

ORDINANCE NO. 2138 22

AN ORDINANCE AUTHORIZING THE ADOPTION OF THE VILLAGE OF HAWTHORN WOODS, ILLINOIS URBAN FOREST TREE MANAGEMENT PLAN

BE IT ORDAINED by the Mayor and Board of Trustees of the Village of Hawthorn Woods, Illinois, that the Mayor and Chief Operating Officer be, and the same are, hereby authorized and directed to execute an adopt the **Urban Forest Tree Management Plan**, in substantially the form attached hereto as Exhibit "A," and, by this reference, made a part hereof. The foregoing Ordinance was adopted by the Village Board of Hawthorn Woods, Illinois, on January 24, 2022:

AYES: Kaiser, Riess David Bayne McCaskey, Ryckers

NAYS: ⊖

ABSENT AND NOT VOTING: ⊖

APPROVED: *Dominick DiMaggio*
Dominick DiMaggio, Mayor

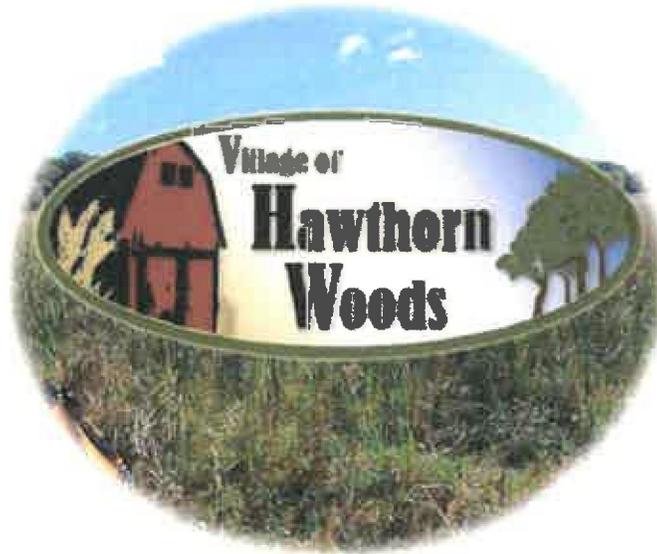
ATTEST: *Donna Lobaito*
Donna Lobaito, Village Clerk

ADOPTED: January 24, 2022

APPROVED: January 24, 2022

Village of Hawthorn Woods, IL

Urban Forest Management Plan



Prepared By

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Prepared On

October 22nd, 2021

This publication was made possible with a grant from the Illinois Department of Natural Resources and United States Department of Agriculture Forest Service, with assistance from the Morton Arboretum

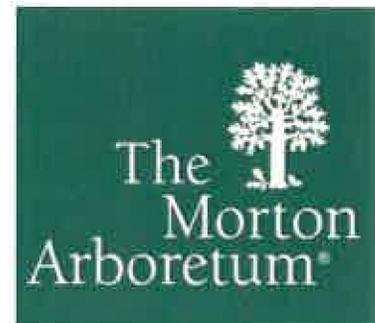
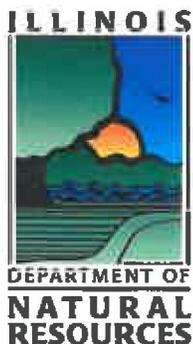


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OVERVIEW HAWTHORN WOODS'S URBAN FORESTRY MANAGEMENT PLAN

The Village of Hawthorn Woods (VHW) currently manages 1,425 trees throughout its parks system, not including street trees. There is also room in many parks for future tree planting, which represents potential for growth of VHW's urban forest. VHW's park trees were inventoried in 2020 and that data was used to develop this Urban Forestry Management Plan, which will detail how these trees will be managed for the benefit of the Village of Hawthorn Woods, its park patrons, and residents of the Village over the next 10 years, with a focus which begins in 2022 and projects out to 2032. We should note that though the Villages street trees are not reflected in this plan, the Village of Hawthorn Woods is looking into getting a full street tree inventory and including that in an update of this plan.

In terms of the condition of the Urban Forest in VHW's parks, there are both strengths and opportunities for improvement. In terms of strengths, the VHW has a smaller tree population that is in overall very good condition, and it appears that the department has been managing that resource well in the past. In terms of opportunities, the diversity level and overall number of species is quite low, and this UFMP will aim to even improve upon this. This will be examined in further detail below, but diversifying new plantings based on our recommendations will be a long-term goal. Also, the current budget being applied towards forestry management should be larger. At a projected \$15,000 per year, this is enough to fulfill basic needs, but an increase in budget would allow VHW to accomplish much more. This will be explored later in this plan.

In order to enhance the Urban Forestry program so it will create long term benefits to the community while reducing costs, the following Urban Forest Management Plan will address each one of these strengths and opportunities and create goals and milestones for each. Further detail is given in the body of the Plan, with separate sections detailing specific Urban Forestry activities, and how we propose they are achieved, along with standards and Best Management Practices for each.

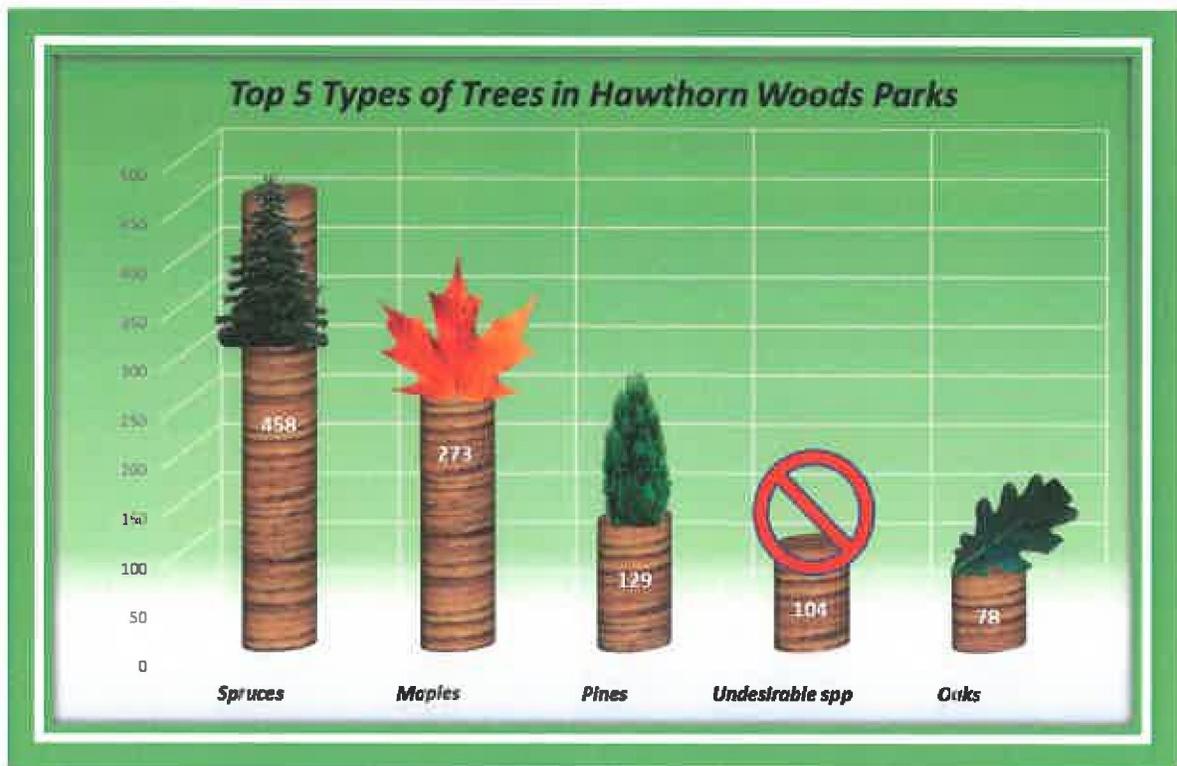
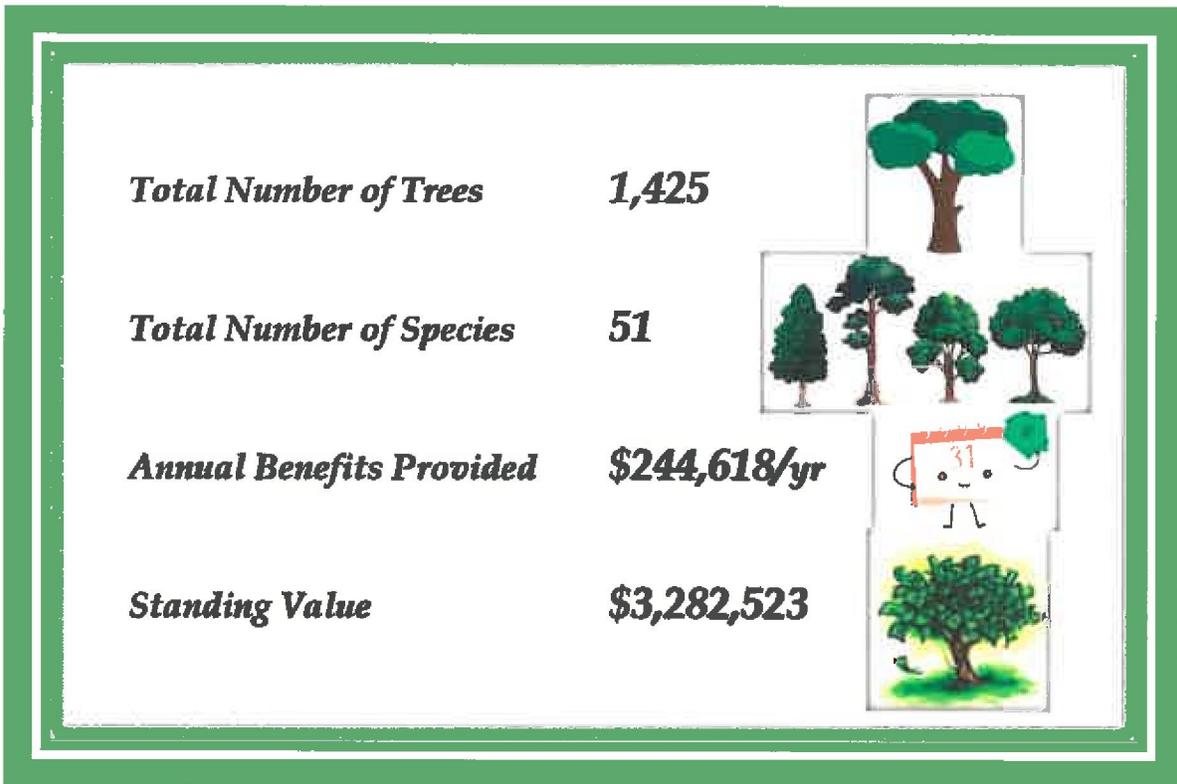
An urban forestry program has been created in this Plan which attempts to achieve the greatest benefit for the community, based on the available data we have from the park tree inventory, as well as input from stakeholders and residents of the Village of Hawthorn Woods. However, all plans are subject to change based on new information, budgets, or other unforeseen circumstances. For this reason, it is asked that readers consider this plan to be a living, breathing document, and goals and strategies will be updated to fit new circumstances as needed.

This Urban Forestry Management Plan should be reviewed periodically, at which point VHW, and its residents, business owners, and other stakeholders will have an opportunity to provide input and help improve the Plan during those annual reviews. These strategies and goals are not absolute, but rather serve as guideposts to mark the road to success.

MISSION STATEMENT

It shall be the mission of this Urban Forest Management Plan to outline goals, budgets, and Arboricultural Best Management Practices for the management of the Urban Forest for The Village of Hawthorn Woods in order to increase canopy cover and maximize the benefits trees provide, while minimizing cost, and create a program to manage the Urban Forest for the greatest public good in a manner that is both financially and programmatically sustainable, while maintaining flexibility for future adaptive management.

VHW's URBAN FOREST: AT A GLANCE...



DIRECT GOALS

Listed below are the direct goals of this Urban Forest Management Plan (herein referred to as “UFMP”, or “the Plan”), as well as a brief discussion of how they shall be met. Direct goals are those which this plan addresses very explicitly in describing pruning, removal, planting, and other activities. Every attempt was made to make these goals realistic and achievable, so they do not place an undue burden on Village of Hawthorn Woods, its patrons, or its resources. Instead, the direct goals of this UFMP are to save money and provide greater benefits over time through proactive, as opposed to reactive, management. The Plan is also meant to be adaptive: new concepts, the introduction of new pests or pathogens, or changing climate (both social and meteorological) may all change the way the Urban Forest is viewed.

The Plan is intended to be reviewed periodically by VHW, the Village’s Board of Trustees, and any additional stakeholders. The review process should include evaluation of progress made towards these goals. Goals may be altered after the review as conditions warrant. This UFMP is written with the understanding that organizations, stakeholders, and residents change over time, and therefore its goals require a degree of flexibility. Since trees represent a long term (50-80 year) commitment, this UFMP is intended to provide guidance and continuity through those changes, while also adapting to them as the need arises.

Create a Needs Analysis for the Current Tree Population

Every tree population today is the result of decades of past management decisions. Over time, we increase our overall level of knowledge, skill, and efficiency in managing trees. Based on that new knowledge, we sometimes discover that decisions made decades ago may appear in retrospect to have been wrong, even though they seemed like a good idea at the time. It is the goal of this Plan to assess the current state of the Village of Hawthorn Woods’s Urban Forest and examine its overall strengths and benefits, as well as look for opportunities for improvement to inform future decisions.

Each aspect of VHW’s tree data has been analyzed: How many trees, what condition they are in, how old they are, what needs they may have, and more were all examined to create goals to improve the tree population for the benefit of the organization, its residents and patrons, and other stakeholders. Specific goals in terms of planting, removals, pruning, budgets, personnel, and maintenance are all addressed by acknowledging both strengths and opportunities and suggesting how they might be used to VHW’s advantage. These strengths and opportunities will be the guiding principles for the management strategies and specific goals outlined in each section below. The Plan shall also attempt to leave room for adaptive management, so it may be changed when appropriate.

And as mentioned previously, the Village only had stem by stem tree data in its trees in parks, and not the street tree population. All concepts discussed here can be applied to the street trees once a full inventory is completed, which the Village is considering at this time.

Establish Goals in Order to Enhance Strengths and Realize Opportunities

In order to accomplish anything, goals are necessary to help guide organizations through the process. Establishing or enhancing an urban forestry program will require a series of attainable goals to be effectively achieved. This UFMP seeks to accomplish those goals within a realistic budget and attainable timespan. As stated previously, goals are intended to change over time as VHW's capacity to manage the resource may increase or be reduced.

In each section of the Plan related to direct goals, language has been included which incorporates both a budget and time frame in which those goals can be accomplished. The overarching goal will be to have VHW have a sustainable and adaptable forestry program within a 10-year period.

This program will include tree planting, tree maintenance, and tree removal for VHW's Urban Forest, so that the tree population will be healthy, and provide the greatest benefits to the community while maximizing benefits and minimizing risk. To learn more about the budgets, see the individual goals in each section below, or turn to the budget table on page 59.

Update Language for Enforcement of Tree Ordinances

A review was performed with the Morton Arboretum, working in tandem with the Village of Hawthorn Woods, its staff, and relevant community stakeholders to edit and improve ordinances governing trees in VHW. These internal policies are meant to reinforce proper tree care practices while discouraging improper practices and care. These are intended to encourage the staff and community to become engaged with the urban forest in VHW. These policies are common industry regulations, such as enforcing rules about what trees cannot be planted because they are unsafe trees or defining exactly what trees are VHW's and the adjacent resident's responsibility for border trees, among other things. The goal of these ordinances is to create a tree population which is diverse, healthy, and always improving, providing the greatest benefit to the VHW and its residents and stakeholder over the long term. To learn more about the Village's ordinance, please consult the village website at <https://co.elibrary.amlegal.com/codes/hawthornwoodsil/latest/overview>.

Increase Overall Diversity by 2032 Through Tree Planting

Tree species diversity is one of the most important concepts in Urban Forestry today. The reason pests and diseases like Emerald Ash Borer (EAB) and Dutch Elm Disease were so devastating is that there were too many Ash and Elm trees. When EAB arrived, many communities' Ash population was 20% or more, resulting in mass tree loss. This can be avoided by planting a greater diversity of tree species, so that when new pests or pathogens are introduced, we only lose small amounts of specific tree species. Diversity leads to stability, and stability leads to reduced costs and increased benefits over time. To learn more about species diversity now and in the future, turn to pages 16-37.

An achievable “Diversity Vision” has been created for 2032 which will see the tree population become even more diverse than it is at present. Currently, the tree population in VHW’s parks is composed overwhelmingly of Spruces and Maples, with Pines, Undesirable species, and Oaks representing the remaining top 5 species. This is somewhat typical for many parks and other tree populations overall in the Midwest region, but this Plan will seek to introduce more diversity and create a more robust and resilient tree population overall.

For this Plan, trees will be planted which are underrepresented or not present in the current population and planted in a manner that selects the right tree for the right site. A direct goal will be to create a tree planting program where trees are matched to existing sites for the next 10+ years. Currently, VHW plants approximately 20 trees each year, and this plan seeks to increase that number from 20 to 80 trees per year, to both be able to replace older declining trees, as well as to grow the tree population by over 265 trees overall by 2032. Ideas such as contract growing, creating an in-house liner nursery and others will be explored. To learn more about tree planting and reforestation, turn to pages 42-46, and appendices A, B, and I

Maintain an Acceptable / Unacceptable Species List

The urban environment is a difficult place for a tree to live. Between road salts, urban pollutants, limited soil, and other challenges, not all trees will thrive in the urban environment. Fortunately, parks are much more forgiving than street tree sites. That said, trees which have very weak wood, which are known invasive species, which produce messy or foul-smelling fruits, or which create a public nuisance should also be avoided. Acceptable species are those which are adapted to our changing Midwest climate, are not invasive, and meet diversity goals. Included in this Plan is an “acceptable and unacceptable” species list which will detail specific trees which may be planted in the parks. The VHW and its Sustainability Committee will review the list periodically to ensure that it is maintained in accordance with the latest information on specific trees. For more information on what species can and cannot be planted, see the Acceptable Species List in Appendix A.

Manage Tree Removals

For public safety, or to prevent the spread of tree pests and pathogens, sometimes tree removal is unavoidable. Based on the inventory data, we believe there are approximately 105 trees currently requiring removal in the VHW parks tree population. To maintain public safety, a tree removal program has been created in this Plan which budgets for the safe removal of all these trees over the three years after adoption of this plan in order to maintain public safety. Beginning this year, the anticipated 30 trees which are believed to be priority removals can be budgeted for removal, and trees which are believed to be standard removals can be prioritized and budgeted in the 2nd year. In the third year, the lower priority removals can be budgeted. After this, updates to the tree inventory will identify any remaining trees in need of removal.

Cost projections for tree removals have been made based on the number, age, and condition of trees in VHW's parks for the next 10 years, so that long term budgeting projections can be made. Also included are ANSI and ISA safety standards, as well as suggested staff and contractor qualifications to ensure VHW is hiring staff and contractors who will be held to the highest industry standards. For more information on VHW's proposed tree removal program, turn to pages 38-42.

Create a Cycle Pruning Program

Properly pruned trees establish faster, grow quicker, and live longer lives than trees which are not pruned, or improperly pruned. Since large trees provide the greatest benefits to the community, pruning is a critical part of the Urban Forestry program in VHW. Pruning is planned to be performed by VHW staff, Certified Arborist contractors, and for some of the newer trees to be planted, potentially by local, well-trained volunteers. Currently, VHW prunes trees on an *ad hoc* basis in their parks in response to storm damage and other events. The initial goal will be to prune the estimated 150 trees which appeared in the park tree inventory as being in the greatest need of pruning.

With an approximately 20% annual budget increase each year over the next 10 years, we hope to develop a 7-year cyclical pruning program for the Village's park trees which can be expanded into the street tree population as well. This program will ensure that all trees in Village parks are pruned at a minimum every 7 years, increasing tree health and vigor while reducing costs associated with storm damage and tree failure. We also propose that a volunteer group be trained in proper pruning and maintenance of young trees, so that the community can assist in caring for this important Urban Forest resource. This group may assist in other tasks as well, such as watering, and monitoring for new insects and diseases. For more information on pruning and maintenance, turn to pages 46-51.

Maintain an Accurate Tree Inventory on an Annual Basis

Managing an urban forest requires a clear understanding of the trees, their ages, conditions, and maintenance needs, so that VHW crews and contractors can perform work on these trees. A stem-by-stem tree inventory was completed in 2020 by a contractor procured by the Village. This inventory resulted in an assessment of trees in VHW's parks and will serve as the data which will guide the VHW forestry program throughout the next 10 years. In addition, the Village is looking into expanding their tree inventory to cover their street tree population as well.

All inventories are a snapshot in time. With 1,425 trees in Hawthorn Woods's parks, the tree inventory should be maintained at a high level of accuracy so that it does not become out of date. Currently, the data is being maintained in Microsoft Excel. However, as the VHW looks into expanding its inventory to include street trees, we also recommend that the inventory be maintained in a GIS system (Geographic Information Systems), and updated periodically by a Forestry Consultant, to keep the information at its most current. Maintaining this tree data at a high level is vital in the execution of this Management Plan and future manifestations thereof.

Proper Mulching of All New Plantings

The urban environment is a difficult place for a tree to become established and to live a long, healthy life. Proper mulching can significantly increase a tree's ability to do this. Mulch helps to conserve water during the summer by preventing it from evaporating from the soil. It also helps prevent weeds from growing around the tree and competing for water and nutrients and keeps lawn equipment such as weed whips away from the trunk where they can damage the tree. All new VHW plantings will be properly mulched at the time of planting by the planting contractor.

Another intended outcome of this initiative will be to educate residents about proper mulching care and notify them when poor mulching techniques are being used. Of particular concern is the practice known as "Volcano Mulching" which has the opposite effect of proper mulching and can severely damage a tree over time. For more information on proper mulching, turn to pages 51-53.

Incorporation of Best Management Practices in Tree Care operations

"Best Management Practices" is a term which means being on the cutting edge of your industry. All contractors working for VHW should be compliant with the latest industry Best Management Practices, based on the appendices in this report. The ANSI and ISA Best Management Practices shall be integral parts of any Request for Proposal (RFP) or bid documents when seeking qualified contractors. Full text of all referenced standards shall be made available to all VHW employees and contractors performing tree care operations. Public outreach and education shall be performed by VHW's staff, ensuring that residents understand these practices as well. This UFMP will be placed in the public domain for all residents to use as a reference.

Creation, utilization, and maintenance of a Tree Risk Assessment policy

Trees create great benefits, but they may also pose various degrees of risk. Tree limb failure can have catastrophic effects on people or property, and trees need to be well-managed and healthy to avoid that risk. A risk assessment policy has been created for Village of Hawthorn Woods as part of this Plan. This policy will aid in identifying, documenting, and designating for removal or mitigation trees which may pose a threat to public safety in a timely manner. This will reduce the overall level of risk posed by trees, as well as exposure to liability from tree related incidents. Basic risk assessment language is included in this document, and a basic draft Tree Risk Assessment Policy has been created on pages 56-58, and more info can be found in Appendix G.

Increase Urban Tree Canopy from 29.11% to 31%

Tree canopy is important to the community because more and larger trees provide greater benefits such as decreased heating and cooling costs, pollution reduction, and increased storm water uptake. Tree lined parks and streets are more attractive to homebuyers and potential new businesses, which increases home values, home ownership, and tax revenue. All these factors benefit the community, so a direct goal will be to increase tree canopy in the Village of Hawthorn Woods overall.

Currently, Hawthorn Woods contains 29.11% tree canopy coverage, compared to other land cover types. Increases in tree canopy come with increases in benefits to the community. Based on data from the Chicago Region Trees Initiative, we believe that an increase to 31% canopy cover is a realistic goal for Hawthorn Woods by 2032. This will be accomplished by increasing the number of trees on Village property, as well as improving tree care allowing trees to become larger, and create more canopy cover. Tree planting on private property will also be incentivized through public-private partnerships. As part of this canopy increase, we are concerned with *quality* of canopy, and some of this increase will involve reduction in invasive or aggressive trees in favor of more desirable species. The benefits trees provide will help Hawthorn Woods residents save money. For more information on Urban Tree Canopy, tree benefits, and other such information, turn to pages 25-30 and 35-36.

Tree Preservation / Low Quality Species Management

Sometimes trees can become damaged by construction activities, costing VHW money, and eliminating the benefit the tree had to the community. A basic tree survey and assessment should be conducted prior to any construction activities on Village-owned land. A tree protection zone must be established and maintained during construction. The removal of low quality or invasive species is also strongly encouraged. This not only increases the amount of planting space or usable land, but also increases public safety. A direct goal of this Urban Forestry Management plan is to preserve trees during construction and reduce the number of undesirable species within the Village.

Increase Awareness of the Urban Forest in Village of Hawthorn Woods, and Engage Stakeholders

The reason for the establishment and enhancement of an Urban Forestry program in Village of Hawthorn Woods is to improve the lives of the residents, business owners, and other stakeholders to create a healthier, happier community. In order to make this happen, VHW is looking for partners in the community to provide support for this program. Village of Hawthorn Woods staff is reaching out to local garden clubs, philanthropic organization, residents, and business owners to make the forestry program innovative, and community based. In this manner, residents and business owners in Hawthorn Woods can take ownership of this important and beneficial resource, and allow it to work for them, their families, businesses, and the good of the whole Village. For more on these innovative programs, and how you can get involved, turn to pages 10-15.

