37	0%
Vines	28	0%
Improperly Mulched	3	0%
Nutrient Deficiency	1	0%
Improperly Installed	0	0%
TOTAL	**11,759**	**100%**

Results

A total of 11,759 observations were recorded during the 2021 tree and vacant site inventory. Crown dieback was most frequently observed and recorded (29%) during the 2021 tree inventory.

Discussion/Recommendations

Trees noted as having defects such as cavity or decay, poor tree architecture (codominant leader), weakly attached branches (included bark), root problems, and/or pest problems should be regularly inspected in addition to the trees noted for reinspection. Corrective actions should be taken when warranted. If the tree's condition worsens, removal may be required. It should be noted that of the 11,759 observations, 1,379 (12%) observations could have potentially been avoided. These observations include mechanical damage, improper pruning, poor location, improper mulching, and improper planting.

The costs for treating deficient trees must be considered to determine whether removing and replacing the tree is the more viable option.

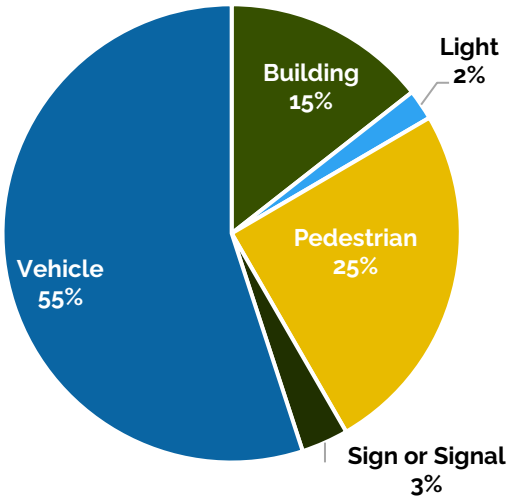
Utility Conflicts

In an urban setting, space is limited both above and below ground. Trees in this environment may conflict with utility wires which may pose risks to public health and safety. Existing or possible conflicts between trees and powerlines were recorded during the 2021 inventory. The presence of overhead utility lines above a tree or planting site was noted. Additionally, hardscape damage was noted when present. It is important to consider this data when planning pruning activities and selecting tree species for planting.

Table 9. Summary of wire conflicts

Wire Conflict	Count	Percent
Present & Conflicting	1,002	7%
Present & No Conflict	3,739	28%
No Lines Present	8,801	65%
TOTAL	**13,542**	**100%**

Figure 19. Summary of clearance conflict type



RESULTS

A total of 1,002 (7%) trees were noted with having a conflict with wires. Additionally, the inventory noted specific clearance conflicts. In Figure 16 above, it can be seen that the highest rates of clearance conflicts occurred around vehicles (55%) and pedestrians (25%).

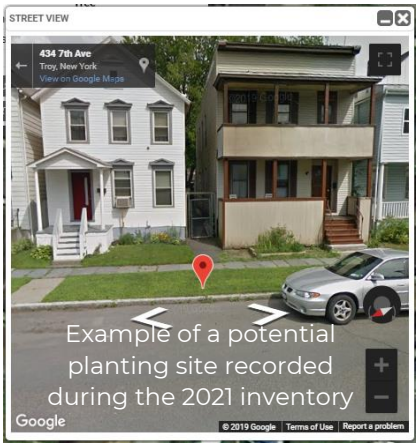
DISCUSSION/RECOMMENDATIONS

Planting only small-growing trees within 20 feet of overhead utilities, medium-size trees within 20–40 feet, and large-growing trees outside 40 feet will help improve future tree conditions, minimize future utility line conflicts, and reduce the costs of maintaining trees under utility lines. Future tree installations should consider the growing space, root space, and site conditions to accommodate a tree's potential growth capacity.

POTENTIAL TREE PLANTING SITES

During the 2021 inventory, vacant sites, also referred to as "potential tree planting sites", were inventoried. These inventoried sites are not meant to be fully stocked within the planning horizon of this Plan but are meant to provide information for the City to utilize in all tree planting planning.

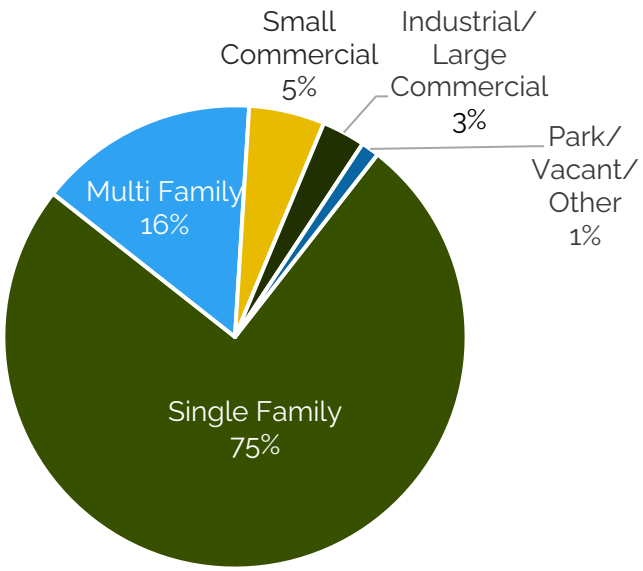
Potential tree planting sites within public rights-of-way (ROW) and in City parks were recorded based on the available growing space, proximity to existing trees, distance from existing above and below-ground utilities, distance from intersections, and other possible obstructions. An inventory of potential tree planting sites can provide information regarding a City's stocking level.



Example of a potential planting site recorded during the 2021 inventory

Stocking is a traditional forestry term used to measure the density and distribution of trees. For an urban/community forest such as Schenectady's, stocking level is used to estimate the total number of sites along the street ROW that could contain trees. The following summary provides select available potential planting sites for street ROW and parks and does not provide specific recommendations regarding stocking level. Due to budget limits, not all potential planting sites may be included in this assessment and the city will need to incorporate new potential planting sites moving forward. A recommendation for a "no net loss" program is provided in the Tree Maintenance Schedule and Budget worksheet which suggests planting a total of 1,446 trees (207 trees per year for seven years) to account for the Priority 1 and Priority 2 removals. Additional tree plantings should be considered as part of the City's goal to increase tree canopy cover and provide additional benefits to the community. Additionally, more trees can assist the City in achieving stormwater reduction and water quality goals. Lastly, based on the analysis of the tree diameter classes citywide, the City should be planting more trees for a more ideal distribution of tree sizes that reduce tree maintenance surges and increase the flow of ecosystem services equally across the City. Planting efforts should consider engaging the community by engaging them in species selection and locations as well as planting and care.

Figure 20. Potential planting sites by land use



Results

A total of 1,514 potential tree planting sites have been recorded in the 2021 inventory. It is not necessarily recommended to stock these sites immediately or even in the seven-year cycle but provide the City with information if the opportunity arises. The Single Family land use has the highest overall count of potential planting sites across all three planting site categories.

Value and Benefits of Schenectady's Public Trees

The community forest plays an important role in supporting and improving the quality of life in urban areas. A tree's shade and beauty contribute to a community's quality of life and soften the often-hard appearance of urban landscapes and streetscapes. When properly maintained, trees provide communities abundant environmental, economic, and social benefits that far exceed the time and money invested in planting, pruning, protection, and removal.

The trees growing along the public streets constitute a valuable community resource. They provide numerous tangible and intangible benefits such as pollution control, energy reduction, stormwater management, property value increases, wildlife habitat, education, and aesthetics.

The services and benefits of trees in the urban and suburban setting were once considered to be unquantifiable. However, by using extensive scientific studies and practical research, these benefits can now be confidently calculated using tree inventory information. The results of applying a proven, defensible model and method that determines tree benefit values for the City of Schenectady's tree inventory data are summarized in this Plan using the U.S. Forest Service's i-Tree's Streets application. The results of Schenectady's tree inventory provide insight into the overall health of the City's public trees and the management activities needed to maintain and increase the benefits of trees into the future.

Tree Tools software was developed by the U.S. Department of Agriculture, Forest Service (USDA FS) with the help of several industry partners. Learn more at www.itreetools.org.

Benefit Analysis of Schenectady's Public Trees

To identify the dollar value provided and returned to the community, the City's tree inventory data were formatted for use in the i-Tree Streets benefit-cost assessment tool. i-Tree Streets, a component of i-Tree Tools, analyzes an inventoried tree population's structure to estimate the costs and benefits of that tree population. The assessment tool creates an annual benefit report that demonstrates the value street trees provide.

These quantified benefits and the reports generated are described below.

- **Aesthetic/Other Benefits**: Shows the tangible and intangible benefits of trees reflected by increases in property values (in dollars).
- **Stormwater**: Presents reductions in annual stormwater runoff due to rainfall interception by trees measured in gallons.
- **Carbon Stored**: Tallies all of the carbon dioxide (CO2) stored in the urban forest over the life of its trees as a result of sequestration. Carbon stored is measured in pounds.
- **Energy**: Presents the contribution of the urban forest towards conserving energy in terms of reduced natural gas use in the winter (measured in therms [thm]) and reduced electricity use for air conditioning in the summer (measured in Megawatt-hours ([MWh]).
- **Carbon Sequestered**: Presents annual reductions in atmospheric CO2 due to sequestration by trees and reduced emissions from power plants due to reductions in energy use. This is measured pounds and has been translated to tons for this report. The model accounts for CO2 released as trees die and decompose and CO2 released during the care and maintenance of trees.

- **Air Quality**: Quantifies the air pollutants (ozone [O3], nitrogen dioxide [NO2], sulfur dioxide [SO2], particulate matter less than 10 micrometers in diameter [PM10]) deposited on tree surfaces, and reduced emissions from power plants (NO2, PM10, volatile organic compounds [VOCs], SO2) due to reduced electricity use in pounds. The potential negative effects of trees on air quality due to biogenic volatile organic compounds (BVOC) emissions is also reported.
- **Replacement Value**: Replacement values are estimates of the full cost of replacing trees in their current condition, should they be removed for some reason. Replacement values are based on the Council of Tree and Landscape Appraisers (CTLA) Guide for Plant Appraisal, which uses a trunk formula methodology.
- **Importance Value (IV)**: IVs are calculated for species that comprise more than 1% of the population. The Streets IV is the mean of three relative values (percentage of total trees, percentage of total leaf area, and percentage of canopy cover) and can range from 0 to 100, with an IV of 100 suggesting total reliance on one species. IVs offer valuable information about a community's reliance on certain species to provide functional benefits. For example, a species might represent 10% of a population but have an IV of 25% due to its substantial benefits, indicating that the loss of those trees would be more significant than just their population percentage would suggest.

The data collected from the inventory of trees completed in December 2021 were analyzed in i-Tree Eco for an understanding of the value and benefits of Schenectady's public trees. The following provides a summary of the results

Table 10. Summary of the annual benefits provided by Schenectady's public trees

Benefits	Total ($)	Quantity	$/tree	$/capita
Aesthetic/Other	$553,537	N/A	$47.95	$8.48
Stormwater	$151,909	18.6 million gallons	$13.16	$2.33
CO2	$15,716	4.4 million pounds	$1.36	$0.25
Energy	$575,482	944MWh, 321,822 Therms	$49.85	$8.82
Air Quality	$110,788	23,484 pounds	$9.60	$1.70
Total Benefits	**$1,407,432**		**$121.92**	**$21.58**

*Distribution of benefits per tree and per capita based on 11,545 trees and a population of 65,279 people

RESULTS

Based on the 2021 inventory of trees in public rights-of-way (ROW) and in parks, Schenectady's public tree population provides a total of $1,407,432 in annual benefits by increasing property values, reducing stormwater volumes, sequestering carbon and storing carbon dioxide, conserving energy use, and improving air quality. This value results in approximately $122in benefits provided by each tree annually and approximately $22 worth of benefits are shared by each resident in the City.

Tree Species Importance Values (IV)

Understanding the importance of a tree species to the community is based on its presence in the ROW, but also its ability to provide environmental and economic benefits to the community. The IV calculated by i-Tree Streets considers the total number of trees of a species, its percentage in the population, and its total leaf area and canopy cover. The IV can range from 0 to 100, with an IV of 100 suggesting total reliance on one species. If IV's are

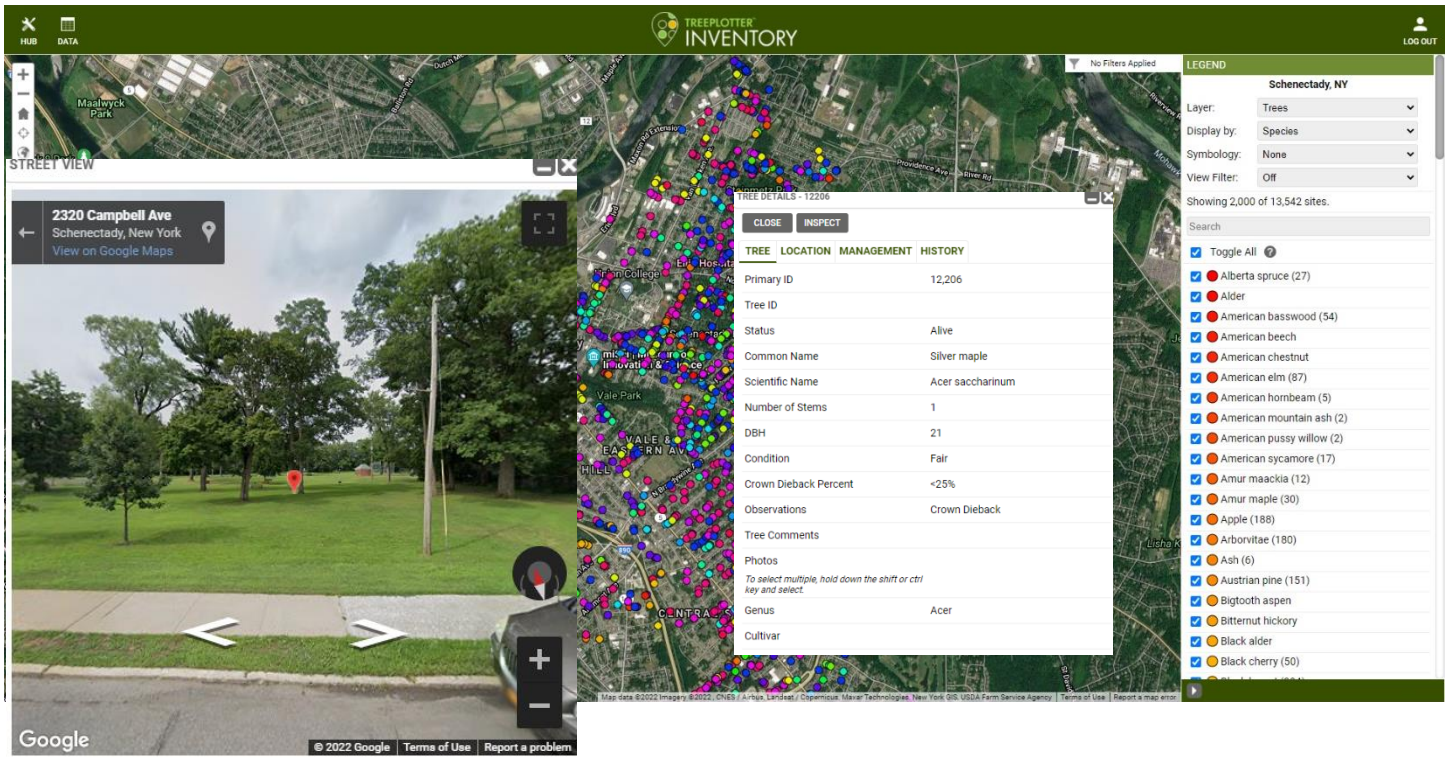
greater or less than the percentage of a species in the ROW, it indicates that the loss of that species may be more important or less important than its population percentage implies.

Table 11. Tree species with the highest importance values (IV)

Common Name	Importance Value
Norway maple	31.8
Silver maple	25.6
Red maple	16.8
Eastern white pine	12.4
Honeylocust	7.0
Black locust	6.3
Callery pear	5.9
Littleleaf linden	5.4
Apple spp	5.1
Crimson King Norway Maple	4.5

RESULTS

The i-Tree Streets assessment found that Norway maple has the greatest IV in the tree population at 31.8 and based on the species diversity analysis, it comprises 18% of the tree population (2,006 of 11,545 live trees). This indicates that the loss of the Norway maple population would be economically detrimental. The second highest IV was for silver maple (25.6), followed by red maple (16.8) and Eastern white pine (3.7). Japanese tree lilac is the tenth most common species in the ROW with 255 trees (2%) but is not present in the top 10 IV's list. Japanese tree lilacs are smaller in size and canopy at maturity and therefore, provide less environmental benefits to the community, which all factor into assigning IV. The IV for Japanese tree lilac is just a bit higher than its percentage of the population. However, if the IV was less than its percentage of the tree species population, this would indicate that the loss of Japanese tree lilac would not have a significant economic impact.



