220142

To: Public Works and Environmental Concerns Committee

From: Eric Hendrickson, Forestry & Urban Landscape Supervisor EH

Through: Carl Goldsmith, Director of Public Works

Date: 4/4/22

RE: Urban Forestry Management Plan

On January 4, 2021, the Village of Lombard received an Urban and Community Forestry Funding Grant from the State of Illinois Department of Natural Resources to update our Forestry Management Plan. The designated consultant for the northern portion of the state was Great Lakes Urban Forestry Management. Our previous Forestry Management plan was written in 1998 and partially updated in the early 2000's. Staff worked extensively with the consultant to craft a plan which is well suited for the Village of Lombard.

The Urban Forestry Management Plan is a public document which details the way the Village manages its urban forest. The updated plan details the state of the Village's urban forest and reflects current maintenance practices and standards. Additionally, the plan sets forth short-term and long-term goals. Some of these goals reflect current Village practices and others are targets to strive towards, if the Village so desires. The plan contains an updated acceptable/unacceptable species list. Placing thus list in the UFMP allow staff to modify the list should new information become available regarding tree species without requiring changes to the Tree Ordinance. Contained within the appendixes of the plan are industry recognized standards and practices for tree care and protection. Flexibility is built into the plan, including periodic review to allow the Village to adapt to changes in priorities and resources.

Staff recommend the adoption of this management plan for Village owned trees.

Att: UFMP

Village of Lombard, IL

Urban Forestry Management Plan

Prepared By

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Prepared On

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OVERVIEW OF LOMBARD'S URBAN FOREST MANAGEMENT PLAN

Lombard, Illinois currently manages 18,998 trees, with 271 currently marked for removal, throughout its Village parkways and municipal properties. There are also 2,330 currently planting spaces recorded with 681 already slated for replacement trees resulting in a net 1,649 open spaces. The Village has maintained inventory data on their parkway trees and that data was used to create this Urban Forest Management Plan which will detail how these trees will be managed for the benefit of the Village of Lombard over the next 10 years, with a focus which begins in 2022, and projects out to 2032.

In terms of the condition of the Urban Forest in Lombard, there are both strengths and opportunities for improvement. Among the strengths is the fact that the Village has been pro-active in obtaining a tree inventory and using it to manage the tree population. The Village has also been committed to implementing a consistent cycle pruning program and has also put efforts into improving diversity. Removals have also been satisfactorily managed in order to mitigate risk. Some challenges include understaffing, some residents' negative perceptions of trees and public works staff, and periodic decreases in budgets. The current budget being applied towards forestry management should likely be larger. At $852,240 per year, this is enough to fulfill Capital Improvement Plan (CIP) items for contract pruning, removal and tree planting as well as other fundamental needs, but even a modest increase in budget would allow Lombard to accomplish much more.

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 challenges and create goals and milestones for each. Below is a broad view of the direct goals to come in the 2022-2032 period. 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.

This Plan intends to enhance the existing urban forestry program which strives to achieve the greatest benefit for the community, based on the available data we have from the inventory, as well as input from stakeholders and residents of the Village of Lombard.

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 that this plan is to be a dynamic document, and goals and strategies will be updated to fit new circumstances as needed.

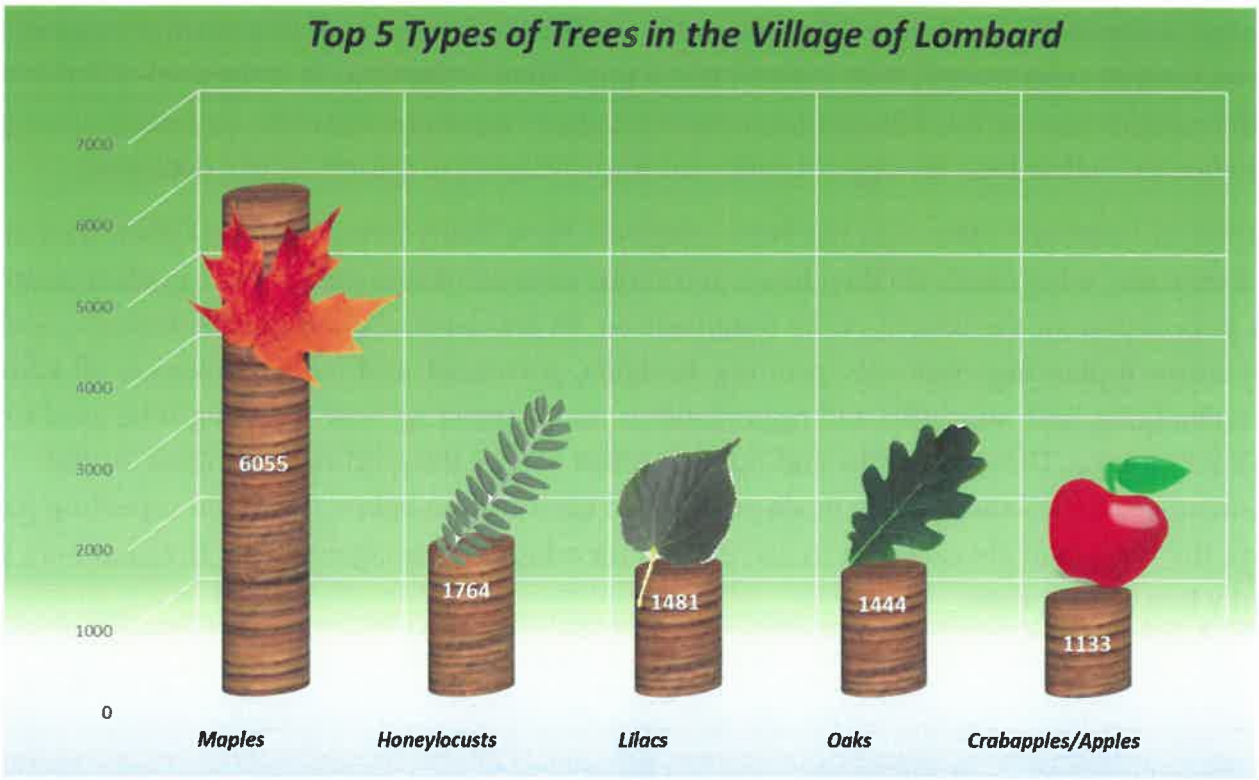
This Plan should be reviewed periodically by the Public Works and Environmental Concerns Committee (PWECC) along with other Village staff at which point the Village, and its residents, business owners, and other stakeholders will have an opportunity to provide input and help improve the Plan during those 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 in the Village of Lombard, Illinois to increase canopy cover, maximize the benefits trees provide while minimizing cost, mitigate against climate change, and create a program to manage the Urban Forest Resource for the greatest public good in a manner that is both financially and programmatically sustainable, while maintaining flexibility for future adaptive management.

LOMBARD'S URBAN FOREST: AT A GLANCE...

Total Number of Trees	*18,998*
Net Open Planting Spaces	*1,649*
Total Number of Species	*140*
Annual Benefits Provided	*$2,959,699/yr*
Standing Value	*$28,410,000*



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 the Village of Lombard, its residents, 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 the Lombard Village Board, Lombard Public Works, PW Forestry Division, the PWECC, and any other 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 Lombard'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 Lombard's tree data has been analyzed: How many trees, what condition they are in, how old they are, what needs do they have, and more were all examined to create goals to improve the tree population for the benefit of the organization, its residents, 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 the Village's advantage. These strengths and opportunities will be the guiding principles for the management strategies and specific goals outlined in each section below. To avoid repeating past mistakes, the Plan shall also attempt to leave room for adaptive management, so the plan may be changed when appropriate.

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. Enhancing a highly functional forestry program will require a series of attainable goals to in order to be 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 the Village'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 incorporate both a budget and a time frame in which those goals can be accomplished. The overarching goal will be to have Lombard use this UFMP to create a more sustainable and adaptable forestry program within a 5-10 year period.

This program will include tree planting, tree maintenance, and tree removal for Lombard's Urban Forest, so that the tree population will be healthy, and the focus will be on maximizing benefits and minimizing risk for the community. To learn more about the budgets, see the individual goals in each section below, or turn to the budget sections starting on page 41 or the budget summary on page 63.

Update Village Ordinances for Enforcement of Tree Policies

With assistance from Morton Arboretum, working in tandem with Lombard staff and relevant community stakeholders, a goal has been to edit and improve ordinances governing trees in Lombard. These ordinances are meant to reinforce proper practices while discouraging improper practices and care, and are not meant to be overly punitive, but rather to encourage the community to engage in proper tree care practices for the benefit of all parties. These ordinances are common industry regulations, such as enforcing rules about what trees cannot be planted because they are undesirable trees or defining exactly what trees are the Village's and the homeowner's responsibility, among other things. The goal of these ordinances is to create a tree population which is diverse, healthy, and providing the greatest benefit to the Village and its residents over the long term.

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.

An achievable "Diversity Vision" has been created for 2032 which will see the tree population become far more diverse than it is at present. The current population includes 140 individual species and the diversity vision included in the Plan aims to reduce the number of trees that are over-represented and/or lower quality species while also seeking to increase the number of species that are under-represented or not present in the tree population.

Not only will trees be planted which are underrepresented or not present in the current population, they will also be planted in such 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, Lombard plants approximately 215-250 trees each year, and this plan seeks to increase that to 300 trees per year, to both be able to replace older declining trees, as well as to grow the tree population by 600 trees overall by 2032. Ideas such contract growing, creating in in house liner nursery and others will be explored. To learn more about tree planting and reforestation, turn to page 46 and Appendices A & B.

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. 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 Midwest climate, are not invasive, and do not pose high risk. Included in this Plan is an "acceptable and unacceptable" list which will detail specific trees which may be planted on Village owned properties. Village Staff, Public Works, and the PWECC will review the list periodically to ensure that it is being maintained in accordance with the latest information on specific trees. For more information on what species can and cannot be planted in Lombard, 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. The Village already has a robust tree removal program and Forestry staff is constantly assessing the health of parkway trees and many removals are identified outside of the inventory updating process. In 2020, 612 trees were marked for removal and removals are typically completed within a year. In 2022, it is expected that 300 will be identified for removal. Cost projections for tree removals have been made based on the number, age, and condition of trees in Lombard 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 bid specifications to ensure the Village is hiring qualified contractors who will be held to the highest industry standards. For more information on Lombard's tree removal program, turn to page 41.

Maintain 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 Lombard. Lombard's cyclic tree maintenance program was begun in 1995 and helps to increase tree health and vigor while reducing costs associated with storm damage and tree failure. It has been modified several times through the years to reflect goals, staffing levels and available resources. Pruning is done by Lombard staff or reputable contractors. The Village currently prunes trees 7" DBH and over on a 6 year cycle and trees 6" DBH and under are on a 3 year cycle. The total number of trees pruned varies between 2500 and 4000 trees depending upon the area being winter pruned and this also does not include request pruning. All young tree pruning (<=6") currently done by Forestry staff. Trees 7" and greater are pruned using a mixture of Village staff and contracted resources. There has been interest in moving to a 5 year cycle for larger trees as in years 5 and 6 many trees are in need of being raised over the roadway, walks and driveways. For more information on tree pruning maintenance, turn to page 50.

Maintain an Accurate Tree Inventory on an Annual Basis

Managing an urban forest requires a clear understanding of the trees, their ages, conditions, and locations, so that Village crews and contractors can perform work on these trees. A stem-by-stem tree inventory was initially completed in 1998. A portion of the inventory has been updated every year since on a rotating basis. Currently, all inventory data is at most 6 years old. The inventory data provides an unbiased assessment of all of the trees on public Right of Ways in the Village, and will serve as the data which will guide the forestry program throughout the next 10 years.