Increase Tree Count from 1,425 to 1,690 Trees

Currently, the stocking density of VHW's parks is average, but there are certainly plenty of planting opportunities. In addition to the planting of shade trees, this plan seeks to increase the overall number of trees by creating a multilayered canopy, consisting of large canopy trees with medium sized trees and smaller ornamentals growing beneath them. By using this approach, the number of trees in VHW's parks can be increased by over 18%, which will correspond with an increase in overall benefits of these trees to the community, and aid in growing the overall canopy in the Village of Hawthorn Woods.

Additional Goals

There are no strategic timelines set forth here for these programs. As the direct goals of the Urban Forestry program in Village of Hawthorn Woods are met or exceeded, then these additional goals will be discussed by the Village of Hawthorn Woods and its Sustainability Committee as time and budgets become available. We believe that many of these programs represent some of the most progressive Urban Forestry policies currently, and that they should all be considered for implementation.

Volunteer Labor (TreeKeepers/Local Organizations)

As mentioned above, the ability to use well-trained residents as volunteer labor for pruning of young trees and planting of smaller sized nursery stock during Spring and Fall planting cycles may benefit VHW's bottom line. In order to accomplish this, several training sessions will be required for these volunteers to be confident enough that they can perform these activities with minimal supervision. The Forestry Consultant, working in tandem with VHW staff and local organizations, can educate residents on the proper way to prune young trees, as well as how to plant container-grown trees, water and mulch trees, identify trees, and other basic tree knowledge.

There is a local chapter of the Open Lands Tree Keepers program which is currently being planned. This organization is a non-profit which assists in educating people about trees, how to prune, plant, and manage them, and their benefits to society. There are other local organizations with which VHW could partner with as well, please see pages 13-15 for more details. Upon acceptance of this Plan, we expect VHW will reach out to Open Lands or a similar local organization in order to establish a relationship, and assist in the creation of this volunteer program, which will engage the community, as well as save VHW money overall on its maintenance program.

For residents who may not be interested in joining the volunteer program, but still want to know a little bit more about how to take care of their trees, it is recommended that VHW hold several annual tree education sessions, to coincide with annual Spring and Fall planting cycles. These sessions could be taught by VHW staff, the Forestry Consultant, or other such qualified parties, and cover tree watering, fertilization, pruning, and the basics of how to spot insects and diseases. In addition, basic tree care pamphlets shall be made available at VHW offices and facilities. An Arbor Day celebration is an example of one such outreach event where trees could be planted, and education sessions run.

Contract Growing Program

One of the keys to a successful Tree Planting Program is the availability of high-quality nursery stock from local sources. Incorporated with the UFMP for Village of Hawthorn Woods is a diversity vision for 2032 that includes a great variety and diversity of different trees. A new approved species list has also been developed, as well as the tree species that are prohibited on public property. Having this information is an advantage for VHW, in that the nature of the urban forest's species composition is already known. It is believed that a comprehensive tree planting plan will be an important part of this process as well.

This knowledge, however, does not guarantee the availability of those specific trees when the time arrives to fill a particular site. One way to assure the availability of nursery stock VHW desires each year is to have trees contract grown by local nurseries and reserved specifically for VHW. This way, VHW will not have to compete with the landscape industry, other local organizations responsible for tree planting, or local retailers. The way contract growing works is that trees are ordered in annual increments. Each year, VHW will purchase the trees previously ordered for that year and place an order for the following year. This gives the supplying nursery time to procure, plant, and bring the agreed upon trees to the size and branching habit specified.

As numbers of trees required for planting vary from year to year, tree order projections should be made conservatively. In agreement with the nursery, VHW would reserve the right to increase orders when needed. Nurseries should be located within a specified distance of Hawthorn Woods, to ensure climatic zone compatibility and reduced transportation costs, and planting stock exposure to the elements. Nurseries should be of sufficient production capacity to furnish all trees ordered in advance, as well as possible increases. Nurseries should be chosen on their capacity to produce stock, and meet quality, form, and health standards as specified by VHW. The nursery should allow tagging by VHW staff or other representative such as the Forestry Consultant.

A long-term tree planting contract may be developed alongside the nursery supply contract. This contract would specify all pick-up, transportation, planting, and spoil disposal procedures, as well as establish costs for planting trees. Trees should be evaluated one year after planting and assessed for health and survival. Responsibility for replacement of trees that have not survived the one-year guarantee period is divided equally between the supplier, the planter, and VHW. Trees that are dug or balled improperly will be replaced by the nursery. Trees improperly handled or planted are replaced by the planter. Trees that do not survive because of lack of maintenance are replaced by VHW. VHW already has an in-house nursery at its Public Works garage where it grows a portion of its own trees, and a contract growing program would help to supplement this.

Memorial Tree Planting Program Expansion

Seeing as both park and street trees belong to VHW, the Village should ultimately make the decisions on what trees will be planted at specific sites. However, if residents are interested in planting a specific species of tree in a park location to memorialize a loved one or group, a cost-share program exists, whereby the resident can pay for a portion of the cost of the installed tree which they have requested. Species must be approved by VHW staff or Forestry Consultant, to ensure that the species selected is a good choice that is fit for the site, but the memorial tree purchaser would have more say as to species selection.

A memorial placard or similar device is used to memorialize whoever the purchaser sees fit. Expansion of this cost sharing program would not only reduce annual planting costs, but also gives patrons and residents a sense of ownership about the urban forest. Educational programs for how to plant, care for, and eventually harvest and transplant trees could also be run, resulting in a volunteer workforce that could aid in accomplishing other goals laid out in this plan.

Expansion of Private Property Tree Planting Incentive Programs

Tree planting on private property is a direct goal of this Urban Forestry Management Plan, as noted above. Though VHW has no formal jurisdiction to plant trees on private property, the benefits of tree planting on private property are substantial in terms of energy savings, storm water benefits, and other benefits, and helps meet the canopy cover goals described above. VHW should consider expanding its incentives for residents and business owners to plant trees on their property.

The Village already holds an annual Arbor Day event where tree saplings are given away to local residents, but there are other more year round incentive programs that could be offered as well, such as contracts with local nurseries for reduced costs trees for Hawthorn Woods residents, or slight reductions in utility bills for planting trees on private property. Similar programs have been instituted at other municipalities and park districts in the area, with trees being supplied by local nurseries, or by groups such as Living Lands and Waters, which supplies seedling trees for no or low cost to public entities as well.

Encourage Residents to Use UFMP Guidelines on Private Property

As noted in the section above, this UFMP attempts as much as possible to encourage residents to plant trees on their own property and includes incentive programs for doing so. That said, the Village cannot directly by ordinance or codification require residents to do so. But seeing as the Urban Forest is a common resource which benefits us all, the Village of Hawthorn Woods strongly encourages residents to read through this Urban Forestry Management Plan,

Wood Utilization Program

As the UFMP recommendations take effect, a considerable amount of wood will be generated that may be suitable for use as urban timber. Urban timber is defined as saw logs generated from urban tree removal operations. Larger and longer logs are suitable for dimensional lumber production, and smaller material may be used to produce many other products. Forming strategic partnerships with local sawmills, woodworkers, and carpenters would be an important early goal of this program, while creating a market for the finished goods will be an ongoing goal.

Urban timber can be utilized to mill wood into a large variety of products including dimensional lumber, fine furniture, and artisan pieces. In order to successfully upcycle urban timber into usable lumber, several steps must be followed in order to produce logs suitable for milling.

Urban timber production will include specifications for tree removal operations that will produce saw logs of the proper dimension and quality. Specifications for the construction of public buildings that require a specified amount of upcycled, local urban timber may qualify for LEED certification points, and raising awareness of the benefits of the urban forest in general, creating a saleable product that can serve as a revenue stream.

Strategic Partnerships

Strategic partnerships are a very effective means of getting forestry projects funded when tax funding may present a shortfall, or when additional volunteer labor is needed. These typically involve either public-private partnerships or partnering with other public entities. Typically, the organizations seen participating in these programs include local garden clubs, scout groups, rotary clubs, businesses, state departments of natural resources, and other such groups. This will be an ongoing goal, and continuing partnerships with new organizations shall always be sought.

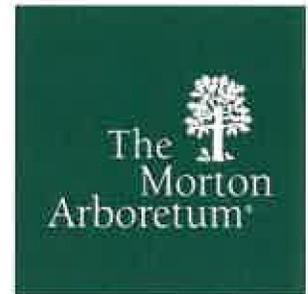
Lake County Forest Preserve District

As principal guardian of Lake County's open space and natural areas since 1958, LCFPD focuses on preservation, restoration, education and recreation, and protects nearly 31,000 acres of natural land in Illinois. Several preserves are located in and around VHW. LCFPD would be a valuable partner in sourcing nursery stock, as well as assisting in training volunteers when possible. They have a great wealth of knowledge and are worth reaching out to for partnership in accomplishing the goals of this plan.



The Morton Arboretum

The Morton Arboretum, aside from being a wonderful place to visit to learn about trees, also has significant educational and operational resources available. As the overall administrator on the grant which funded this project, they have a vested interest in seeing it succeed. They offer educational programs, volunteer education, and a whole host of other services which can make this plan a success.



Chicago Regional Trees Initiative

CRTI is an amalgamation of many of the above groups acting together as a driving force for establishing the importance of urban forestry in the Chicagoland area and abroad. CRTI has several working groups which handle topics such as forest composition, risk management, communications, etc. They are always looking to partner with local communities to get tasks accomplished and publicized, so they will be a first-rate resource for accomplishing the goals laid out in this plan.



Lake Zurich Community School District 95

Urban Forestry is by and large an unknown profession, but there are many aspects of STEM concepts that go into it: GIS Mapping, chemistry, physics, biology, and math are all essential facets of Arboriculture. A relationship with schools ranging from elementary up through high school would be a reciprocal relationship, where students could engage in study projects based around trees, citizen science, and volunteerism, and VHW staff or urban forestry consultants could provide guest lectures to the students in any of these areas and develop interest in or even promote careers in the green industry.



OpenLands

OpenLands is a highly diverse NPO in the Chicagoland area which focuses on many aspects of ecology in the urban and suburban environment such as natural areas, urban forestry, wetland conservation, and other such topics. They have a vast network of connections around the area, and also offer trainings and volunteerism efforts, such as the TreeKeepers program, which educates residents on the care of young trees, tree biology, and the like.



Illinois Department of Natural Resources

The IDNR's Urban and Community Forestry program is actually how VHW was funded for this program to begin with! The IDNR's mission is to protect, perpetuate, restore, conserve, and manage the forest and related resources of Illinois, both public and private. To that end, they have an abundance of resources, staff, and a network of partners which can help PHPD accomplish the goals laid out in this plan, including additional funding for such things as tree planting or local education and outreach.



Ela Area Public Library

The Library is a place where people congregate and learn. As such this would be a first-rate location to advertise opportunities for volunteerism and learning about urban forestry, as well as stocking and showcasing books related to urban forestry and its related disciplines.



Hawthorn Woods In-Bloom Committee

The Village of Hawthorn Woods joined the America in Bloom effort in 2018 and formed its own local chapter in 2019. This committee is responsible for building community pride, participation, and beautification. Its members serve as volunteers for this initiative. The In Bloom Committee is working in several different areas including Flowers and Landscaping, Urban Forestry, Public Awareness, and Environmental Education. It is an award-winning group which may be able to help achieve some of the goals laid out in this UFMP.



Personnel

In order to streamline Urban Forestry Operations, tasks will be assigned to various staff and contractors/consultants. Below is a representation of tasks, and which of the above parties is responsible for these tasks.

Director of Parks and Recreation

The Director of Parks and Recreation is responsible for overseeing and coordinating the activities of both in house staff and outside contractors when it comes to maintaining the grounds. They create Requests for Proposals, manage field staff, and deal with daily operations related to trees, and are the decision makers when it comes to the planting, pruning, maintenance, and removal of trees in the parks. The Director of Parks and Recreation takes direction from the Village Chief Operating Officer and Sustainability Committee working as the Tree Board who recommends changes to the Mayor and Village Board of Trustees. Working in tandem with the Forestry Consultant, they will direct field staff and contractors when it comes to maintenance of the Urban Forest.

Assistant Public Works Director

Similar to the Director of Parks and Recreation above, the Assistant Public Works Director acts as the Village Arborist, and reviews tree removal permits and may assist the landscape consultant with plans for development on private property that may affect trees and is responsible for many of the same services as the Director of Parks and Recreation, but with a focus on street trees as opposed to park trees, though the two act in tandem to provide urban forestry related advice and services for the Village.

Village Board of Trustees

The Village Board of Trustees is responsible for the allocation of funds to specific Urban Forestry initiatives. They take direction from their constituents, are informed by the Chief Operating Officer through information provided by the Sustainability Committee/Tree Board, village staff and Forestry Consultant, and are tasked with reviewing this information to make sound decisions about funding these programs. The Board of Trustees will also be tasked with being part of the team that review this Plan on a periodic basis to make recommendations for edits to help adaptively manage the Urban Forestry program for VHW.

Planning Staff

Planning staff will exercise authority related to planning of large-scale programs related to the Urban Forest, with the assistance and guidance of the Sustainability Committee/Tree Board and Village Board of Trustees, and Urban Forestry Consultant.

Chief Operating Officer

The Chief Operating Officer has final approval on all projects related to trees and public works.

Sustainability Committee

The Sustainability Committee reports to the Village Board of Trustees on various issues concerning the well-being of the residents and community. The Sustainability Committee has overseen the Arbor Day sapling distribution to local schools, planting of bulbs in various parks, and has organized the Adopt-A-Highway program. They study and make recommendations to the Village Board on concerns such as emerald ash borer, gypsy moth, and Dutch elm disease.

Urban Forestry Consultant

The Forestry Consultant is responsible for impartially assessing the tree population on a periodic basis, at the discretion of the Board of Commissioners and the Buildings and Grounds Supervisor. The Forestry Consultant communicates the needs of the trees to the Commissioners and the Director of Parks and Recreation and Deputy Public Works Director so that individual needs in terms of tree planting, removal, and maintenance can be performed. The Forestry Consultant may also function as VHW Arborist during periods of VHW staff absence at the request of VHW.

Tree Care Contractors

Tree Care Contractors are responsible for performing work identified by the Board of Trustees, Forestry Consultant, and VHW staff in a timely, safe, and expeditious manner. The Tree Care Contractor must have at least one International Society of Arboriculture Certified Arborist on site when work is being performed. The contractors will also guide and participate in the performance of Tree Trimming, Pruning, Removal, and Plant Health Care operations. Other operations, such as Tree Planting, Tree Watering, and Tree Mulching do not have to be performed under the direct supervision of a Certified Arborist.

State of the Urban Forest

In 2020, a contractor was procured by the Village in order to inventory the publicly managed park trees in the community of Hawthorn Woods, Illinois. This inventory resulted in a total of 1,425 trees. The charts and statistics in this portion of the Management Plan illustrate that the tree population in VHW can be characterized as overwhelmingly younger and in an above average condition. The species diversity in VHW is low, which leaves room for improvement. Based on the data in the Management Plan, the Village of Hawthorn Woods will be equipped to use this inventory information to address short term concerns, long term management considerations, and overall planning objectives.

It should be mentioned here again that this inventory was only for the parks trees, and the data analysis that follows is confined to that group of trees. The Village of Hawthorn Woods is in the exploratory phase of considering a street tree inventory for the whole village, and this data and the Plan overall can be updated at that time with that new information.

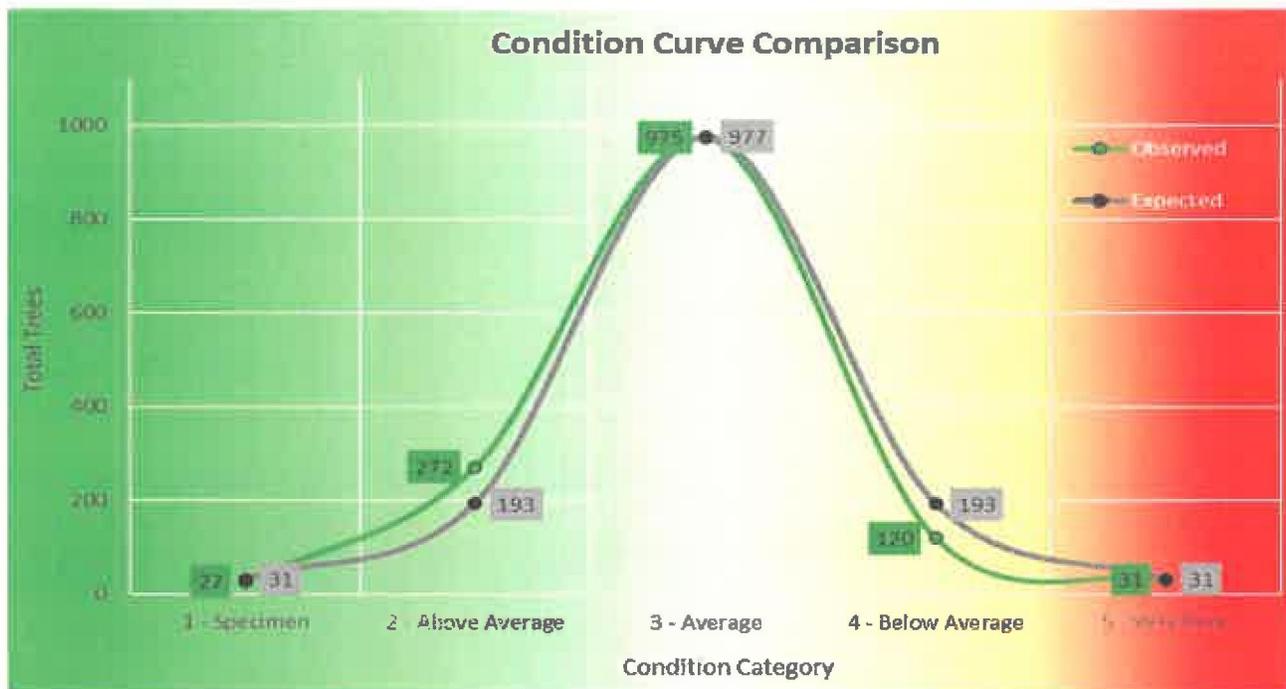
Basic Statistics – Managed Trees

Total Number of Trees	1,425
Total Number of Stumps	0
Total Number of Species	51
Total Diameter Inches	9,854"
Average Tree Diameter	6.91"
Average Tree Condition	2.89 (Above Average)
Average Mature (≥8" DBH) Tree Condition	2.39 (Far Above Average)

Condition Curve

Since the rating system used during data collection differed from GLUFM’s system, GLUFM merged the systems based on the 1-5 ratings below. The rating criteria is as follows:

Condition 1	Specimen – Tree has no observable defects, wounds, diseases, and has perfect form for the species. Since younger trees are generally trouble free, a condition 1 tree must by the Forestry Consultant’s definition be greater than 16” DBH. These are legacy trees, and as such are rare.
Condition 2	Above Average – Tree may have a small amount of deadwood, or a very limited number of minor defects. The overall form of the tree must be good, and consistent for the species. These trees, by the Forestry Consultant’s definition, must be larger than 8” DBH.
Condition 3	Average – Tree has moderate amounts of deadwood, wounds, or other defects, but is generally healthy. A wide variety of forms is acceptable for this group, which is meant to define the middle ground around which better or worse trees can be defined.
Condition 4	Below Average – Tree has defects, deadwood, wounds, disease, etc. which are likely to cause a need for removal. Very poor form or architecture can put an otherwise healthy tree in this category as well.
Condition 5	Very Poor – Tree must be removed. Defects are too far advanced for the tree to be reasonably saved. Like condition 1 trees, these are rare, as generally trees approaching this level are removed before they deteriorate to this level.



The chart above represents the distribution of trees in each of the 5 categories. We have included the tree condition ratings we observed in the field, as well as a curve representing an “average” distribution so that comparisons can be made. The green line represents what we observed in the field, and the grey line represents an average or “normal” tree population.

The Condition 1, or specimen trees, were slightly lower than would be predicted by the standard distribution alone, but we always expect that the specimen trees (and often Condition 5 trees as well) will come in lower than their statistical norm because of their rarity. That said, having 27 trees designated as Condition 1 is commendable and a highly desirable trait in a tree population. As younger trees are planted in sites with adequate growing space, and if they are properly pruned and maintained, they should develop with good structure and may mature to become Condition 2 and eventually Condition 1 trees as well.

The Condition 5, or very poor trees, came in at the expected norm. It is recommended that Condition 5 trees be prioritized and removed in a timely manner.

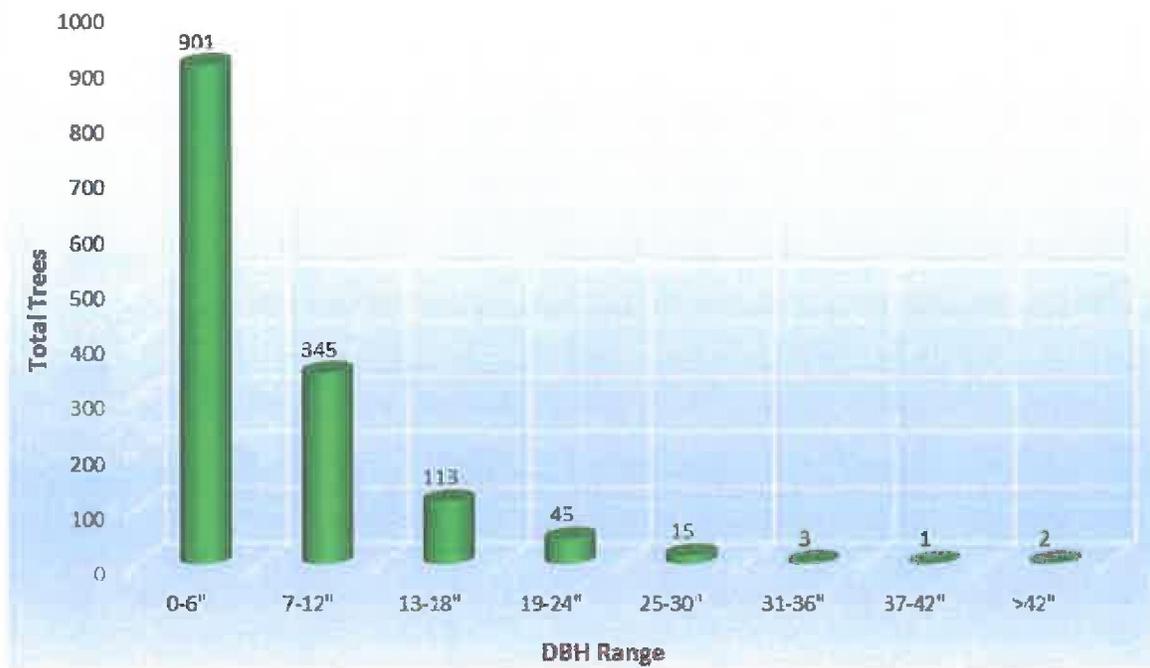
The Condition 2, or above average trees, are higher than what statistical analysis would predict which again is commendable. Looking toward the future, VHW has an opportunity to even further increase the number of trees in the Condition 2 category. In general, if trees are properly mulched and maintained, newly installed trees are done so correctly and cared for well, and site selection for the trees is well matched to the species, trees will often mature with good form and without significant defects. These trees can eventually become Condition 2 trees.

The Condition 4, or below average trees were lower than what would be statistically expected. The trees in this category generally include a variety of species that have developed excessive deadwood and/or other structural defects. With proper maintenance and using the tree inventory to be able to locate trees in need of removal and maintenance, VHW can look to further decrease this number as they move forward and attend to issues that have been identified.

The trees in the Condition 3, or average, category came in at the expected norm which, in comparison with the numbers in the other categories, is a good indicator of a high level of maintenance.

Age Class Analysis

Age Class Diversity



In terms of the ages of trees in Village of Hawthorn Woods, the tree population was split into 8 classes of 6" diameter each. This shows how many trees are in each "age class". Because trees are measured by trunk diameter, this breakdown can help show where trees are in their life cycles. Some trees like Cottonwood and Silver Maple grow in diameter very quickly, up to 1" per year or possibly more. Other slower growing trees such as Oak and Hickory may only add ¼" or less every year. As a broad generalization, it can be said that most trees on average grow at around ½" per year.

This age class analysis chart illustrates a somewhat typical trend in the overall age spread of a tree population seen in a park district setting. Often, we see many trees being younger to middle aged and a relatively lower number of trees in the older age categories. The VHW tree population is overwhelmingly young with over 87% of the tree population (1,246 of total 1,425 trees) measuring less than 13" DBH, an indication of relatively recent commitment to continual tree planting, as evidenced by the number of trees in the 1-12" ranges.

As shown above, 63% of the total population has a DBH of 6" or less which we generally consider to be less than about 15 years old. Another 24% of VHW's trees have a DBH of 7-12" which are generally considered to be about 15-25 years old. The 13-18" DBH category makes up about 8% of the population and is considered to be approximately 25-35 years old. The 45 trees (about 3%) in the 19-24" DBH category are generally mature trees over 35-45 years old.