Community Forest Management

Source: Times Union

Tree Management Recommendations and Budgets

This tree management program recommended within the Community Forest Management Plan was developed to uphold Schenectady's vision for preserving its community forest. This 7-year program is based on the tree inventory data. The management program provided in this section describes the recommended approach for proper tree care if no changes are made in tree care responsibility.

This program was designed to reduce risk through prioritized tree removal and pruning, and to improve tree health and structure through proactive pruning cycles. Tree planting to mitigate removals and increase canopy cover and public outreach are important parts of the program as well. While implementing a tree care program is an ongoing process, tree work must always be prioritized to reduce public safety risks. It is recommended to complete the work identified during the inventory based on the assigned Maintenance Priority— (Priority 1), (Priority 2), (Priority 3), and (Priority 4). However, it is also essential to routinely monitor the tree population to identify other high priority or high risk trees so that they may be systematically addressed. While regular pruning cycles and tree planting is important, priority work (especially for high priority and high risk trees) must sometimes take precedence to ensure that risk is expediently managed. The following maintenance recommendations were recorded during the 2021 inventory:

- *Maintenance Priority:* Informs the maintenance practices and specific trees to address in order of priority.
- *Maintenance Type:* Provides additional information about the maintenance priority recommendation. Understanding the maintenance type helps to establish maintenance routes, schedules, and budgets.

Priority and Proactive Tree Maintenance

In this Plan, priority tree maintenance includes tree removals and pruning of trees with an assessed Maintenance Priority. These priorities range from 1-4 with the following classifications:

- **Priority 1 and Priority 2** maintenance may refer to the removal of the dead, diseased, damaged, or uprooted tree and/or the removal of a probable or imminent risk such as a broken limb or split leader.
- **Priority 3** maintenance is the routine pruning to manage risk or health, develop structure, provide clearance, manage shape, improve aesthetics, manage fruit or flower production, and/or manage wildlife habitat.
- **Priority 4** maintenance refers to the structural pruning of young, developing trees to remove diseased, damaged, or crossing branches; to form a central branch leader; to improve branching structure; to establish the lowest permanent branch; and/or remove sucker growth and epicormic shoots. Additional Priority 4 maintenance for young trees may include watering, amending or adding mulch, adding or removing stakes or ties, and/or soil amendments or fertilizer treatment.

The City of Schenectady and its tree managers may use Microsoft Excel or TreePlotter to filter for specific Priorities outlined in this section (Priority 1-4). Specific Priority parameters detailed in the table below for the City to observe and utilize. As part of the Management Plan project, the City was provided an export of the complete inventory data in Excel format along with links to map scenarios ("Custom URLs") within TreePlotter for data analysis.

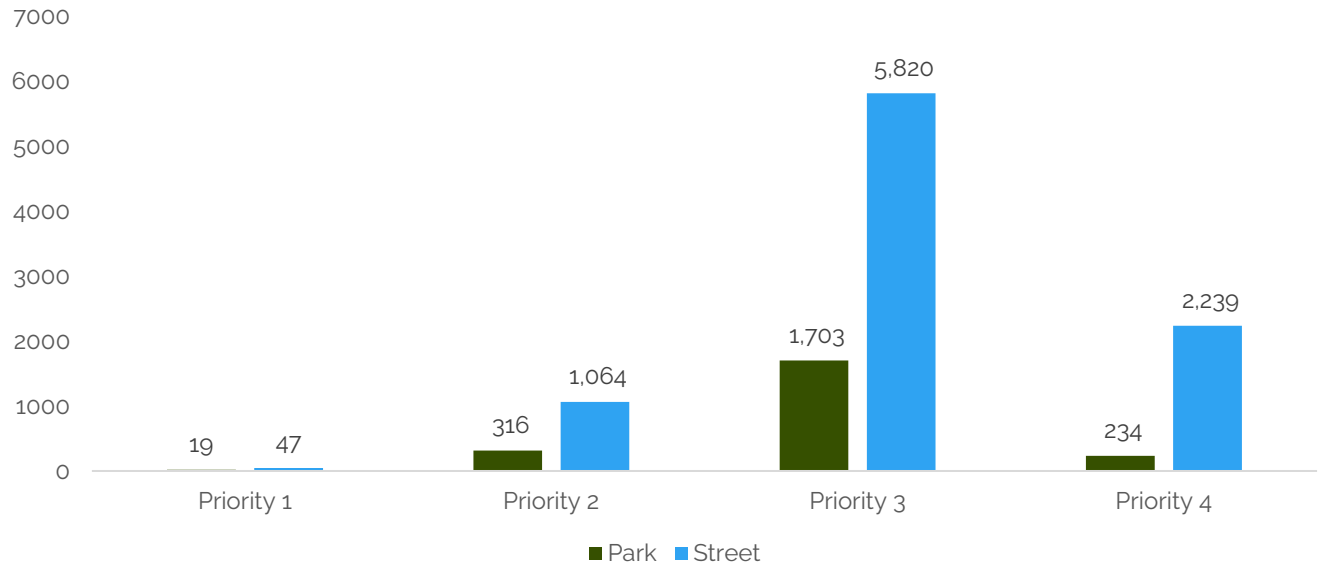
Table 12. Priority maintenance parameters for Schenectady's trees

	Tree Inventory Export to Excel	TreePlotter Filter
Priority 1	200 trees	200 trees
	a. Status = dead, or	Tree Filter: Condition = ('Dead') or
	b. Condition = dead	Status = ('Dead')
Priority 2	1,075 trees	1,075 trees
	a. Status = alive, and	Tree Filter: Status = ('Alive') and
	b. Tree work=removal	(Tree Work='Removal')
Priority 3	10,607 trees	10,607 trees
	a. DBH >6”	Tree Filter: not Condition = ('Dead') and
		not DBH Range = ('0-3in' or
		'3-6in') and
		not Status = ('Dead' or
		'Proposed Site - Large' or
		'Proposed Site - Medium' or
		'Proposed Site - Small' or
		'Removed' or
		'Stump') and
		not (Tree Work='Removal')
Priority 4	1,045 trees	1,045 trees
	a. DBH <6”	Tree Filter: not Condition = ('Dead') and
		not DBH Range = ('6-12in' or
		'12-18in' or
		'18-24in' or
		'24-30in' or
		'>30in' or
		'N/A') and
		not Status = ('Dead' or
		'Proposed Site - Large' or
		'Proposed Site - Medium' or
		'Proposed Site - Small' or
		'Removed' or
		'Stump') and
		not (Tree Work='Removal')

Maintenance Priority

Although tree removal is usually considered a last resort and may sometimes create a reaction from the community, there are circumstances in which removal is necessary. Trees fail from natural causes, such as diseases, insects, and weather conditions, and from physical injury due to vehicles, vandalism, and root disturbances. It is recommended that trees be removed when corrective pruning will not adequately eliminate the hazard or when correcting problems would be cost-prohibitive. Trees that cause obstructions or interfere with power lines or other infrastructure should be removed when their defects cannot be corrected through pruning or other maintenance practices. Diseased and nuisance trees also warrant removal. Even though large short-term expenditures may be required, it is important to secure the funding needed to complete priority tree removals. Expedient removal reduces risk and promotes public safety. The following sections briefly summarize the recommended removals identified during the inventory completed in December 2021.

Figure 21. Summary of maintenance priority counts for street and park trees



RESULTS

A total of 66 trees were identified as requiring Priority 1 maintenance (removal) of which 47 trees reside in the public rights-of-way and 19 within the City's parks. A total of 1,380 trees were identified as requiring Priority 2 maintenance (removal) of which 1, 064 reside in the public rights-of-way and 316 within the City's parks. As for Priority 3 maintenance (routine pruning), a total of 7,523 trees were identified, with 5,820 trees residing in public rights-of-way and 1,703 within the City's Parks. And lastly, 2,473 trees were designated as Priority 4 maintenance young tree training pruning). Of these 2,473 trees, 2,239 reside in public rights-of-way and 234 within the City's parks.

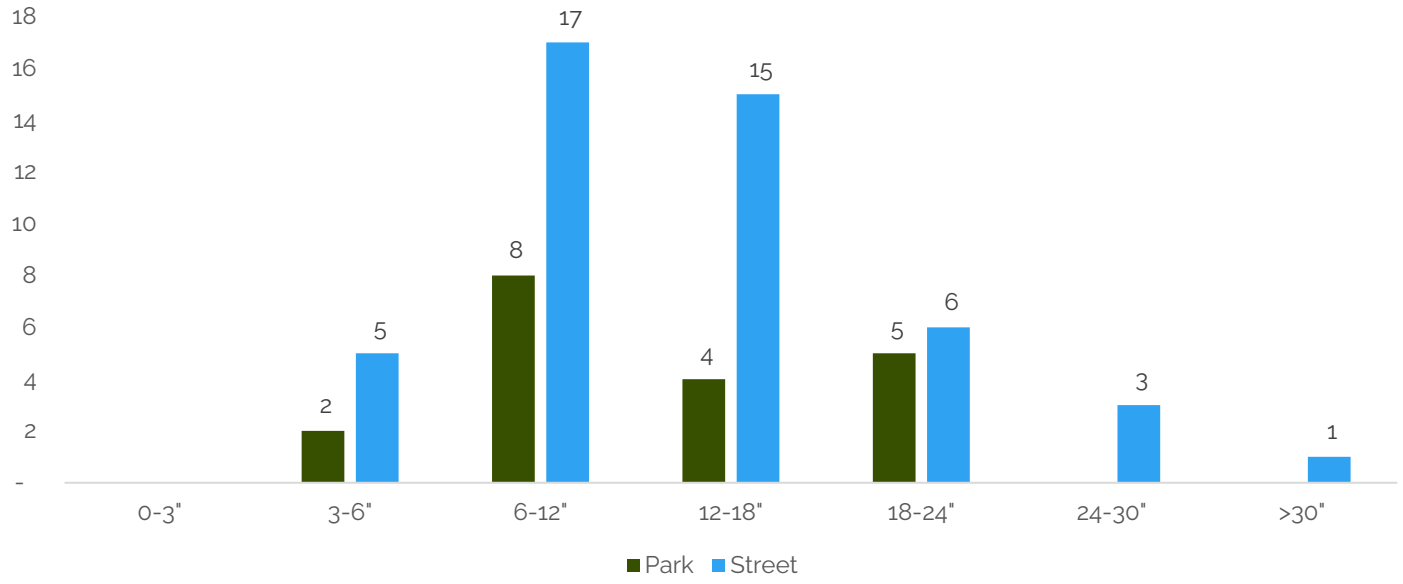


Figure 22. Priority 1 removals by diameter class

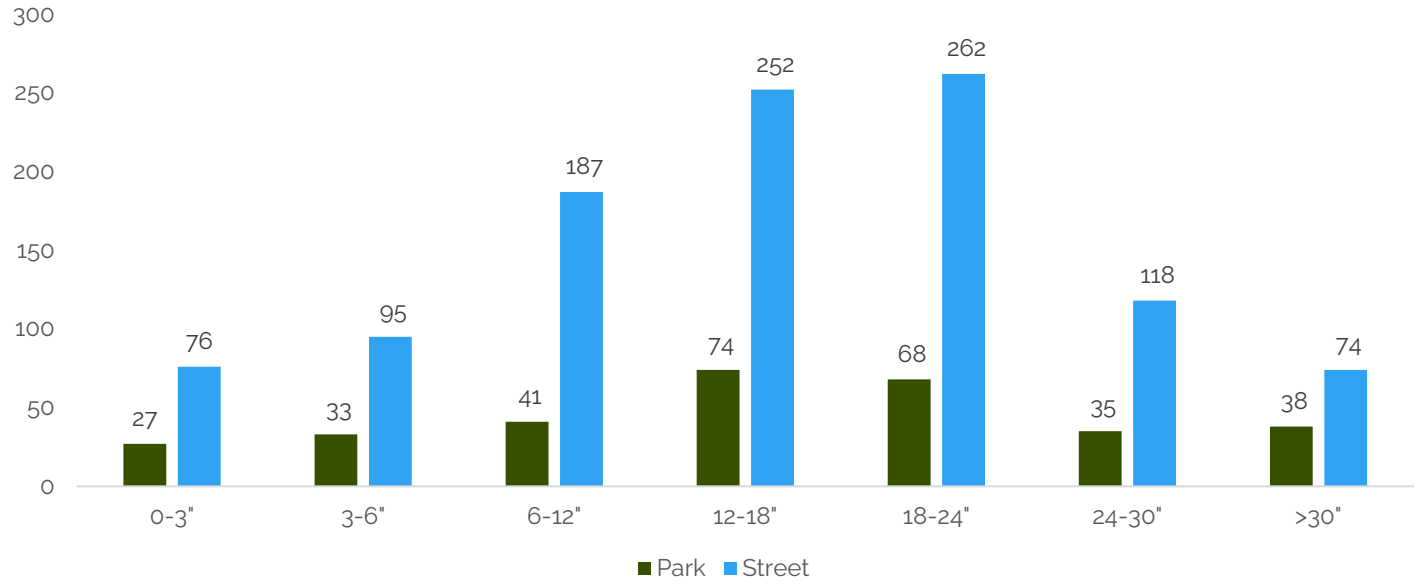


Figure 23. Priority 2 removals by diameter class

Results

The majority of Priority 1 trees requiring removal within the public rights-of-way (17 trees) and city parks (8 trees) are in the 6-12-inch diameter class. On the other hand, the majority of Priority 2 trees requiring removal in the public rights-of way (262 trees) are in the 18-24-inch diameter class. However, the majority of the Priority 2 trees requiring removal in the city parks are in the 12-18-inch diameter class.

Discussion/Recommendations

Trees identified as requiring (Priority 1) maintenance with a recommendation to Remove should be addressed immediately. The count of trees by diameter class nor the size of the tree necessarily dictate priority. Priority should be based on a variety including but not limited to the tree's size, condition, location, potential targets, and other factors. The City should use the TreePlotter software application to locate these trees and prioritize. Following mitigation of the Priority 1 maintenance, trees listed as Priority 2 should be addressed. Priority 2 maintenance may coincide with Priority 1 maintenance if the trees are in close proximity to

one another or other factors that support cost and time efficiency and promptness of tree issue mitigation.

Unless already slated for removal, trees noted as having poor tree architecture or weakly attached branches and codominant stems or missing or decayed wood should be inspected on a regular basis. These observations can be filtered in the City's TreePlotter software application to identify the location of these trees for monitoring. Summaries of observations are provided further in this analysis. Corrective action should be taken for these observations when warranted. If their condition worsens, tree removal may be required. Proactive tree maintenance that actively mitigates elevated-risk situations will promote public safety. Updating the tree inventory data can streamline workload management and lend insight into setting accurate budgets and staffing levels. Inventory updates should be made electronically and can be implemented using the City's TreePlotter or similar software applications.

Proactive Tree Maintenance

The following summaries provide information regarding routine pruning of trees to prevent future issues and to improve the overall health of the tree. This information is used to inform the recommended Priority 3 maintenance tasks to establish the maintenance cycles and associated costs.

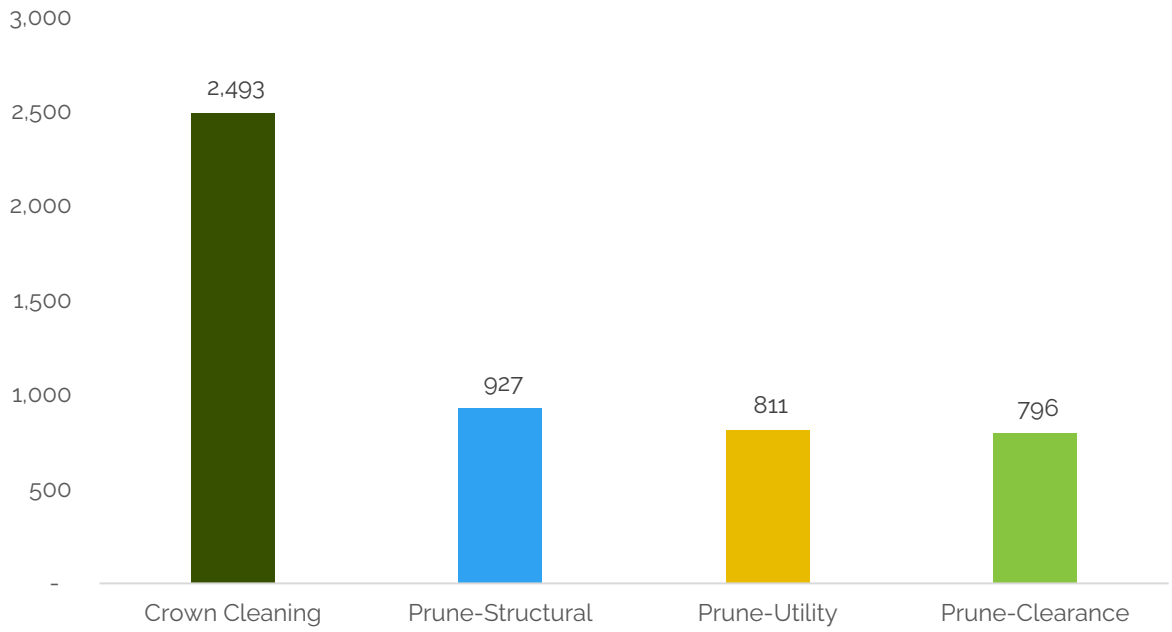


Figure 24. Top Tree Maintenance Recommendations for all trees

Results

The majority of trees that are not assigned for removal in Priority 1 and 2 have been assigned "Crown Cleaning" as a routine tree maintenance recommendation. Following crown cleaning, the pruning groups (structural, utility,clearance) hold the other top spots for tree maintenance.