All inventories are a snapshot in time. With 18,998 trees on Village parkways and ROWs, the tree inventory should continue to be maintained at a high level of accuracy so that it does not become out of date. Maintaining this tree data at a high level is vital in the execution of this Management Plan. Staff currently updates the inventory in one of the 6 pruning zones each year on a rotating basis so data on no section of town is more than 6 years old. If we were to move to a 5 year pruning cycle, the inventory updating would be modified accordingly. Inventory data is also entered for new trees upon planting. Inventory data is updated when trees are marked for removal to ensure proper DBH and condition ratings. Removed trees are retired from the inventory once the final stump grinding and restoration tasks have been completed for each tree.

Proper Mulching of All New Plantings

As noted above, 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 Village plantings will be properly mulched at the time of planting by Village staff. 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 56-57.

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 the Village 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), bid documents, or contracts when seeking qualified contractors. Village staff might also consider providing basic guidelines/classes for residents on BMPs. This UFMP will be placed in the public domain for all to use as a reference.

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. The Village's current tree risk assessment policy has been incorporated into this plan. This policy aids in the identification and documentation of trees which are candidates for removal or mitigation efforts 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 Tree Risk Assessment Policy has been created on page 61 and an ISA Basic Tree Risk Assessment Form can be found in Appendix G.

Increase Urban Tree Canopy from 26.90% to 28%

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 streets are more attractive to homebuyers and potential new businesses, which increases home values, home ownership, and tax revenue. All of these factors benefit the community, so a direct goal will be to increase tree canopy in the Village of Lombard. Currently, Lombard contains 26.90% tree canopy coverage, compared to other land cover types.

Based on data from the Chicago Region Trees Initiatives, we believe that an increase to 28% canopy cover is a realistic goal for Lombard by 2032. This will be accomplished by increasing the number of trees on publicly owned property, as well as improving tree care allowing trees to live longer, become larger, and create more canopy cover. The canopy analysis was done for all land cover types, both public and private. While Lombard does not have direct jurisdiction over private land, there are various programs that have been successful in increasing tree canopy on private land by incentivizing private citizens to plant trees.

Tree planting on private property should also be encouraged. As we will show in the detailed portions of this Plan, these are real benefits that will help Lombard Residents save money. For more information on Urban Tree Canopy, tree benefits, and other such information, turn to page 31.

Tree Preservation / Invasive Species Management

Sometimes trees can become damaged by construction activities, costing the Village money, and eliminating the benefit the tree had to the community. A tree protection zone must be established and maintained during construction and the Village should monitor construction activities to ensure local ordinances are adhered to. Current policies call for the protection of ROW trees and the Village ordinance contains language relating to the potential removal of ROW trees during construction or as a result of construction.

The removal of low quality or invasive species is also recommended. This not only increases the amount of planting space, but also increases public safety. A direct goal of this Urban Forestry Management plan is to preserve trees during construction and reduce the amount of undesirable species within the Village.

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

The primary goal of the Urban Forestry program in Lombard is to improve the lives of the residents, business owners, and other stakeholders who want to see the Village be a healthier, happier community. In order to make this happen, Lombard is looking for partners in the community to provide support for this program. In this manner, residents and business owners in Lombard 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 page 11.

Increase Stocking Density from 92% to 95%

There are also 2,330 currently planting spaces recorded with 681 already slated for replacement trees resulting in a net 1,649 open spaces. The stocking density is good at approximately 92%. While 100% stocking density would be possible to achieve over the 10 year scope of this plan, it is not actually always desirable. We do believe that 95% stocking density is attainable and desirable. This will be done primarily by increased tree plantings in the coming years, and use of innovative strategies to fund increases in tree planting.

Ensure Long Term Tree Procurement

One of the keys to a successful Reforestation Plan or Tree Planting Program is the availability of high-quality nursery stock from local sources. Incorporated with the UFMP for the Village of Lombard 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 the Village, in that the nature of the urban forest in terms of species composition is already known. It is believed that a comprehensive tree planting plan will be an important part of this process as well.

Lombard is currently a member of the Suburban Tree Consortium and has been able to find a wide variety of trees through the member nurseries. Lombard also maintains a five year advance order with several nurseries through the STC. The Village will continue to be a member of the STC and will utilize its five year advance order to work towards improved tree diversity.

Additional Goals

There are no strategic timelines set forth here for these programs. As the direct goals of the Urban Forestry program in Lombard are met or exceeded, these are goals to be discussed by the Village of Lombard and the PWECC as time and budgets become available. We believe that many of these programs represent some of the most progressive Urban Forestry policies in the current climate, and that they should all be seriously considered for implementation.

Establishment of Village of Lombard Propagation Nursery

Consideration should be given to the establishment of a small propagation nursery on Lombard-owned land. The Village of Lombard can grow a share of its own trees, using much smaller trees obtained from wholesale nurseries at a fraction of the cost of a full-sized tree. Small trees can be purchased wholesale, and then grown to maturity in Lombard. Such programs have been successfully instituted in many communities, and represents a quality investment that results in cost savings over the long term. Trees can be purchased when small, or donated from residents, and grown to plantable size on Village-owned land.

We would recommend that the Village work with the Forestry Consultant, Park District, local nurserymen, and other strategic partners in order to explore this concept, and begin the planning phase in 2025, with the goal of having a functional nursery by 2030. The amount of time required for the care of young trees is minimal, and at an average cost of $250-$300 per 2" DBH tree wholesale, the Village could save a significant amount of money in their tree planting program by pursuing this goal. In addition, not unlike a community garden, local residents could assist with the care of these nursery trees.

Enhance Cost-Sharing Program for Tree Purchase

Seeing as publicly owned trees belong to the Village, and not the residents, the Village should ultimately make the decisions on what trees will be planted at which specific sites. Species must be approved by the Forestry and Urban Landscaping Supervisor or Forestry Consultant, to ensure that the species selected is a good choice that is fit for the site. The Village has an existing cost share program in ordinance CH 99.22 (B) to be used in locations where no tree had previously been removed by the Village. In instances where the Village has removed an existing tree and sufficient room is present, the Village pays the full cost of the replacement tree. The Village may consider ways of enhancing this program.

Private Property Tree Planting Incentive Programs

Tree planting on private property is actually a direct goal of this Urban Forestry Management Plan, as noted above. Though the Village 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. The Village should consider incentivizing residents and business owners to plant trees on their property. Partnering with local nurseries to create a program where residents can purchase trees from that nursery at a reduced price may also be a way to encourage tree planting on private property.

Another idea which has been successfully implemented in other municipalities is having the Village purchase trees from a wholesale nursery at wholesale prices, and then have an annual tree sale to local residents. The Village resells the trees at a slight markup from the wholesale cost, but still less than retail, and uses the proceeds to fund its forestry initiatives. Such programs would encourage tree planting on private property by reducing tree costs to the residents.

Wood Utilization Program

As the UFMP recommendations take effect, a considerable amount of removed tree material 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. A sample Urban Timber Harvesting specification in appendix H.

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.

Forest Preserve District of DuPage County

For over 100 years the Forest Preserve District of DuPage County has strived to protect and improve the county's natural areas while providing high-quality educational and recreational experiences for the people who call DuPage home. The FPDDC is a nationally recognized conservation agency that envisions a community in which all citizens share a connection with nature and an appreciation for cultural history. They have a great wealth of knowledge, and are worth reaching out to for partnership in accomplishing the goals of this plan.

Chicago Region Trees Initiative

CRTI is actually an amalgamation of many 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 partner with local organizations to get tasks accomplished and publicized.

Illinois Arborist Association

The mission of the Illinois Arborist Association is to "Foster interest, establish standards, exchange professional ideas and pursue scientific research in Arboriculture." IAA is a professional organization made up of certified arborists from throughout the state of Illinois. The association strives to further the education of certified arborists and can serve as a valuable resource to reach the goals of this plan.

DuPage Stormwater Management Agency DuPage Stormwater Management System strives to protect businesses, homes and neighborhoods from flood damages, clean wastewater entering our plants and manage water as a vital resource for the area. The fact that trees are a valuable resource for helping to prevent excess stormwater runoff makes the Agency a potential strategic partner.

Lombard Park District

Lombard Park District may be able to coordinate environmental projects going forward including the creation of educational and outreach programs for residents to learn how to properly care for their own trees. This type of program might focus on trees, tree care, education, and other environmental initiatives.

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 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 how Lombard was funded for this UFMP. 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 Lombard accomplish the goals laid out in this plan, including additional funding for such things as tree planting or local education and outreach.

Lombard Garden Club

The Lombard Garden Club promotes an interest in gardening and the beautification of the landscape in the community. Lombard Garden Club is active in the community and in partnership with local organizations it contributes to the beauty of Lombard through donations and volunteer service. Trees are an essential part of gardening, and spreading the word about the importance of trees can be accomplished through local volunteers like those at the Garden Club and may serve as a resource for education and other environmental initiatives.

Local school districts

Urban Forestry is by and large a fairly 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 local districts could be a reciprocal relationship, where students could engage in study projects based around trees, citizen science, and volunteerism, and Lombard 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.

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.

Helen Plum Library

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

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.

Department of Public Works and the Public Works and Environmental Concerns Committee (PWECC)

The Department Public Works and the Public Works and Environmental Concerns Committee (PWECC) are the stewards of this Urban Forestry Management Plan. As the representatives of the residents of Lombard, the PWECC, in conjunction with the Department of Public Works Forestry Division, is tasked with ensuring the proper oversight of the Urban Forest so that all residents can realize its benefits. The PWECC is tasked with making informed decisions to bring to the Village Board as it pertains to decisions affecting the Urban Forest, usually based upon staff recommendations.

The PWECC may seek guidance from the Council, Forestry Consultant, and the Forestry and Urban Landscaping Supervisor, and uses its opinions and independent research to make decisions. The Department of Public Works and the PWECC are responsible for periodically updating the Urban Forestry Management Plan based on new information and new Committee Members. The PWECC considers and makes recommendations to the Corporate Authorities regarding Public Works standards and ordinances, and matters concerning health, and environmental quality concerns in the Village; plus street lighting, drainage, sewers, streets and sidewalks, forestry, subdivisions flood control and water meters issues. The Public Works and Environmental Concerns Committee meets on the second Tuesday of the month at 7 p.m. at Village Hall. Committee members serve two-year terms.

Trustee Bob Bachner, Chairperson (2025)

Trustee Anthony Puccio, Alternate Chairperson (2023)

David Arnold (2021)

VACANCY

Mark Dvorak (2021)

Joe Glazier, Jr. (2021)

Allen Hennig (2021)

John Kaforski (2021)

Mike Kuderna (2021)

Arthur Kuehl (2021)

Staff Liaisons: Carl Goldsmith, Director of Public Works

Forestry and Urban Landscaping Supervisor

The Forestry and Urban Landscaping Supervisor is responsible for implementing forestry programs with the approval and cooperation of governmental jurisdictions in Lombard. This position will seek bids from qualified Tree Care Contractors to complete the work approved by the various agencies, as well as maintain the tree inventory, and act as a representative for public concerns. At the request and/or approval of the various Councils and Committees, the duties of the Forestry and Urban Landscaping Supervisor may be performed by the Forestry Consultant, however, the Boards and the Committees will be tasked with ensuring that no conflict of interest exists in doing so. The Forestry and Urban Landscaping Supervisor will exercise authority related to planning of large-scale programs related to the Urban Forest, with the assistance and guidance of the PWECC and Urban Forestry Consultant. The Forestry and Urban Landscaping Supervisor or his designee will exercise authority related to decision-making concerning pruning or removal of Parkway Trees. The Forestry and Urban Landscaping Supervisor will exercise authority related to enforcing the existing and proposed changes to the Village Code and Ordinances as referenced by this document.

Tree Care Contractors

Tree Care Contractors are responsible for performing work identified by the Public Works Director, Forestry Consultant, and Forestry and Urban Landscaping Supervisor in a timely, safe, and expeditious manner. All Tree Care Contractors 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.