Trees measuring over 24" DBH account for just over 1% of the total tree population. The 21 trees in the 25"+ DBH categories are considered to be about 45-50+ years old. It should be mentioned that the number of trees in the 30"+ categories are often lower due to the natural senescence and ensuing decline of trees in urban settings, though trees found in parks are frequently longer lived due to the fact they often have unrestricted growing space, both above and below ground. A fairly equal number of trees in each age classification is, within reason, desirable and indicative of a consistent focus on tree planting and tree maintenance in VHW over the years and shows that the right trees are being planted in the correct locations. As the younger VHW continues to have an opportunity, over time, to bring the tree age classes to a more balanced level.

The table of Hawthorn Woods's population growth since 1950 is shown at the right, and it is apparent that the growth in the number of trees in the VHW system increases around the same time as the population of the Village was increasing dramatically. For the Village, population growth has had some significant populations spikes between 1980 and 2010. For the trees, there is a fairly large portion of the tree population in the 1-12" DBH range, which at 1/2" growth per year on average, corresponds to around 5-25 years ago, or right around 1990 and later. The 2022 population is 9,062.

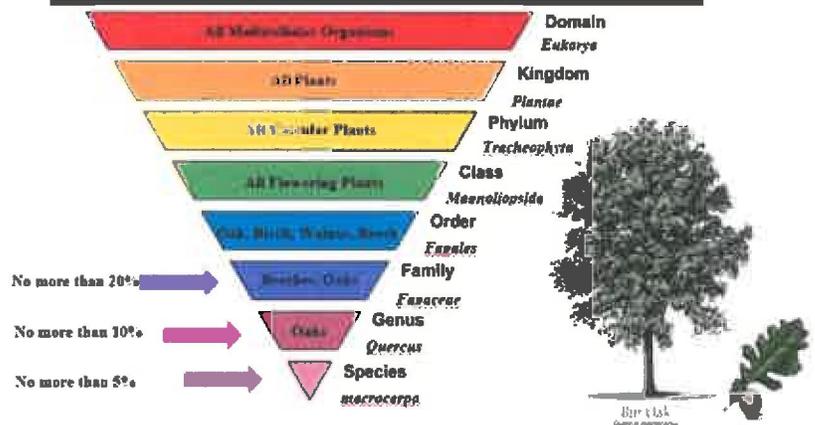
Year	Population
1950	100
1960	239
1970	339
1980	1,658
1990	4,423
2000	6,002
2010	7,663
2020	8,666

A goal of this plan will be to increase tree plantings in coming years to not only replace removed trees but grow the population as well.

Diversity Analysis

Taxonomy is the method by which scientists classify plants, animals, and other life forms into distinct categories. A species is unique. There is only one type in that category, such as Burr Oak (*Quercus macrocarpa*), which refers to only one specific type of tree. A genus, however, is a group that may contain multiple species. All Oak trees, for instance, are in the genus *Quercus*.

Taxonomy and the 20-10-5 Rule



The more similar tree species are to each other, the higher the likelihood that an insect or pathogen can exploit every species of that genus. Emerald Ash Borer is a classic example of this, as it affected every tree species in the ash genus. The most effective prevention of tree loss we have is to limit the number of trees planted that a new pest or pathogen can affect. While diversity at the species level is important, it is also important to achieve diversity on the genus and family levels.

The “20-10-5” rule for VHW’s future tree plantings is recommended, which states that no more than 20% of any one family, 10% of any one genus, and 5% of any one species shall be planted during any one single planting cycle. It will also be a long-term direct goal of the forestry program to have the tree population as a whole in compliance with the 20-10-5 Rule, although it may not be possible by the 2032 date used in this document. This level of taxonomic diversity is consistent with today’s arboricultural industry standards (see above graphic).

The old paradigm of urban forestry was to create landscapes in which every tree was the same type, shape, age, and height. This was thought to produce a uniform appearance. Urban foresters have since learned that once a pest or pathogen is introduced into a monoculture planting, an epicenter of infestation is created that may cause serious damage, both ecologically and financially. Diversity in the urban forest helps to prevent and reduce the impacts of pests and pathogens. There are three aspects of diversity in the urban forest. We will examine these in detail below.

Taxonomic (Species) Diversity

Why is it important to plant a diverse set of trees at the species, Genus, and Family levels? Simply put, it is to ensure that communities will not fall victim to mass tree loss from pests and pathogens in the future. The reason Emerald Ash Borer (EAB) was such a devastating expense for many organizations was because their tree populations were composed of over 20% Ash trees. When these trees died and had to be removed, those organizations lost 20% of their trees.

This comes with the obvious expenses of having to remove these trees and replace them. But it also comes with hidden expenses as well, namely the loss of the ecological services that those trees provided: Homes cost more to heat and cool, storm water infrastructure falls under heavier pressure, and increases in pollutants and greenhouse gases may be observed. For all these reasons, a more diverse group of trees needs to be planted, such that we are never at risk of losing more than 5-10% of our trees at any given time due to a pest or pathogen.

The diversity in Hawthorn Woods’s parks & facilities overall is moderate for a population its size, and dominated by Spruces and Maples, with Pines, Undesirable species, and Oaks representing the remaining top 5 species. This is not uncommon in park district settings, where the need for privacy and screening demands a high number of evergreens, and traditionally “urban tolerant” species such as Maples dominate. That said, having Oak appear in the top 5 most numerous on the species list is a desirable aspect, as a native Illinois species.

Spatial Diversity

Spatial diversity is the concept of mixing tree species over the whole geographic area. The easiest way to slow the spread of any new pest or pathogen is to increase the distance between potential host trees. Every pest or disease, such as EAB or Dutch Elm Disease (DED), has a limited area to which it can spread in a given time frame. The more difficult it is to get to the next host tree, the less of a problem the pest or pathogen becomes, and the easier quarantine becomes.

In addition to the functional benefits provided by increasing spatial diversity, organizations which have implemented diverse planting over the past several decades have demonstrated that such diversity yields an arboretum-like landscape that is both functional and aesthetically pleasing. At present, the Spatial Diversity in VHW is generally moderate. During the tree planting planning phase, care should be taken to ensure that new plantings are done in a manner that yields a spatially diverse tree population, and creation of areas of low spatial diversity (monocultures) will be avoided. The creation of the multilayered canopy discussed throughout is one such strategy.

Age-Class Diversity

Age-class diversity is also an important consideration. A healthy natural forest has trees of many ages. Young, intermediate, and mature trees allow for regeneration, replacement and vigor in the overall forest community. A mixture of tree species, locations, and ages will lead to great diversity, which insulates a natural forest against pest and pathogen outbreaks. The Urban Forest is no different. The old urban forestry paradigm promoted even-aged tree plantings, so that all trees were approximately the same size and age. However, once these trees begin to decline, most will require removal and replanting simultaneously. This can leave an entire street segment or neighborhood without shade and aesthetics for a long time.

The current approach of the urban forestry community is to strategically plant trees on streets or in neighborhoods over a longer timeframe. With this strategy, trees will grow to maturity in different stages, and decline at different times. When declining trees are eventually removed, there will always be a variety of age classes and tree sizes on a block or in a neighborhood. This reduces the pressure to plant trees in an area immediately after tree removal, helping to manage costs. A mixed age-class planting ensures that mature trees are always present in a neighborhood. It also will allow for strategic planting of smaller or medium sized trees.

An additional benefit of mixed-age plantings is the ability to plant shade-loving trees as well as sun-loving trees. When a street or neighborhood is newly planted with trees of the same age, all the trees are essentially in full sun. This reduces the ability to plant shade loving trees, as they have a tendency to dry out in the summer sun. With mixed-age stands, shade-tolerant, trees may be planted underneath the canopy of larger, mature trees. This approach will be used for future tree removal and replacement and help to create an Urban Forest that has mature trees, middle aged trees, and young trees in similar quantities.

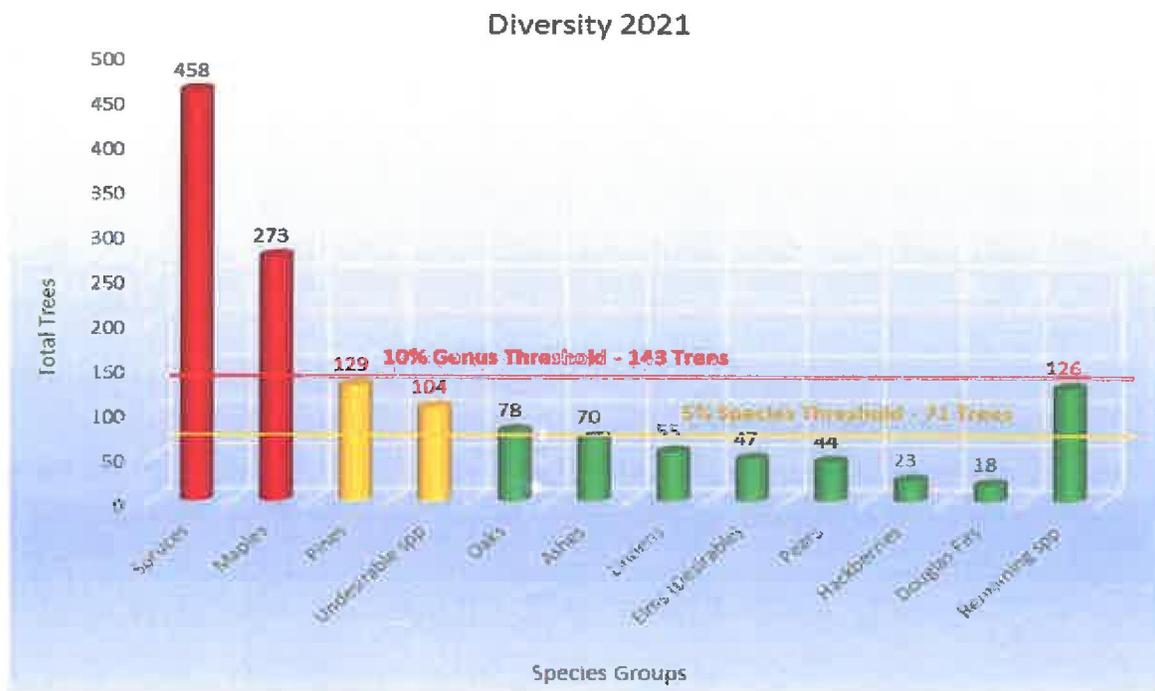
Current Tree Population

SPECIES	COUNT	% OF TOTAL	AVG DBH	AVG COND
ALDER-SPP	7	0.49%	26.00	1.29
ASH-BLACK	1	0.07%	18.00	5.00
ASH-SPP	68	4.77%	12.72	3.40
ASH-WHITE	1	0.07%	22.00	3.00
BALDCYPRESS	14	0.98%	3.07	3.00
BEECH-SPP	1	0.07%	8.00	3.00
BIRCH-RIVER	8	0.56%	7.75	2.88
BLACK LOCUST	1	0.07%	14.00	2.00
BOX ELDER	4	0.28%	12.75	3.25
CHERRY-SPP	1	0.07%	3.00	5.00
DOUGLAS FIR	18	1.26%	7.00	3.00
ELM-HYBRID	17	1.19%	2.88	3.00
ELM-SIBERIAN	7	0.49%	19.14	2.43
ELM-SPP	30	2.11%	11.00	3.13
GINKGO	4	0.28%	1.00	3.00
HACKBERRY	23	1.61%	3.35	3.00
HICKORY-BITTERNUT	2	0.14%	20.50	2.00
HICKORY-SHAGBARK	2	0.14%	2.00	3.00
HICKORY-SPP	3	0.21%	40.33	1.00
HONEYLOCUST	60	4.21%	9.35	2.70
HORSECHESTNUT	9	0.63%	2.78	3.00
JUNIPER-SPP	1	0.07%	3.00	3.00
KENTUCKY COFFEETREE	6	0.42%	3.83	3.17
LINDEN-AMERICAN	5	0.35%	4.00	3.00
LINDEN-LITTLELEAF	12	0.84%	3.00	3.00
LINDEN-SILVER	8	0.56%	1.38	3.63
LINDEN-SPP	30	2.11%	5.47	3.37
MAPLE-AMUR	10	0.70%	3.00	3.00
MAPLE-FREEMAN	21	1.47%	3.00	3.00
MAPLE-NORWAY	4	0.28%	13.50	2.25
MAPLE-RED	93	6.53%	4.82	3.15
MAPLE-SILVER	6	0.42%	16.17	2.00
MAPLE-SPP	131	9.19%	7.77	2.93
MAPLE-SUGAR	8	0.56%	3.00	3.00
OAK-RED	15	1.05%	18.67	1.93
OAK-SPP	39	2.74%	6.97	2.77
OAK-SWAMP WHITE	14	0.98%	3.36	3.00
OAK-WHITE	10	0.70%	3.50	3.00
PEAR-CALLERY	44	3.09%	5.89	3.02
PINE-AUSTRIAN	65	4.56%	9.11	2.28

VILLAGE OF HAWTHORN WOODS URBAN FORESTRY MANAGEMENT PLAN

PINE-MUGO	1	0.07%	3.00	3.00
PINE-SCOTCH	2	0.14%	2.00	3.00
PINE-WHITE	61	4.28%	5.52	2.90
POPLAR-SPP	2	0.14%	27.50	3.50
SPRUCE-BLACK HILLS	40	2.81%	4.40	3.00
SPRUCE-COLORADO	173	12.14%	4.66	3.14
SPRUCE-NORWAY	226	15.86%	5.82	2.69
SPRUCE-SERBIAN	19	1.33%	4.47	3.00
WALNUT-BLACK	5	0.35%	15.80	2.20
WILLOW-SPP	64	4.49%	10.30	2.61
WILLOW-WEeping	29	2.04%	4.07	3.00

The Village of Hawthorn Woods tree population consists of 51 distinct tree species, accounting for 1,425 total trees. The above table shows the percent of the total population each species makes up, as well as the percent of the total population each represents, average Condition, and average Trunk Diameter. To see which trees are performing well, we would look for trees with a Condition rating of less than 3, with a large DBH. This population is shown graphically on the following page:



The “20-10-5” rule has been adopted as a Best Management Practice in Urban Forestry. This rule simply states that a tree population should ideally have no more than 20% of any single Family, no more than 10% of any single Genus, and no more than 5% of any single species. As we have learned from EAB and Dutch Elm Disease, when a pest or pathogen that attacks specific tree genera is introduced into a region where those specific genera are overrepresented, tree populations can take a devastating hit. We have included 10% Genus threshold and 5% species threshold lines on the diversity analysis graph above.

Spruce species account for over 32% of VHW's tree population and Maples represent over 19%. It is quite common for Spruces and Maples species to be highly represented species in parks because Spruces are often used for screening and year-round greenery, and Maples are an adaptable and hardy tree. Blue Spruce trees are particularly susceptible to a number of pathogens and/or pests in our region and should be monitored for the presence or progression of these diseases or infestations.

It should generally be said that reducing the number of Spruces and Maples while increasing lesser represented species should be a strategic goal, and our Diversity Vision has accomplished this.

A long-term tree planting plan would be a valuable tool for VHW to pursue in the future. Such a plan would not only further improve overall diversity, but also maximize the lifespan of trees in the parks by carefully matching tree species requirements and tolerances with each individual planting site. Trees that are well adapted to their growing conditions will establish more quickly, require less maintenance, be healthier overall, and more resistant to disease and insect problems. By matching the right trees with the right planting spaces using a tree planting plan, the Village of Hawthorn Woods can help protect its investment in each new tree.

Going forward it is recommended that VHW sets a goal to limit any planting of Spruce and Maple species and to opt for improved varieties of these species when absolutely necessary. The "Undesirable" species group consists of tree species such as Boxelder, Willow, and Siberian Elm. These trees are known for either being invasive or weak-wooded trees that often develop a variety of structural defects as they mature. For safety, aesthetic, and ecological reasons, it is recommended that VHW set a goal of gradually reducing the number of undesirable trees in its parks and replanting them with a diverse set of tree species to increase overall diversity.

VHW has many species to choose from which are commercially available and currently underrepresented or not present in their population. As mentioned above, the Urban Forest Management Plan will lay out strategies to correct this imbalance, and we will examine the specific species recommended in the "Future of the Urban Forest" Section below.

iTree Report / Urban Tree Canopy Assessment

iTree is a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides Urban Forestry analysis and benefits assessment tools. The i-Tree tools help communities of all sizes to strengthen their forest management and advocacy efforts by quantifying the structure of trees and forests, and the environmental services that trees provide.

The iTree suite calculates hard dollar values that trees provide to communities. Trees provide "ecological services" that saves VHW money, such as in heating and cooling costs, where large trees help shade facilities in the summer, saving on air conditioning and electricity bills, and provide windbreaks during the winter, saving on heating and natural gas costs.

They also provide CO2 uptake, reducing the effects of climate change, as well as air quality improvements by the absorption of urban pollutants. Trees also absorb stormwater, which reduces strain on stormwater infrastructure, and saves money in replacement costs. Finally, trees contribute up to 15% of the total value of a property, so they have monetary aesthetic benefits as well.

Using the data from the tree inventory, several iTree reports have been prepared for the Village of Hawthorn Woods. Below you will find reports on the net annual benefits of the tree population, replacement values, and breakdown of benefits per species. We performed both the iTree Streets analysis which looks primarily at energy savings, and an iTree Eco analysis which focuses more on ecological benefits such as Carbon Storage and Sequestration. The results of these analyses are below, and full tables and iTree Reports are appended.

iTree Streets Analysis Results

Hawthorn Woods

Total Annual Benefits, Net Benefits, and Costs for Public Trees

7/8/2021

Benefits	Total (\$) Standard Error	\$/tree Standard Error	\$/capita Standard Error
Energy	5,491 (N/A)	3.85 (N/A)	0.61 (N/A)
CO2	1,235 (N/A)	0.87 (N/A)	0.14 (N/A)
Air Quality	1,290 (N/A)	0.91 (N/A)	0.14 (N/A)
Stormwater	52,764 (N/A)	37.03 (N/A)	5.86 (N/A)
Aesthetic/Other	163,604 (N/A)	114.81 (N/A)	18.18 (N/A)
Total Benefits	224,384 (N/A)	157.46 (N/A)	24.93 (N/A)

Total Standing Value of VHW's Tree Population

\$851,368

(Per CTLA's 9th Guide to Plant Appraisal)

iTree Eco Analysis Results

- Number of trees: 1,425
- Tree Cover: 8.562 acres
- Most common species of trees: Norway spruce, Blue spruce, maple spp
- Percentage of trees less than 6" (15.2 cm) diameter: 63.2%
- Pollution Removal: 447.9 pounds/year (\$647/year)
- Carbon Storage: 303.5 tons (\$51.8 thousand)
- Carbon Sequestration: 8.077 tons (\$1.38 thousand/year)
- Oxygen Production: 21.54 tons/year
- Avoided Runoff: 20.2 thousand cubic feet/year (\$1.35 thousand/year)
- Building energy savings: N/A – data not collected
- Avoided carbon emissions: N/A – data not collected
- Replacement values: \$762 thousand

Total Standing Eco Value of VHW Trees \$ \$813,800

Total Annual Eco Value of VHW Trees \$5,917/year

To summarize these values together, we have created the following summary table

Annual Values	
Benefits to Residents	\$224,384/year
Benefits to Environment	\$5,917/year
SUBTOTAL (Each Year)	\$230,301/Year
Standing Values	
As a Commodity	\$851,368
As an Ecological Resource	\$813,800
SUBTOTAL	\$1,665,168

As can be seen from the above tables, the tree population in Village of Hawthorn Woods currently provides approximately \$230,301 in benefits every year, directly related to trees and their effect on facilities and the environment. It should be noted that the annual budget for all forestry activities recommended in this plan total approximately \$50,000 per year, so the benefits from the tree population are worth nearly 5 times what the cost put into them is! We will examine this further below. In addition, the total standing value as a commodity and an ecological resource of the whole tree population is \$1,665,168.

These benefits can be viewed as income to Hawthorn Woods's residents, and so long as the trees are well maintained, they will continue to provide these benefits, and more as the tree population grows in size. As trees grow, they also increase their benefits! For example, a 3" diameter tree provides less than \$50/year in benefits, whereas a 20" tree can provide up to \$500 per year. The goal is to increase benefits even more, where the tree population pays for itself and even yields "profits"!

The replacement value of trees was also calculated. Currently, the standing value of all trees in Village of Hawthorn Woods population is \$851,368. This value is calculated using the industry standard reference, the *9th Edition Guide to Tree and Landscape Appraisal*, which is published by the Council of Tree and Landscape Appraisers.

The iTree Eco data looks at the value of the trees in the absence of the effect of homes or businesses, and looks at trees more from an ecological perspective, mostly what the tree's value is in sequestering and storing Carbon. These numbers are based on peer reviewed science in both Arboriculture as well as Climatology and other disciplines.

The goal of this Plan is to create a tree population which maximizes all of these ecological services to Hawthorn Woods residents by increasing the number of trees in the parks, and how long they live, while minimizing costs in order to create a healthy, well maintained, and vibrant tree population.

Urban Tree Canopy Assessment

Based on data available from the USDA Forest Service and Morton Arboretum, the total Urban Tree Canopy of Hawthorn Woods can be determined. This is expressed as the percent of the Village covered by tree canopy from an aerial view. This assessment included 7 total land cover types, including trees, grass and shrub, bare soil, water, buildings, roads/railroads, and other paved surfaces. The result of this tree canopy assessment was that Hawthorn Woods contains 29.11% total tree canopy. The map of the canopy assessment appears on the page after next.

The tree inventory itself was only conducted on publicly owned land in the parks themselves. Detailed information on each tree is not included in this assessment, only total coverage. Aerial images were used to estimate how much tree and other land cover types were in the Village using a software which is similar to Google Earth.

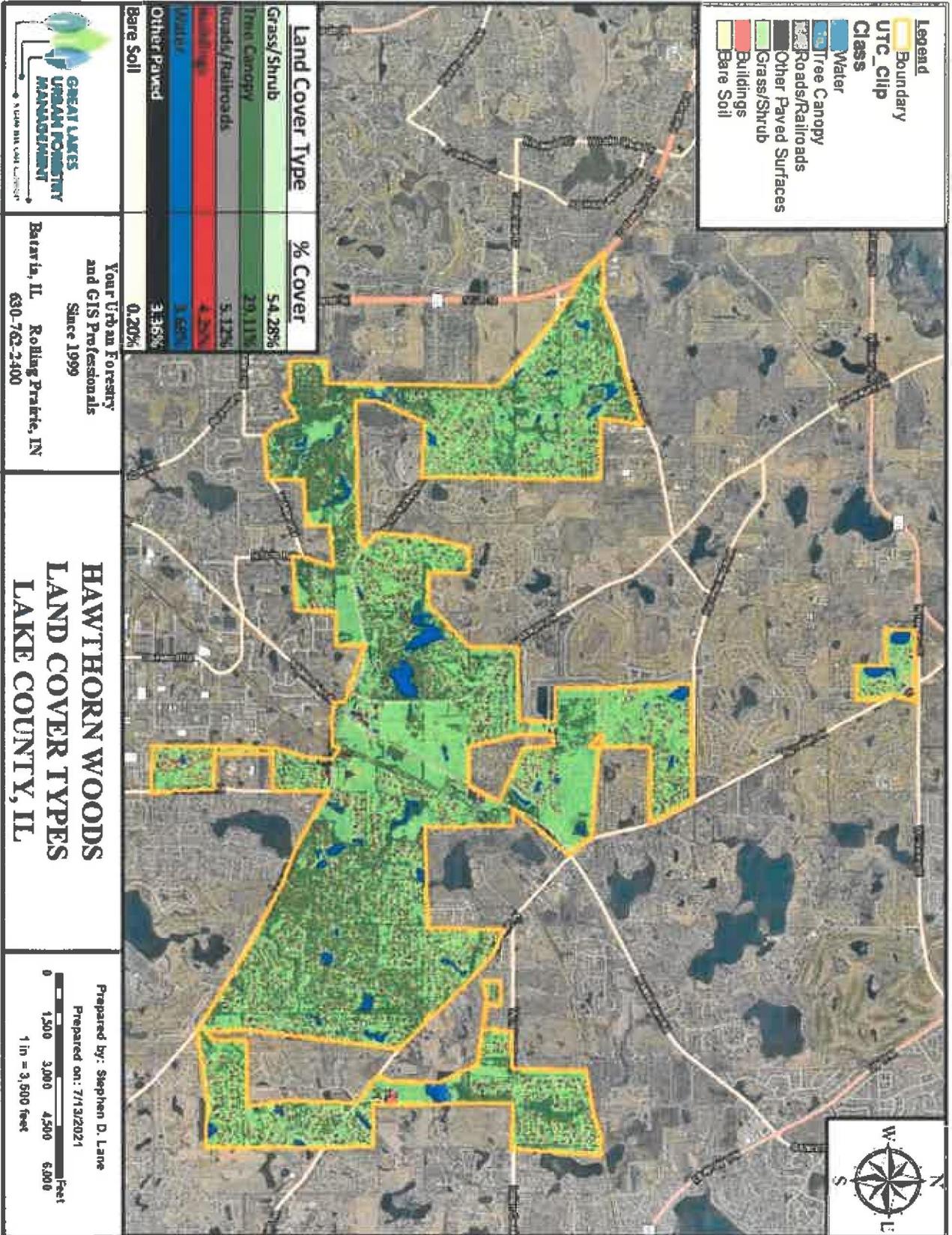
The goal is to increase the total tree canopy in Hawthorn Woods to 31% by 2032. This goal has been estimated by analyzing data from many different urban tree populations in the Chicago and Northwest Indiana regions, and is based on preliminary data from the Chicago Region Trees Initiative’s (CRTI) Forest Composition Workgroup. We believe this is an attainable goal over this time period. Hawthorn Woods has an overall moderate amount of tree canopy, comparable to other urban communities in the northeast Illinois region. Therefore the goal set is a rather modest increase, which will still yield beneficial results.