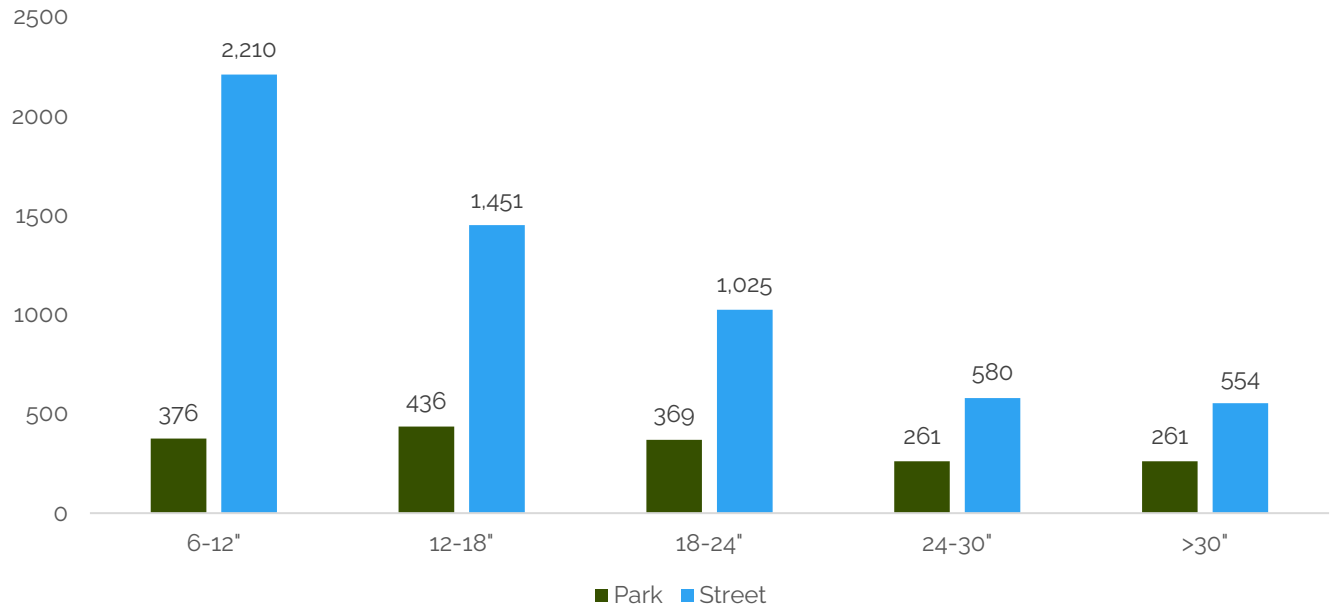
Discussion/Recommendations

This information is used to inform the Priority 3 maintenance summarized in the following section.

Proactive Tree Maintenance – Priority 3 (Routine)

The previous section summarized the general Maintenance Type assigned to trees not requiring removal. This general type of maintenance applies to the routine pruning of trees for maintaining the health of the tree and the safety of the public. As such, trees with this Maintenance Type recommendation were assigned a Maintenance Priority of "(Priority 3)". Routine pruning generally requires cleaning the canopy of both small and large trees to remove defects such as dead and/or broken branches that may be present even when the rest of the tree is sound. In these cases, pruning the branch or branches can correct the problem and reduce risk associated with the tree. The following chart provides a summary of the Priority 3 trees by diameter class since the size of the tree and their frequency can affect maintenance costs.

Figure 25. Summary of street and park tree Priority 3 (Routine) Maintenance by diameter class



Results

Street and park trees greater than 6 inches in DBH were summarized to understand the distribution of Priority 3 trees. Of the 7,523 trees recommended for Priority 3 maintenance, 5,820 are street trees and 1,703 are park trees. The majority of Priority 3 street trees fall within the 6-12-inch diameter class while the majority of Priority 3 park trees fall within the 12-18-inch diameter class. The 24-30-inch and >30-inch diameter classes contained the lowest count of street and park trees recommended for Priority 3 maintenance.

Discussion/Recommendations

The Priority 3 Maintenance summary provides an overview of the trees that specifically require routine pruning to remove defects such as dead and/or broken branches that may be present even when the rest of the tree is sound and/or the pruning of branches for clearance of roadways, pedestrians, parking, signs, and/or utilities. These summaries do not provide the complete picture of what is required for a citywide routine pruning cycle of public rights-of-way trees because it does not include all eligible trees, only trees specifically identified during the 2021 inventory. The following section provides the appropriate tree numbers that were used in provided the recommended tree maintenance cycle.

Street and Park Tree Pruning Cycles

The goals of pruning cycles are to visit, assess, and prune trees on a regular schedule to improve health and reduce risk. It is recommended that pruning cycles begin after all Priority 1 and Priority 2 trees are corrected through removal or pruning. However, due to the long-term benefits of pruning cycles, the pruning cycles should be implemented as soon as possible. To ensure that all trees receive the type of pruning they need to mature with better structure and lower associated risk, two pruning cycles are recommended: the routine pruning cycle and the young tree pruning cycle. The cycles differ in the type of pruning, the general age of the target tree, and length.

The recommended number of trees in the pruning cycles will need to be modified to reflect changes in the tree population as trees are planted, age, and die. Newly planted trees will enter the young tree cycle once they become established. As young trees reach maturity, they will be shifted from the young tree cycle into the routine pruning cycle. When a tree reaches the end of its useful life, it should be removed and eliminated from the routine pruning cycle.

For many communities, a proactive tree management program is considered unfeasible. An on-demand response to urgent situations is often the approach. Research has shown that a proactive program that includes a routine pruning cycle will improve the overall health of a tree population. Proactive tree maintenance has many advantages over on-demand maintenance, the most significant of which is reduced risk. In a proactive program, trees are regularly assessed and pruned, which helps detect and eliminate most defects before they escalate to a hazardous situation with an unacceptable level of risk. Other advantages of a proactive program include: increased environmental and economic benefits from trees, more predictable budgets and projectable workloads, and reduced long-term tree maintenance costs. This recommended pruning cycle is provided, though, recommendations in this Plan include the development of tree maintenance priority corridors and a shared responsibility of tree maintenance between the City and the adjacent property owners. As stated above, the pruning cycles should be adjusted as trees are planted and removed and as trees mature and transition from the young tree pruning category to the routine pruning category.

STREET TREE ROUTINE PRUNING CYCLE

The routine pruning cycle for street trees includes established, maturing, and mature trees (mostly greater than 6 inches DBH) that need cleaning, crown raising, and reducing to remove deadwood and improve structure. Over time, routine pruning can reduce reactive maintenance, minimize instances of elevated risk, and provide the basis for a more defensible risk management program.

The length of the street tree routine pruning cycle is based on the size of the tree population and what was assumed to be a reasonable number of trees for a program to prune per year. Generally, the routine pruning cycle recommended for a tree population is five years but may extend to seven years if the population is large.

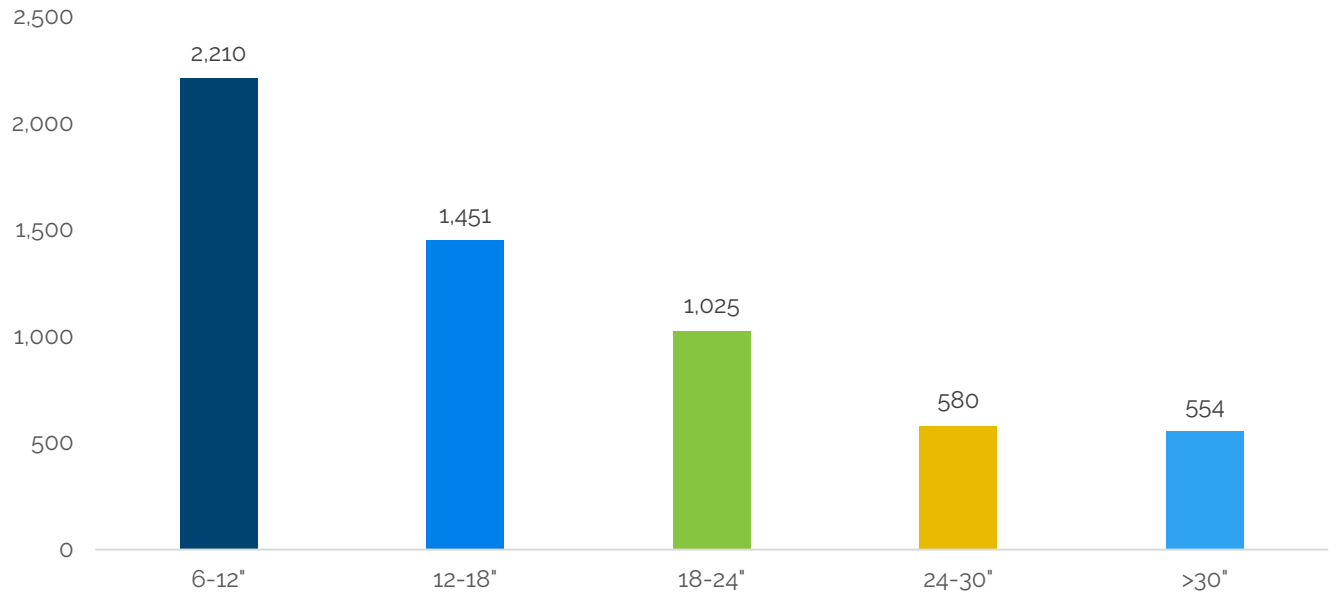


Figure 26. Street trees recommended for the routine pruning cycle summarized by diameter class

Street Tree Pruning Cycle Recommendations & Schedule

It is recommended that the City establish a 7-year routine pruning cycle for street trees in which approximately one-seventh of the tree population is to be pruned each year. The 2021 tree inventory identified approximately 7,523 trees that should be pruned over a 7-year cycle. This results in an average of 1,074 trees to be pruned each year over the course of the cycle. It is recommended that the routine pruning cycle begin in Year Three of this 7-year plan, after all Priority 1 and Priority 2 trees are addressed.

The inventory found that most trees (5,820 street trees of 9,241 total street trees, 63%) needed routine pruning. Figure 23 shows that a variety of tree sizes will require pruning; however, most of the street trees that require routine pruning were smaller than 18 inches DBH.

Park Tree Routine Pruning Cycle and Recommendations

In addition to the street tree pruning cycle, a routine maintenance schedule is recommended for park trees. Based on Figure 24 on the next page, a total of 2,280 park trees are suitable for a routine pruning cycle (living park trees >6 inches DBH and not a Critical or Young Priority).

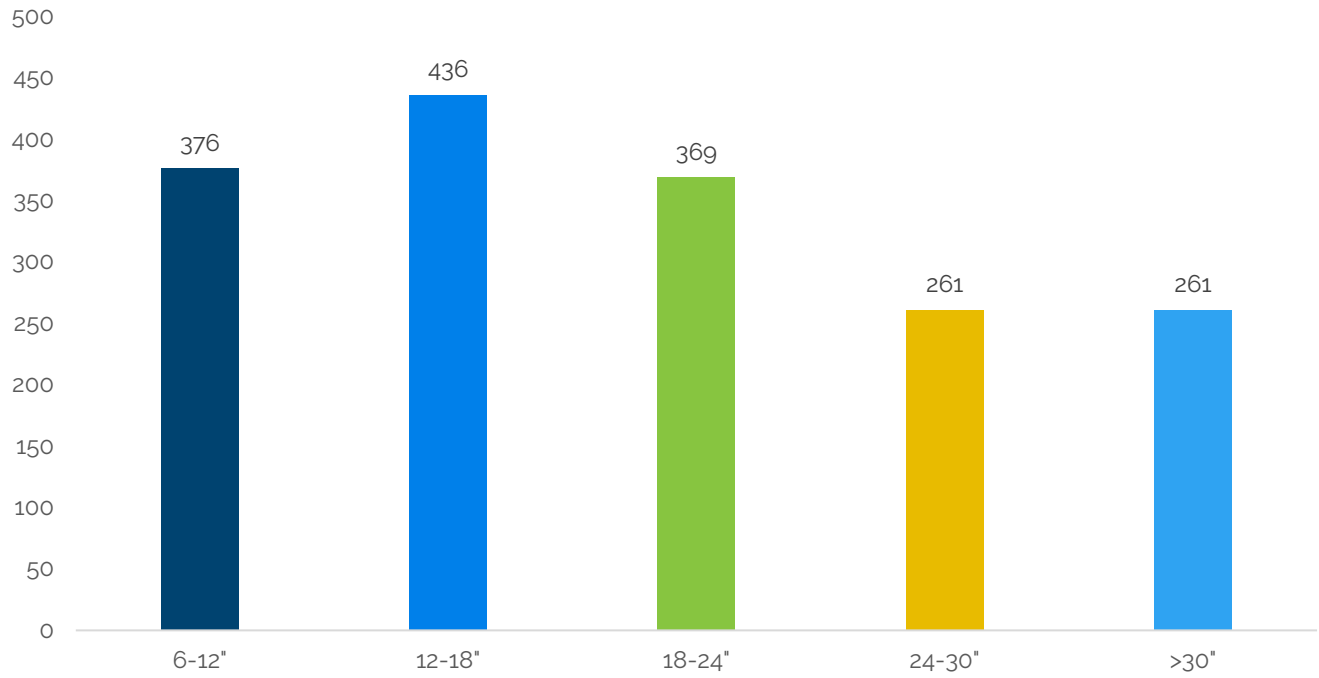


Figure 27. Summary of the diameter classes of the park trees for routine pruning

With 2,280 total park trees suitable for routine pruning, approximately 326 park trees should be pruned per year. Based on the figure above, the 12-18-inch diameter class comprises most of the park tree routine pruning with 436 trees. The park trees suitable for routine pruning includes only living trees, though some of the park trees are in less than Fair condition (135 Poor trees) and should be monitored and evaluated for removal rather than routine pruning in subsequent years. Any Priority 1 or 2 maintenance should be completed before those trees are added to the pruning cycle.

Young Tree Pruning Cycle and Recommendations

Trees included in the young tree training pruning cycle are generally less than 6 inches DBH. These younger trees sometimes have branch structures that can lead to potential problems as the tree ages. Potential structural problems include codominant leaders, multiple limbs attaching at the same point on the trunk, crossing/interfering limbs, or dead/diseased/damaged limbs. If these problems are not corrected, they may worsen as the tree grows, increasing risk and creating potential liability. Young tree training pruning is performed to improve tree form or structure; the recommended length of the young tree pruning cycle is three years because young trees tend to grow at faster rates (on average) than more mature trees. The young tree cycle differs from the routine pruning cycle in that these trees generally can be pruned from the ground with a pole pruner or pruning shear. The objective is to increase structural integrity by pruning for one dominant leader. Young tree training pruning is species-specific, since many trees may naturally have more than one leader. For such trees, young tree training pruning is performed to develop a strong structural architecture of branches so that future growth will lead to a healthy, structurally sound tree. In addition to training pruning, young trees may also require additional maintenance such as added or amended mulch, watering, added or removed stakes and ties, and/or clearance of debris and litter. These activities can potentially be remedied during the young tree training pruning.

Figure 29. Count of young trees for training pruning cycle along streets and in parks.