Forestry Consultant

The Forestry Consultant is responsible for impartially assessing the tree population on an a periodic basis, at the discretion of the Public Works Director and the Forestry and Urban Landscaping Supervisor. The Forestry Consultant communicates the needs of the trees to the Public Works Director and the Forestry and Urban Landscaping Supervisor so that individual needs in terms of tree planting, removal, and maintenance can be performed. The Forestry Consultant may also function as the Forestry and Urban Landscaping Supervisor during periods of the Forestry and Urban Landscaping Supervisor's absence at the request of the Village.

State of the Urban Forest

Using the tree inventory data provided by the Village of Lombard, it was determined that there are a total of 18,998 trees on Village Owned Right of Ways. The charts and statistics in this portion of the Management Plan illustrate that the tree population in Lombard can be characterized as being in overall satisfactory condition and the stocking density is good, at 92%. The species diversity in Lombard is quite high with 140 individual species represented. Based on the following data in the Management Plan, the Village of Lombard will be equipped to use this valuable information to address short term concerns, long term management considerations, and overall planning objectives.

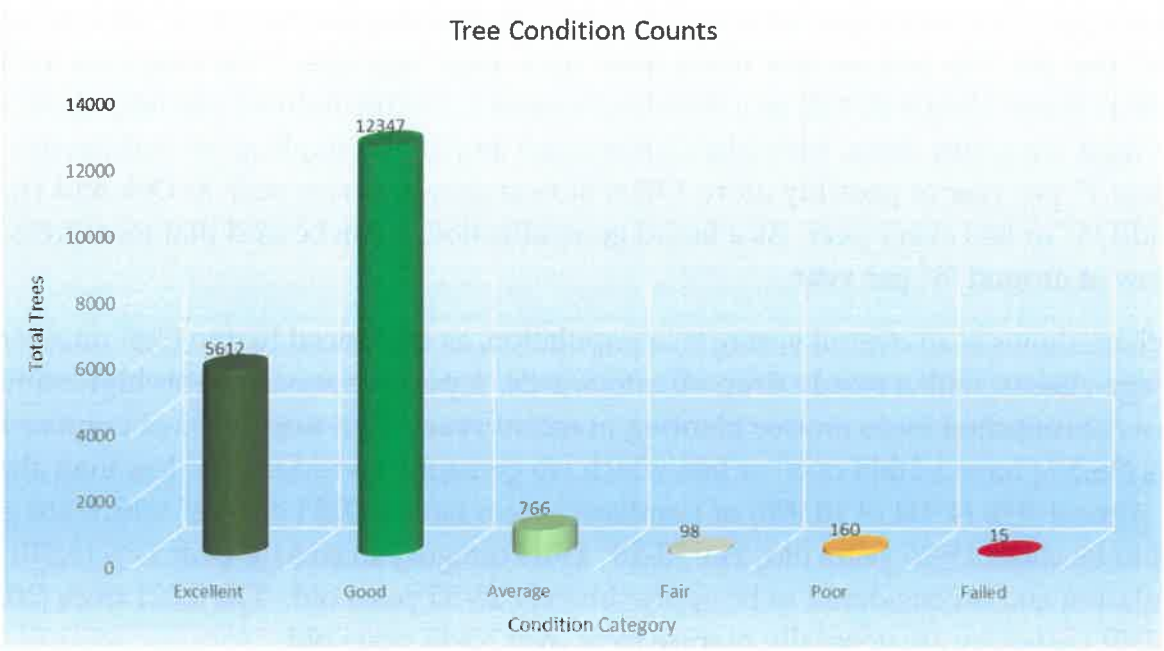
Basic Statistics – Managed Trees

Number of Trees in Inventory	18,998
Number of Open Planting Spaces	2,330
Total Number of Species	140
Total Diameter Inches	218,892"
Average Tree Diameter	11.52"

Condition Statistics

During tree inventory, the condition of each tree's health and structure was rated. This factors were combined to place the tree on a 6 point rating system. The rating criteria is as follows:

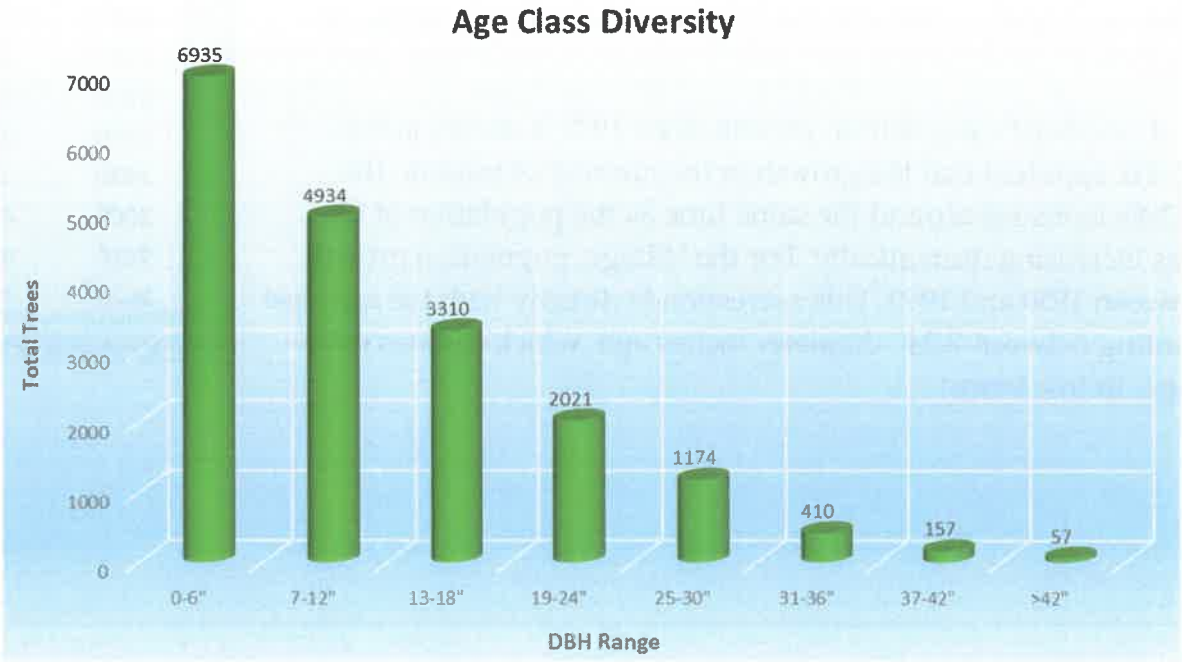
Excellent	Tree has no above ground defects beyond those which can be easily corrected with minor structural pruning.
Good	Tree has evidence of minor structural or health issues which are unlikely to shorten the tree's useful life span.
Average	Tree has evidence of structural or health issues which may or may not shorten the tree's useful life span.
Fair	Tree has some structural or health issues which are expected to limit the tree's useful life span.
Poor	Tree has one or multiple severe defects which will significantly reduce the tree's remaining useful life span.
Failed	Dead trees or trees with major structural issues which are scheduled for removal.



This chart represents the distribution of trees in each of the categories list above. As can be readily discerned, the vast majority of Lombard's trees, 65% of the population, were found to be in Good condition. The second most numerous category is the Excellent rating representing nearly 30% of the population. These statistics are indicative of a vigorous and well-maintained urban forest for which Lombard should be commended.

It is recommended that trees in Fair or Poor condition be monitored and maintained or removed as necessary. The tree in Failed condition should be prioritized and removed.

Age Class Analysis



In terms of the ages of trees in Lombard, we have split the tree population into 8 "classes" of 6" diameter increments. This tells us how many trees are in each "age class". Because trees are measured by Diameter at Breast Height (DBH) as a standard measure, 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.

What this chart shows is an overall young tree population, as evidenced by the high number of trees in the 1-6" age classes, with a steady drop off afterwards. A positive aspect of this high number is that this shows a concentrated focus on tree planting in recent years. That said, 6,935 of Lombard's total 18,998 trees (36.5%) have a DBH of 6" or less which we generally consider to be less than about 15 years old. Almost 30% (4,934 of 18,998) of Lombard'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 over 17% (3,310 of 18,998) of the population and is considered to be approximately 25-35 years old. The 2,021 trees (10.6%) in the 19-24" DBH category are generally mature trees over 35-45 years old.

The 1,798 trees in the 25"+ DBH categories make up just over 9% of the population and are considered to be about 45-50+ years old. Some of these are still in good to fair condition, however some of these may be nearing the end of their natural life. 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.

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 Lombard over the years and shows that the right trees are being planted in the correct locations. Going forward, Lombard has an opportunity, over time, to bring the tree age classes to a more balanced level.

The table of Lombard's population growth since 1920 is shown at the right, and it is apparent that the growth in the number of trees on the Village ROWs increases around the same time as the population of the Village was increasing dramatically. For the Village, population growth spiked between 1950 and 1990. This corresponds directly with the increase in tree planting between 7-24" diameter inches ago, which equates to 15-50 years ago, in tree terms!

1920	1,331
1930	6,197
1940	7,075
1950	9,817
1960	22,561
1970	34,043
1980	36,879
1990	39,408
2000	42,322
2010	43,165
2020	44,303

Arborist Recommendation / Maintenance

In terms of recommendations of maintenance needs in the Lombard tree population, the statistics displayed above show a positive trend overall. Most trees require only Cyclical Pruning on a regular basis, which is an overall desirable trait in a tree population. The remaining categories, other than removals discussed above, were used to indicate trees in need of maintenance which should be prioritized over those in the Cyclical Prune category and will be discussed briefly below. It should be noted these are projections based on past data, and maintenance is constantly evolving.

The 700 trees in the "Remove" set include a variety of tree species which have declined or developed structural defects and are beyond the point of salvaging. This plan includes a timeline and strategy for completing these removals.

The 750 trees in the "Prune-Priority" group are trees which are simply overgrown, or have parts which need to be removed promptly, and should have pruning prioritized over the trees in the cyclical prune set. Generally, we consider this to be a "within 1-3 years" level of pruning.

Trees 1,500 categorized as "Prune-Train" are typically trees smaller than 8" DBH and have structural issues or are overgrown and require selective pruning to establish better architecture in the future. Establishment pruning, or the pruning of young trees to establish proper branching habit and structure, is one of the least expensive yet most effective maintenance items that can be performed on a young tree.

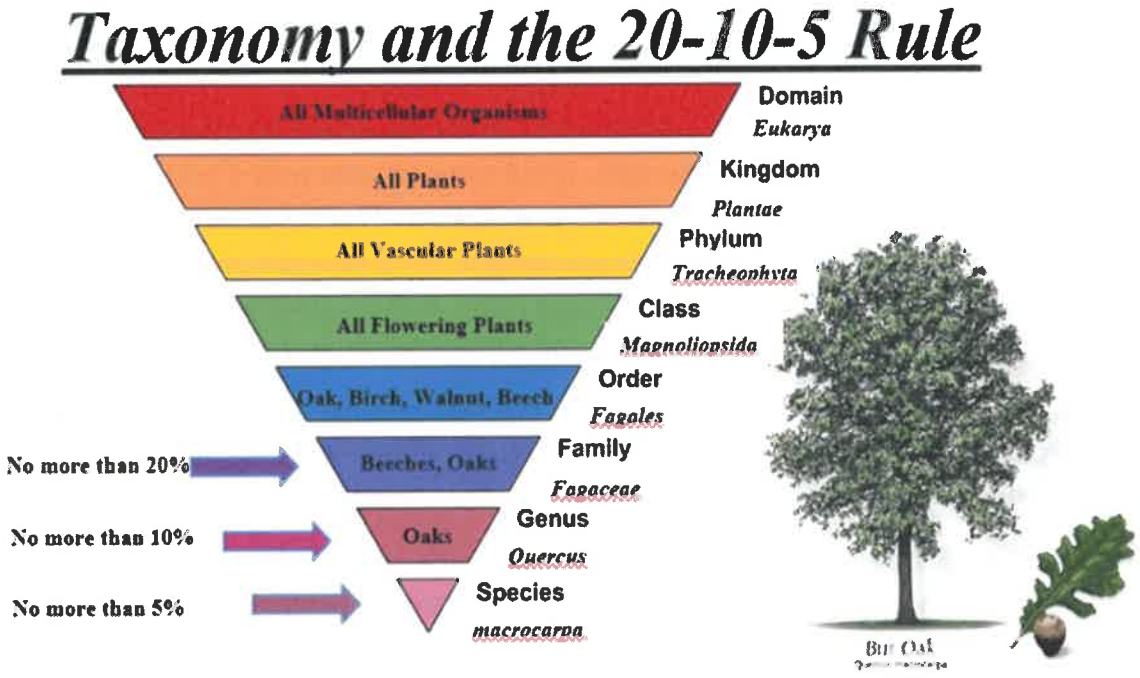
The 200 total trees in the "Monitor" category can be viewed as being in a transitional phase. For the most part, the tree has a significant defect and/or shows signs of developing structural issues or general decline which must be observed. These trees should be reassessed periodically, and their maintenance status updated appropriately.