This will be accomplished through increasing the number of trees in the parks, municipal campuses, schools, and on the parkways. It will also be accomplished by maintaining the existing tree population in a proactive fashion, by enhancing the Urban Forestry program in VHW. This will ensure that existing trees will live longer as they are given appropriate care. Tree planting and maintenance will also be encouraged on private property, by incentivizing residents and business owners to plant trees through public private partnerships such as those outlines above.

As noted above, this effort will also involve the removal and replacement of some portions of existing canopy, namely where there are invasive species or aggressive native species such as Cottonwood, Buckthorn, Asian Honeysuckle, Boxelder, and other such trees. Replacement of these trees with desirable native species will be an important part of growing the canopy.

Outreach and education will also be provided to residents through events such as Arbor Day and Earth Day celebrations. This goal will be monitored by using aerial imagery analysis like the analysis presented below. Every 10 years, the imagery will be assessed, and a new canopy cover percentage will be calculated for Hawthorn Woods.

Land Cover Type	% Cover
Grass/Shrub	54.28%
Tree Canopy	29.11%
Roads/Railroads	5.12%
Buildings	4.25%
Water	3.68%
Other Paved	3.36%
Bare Soil	0.20%



The Future of the Urban Forest

In this section, a diversity vision of what the tree population of VHW could become by 2032 was created and compared with the current population. Using the tree data, and the diversity vision, we will then define how VHW can move to where it is envisioned it could be.

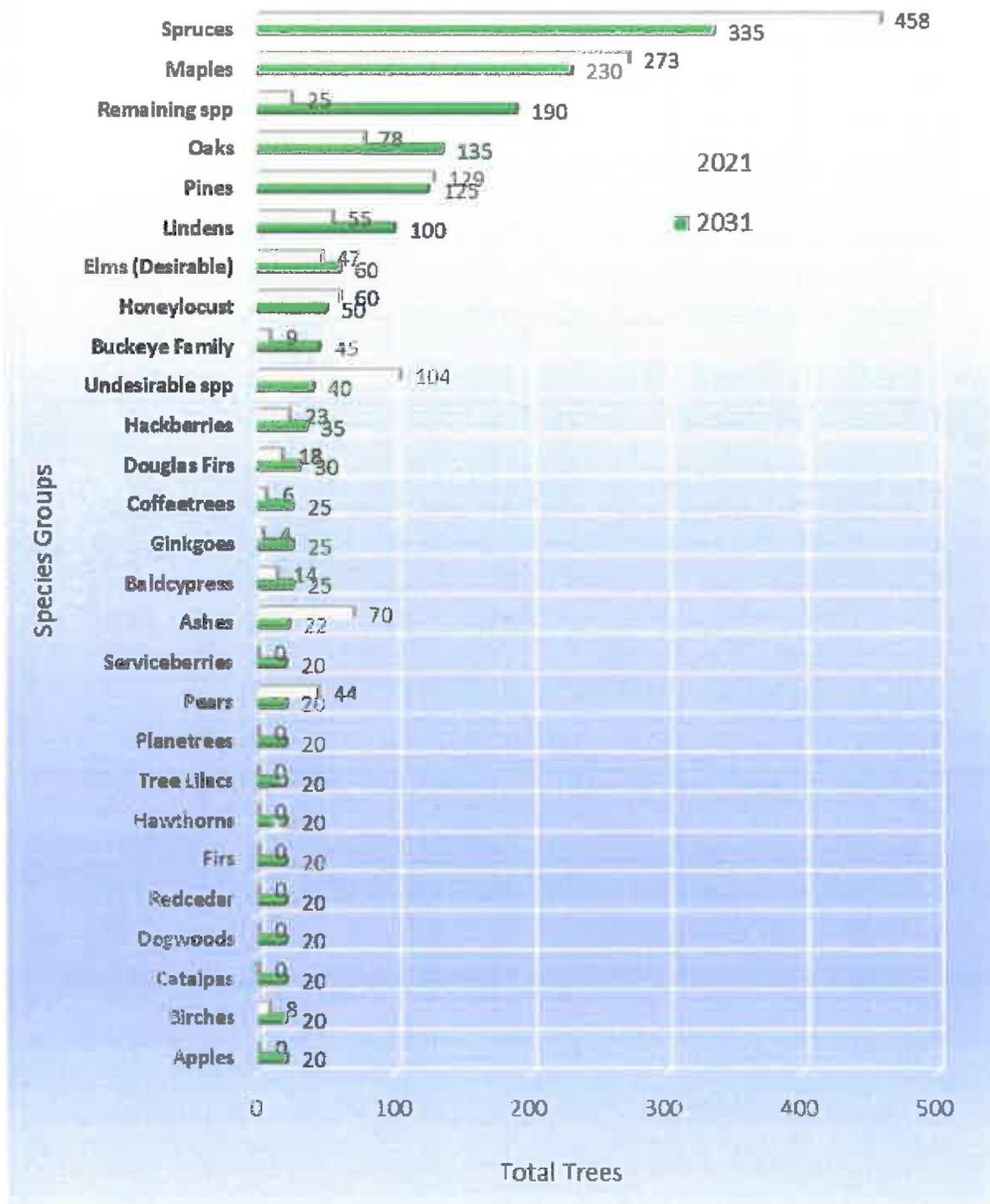
Change in Species Composition 2022 – 2032

The full calculations for this change in diversity were performed by hand, not using automated software. Local knowledge of the trees, their conditions, what is growing well and what isn't were all used and yielded this very customized forest composition change list. These goals are meant as general guideposts, and not absolutes. Please be aware that this plan, and particularly the species composition goals, are meant to be adaptively managed over time, and as new information becomes available.

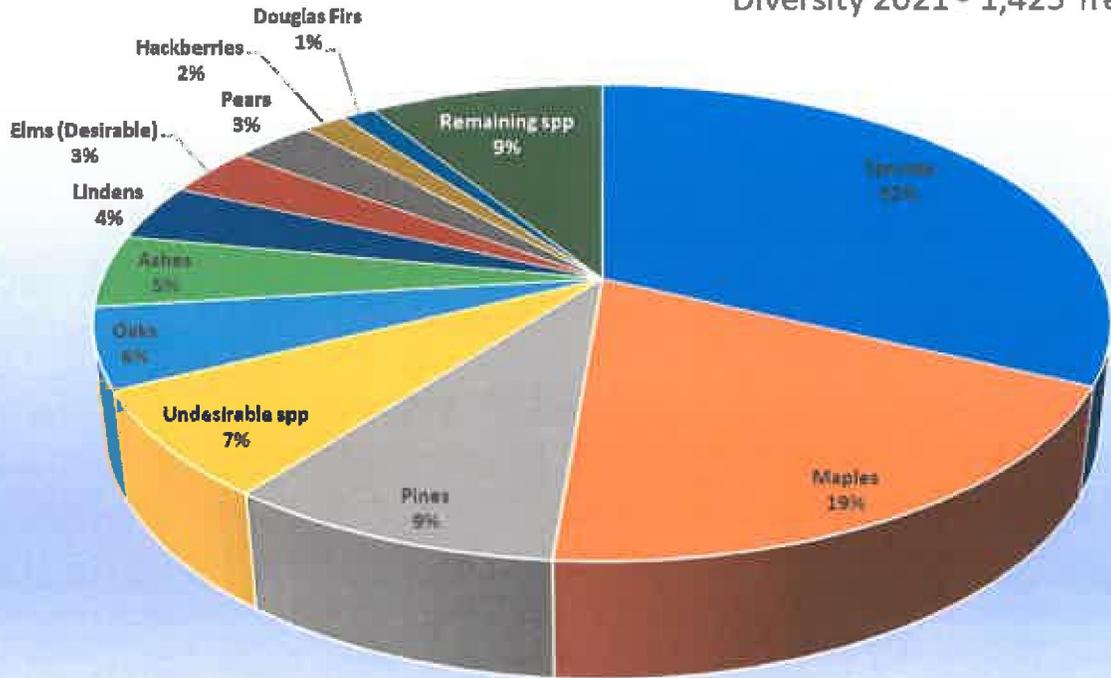
SPECIES	COUNT 2021	COUNT 2031	SPECIES	COUNT 2021	COUNT 2031	SPECIES	COUNT 2021	COUNT 2031
SPRUCE-NORWAY	226	150	LINDEN-SILVER	8	15	BUCKEYE-YELLOW	0	10
SPRUCE-COLORADO	173	125	MAPLE-SUGAR	8	15	CATALPA	0	20
MAPLE-SPP	131	100	ALDER-SPP	7	15	DAWN REDWOOD	0	5
MAPLE-RED	93	70	ELM-SIBERIAN	7	0	DOGWOOD-CORNELIAN	0	10
ASH-SPP	68	20	KENTUCKY COFFEETREE	6	25	DOGWOOD-SPP	0	10
PINE-AUSTRIAN	65	40	MAPLE-SILVER	6	5	EASTERN REDCEDAR	0	20
WILLOW-SPP	64	20	LINDEN-AMERICAN	5	25	FIR-CONCOLOR	0	20
PINE-WHITE	61	40	WALNUT-BLACK	5	5	HAWTHORN-COCKSPUR	0	10
HONEYLOCUST	60	50	BOX ELDER	4	0	HAWTHORN-SPP	0	10
PEAR-CALLERY	44	20	GINKGO	4	25	HORNBEAM-AMERICAN	0	10
SPRUCE-BLACK HILLS	40	30	MAPLE-NORWAY	4	5	HORNBEAM-EUROPEAN	0	5
OAK-SPP	39	45	HICKORY-SPP	3	5	IRONWOOD	0	10
ELM-SPP	30	20	HICKORY-BITTERNUT	2	5	KATSURATREE	0	5
LINDEN-SPP	30	30	HICKORY-SHAGBARK	2	5	LILAC-TREE	0	20
WILLOW-WEeping	29	20	PINE-SCOTCH	2	20	LONDON PLANETREE	0	20
HACKBERRY	23	35	POPLAR-SPP	2	5	MAGNOLIA-CUCUMBER	0	5
MAPLE-FREEMAN	21	25	ASH-BLACK	1	1	MAGNOLIA-SaucER	0	5
SPRUCE-SERBIAN	19	30	ASH-WHITE	1	1	OAK-CHINQUAPIN	0	10
DOUGLAS FIR	18	30	BEECH-SPP	1	10	OAK-SHINGLE	0	10
ELM-HYBRID	17	40	BLACK LOCUST	1	5	PERSIAN IRONWOOD	0	5
OAK-RED	15	25	CHERRY-SPP	1	5	PINE-LAMBER	0	20
BALDCYPRESS	14	25	JUNIPER-SPP	1	10	REDBUD	0	10
OAK-SWAMP WHITE	14	25	PINE-MUGO	1	5	SERVICEBERRY-SPP	0	20
LINDEN-LITTLELEAF	12	30	APPLE-CRAB	0	20	SWEETGUM	0	10
MAPLE-AMUR	10	10	BLACKGUM	0	10	TULIPTREE	0	10
OAK-WHITE	10	20	BUCKEYE-OHIO	0	10	WITCH HAZEL	0	10
HORSECHESTNUT	9	15	BUCKEYE-RED	0	10	YELLOWWOOD	0	10
BIRCH-RIVER	8	20				ZELKOVA	0	10

	Plant in Abundance
	Plant in Limited Quantities
	Maintain Existing Population
	Reduce Population Size

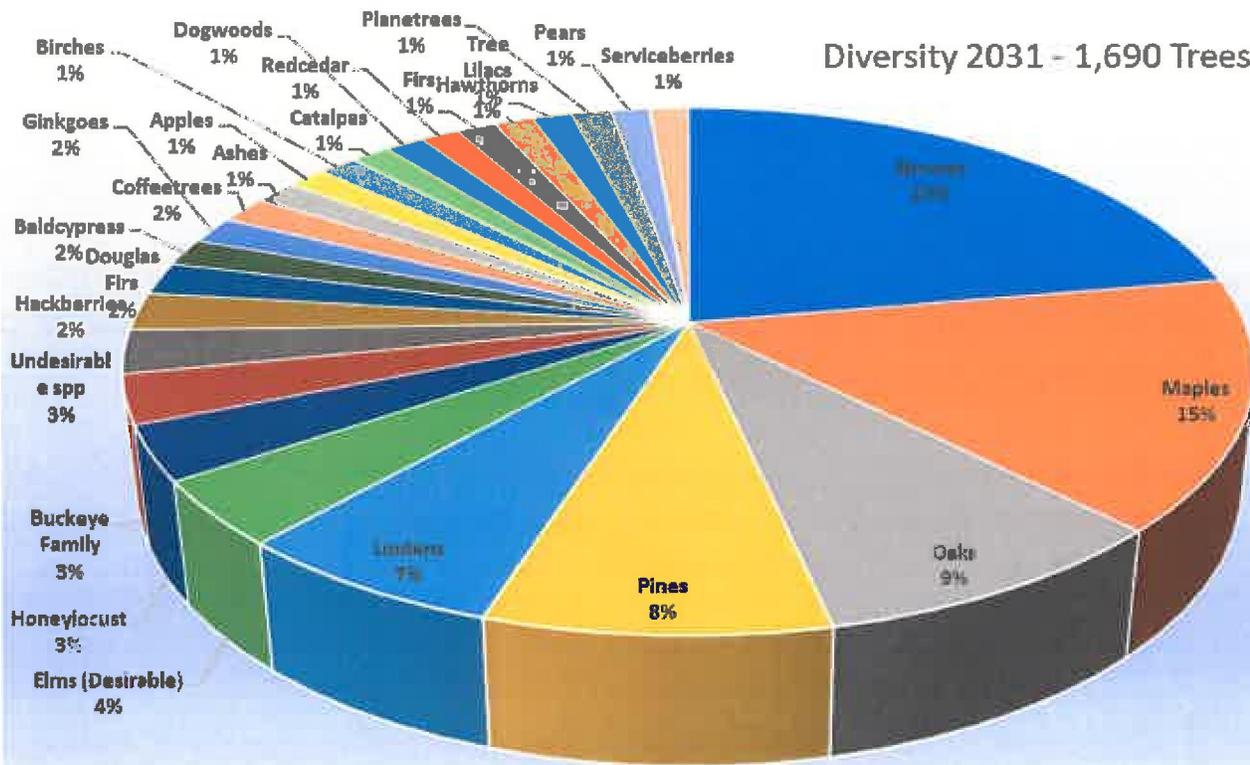
Diversity 2021 vs 2031



Diversity 2021 - 1,425 Trees



Diversity 2031 - 1,690 Trees



As can be seen from the above several pages of charts showing the change in species composition over the next 10 years, there will broadly be a move away from the overrepresented and overplanted species discussed above, and a variety of new species, and those which are underrepresented. This will lead to an increase from 1,425 to 1,690 trees total in the parks by creating a multilayered canopy, as well as an increase from the current total of 51 species up to a total of 81 species, or an increase of approximately 60% in overall species diversity. This will also create a more diverse Urban Forest which is resistant to pest and pathogen outbreaks by not relying on only a few species with which to fill its parks.

The Benefits of Larger, Healthier Trees

Larger trees provide greater benefits to the community: They create more shade to offset cooling costs, absorb more storm water, create greater buffers against cool winter winds for heating costs, and absorb and sequester more carbon than smaller trees do. For the 2032 vision of the tree population, a variety of methods were used to arrive at a reasonable age-class distribution. We used the current population structure and anticipated high rates of survival based on new planting practices which would involve a “right tree/right site” approach, as well as increased survivorship of existing trees due to better management and care practices. Predicted growth, survivorship, and eventual tree losses are based on current species composition and future plantings and removals. This allowed the creation of a vision of what the tree population will look like 10 years from now.

Tree Size Comparison: 2021-2031



It can be seen from the above chart that the existing tree population (grey bars) shows what was described as a younger to middle aged tree population with the 1-6" and the 7-12" categories making almost 87% of the population. The projected age class chart shows uptick in the number of middle aged to older trees in the population, due to increased maintenance and levels of care which will allow more trees to survive into the older age classes, where they will provide the greatest benefits in terms of ecological services to the community.

	2021	2026	2031
0-6"	901	825	500
7-12"	345	600	600
13-18"	113	200	350
19-24"	45	75	150
25-30"	15	30	50
31-36"	3	7	20
37-42"	1	2	5
>42"	2	1	5

The table in the upper right of this page shows a general expectation of how the changes in tree diameters might change over the next 10 years based on the methods to be applied in this Urban Forestry Management Plan. These numbers were projected by hand, based on our prior experience, and the methods detailed below. If these projections hold, VHW could see a 38% increase in annual benefits of \$88,677 for a total of \$318,968. Standing values of the tree population could increase from their current level of \$1,665,168 to approximately \$2,691,859 as these trees age and provide even greater benefits to the community.

For projections of future age classes of trees, a ½" per year average growth rate was roughly estimated by assuming that it would take an average tree 10 years to go from one age class to the next (6" = appx 10 years growth). Also used were the number of trees to be planted and removed annually, as calculated below in the Tree Planting and Tree Removal sections. These numbers were arrived at based on all the above, as well as the best professional opinion of the Forestry Consultant. As time goes by, these projections will likely change.

The overall increase in size of the tree population and diameters of the individual trees will yield a much greater dollar figure when it comes to the ecological services provided and provide residents with a greater sense of being in a more arboretum like setting.

Ecological and Social Services Provided by Trees:

Energy Savings: During the summer when temperatures are warm, trees create shade, and temperatures are cooler in the shade. Cooler temperatures cause air conditioners to have to work less, which reduces the amount of energy a household uses. During the winter when temperatures are cold, winter winds cool your home quickly. Trees act as windbreaks, causing heating systems to use less natural gas, saving energy and money.

Carbon Dioxide (CO2): The amount of CO2 which is put into the atmosphere each year has a direct correlation with global climate change. That change causes more severe storms, greater drought conditions, and many other costly outcomes. Reducing CO2 from our atmosphere lessens these effects. Trees uptake CO2 and act as a carbon sink, putting carbon into long term storage in its woody tissues, removing it from our atmosphere, creating a net benefit to society, and saving money.

Air Quality: Industrial processes and vehicle emissions put pollutants into our air. These pollutants can cause or worsen health conditions such as heart disease, asthma, and lung disease. In addition, these pollutants can mix with water in the atmosphere and create nitric and sulfuric acid, causing acid rain, which can destroy fisheries and contaminate water supplies. Trees absorb these compounds with their leaves and other tissues and prevent them from remaining in the atmosphere. Reductions in these pollutants results in overall better health, reducing the cost of healthcare to society, and saving communities money.

Storm water: The cost of delivering fresh water to homes, as well as removing and treating wastewater and storm water is considerable. One of the greatest costs comes when these systems are overwhelmed, such as during flooding, which can cause millions of dollars of damage to homes and vehicles, or when these systems need to be replaced. Fortunately, trees take water from the soil and put it back into the atmosphere through the process of transpiration. Therefore, the more trees an organization has, the less flooding is an issue, and the less strain is put on storm water infrastructure, resulting in fewer repairs and replacements. In addition, tree canopy slows rainfall’s effects on flooding by “intercepting” it with leaves and branches, delaying how quickly rainfall can become floodwater. All of this adds up to savings for an organization.

Aesthetic/Other: up to 15% of the value of a property can be attributed to its trees and other landscaping. Tree lined streets are much more appealing to homebuyers than streets devoid of trees, resulting in increased home sales, and therefore increased tax revenue, or increased tax revenue with which to fund initiatives relating to trees, attract new businesses, etc.

Health, Safety, and Learning: There have been many studies linking increases in the amount of tree cover and greenspace overall to increases in the ability of students to learn and focus when compared to environments where there is a great deal of hardscape. There have also been studies showing a strong link between increases in greenspace and reduced incidence of mental disorders, heart disease, lung disease, and certain cancers. Finally, there are many studies showing that increased tree planting leads to reductions in crime rates. All in all, trees have many social benefits as well!

Return on Investment

Return On Investment (ROI) for an individual tree is strongly favorable over the life of a tree in terms of investment in planting, care, and removal versus the ecological benefits the tree provides. As we justify expenditures on tree care, it is important that organizations are aware of this. On the following page is an ROI calculation. This breaks the tree’s lifetime into three phases, based on the anticipated costs in the budgets sections below. These phases are the young (3-12” DBH), mature (13-24” DBH), and full grown (25-36”). The iTREE algorithm was applied towards the average benefits provided by a tree at each life stage, and multiplied over that 20 year period. We also looked at costs for planting, watering, routine and emergency maintenance, and eventual removal of that tree over 60 years.

Total Investment	\$3,610.00
Total Return	\$10,819.60
Total ROI Over 60 Years	199.71%

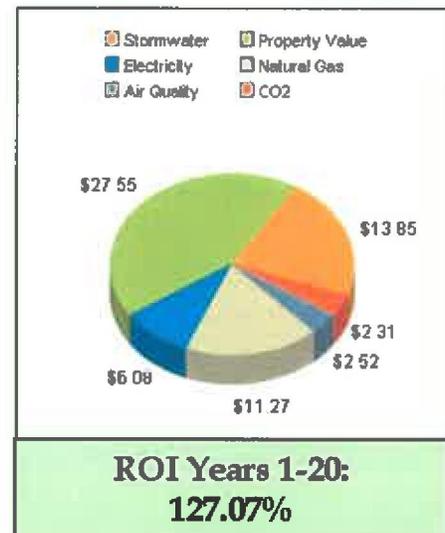
VILLAGE OF HAWTHORN WOODS URBAN FORESTRY MANAGEMENT PLAN

Return on Investment: Years 1-20 (3-12" Diameter)

Costs

Initial Purchase and Installation	\$300.00
Watering for 2 Years	\$100.00
Pruning - 4x @ \$40/prune	\$160.00
TOTAL INVESTMENT	\$560.00

Benefits	Avg/Year	Over 20 Years
Electricity	\$6.08	\$121.60
Natural Gas	\$11.27	\$225.40
Property Value	\$27.55	\$551.00
Stormwater	\$13.85	\$277.00
Air Quality	\$2.52	\$50.40
CO2 Reduction	\$2.31	\$46.20
TOTAL RETURN		\$1,271.60

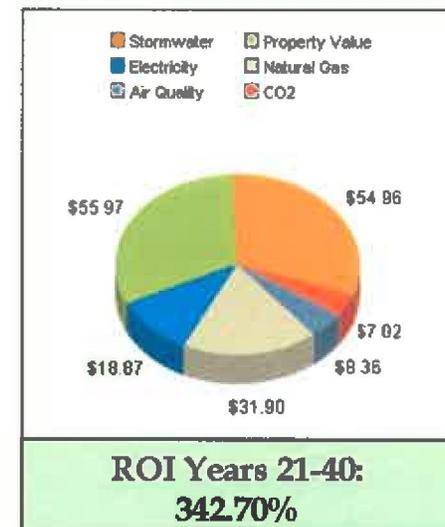


Return on Investment: Years 21-40 (13-24" Diameter)

Costs

Pruning - 4x @ \$75/prune	\$300.00
Emergency Maintenance (2x)	\$500.00
TOTAL INVESTMENT	\$800.00

Benefits	Avg/Year	Over 20 Years
Electricity	\$18.87	\$377.40
Natural Gas	\$31.90	\$638.00
Property Value	\$55.97	\$1,119.40
Stormwater	\$54.96	\$1,099.20
Air Quality	\$8.36	\$167.20
CO2 Reduction	\$7.02	\$140.40
TOTAL RETURN		\$3,541.60

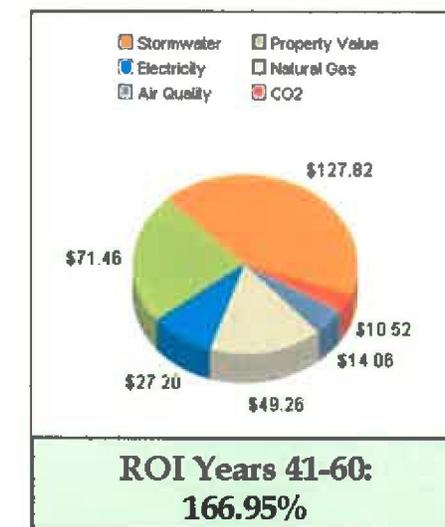


Return on Investment: Years 41-60 (25-36" Diameter)

Costs

Pruning - 4x @ \$150/prune	\$600.00
Emergency Maintenance (2x)	\$650.00
Eventual Cost of Removal	\$1,000.00
TOTAL INVESTMENT	\$2,250.00

Benefits	Avg/Year	Over 20 Years
Electricity	\$27.20	\$544.00
Natural Gas	\$49.26	\$985.20
Property Value	\$71.46	\$1,429.20
Stormwater	\$127.82	\$2,556.40
Air Quality	\$14.06	\$281.20
CO2 Reduction	\$10.52	\$210.40
TOTAL RETURN		\$6,006.40



Tree Removals

The first step towards attaining VHW’s forestry goals will be to remove trees which are diseased, dying, or present a hazard. At present, there is no existing inventory data on how many trees require removal, but based on similar tree populations, and the condition ratings and DBH’s trees were given during the inventory, we anticipate that approximately 30 trees will require a priority removal (within the next year), 35 trees will require standard removal within the next 2 years, and 40 trees will require a lower priority of removal for nonthreatening conditions within the next 3 years.