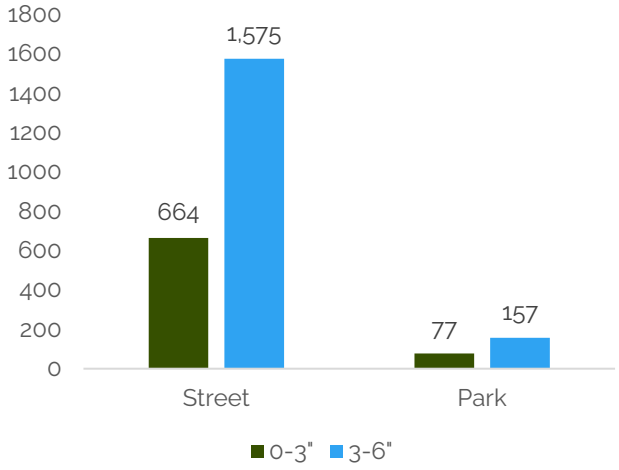
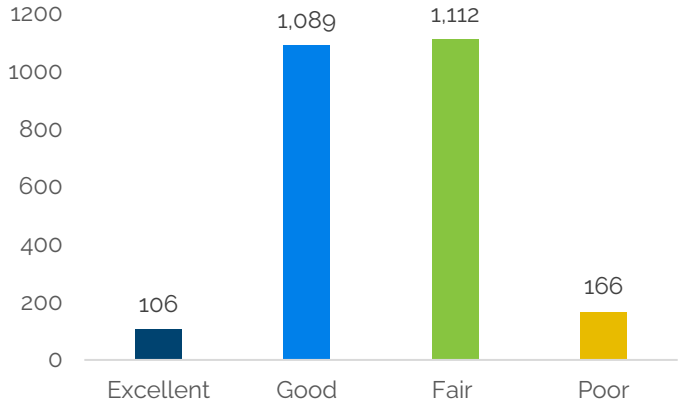


Figure 28. Condition of street and park trees considered for the young tree training pruning cycle



Young tree training pruning is recommended citywide (street and park trees) for trees less than 6 inches in diameter and is shown in the Tree Maintenance Schedule and Budget table in Appendix F. There are 2,239 street trees and 234 park trees in these diameter classes which total 2,473 trees suitable for the training pruning cycle.

Young trees that are less than Good condition should be monitored and appropriately addressed to ensure health. Young trees that cannot recover should not be included in the cycle and should instead be removed and replaced.

Summary of Recommended Tree Management Activities

Utilizing data from the 2021 tree inventory, an annual maintenance schedule was developed that details the number and type of tasks recommended for completion each year. The budget projections are based on industry standards and public bid tabulations. Actual costs were not specified by Schenectady. A summary of the maintenance schedule is presented; a complete table of estimated costs for Schenectady's 7-year tree management program follows. The schedule provides a framework for completing the inventory maintenance recommendations over the next seven years. Following this schedule can shift tree care activities from an on-demand system to a more proactive tree care program.

As seen in Appendix F, the Tree Maintenance Schedule and Budget, to implement the street and park tree maintenance schedule of Priority 1 and 2 removals, Priority 3 routine pruning, priority 4 training pruning, and replacement planting, the City's tree maintenance budget should be no less than $215,463 for the first year of implementation, no less than $211,278 for the second year, no less than $425,864 for the third year, and no less than $379,664 for the final four years of the maintenance schedule.

This maintenance schedule addresses the 66 Priority 1 removals, 1,380 Priority 2 removals, 7,523 Priority 3 routine pruning trees, and 2,473 young tree pruning trees. . This includes trees in the public rights-of-way and in parks with this Maintenance Priority. A total of 2,473 street and park trees are less than 6 inches in diameter and require young tree maintenance for establishing proper branching structure and tree health. This maintenance activity is included in the maintenance schedule, and it is recommended to prune these trees on a three-year cycle (824 trees per year). The routine pruning cycle of 5,820 street trees—or 831 trees per year

for seven years—begins in the third year. The routine pruning cycle for parks begins in year three and is approximately 243 trees per year for the seven-year cycle to be distributed across the City's 16 parks, 2 athletic fields, 1 educational field, gateway plaza, and Steinmetz Memorial.

Annual budget funds are needed to ensure that high risk trees are remediated and that crucial routine pruning and young tree pruning cycles can begin. With proper professional tree care, the safety, health, and beauty of the community forest will improve.

If routing efficiencies and/or contract specifications allow for the completion of more tree work, or if the schedule requires modification to meet budgetary or other needs, then the schedule should be modified accordingly. Unforeseen situations such as severe weather events may arise and change the maintenance needs of trees. Should conditions or maintenance needs change, budgets and equipment will need to be adjusted to meet the new demands.

This information should be presented to the City when discussing tree maintenance priority corridors, shared responsibility of tree maintenance, budgets, and staffing levels.

Table 13. Summary of tree maintenance activity costs

Activity & Year	2022	2023	2024	2025	2026	2027	2028	TOTAL
Priority 1 Removals	$17,925	$14,500	$13,225	$0	$0	$0	$0	$45,650
Priority 2 Removals	$31,695	$31,495	$31,460	$31,460	$31,260	$31,230	$30,980	$219,580
Priority 3 Routine Pruning	$0	$0	$170,860	$170,635	$170,635	$170,424	$170,424	$852,979
Priority 4 Young Tree Pruning	$22,260	$22,260	$22,260	$22,260	$22,260	$22,260	$22,260	$155,820
Replacement Trees	$45,000	$44,000	$43,600	$39,600	$39,200	$39,000	$38,800	$289,200
Replacement Trees-Young Tree Maintenance	$0	$0	$45,000	$41,800	$43,600	$39,600	$39,200	$209,200
Annual Mortality and Planting	$98,583	$99,023	$99,459	$99,855	$100,247	$100,637	$78,000	$675,801
TOTAL	**$215,463**	**$211,278**	**$425,864**	**$405,610**	**$407,202**	**$403,151**	**$379,664**	**$2,448,230**

Community Engagement

Opportunities to Engage

Community Meetings. Discuss the Plan, projects, and issues with residents throughout the City.

Public Surveys. Conduct surveys to gather rich insights into public perception on the importance of trees.

Non-profit Partnerships. Utilize ReTree Schenectady to create or improve partnerships.

Social Media. Post Plan implementation progress, announcements, and opportunities on social media.

Fliers & News Articles. Distribute to raise awareness and gather support.

Press Releases. Share projects, events, and studies in The Daily Gazette.

Canvassing of Homes. ID street blocks and areas for spreading community forestry awareness.

Email Listserv. Keep the community up-to-date on Plan implementation and events.

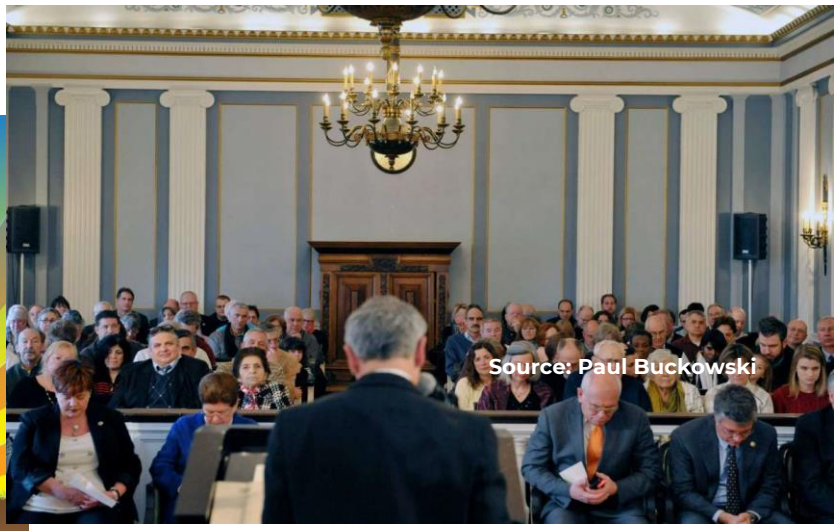
Community Engagement

A successful plan and community forestry program blend the various needs, opportunities, perspectives, and preferences of stakeholders and listens to the community.

Community Engagement Recommendations

The plan development process included substantial research regarding community outreach and education opportunities. This study provided a broad perspective of the challenges that face Schenectady's community forest.

For successful implementation of this Plan and strengthened compassion and support for the community forest, community engagement activities should be arranged to provide updates, stewardship opportunities, and a platform for discussing varying opinions on matters pertaining to the care of the community forest. Connections and relationships that will develop among stakeholders during these meetings are valuable outcomes of the outreach process. As community awareness increases and citizens become involved that will be more invested in the trees that grow around them. Only when this realization is made can the people of Schenectady that ultimately see the value of their contributions to the community forest.



Source: Paul Buckowski

Recommendations & Strategies

Action Strategy One:

Maximize the efficiencies in maintaining trees

A. Manage Risk Trees

- Address the Priority 1 and 2 tree removals (1,446 trees). Use information in this Plan to acquire more funding and support.
- Use the City's TreePlotter software or similar program to prioritize the maintenance.
- Use the Tree Maintenance Worksheet provided in the Community Forest Management Plan to address these trees in a 3-year period. Use the worksheet to estimate costs.

B. Establish a Routine Street and Park Tree Pruning Cycle

- Establish a 7-year cycle for street and park trees, pruning approximately 831 street trees and 243 park trees per year.
- Use the Tree Maintenance Worksheet to estimate and budget annual and 7-year costs for routine pruning.
- Prioritize, schedule, and track tree maintenance using the City's TreePlotter software.
- Build support for the pruning cycles by using the data summarized in the Community Forest Management Plan.

C. Plant and Maintain Young Trees

- Consider a "no net loss" policy by implementing at least a 1:1 ratio in terms of tree removals to replacements. It is recommended to plant at least 207 trees per year to compensate for recommended removals and upwards of 124 trees per year to compensate for natural mortality.
- Consider using trained volunteer groups for the planting and post-planting care of young trees. Require the use of industry best practices. Continue to partner for grants.

D. Continue to Monitor

- As maintenance, removals, and plantings are conducted, track information in the City's TreePlotter software or similar program.
- Keep the tree inventory data maintained and monitor for any changes or risks to public trees and the community forest such as tree pests and diseases. Consider a citywide canopy assessment for a better understanding of the community forest.

E. Evaluate Staffing and Levels of Services

- Evaluate the recommendations in this Plan to identify the necessary staff and resources to manage the urban forest sustainability and improve the levels of services to the community.
- Consider hiring a City Arborist to support implementation of this Plan.
- As an alternative to or in addition to the City Arborist, consider hiring an on-call consulting arborist to support tree monitoring, tree permitting, ordinance enforcement, selective pruning, routine tree maintenance, planting, and other standards and best practices as recommended in the Plan.

Action Strategy Two:

Use planning, legislation, and enforcement to integrate trees more fully

A. Update and Acquire Approval of the Street Tree Ordinance

- Use the recommendations and resources in the Community Forest Management Plan to finalize the Street Tree Ordinance for adoption.
- Conduct outreach with the community and communications with other City departments to establish awareness and clear understanding of the Street Tree Ordinance. The Tree Board will be advocates and enforcers of this effort.

B. Integrate Community Forestry with Plans and Policy

- Leverage the urban forest strategies listed in the City's Comprehensive Plan (*Reinventing the City of Invention*) to achieve goals and recommendations in this Plan. Strategies in the Comprehensive Plan include: Protect Sensitive Natural, Scenic, and Environmental Areas and Permanently Preserve Open Spaces; Develop and Maintain Excellent Park and Recreation Resources, and Become a Model "Healthy Community"; Employ Best Practices and Creative Land Use Tools to Shape Development, and Promote Beautification Program and Efforts City-wide.
- Provide urban and community forest expertise during the design and planning stages of projects to preserve appropriate existing trees, enhance tree plantings, and provide adequate canopy and root growing space.
- Provide urban and community forest expertise when existing policy and ordinances are updated such as design standards and Zoning minimum green space requirements. Reference the adopted Street Tree Ordinance where applicable.

Action Strategy Three:

Implement Best Management Practices for the health and benefits of trees

A. Develop and Implement Tree Planting Plans

- Develop tree planting plans to establish and maintain optimal levels of age and tree species diversity.
- Consider the spatial location of trees for increasing equity of tree canopy and associated benefits.
- Plant street and park trees that maximize benefits, minimize risk, consider site conditions and water restraints, maintenance costs, and potential tree pest and disease risk.
- Establish or update a recommended tree species list that provides recommendations based on mature tree size and the given site conditions.
- Continue to utilize the expertise of the Tree Board.

B. Adhere to Best Management Practices and Standards in Tree Care

- Continue to implement approved best management practices and standards for tree planting, tree pruning, tree nursery selection, and all other community forestry operations.
- Reference these practices and standards in the Street Tree Ordinance and keep it updated.
- Monitor the community forest for potential tree pest and disease risks and use the emerald ash borer plan developed by the Street Tree Advisory Board. Consider a plan

for the Asian longhorned beetle due to the abundance of green ash trees and maple trees.
- Require adherence to best practices and standards for any shared maintenance responsibility of young, established, and mature trees.
- Establish or update protocols relating to storm planning, response, and mitigation.
- Consider wood utilization options for any woody debris resulting from tree maintenance and removal operations.

Action Strategy Four:

Foster support for the community forest

A. Educate and Engage the Community

- Promote the formation of a tree council or advisory committee to connect the City to a dedicated group of resident tree advocates.
- Continue to partner with the ReTree Schenectady program and other volunteer tree stewardship programs and events.
- Provide educational materials, workshops, and information on the City's website regarding community forestry and this Plan.
- Maintain and enhance partnerships to implement recommendations in this Plan.
- Promote the community forest ecosystem benefits summarized in this Plan.
- Provide community forestry information specific to developers, businesses, and property owners.
- Lead by example by continuing to implement sound community forest management practices.
- Implement actions in this Plan to acquire and maintain the Arbor Day Foundation's Tree City USA award.
- Use the enhanced community support to acquire more resources and funding for the community forest management program.

Conclusion

CONCLUSION

The community forest is providing many important ecological functions and economic benefits to the City of Schenectady. Continuous delivery of those services depends on the long-term health and resilience of the tree population. Over 13,000 trees exist along the public streets and parks in Schenectady providing a multitude of benefits including stormwater reduction, energy savings, increased property values, improved air quality, and enhanced overall community well-being. These benefits have an estimated annual value of over $1.4 million.

Managing trees in urban areas is an arduous and intricate process. Navigating the recommendations of experts, the needs of residents, the pressures of local economics and politics, concerns for public safety and liability, physical components of trees, forces of nature and severe weather events, and the expectation that these issues are resolved all at once is a considerable challenge. The City should begin to implement recommendations in this Plan as soon as possible to ensure a healthy, thriving, and sustainable community forest.

To sustain desired levels of community forest services recommended in this Plan, a multi-faceted approach must be implemented by evaluating tree maintenance responsibilities, enhancing planting, storm preparedness, preserving existing trees, monitoring for changes in community forest characteristics, and amplifying community stewardship.


Source: Flickr

APPENDICES

Appendix A. Description of Inventory Fields Analyzed

Appendix B. Keep Your TreePlotter Inventory Up to Date

Appendix C. Creating a Tree Policy Manual or Street Tree Ordinance

Appendix D. Guidelines for Creating a Community Tree Board

Appendix E. Example Annual Work Schedule

Appendix F. Tree Maintenance Schedule and Budget

Appendix G. Tree Maintenance and Planting Best Practices

Appendix H. Planting Plan

Appendix I. Storm and Disaster Management Guidance

Appendix J. Community Forestry Resources

Appendix A. Description of Inventory Fields Analyzed

Data analysis and professional judgment are used to generalize the state of the inventoried tree population ("State of the Community Forest Resource"). Recognizing trends in the data can help guide short-term and long-term management planning. In this Plan, the following attributes from the inventoried tree population were assessed:

Assessing Tree Structure

- *Land Use*: These summaries provide an overview of the distribution of trees across the City. Land use may determine existing and potential limitations, such as frequency of watering and available root space, and opportunities, such as volunteer groups or business district incentive programs. Land use may contribute to the tree's condition and growth potential.
- *Location Site* and *Root Space*: This data provides information about the existing and potential constraints or available space for continued healthy growth for a given species. An analysis of condition and these location attributes may inform future planting procedures and species selection.
- *Species and Genera Diversity*: The variety of genera and species in a specific population affects the population's ability to withstand threats from invasive pests and diseases. Diversity also impacts tree maintenance needs, costs, and timing and informs tree planting goals and canopy continuity.
- *Diameter Size Class Distribution*: The statistical distribution of a given tree population's trunk-size class, measured at 4.5-feet above grade or diameter at breast height (DBH) is used to indicate the relative age of a tree population. The diameter size class distribution affects the valuation of tree-related benefits as well as the projection of maintenance needs and costs, planting goals, and canopy continuity.

Attributes Informing Maintenance Needs

- *Condition:* The general health of a tree population, indicates how well trees are performing given their site-specific conditions. General health affects both short-term and long-term maintenance needs and costs as well as canopy continuity.
- *Relative Performance Index (RPI)*: RPI is a comparison of a species' condition rating of "Good" and the tree population's "Good" rating. Using the percent of Good trees for a given species divided by the tree population percentage of Good trees gives a value of equal to 1, less than 1, or greater than 1. A value equal to 1 means the particular species is as healthy as the overall tree population. A value less than 1 means the species isn't as healthy as the overall tree population. A value greater than 1 means the species is healthier than the overall tree population. RPI answers the question of how well a species is performing in terms of health compared to the entire inventoried population.
- *Observations*: Qualitative assessments recorded by the Inventory Arborist regarding a tree feature or feature in proximity to the tree that may affect the tree's existing or future health and/or impact tree maintenance or future. These may be observations caused by abiotic or biotic factors or by anthropogenic agents. Summaries of observations inform future species selection and/or improved planting and maintenance practices.
- *Wire Conflict*: These observations provide information about the preference for a tree at a given site. If routine wire clearance maintenance is conducted for a given tree, a better suited tree for the site may be chosen as the replacement tree after the existing tree reaches senescence and is removed.