The 125 trees in the "Maintenance-Other" category typically need some other form of maintenance not covered in the rest of the categories. Tasks for other maintenance needs are created in Cartegraph asset management system.

The 50 trees in the "Risk Assessment" category may be considered for a Level 2 or Level 3 Risk Assessment and/or other mitigating action. Lombard's Risk Assessment policy will be discussed later in this UFMP.

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 Bur 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*. The further down the taxonomic ladder you go, the more similar things become.



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, so that a large selection of trees is planted.

The "20-10-5" rule for Lombard'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 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 tree lined streets and parks in which every tree was the same type, shape, age, and height. This was thought to produce a uniform appearance. Urban foresters have now learned that once a pest or pathogen is introduced into a monoculture planting such as this, 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 we 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 of 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.

As will be discussed in further detail below, the tree population in Lombard is by far dominated by Maple species. In decreasing numbers, the remaining of the top 5 include Honeylocust, Lilacs, Oaks, and Crabapple/Apple species.

Spatial Diversity

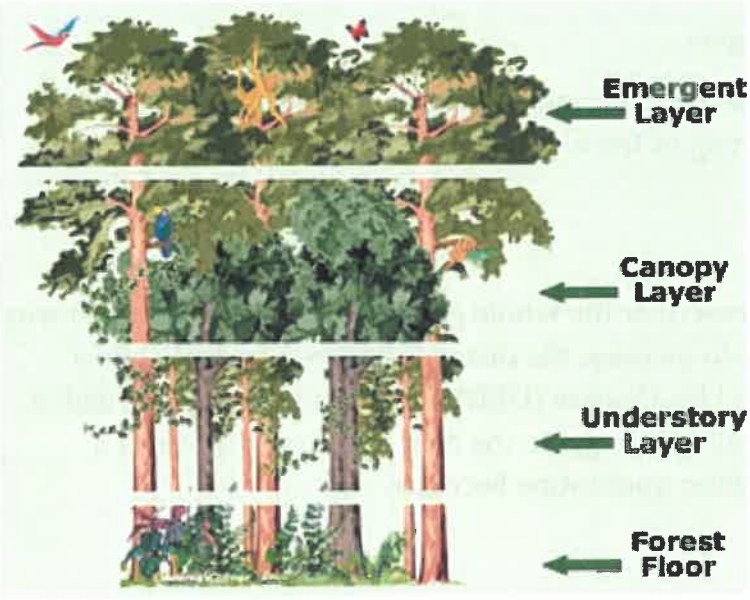
Spatial diversity is the concept of mixing tree species over the whole geographic area. The easiest way to slow the spread of any new pest or pathogen is to increase the distance between potential host trees. Every pest or disease, such as EAB or Dutch Elm Disease (DED), has a limited area to which it 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 Lombard is very high, and they have been cognizant of this concept over the past 20 years in planning their urban forest. During the tree planting planning phase, extra care should be taken to ensure that new plantings are done in a manner that yields a highly spatially diverse tree population, and creation of areas of low spatial diversity (monocultures) will be avoided.

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 outdated 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

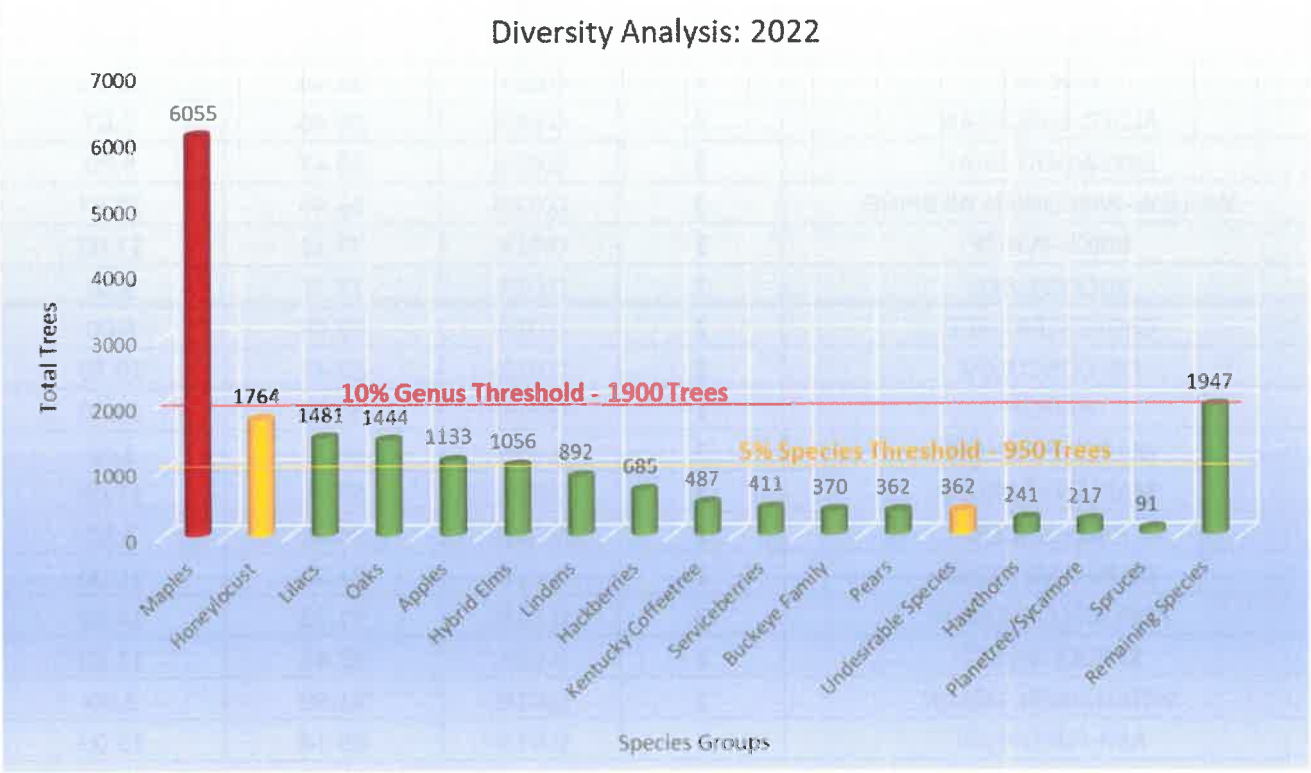
SPECIES	COUNT	% OF TOTAL	AVERAGE OCI	AVERAGE DBH
HONEYLOCUST	1764	9.28%	86.22	17.66
MAPLE-NORWAY	1506	7.93%	77.17	15.18
MAPLE-SILVER	1304	6.86%	79.23	25.49
LILAC-JAPANESE TREE	1249	6.57%	85.35	5.94
APPLE-CRAB SPP	1129	5.94%	83.17	5.87
ELM-HYBRID	1056	5.56%	85.57	7.77
MAPLE-FREEMAN	807	4.25%	84.15	9.59
MAPLE-RED	660	3.47%	81.73	9.78
MAPLE-SUGAR	646	3.40%	82.85	10.51
HACKBERRY	596	3.14%	87.98	8.17
KENTUCKY COFFEETREE	487	2.56%	87.50	6.07
LINDEN-LITTLELEAF	475	2.50%	79.40	14.49
OAK-RED	418	2.20%	85.23	17.78
PEAR-CALLERY	362	1.91%	79.90	12.78
MAPLE-HEDGE	348	1.83%	85.02	8.77
OAK-SWAMP WHITE	335	1.76%	88.93	9.14
MAPLE-MIYABEI	328	1.73%	88.45	6.68
LINDEN-AMERICAN	275	1.45%	83.54	11.48
MAPLE-SHANTUNG	262	1.38%	86.86	7.56
HAWTHORN-COCKSPUR	220	1.16%	82.95	5.47
SERVICEBERRY-APPLE	216	1.14%	81.23	3.66
OAK-BURR	210	1.11%	87.41	11.92
ELM-SIBERIAN	191	1.01%	74.61	23.56
SERVICEBERRY-ALLEGHENY	178	0.94%	84.57	3.10
OAK-ENGLISH	175	0.92%	85.69	6.66
LILAC-PEKING	174	0.92%	87.75	4.49
ELM-AMERICAN	161	0.85%	77.00	24.11
SYCAMORE	161	0.85%	82.83	23.73
BIRCH-RIVER	151	0.79%	84.76	8.08
GINKGO	148	0.78%	87.18	5.10
LINDEN-SILVER	142	0.75%	86.42	2.35
HORSECHESTNUT	130	0.68%	81.71	8.39
MAPLE-BLACK	129	0.68%	86.97	3.11
ARBOR VITAE	117	0.62%	88.52	6.66
BEECH-EUROPEAN	112	0.59%	84.93	6.05
IRONWOOD	107	0.56%	84.37	4.11
HORNBEAM-AMERICAN	103	0.54%	83.48	4.02
HORSECHESTNUT-RED	96	0.51%	84.85	2.55
OAK-HILLS	94	0.49%	82.71	23.34
ASH-GREEN	93	0.49%	85.44	12.78

BALDCYPRESS	90	0.47%	86.65	3.09
SUGARBERRY	89	0.47%	89.72	7.44
ASH-WHITE	88	0.46%	82.57	13.23
BUCKEYE-OHIO	84	0.44%	86.05	9.74
DOGWOOD-CORNELIAN	71	0.37%	83.31	3.66
OAK-CHINQUAPIN	71	0.37%	87.79	3.27
SPRUCE-BLUE	71	0.37%	84.10	10.87
CATALPA	65	0.34%	71.83	28.97
LONDON PLANETREE	56	0.29%	86.26	3.14
MULBERRY-WHITE	53	0.28%	69.95	18.77
BLACKGUM	51	0.27%	87.43	5.63
SWEETGUM	50	0.26%	88.30	3.82
OAK-SHINGLE	49	0.26%	84.27	4.10
COTTONWOOD	45	0.24%	83.56	30.96
HAZELNUT-TREE	45	0.24%	85.25	2.82
MAPLE-AMUR	43	0.23%	77.91	11.60
WALNUT-BLACK	43	0.23%	81.28	18.74
TULIPTREE	40	0.21%	86.92	12.18
YELLOWWOOD	36	0.19%	85.47	2.36
BUCKEYE-YELLOW	35	0.18%	81.77	2.51
OSAGE ORANGE	33	0.17%	68.08	26.55
PINE-AUSTRIAN	33	0.17%	74.52	16.67
LILAC-JAPANESE	30	0.16%	86.05	8.33
OAK-WHITE	28	0.15%	84.96	19.14
BURNING BUSH-WINGED	25	0.13%	77.10	5.64
HORNBEAM-EUROPEAN	25	0.13%	86.17	3.27
BUCKEYE-AUTUMN SPLENDOR HYBRID	23	0.12%	88.00	2.35
PINE-MUGO	22	0.12%	77.56	7.09
HAWTHORN-WASHINGTON	21	0.11%	63.98	13.29
LILAC-COMMON	21	0.11%	79.92	8.29
OAK-SCARLET	19	0.10%	84.11	9.68
DOGWOOD-CORNELIANCHERRY	18	0.09%	80.72	2.06
MAPLE-TARTARIAN	18	0.09%	86.08	3.50
REDBUD	18	0.09%	75.12	10.33
SPRUCE-NORWAY	18	0.09%	89.07	13.89
SERVICEBERY-DOWNY	17	0.09%	83.32	6.53
CHERRY-BLACK	16	0.08%	72.04	15.25
KATSURATREE	16	0.08%	80.73	17.94
OAK-SAWTOOTH	16	0.08%	87.58	5.19
DOUGLAS FIR	15	0.08%	81.39	10.47
OAK-BEBB	15	0.08%	88.84	2.27
VIBURNUM-SPP	13	0.07%	91.91	0.15