After this initial 3-year period, in order to attain the goals set forth in the Diversity Standards, the background rate of tree removal will be approximately 60 trees per year by 2032. From 2025 forward, reevaluation of the tree population on an annual or semiannual basis by the Village Forester or Forestry Consultant will specify which trees require removal. These numbers, detailed below, are meant to be placeholders for budget calculations and diversity standards. This does not require that 60 trees be removed each year, this is simply a projection based on the existing inventory data.

This may sound like a lot of trees, but primarily these will be failed new plantings after a certain point, as well as undesirable or weak wooded species such as Silver Maple, Cottonwood, etc. Though these trees may not pose an immediate threat, they are generally undesirable and can be susceptible to storm damage. As they are removed and replaced, eventually it is expected that the number of removals annually will taper off.

For purposes of projection, costs have been estimated using a rate of \$25/diameter inch for tree removal and stump grinding, which is a conservative estimate based on current market pricing. Rates could certainly be found lower than this in a competitive bid process or using in-house labor. As is the case with all cost projections for this Plan, no cost increase is assumed for the first 5 years, and a 3% annual cost increase is assumed thereafter. This is also a conservative estimate based on the Consumer Price Index, and actual costs are likely to be lower than projected.

Milestones	2022	2023	2024	2025	2026	2027-2032
Trees Removed	30	35	40	45	50	60/year avg
Diameter Inches	210"	245"	280"	315"	350"	375"/year avg
Notes	High Priority Removals	Standard Removals	Lower Priority Removals	Update Inventory for New Removals	Update Inventory for New Removals	Update Inventory for New Removals
Removal Cost (2021)	\$5,250	\$6,125	\$7,000	\$7,875	\$8,750	\$9,375
Removal Cost (CPI)	\$5,250	\$6,125	\$7,000	\$7,875	\$8,750	\$10,781

This same process was also used for the remainder of the trees which were marked for removal. Using this data, cost estimates were prepared for the long-term removals, based on the tree inventory data. As this is a program to be adaptively managed, these budget tables can be revisited periodically to reflect actual costs being paid.

Tree Removal Activities

Safe Removal of a Tree to an Appropriate Flush Cut

Tree removal can be dangerous, but when performed by professionals is very safe. Therefore, all tree removal activities on VHW's property should be performed under the guidance of a Certified Arborist or Arborist Trainee. This may be the supervision of VHW staff or the Forestry Consultant alongside a contractor. The safe removal of a tree involves the safe removal and lowering of all portions of the tree according to all relevant ANSI standards and Best Management Practices. The stump must be flush cut such that the highest portion of the cut is no greater than two inches from the highest part of the ground surface to prevent a tripping hazard on public property.

Stump Grinding

Within a reasonable amount of time following the removal, stumps and surface roots should be removed using an approved stump grinding machine, such that the stump is ground to a minimum depth of 6 inches, and no surface roots are visible. If the site is to be planted with a new tree, that depth should be increased to 12 inches below the soil surface. This will ensure that a new tree may be successfully planted, and that no re-sprouting will occur from the old stump. The depths to which the stump must be ground may be altered by the VHW depending on needs for specific circumstances or contracts. Until the planting space is fully restored, the stump hole should be filled and compacted to ground level using the debris resulting from the stump removal.

Planting Site Restoration

Once the tree has been safely removed and the stump has been ground out, the open planting space must be fully restored if a tree is not scheduled to be planted in or adjacent to the old hole. Site restoration consists of removing the stump chips from the hole, filling it with a quality mineral topsoil, tamping down to match the surrounding grade, spreading grass seed over the top of the topsoil, and securing green turf blanket over the topsoil. This will ensure that grass grows to restore the aesthetics and function of the old site and prevents tripping hazards from the removal scar.

Reasons for Tree Removal

Removal of trees on public spaces is an unavoidable reality of managing large tree populations. When the trunk, branches or roots fail, a standing tree can cause personal injury or property damage, and even small dead trees can be an eyesore. Old trees can hold great sentimental value, and many people become attached to them. However, there are times when their presence creates a public hazard, and it is at those times that action must be taken to ensure public safety. It is also important to remember that the removal of a tree today is the promise of a new tree for tomorrow!

Removal of trees on VHW property shall always be at the discretion of VHW staff and/or the Forestry Consultant. Trees will never be removed without a sound reason from VHW or Forestry Consultant. Neighboring residents and concerned park patrons may request a tree to be removed for reasons NOT detailed below, and these requests will be reviewed by VHW staff, the Board of Trustees, or the Forestry Consultant.

Generally speaking, however, trees with a greater need for removal based on public safety will always hold a higher priority. Under no circumstances will VHW be responsible for trees which are not on park property, with the exception of pruning potentially hazardous limbs overhanging park property.

Dead or Dying

If a tree is biologically dead or nearly dead, it will require removal. Trees which are standing dead, have approximately 50% dead crown or greater, or have less than approximately 40% structurally sound wood in the cross-section of the trunk shall be removed as expediently as practical. These determinations shall be at the discretion of VHW staff or the Forestry Consultant.

Diseased or Infested

Diseases are caused by viral, fungal, or bacterial pathogens. Infestations are caused by insects or other small animals. Dutch Elm Disease and Oak Wilt, for example, are fungal diseases that kill Elm and Oak trees when they are infected. Emerald Ash Borer is an insect which kills Ash trees by infesting them. The prompt removal of diseased or infested trees limits the exposure of other nearby trees. The removal of 1 tree may save dozens of others. Trees deemed to be diseased or infested by VHW staff or the Forestry Consultant shall be removed as expediently as possible in order to slow the spread of such insects and diseases.

High or Extreme Risk

“Tree Risk” is the potential of a tree or tree part to impact a nearby person or piece of property and cause property damage or personal injury. This topic is of great interest in Arboriculture today, and the insurance industry is becoming increasingly involved in the process of assessing and managing the risk posed by trees. Litigation involving trees is a perennial concern for public entities. All trees in VHW were assessed for a basic level of risk during the initial inventory, and several trees were found to be at elevated risk levels. If such risk can only be safely mitigated by tree removal, as opposed to pruning or other measures, then timely removal is critical because of potential exposure of the public or property to potential harm.

VHW staff, the Forestry Consultant or another TRAQ Qualified Risk Assessor must assess the tree and prepare a Tree Risk Assessment Report to document the details of the situation prior to removal. Often, risk can be mitigated by removing a portion of the tree, or other corrective measures. If the entire tree is deemed to be at high or extreme risk of failure, however, the entire tree shall be removed as a means of reducing its residual risk to zero.



Emergency / Storm Damage Removals

A tree shall be removed if it has been severely damaged and/or compromised by lightning, wind, or other such weather event. "Storm-damaged" shall be generally defined as a tree which has lost 33% or more of its crown, has a large crack or other wound in the trunk, has a lean of greater than ten degrees from vertical resulting directly from strong winds, has sustained a lightning strike, or other such issues directly related to storm events. VHW staff or the Forestry Consultant shall determine the need for removal of a tree in these cases. Though in emergency situations such as a tree impacting a person, vehicle, power lines, or other such emergency, VHW may perform any actions necessary to abate public hazards so long as they are in compliance with all relevant Arboricultural standards and practices.

Damage from Construction or Vehicle Strike

VHW staff or Forestry Consultant shall assess trees that have been impacted by a vehicle strike or piece of construction equipment. If the tree has suffered physical damage or extreme root compaction and is likely to decline and become high risk, it will be scheduled for removal in order to maintain public safety. That decision will be based on the best professional judgement of the Forestry Consultant or VHW staff.

Reasonable Resident Request

If a tree has non-terminal pest or pathogen issues, moderately poor structure or is in somewhat poor condition, a concerned resident or park patron may request the removal of the tree. These requests will be reviewed by VHW staff and/or the Forestry Consultant and evaluated on a case-by-case basis. If the tree shows significant potential to decline or pose a threat, VHW may agree to the removal within a reasonable time frame. Young and healthy trees will generally not be considered eligible. Priority will always be given to trees in danger of threatening public safety.

Interference with Utility or Signage

A tree shall be removed if it is interfering with the function or visibility of official traffic control devices or has impacted above or belowground utilities in a manner that cannot be mitigated by pruning or other measures. In these cases, it is likely that no new tree will be planted in these sites.

Overplanted and Underperforming

No healthy tree shall be removed for the sole reason of having been overplanted. As a result of this Plan, VHW will be enhancing diversity in the urban forest, with the goal of building a diverse urban forest. Overplanted species listed as being in poor condition will be reviewed to assess further decline or recovery. Those trees in noticeable decline shall be removed at the discretion of VHW staff and/or the Forestry Consultant. This will be used as a preventative measure so that these trees do not continue to decline to a point where they become hazardous, and not used as a reason to remove an otherwise healthy tree.

Local VHW Tree Removal Requirements and Standards

All of the following requirements and standards shall be met during tree removal activities as matter of local policy. For a detailed view of the specific ANSI and ISA standards, please see Appendix H.

Village of Hawthorn Woods Internal Policies

1. All personnel directly involved with process of chainsaw operation, climbing, bucket truck operation, and rigging limbs shall be provided with sufficient training and experience to perform such duties while employed by Village of Hawthorn Woods, as either grounds maintenance, or performing work as a contractor employed by VHW.
2. Only qualified utility arborists may perform tree removal operations within ten feet of an electric utility line. VHW employees or contractors may complete the process of trunk removal and stump grinding only if the remaining portion of the tree is greater than ten feet away from a transmission line.
3. VHW will not remove healthy trees in order to meet diversity goals, unless the tree poses a risk to persons or property.
4. VHW shall not perform or assist, programmatically or financially, with the removal of trees on private property. Public/Private tree ownership is defined as having 51% or greater of its trunk diameter on park property. Limbs overhanging park property may be pruned back to the property line with adjacent properties

Tree Planting

Whereas tree removal is necessary to promote public safety, planting of new trees must happen in order to increase our diversity and canopy cover. At present, VHW has many open planting spaces on its properties. As a means of attaining the goals of increasing canopy cover to 31%, and increasing overall diversity significantly, this plan calls for the planting of nearly 850 trees over the coming 10 years. These trees will be planted by Village staff, contractors, and possibly even volunteers who have been properly trained. This plan has a direct goal of planting trees where they have the best chances to establish and thrive based on their specific sites and species requirements.

For the goals and milestones shown below, the program began with being able to at least replace 105 trees called out for removal above. After completing this, a gradual 10 trees planted per year increase is called for. After approximately 5 years, plantings begin to outpace removals in this plan.

For the costs of planting, \$300 per tree (installed) has been used. This is a conservative estimate based on retail costs, and likely the Village will be able to perform planting at a more favorable rate. If volunteer labor is employed, and smaller trees planted, these costs could reduce significantly. Some of the strategic partners listed above may also be able to reduce costs significantly through volunteerism.

VILLAGE OF HAWTHORN WOODS URBAN FORESTRY MANAGEMENT PLAN

Milestones	2021	2022	2023	2024	2025	2026-2031
Trees Planted	400	450	500	550	600	600/year avg
Planting Cost (2021)	\$120,000	\$135,000	\$150,000	\$165,000	\$180,000	\$180,000
Planting Cost (CPI)	\$120,000	\$135,000	\$150,000	\$165,000	\$180,000	\$207,000

The Importance of Planning Your Tree Planting

The Right Tree in the Right Site

Urban Forestry has an unfortunate history of not planning carefully for tree planting. Whatever was readily available, inexpensive, urban tolerant, and grew fast was seen as desirable, and often planning of tree plantings was left to developers, or nurseries and plantsmen. With our history of invasive insects and diseases in the Midwest region and knowing these will only get worse in the future, it is more crucial than ever that we have a process to plan our tree plantings.

This process should involve assessing each site to be planted in much the same way we would assess a tree, except that in this case, we look for factors such as available above and below ground growing space, how much light the site receives, amount of soil moisture present, and possibly other factors such as soil pH and texture. Once this information is collected, planting sites can be matched with trees which are well suited to those sites. Matching the right tree to the right site like this will result in trees which establish faster, grow more vigorously, live longer, and provide far greater benefits. Even a simpler version of this process is better than nothing.

Playing an active role in tree planting planning also allows for meeting diversity standards such as the taxonomic, spatial, and age class diversity principles outlined above, and attempts to get the tree population into compliance with the "20-10-5 Rule". Parks departments have a distinct advantage here over street tree populations, as trees can be planted nearly anywhere vs needing to replace a tree very close to the removal site of an old tree on the parkway. Being targeted about species selection also allows the use of species which are slightly more difficult to find appropriate sites for. These species that are considered "less urban tolerant" can be planted when the appropriate site is found!

The success of a tree depends on where and how it is planted. VHW staff or the Urban Forestry Consultant should assess planting sites before trees are purchased and installed each year, to ensure the correct tree is being planted for the correct site. Each tree planted represents a 25-75+ year commitment, and this planning helps to increase the benefits to the community from this commitment. A list of acceptable species to be planted appears in Appendix A.

Nursery Stock Procurement

Nursery stock quality is yet another aspect of planning which can help a tree establish, survive, and thrive to provide great benefits to the community. VHW staff or the Urban Forestry consultant should inspect and select every tree which is to be planted on park property to minimize the possibility of installing lower quality nursery stock. Specifications should be for material no smaller than 1.75" caliper, with good form for the species, planted as either balled and burlapped or minimum 5-gallon containerized stock.

Currently, the nursery industry is recovering from a nursery stock shortage due to high demand to replace Ash trees lost to Emerald Ash Borer, which impacted the availability of some species. We strongly recommend to not accept substitutions in the requested species lists, as many nurseries may still attempt to substitute overplanted trees for some of the higher diversity species which may still be difficult to obtain. It is recommended to have an approved substitution prepared for each requested tree species.

Tree Transport and Planting

Proper transport and planting procedures determine a tree's success after planting. Even healthy trees from the field, if improperly transported, may dry out during transport, or suffer structural damage to root balls.



When it comes time to plant, trees planted too deeply will suffer from root compaction and trunk decay. Trees planted without properly dug holes may suffer from stunting. Trees planted without proper removal of packaging materials may develop girdling roots. Trees planted too high may have surface root desiccation. Trees improperly staked or with improper trunk protection may suffer from trunk wounds or girdling of the entire trunk. The standards and Best Management Practices for tree transport and planting are detailed later in this section, as well as Appendix I. Trees may be planted by a local volunteer work force so long as the workers have been adequately trained by the Forestry Consultant or other local qualified organization prior to planting, and trees are of a smaller size such as containerized stock.

Tree Spacing and Visibility Requirements

Minimum tree spacing between large, medium, or small sized deciduous shade trees should be appropriate for the species and conform to arboricultural Best Management Practices. It is generally recommended this be no less than 40 feet between plantings, with some exceptions for smaller trees. This will allow trees to grow to their full potential without heavy competition for water and nutrients with neighboring trees, and without limited space for crown growth. As mentioned previously, a direct goal is to create a multilayered canopy, and this may involve some degree of latitude when it comes to spacing requirements.

Watering

Watering of newly planted trees is essential to their establishment, growth, and survival, particularly during the first 2 years of their lives. There are several different options for watering trees, including outside contractors, use of in-house staff, or use of volunteer labor. Since these costs can vary greatly, they have not been included in the budget table above, but it is worthy of note that determining how trees are watered may have a significant impact on the budget. Use of volunteer or in-house labor is strongly recommended to keep costs down.

Challenges of Urban Plantings

Urban planting sites are a difficult environment for a tree to thrive in, and based on long term data, it is expected that 5-10% of new plantings fail each planting cycle. VHW's contracts for tree planting should include a one to two-year replacement warranty for any new trees that fail to thrive in their new environment. Urban tree plantings can pose an uphill battle in many ways, due to limited soil volume, salt runoff, airborne pollutants, and other factors. New planting mortality is to be expected, despite best efforts to prevent such an outcome, but the planning measures outlined above will help to mitigate annual new planting mortality

Local VHW Tree Planting Requirements and Standards

Village of Hawthorn Woods Internal Policies

1. Planting sites shall be determined and monitored using VHW's tree inventory, in conjunction with VHW staff and Forestry Consultant input.
2. New planting sites should be 10 feet away from signage, driveways, intersections, and utility structures. If this distance cannot be maintained, the site should not be planted, even if a tree was removed from the same site.
3. Choice of species for planting should be done so according to VHW's taxonomic, spatial, and age-class diversity goals. A diverse and resilient urban forest minimizes exposure to financial, environmental, and health risks while maximizing aesthetics, environmental benefits, and ecosystem services to its residents and patrons.
4. All planting stock shall be grown within 150 miles of the Village of Hawthorn Woods.
5. Acceptable nursery stock shall conform to the following standards:
 - A. Minimum of 1.75 inch caliper, measured at six inches from the trunk flare
 - B. Root ball conforms to ANSI Z60.1 Standards for Nursery Stock
 - C. Less than 10% deadwood in the crown
 - D. Architecture consistent for the species, cultivar, or variety in question
 - E. No included bark or other such narrow branch attachments, unless consistent with species or variety
 - F. Free of pests or pathogens
 - G. Approved species list for Village of Hawthorn Woods
6. Planting and digging of certain species shall only occur at certain times of year, in accordance with nursery industry best management practices and professional judgement. These times are subject to the professional opinions of both VHW and its contractors.

7. JULIE, or another similar utility locating service, shall be contacted, and all utilities located a minimum of three days before planting is scheduled to begin.
8. A minimum of a one-year replacement guarantee shall be extended from approved nurseries and plantmen for all new plantings rated to hardiness zone five or lower.

Tree Pruning

When maintaining a tree population for its greatest benefits and lowest risk, tree pruning is one of the most cost-effective maintenance activities which can be performed. Pruning provides several important services for a tree: It reduces the risk of failure, provides clearance for utilities or other structures, reduces wind resistance and wind damage, maintains overall tree health, and improves overall aesthetics.

For the Goals and Milestones, we anticipated the number of trees which will likely require pruning based on averages form around the industry. Once again, this was done because the inventory data did not include any information on recommended maintenance. However, we anticipate that approximately 150 trees of the 1,425 in the parks will likely require some kind of priority pruning before VHW can get on a regularly scheduled 7-year cycle prune, For the next 5-6 years, it is recommended that VHW slowly increase the number of trees pruned each year through around 2028 until they are at full capacity to handle the 7-year pruning cycle which has been proposed for VHW. Once in the full 7-year pruning cycle for the estimated tree population of 1,690 total trees by 2032, it is anticipated that approximately 240 trees per year will require pruning to maintain this cycle. For cost estimates associated with these activities, several assumptions were made:

First, because young trees (12" and less in diameter) are easy to prune, it is assumed that VHW staff can prune all trees less than 12", and \$50 per tree was used as an estimate for this group, based on average cost in the industry at this time. For medium (12"-24") and large (24"+) trees, average figures of \$100 and \$150 per tree (respectively) were used, once again based on average cost in the industry (see tables below). Consistent with other budget tables, a 3% annual CPI increase was added for every year thereafter.

Currently, VHW prunes trees on an *ad hoc* basis in response to storms and other events using a combination of in-house labor and contracted services. Using well-trained volunteer labor to prune young, newly planted trees and smaller trees which can safely be pruned from the ground without power equipment, it is believed that these budget figures could become even more favorable. This makes the estimates below fairly conservative, as is the case with all budget projections in this Plan.

VILLAGE OF HAWTHORN WOODS URBAN FORESTRY MANAGEMENT PLAN

Milestones	2022	2023	2024	2025	2026	2027-2032
Trees Pruned	150	170	190	200	210	240/year avg
Notes	Priority Pruning as Identified From Inventory	Begin Ramp up to Cycle Prune	Begin Cycle Prune	200 Cycle Prunes	210 Cycle Prunes	Approximately 240 Cycle Prunes / year in perpetuity
Cost (2021)	\$5,490	\$6,225	\$6,955	\$7,325	\$7,685	\$10,500
Cost (CPI)	\$5,490	\$6,225	\$6,955	\$7,325	\$7,685	\$12,075

Provided below is a series of estimates based on the change in composition of the Urban Forest over time. As larger underperforming trees are removed and smaller trees planted in their place, the size breakdown of the Urban Forest will change. Given this expected change in the average size of trees, we have included several breakdowns below estimating costs as the composition of the Urban Forest changes. As this tree population grows in age and size, it will provide even more benefits for the community! So though pruning becomes slightly more expensive as trees grow, that cost is far outpaced by the additional benefits those trees provide! Please note these are estimates and should be reviewed periodically to ensure accuracy.

2022 Cost Breakdown – Pruning 200 Trees/Year by 2022

	Total Trees	Avg %	Cost/Tree	Pruned/year	Cost/year
Evergreen	620	43.51%	\$20	87	\$ 1,740.35
Large (>24")	21	1.47%	\$150	3	\$ 442.11
Medium (13-24")	150	10.53%	\$75	21	\$ 1,578.95
Small (1-12")	634	44.49%	\$40	89	\$ 3,559.30
					\$ 7,320.70

2026 Cost Breakdown – Pruning 220 Trees/Year by 2027

	Total Trees	Avg %	Cost/Tree	Pruned/year	Cost/year
Evergreen	525	34.09%	\$20	75	\$ 1,500.00
Large (>24")	40	2.60%	\$150	6	\$ 857.14
Medium (13-24")	200	12.99%	\$75	29	\$ 2,142.86
Small (1-12")	785	50.97%	\$40	112	\$ 4,485.71
					\$ 8,985.71

2032 Cost Breakdown – Pruning 240 Trees/Year by 2032

	Total Trees	Avg %	Cost/Tree	Pruned/year	Cost/year
Evergreen	500	29.59%	\$20	71	\$ 1,420.12
Large (>24")	70	4.14%	\$150	10	\$ 1,491.12
Medium (13-24")	260	15.38%	\$75	37	\$ 2,769.23
Small (1-12")	860	50.89%	\$40	122	\$ 4,885.21
					\$ 10,565.68

Pruning Activities

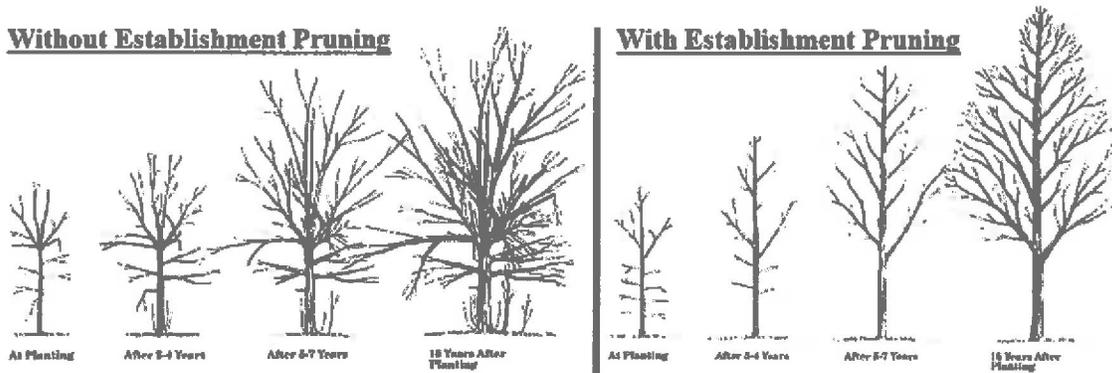
Creation of a Pruning Cycle

Initially, trees have been prioritized which have been identified in the inventory as requiring either Priority, Dead Limb, or Training pruning, regardless of where they are located. This is to prioritize public safety before routine maintenance. After these trees are pruned, VHW should aim to create a 7-year pruning cycle based on the size of its tree population both now and in 2032. With approximately 1,690 trees total by 2032, this would mean that over a 7-year period, approximately 240 trees would require pruning each year. As noted above, the number of trees as well as their overall sizes will be changing, hence the above tables showing adaptive management of the tree pruning program. We believe this is a realistic goal based on communications with VHW staff.

Though tree pruning may seem expensive, the cost of maintaining trees is significantly less than the costs associated with trees damaging property or injuring residents or patrons. The benefits trees provide when healthy and well maintained can be prolonged and significantly increased, as shown in the projections above. A cycle pruning program is the hallmark of an effective forestry program, and it is highly recommended that VHW plan to increase budgets for this essential expense.

Pruning of Young Trees

For the purposes for this Plan, a young tree is considered to be under 12" DBH. Young trees are still trying to acclimate to their sites. The pruning of young trees has different goals and outcomes than the pruning of larger, mature trees. Standard nursery stock has been meticulously pruned for four to ten years to have a single trunk, and the specific branching patterns which are considered common to the various tree species. Without proper establishment pruning, these trees might have multiple trunks, poor branch structure, and overall poor form and architecture.



Pruning of young trees to establish proper form is one of the most cost-effective maintenance activities which can be performed. It is an inexpensive task that does not require a great time commitment and saves thousands of dollars in pruning and maintenance costs later in the tree's life. As mentioned above, due to not having to climb trees or use dangerous equipment, young trees may be pruned by VHW staff or well-trained volunteer labor, with proper training from the Forestry Consultant or a similar qualified organization.

Pruning of Mature Trees

A mature tree, for the purposes of this Plan, is considered to be 12" or greater in diameter. Mature trees are established in and acclimated to their sites. The pressure these trees face from their environment generally comes from above-ground factors such as pests, pathogens, man-made structures, other trees, storms or lightning strikes, as well as some below ground factors like girdling roots, limited soil volume, or poor soil quality. Pruning is performed to mitigate the above-ground issues, as well as balance out any below ground issues when possible. Natural aging and limb dieback are additional reasons these trees are pruned.