- *Hardscape Damage*: These observations inform future tree species selection for a given site and/or the mitigation approach for the tree and/or the hardscape damaged.
- *Maintenance Priority* and *Maintenance Type* descriptions are provided in the Tree Maintenance Recommendations section.

KEEP YOUR TREEPLOTTER INVENTORY UP TO DATE

4 STEPS TO SUCCESS

- Assign Roles
- Define Frequency of Updates
- Continuing Education
- Plan for the Next Person

PlanIT Geo
developers of TreePlotter

Maintaining your inventory is often easier said than done. An accurate inventory is the foundation for successful tree maintenance and community forest management. It is important to set a routine on updating your inventory and to assist you, we have four steps for successful maintenance of your TreePlotter Inventory.

1) First you must assign your roles within your TreePlotter app. Who will the main administrator be? Who within your organization will have a login and what privileges will everyone have within the app? Additionally, identify and communicate best practices for data management

2) You must come up with a system for checking in to make sure that timely updates are being made. For example, maybe on a quarterly basis, host a meeting with the various departments responsible for tree maintenance to see if any major changes have not be updated in your app.

3) As you continue to use the app and become more confident with your capabilities, do not be afraid to explore PlanIT Geo's TreePlotter Support website at support.treeplotter.com/ where you can find tutorials and articles that will help you make the most of your app. Our customer success and support teams are also available to work with you directly on how to best utilize your app.

4) Last, but not least, it is important to look to the future and how your inventory process will be passed along to the next person that fills your shoes. Creation of a Standard Operating Procedure with finer details may be of value for successful future management.

Appendix C. Creating a Tree Policy Manual or Street Tree Ordinance

Tree Policy Element	Description
ANSI Standards	Reference and adherence to ANSI Standards for arboricultural practices (A300), safety (Z133), or Nursery Stock (ANSI Z60.1) (any or all).
Ages/Diameter Distribution	Specific management for the development of an age-diverse tree population
Arborist Standards	Standards of practice for arborists (i.e. Certification).
Best Management Practices (BMPs)	Establishes or references tree maintenance BMPs (i.e. written comprehensive standards & standards).
No Net Loss	Can refer to trees, basal area, or canopy.
Fertilization and Mulching	Fertilization or mulching standards required for conserved & planted trees.
Lightning Protection Systems	BMP written to the ANSI A300 Standard.
Planting	Planting and transplanting standards required/specified. ANSI A300 Standard.
Pruning	Pruning standards required for conserved & planted trees. ANSI A300 Standard.
Removal	Infrastructure damage, stump grinding, etc.
Utility	Utility pruning, planting, and installation policy (e.g. boring vs. trenching).
Support Systems (Guying and Bracing)	BMP written to the ANSI A300 Standard.
Tree Risk	Tree risk assessment procedures; ISA BMP or equivalent. (ANSI A300 Part 9 & ISA BMP)
Disaster Response/Recovery Mechanism	Staff knowledge of the municipality's protocol for requesting disaster resources through the county or state with access to mutual aid and EMAC.
Urban Forestry as part of the County Disaster Plan	The CFMP is incorporated into the county/municipal disaster plan; specifically in reference to debris management and risk mitigation.
Recordkeeping, Reporting, and Communications	A process has been put in place to maintain records on requests, inspections, evaluations, and mitigation of risk; and on the communications among the managers related to those risk assessments.
Construction Management Standards	Written standards for: tree protection, trenching/boring in CRZs, pre-construction mulching, root or limb pruning, watering (any or all). See ISA BMPs.
Design Standards	Standards for design that specifically require trees; standards for tree placement (i.e. location), soil treatment, and/or drainage.
Genus/Species Diversity	Suggests or requires diversity of plant material.
Green Stormwater Infrastructure (GSI)	BMPs for site level GI practices like rain gardens and swales. Small-scale projects.
Inventory Data Collection	Adopt or develop applicable (written) standards for local urban tree inventory data collection to support QA/QC.
Minimum Planting Volume	Minimum required root zone volume.
Minimum Tree Size	Minimum caliper for tree replacements, and/or minimum size of existing trees to receive tree density or canopy credit.

Root Protection Zone (CRZ)	Defines adequate root protection zone; Critical Root Zone (CRZ).
Safety	Refer to ANSI Z133 Safety Standards.
Topping	Prohibits topping or other internodal cuts (public & private).
Tree Species List	Identifies and publishes a list of the most desirable, recommended, and/or preferred species (may include native and non-native species); alternatively, a list of species prohibited.
Tree Quality Standards	Written standards for tree selection at nursery in addition to Z60.1.
Utility Right-of-Way (ROW) Management	Requirements for planting, pruning, and/or removal of trees within a utility ROW.
Significant Trees	Criteria for designating trees of unique size, history, location, species, etc. and the protection practices of such trees.
Urban Agriculture	Enabled urban food forestry practices.
Wood Utilization	Larger diameter material is processed for wood products.
Third-party forest products certification compliance	Adoption of one of the international standards for production of wood products, for example, Forest Stewardship Council™ (FSC®). Standards can apply to any/all publicly owned and managed trees; parks, street trees, and/or community forests.
Energy generation	Local or regional use of chips or other woody debris for co-generation facilities.
Composting of Leaf and/or Other Woody Debris	Leaves and small woody debris are captured and used on-site or processed by someone by composting for reuse.
Urban Interface (WUI)	Programs or policies that improve management of the urban interface for fire and/or invasive species.
Performance Monitoring	Recognizes the annual or biennial calculation of metrics (e.g. some component of ecosystem services) for the purpose of tracking management performance.
Canopy Goals	Established based on the i-Tree Canopy and Planting Prioritization data. Develop canopy goals at the parcel level, by land use, neighborhood, census boundary, and citywide. Use U.S. Forest Service and i-Tree research to calculate number of trees to achieve canopy percentages.

APPENDIX D. GUIDELINES FOR CREATING A COMMUNITY TREE BOARD

To increase the capacity and voice for the trees in Schenectady, guidance is provided for the City to consider the benefits and challenges of establishing a Tree Advisory Committee or Tree Board.

Overview

Forming a tree advisory committee (TAC)— also referred to as a tree commission, tree board, urban forestry commission, beautification committee, environmental advisory committee, community forestry commission, among others depending on the jurisdiction— is one step that a community can take to create and sustain a community forestry program. The powers and responsibilities of a tree advisory committee are based on state statute and are assumed by local government. By forming and empowering a tree commission, a community can place the responsibility for important community decisions in the hands of unpaid volunteers with designated powers.

General Responsibilities

Tree commissions are either advisory or administrative and may have various responsibilities, including the following:

- Lessen the involvement of a municipal council for tree-related matters.
- Advise community leaders and staff on administering the urban forest.
- Stimulate and organize tree planting and maintenance.
- Develop and implement urban forest inventories, management plans, and ordinances.
- Lessen liability by arranging to remove hazardous trees and repair damage caused by trees.
- Settle community disputes caused by tree removal, planting, or maintenance.

Formation of a Tree Advisory Committee

Formation of a tree advisory committee and development of a comprehensive community forestry program usually take place together. While working with community officials to start a TAC, citizens also can undertake other aspects of a community tree program, such as fund-raising and developing tree inventories. A TAC should reflect the values and standards of the community and should help champion a community forestry effort. The formation and empowerment of a TAC can be a crucial element in developing broad-based support for community trees and ensuring long-term success and continuance of a community forestry program.

The following steps may be taken in forming a tree advisory committee:

- Organize interested citizens and informally outline problems and opportunities for a TAC to address. Identify specific occurrences or situations (such as tree failures, tree removals, pruning, sidewalk damage, or tree planting) that have caused community conflict or liability. Describe benefits that are expected to result from an organized tree program (such as lower community liability, higher real estate values, more attractive commercial areas, and healthier trees).
- Contact other communities with tree advisory committees or other experts, such as the New York State Urban Forestry Council, New York State Department of Environmental Conservation, and Cornell Cooperative Extension for advice and support.
- When ideas and plans are well organized and fairly complete, contact local government leaders and identify a municipal official who is interested in working with the group. It is important to include municipal officials early in any effort to organize a TAC.
- Hold informal meetings with concerned citizens and local officials to discuss ideas and plans. Contact the municipal solicitor to discuss how a tree advisory committee can be legally established within a community.

- Identify and agree upon the powers, authority, and responsibilities of the TAC, through meetings with municipal council members, officials, and the solicitor.
- Involve community members through public hearings and other opportunities for public participation and response.
- Develop or rewrite the ordinance that legally establishes the TAC and defines its authority and powers.
- Seek the council's approval of the ordinance at a public hearing.

Establishment of the Tree Advisory Committee Ordinance

Municipal ordinances establishing and empowering tree advisory committees should contain the following sections:

- Number of commission members,
- Experience or expertise required of members,
- Place of residence,
- Compensation, if any,
- Length of terms,
- Rotation of terms,
- Vacancies,
- Duties:
    - Adjudicate tree-related matters,
    - Approve permits for tree removal, planting, or pruning,
    - Review hazardous trees every year,
    - Provide educational opportunities and materials,
    - Arrange for tree planting,
    - Arrange for tree and stump removals,
    - And oversee pruning and other maintenance.
- Power:
    - Advisory or managerial,
    - Trees on public right-of-way or all public property,
    - And landscape plans for street trees or include development sites.

Additional Potential Responsibilities

Ordinances establishing tree advisory committees also can:

- Mandate a municipal arborist or forester position,
- Mandate and outline the creation of a municipal forestry master plan,
- Outline required standards and guidelines for tree planting and maintenance.

Supporting the Tree Advisory Committee

- Consider training members through the Arbor Day Foundation's Tree Board University.
    - An online training course consisting of eight courses:
        1. Tree Board 101
        2. Partnerships and Collaboration
        3. Engaging in the Political Process
        4. Community Forestry Planning
        5. Communications and Marketing

6. Financing, Budgeting, Grants, Fundraising
7. Getting Things Done
8. Moving Forward

- Utilize additional resources such as the Arbor Day Foundation's Tree Board flier.
- Keep the tree advisory committee informed of the progress in implementing the Urban Forest Management Plan.
- Consider including a member(s) on the Community Forest Management Plan implementation team.
- Establish Memorandums of Understanding (MOUs) or Standard Operating Procedures (SOPs) to instill cooperation and success.
- Keep the TAC current on urban forestry research, technology, tools, and ideas.
- Communicate programs, events, strengths, challenges, and opportunities.

Summary

Tree advisory committees can have a great impact on a community's appearance and image as well as its public safety and comfort. Tree commissions, boards, or committees help champion and coordinate a comprehensive and expert program to manage and sustain public trees. They provide long-term, stable management for a valuable, long-lived resource. By forming a tree advisory committee in a community, the attractiveness of the community and its quality of life and environment can be enhanced and sustained.

Example Ordinance for Establishing the Tree Advisory Committee

ORDINANCE NO. ##-####

AN ORDINANCE OF THE CITY OF SCHENECTADY, AMENDI SCHENECTADY MUNICIPAL CODE TITLE X, COMMISSIONS AND BOARDS TO ESTABLISH A TREE ADVISORY COMMITTEE

WHEREAS, the City Council desires to establish a Tree Advisory Committee to facilitate the development and implementation of the 2022 Community Forest Management Plan and public tree-related policies, projects, and programs that serve to enhance the City's community forest and associated benefits including human health and well-being, reduced surface temperatures, air and water quality improvements, improved wildlife habitats and ecosystems, climate change adaptation and mitigation, increased property values, among others as defined in Section XX of Schenectady's Tree Ordinance; and

WHEREAS, the City Council desires the Tree Advisory Committee to encourage community members and organizations to take actions to help achieve the City's community forestry goals as adopted by the City Council and documented in the City's Community Forestry Management Plan and other tree-related plans, as amended from time to time.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SCHENECTADY DOES ORDAIN AS FOLLOWS:

SECTION 1. RMC TITLE X, CHAPTER XX ADDED

Schenectady Municipal Code Title X, Chapter XX is added to read as follows:

CHAPTER XX. TREE ADVISORY COMMITTEE

Sections:

X-XX-1. Creation and regulations.

X-XX-2. Composition.

X-XX-3. Meetings.

X-XX-4. Duties and responsibilities.

X-XX-5. Terms.

X-XX-6. Term Limit

Sec. X-XX-1 Creation.

A Tree Advisory Committee is established and shall be added to the list of commissions established by city council in Chapter 22. The uniform regulations for council-established city boards, commissions and committees contained in Chapter 22 apply to the Tree Advisory Committee unless otherwise provided in this ordinance.

Sec X-XX-2 Composition.

The Tree Advisory Committee shall consist of five members. To the extent feasible, the committee shall include representatives with expertise and leadership interests related to various urban forest landscapes and activities including tree planting, tree assessments, arboriculture, tree preservation, policy, and community engagement. Consideration should also be given to having the commission reflect the diversity of the Schenectady community relative to geographic location, gender, age and ethnicity.

Sec. X-XX-3 Meetings.

The Tree Advisory Committee shall meet quarterly. A subgroup of the committee may convene additional working group meetings and may rely on community groups to work on focused topics of interested related to special projects and programs. The city council and Tree Advisory Committee shall meet annually in a work session with city staff to review accomplishments, discuss issues and establish a Tree Advisory Committee work plan for the following year.

Sec. X-XX-4 Duties and responsibilities.

The Tree Advisory Committee shall act in an advisory capacity to the city council and shall have the following duties and responsibilities, functions, and objectives:

(a) Assist the city with the implementation of actions included in adopted urban forestry and public tree plans, including the Community Forest Management Plan and other plans related to or impacting/influencing community forest/public tree management, public tree planting, climate change mitigation/adaptation, and tree preservation.

(b) Help advocate for Schenectady's community forest interests with regional agencies, including support for community forest management funding.

(c) Assist the city with public education, outreach, and promotional activities in order to stimulate the greatest possible community participation in efforts such as tree plantings, tree inventories, tree pest and disease monitoring, tree maintenance, and other sustainable urban forestry activities supported by the Community Forest Management Plan.

(d) Assist with city applications for grant funding from the NYS Department of Environmental Conservation and other sources identified in the Community Forest Management Plan for community forest planting, maintenance, management, and community engagement.

(e) Provide input on the preparation of new and updated urban forestry policies, plans and projects.

(f) Make recommendations to the manager overseeing community forest management and the city council on matters related to trees, tree preservation, and arboriculture, including the review of city tree ordinances, policies and programs.

(g) Make recommendations to the manager overseeing urban forest management [Urban Forester and Natural Resources Manager] and city council regarding matters affecting development of privately and publicly landscaped areas within the city.

(h) To the extent that there are references in Schenectady Municipal Code, specifically Tree Regulations, to the authority or responsibilities of the Tree Advisory Committee is authorized to exercise that authority or responsibility. In particular, the Tree Advisory Committee is authorized to take action as the decision-making body for specified actions set forth in this code, particularly related to appeals of decisions regarding planting and removal of city trees.

(i) Provide a forum to receive public comment on urban forestry topics.

(j) Oversee the City's Landmark Trees Program by raising awareness and encouraging participation.

(k) At the request of the city council, the Tree Advisory Committee may perform other advisory functions not noted above.

Sec. X-XX-5 Terms.
The term of the Tree Advisory Committee members shall be four years. The terms shall be staggered such that four of the committee members' terms will conclude on December 31 of the second year and five will conclude on December 31 of the fourth year. If a committee member does not complete a full term, a new committee member may be appointed for the duration of that term.

Sec. X-XX-6 Term Limit.
No person shall be eligible to serve as a member of the Tree Advisory Committee for more than two full terms.

SECTION 2. SEVERABILITY

If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held by a court of competent jurisdiction to be invalid, such a decision shall not affect the validity of the remaining portions of this Ordinance. The City Council of the City of Schenectady hereby declares that it would have passed this Ordinance and each section or subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be declared invalid.

SECTION 3. EFFECTIVE DATE

This Ordinance shall take effect and will be enforced thirty (30) days after its adoption.

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SECTION 4. PUBLICATION AND POSTING

This ordinance must be published once in a newspaper of general circulation, printed and published in Niagara County and circulated in the City of Schenectady, within fifteen (15) days after its adoption.