BLACK LOCUST	12	0.06%	73.59	16.25
CHERRY-PLUM	12	0.06%	78.52	6.67
OAK-SHUMARD	12	0.06%	86.77	2.75
PERSIAN IRONWOOD	12	0.06%	89.09	2.17
BOXELDER	11	0.06%	63.57	23.64
EASTERN REDCEDAR	11	0.06%	84.67	12.00
ALDER-SPAETH	10	0.05%	86.30	2.00
PINE-SCOTCH	10	0.05%	78.74	11.50
ZELKOVA	10	0.05%	86.30	2.00
HARDY RUBBERTREE	9	0.05%	79.39	2.22
HICKORY-SHAGBARK	9	0.05%	86.87	15.00
POPLAR-WHITE	9	0.05%	83.67	23.22
PINE-WHITE	8	0.04%	90.02	17.50
LILAC-MANCHURIAN	7	0.04%	71.46	4.29
ROSE OF SHARON	7	0.04%	82.17	3.57
AILANTHUS	6	0.03%	77.24	16.50
BEECH-AMERICAN	5	0.03%	82.14	2.00
CHESTNUT-CHINESE	5	0.03%	97.07	0.20
DAWN REDWOOD	5	0.03%	86.30	2.00
MAGNOLIA-SAUCER	5	0.03%	70.27	18.40
NINEBARK-SPP	5	0.03%	89.12	1.80
APPLE-EDIBLE	4	0.02%	77.76	9.00
BUCKTHORN	4	0.02%	77.76	12.25
ELM-RED	4	0.02%	86.23	26.75
JUNIPER-COMMON	4	0.02%	82.97	8.00
YEW-SPP	4	0.02%	75.44	11.25
ALDER-EUROPEAN	3	0.02%	90.40	7.67
DOGWOOD-GRAY	3	0.02%	89.47	5.00
WILLOW-WISCONSIN WEEPING	3	0.02%	96.46	26.67
BIRCH-WHITE	2	0.01%	77.12	11.00
BUCKEYE-RED	2	0.01%	77.77	3.50
CHOKEBERRY-RED	2	0.01%	92.04	6.00
FIR-CONCOLOR	2	0.01%	82.41	10.50
LARCH	2	0.01%	91.39	14.00
MAPLE-JAPANESE	2	0.01%	88.72	3.00
MAPLE-TATARIAN	2	0.01%	57.76	11.00
PINE-LIMBER	2	0.01%	94.76	2.50
PLUM-AMERICAN	2	0.01%	81.22	11.00
POPLAR-LOMBARDY	2	0.01%	51.73	14.50
SPRUCE-WHITE	2	0.01%	92.45	11.50
WITCH HAZEL-OZARK	2	0.01%	91.50	3.00
ASH-EUROPEAN	1	0.01%	89.14	13.00

ASPEN	1	0.01%	88.97	7.00
BOX ELDER	1	0.01%	40.87	13.00
CHERRY-EUROPEAN BIRD	1	0.01%	14.95	4.00
CHERRY-SARGENT	1	0.01%	75.71	2.00
DOGWOOD-PAGODA	1	0.01%	82.50	4.00
GOLDEN RAINTREE	1	0.01%	78.34	13.00
HONEYSUCKLE-SPP	1	0.01%	87.98	0.00
MAGNOLIA-CUCUMBER	1	0.01%	76.60	17.00
MAGNOLIA-STAR	1	0.01%	78.01	5.00
MOUNTAIN ASH-EUROPEAN	1	0.01%	79.70	6.00
OAK-PIN	1	0.01%	85.52	25.00
OAK-SCHUETTES	1	0.01%	93.56	7.00
PRIVET-SPP	1	0.01%	9.82	4.00
SMOKETREE	1	0.01%	93.41	9.00
SUMAC-SMOOTH	1	0.01%	91.74	2.00
WILLOW-WHITE	1	0.01%	79.66	12.00

As shown in the table above, the Village of Lombard Tree population consists of 140 distinct tree species, accounting for 18,998 total trees. The above table shows the percent of the total population each species makes up, as well as the average Condition and Trunk Diameter. To see which trees are performing well on Village parkways, we would look for trees with a high OCI and with a larger average DBH. This population is shown graphically below:



As can be seen above, the tree population in Lombard is diverse overall, but by far is dominated by Maple species. In decreasing numbers, the remaining top 5 include Honeylocust, Lilacs, Oaks, and Crabapple/Apple spp. From there, the number of tree species representing more than 1% of the total tree population drops off steadily. It should generally be said that reducing the number of Maples and Honeylocusts overall while increasing lesser represented species should be a strategic goal, and our Diversity Vision will help to accomplish this.

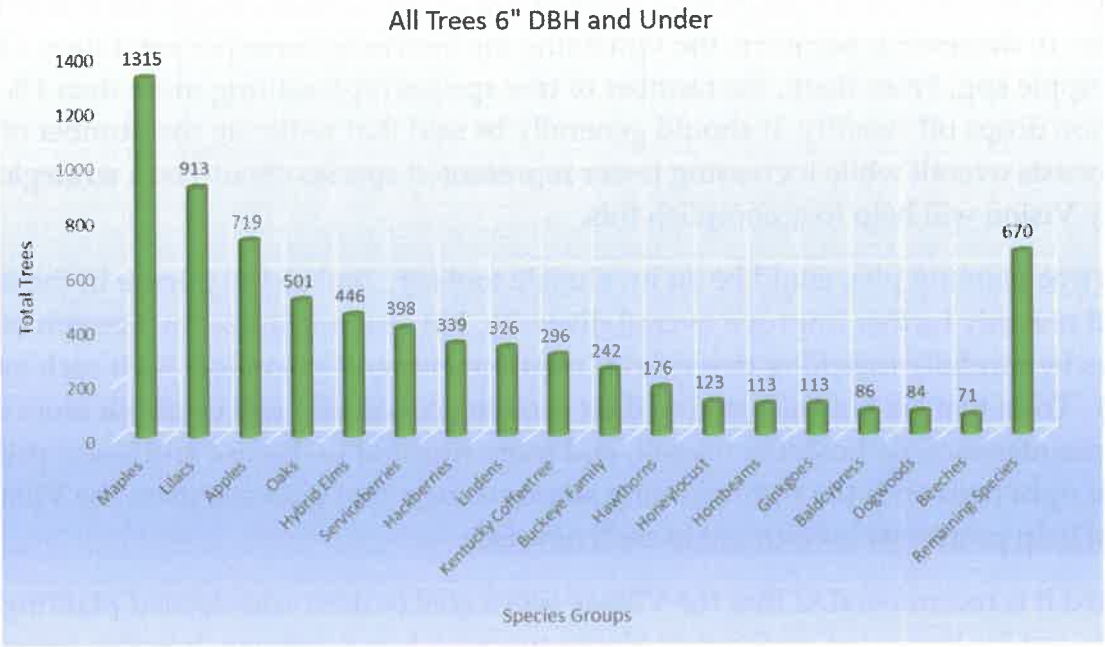
A long-term tree planting plan could be an invaluable tool for Lombard to pursue in the future. Such a plan would not only further improve overall diversity, but also maximize the lifespan of trees on the parkways by carefully matching tree species requirements and tolerances with each individual planting 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 Lombard can help protect its investment in each new tree.

Going forward it is recommended that the Village sets a goal to limit widespread planting of Maple species and to opt for improved varieties of Maple species when necessary. It is also recommended to slow the planting of large numbers of new Honeylocust. Additionally, the 362 trees in the "Undesirable spp" category include trees such as Ailanthus, Boxelder, Buckthorn, Black Cherry, Cottonwood, Siberian Elm, Honeysuckle, Mulberry, White Poplar, Osage Orange, and Willow spp. 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 the Village set a goal of gradually reducing the number of undesirable trees on its parkways and replanting them with a diverse set of tree species to increase overall diversity and improve tree population stability.

Although Lombard's diversity is high overall (with the exception of the Maples), the Village has a number species to choose from which are commercially available and underrepresented in their population. As mentioned above, the Urban Forest Management Plan will lay out strategies to even further improve diversity, and we will examine the specific species recommended in the "Future of the Urban Forest" Section below.

Young Tree Diversity

This Management Plan has spent significant time discussing the existing diversity. It should be noted that the diversity of new plantings has been much improved, as can be seen from the chart showing all trees 6" in diameter and less below. This chart represents the trees planted in the last 10 years.



As shown above, Maples are still by far the most highly represented species even among the younger population and it is recommended that this trend be curtailed. In addition, the planting of more, and more diverse, sets of smaller ornamentals other than Lilacs and Crabapples is suggested in order to contribute to the multilayered canopy mentioned previously and to increase small species diversity.

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 save homeowners money, such as in heating and cooling costs, where large trees help shade houses 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 has been prepared the Village of Lombard. 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

Lombard

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

12/3/2021

Benefits	Total ($)	Standard Error	$/tree	Standard Error	$/capita	Standard Error
Energy	151.603	(N/A)	7.98	(N/A)	3.42	(N/A)
CO2	32.254	(N/A)	1.70	(N/A)	0.73	(N/A)
Air Quality	34.969	(N/A)	1.84	(N/A)	0.79	(N/A)
Stormwater	1.335.581	(N/A)	70.30	(N/A)	30.13	(N/A)
Aesthetic/Other	1.208.392	(N/A)	63.61	(N/A)	27.26	(N/A)
Total Benefits	2.762.799	(N/A)	145.43	(N/A)	62.32	(N/A)

$21,508,098

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

iTree Eco Analysis Results

- Number of trees: 18,997
- Tree Cover: 190.8 acres
- Most common species of trees: Honeylocust, Norway maple, Silver maple
- Percentage of trees less than 6" (15.2 cm) diameter: 36.5%
- Pollution Removal: 5.299 tons/year ($73.7 thousand/year)
- Carbon Storage: 8.876 thousand tons ($1.51 million)
- Carbon Sequestration: 193.8 tons ($33.1 thousand/year)
- Oxygen Production: 516.8 tons/year
- Avoided Runoff: 472.3 thousand cubic feet/year ($31.6 thousand/year)
- Building energy savings: N/A – data not collected
- Avoided carbon emissions: N/A – data not collected
- Structural values: $26.9 million

Total Standing Eco Value of Lombard's Trees $6,901,902

Total Annual Eco Value of Lombard's Trees $196,900/year

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

Annual Values	
Benefits to Residents	$2,762,799
Benefits to Environment	$196,900
SUBTOTAL (Each Year)	$2,959,699
Standing Values	
As a Commodity	$21,508,098
As an Ecological Resource	$6,901,902
SUBTOTAL (Standing)	$28,410,000

As can be seen from the above tables, the tree population in the Village of Lombard currently provides approximately $2,959,699 in benefits every year, directly related to trees and their effect on homes, businesses, and the environment. It should be noted that the annual budget for all forestry activities recommended in this plan (planting, pruning, removal, and consulting), projected for the calendar year 2032, will total approximately $568,545 per year, so the benefits from the tree population are worth more than five 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 $28,410,000.