Pruning of mature trees may mitigate a short-term risk, such as after a storm, or pruning may be done to maintain a tree's long-term health and structure. In the wild, trees shed limbs frequently. This is called self-pruning. Allowing trees to self-prune over time is not advisable in an urban setting. Safety factors may arise, and the process of self-pruning may bring up aesthetic issues in an urban environment. Mature public trees should only be pruned by professional Certified Arborists and done in accordance with industry Best Management Practices and accepted ISA and ANSI standards.

Private Property Trees

Village of Hawthorn Woods shall not be responsible for the pruning of trees located on private property. VHW reserves the right to prune portions of trees overhanging their property back to the adjacent property line, but is under no obligation to do so, and will perform such pruning at the discretion of VHW staff and/or the Forestry Consultant

Reasons for Pruning

Establishment Pruning

Establishment pruning of newly planted trees is the single most cost-saving measure in tree care, as it establishes good form and branch structure for the life of the tree. Establishment pruning should be performed a minimum of one time prior to the tree reaching six inches in diameter. Once established, the tree will only require periodic cycle pruning to maintain an appropriate form for the urban forest and to maintain health and keep the tree free of dead limbs. As mentioned above, because establishment pruning can be done without the use of dangerous equipment, the use of well-trained volunteers can be an effective means of pruning these young trees.

Cycle Pruning

A Best Management Practice in Urban Forestry is that trees should be pruned on a cyclical basis as preventative maintenance. No tree should go more than seven years without proper pruning. Cycle pruning ensures that dead branches, storm damaged limbs, or unsightly growth are removed before becoming hazardous or bad for the health of the tree. Cyclical pruning also ensures the proper leaf to stem ratio, which provides structural support for the tree. It also ensures that pruning stays relatively inexpensive, as severe issues do not have time to develop. Cycle pruning is a maintenance activity which if performed regularly, actually needs to be performed less often!

Emergency / Storm Damage Pruning

Emergency pruning is nearly always necessary to mitigate severe risk after storm events, such as limbs which have fallen and are blocking traffic, have impacted a structure or playground, are interfering with a utility, or are hanging and in imminent danger of doing any of the above.

Emergency and Storm Damage Pruning should be conducted at the discretion of VHW, with the best interests of the public in mind. This is one of the few occasions on which the recommendations of this Plan may be temporarily suspended. When life or property are in imminent danger due to conditions associated with a downed tree or tree part, VHW may take whatever remedial action is practical and reasonable to mitigate such imminent risk.

Sanitation Pruning

When a tree has been diagnosed as having been diseased or infested with a pest or disease, sanitation pruning may be employed to maintain the tree while removing the diseased or infested portions. This technique is only effective when the host tree is infected/infested with certain pests and pathogens, and only in a localized area of the tree. With more widespread cases of disease or insect infestation, removal will be the most cost-effective and safest option to avoid endangering other nearby trees, as these pests and diseases tend to spread, particularly when there is more of the same species nearby.

Removal of High-Risk Limbs

At times, a tree as a whole may not pose a high risk, but a single limb may have defects that make it hazardous. At these times, the removal of such limbs or parts may render the tree to be low risk again, without causing permanent damage to the tree.

Village of Hawthorn Woods Internal Policies

1. All activities directly related to the operation of a chainsaw, bucket truck, limb rigging, or tree climbing shall be performed by a qualified VHW employee, or under the supervision of a certified arborist or arborist trainee.
2. No pruning or maintenance activity that takes place within ten feet of a power transmission line shall be performed by a VHW employee unless certified as a qualified Utility Arborist.
3. No cabling, bracing, or other such support systems shall be installed in VHW-owned trees, either by the VHW, its residents, or any contractors. Exception may be made by obtaining prior written approval of VHW or its Board of Trustees.
4. No heading, pollarding or espalier pruning shall be conducted on Village-owned trees, and no wound dressings shall be used under any circumstances, without prior approval of Village of Hawthorn Woods.
5. The need for pruning and maintenance of individual trees shall be at the discretion of VHW and/or the Forestry Consultant.

6. No more than 25% of a tree's crown shall be removed during pruning operations in order to preserve the health of the tree. Any more than 25% of the crown being removed put the tree in danger of severe dieback, and removal should be considered at that point.

Other General Maintenance

Maintenance Activities

Retaining a Consultant

The task of enhancing an Urban Forestry program can be difficult! There may be new challenges and learning curves, contracts to renegotiate, bid documents to create, resident or patron concerns to manage, and other experiences which may require the assistance of a professional. Currently, VHW does not have a Certified Arborist on staff, though they do have knowledgeable grounds staff. That said, at least during the initial years of navigating the goals outlined in this plan, retaining an Urban Forestry Consultant would be a wise decision.



The Forestry Consultant may be involved in sourcing and interviewing contractors and vendors for tree pruning, removal, and planting operations, assisting in maintaining the tree inventory, training VHW staff on tree health and risk assessments, assisting in explaining policies to residents and patrons, and preparing contract and bid specifications. The importance of this early relationship cannot be overstated, no matter how large or small the organization.

Chemical Applications

Trees, like people, sometimes contract pests and pathogens. Often these pests and pathogens can be controlled with a simple chemical application just as illnesses in humans can be controlled with medication. This practice is called Plant Health Care. When financially practical, chemical control for common pests or pathogens may be utilized as a preventative or curative method and increase the aesthetics and benefits of the tree population.



At present, Hawthorn Woods chemically treats trees and herbaceous species on a very limited basis against known pest or pathogen and has committed to the use of organic solutions to pest and pathogen issues instead of more potentially harmful formulations. However, in the unpredictable face of new introduced pests and pathogens, VHW is leaving the door open to potential mass treatments should they be ecologically and financially sustainable.

Residents of Hawthorn Woods may not perform chemical applications on any Village owned trees under any circumstances. Treatments performed by VHW on its own trees must be performed by a Certified Arborist who holds a valid Pesticide Applicators license.

Water Management

The importance of water in the establishment, growth, and survivorship of trees cannot be overstated. Most trees adapted to our climate zone (USDA Zone 5b) are also adapted to the amount of moisture we have in an average year. However, younger trees with less expansive root systems are susceptible to prolonged drought. Young trees need supplemental watering, which is an essential maintenance activity and can prevent newly planted tree mortality.

As we anticipate approximately 850 additional trees being planted over the course of the next 10 years, this concept becomes very important. A watering program, as mentioned previously, may be performed by well-trained volunteer labor, in-house staff, or by an outside contractor. Whichever way VHW chooses to perform this task, it is vital, even though it is not represented in our budget tables due to high variability in who will perform this work. A general rule would be to expect to pay somewhere on the order of \$50/tree for the first 2 years of its life to water it several times throughout the first 2 growing seasons.

Mulch

Proper application of mulch is a necessary and cost-effective maintenance activity. Mulch has many benefits, including reducing weed growth in the root zone, protecting the tree trunk and root flare from lawn maintenance equipment, allowing water to move into the soil, reducing evaporation and drought stress, and creating a naturally fertile soil environment. Turf grass typical of parkways competes for water and nutrients, and mulch reduces this competition. But not all mulching is beneficial. The practice known as “Volcano Mulching” is the practice of piling mulch against the trunk in excess of 3” deep. This causes moisture build up against the trunk, and can cause decay of the trunk tissue, and possibly death. Material such as crushed limestone, red volcanic rock, or rubber pellets can alter the soil chemistry in an undesirable way, and cause dieback or tree death.

Improper Mulching



Proper Mulching

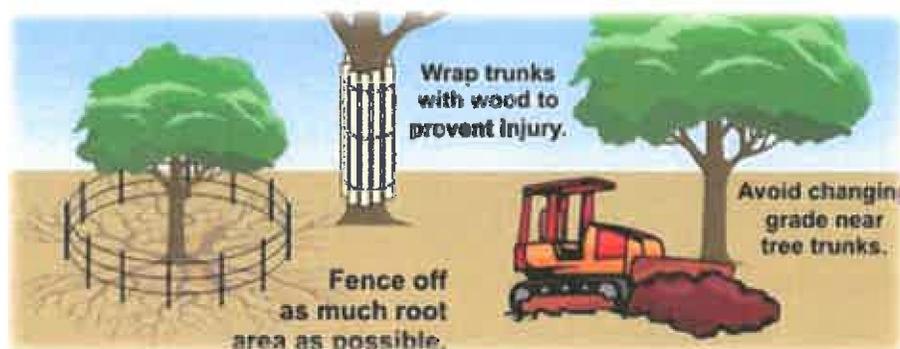


Fortunately, mulch is a commodity most communities can get for free so long as they are pruning and removing trees each year. A marshalling yard for wood chips could be established in Village limits. These chips could be made available for free to residents as well as planting contractors. This arrangement would work well for everyone: Removal contractors do not have to pay to dispose of chips, residents get free woodchips, and planting contractors don't have to charge VHW for mulch when new trees are planted. All newly planted trees should have mulch applied appropriately.

A goal for VHW should be to mulch all trees 12" DBH and smaller, but for now, mulch for all newly planted trees, and preventing volcano mulching should be a primary concern.

Tree Preservation and Management During Construction

Though parks generally do not have the same ordinances as municipalities when it comes to tree protection on private property, they should still abide by Best Management Practices when performing development work on their own property. Therefore, tree and shrub protection and preservation during construction represents an investment in the community! Ensuring the protection and preservation of these trees while minimizing burdens to businesses, developers, and residents is essential to a healthy urban forest.



Tree protection and preservation during periods of construction involves protecting trees from damage caused by construction activities. This damage includes physical and chemical damage to the trunk, branches, and roots. Damage may be caused by equipment such as backhoes, skid steers, or other appendage-type equipment. Effects of damage to the visible above ground portions of the tree can be obvious, as when branches are broken. But hidden effects such as root compaction or improper grading may not become evident for years until the tree begins to die back. The standards set forth below and in Appendix K are industry standards with a proven record of success.

Village of Hawthorn Woods Internal Policies

1. A tree survey shall be performed by a qualified individual prior to the beginning of any development activities on Village property. The survey shall detail the size, species, and condition of each tree six inches DBH and greater OR managed landscape tree (intentionally planted, non-volunteer tree) of any size.
2. The Tree Survey and a Tree Protection Plan shall be submitted to the Village of Hawthorn Woods and all relevant architects, engineers, and workers, detailing the following:
 - A. Trees to be removed
 - B. Trees to be preserved
 - C. Location and size of the Tree Protection Zone (TPZ) for each tree
3. The Tree Protection Zones for each tree shall be visibly delineated by the site engineer, using orange snow fencing or other high visibility exclusion material. When such a delineation is not possible, all workers on site shall be made aware of the TPZ verbally.

Tree Risk Assessment and Sample Policy

Trees provide ecosystem and aesthetic benefits, but all trees also pose some degree of risk. Determining the acceptable level of risk, along with effectively managing that risk, is a key priority for urban forestry operations. As a tree manager, Village of Hawthorn Woods must always assume some degree of risk. It is up to VHW to track that risk and decide how to mitigate risk from trees in a manner which is responsible both economically as well as in the interest of public safety.

Levels of Risk Assessment – An Overview

These Risk Assessment Levels are based on the International Society of Arboriculture’s (ISA) Tree Risk Assessment Qualification (TRAQ) protocols, as well as the ANSI A300 Part 9 (Tree Risk Assessment) Standards. The TRAQ forms can be found in Appendix G at the end of this report. All trees in VHW parks were assessed for a basic level of risk during the inventory. These assessments were rapid assessments, and do not represent any formal level of TRAQ risk assessment and are not legally binding. They are solely intended to provide VHW with data showing a need for a more detailed assessment of individual trees such as those listed below.

Level 1 Assessment

Also called a “limited visual assessment”, whereby a tree has a basic analysis of obvious physical defects and condition. The assessor walks or drives by the tree, assesses it quickly for defects, evaluates the risk posed by the subject tree, and reports the results of the assessment to the tree owner. Often, prior to a recommendation, a more detailed (Level 2 or Level 3) assessment will be required to gather additional data.

Level 2 Assessment

A Level 2 Assessment, also called a “basic assessment”, is a report detailing the information collected during a detailed visual inspection of the tree and the surrounding site. Such an inspection requires a 360 degree walk around, and may include the use of simple tools, such as binoculars, magnifying lenses, mallets, probes, and trowels or shovels. The goal is to get a more complete picture of the tree in its environment, as well as previous histories of failures, and a root to branch evaluation of not only the tree but also potential “targets” which falling tree limbs may impact. Targets are things such as structures, people, vehicles, or other things which may be damaged or injured by trees.



Level 3 Assessment

A Level 3 Assessment, also called an “advanced assessment”, provides detailed information about specific tree parts, targets, and risk associated with each potential interaction. By definition, it requires specialized equipment known as “advanced tools”, such as bucket trucks, resistance drills, sonic tomographs, and other such equipment. This is the most detailed and time-intensive type of assessment and is typically only performed when a decision to retain or remove a tree is very difficult, as would be the case for a high-quality tree near a potential target that has significant defects, the extent of which are not known, but must become known before making a decision.

Considerations in Assessing Risk

The following are meant for the reader to gain additional insight into the TRAQ process. Once again, TRAQ inspections were not performed on VHW trees, but this information will help to understand the terminology better and help inform staff and residents as to how and why these inspections are performed.

Likelihood of Tree Part Failure

Like it sounds, this is a process of determining how likely a tree part is to fail, and then how likely that failure is to impact a target. Likelihood of failure is an assessment of the tree’s defects, and the load on those defects, like weight, gravity, ice, or wind. The parts impacted are generally the roots, root plate, trunk, branches, or potentially whole tree failure at multiple points.



Likelihood of Impacting a Target

Determining the likelihood of impacting a target is figuring out the occupancy rate, or the amount of time that targets (people or high value property) are within the fall zone of a tree. A large tree in the middle of a field could fail with little impact, but that same tree in a playground might have serious consequences. In many roadways, motor traffic is present day and night. All of VHW's inventoried 612 trees are on publicly owned land, where failure of a tree not only could impact motorists, but also park patrons and structures.

Consequences of a Tree Failure Impacting a Target

The potential consequences of the tree failure impacting a target is a cumulative function of both the "value" of the target (person vs car) and the consequences to that target if the tree fails. Whereas the previous step was concerned with occupancy rates, this step looks at the consequences of the impact, and assumes that the target is always present.

To follow with the above example, it is assumed that if a park tree were to fail, that a car, utility line, and person are all underneath it at the time of failure, and the consequence to those targets is evaluated. Consequences are generally considered to be "minor" for targets that can be easily replaced or repaired and step up through 4 levels with the highest level being "severe", which would constitute severe injury to a person, or even a fatality.



Weather

Every tree, no matter how healthy, can fail from wind, lightning strikes, ice loading or soil saturation. "Normal" weather can cause tree or tree part failures for trees which have existing defects, like deadwood, cavities, or poor architecture. Extreme weather events, by contrast, can cause the failure of perfectly healthy trees. For all Tree Risk Assessments, Risk should be assessed assuming "normal" weather conditions. Though it should be noted that "normal" weather conditions for northeastern Illinois do include gusty winds, thunderstorms, snow, and even an occasional ice storm. It is the extremes of these events that should be considered abnormal.

Village of Hawthorn Woods DRAFT Tree Risk Assessment Policy

Village of Hawthorn Woods (VHW) has drafted this sample policy as a first step towards creating a final policy which will be adopted at a future date pending review by the Village's legal team and various department heads. This draft policy is provided to give a sample of how to maintain an acceptable level of risk as it pertains to its tree population. In order to maintain an acceptable level of public safety, while mitigating undue burden, VHW shall be considering the following risk assessment protocols as it moves towards a final policy at a to be determined date:

1. The VHW maintains a tree inventory detailing the species, size, and condition of all trees on the Village's parks and facilities, as well as a basic level of risk posed by each tree. This Urban Forestry Management Plan recommends that the trees listed as being in elevated risk categories during the initial inventory be audited on an ad hoc basis. During these audits, qualified VHW staff and/or the Forestry Consultant should inspect these trees and identify trees potentially posing an unacceptable level of risk. Such trees identified shall either be scheduled for a more detailed risk assessment (Level 2 or 3), or shall be mitigated, either by pruning, bracing, or removal, as soon as practical following the assessment.
2. VHW staff or the Forestry Consultant shall perform limited visual assessments on an ad hoc basis by monitoring the trees during the normal course of daily operations. Trees which may appear to present an elevated risk level shall be scheduled for a more detailed risk assessment (Level 2 or 3), or shall be mitigated, either by pruning, bracing, or removal, as soon as practical following the assessment.
3. Upon notification from a resident or patron of a concern about a potentially high-risk tree, qualified VHW staff and/or the Urban Forestry Consultant shall perform a Level 1 limited visual inspection within (14) business days of the notification by the resident. If a Level 2 or Level 3 Risk Assessment is required based on that inspection, it shall be performed within an additional (14) business days. A decision shall be made by VHW staff, the Board of Trustees, and/or the Forestry Consultant as to what the appropriate mitigation measures are, if any.
4. All trees determined to be in need of mitigating actions (removal, pruning, etc.) should be documented in writing by VHW staff and/or the Urban Forestry Consultant. This documentation shall include the date the assessment was performed, the species, size, and condition of the tree, and a brief narrative detailing which parts of the tree are likely to fail, the likelihood of failure, the likelihood of impacting a target, the consequences of tree or tree part failure, and the overall tree risk rating, per the ISA's TRAQ system of risk assessment.
5. A minimum branch diameter of three (3) inches, by ocular estimate, shall be the standard to which this risk assessment policy applies. Assessing all branches smaller than three inches represents an undue burden to VHW.

Full TRAQ Forms can be found in Appendix G at the end of this report.

TRAO Tree Risk Assessment Matrices

Likelihood of Tree Failure Impacting Target

<u>Likelihood of Tree Failure</u>	<u>Likelihood of Impacting Target</u>			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat Likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat Likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat Likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Risk Rating Matrix

<u>Likelihood of Failure and Impact</u>	<u>Consequences</u>			
	Negligible	Minor	Significant	Severe
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat Likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Projected Budget

The budget numbers below, as mentioned several times through this Urban Forestry Management Plan, are conservative figures based on current industry rates for the services listed. Based on input from VHW staff, the budget begins this year with a dollar amount that is within their current annual budget for tree related expenses. From there, generally the budget increases slightly each year, and projects through 2032, at which time, including CPI, the budget will have increased from the current level of approximately \$17,750 in 2022 to approximately \$52,750 by 2032. This represents a moderate budget increase for such an increase in values of the Urban Forest.

REMOVALS	Milestones	2022	2023	2024	2025	2026	2027-2032
	Trees Removed	30	35	40	45	50	60/year avg
	Diameter Inches	210"	245"	280"	315"	350"	375"/year avg
	Notes	High Priority Removals	Standard Removals	Lower Priority Removals	Update Inventory for New Removals	Update Inventory for New Removals	Update Inventory for New Removals
	Removal Cost (2021)	\$5,250	\$6,125	\$7,000	\$7,875	\$8,750	\$9,375
	Removal Cost (CPI)	\$5,250	\$6,125	\$7,000	\$7,875	\$8,750	\$10,781

PLANTINGS	Milestones	2022	2023	2024	2025	2026	2027-2032
	Trees Planted	20	30	40	50	60	80/year avg
	Planting Cost (2021)	\$6,000	\$9,000	\$12,000	\$15,000	\$18,000	\$24,000
	Planting Cost (CPI)	\$6,000	\$9,000	\$12,000	\$15,000	\$18,000	\$27,600

PRUNING	Milestones	2022	2023	2024	2025	2026	2027-2032
	Trees Pruned	150	170	190	200	210	240/year avg
	Notes	Priority Pruning as Identified From Inventory	Begin Ramp up to Cycle Prune	Begin Cycle Prune	200 Cycle Prunes	210 Cycle Prunes	Approximately 240 Cycle Prunes / year in perpetuity
	Cost (2021)	\$5,490	\$6,225	\$6,955	\$7,325	\$7,685	\$10,500
	Cost (CPI)	\$5,490	\$6,225	\$6,955	\$7,325	\$7,685	\$12,075

FORESTRY CONSULTANT	Milestones	2022	2023	2024	2025	2026	2027-2032
	Notes	Basic Assistance with contract prep, etc	Appraisals and Risk Management	Inventory Updates / Risk Management			
	Cost (2019)	\$1,000	\$1,000	\$2,000	\$2,000	\$2,000	\$2,000
	Cost (CPI)	\$1,000	\$1,000	\$2,000	\$2,000	\$2,000	\$2,300

TOTALS	TOTALS - 2021 \$	\$17,740	\$22,350	\$27,955	\$32,200	\$36,435	\$45,875
	TOTALS - CPI 3%	\$17,740	\$22,350	\$27,955	\$32,200	\$36,435	\$52,756

Summary / Conclusion

The Village of Hawthorn Woods, its employees, residents, committees, business owners, and partners, all have a keen eye on the future when it comes to progressive policies which benefit the environment. And all of these groups seem to understand that what benefits the environment in turn directly benefits all of them as well: More trees lead to increased home purchase and businesses taking root, leading to a more prosperous and vibrant community. Cleaner air and water lead to better health outcomes and positive perceptions of life. Taking care of the flora and fauna around us leads to them taking care of us, as is the case with maintaining vegetation for bees and other pollinators which leads to increased biodiversity and a more stable ecosystem in which to live.

On the human side of the equation, Hawthorn Woods has a tremendous benefit of having a devoted Sustainability Committee which dedicates itself to the preservation and enhancement of all these resources, and a citizenry which is very engaged with all of their endeavors. On the ecological side of the equation, Hawthorn Woods has been blessed with a great diversity of ecosystems, from prairies to Oak Woodlands, and even aquatic habitats. And these groups, the human and ecological sides, are working in tandem to provide human-created ecosystems in their parks and other public lands which mimic these natural systems for the benefit of the entire system.

At present, Hawthorn Woods has a good diversity of trees which appear to be in good condition in the data which was provided to us. A near term goal will be to expand the existing tree inventory to include all street trees and trees on other village owned properties so that all the concepts discussed in this plan may be expanded into that realm as well. Also, based on all the observations above about the residents of Hawthorn Woods and their commitment to green infrastructure, that the Village use this Management Plan for public outreach, and encourage its residents to voluntarily abide by the concepts laid out herein, even on their own private property.

And with such a committed citizenry, we would like to provide one additional reminder about the nature of this plan: It is a starting line, not a finishing line! This plan is meant to be reviewed and adaptively managed over time as new goals and new information come to light. The more the residents and staff engage with this plan, the better it will become over time, and we will use this space at the end of this plan not as a conclusion of the process, but rather a call to action to get engaged in the future of the urban forest and all of the benefits it can bring!

Great Lakes Urban Forestry Management would like to take the time here to thank the Village of Hawthorn Woods, its residents, Sustainability Committee, and other stakeholders who participated in the process of creating this management plan. We now task you with taking it into the future, and using it as an ever-brightening guiding light by which to make the Village of Hawthorn Woods a leader in Urban Forestry and Sustainability. It has been a pleasure to work with you all, and we look forward to maintaining our partnership for the betterment of the Hawthorn Woods Urban Forest.

Glossary of Terms

Aerial Device: Any piece of equipment expressly intended to elevate a human worker above the level at which they typically stand with their feet on the ground surface. Can include but is not limited to bucket trucks, scissor lifts, etc

Aggressive: A floral or faunal organism which is native (endemic) to the United States or northern Illinois, but which is known to outcompete other more desirable organisms

Arborist: An individual engaged in the profession of arboriculture who is educated, trained and licensed to provide for or supervise the management of trees and other woody plants

Arborist Trainee: Any person working under the direct supervision of an Arborist or Certified Arborist

Balled and Burlapped: A tree, shrub, or other plant prepared for transplanting by allowing the roots to remain covered by a ball of soil around which canvas or burlap is tied and secured with a basket.

Bare Root: Harvested plants from which the soil or growing medium has been removed

Best Management Practices (BMP): Methods or techniques found to be the most effective and practical means in achieving an objective while making the optimum use of resources.

Caliper: Standard nurseryman's measure of tree diameter (size). Caliper measurement of the trunk shall be taken six inches above the ground up to and including four-inch caliper size. If the caliper at six inches above the ground exceeds four inches, the caliper should be measured at 12 inches above the ground.

Certified Arborist: An individual who has sufficient experience in the field of Arboriculture, and has been certified by the International Society of Arboriculture as being a Certified Arborist

Border Trees: Trees whose trunks, when measured at DBH, are situated on both Public and private property

Branch Collar: The branch collar is the point where a branch joins the trunk or another branch. This is the area the arborist chooses to make a proper cut.