* * *

The foregoing ordinance was introduced before the City Council of the City of Schenectady at the regular meeting of the City Council, held on the __ day of _____ and finally adopted at a regular meeting of the City Council held on the __ day of _____ by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Mayor

ATTEST:

APPROVED AS TO FORM:

_____
City Clerk

_____
Sr. Deputy City Attorney II

APPENDIX E. EXAMPLE ANNUAL WORK SCHEDULE

Annual Work Schedule for Community Trees
(Each dot in chart below = one week/month. Circle dot(s) to show when work will be down)

Example annual work schedule for community trees: reformatted from original source (https://extension.psu.edu/annual-work-plans-for-tree-commissions - click "Download PDF")

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1. Planning and administration	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
a. prioritize work to be done	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
b. organize activities	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
2. Tree Planting	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
a. survey potential planting sites	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
b. decide locations, species, and cultivars	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
c. notify adjacent property owners	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
d. announce and hold public hearing	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
e. order trees	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
f. inspect and tag trees in nursery	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
g. receive, inspect, and store trees	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
h. plant trees, prune, stake, and water	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
i. water trees periodically	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
3. Tree Pruning	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
a. survey trees, decide which to prune	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
b. arrange for crew, equipment, and supplies, or arrange for service contract	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
c. supervise pruning and disposal of wastes	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
4. Tree Removal	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
a. survey trees, decide on removals	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
b. notify adjacent property owners	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
c. announce and hold public hearings	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
d. arrange for crew, equipment, and supplies, or arrange for service contract	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
e. supervise removals	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
f. grind stumps, reseed	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
5. Public relations and funding	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
a. report to municipal officials	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
b. prepare news releases	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
c. arrange news and TV coverage of events	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
d. submit Tree City USA application	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
e. submit grant applications	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
f. develop education programs	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
g. hold Arbor Day ceremony	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
h. conduct youth education	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
6. Other Tasks	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
a. water trees during drought	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
b. fertilize deficient trees	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
c. control diseases and insects, as needed	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
d. collect leaves and recycle	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
e. clean up storm breakage	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
f. conduct training, professional development	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
g. train tree workers	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •

Appendix F. Tree Maintenance Schedule and Budget

This maintenance schedule and budget worksheet on the next page was developed based on the 2021 street and park tree and vacant site inventory. An interactive version of this worksheet was provided as part of the Community Forest Management Plan project. Plan recommendations regarding tree maintenance are based on this analysis and worksheet.

Estimated Costs for Each Activity			Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		7	Total
Activity	DBH Class	Cost / Tree	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	Year Cost	Trees
Priority 1: Critical Removals (addressed in first 3 years)	0-3"	$100	-	$0	-	$0	-	$0									$0	0
	3-6"	$175	3	$525	2	$350	2	$350									$1,225	7
	6-12"	$300	9	$2,700	8	$2,400	8	$2,400									$7,500	25
	12-18"	$850	7	$5,950	6	$5,100	6	$5,100									$16,150	19
	18-24"	$1,275	4	$5,100	4	$5,100	3	$3,825									$14,025	11
	24-30"	$1,550	1	$1,550	1	$1,550	1	$1,550									$4,650	3
	>30"	$2,100	1	$2,100	-	$0	-	$0									$2,100	1
Activity Total(s)			**25**	**$17,925**	**21**	**$14,500**	**20**	**$13,225**	**-**	**$0**	**-**	**$0**	**-**	**$0**	**-**	**$0**	**$45,650**	**66**
Priority 2: Immediate Removals (Split into 7 years)	0-3"	$30	15	$450	15	$450	15	$450	15	$450	15	$450	14	$420	14	$420	$3,090	103
	3-6"	$35	19	$665	19	$665	18	$630	18	$630	18	$630	18	$630	18	$630	$4,480	128
	6-12"	$80	33	$2,640	33	$2,640	33	$2,640	33	$2,640	32	$2,560	32	$2,560	32	$2,560	$18,240	228
	12-18"	$120	47	$5,640	47	$5,640	47	$5,640	47	$5,640	46	$5,520	46	$5,520	46	$5,520	$39,120	326
	18-24"	$200	48	$9,600	47	$9,400	47	$9,400	47	$9,400	47	$9,400	47	$9,400	47	$9,400	$66,000	330
	24-30"	$250	22	$5,500	22	$5,500	22	$5,500	22	$5,500	22	$5,500	22	$5,500	21	$5,250	$38,250	153
	>30"	$450	16	$7,200	16	$7,200	16	$7,200	16	$7,200	16	$7,200	16	$7,200	16	$7,200	$50,400	112
Activity Total(s)			**200**	**$31,695**	**199**	**$31,495**	**198**	**$31,460**	**198**	**$31,460**	**196**	**$31,260**	**195**	**$31,230**	**194**	**$30,980**	**$219,580**	**1380**
Priority 3 Routine Tree Pruning (7-year cycle beginning at year 3)	0-3"	$20					-	$0	-	$0	-	$0	-	$0	-	$0	$0	0
	3-6"	$30					-	$0	-	$0	-	$0	-	$0	-	$0	$0	0
	6-12"	$75					369	$27,707	369	$27,707	369	$27,707	369	$27,707	369	$27,707	$138,536	2586
	12-18"	$120					270	$32,349	270	$32,349	270	$32,349	270	$32,349	270	$32,349	$161,743	1887
	18-24"	$170					199	$33,854	199	$33,854	199	$33,854	199	$33,854	199	$33,854	$169,271	1394
	24-30"	$225					121	$27,225	120	$27,000	120	$27,000	120	$27,032	120	$27,032	$135,289	841
	>30"	$425					117	$49,725	117	$49,725	117	$49,725	116	$49,482	116	$49,482	$248,139	815
Activity Total(s)			**-**	**$0**	**-**	**$0**	**1,076**	**$170,860**	**1,075**	**$170,635**	**1,075**	**$170,635**	**1,075**	**$170,424**	**1,075**	**$170,424**	**$852,979**	**7523**
Priority 4 Training Prune (3-year cycle beginning at year 1)	0-3"	$20	247	$4,940	247	$4,940	247	$4,940	247	$4,940	247	$4,940	247	$4,940	247	$4,940	$34,580	741
	3-6"	$30	577	$17,320	577	$17,320	577	$17,320	577	$17,320	577	$17,320	577	$17,320	577	$17,320	$121,240	1732
Activity Total(s)			**824**	**$22,260**	**824**	**$22,260**	**824**	**$22,260**	**824**	**$22,260**	**824**	**$22,260**	**824**	**$22,260**	**824**	**$22,260**	**$155,820**	**2473**

			Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		7	Total
Activity	Item	Cost / Tree	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	Year Cost	Trees
Replacement Tree (total removals over 7 years. Does not include vacant sites at this time)	Purchasing	$90	225	$20,250	220	$19,800	218	$19,620	198	$17,820	196	$17,640	195	$17,550	194	$17,460	$130,140	1446
	Planting	$110	225	$24,750	220	$24,200	218	$23,980	198	$21,780	196	$21,560	195	$21,450	194	$21,340	$159,060	1446
Activity Total(s)			**225**	**$45,000**	**220**	**$44,000**	**218**	**$43,600**	**198**	**$39,600**	**196**	**$39,200**	**195**	**$39,000**	**194**	**$38,800**	**$289,200**	**1446**
Replacement Tree - Young Tree Maintenance (beginning at year 3)	Mulching	$100	0	$0	0	$0	225	$22,500	220	$22,000	218	$21,800	198	$19,800	196	$19,600	$105,700	1446
	Watering	$100	0	$0	0	$0	225	$22,500	198	$19,800	218	$21,800	198	$19,800	196	$19,600	$103,500	1446
Activity Total(s)			**0**	**$0**	**0**	**$0**	**225**	**$45,000**	**220**	**$41,800**	**218**	**$43,600**	**198**	**$39,600**	**196**	**$39,200**	**$209,200**	**2892**
Annual Mortality Removals (1% of 11,545 total live trees) (includes stump removal)	Average DBH 13.9	$850	115	$98,133	115	$98,133	115	$98,133	115	$98,133	115	$98,133	115	$98,133	115	$98,133	$686,928	808.15
Annual Planting Mortality (1% of tree plantings)	Average Tree	$200	2	$450	4	$890	7	$1,326	9	$1,722	11	$2,114	13	$2,504	14	$2,892	$11,898	59.49
Annual Established & Planting Mortality Totals			**117**	**$98,583**	**119**	**$99,023**	**122**	**$99,459**	**124**	**$99,855**	**126**	**$100,247**	**128**	**$100,637**	**129**	**$78,000**	**$675,801**	**868**
Activity Grand Total			**1,391**		**1,383**		**2,684**		**2,640**		**2,635**		**2,615**		**2,612**		**15,960**	
Cost Grand Total				**$215,463**		**$211,278**		**$425,864**		**$405,610**		**$407,202**		**$403,151**		**$379,664**	**$2,448,230**	

Appendix G. Tree Maintenance and Planting Best Practices

The community forest within Schenectady plays a significant role in maintaining the health and vitality of urban life. The community forest provides a wealth of benefits to neighborhoods and residents through the reduction of energy consumption, the removal of pollutants from the air and water, reduction in stormwater flows, increased valuation of private property, increased worker productivity, reduction in stress and violent crime, as well as providing recreational opportunities and aesthetic diversity. At the same time stresses from the urban environment including air pollution, damage by vehicles, increased impervious surface, soil compaction, and maintenance neglect reduce the diversity and magnitude of these benefits and may lead to tree-related problems.

The inherently close interaction between people and trees in the City requires active and diligent management of the urban and community tree and forest resources to ensure public safety. To enhance tree canopy and associated benefits, trees need to be properly maintained and planted.

The City of Schenectady can use this information to make any updates to the proposed Street Tree Ordinance.

Tree Maintenance Best Practices

The following provides an overview of tree maintenance best practices. It is not intended to be an extensive or comprehensive summary of best practices. All tree maintenance practices should follow the American National Standards Institute's (ANSI) A300 Standards (Parts 1-10).

Reasons for Tree Pruning

1. ***Pruning for Safety***
   Involves removing branches that could fall and cause injury or property damage, trimming branches that interfere with lines of sight on streets or driveways, and removing branches that grow into utility lines. Safety pruning can be largely avoided by carefully choosing species that will not grow beyond the space available to them and have strength and form characteristics that are suited to the site.

2. ***Pruning for Health***
   Involves removing diseased or insect-infested wood, thinning the crown to increase airflow and reduce some pest problems, and removing crossing and rubbing branches. Pruning can best be used to encourage trees to develop a strong structure and reduce the likelihood of damage during severe weather. Removing broken or damaged limbs encourages wound closure.

3. ***Pruning for Form***
   Improves the structure of trees and removes branches that are more likely to fail. Branches that are poorly attached may be broken off by wind and accumulation of snow and ice. Branches removed by such natural forces often result in large, ragged wounds that rarely seal.

4. ***Pruning for Aesthetics***
   Involves enhancing the natural form and character of trees or stimulating flower production.

   To reduce the need for pruning it is best to consider a tree's natural form. It is very difficult to impose an unnatural form on a tree without a commitment to constant.

Common Types of Tree Pruning

1. ***Crown Cleaning***
   Consists of the selective removal of dead, dying, diseased, and weak branches from a tree's crown. No more than 25% of the live crown should be removed in any one year, even for young trees.

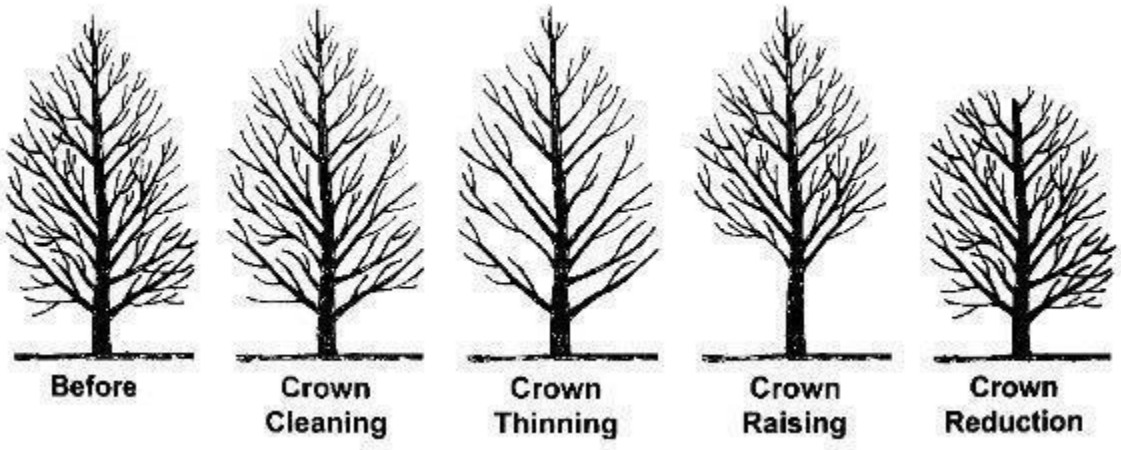
2. ***Crown Thinning***
   Primarily for hardwoods, thinning is the selective removal of branches to increase light penetration and air movement throughout the crown of a tree. The intent is to maintain or develop a tree's structure and form. To avoid unnecessary stress and prevent excessive production of epicormic sprouts, no more than one-quarter of the living crown should be removed at a time. If it is necessary to remove more, it should be done over successive years.

   Branches with strong U-shaped angles of attachment should be retained. Branches with narrow, V-shaped angles of attachment often form included bark and should be removed.

3. ***Crown Raising***
   The practice of removing branches from the bottom of the crown of a tree to provide clearance for pedestrians, vehicles, buildings, lines of site, or to develop a clear stem for timber production. After pruning, the ratio of the living crown to total tree height should be at least two-thirds. On young trees temporary branches may be retained along the stem to encourage taper and protect trees from vandalism and sunscald.

4. ***Crown Reduction***
   Most often used when a tree has grown too large for its permitted space. This method, sometimes called drop crotch pruning, is preferred to topping because it results in a more natural appearance, increases the time before pruning is needed again, and minimizes stress (see drop crotch cuts in the next section). Crown reduction pruning, a method of last resort, often results in large pruning wounds.

Types of tree pruning:

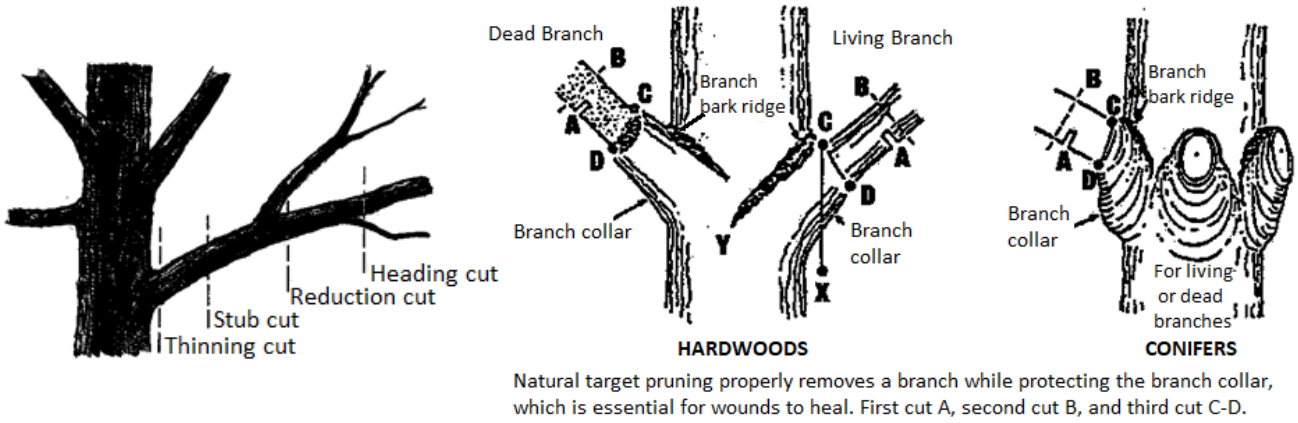


Tree Pruning Cuts

Pruning cuts should be made so that only branch tissue is removed and stem tissue is not damaged. To find the proper place to cut a branch, look for the branch collar that grows from

the stem tissue at the underside of the base of the branch. On the upper surface, there is usually a branch bark ridge that runs parallel to the branch angle, along the stem of the tree. A proper pruning cut does not damage either the branch bark ridge or the branch collar. A proper cut begins just outside the branch bark ridge and angles down away from the stem of the tree, avoiding injury to the branch collar.

Types of pruning cuts and the proper branch cutting technique:



Natural target pruning properly removes a branch while protecting the branch collar, which is essential for wounds to heal. First cut A, second cut B, and third cut C-D.

Image source: Pennsylvania State University Urban Forestry Extension

Utility Tree Maintenance Best Practices

Utility Tree Pruning Overview

The City should work with the utility companies to ensure proper pruning practices are followed and that open communication between the company, the city, and the public are maintained. The International Society of Arboriculture provides guidelines for maintaining trees near power lines (*Best Management Practices – Utility Pruning of Trees*, G. Kempter).