These benefits can be viewed as "income" to Lombard's residents, and so long as the trees are well maintained, they will continue to provide these benefits, and more. As trees grow, they also increase their benefits! For example, a 3" diameter tree provides less than $50/year in benefits, whereas as 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 the Village of Lombard population is $21,508,098. 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 Urban Forestry Management Plan is to create a tree population which maximizes all these ecological services to Lombard residents by increasing the number of trees in Village, and how long they live, while minimizing costs in order to create a healthy, well maintained, and vibrant tree population.

Urban Tree Canopy Assessment

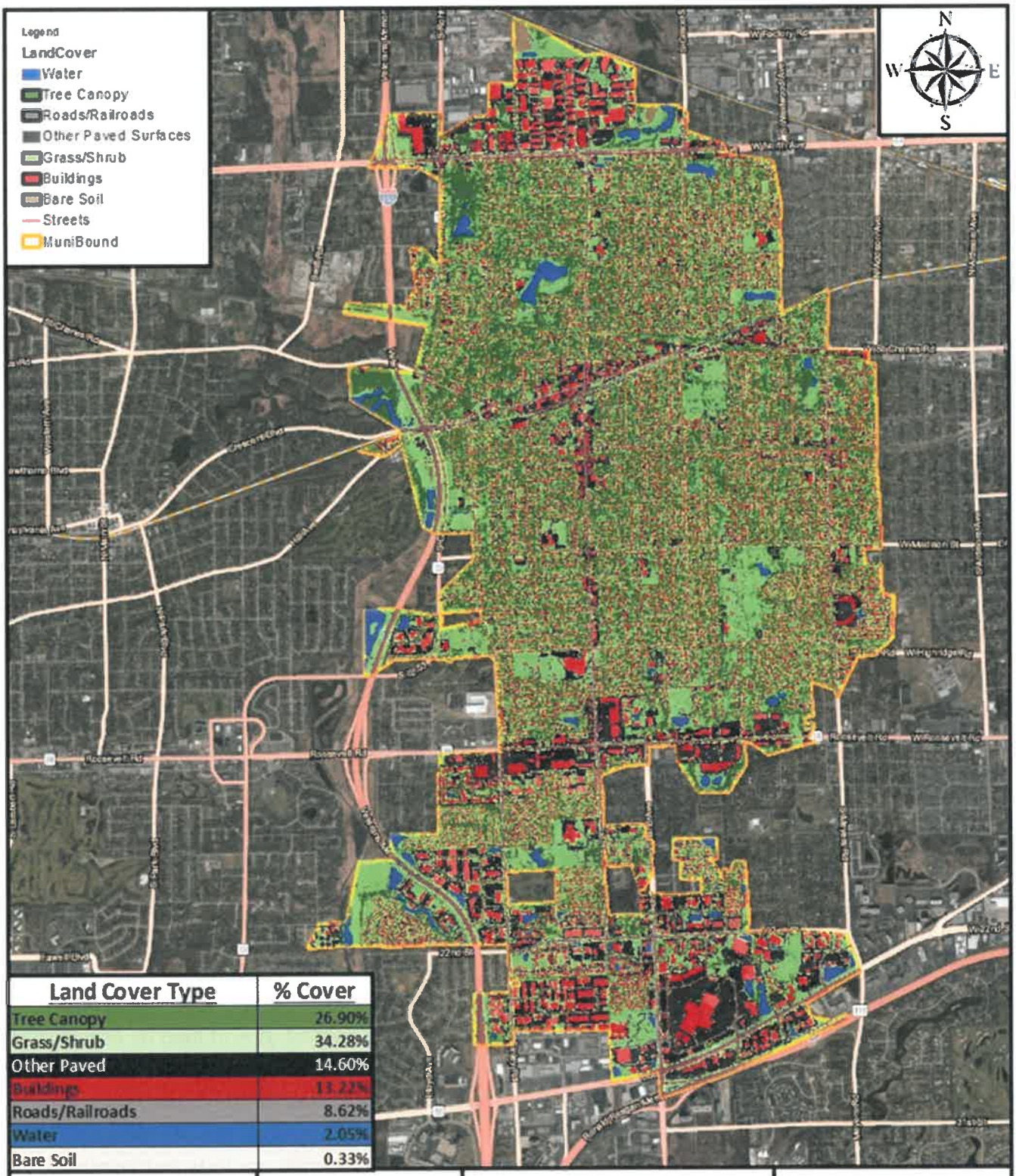
Based on data available from the US Forest Service and Morton Arboretum, the total Urban Tree Canopy of Lombard can be determined. This is expressed as the percent of the Village covered by tree canopy from an aerial view. This assessment included 7 total land cover types, including trees, grass and shrub, bare soil, water, buildings, roads/railroads, and other paved surfaces. The result of this tree canopy assessment was that Lombard contains 26.9% total tree canopy. The map of the canopy assessment appears on the page after next.

Land Cover Type	% Cover
Tree Canopy	26.90%
Grass/Shrub	34.28%
Other Paved	14.60%
Buildings	13.22%
Roads/Railroads	8.62%
Water	2.05%
Bare Soil	0.33%

Lombard's tree inventory itself was only conducted on publicly owned land such as parkways and boulevards, etc. 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 or other aerial imagery viewers.

The goal is to increase the total tree canopy in Lombard to 28% 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. Lombard as a whole has an overall decent amount of tree canopy, and it is about average compared to other similar suburban communities of Chicagoland. This is why the goal set is a rather moderate increase, which will still yield beneficial results.

This will be accomplished through increasing the number of trees on Village owned properties and municipal campuses and on the parkways and other ROWs of Lombard. It will also be accomplished by maintaining the existing tree population in a proactive fashion, by enhancing the Urban Forestry program in Lombard. 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. 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 Lombard.



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LAND COVER TYPES VILLAGE OF LOMBARD DUPAGE COUNTY

1 inch = 3,400 feet

0 800 1,600 3,200 4,800 Feet

Created On : 5/20/2021

The Future of the Urban Forest

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

Change in Species Composition 2022 – 2032

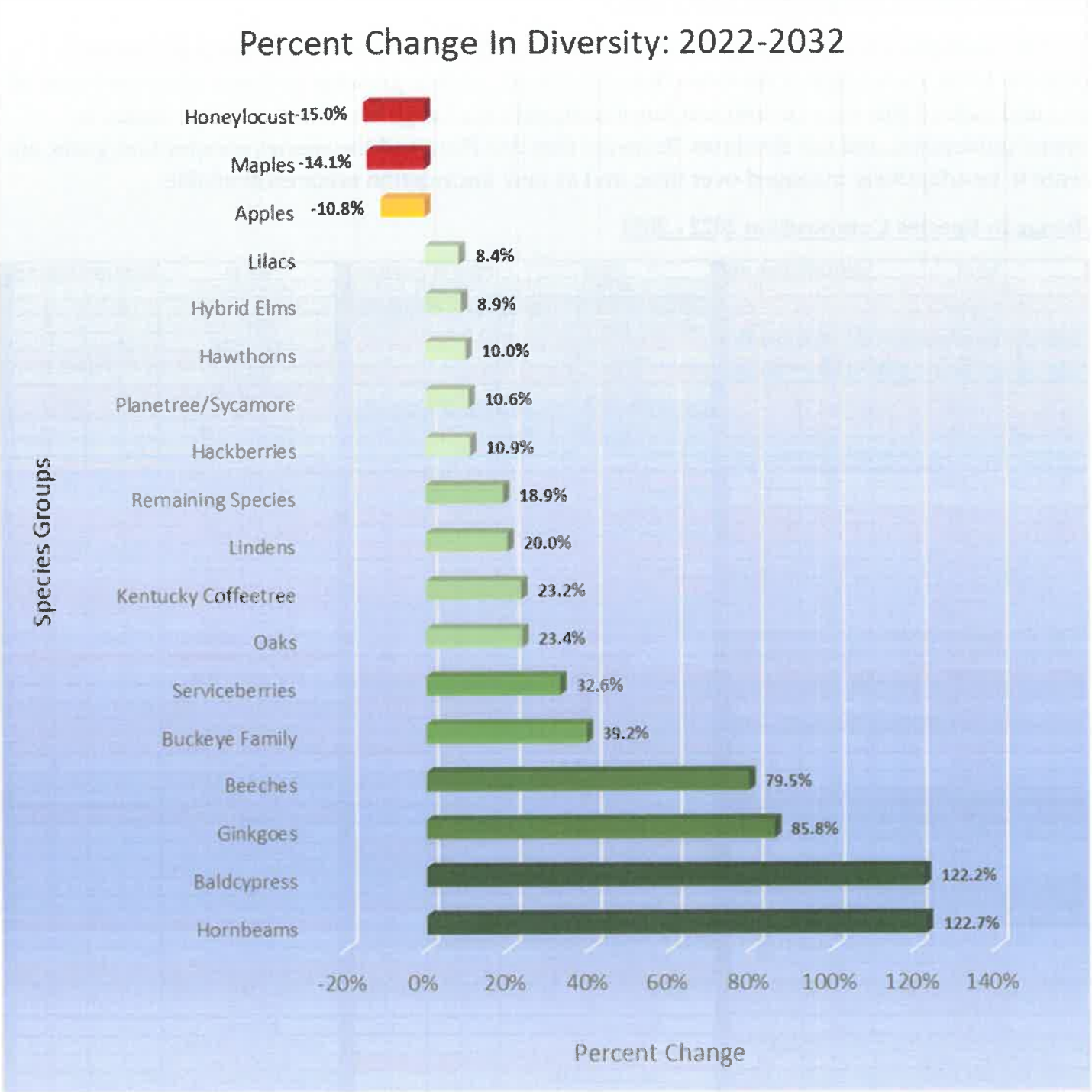
The full calculations for this change in diversity were performed by hand, not using automated software. Local knowledge of the trees, their conditions, what is growing well and what isn't were all used and yielded this very customized forest composition change list. These goals are meant as general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

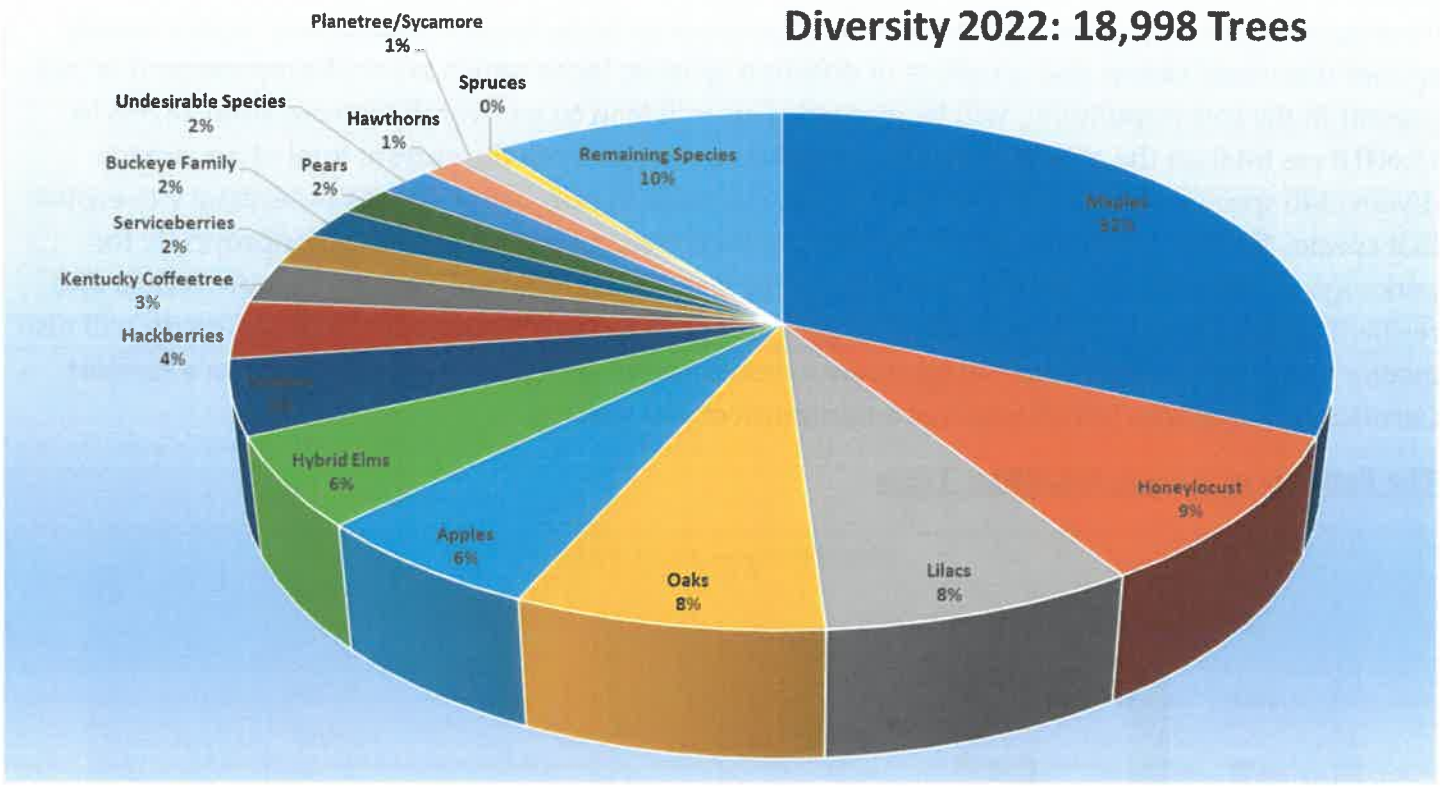
Change in Species Composition 2022 - 2032