Climbing Line: Any rope or other such material explicitly intended for bearing the weight of a human being

Collected Plants: Trees or shrubs which have been sourced from private property for the intent of transplanting elsewhere

Compacted Soil: A high-density soil lacking structure and porosity, characterized by restricted water infiltration and percolation (drainage), and limited root penetration

Consumer Price Index: an index of the variation in prices paid by typical consumers for retail goods and other items

Containerized: A tree, shrub, or other plant prepared for transplanting, or grown in, a solid-walled container such as a plastic pots or wooden boxes

Contracted Staff: People working for VHW as part of an independently owned and operated private company which performs work for VHW, but who are not directly employed by VHW

Controlling Authority: An agency, organization, or corporate entity with the legal authority and/or obligation to manage individual trees or tree populations

Crew Leader: Any personal who has by direction or implication been chosen to lead a team of In-House or Contracted Staff

Crown: The upper part of a tree, measured from the lowest branch, including all branches and foliage

Critical Root Zone (CRZ): The minimum volume of roots necessary for a tree to have health and stability

Cycle Pruning: The process of routine maintenance pruning of trees, not related to storm damage or other hazard or emergency related pruning, that occurs on a set and predictable time scale set forth by VHW

Deadwood: Wood on a tree or shrub which is no longer biologically living and becomes brittle or prone to failure

Decline/Declining: Trees or shrubs which are experiencing symptoms of a general decline on health due to age, pest, or pathogen related issues

Desirable: A Tree or other plant whose characteristics are sought after due to ecology, aesthetics, or public safety

Diameter or DBH: Diameter at Breast Height. A standard forestry measure of tree diameter (size), measured at 4.5' above ground level on the uphill side of a tree using a Diameter Tape or Biltmore Stick

Digging Machine(s): Any piece of mechanical equipment whose express purpose is to remove soil and plants from their current locations

Diseased: The status of a tree which has been negatively impacted by a pathogen, bacterial, fungal, viral, or similar lower life forms

Drip Line: The soil surface delineated by the branch spread of a single plant or group of plants

Drought: A period of two weeks or greater, during which there is less than one inch of rainfall, when the average daytime temperature during that same period exceeds 75 degrees Fahrenheit.

Dutch Elm Disease: A fungal pathogen which causes the decline and death of specific species of Elm trees.

Dying: A tree which is in the process of biological death due to senescence, disease, infestation, or other such malady from which there is very little to no hope of long-term survival

EAB: Emerald Ash Borer. An invasive beetle pest which affects all Ash trees.

Establishment Pruning: The pruning of a young tree in order to establish proper form and branching habit.

Established Trees: Those trees which have been permanently planted for a period of no less than 6 months, and which have permanent roots established in the soil

Failure (tree failure): Breakage of stem or branches, or loss of mechanical support in the root system

Feeder Root: Any portion of the below ground portions of the tree whose purpose is to absorb water and nutrients

Floodplain: Land which has been determined to be periodically inundated with water from a nearby moving or static water body, such as a lake or river. Determined by the Federal Emergency Management Agency

Flush Cut: Either a pruning cut or final cut to remove a stump, for which the maximum acceptable distance from the ground or the branch bark ridge shall be no greater than 2 inches.

Full-Time: An employee who has regular employment through VHW and whose work hours exceed 36 hours in a week, and who is employed year-round.

Fungal: Any of a group of spore-producing organisms feeding on organic matter, including molds, yeast, mushrooms, and toadstools.

Grade: The level or pitch of a certain piece of land, as defined by the trees or shrubs which inhabit it

Hardscape: The nonliving or man-made fixtures of a planned outdoor area, such as sidewalks, retaining walls, streetlamps, etc.

Hazard: A known and documented state of imperiling public safety

Healthy Tree: Any tree which is successfully adapting to its environment, and shows no signs of disease, pests, pathogens, or other such maladies, as determined by VHW staff or the Forestry Consultant

Host: An organism which is susceptible to a known pest or pathogen

Infested: The status of a tree which has been negatively impacted by pests

In-House Staff: Staff directly employed by the Village of Hawthorn Woods, on either a full-time or Part-Time Basis

Invasive: A floral or faunal organism which is not native (endemic) to the United States or northern Illinois

Job Site: Any geographic location where a person or persons will be performing activities related to the care and maintenance of Village of Hawthorn Woods property

J.U.L.I.E. (311): The Illinois underground utility locating service

Liner Nursery: A privately owned plant propagation facility which specializes in the growth of small trees which are intended to be planted for growth into a full form

Managed: A tree or shrub which is in an area of VHW which is routinely mowed and managed. Not a wild forest grown tree or shrub, or area containing such trees and shrubs

Manufacturer's Recommendations: Any expressly written instruction manual for a given piece of equipment that details how said equipment is supposed to be managed or maintained

Mineral Soil: Any substrate which is composed of a variety of rocks and minerals in various states of decomposition, leading to the development of a substance on which living plants may live

Mitigation: The process of diminishing risk

Monoculture: A population of trees in close proximity to one another which is comprised of 3 species or less of trees and shrubs which is prone to pest or pathogen outbreak

Natural Resources: Flora, fauna, and other such living and non-living parts of the environment which the Village of Hawthorn Woods maintains

Nursery Stock: Woody Perennials which are of a "Tree Form" growth habit and are supplied by a nursery contractor for planting. Not established trees.

Park Property: Land which, by deed or title, belongs to the Village of Hawthorn Woods

Parkway Tree: Any woody plant within a Publicly Owned right-of-way, or any other property owned or managed by the Village of Hawthorn Woods

Part-Time: An employee who has regular employment through VHW and whose work hours are less than 36 hours in a week, and who is employed year-round.

Pathogen: A fungus, virus, or other such microscopic organism which causes decline or death of trees

Pest: An insect or other macrofaunal organism which causes decline or death of trees

Private Property: Land which, by deed or title, does not belong to the Village of Hawthorn Woods

Public Safety: The welfare and protection of the general public

Reforestation: The process by which trees are planted to replace trees which have been removed

Rigging Line: Any rope or other such material explicitly intended for bearing the weight of a tree limb. Not to be used for supporting a human being.

Right-of-Way (ROW): The publicly owned land on which a road, drainage ditch, trail, or other public access is built

Risk: A situation involving potential exposure to danger or endangering public safety

Root Protection Zone (RPZ): The area on the ground surrounding a tree in which excavation, compaction, and other construction-related activities should be avoided or mitigated

Saddle: A piece of equipment expressly intended to hold a human being above ground level with the assistance of a rope or other such device

Sanitation Pruning: The removal of tree limbs that have become diseased or infested, in order to prevent the spread of disease or infestation from spreading throughout the rest of the tree e.g., Dutch Elm Disease, Black Knot Fungus, etc.

Seasonal Employees: Those employees retained by VHW for less than 6 months out of the calendar or budget year

Shrub: Any woody perennial which has a multi-stemmed growth habit not consistent with being considered a tree. Can be subject to interpretation by VHW Staff.

Sound Wood: Structurally sound, non-decayed, non-compromised wood in the trunk or Scaffold Branches

Staff: Those employees retained by VHW on a full-time basis with benefits provided

Structural Root: Any portion of the below ground portions of the tree whose purpose is to stabilize the plant against the forces of wind and gravity

TRAQ: Tree Risk Assessment Qualification. The International Society of Arboriculture's formal status of an individual who is qualified to assess the risk that trees may bring to the general public

Tree Protection Zone (TPZ): The area surrounding a tree in which excavation and other construction-related activities should be avoided.

Tree Risk: The likelihood and consequences of failure of a tree or tree parts

Tree Risk Assessment: A systematic process used to identify, analyze, and evaluate tree risk

Underperforming: Trees which have systematic health and vigor issues resulting in poor health, architecture, or other such maladies as determined by VHW staff

Undesirable: A tree which is not desired in the landscape due to ecological, aesthetic, or public safety reasons, as determined by VHW Staff.

Unmanaged: A tree or shrub which is in an area of the Village of Hawthorn Woods which is not routinely mowed and managed. A wild forest grown tree or shrub, or area containing such trees and shrubs.

Urban Wood: Any tree or other woody perennial material which has been harvested for the sole purpose of long-term storage in the form of furniture, recreational material, etc. Differentiated from “Reclaimed Wood”

Utility Arborist: A person explicitly trained in the management of trees and other plants in relation to energized power lines. Someone who is licensed to work with conflicts between trees and such energized power lines.

Appendix A: Acceptable and Unacceptable Species

Species not appearing on this list can be approved or disallowed by consensus of the Tree Commission, acting under the supervision of VHW staff and/or the Forestry Consultant

NOT APPROVED	APPROVED SPECIES (ANYWHERE)			PARKS ONLY
	Large Trees	Medium Trees	Small Trees	Large Trees
AILANTHUS	BALDCYPRESS	ALDER	AMERICAN REDBUD	CHESTNUT-CHINESE
AMUR CORN TREE	BEECH-AMERICAN	AMUR MAACKIA	APPLE-CRAB SPP	MAGNOLIA-CUCUMBER
ASH-EUROPEAN	BEECH-EUROPEAN	BIRCH-RIVER	BUCKEYE-RED	Medium Trees
ASH-GREEN	BLACK LOCUST	BIRCH-WHITE	DOGWOOD-SPP	GOLDEN RAINTREE
ASH-WHITE	BUCKEYE-OHIO	BLACKGUM	HAWTHORN-COCKSPUR	MOUNTAIN ASH
BOXELDER	BUCKEYE-YELLOW	ELM-CHINESE	HAWTHORN-SPP	PEAR-EDIBLE
BUCKTHORN	CATALPA	HARDY RUBBER TREE	LILAC-TREE	SASSAFRASS
BURNING BUSH	DAWN REDWOOD	HAZELNUT-TURKISH	ROSE OF SHARON	SEVENTH SON FLOWER
CHERRY-BLACK/PIN	ELM-HYBRID	HORNBEAM-AMERICAN	SERVICEBERRY-SPP	Small Trees
COTTONWOOD	GINKGO	HORNBEAM-EUROPEAN	SMOKETREE	APPLE-EDIBLE
ELM-AMERICAN	HACKBERRY	IRONWOOD		CHERRY-ORNAMENTAL
ELM-SIBERIAN	HICKORY-SPP	KATSURA		LILAC-SHRUB
HONEYSUCKLE	HONEYLOCUST	MAPLE-HEDGE		MAGNOLIA-SAUCER
MAPLE-NORWAY	HORSECHESTNUT	MAPLE-MIYABEI		MAPLE-AMUR
MAPLE-SILVER	KENTUCKY COFFEETREE	MAPLE-PAPERBARK		MAPLE-JAPANESE
MULBERRY-SPP	LARCH	MAPLE-RED		PEACH/NECTARINE
POPLAR-SPP	LINDEN-AMERICAN	MAPLE-SHANTUNG		PLUM-SPP
POPLAR-WHITE	LINDEN-LITTLELEAF	MAPLE-TRIFLORUM		WITCH HAZEL
PRINCESS TREE	LONDON PLANETREE	OAK-CHINKQUAPIN		Evergreens
RUSSIAN OLIVE	MAPLE-ARMSTRONG	OAK-ENGLISH		ARBOR VITAE
WALNUT-ANY	MAPLE-AUTUMN BLAZE	OAK-SHINGLE		DOUGLAS FIR
WILLOW-SPP	MAPLE-SUGAR	PEAR-CALLERY		EASTERN REDCEDAR
	OAK-BURR	PERSIAN IRONWOOD		FIR-CONCOLOR
	OAK-PIN	YELLOWWOOD		HEMLOCK-SPP
	OAK-RED			JUNIPER-COMMON
	OAK-SWAMP WHITE			PINE-AUSTRIAN
	OAK-WHITE			PINE-MUGO
	PAGODATREE			PINE-WHITE
	PERSIMMON			SPRUCE-BLUE
	SWEETGUM			SPRUCE-NORWAY
	SYCAMORE			SPRUCE-SPP
	TULIPTREE			YEW
	ZELKOVA			

Do Not Plant

Plant limited quantities

Plant in abundance

Appendix B: Additional Comments on Species

SPECIES	COMMENTS	SPECIES	COMMENTS
AILANTHUS	NOT APPROVED	LILAC-SHRUB	Parks Only
ALDER-SPP		LILAC-TREE	Improved varieties, tree form only
AMERICAN HORNBEAM		LINDEN-AMERICAN	
AMERICAN REDBUD		LINDEN-LITTLELEAF	
AMUR MAACKIA		LINDEN-SILVER	
APPLE-CRAB SPP	Apple Scab resistant varieties only	LINDEN-SPP	
APPLE-EDIBLE	Parks Only	LONDON PLANETREE	Prefer 'Exclamation!', 'Bloodgood' not allowed
APRICOT	NOT APPROVED	MAGNOLIA-CUCUMBER	
ARBORVITAE	Parks only	MAGNOLIA-SAUCCER	Scale resistant varieties only
ASH-BLUE	NOT APPROVED	MAGNOLIA-SHRUB	Star Magnolia or similar Magnolia pruned to tree form
ASH-GREEN	NOT APPROVED	MAPLE-AMUR	Parks only unless pruned to tree form
ASH-WHITE	NOT APPROVED	MAPLE-AUTUMN BLAZE	Or other similar Acer x freemannii
ASPEN	Improved varieties only	MAPLE-BLACK	
BALDCYPRESS	Prefer 'Shawnee Brave'	MAPLE-HEDGE	
BEECH-AMERICAN		MAPLE-JAPANESE	Small growing space only
BEECH-SPP	Prefer 'Tricolor' or 'Riversii'	MAPLE-MIYABEI	Prefer 'State Street'
BIRCH-RIVER	Prefer single stem only	MAPLE-NORWAY	NOT APPROVED
BIRCH-SPP	Sweet Birch, Yellow Birch, or other new introductions	MAPLE-PAPERBARK	
BIRCH-WHITE	Bronze Birch Borer resistant only, prefer 'Whitespire'	MAPLE-RED	Improved varieties only
BLACK LOCUST	Improved varieties only, prefer 'Purple Robe'	MAPLE-SILVER	NOT APPROVED
BLACKGUM		MAPLE-SUGAR	Prefer 'Green Mountain'
BOXELDER	NOT APPROVED	MOUNTAIN ASH	Improved varieties only
BUCKEYE-OHIO		MOUNTAIN ASH-EUROPEAN	Improved varieties only
BUCKEYE-RED	Prefer 'Rt. McNair' or 'Bottlebush'	MULBERRY-SPP	NOT APPROVED
BUCKEYE-YELLOW		OAK-BURR	
BUCKTHORN	NOT APPROVED	OAK-CHESTNUT	
BURNING BUSH	NOT APPROVED	OAK-CHINKQUAPIN	
CAROLINA SILVERBELL	Protected sites only	OAK-ENGLISH	
CATALPA		OAK-PIN	
CHERRY-BLACK	NOT APPROVED	OAK-RED	
CHERRY-PURPLE LEAF		OAK-SWAMP WHITE	
CHERRY-SPP	Ornamental, Black Knot resistant varieties only	OAK-WHITE	
COTTONWOOD	NOT APPROVED	OTHER	Open for new introductions
DAWN REDWOOD		PAGODATREE	
DOGWOOD-SPP	Hardy varieties only	PEACH	Parks only
DOUGLAS FIR	Parks only	PEAR-CALLERY	NOT APPROVED
EASTERN REDCEDAR	Parks only	PEAR-EDIBLE	Parks Only
ELM-AMERICAN	NOT APPROVED	PERSIAN IRONWOOD	Medium growing space only
ELM-HYBRID	Hardy varieties only	PERSIMMON	American variety preferred (Diospyros virginiana)
ELM-RED	NOT APPROVED	PINE-AUSTRIAN	Parks Only
ELM-SIBERIAN	NOT APPROVED	PINE-SCOTCH	Parks only
ELM-SPP	New cultivar introductions	PINE-WHITE	Parks only
EUONYMUS	Eastern Wahoo ONLY no non-native varieties	PLUM-SPP	Parks Only
FIR-SPP	Parks only	PUSSYWILLOW	Parks only
FRINGETREE		ROSE OF SHARON	
GINKGO	Male only	SASSAFRAS	
GOLDEN RAINTREE		SERVICEBERRY-SPP	Prefer 'Autumn Brilliance'
HACKBERRY		SEVENTH SON FLOWER	
HARDY RUBBER TREE		SHRUB-SPP	Parks only, open for new introductions
HAWTHORN-SPP	Thornless varieties only	SMOKETREE	American variety preferred, small growing space only
HICKORY-BITTERNUT		SPRUCE-BLUE	Parks only
HICKORY-SHAGBARK		SPRUCE-NORWAY	Parks only
HONEYLOCUST	Prefer 'shademaster' or 'Inermis'	SPRUCE-SPP	Parks only
HONEYSUCKLE	NOT APPROVED	SUMAC	Parks only
HORNBEAM-EUROPEAN		SWEETGUM	Prefer 'Happidaze'
HORSECHESTNUT		SYCAMORE	In natural areas only, London Planetree preferred
HYDRANGEA-PEGEEE		TULIPTREE	
IRONWOOD		VIBURNUM	Tree form only
JUNIPER-COMMON	Parks Only	WALNUT-BLACK	NOT APPROVED
KATSURA		WILLOW-SPP	NOT APPROVED
KENTUCKY COFFEETREE	Fruitless varieties only	YELLOWWOOD	
LARCH		YEW	Parks Only
		ZELKOVA	Prefer 'Green Vase'

Appendix C: Balled and Burlapped Planting Detail

INTERNATIONAL SOCIETY OF ARBORICULTURE

INTERNATIONAL SOCIETY OF ARBORICULTURE
 1400 WEST ANTHONY DRIVE
 CHAMPAIGN, IL 61821
 (217) 355-9411
 (217) 355-9516 FAX

DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS, CO-DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.

STAKE TREES ONLY UPON THE APPROVAL OF THE LANDSCAPE ARCHITECT. SEE STAKING DETAIL.

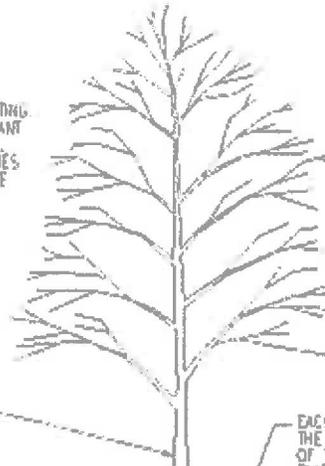
WRAP TREE TRUNKS ONLY UPON THE APPROVAL OF THE LANDSCAPE ARCHITECT. SEE WRAPPING DETAIL.

MARK THE NORTH SIDE OF THE TREE IN THE NURSERY, AND ROTATE TREE TO FACE NORTH AT THE SITE WHEN EVER POSSIBLE.

SET TOP OF ROOT BALL FLUSH TO GRADE OR 25-50 MM (1-2 IN.) HIGHER IN SLOWLY DRAINING SOILS.

50 MM (2 IN.) MULCH. DO NOT PLACE MULCH IN CONTACT WITH TREE TRUNK. MAINTAIN THE MULCH WEED-FREE FOR A MINIMUM OF THREE YEARS AFTER PLANTING.

NOTE: FOR DIMENSIONS OF PLANTING AREAS, TYPES OF SOIL, AMENDMENTS, OR SOIL REPLACEMENT. SEE "SOIL IMPROVEMENT DETAILS."



EACH TREE MUST BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL. TREES WHERE THE TRUNK FLARE IS NOT VISIBLE SHALL BE REJECTED. DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL.

MULCH RING
 1800 MM (6 FT.) DIAM. MIN.
 2400 MM (8 FT.) DIAM. PREFERRED

200 MM (8 IN.)

100 MM (4 IN.) HIGH EARTH SAUCEP BEYOND EDGE OF ROOT BALL

REMOVE ALL TWIG, ROPE AND WIRE, AND BURLAP FROM TOP HALF OF ROOT BALL.

IF PLANT IS SHIPPED WITH A WIRE BASKET AROUND THE ROOT BALL, CUT THE WIRE BASKET IN FOUR PLACES AND FOLD DOWN 200 MM (8 IN.) INTO PLANTING HOLE.

PLACE ROOT BALL ON UNEXCAVATED OR TAMPED SOIL.

TAMP SOIL AROUND ROOT BALL BASE FIRMLY WITH FOOT PRESSURE SO THAT ROOT BALL DOES NOT SHIFT.

NOTES

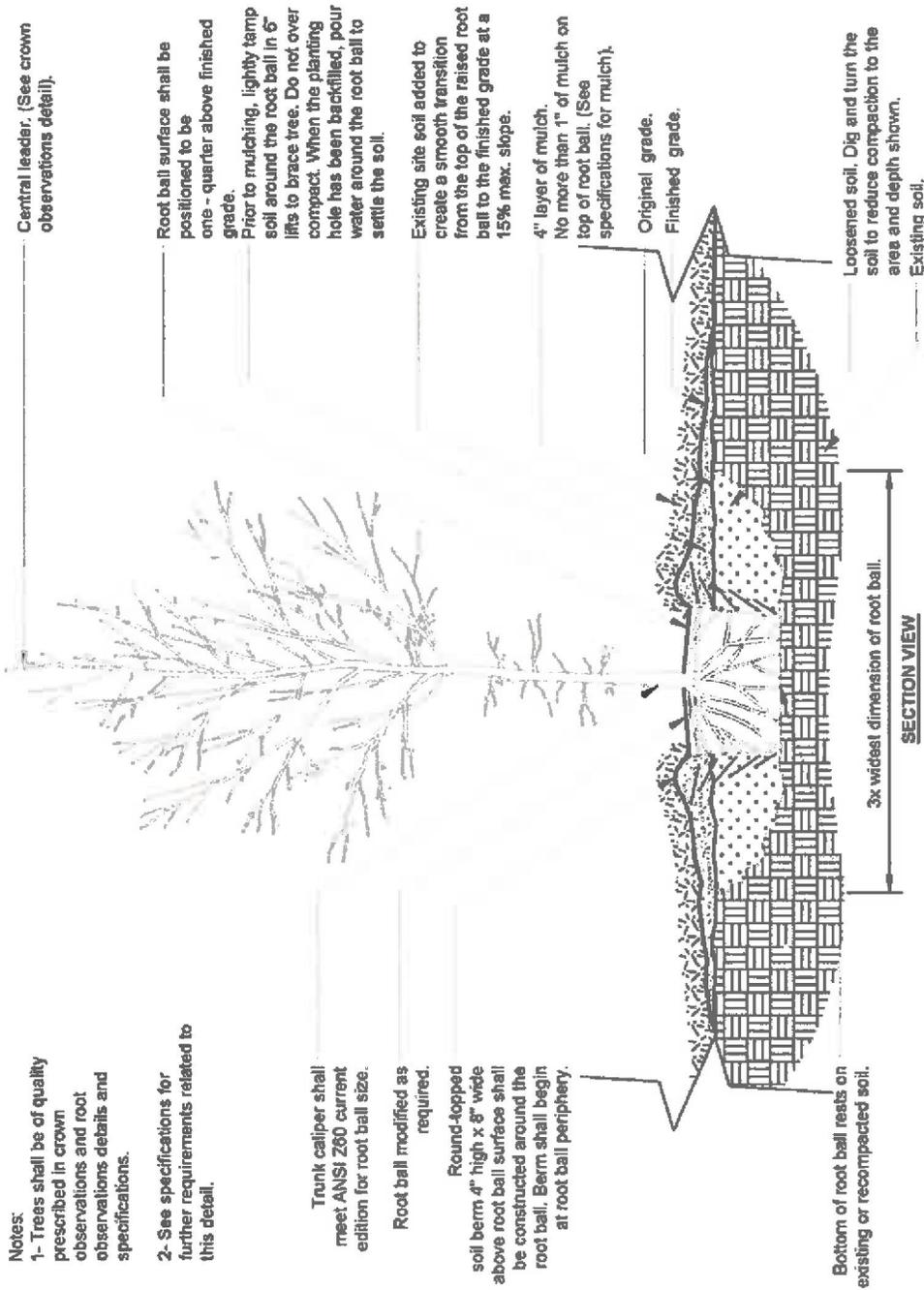
- PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.



TREE PLANTING DETAIL - B&B TREES IN ALL SOIL TYPES

NOTE: THIS DETAIL ASSUMES THAT THE PLANTING SPACE IS LARGER THAN 2400 MM (8 FT.) SQUARE, OPEN TO THE SKY, AND NOT COVERED BY ANY PAVING OR GRATING.