Maintaining power lines free of tree growth is based on a consistent, planned trimming cycle of the utility vegetation management company. This approach improves electric service to all the customers who get their power from that line. A sensible approach to trimming trees means having a thorough maintenance plan that improves the safety and reliability of electric service to residents. Residents and the City staff should not attempt to trim any vegetation growing near or on any overhead power lines.

Utility Tree Maintenance Techniques

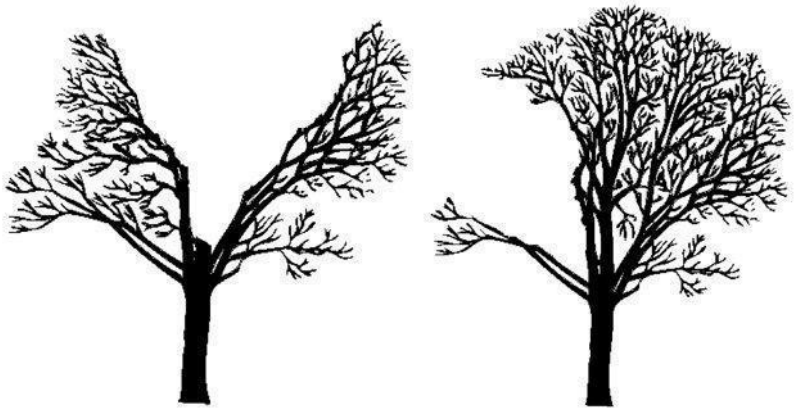
1. ***Directional Pruning***
   Removes entire branches and limbs to the main trunk of the tree and future growth is directed away from the power lines. Reduction cuts are used for removing these branches and limbs and should be pruned properly back to a lateral branch that is at least one-third the diameter of the branch being removed. This allows for good wound closure and protects apical dominance and reduces sprouts.

   Avoid topping or rounding over trees. This removes more foliage than directional pruning, increases the number of tree wounds, stresses the tree, causes unstable decay, and increases water sprouts.

2. ***Right Tree Right Place***
   Selecting the right tree for the site can reduce potential safety hazards and improve the reliability of the electric service. Smaller trees near power lines do not need to be excessively pruned and do not lose their natural form.

3. ***Recommended Trees***
   Trees potentially suitable for planting adjacent to power lines should be shorter and slow growing to prevent clearance issues.

Example of trees directionally pruned for clearance from power lines:



Young Tree Maintenance Best Practices

Proper pruning is essential in developing a tree with a strong structure and desirable form. Trees that receive the appropriate pruning measures while they are young will require less corrective pruning as they mature.

Young Tree Maintenance Techniques

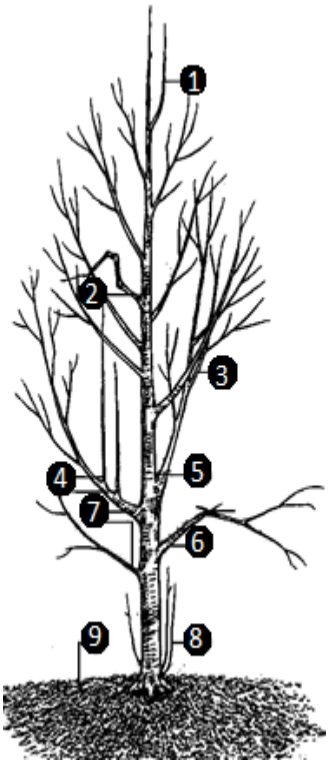
1. ***Consider the Nature Form and Desired Growth***
   Accentuate the natural branching habit of a tree and correct any structural problems over time, if needed, to not stress the tree.

2. ***Pruning in 1-2 Years after Planting***
   Prune as little as possible after planting to ensure there are enough temporary branches to produce food for new growth of roots, trunk, and branches. Prune only dead, broken, malformed, or diseased branches. Remove codominant leaders to maintain one dominant trunk. Prune for clearance if absolutely necessary. Keep size of branch removed to less than one inch in diameter.

3. ***Pruning 2-3 Years after Planting***
   Prune any dead, broken, malformed, or diseased branches. Remove any suckers from the base of the tree. Next, determine the permanent branch structure by considering:

   - Remove, thin, or cut back any competing leaders
   - Remove crossing or rubbing branches, keeping the branch that maintains the natural form
   - Thin excessively crowded branches but do not lions-tail
   - Remove branches with narrow angles between the branch and trunk (consider species)
   - Remove branches to maintain well-spaced branches along and around the trunk. Ideal mature trees will have lateral branches that are 18-24 inches apart (depending on species)
   - Avoid pruning near time of bud break
   - Prune flowering trees after flowering

Example of branches to be pruned for newly planted trees to promote good structure:



Prune competing leader

Prune malformed branches

Remove crossing branches

Remove water sprouts

Remove branches with poor angles

Prune broken or damaged branches

Prune temporary branches over time

Remove suckers

Apply 2-3” of mulch

Photo source: Pennsylvania State University Urban Forestry Extension

Tree Planting Best Practices

The following provides an overview of best practices that should be considered and followed before during and after planting trees.

- Trees to be planted should be selected from an approved tree planting list developed to maintain and enhance species diversity that are suitable for the Schenectady, NY Plant Hardiness Zone and changing climates.
- Planting material will conform to the latest version of the American Standard for Nursery Stock (American National Standards Institute [ANSI] Z60.1). Trees to be planted should be of standard quality or better, and should be true to name and type of their species variety.
- Trees should not be planted in tree lawns less than 2 feet in width or in planting pits less than 5 feet long by 5 feet wide.
- Trees should not be planted within 50 feet of any major intersection, or within 20 feet of a fire hydrant, a driveway, or a pole supporting a light.
- The burlap and twine from balled-and-burlap trees should be removed from the tree and the tree pit. Wire tree baskets may remain on the root ball, but the top one-third should be clipped and removed from the planting hole.
- Mulch should be placed around trees in a minimum 3-foot circle and 3-inch depth to protect trees from lawnmower damage and competition from turf; mulch will be kept away from tree trunks.
- Newly planted trees should be irrigated weekly during droughts in the growing season for three years.

Appendix H. Planting Plan

Tree Planting Initiative

Tree planting is critical to the health and longevity of Schenectady's community forest. However, tree planting should be methodically planned with a specific purpose in mind. One of the best ways to do this is to define and adopt an official planting initiative guided by a planting strategy. The first step in developing a planting strategy is to define the goals. Often times, this goal aligns with a citywide tree canopy cover goal and the timeframe to achieve it.

An effective tree planting initiative and program address three main questions: where to plant, what to plant, and how to plant? It is important to develop an overall planting strategy where the initial planting efforts are concentrated on streets and areas with the greatest need for improvement. Tree species and planting location designations are significant components of a municipal tree care program because of the long-term impact of these decisions. Success of a continuing tree planting program will be judged by the health of the trees after planting and the amount of money spent on planting and maintaining the new trees. With a small amount of planning, healthy trees with greater life expectancy can be established with minimal up-front investment and relatively minor maintenance costs.

This Tree Planting Initiative provides guidelines for the implementation of an organized and comprehensive tree planting strategy that results in the prioritization of tree planting locations and the expansion of Schenectady's community tree canopy within the confines of available resources. Information on suitable planting locations in the City is provided in the previous section and general recommendations on choosing suitable trees for each site follow.

Where to Plant

There are numerous opportunities to plant more trees on public property in the City of Schenectady. Historically, the locations of new tree plantings on City-owned rights-of-way in Schenectady have been based on constituent requests, the replacement of dead or dying trees (where feasible), and project-specific plantings (e.g., streetscape improvement projects). With the updated tree inventory, City managers now also know the exact location of additional planting sites that are available throughout the City. Schenectady's street and park tree inventory includes 1,514 available planting sites as of February 2022. Moreover, the development of a prioritization scheme based on inventory data allows the City to begin significant tree planting efforts in high priority areas of the City.

According to the January 2022 inventory analysis report, the current stocking level is 85.3%, based on a total 13,542 suitable planting sites, including 11,545 trees, 1,514 vacant sites, and 215 stumps. "Stocking" is a traditional forestry term used to measure the density and distribution of trees. In this case it means that, of the total number of available planting sites identified in the tree inventory along the public right-of-way, 85.3% currently have a tree present. Of the total public trees in the inventory, 1,446 trees were recommended for removal (in 2022 inventory analysis report). These recommended removals represent a future increase in total number of potential planting sites. An important benchmark in maintaining a sustainable community forest is to keep it at least 90% stocked, such that no more than 10% of the existing planting sites remain vacant. The City should make every effort to budget for tree planting in the future to maintain the community forest at least 90% stocked and to continue increasing its canopy.

Tree Planting Parameters

Trees are an important part of the City, but they must coexist with various other aspects of the built environment. To provide ample space for a growing tree while also maintaining public safety and protecting other City infrastructure, the City should use the following minimum guidelines when choosing new planting locations:

- New tree wells in existing sidewalks provide a minimum of 18 square feet of open soil (ex. a 3' x 6' tree well).
- New tree wells in new sidewalks should provide a minimum of 36 square feet of open soil (ex. a 6' x 6' tree well), and at least 1,000 gross cubic feet of soil value space for each tree, providing any soil volume under paved surfaces through suspended pavements or structural cells.
- To reduce infrastructure conflicts and maintain visibility and access to important public safety features, trees should be planted a minimum of:
- 20 feet away from any intersection, crosswalk, or stop sign;
- 5 feet away from any fire hydrant or utility pole;
- 10 feet from any streetlight;
- 3 feet from any driveway or walkway; and
- 1 foot away from any underground utilities (ex. gas and water).
- The width of the sidewalk must also be taken into account, as per American with Disabilities Act (ADA) regulations a 3 foot sidewalk width must remain.
- Trees must be spaced out in such a way that they have room to grow. Trees are spaced at least 20 feet on center (i.e., measured trunk to trunk).

What to Plant

The City must determine which tree species will be planted in each specific site. The phrase "right tree, right place" is the most important concept in planting. Many factors must be considered in choosing a species for a site that maximizes the health and survivability of the tree, and the benefits provided by that tree. Trees in urban environments must withstand particularly challenging conditions, such as high temperatures, drought, flooding, air pollution, soil salt, and limited growing space both above and below ground. Trees have different characteristics suitable for different landscapes, sites, and microclimates. It is recommended that all characteristics be recognized, including, but not limited to, the desired function (e.g., seasonal flowering, shade canopy, wind resistance), mature size and shape for the intended location, soil conditions, root structure, maintenance requirements, potential pest problems, and survivability in the face of climate change. Equally important to selecting the right tree is choosing the right spot to plant it. Blocking an unsightly view or creating shade may be a priority, but it is important to also consider how a tree may impact existing structures and utilities as it grows taller, wider, and deeper. For example, if the tree's canopy, at maturity, will reach overhead utility lines, it is best to choose another tree or a different location. Taking the time to consider location before planting can prevent power disturbances and improper utility pruning practices.

Historically, there has been some mismatch of tree species selection with available planting sites in Schenectady. There are some large growing trees under power lines, and there are some small growing trees planted in sites suitable for larger trees. Large trees in small spaces can damage sidewalks and curbs, require severe pruning for overhead utility lines and street clearance, and often have a much shorter service life due to the restricted growing area. Small trees in large spaces limit the use of mature shade trees on public streets. It is well known that

larger growing trees provide the most environmental and economic benefits, and appropriate areas to plant them rarely exist in older, well-developed communities. Proactive planning should be made to plant the "right tree in the right place" in the vacant sites, considering available growing space, presence of utilities, and traffic and pedestrian clearance issues, while obtaining the desired aesthetic effects and function of the street tree. Planting the proper type of tree for each planting area will result in a more effective, healthy, and attractive urban forest.

Tree Species Diversity

At the scale of the entire community forest, species diversity in new plantings should be of major importance. Planting a variety of species can decrease the impact of species-specific pests and diseases by limiting the number of susceptible trees in a population. Species diversity also helps withstand community forest impacts from drought, ice, flooding, strong storms, and wind. In Schenectady, there is a great deal of room for improvement in regards to species diversity.

As stated in the Structure of the Public Tree Population section, at the genus level, maples (Acer) account for 40% of the total public tree population and Norway maples exceed the 10% suggested species threshold, accounting for 17% of public trees. As a result, the community forest in Schenectady is majorly susceptible to the Asian long-horned beetle (ALB) that favors maples among other species such as birch, elm, ash, poplar, horse chestnut, and willow. The beetle lays eggs, which hatch and bore into the tree to feed on the tree tissues that transport water and nutrients. Eventually the tree is girdled and succumbs to death within 7-9 years. The trees in Schenectady are also faced with the threats of Emerald Ash Borer (EAB), Sudden Oak Death, Oak Wilt Disease, and Beech Leaf Disease.

The dangers of planting monocultures have proven to be devastating to community forests. One of Schenectady's goals should be to increase species diversity throughout the City, such that no species represents more than 10% and that no one genus comprises more than 20% of the population. Consideration should be given to large trees that provide shade, are aesthetically pleasing, and provide food or habitat for native insects and wildlife. Although the City should consider focusing efforts on planting species that are native to the region, particularly in the face of climate change, the wider effort should focus on urban-tolerant and/or wind-resistant species, regardless of origin.

Tree Species Selection

Matching a species to its favored climatic and soil conditions is the most important task when planning for a maintainable and survivable landscape. Plants that are well matched to their environmental conditions are much more likely to resist pathogens, insect pests, and severe storm damage and will therefore require less maintenance overall and be more likely to survive. In addition to considering site characteristics (such as climate, precipitation, native vegetation, availability of space) and soil characteristics (such as soil texture, structure, drainage, pH, water availability, and road salt), specific physical tree features must also be scrutinized to ensure public safety. Some considerations for street trees are the amount of litter dropped by mature trees, the maintenance required, and public acceptance.

In the face of climate change, plummeting insect populations, and mass extinctions, the City should focus efforts on planting species indigenous to the region. Planting species that are native to the region whenever possible will provide additional benefits to the ecosystem at large. Above all, given the tough growing conditions in an urban environment, tree species

should be selected for their durability and low maintenance requirements. These attributes are highly dependent on site characteristics as well as species characteristics.

How to Plant

The steps taken to properly plant trees must continue to be clearly outlined for City crews and/or contractors performing the work. Planting oversight and/or post planting inspections must continue to be performed to ensure that the work meets the guidelines set forth by the City. The tree planting methodology outlined in this section is supported by industry standards and best practices, including the American National Standards Institute (ANSI) Z60.1-2014 American Standard for Nursery Stock, and the American National Standards Institute (ANSI): Standard A300. Standard Practices for Tree, Shrub and other Woody Plant Maintenance.

These standards and best practices detail the methods and protocols for selecting healthy planting stock, handling trees during transport and planting, preparing the planting site, planting the tree, mulching, and young tree pruning.

Key Considerations for a Tree Planting Plan

A planting strategy is crucial to community forest sustainability and should be based on data, available resources, partnerships, and community input. Some of the more common goals that define a planting strategy include:

Equitable Distribution. With this goal, planting priorities are assigned to areas determined to be the most in need based on the goal of an even distribution of benefits provided by trees. Beyond equal distribution, an area defined to be "in-need" is determined locally and can be a combination of priorities or focused on one specific priority. It is recommended the City utilize the guidance provided in the Tree Canopy Cover Goals section to identify areas of low tree equity that are most suitable for planting.

Areas of Predicted Future Canopy Loss. Older neighborhoods with a more established tree canopy can anticipate significant losses in future years. One method to planning future planting efforts is to target these replanting areas now to aid in a less drastic succession of trees over time.

Benefits-Based Plantings. Areas that have a specific issue like poor air or water quality, or a large percentage of older residents sensitive to heat stress, may work to plant trees based on the anticipated benefits in years to come.

Regular, Methodical Planting in Concert with Cyclical Tree Care Efforts. Planting may be most effective if it follows the City's inventory, in that trees are planted where they are removed. Regular methodical planting can also be considered a worthy goal.

Species Diversity. Planting strategies should not only identify where to plant, but also what is being planted. Species diversity in Schenectady can quickly become an even bigger issue if data is not used to make decisions on the types of trees to plant. Neighborhood-level and citywide planting plans should detail how biodiversity will be maintained with short- and long-term strategies.

Inventory-Driven Plantings. In addition to tree canopy assessment data or data pertaining to the spatial location of existing tree canopy and possible planting space, a city may also utilize or conduct inventories of available public planting spaces. Often, these types of inventories identify planting spaces based on criteria such as minimum width, distance from

existing tree, distance from intersection, among others. Most planting space inventories catalogue the relative size of the growing space (small, medium, large).

Partners in Planting. Schenectady's planting strategy should also include who is doing the planting. This work can be done by City partners such as neighborhood groups, community tree stewards, developers, and other interested parties, thus allowing the City to focus on specialized care (pruning, removals, assessments).

Future tree plantings should focus on maintaining or increasing species diversity and reducing reliance on any particular species.