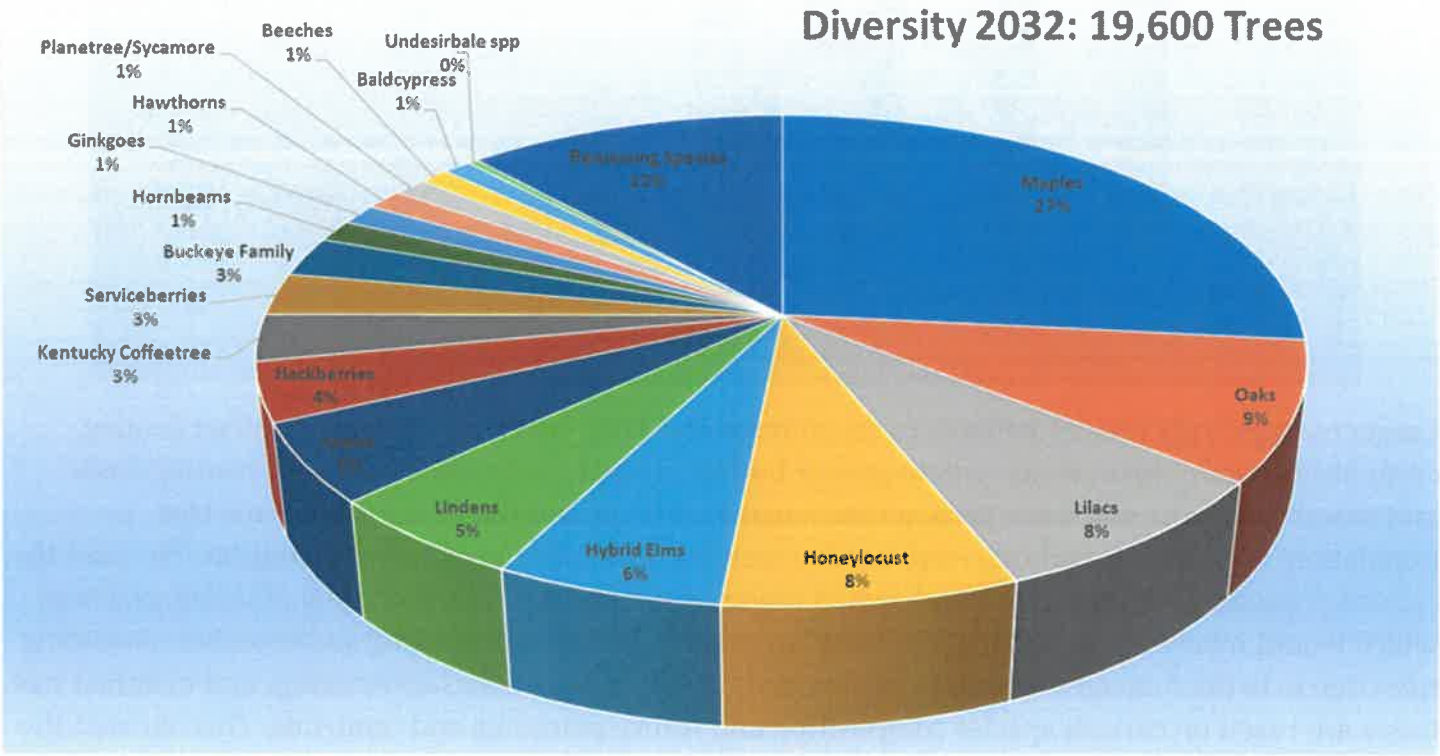
SPECIES	COUNT 2022	COUNT 2032
HONEYLOCUST	1764	1500
MAPLE-NORWAY	1506	1100
MAPLE-SILVER	1304	1000
LILAC-JAPANESE TREE	1249	1350
APPLE-CRAB SPP	1129	1000
ELM-HYBRID	1056	1150
MAPLE-FREEMAN	807	750
MAPLE-RED	660	550
MAPLE-SUGAR	646	550
HACKBERRY	596	650
KENTUCKY COFFEETREE	487	600
LINDEN-LITTLELEAF	475	500
OAK-RED	418	400
PEAR-CALLERY	362	175
MAPLE-HEDGE	348	300
OAK-SWAMP WHITE	335	400
MAPLE-MIYABEI	328	400
LINDEN-AMERICAN	275	310
MAPLE-SHANTUNG	262	325
HAWTHORN-COCKSPUR	220	250
SERVICEBERRY-APPLE	216	240
OAK-BURR	210	250
ELM-SIBERIAN	191	25
SERVICEBERRY-ALLEGHENY	178	250
OAK-ENGLISH	175	200
LILAC-PEKING	174	250
ELM-AMERICAN	161	100
SYCAMORE	161	100
BIRCH-RIVER	151	150
GINKGO	148	275
LINDEN-SILVER	142	240
HORSECHESTNUT	130	170
MAPLE-BLACK	129	150
ARBOR VITAE	117	100
BEECH-EUROPEAN	112	200
IRONWOOD	107	170
AMERICAN HORNBEAM	103	210
HORSECHESTNUT-RED	96	110
OAK-HILLS	94	110
ASH-GREEN	93	50
BALDCYPRESS	90	200
SUGARBERRY	89	110
ASH-WHITE	88	50
BUCKEYE-OHIO	84	110
DOGWOOD-CORNELIAN	71	90
OAK-CHINQUAPIN	71	125
SPRUCE-BLUE	71	50
CATALPA	65	100
LONDON PLANETREE	56	140
MULBERRY-WHITE	53	30

SPECIES	COUNT 2022	COUNT 2032
BLACKGUM	51	100
SWEETGUM	50	110
OAK-SHINGLE	49	90
COTTONWOOD	45	10
HAZELNUT-TREE	45	45
MAPLE-AMUR	43	30
WALNUT-BLACK	43	15
TULIPTREE	40	125
YELLOWWOOD	36	65
BUCKEYE-YELLOW	35	75
OSAGE ORANGE	33	65
PINE-AUSTRIAN	33	20
OAK-WHITE	28	50
BURNING BUSH-WINGED	25	0
BUCKEYE-AUTUMN SPLENDOR HYBRID	23	30
PINE-MUGO	22	15
HAWTHORN-WASHINGTON	21	15
LILAC-COMMON	21	0
OAK-SCARLET	19	30
DOGWOOD-CORNELIANCHERRY	18	30
MAPLE-TARTARIAN	18	25
REDBUD	18	20
SPRUCE-NORWAY	18	10
SERVICEBERY-DOWNY	17	55
CHERRY-BLACK	16	5
KATSURATREE	16	30
OAK-SAWTOOTH	16	14
DOUGLAS FIR	15	20
HORNBEAM-EUROPEAN	15	55
OAK-BEBB	15	25
VIBURNUM-SPP	13	20
BLACK LOCUST	12	20
CHERRY-PLUM	12	5
OAK-SHUMARD	12	30
PERSIAN IRONWOOD	12	20
BOX ELDER (SPECIES)	11	0
EASTERN REDCEDAR	11	10
ALDER-SPAETH	10	40
EUROPEAN HORNBEAM	10	20
PINE-SCOTCH	10	0
ZELKOVA	10	65
HARDY RUBBERTREE	9	18
HICKORY-SHAGBARK	9	17
POPLAR-WHITE	9	7
PINE-WHITE	8	0
LILAC-MANCHURIAN	7	5
ROSE OF SHARON	7	14
AILANTHUS	6	0
BEECH-AMERICAN	5	10

SPECIES	COUNT 2022	COUNT 2032
DAWN REDWOOD	5	15
MAGNOLIA-SAUCER	5	3
NINEBARK-SPP	5	5
APPLE-EDIBLE	4	11
BUCKTHORN	4	0
ELM-RED	4	0
JUNIPER-COMMON	4	0
YEW-SPP	4	0
ALDER-EUROPEAN	3	10
DOGWOOD-GRAY	3	5
WILLOW-WISCONSIN WEEPING	3	0
BIRCH-WHITE	2	20
BUCKEYE-RED	2	20
CHOKEBERRY-RED	2	0
FIR-CONCOLOR	2	0
LARCH	2	20
MAPLE-JAPANESE	2	10
MAPLE-TATARIAN	2	0
PINE-LIMBER	2	0
PLUM-AMERICAN	2	10
POPLAR-LOMBARDY	2	1
SPRUCE-WHITE	2	0
WITCH HAZEL-OZARK	2	10
ASH-EUROPEAN	1	1
ASPEN	1	20
BOX ELDER (IMPROVED)	0	10
CHERRY-EUROPEAN BIRD	1	0
CHERRY-SARGENT	1	10
DOGWOOD-PAGODA	1	20
GOLDEN RAINTREE	1	10
HONEYSUCKLE-SPP	1	0
MAGNOLIA-CUCUMBER	1	10
MAGNOLIA-STAR	1	10
MOUNTAIN ASH-EUROPEAN	1	10
OAK-PIN	1	10
OAK-SCHUETTES	1	10
PRIVET-SPP	1	0
SMOKETREE	1	10
SUMAC-SMOOTH	1	1
WILLOW-WHITE	1	0
AMUR MAACKIA	0	45
BIRCH-GREY	0	10
BUTTERNUT	0	9
DOGWOOD-GOLDEN GLORY	0	10
HICKORY-PECAN	0	9
LINDEN-MONGOLIAN	0	20
MAGNOLIA-BUTTERFLIES	0	10
MAPLE-PAPERBARK	0	10
OAK-BLACK	0	38
PERSIMMON	0	10