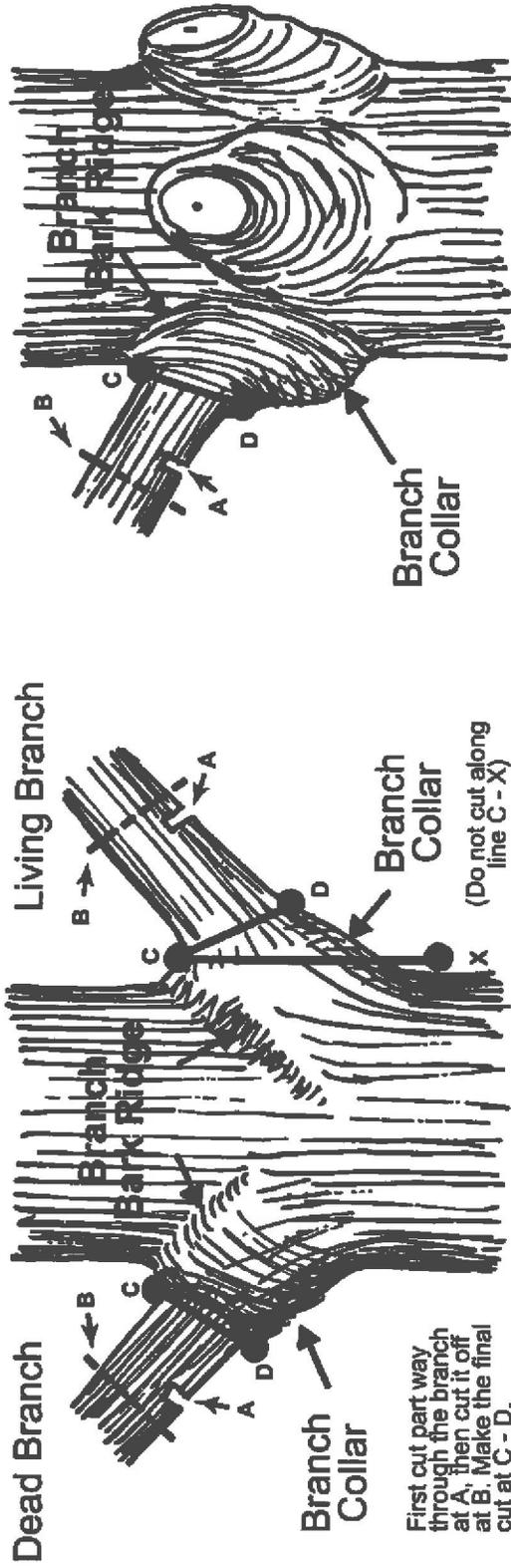
Appendix D: Containerized Planting Detail



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Appendix E: Tree Pruning Detail

Proper Pruning Principles

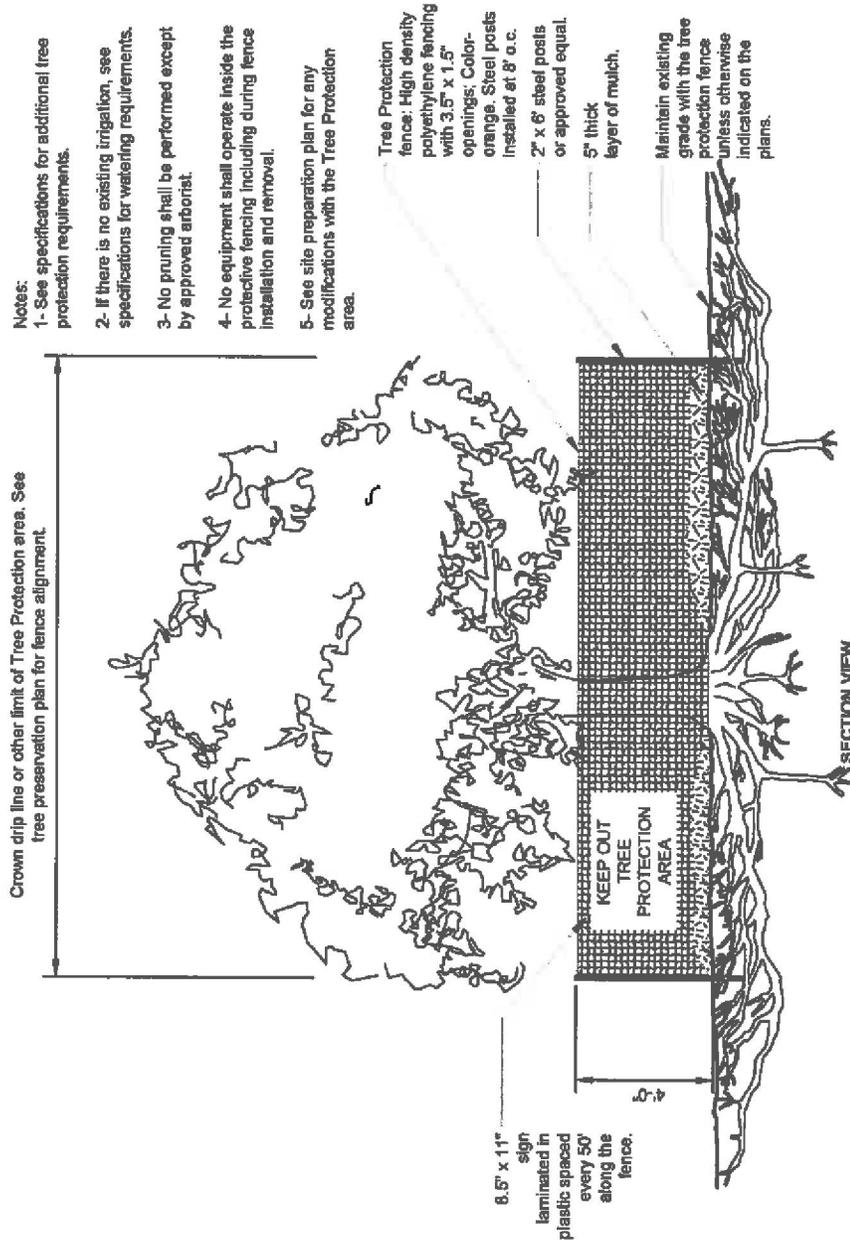


Hardwoods

Conifers



Appendix F: Tree Protection Detail



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TREE PROTECTION



Appendix G: ISA Tree Risk Assessment Form (TRAQ Level 2-Basic)

ISA Basic Tree Risk Assessment Form

Client _____ Date _____ Time _____
 Address/Tree location _____ Tree no. _____ Sheet _____ of _____
 Tree species _____ dbh _____ Height _____ Crown spread dia. _____
 Assessor(s) _____ Time frame _____ Tools used _____

Target Assessment

Target number	Target description	Target zone				Occupancy rate 1 - rare 2 - occasional 3 - frequent 4 - constant	Practical to move target?	Restriction practical?
		Target within drip line	Target within 1x Ht.	Target within 1.5x Ht.	Target within 2x Ht.			
1								
2								
3								
4								

Site Factors

History of failures _____ Topography Flat Slope _____ % Aspect _____
 Site changes None Grade change Site clearing Changed soil hydrology Root cuts Describe _____
 Soil conditions Limited volume Saturated Shallow Compacted Pavement over roots _____ % Describe _____
 Prevailing wind direction _____ Common weather Strong winds Ice Snow Heavy rain Describe _____

Tree Health and Species Profile

Vigor Low Normal High Foliage None (seasonal) None (dead) Normal _____ % Chlorotic _____ % Necrotic _____ %
 Pests _____ Abiotic _____
 Species failure profile Branches Trunk Roots Describe _____

Load Factors

Wind exposure Protected Partial Full Wind funneling _____ Relative crown size Small Medium Large
 Crown density Sparse Normal Dense Interior branches Few Normal Dense Vines/Mistletoe/Moss _____
 Recent or planned change in load factors _____

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown LCR _____ %
 Dead twigs/branches _____ % overall Max. dia. _____
 Broken/Hangers Number _____ Max. dia. _____
 Over-extended branches
 Pruning history
 Crown cleaned Thinned Raised
 Reduced Topped Lion-tailed
 Flush cuts Other _____
 Cracks _____ Lightning damage
 Codominant _____ Included bark
 Weak attachments _____ Cavity/Nest hole _____ % circ.
 Previous branch failures _____ Similar branches present
 Dead/Missing bark Cankers/Galls/Burls Sapwood damage/decay
 Conks Heartwood decay _____
 Response growth _____

Main concern(s) _____

Load on defect N/A Minor Moderate Significant
 Likelihood of failure Improbable Possible Probable Imminent

— Trunk —

Dead/Missing bark Abnormal bark texture/color
 Codominant stems Included bark Cracks
 Sapwood damage/decay Cankers/Galls/Burls Sap ooze
 Lightning damage Heartwood decay Conks/Mushrooms
 Cavity/Nest hole _____ % circ. Depth _____ Poor taper
 Lean _____ ° Corrected? _____

Response growth _____
 Main concern(s) _____

Load on defect N/A Minor Moderate Significant
 Likelihood of failure Improbable Possible Probable Imminent

— Roots and Root Collar —

Collar buried/Not visible Depth _____ Stem girdling
 Dead Decay Conks/Mushrooms
 Ooze Cavity _____ % circ.
 Cracks Cut/Damaged roots Distance from trunk _____
 Root plate lifting Soil weakness

Response growth _____
 Main concern(s) _____

Load on defect N/A Minor Moderate Significant
 Likelihood of failure Improbable Possible Probable Imminent

Appendix H: ANSI Z133.1 Standards - Applies to All Sections

All of the ANSI Z133.1 safety standards shall apply to all tree care operations outlined in the Urban Forestry Management Plan. Listed below is a basic overview of the standard, and it is not verbatim. A full text of this manual will be made available to all Village of Hawthorn Woods employees and contractors involved with tree care operations.

1. All tools and equipment utilized during tree care operations, including those not specifically mentioned below, shall be inspected and maintained by qualified personnel in accordance with the manufacturer's care instructions.
2. All staff shall be trained in the proper use, inspection, and maintenance of said equipment.
3. Certified arborists or arborist trainees shall conduct job briefings daily prior to tree care operations of any kind and the information shall be communicated to all workers.
4. All activities performed on any job site for any activity outlined in this Urban Forestry Management Plan shall comply with all applicable OSHA guidelines and standards.
5. Traffic and pedestrian control shall be established around the job site prior to the beginning of tree care operations.
6. Emergency contact information and a safety kit conforming to the ANSI Z308.1 standards shall be made available to all workers. All employees shall have basic instruction on the use of CPR and First Aid.
7. Personal Protective Equipment (PPE) shall be required when there is a reasonable probability of injury or illness on the job site. Such a determination will be made by the Certified Arborist or Arborist Trainee prior to the beginning of tree care operations each day, and PPE shall be made available. PPE shall be well-maintained in accordance with the manufacturer's requirements.
8. Head protection shall conform to ANSI Z89.1, face and eye protection shall conform to ANSI Z87.1, respiratory protection shall comply with ANSI Z88.2, and leg protection shall always be worn when using a chainsaw.
9. Flammable liquids shall be kept a minimum of ten feet from open sources of flame or high heat and shall be stored in approved containers.
10. All VHW staff and contractors working near electrical hazards shall be qualified to do so and shall be educated in the full ANSI standards for Electrical Hazards and Line Clearance.
11. Vehicles and mobile equipment shall be inspected and maintained by qualified personnel in accordance with the manufacturer's requirements and shall be equipped with all standard safety devices, decals, and instructions, and shall be operated within all federal, state, and local motor vehicle codes and ordinances.

12. Aerial devices shall be inspected and maintained by qualified personnel in accordance with the manufacturer's requirements, and shall be equipped with all standard safety devices, decals, and instructions.
13. Aerial devices shall be stabilized by wheel chocks, outriggers, or stabilizers as necessary for the device, and shall never be used to lift, hoist, or lower logs or equipment unless specifically designed to do so.
14. Aerial devices shall be equipped with fall protection devices and permanent load ratings, both in accordance with ANSI/SIA 92.2 or 92.5, as applicable to the specific aerial device.
15. No aerial device shall be allowed to make contact with electrical conductors, and minimum safe approach distances shall be maintained in accordance with the ANSIZ133.1 Standard.
16. All brush chippers shall be inspected and maintained by qualified personnel in accordance with the manufacturer's requirements, and shall be equipped with all standard safety devices, decals, and instructions.
17. Sprayers and related plant health care equipment shall be inspected and maintained by qualified personnel in accordance with the manufacturer's requirements, and shall be equipped with all standard safety devices, decals, and instructions
18. Sprayer tanks or other similar enclosed spaces shall not be entered unless performed through a confined-space entry plan in accordance with OSHA 1910.46 Requirements, including air-quality testing, training, and PPE.
19. Chain saws and other similar portable power tools shall not be operated unless the manufacturer's safety devices are in proper working order. Such safety devices shall not be removed or modified.
20. Forestry staff shall have a minimum of two points of attachment to the tree or aerial device while operating a chainsaw at all times, unless the hazard posed by the second point of attachment poses a greater hazard than utilizing one point of attachment.
21. A visual hazard assessment, including a root collar inspection, shall be performed by a certified arborist or arborist trainee prior to climbing, entering, or performing work in or on any tree, and a second crew member shall be within visual or voice communication at all times during arboricultural operations that are in excess of 12 feet from the ground surface.
22. All ropes, saddles, carabiners, and other similar climbing equipment shall be: a) approved for use in the tree care industry by the manufacturer, b) have a minimum breaking strength or load capacity of 5,000 lbs., c) be inspected before each use, d) Equipment shall be removed from service when it shows signs of excessive wear or deterioration.

23. All pruning, removal, and rigging operations shall have a designated drop zone where limbs, trunks, and tools can be dropped from aloft without impacting pedestrians or passersby. A visual or verbal communication system between the employee aloft and the employee(s) on the ground shall be established to determine when the employee aloft will safely drop tree parts or tools.
24. Any tree parts which cannot be safely dropped or controlled from aloft shall have a separate rigging line tied to them to help control their fall. The tree shall be inspected for structural stability prior to the establishment of a rigging system in the tree. When trees appear to have defects that could jeopardize the ability to safely use a rigging system to drop or control a limb, an alternate plan shall be implemented.
25. All equipment utilized in rigging shall meet the load ratings for the limb being rigged, and a qualified employee, trained in proper rigging procedure shall determine the rigging procedure and equipment to be utilized. Any equipment which has been damaged or overloaded shall be removed from service.
26. When felling (removing) a tree, a crew leader shall make the determination of what equipment is necessary, and how many crew members are to be directly involved in drop zone operations. A well-established escape route shall be planned for involved workers prior to the beginning of felling operations. Any non-involved workers shall be beyond twice the height of the trunk or tree being removed during felling operations.
27. Notches shall be used on all trees and trunks greater than five inches in diameter during felling operations and should conform to the standards set forth in the ANSIZ133.1 Standard.
28. Loose clothing, ropes, lanyards, and saddles shall not be worn during any tree care activity where the risk of entanglement with tools or machinery is possible, particularly with brush chippers.

Appendix I: Tree Planting Standards (ANSI/ISA BMP)

ANSI Z60.1

1. All root ball and container sizes for all balled and burlapped stock shall conform to the Z60.1 standards for width and depth, such that they encompass enough of the fibrous root system as necessary for the full recovery of the plant upon installation.
2. All bare root stock shall conform to ANSI Z60.1 standards for minimum root spread.
3. All containerized stock shall conform to ANSI Z60.1 standards for plant and container size, as specified by VHW, and shall be healthy, vigorous, well-rooted and established in the container in which it is growing. The root system shall reach the sides of the container but shall not have excessive growth encircling the inside of the container.
4. All collected plants (those grown on unmanaged land) shall be so designated, and shall be considered to be nursery-grown stock when they have been successfully reestablished in a nursery row and grown under regular nursery cultural practices for a minimum of two growing seasons.
5. The trunk or stem of the plant shall be in the center of the ball or container, with a 10% overall variance in location.
6. The use of digging machines in both the packaging and installation of trees is considered an acceptable nursery practice.

ANSI A300 - Part 6

1. Planting sites and work sites shall be inspected for hazards by VHW prior to the beginning of work each day. If portions of the work site are outside of the original scope of work, the controlling authority shall be notified immediately.
2. Location of utilities, obstructions, and other such hazards above and below ground shall be taken into account prior to planting and transplanting operations. These include, but are not limited to, gas, electric, sewer, communication, drainage, and signage.
3. The following shall be taken into consideration prior to transport and planting: Requirements of individual trees, compass orientation of field-grown trees, site feasibility assessments, soil assessment, and drainage assessment.
4. Tools for planting and transplanting shall be properly labelled or purchased for their intended use, and be maintained in accordance with the manufacturer's recommendations
5. The system used to move and store the plant shall minimize desiccation and other damage to the crown, trunk or rootball, and the health and vigor of the plant shall be maintained during these periods.

6. The hole to be dug for all new plantings shall be a minimum of 150% larger than the root ball or container diameter, as deep as the root flare of the tree to be planted and shall have sides from which soil has been loosened in order to aid in root penetration.
7. For balled and burlapped trees, all root ball supporting materials shall be removed from the upper third of the root ball and removed from the planting hole prior to final backfilling.
8. Prior to planting, container root balls shall be managed by approved methods such as, shaving the root ball, slicing the root ball, and redirecting or removing encircling roots.
9. Backfill shall comprise of either the same soil created when the hole was excavated, or a similarly amended mixture to meet a specific objective and shall be applied in a layered fashion to reduce future settling and prevent air pockets.
10. Mulch shall be applied at a depth of two to four inches, near - but not touching - the trunk of the tree and extending to the perimeter of the planting.
11. Support systems such as guy-wires or stakes shall not be installed except where needed.

ISA BMP Manual - Tree Planting

1. Timing of planting shall be determined based on the species, and the best professional opinion of the employees of or contractors working for the Village of Hawthorn Woods.
2. All employees and contractors employed by or working for the Village of Hawthorn Woods shall be familiar with the following types of planting types, and when it is appropriate to use each:
 - A. **Bare-Root:** Field-grown, and dug without soil during the dormant season
 - B. **Ball and Burlap:** Field grown and packaged with a soil ball, using burlap, twine, and a retaining basket of some kind
 - C. **Tree Spade:** Transplanted using a mechanical tree spade to hold the soil ball during transport
 - D. **In-Ground Fabric Bag:** Field grown with the root mass contained in a semi-permeable fabric bag
 - E. **Container Grown:** Grown above ground in containers of various shapes, sizes, and materials
3. Trees packaged with root balls must have their first structural root within two inches of the soil surface. Trees with deeper structural roots will not perform well when transplanted and should be avoided when selecting nursery stock.

4. Trees with root balls shall be handled by the ball, not the stem, to ensure no damage occurs to the root-soil interface or to the stem itself.
5. Trees with leaves shall be transported with a fabric tarp to minimize desiccation and have had their root balls wetted prior to transport.
6. Sites shall be tested for drainage, nutrient levels, and pH prior to planting (or prior to species selection, if possible).
7. Container stock shall be removed from its container, and any encircling roots pruned off prior to planting, and the root ball shaved as necessary.
8. For balled and burlapped trees, encircling roots shall be mitigated prior to planting, wrappings shall be left on until the tree is in the hole; wrapping shall then be removed from the third to fourth of the wire basket and burlap from the top of the ball.
9. As soil is added, wet and tamp each layer down to ensure good moisture and reduction of air bubbles.
10. Do not prune trees at time of planting, unless to remove dead, dying, diseased, or cracked branches, as it may take away from root development to have the tree attempt to heal these above-ground wounds.
11. The use of trunk wrap may be considered in areas with harsh winters, specifically on trees with thin bark, such as London Planetree and certain Maple species.

Appendix J: Tree Pruning Standards (ANSI/ISA BMP)

ANSI A300 - Part 1

1. A designated Arborist or Arborist Trainee shall visually inspect each tree before beginning work. If any condition is observed above and beyond the original scope of work, said condition shall be reported to the controlling authority before any work begins.
2. Pruning cuts which remove a branch at its point of origin shall be made close to the trunk or parent branch without cutting into the branch-bark collar or leaving a stub.
3. Pruning cuts made to reduce the length of a limb or parent stem shall be made at a slight angle relative to the remaining stem, and not damage the remaining stem. If pruning to a lateral branch, the lateral should be large enough to assume the terminal role.
4. Final cuts shall be made such that the result is a flat surface, with the adjacent bark firmly attached.
5. Not more than 25% of the foliage shall be removed during an annual growing season, depending on the tree species, size, age, and condition. If more frequent pruning due to utilities, vistas, or health considerations is necessary, removal of the tree should be considered as an alternative to pruning.

ISA BMP Manual

1. All employees or contractors directly involved with the pruning of trees shall be familiar with the following pruning types and how they are to be used in conjunction with one another:
 1. **Pruning to Clean:** Selective removal of dead, diseased, detached, cracked, and broken branches
 2. **Pruning to Thin:** Selective removal of small live branches to reduce crown density
 3. **Pruning to Raise:** Selective removal of branches to provide vertical clearance
 4. **Pruning to Reduce:** Selective removal of branches and stems to decrease the height or spread of a tree or shrub
 5. **Structural Pruning:** Selective removal of live branches and stems to influence the orientation, spacing, growth rate, strength of attachment, and ultimate size of branches and stems
 6. **Pruning to Restore:** Selective removal of branches, sprouts, and stubs from trees and shrubs which have been topped, severely headed, vandalized, lion-tailed, storm damaged, or otherwise damaged
2. Every effort shall be made to time pruning of individual tree species to be done in accordance with best management practices for the tree species in question. All pruning work shall be done so at the discretion of the Village of Hawthorn Woods and its approved contractors.

Appendix K: Tree Protection (ANSI/ISA BMP)

ANSI A300 – Part 5

1. Tree management plans and specifications for tree management shall be written and administered by a certified arborist qualified in the management of trees and shrubs during site planning, development, and construction. Such activities may include, but are not limited to: demolition, grading, building construction, walkway or roadway construction, excavation, trenching and boring, or other such activity which has the potential to negatively impact trees.
2. The management of trees and shrubs shall be incorporated into the following phases of the site development process:
 - A. Planning
 - B. Design
 - C. Pre-Construction
 - D. Construction
 - E. Landscape
 - F. Post-Construction
3. During the Planning phase, an assessment of tree and shrub resources on the site shall be performed by a certified arborist. The assessment shall identify the species, condition, and size of each tree and shall be incorporated into the site design. Trees to be retained or protected shall appear on site design maps. Trees on neighboring property which could also be impacted should also be considered.
4. During the design phase, a tree management report shall be developed for trees to be conserved on the site, and shall be included in the construction plans and specifications, which may include, but are not limited to:
 - A. Trees to be retained
 - B. Tree and Root Protection Zones (TPZ/RPZ)
 - C. Tree Protection Zone barriers
 - D. Tree Protection plans
 - E. Soil erosion control
 - F. Soil compaction controls
 - G. Staging and storage areas
 - H. Other relevant on-site activities

5. Grading and demolition plans shall include all trees to be retained and removed, as well as the tree protection plans for working around trees to be retained. Plans shall also include equipment routes for avoiding the TPZ. Consequences for non-compliance shall be specified.
6. During the pre-construction phase, all tree protection plans shall be effectively communicated to all parties involved with the site development, and tree protection zone barriers shall be in place prior to the beginning of any construction activities.
7. The TPZ shall be delineated around all trees to be protected during construction, and shall be based on the size, species, and condition of the tree and its root system. Six to 18 times the diameter of the tree is generally considered to be acceptable. Deviations from this diameter may be made at the discretion of a certified arborist. Activities which could damage tree roots or compact soil should be avoided in the TPZ
8. Fencing or other visible barriers to the TPZ shall be installed prior to site clearing, grading, and demolition, and maintained throughout the construction and landscaping phase. When this is not feasible, alternate methods may be considered.
9. During the construction phase, compliance with tree protection plans shall be monitored by a certified arborist, and any damage to tree barriers or trees, or non-compliance shall be reported to the project manager or owner, or other controlling authority.
10. When removing vegetation or pavement during demolition, equipment used adjacent to the TPZ shall be specified to avoid damage to the tree and the surrounding soil, and soil protection measures shall be in place prior to vehicle or heavy traffic in or near the TPZ.
11. Storage or disposal of construction materials or hazardous materials shall not occur in the TPZ.
12. Fill within the TPZ shall not be permitted without mitigation to allow for proper air and water availability to existing roots. If fill cannot be avoided in the TPZ, compaction of fill shall be avoided, and consideration shall be given to a permanent well installation to protect the tree and its roots.
13. During the landscape, irrigation, and lighting phase, levels of compliance shall be documented and reported by a certified arborist. Non-compliance shall be reported to the project manager.
14. During the post-construction phase, a remedial and long-term maintenance plan shall be specified for existing and new landscaping, to ensure success of preservation efforts and newly planted landscaping.
15. Pruning shall be considered to reduce wind sail when necessary. It should not be considered to compensate for root loss.
16. Mulch shall be applied to as much of the tree protection zone as possible, in order to create a favorable soil environment for root recovery after construction activities.

ISA BMP Manual

1. A cost-benefit analysis shall be conducted during the planning phase. In some cases, money may be better invested in tree planting post-construction.
2. The species and age of tree shall be evaluated by a certified arborist, so that trees in good condition with desirable characteristics are preserved, but those in poor condition or with undesirable characteristics are not.
3. A tree inventory and tree management report shall be conducted during the planning phase, and a certified arborist shall work closely with developers to ensure best management practices are being met for both parties.
4. Effort shall be made to retain groups of trees, such that there is a wind and solar buffer around the highest quality trees if possible.
5. The Critical Root Zone (CRZ) is the area around the tree trunk where roots essential for tree health and stability are located. A Tree Protection Zone (TPZ) is an arborist-defined area around the tree which should include the CRZ, as well as additional area to ensure future stability and growth. The TPZ is subject to the professional opinion of the certified arborist.
6. An attempt shall also be made to preserve native soil for landscape planting as native soil with horizons and development is preferred over fill or black dirt.
7. If a sufficient TPZ cannot be established, a 6-12" layer of hardwood mulch, 3/4-inch plywood mat over a four-inch layer of hardwood mulch, or other such measures shall be temporarily installed over the CRZ in order to prevent root and soil compaction.
8. Trunk protection shall be installed on trees very close to construction activities, and should consist of 2x4 or 2x6 planks, strapped snugly to the tree trunk with wire or other strapping, preferably with a closed-cell foam between the trunk and the planks.
9. When roots over one inch cannot be avoided, they shall be pruned, not left torn or crushed. Acceptable methods of pruning are:
 - A. Excavation using supersonic air tools, pressurized water, or hand tools, followed by selective root cutting
 - B. Cutting through the soil along a predetermined line with a tool designed to cut roots
 - C. Mechanically excavating the soil and selectively pruning remaining roots.
10. Wells, tree islands, retaining walls, and other such structures or strategies shall be considered as alternatives to any cut/fill work in the CRZ or TPZ.
11. Monitoring shall take place during construction and post-construction phases, and any non-compliance should be reported to the proper controlling authority right away, so that timely remediation or mitigation efforts may be undertaken.