Schenectady's public tree population is primarily in good or fair condition with over 163 distinct species. The City should continue to focus resources on preserving existing and mature trees to promote health, strong structure, and tree longevity. Structural and training pruning for young trees will maximize the value of this resource, reduce long-term maintenance costs, reduce risk, reduce storm damage, and ensure that as trees mature, they provide the greatest possible benefits over time.

Tree Planting Recommendations

Increase genus and species diversity in new and replacement tree plantings to reduce reliance on abundant groups. At a minimum, strive for no species representing more than 10% of the overall population and no genus representing more than 20% of the overall population.

Use available planting sites to improve diversity, increase benefits, and further distribute the age distribution of street and park trees.

Prioritize planting replacement trees for those trees that have previously been removed. In the City of Schenectady, yearly tree planting recommendations are estimated at a minimum of 207 trees per year for 7 years to replace the 1,446 Priority 1 and 2 removals. In the Maintenance Schedule and Budget Worksheet in Appendix F, these figures can be seen along with schedule for natural mortality of trees for each year.

Identify additional planting sites for trees and use the largest stature tree possible where space allows.

Prioritize successional planting of important species, as determined by relative performance index (RPI) and the relative age distribution.

Species that are adequately represented by established age distributions but lack recent plantings should receive priority care.

Prioritize structural pruning for young trees and ensure maintenance plans and associated budgets are prepared as trees become established.

Regularly inspect trees to identify and mitigate structural and correctable defects to reduce the likelihood of tree and branch failure.

Consider opportunities to further support wildlife habitat and pollinators when making decisions on the species of tree(s) to plant.

Create or update a recommended master tree list for City projects and to provide as a recommendation to the public for private property plantings. Include attributes such as tree size at maturity, primary feature, soil requirements, space requirements, recommended location(s), native/nonnative classification, description, and any concerns.

Consider preparedness planning for invasive pests and deleterious effects of climate change including wildfire, stormwater, and extreme weather events.

Appendix I. Storm and Disaster Management Guidance

Resources

- https://www.fs.usda.gov/naspf/sites/default/files/naspf/pdf/sotuf.pdf
- https://www.fs.usda.gov/ccrc/topics/urban-forests
- http://www.gicinc.org/storm_mit.htm

Guidance

Preparation – Planning and Warning Activities

1. Install and utilize early warning systems such as the National Weather Service, local news stations, local police and fire departments
2. Maintain the current disaster response plan if applicable, verify the following components are included:
    A. Identify individual/departmental roles
        1) Establish an official Tree Care Manager (both for management of the community forest resource and as the point of contact for storm mitigation efforts)
        2) Build a storm mitigation team
        3) Assign a disaster control supervisor.
            a) Has overall direction for storm clean-up efforts
            b) Makes decisions relating to storm clean-up efforts and advises on the need for outside assistance (contractors, other Public Works divisions)
            c) Is responsible for decisions relative to abandoning other divisional responsibilities in favor of storm damage clean-up efforts
            d) Works with City Communications Director for alerting media as to the progress and problems associated with the storm
            e) Coordinates with Natural Resources Director to prioritize response efforts
    B. Contacts for additional support
        1) National level tree service firms
        2) Smaller, local tree service firms
        3) Utility specialists
3. Create a more resilient community forest
    A. Regular tree risk assessments
        1) ISA Level 1 or 2 – annually
            a) Dedicated line-item budget for assessments
        2) Systematic risk-reduction removals/pruning
            b) Lightning protection systems for high-value/significant trees
        3) Post-storm event level 1 assessments
    B. Planting considerations for storm damage resistance
    C. Climate change considerations
        1) Warmer winter temperatures
        2) Increased pest/disease due to more favorable conditions
        3) Increased winter precipitation
            a) More snow and ice loading
            b) Flooding
        4) Decreased summer precipitation
            a) Drought stress
        5) More frequent and intense extreme weather events

6) Mitigation
    a) Reducing greenhouse gas emissions
        - Allocate resources to trees that mitigate emissions
            - Large hardwoods
        - Maintaining tree canopy
    b) Promote energy efficiency
        - Strategically planting trees around buildings
        - Increase stormwater infiltration
        - Using wood vs steel in construction projects
7) Adaptation
    a) Planting a diverse mix of pest-tolerant, well-adapted, low-maintenance, long-lived, and drought-resistant trees ensures greater resilience
        - Species type
        - Species to avoid
    b) Planting small groves of especially water-tolerant species in areas receiving peak volumes of stormwater runoff reduces flooding and pollutant transport
    c) Establishing and adhering to regular maintenance cycles
        - Pruning young trees properly promotes strong branch attachments that are less vulnerable
    d) Distribute urban forest benefits equitably
        - Underserved populations will be disproportionately impacted by climate change – focusing on these demographic areas with urban forest solutions can help

Response – Immediate Activities during and after Natural Disasters

1. Storm damage response: IT IS RECOMMENDED THE CITY OF SCHENECTADY REFER TO THE EMERGENCY OPERATIONS PLAN, NATURAL HAZARDS MITIGATION PLAN, AND THE DEBRIS MANAGEMENT PLAN FOR STORM RESPONSE GUIDANCE. THE FOLLOWING PROVIDES GENERAL INFORMATION FOR THE CITY TO CONSIDER WHEN UPDATING THE AFOREMENTIONED PLANS.
    A. Funding
        1) Sources of assistance
            a) State forestry/natural resources
            b) Federal disaster relief
            c) USDA Forest Service
    B. Emergency plans and contracts
        1) Tree damage response. STATE HOW THE CITY OF SCHENECTADY RESPONDS TO STREET TREES WITHIN THE PUBLIC RIGHTS-OF-WAY AND TREES WITHIN CITY-OWNED PROPERTY. STATE/MAKE CLEAR THAT THE CITY CANNOT ASSESS, CLEAR, FELL, OR REMOVE TREES ON PRIVATE PROPERTY AFTER AN EVENT, UNLESS OTHERWISE NOTED.
            a) Priority streets/corridors for first response
                - **CLASS I**: First, all life-threatening situations within street rights-of-way and City-owned property should be given priority. The City Fire and Police Department request technical assistance for City staff to address the concern(s)

under their supervision and directions. Supervisors should make an on-site visit to determine the severity of the damage in the event of multiple hazardous situations. Crews should remedy the situation to a point where it is no longer life threatening before proceeding to the next location. Final clean up should wait until all life threatening situations are resolved and all streets have been cleared.

- **CLASS II**: Second, all major City-owned property damage instances should be remedied to a point where the crisis is abated. Supervisors should personally inspect and determine the priority of the tree management program responses. Again, final clean up at those sites should wait until all streets and specialized areas are cleaned up.
- CLASS III: Third, preferential streets (considered to be all main thoroughfares) should be cleared of fallen trees and debris. State and county highway departments may be called to clear U.S., state and county routes. Because the specialized forestry skills required to abate life threatening and property damage situations would be utilized immediately, the street clearance work (in case of widespread and severe damage) may not be undertaken by tree management program personnel until sometime well after the storm has passed. In this situation, the tree manager should recommend to the Public Works Director that other public works crews be considered to assist in street clearance work. immediate supervision of these supplementary crews would be under the direction of their respective divisions.

2) Cleanup
    a) Debris disposal
        - The Public Works develops a budget for normal disposal costs associated with yearly tree maintenance tasks. Major tree debris disposal will require additional funding which may be authorized by the City Manager.
    b) Damage Assessment
        - The Department of Public Works should immediately issue a press release detailing the magnitude of the storm and the expected clean up time. Provide direction to the Community as to how to properly handle / dispose of their debris.
        - A critical tool to assist any emergency response is a current tree inventory of all publicly owned trees. Using the inventory, the City can determine the actual damage to the urban forest. Accurate damage (in dollars) can be assessed and submitted for potential reimbursements. Specific costs can be developed for the repair of the urban forest (pruning, removal, cabling, and rodding).
3) Use i-Tree storm for predictions

4) FEMA contacts/expectations

C. Participate in the USDA Forest Service's Urban Forest Strike Team training curriculum.

Recovery – Activities to Regain or Improve upon Pre-disaster Conditions

1. Tree planting
   A. Align with a tree planting strategy that provides guidance on priority areas, tree species selection, post-planting care, and routine maintenance.
   B. Align planting with canopy goals
2. Tree care
   A. Conduct young tree training to prevent future maintenance issues, improve structural integrity, and reduce future costs
   B. Conduct routine programmed pruning of established trees in the public tree population to reduce the risk of storm damage
   C. Inventory, assess, and monitor trees to prioritize maintenance and for information useful in prioritizing storm response
   D. Implement plant health care for trees affected by pests and diseases. Implement an Integrated Pest Management program for prevention, treatment, and recovery due to pests and diseases
3. Training
   A. Provide or support tree maintenance, planting, and risk assessment training for City staff and community partners
   B. Stay current on research relating to storm disaster prevention, response, and recovery
4. Celebrations
   A. Continue to build support for the urban forest through events and programs such as the Arbor Day celebration, Tree City USA recognition, recognition programs for community tree stewards, memorial tree programs, and the Heritage Tree Program

Appendix J. Community Forestry Resources

Local Resources

- Schenectady's TreePlotter app: Ahttps://pg-cloud.com/SchenectadyNY/
- NYS Department of Environmental Conservation Urban and Community Forestry: https://www.dec.ny.gov/lands/4957.html
- NY State Urban Forestry Council: https://nysufc.org/
- NYSDEC Emerald Ash Borer: https://www.dec.ny.gov/animals/7253.html
- Cornell Cooperative Extension: http://ccerensselaer.org/environment
- New York City Tree Planting Standards: http://www.nycgovparks.org/permits/trees/standards.pdf
- Cornell University Urban Tree Booklet: http://www.hort.cornell.edu/uhi/outreach/recurbtree/pdfs/~recurbtrees.pdf
- New York State Flora Atlas: http://newyork.plantatlas.usf.edu/
- NYS DEC Invasive Species List: http://www.dec.ny.gov/animals/65408.html

Community Outreach and Education

- The Nature Conservancy "Health Trees, Healthy Cities": https://www.conservationgateway.org/ConservationPractices/cities/hthc/Pages/default.aspx/training-resources
- U.S. Forest Service "Outreach Services Strategies for all Communities": http://actrees.org/files/What_We_Do/OutreachStrategies.pdf
- Project Learning Tree: https://forestry.ces.ncsu.edu/ncplt/

Regional Urban Forestry

- National Urban and Community Forestry Advisory Council: https://www.fs.fed.us/managing-land/urban-forests/ucf/nucfac
- American Forests: http://www.americanforests.org/
- Urban Forestry Index: www.urbanforestryindex.com
- TreeLink: www.treelink.org
- Trees Are Good: www.treesaregood.org
- American Grove: http://thegrove.americangrove.org/
- Society of Municipal Arborists: http://www.urban-forestry.com/
- Arbor Day Foundation: www.arborday.org
- Alliance for Community Trees: https://www.arborday.org/programs/alliance-for-community-trees/
- Tree Care Industry Association: http://www.tcia.org/
- The New York State Arborists, ISA Chapter: https://nysarborists.com/

Tree Ordinances

- Guidelines for Developing and Evaluating Tree Ordinances (automatic download):
- https://ir.library.oregonstate.edu/downloads/pg15bm22x
- Sample Tree Ordinance: https://www.arborday.org/programs/treecityusa/documents/sample-tree-ordinance.pdf
- Example Tree Contracting Specifications: https://www.springfieldmo.gov/DocumentCenter/View/11756
- Trees and Development Guidelines: http://www.a2gov.org/departments/field-operations/forestry/Pages/StreetTreesDevelopment.aspx

- American Public Works Association "Urban Forestry Best Management Practices for Public Works Managers: Ordinances, Regulations, & Public Policies": https://www2.apwa.net/Documents/About/CoopAgreements/UrbanForestry/UrbanForestry-3.pdf

Urban Forest Storm Preparedness

- Urban Forest Strike Teams: http://articles.extension.org/pages/71461/urban-forest-strike-teams
- APA "Hazardous Tree Management and Post-Disaster Tree Management": https://www.planning.org/research/treemanagement/

Trees and Stormwater

- Urban Watershed Forestry Management: http://www.forestsforwatersheds.org/
- EPA Green Infrastructure: http://water.epa.gov/polwaste/green/upload/stormwater2streettrees.pdf

Urban Forests and Climate Change

- U.S. Forest Service "Urban Forests and Climate Change": https://www.fs.usda.gov/ccrc/topics/urban-forests-and-climate-change

Tree Management Best Practices

- ANSI A300 Standards: https://tcia.org/TCIA/BUSINESS/ANSI_A300_Standards_/TCIA/BUSINESS/A300_Standards/A300_Standards.aspx?hkey=202ff566-4364-4686-b7c1-2a365af59669
- ANSI A300 Pruning Specification Writing Guide: https://www.tcia.org/TCIAPdfs/Resources/Arboriculture/A300TreeCareStandards/A300Pruning-SpecificationWritingGuide-20170413.pdf
- ANSI Z60.1 Nursery Standards: https://www.americanhort.org/page/standards

Trees and Utilities

- Penn State Extension "Questions about Trees and Utilities": https://extension.psu.edu/questions-about-trees-and-utilities
- Utility Arborist Association "Common Questions about Electric Utility Pruning": https://uaa.wildapricot.org/page-18073
- VA Cooperative Extension "Trees and Shrubs for Problem Landscape Sites: Overhead Utility Easements" (automatic download): https://www.urbanforestrysouth.org/resources/library/ttresources/trees-and-shrubs-for-problem-landscape-sites-overhead-utility-easements/at_download/file
- The eXtension Foundation "Trees for Energy Conservation": http://articles.extension.org/trees_for_energy_conservation
- Arbor Day Foundation "Energy-Saving Trees": http://energysavingtrees.arborday.org/#About

Urban Wood Utilization

- http://ncufc.org/urban_wood_utilization_introduction.php

Planning Resources

- Vibrant Cities Lab's Community Asset & Goal-Setting Tool by American Forests and the U.S. Forest Service: https://www.vibrantcitieslab.com/assessment-tool/

- U.S. Forest Service and Davey Institute “Sustainable Urban Forest Guide”: http://www.itreetools.org/resources/content/Sustainable_Urban_Forest_Guide_14Nov2016.pdf
- WI DNR “Technical Guide to Developing Urban Forestry Strategic Plans & Management Plans: http://dnr.wi.gov/topic/UrbanForests/documents/UFPlanningGuide.pdf
- Municipal Urban Forestry Staff American Public Works Association “Urban Forestry Best Management Practices for Public Works Managers: Staffing”: https://www2.apwa.net/Documents/About/CoopAgreements/UrbanForestry/UrbanForestry-2.pdf
- Tree Boards: http://www.tufc.com/pdfs/treeboard_handbook.pdf

Urban Forestry Funding

- How to Fund Your Urban Forestry Program: https://planitgeo.com/library/how-to-fund-your-urban-forestry-program/
- Alliance for Community Trees “Funding Sources”: http://actrees.org/resources/tools-for-nonprofits/fundraising-tools-for-nonprofits/
- Penn State Extension “Sustaining and Funding an Urban Forestry Program”: https://extension.psu.edu/sustaining-and-funding-an-urban-forestry-program
- American Public Works Association “Urban Forestry Best Management Practices for Public Works Managers: Budgeting & Funding”: https://www2.apwa.net/Documents/About/CoopAgreements/UrbanForestry/UrbanForestry-1.pdf
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Tree and Urban Forest Ecosystem Benefits

- U.S. Forest Service i-Tree: www.itreetools.org
- U.S. Forest Northeast Community Tree Guide: Benefits, Costs and Strategic Planting: http://www.itreetools.org/streets/resources/Streets_CTG/PSW_GTR202_Northeast_CTG.pdf
- U.S. Forest Service “The Urban Forest and Ecosystem Services”: https://www.fs.fed.us/psw/publications/mcpherson/psw_2016_mcpherson001_livesley.pdf

Tree Assessment Resources

- U.S. Forest Service Urban Tree Canopy Assessments (UTC): www.nrs.fs.fed.us/urban/utc/
- PlanIT Geo Urban Tree Canopy Assessments: https://planitgeo.com/geospatial-mapping-services/
- i-Tree Canopy Assessments: https://canopy.itreetools.org/
- PlanIT Geo Tree Inventory Software: www.treeplotter.com
- Schenectady, NY’s TreePlotter Software: www.pg-cloud.com/SchenectadyNY

Other Resources

- American Forests “Vibrant Cities Lab”: http://www.vibrantcitieslab.com/
- ISA International Dictionary Online: https://www.isa-arbor.com/education/onlineresources/dictionary
- PlanIT Geo Reports and Plans: www.planitgeo.com/urban-forestry-resource-library

Schenectady's Community Forest Management Plan was developed to provide the road map for the City to maintain a healthy and sustainable community forest that is properly managed and cared for, benefiting the City and its citizens with improved economic and environmental well-being, increasing public safety, cost effective maintenance, and informed tree planting decisions.

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