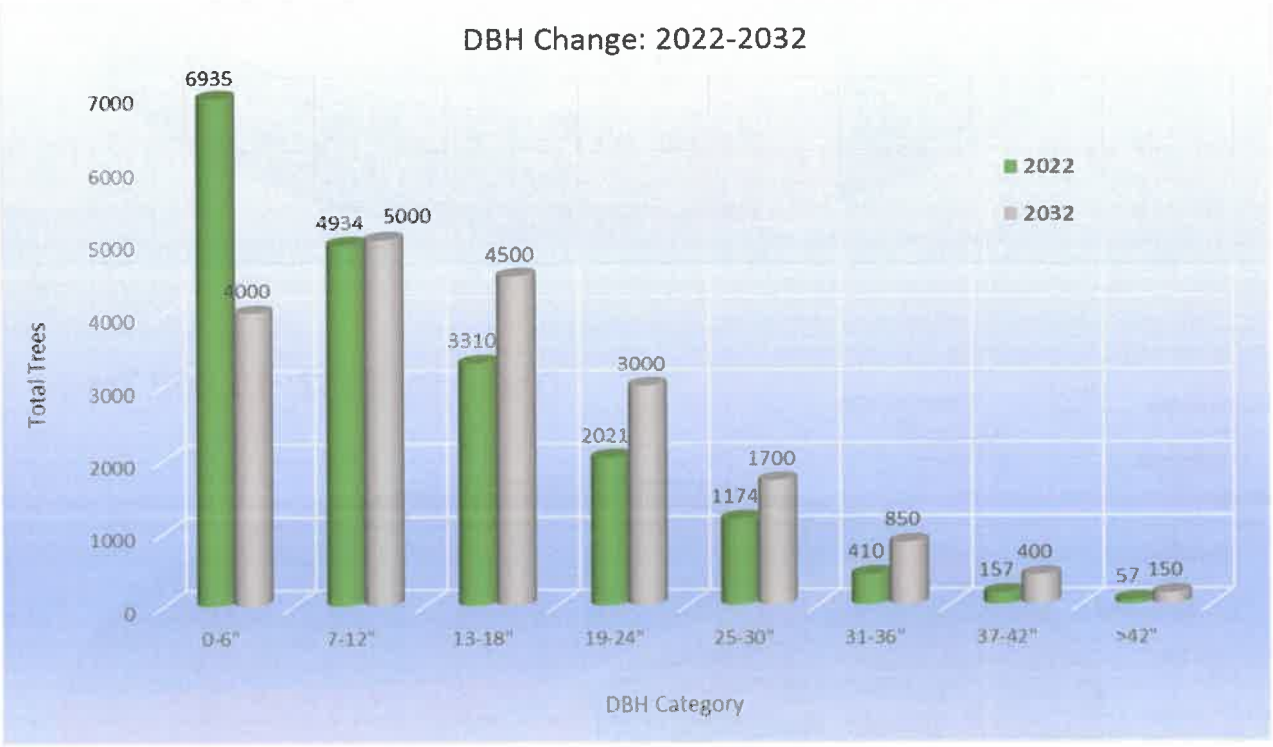

Percent Change In Diversity: 2022-2032
Species Groups
Honeylocust -15.0%
Maples -14.1%
Apples -10.8%
Lilacs 8.4%
Hybrid Elms 8.9%
Hawthorns 10.0%
Planetree/Sycamore 10.6%
Hackberries 10.9%
Remaining Species 18.9%
Lindens 20.0%
Kentucky Coffeetree 23.2%
Oaks 23.4%
Serviceberries 32.6%
Buckeye Family 39.2%
Beeches 79.5%
Ginkgoes 85.8%
Baldcypress 122.2%
Hornbeams 122.7%
-20% 0% 20% 40% 60% 80% 100% 120% 140%
Percent Change


Diversity 2022: 18,998 Trees
Planetree/Sycamore 1%
Spruces 0%
Undesirable Species 2%
Hawthorns 1%
Buckeye Family 2%
Pears 2%
Serviceberries 2%
Kentucky Coffeetree 3%
Hackberries 4%
Hybrid Elms 6%
Apples 6%
Oaks 8%
Lilacs 8%
Honeylocust 9%
Remaining Species 10%


Diversity 2032: 19,600 Trees
Planetree/Sycamore 1%
Beeches 1%
Undesirbale spp 0%
Baldcypress 1%
Hawthorns 1%
Ginkgoes 1%
Hornbeams 1%
Buckeye Family 3%
Serviceberries 3%
Kentucky Coffeetree 3%
Lindens 5%
Hybrid Elms 6%
Honeylocust 8%
Lilacs 8%
Oaks 9%

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 or low quality species discussed above, and a variety of different species, those which are underrepresented or not present in the tree population, will be planted. This will lead to an overall increase from 18,998 to 19,600 trees total on the Village's ROWs, as well as a change from the current total of an already diverse 140 species to a total of 132 species. The decrease in number of species is necessary to ensure that species that are currently present in the Lombard tree population, but are inappropriate for parkways & other ROWs, are eliminated from the species list. This will result in a more robust and resilient Urban Forest which is resistant to pest and pathogen outbreaks. This high diversity will also qualify Lombard to certify the Village as an Arboretum through the Morton Arboretum's ArbNet Certification program, which requires a minimum of 100 species.

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 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.

It can be seen from the above chart that the existing tree population (grey bars) shows an overall younger tree population with a steady decline in numbers in the larger age class categories. The projected age class chart shows a substantial reduction in the smallest age class category over the course of this Plan, and also projects more trees surviving into the older age classes, where they will provide the greatest benefits in terms of ecological services to the community. The table to the right shows this data in a tabular format.

	2021	2026	2031
0-6"	6935	4700	4000
7-12"	4934	5750	5000
13-18"	3310	3900	4500
19-24"	2021	2500	3000
25-30"	1174	1500	1700
31-36"	410	675	850
37-42"	157	250	400
>42"	57	100	150

This was based on the fact that increased levels of care for existing trees would enable them to survive longer. The graph and table show 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. The numbers themselves were projected by hand, based on our prior experience, and the methods detailed below. If these projections hold, Lombard could see a 55% increase in annual benefits or $752,763 for a total of $3,254,845 up from $2,959,699. Standing values of the tree population could increase nearly 20%, or $6,954,247, from their current level of $28,410,000 to approximately $35,355,247.

For projections of future age classes of trees, a ½" per year 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. These are rough estimates for the purposes of this Plan.

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 an arboretum-like setting when they are enjoying the urban forest. Below are several examples of Ecological 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.

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 strive to justify the expenditures on trees and tree care, it is important that organizations and their staff are aware of this.

On the following page, we have provided an ROI calculation sheet. This sheet breaks the tree's lifetime down into three phases, based on the anticipated costs of pruning in the budgets sections below. These phases are the young (3-12" DBH), mature (13-24" DBH), and full grown (25-36") ranges shown below.

Data was taken from the iTree algorithm, and applied towards the average benefits provided by a tree at each of these life stages, and multiplies it out over the 20 year period each phase accounts for. We also looked at costs for planting, watering, routine maintenance, emergency maintenance, and eventual removal of that tree over 60 years. The results are pictured below, with the calculations on the following page.

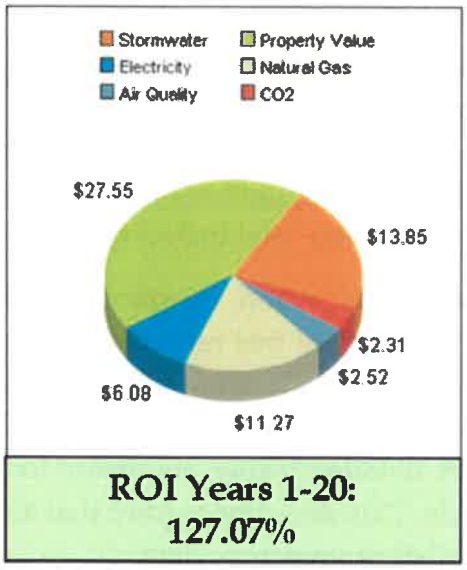
Total Investment	**$3,610.00**
Total Return	**$10,819.60**
Total ROI Over 60 Years	**199.71%**

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
Electricty	$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



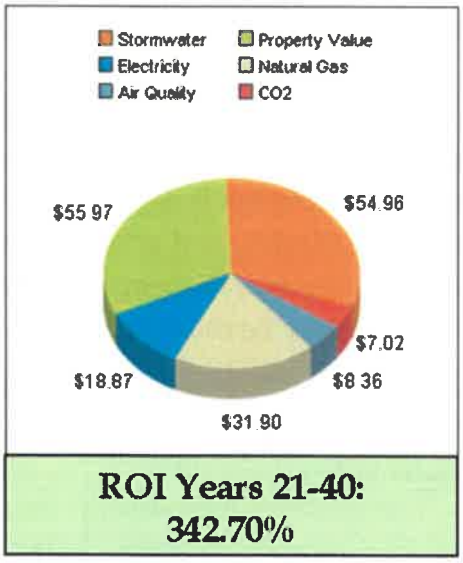
ROI Years 1-20: 127.07%

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
Electricty	$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



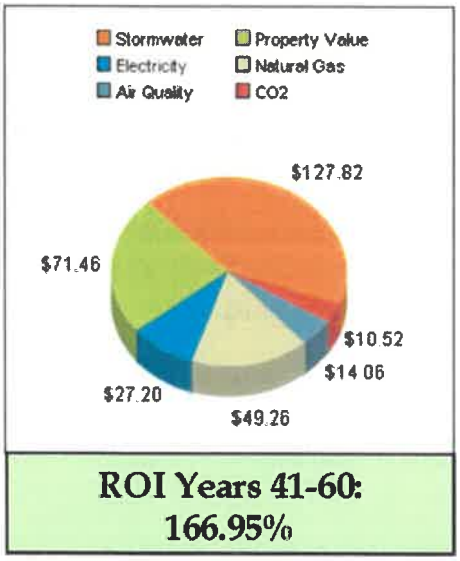
ROI Years 21-40: 342.70%

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
Electricty	$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



ROI Years 41-60: 166.95%

Tree Removals

The first step towards attaining Lombard's forestry goals will be to remove trees which are diseased, dying, or present an unacceptable level of risk. At present, contracted removals are removed no later than 60 days after being marked. In house removals are not as timely due to overall workload. Due to considerable population of over-mature Silver Maples and poor condition Norway Maples, removal costs and total inches will most likely increase for the next 5 years.

After this initial period, in order to attain the goals set forth in the Diversity Standards, the background rate of tree removal will be approximately 450 trees per year. From 2022 forward, reevaluation of the tree population on an annual or semiannual basis by the Forestry and Urban Landscaping Supervisor 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 450 trees be removed each year, this is simply a projection based on the existing inventory data.

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. In addition, for trees in year 2026 and beyond, these are anticipated averages of trees to be removed. Exact numbers of trees to be removed may be more or less.

Milestones	2022	2023	2024	2025	2026	2027-2032
Trees Removed	350	375	400	425	450	450/year avg
Diameter Inches	4025	4312.5	4600	5460	5175	
Notes	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates
Removal Cost (2021)	$90,090	$96,514	$102,948	$122,195	$115,817	$115,817
Removal Cost (CPI)	$90,090	$96,514	$102,948	$122,195	$115,817	$133,190

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 Lombard's public property shall be performed under the guidance of a Certified Arborist or Arborist Trainee. 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

For contracted removals stumps are ground when the removal is completed (or within the next few days typically). For in house removals the Village's goal is to grind the stump within one year. 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 Village of Lombard depending on needs for specific circumstances or contracts. Until such time as 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 site 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, and spreading grass seed and a Penn mulch type seed starter over the top of the topsoil. This will ensure that grass grows back to restore the aesthetics and function of the parkway and prevent 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 and reduce property values. 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's also important to remember that the removal of a tree today is the promise of a new tree for tomorrow!

Removal of trees on Village of Lombard public property shall always be at the discretion of the Forestry and Urban Landscaping Supervisor and/or Forestry Consultant. Trees will never be removed without a sound reason from the Village or Forestry Consultant. Residents may request a tree to be removed for reasons NOT covered below, and these requests will be reviewed by the Forestry and Urban Landscaping Supervisor or Forestry Consultant. Removal requests may be granted and paid for under the annual forestry budget. However, trees with a greater need for removal based on public safety will always hold a higher priority. Under no circumstances will the Village of Lombard be responsible for trees which are not in the right of way.

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 are determined to have insufficient sound wood in the cross section of the trunk based upon a level two or three tree risk assessment, shall be removed as expediently as practical. These determinations shall be at the discretion of the Forestry and Urban Landscaping Supervisor or Forestry Consultant and are based on the Strength Loss Equation for tree structural stability.

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. Only those trees infected or infested with pathogens or pests which pose a threat to the vitality of additional trees will be removed. Trees which are suffering from non-lethal pests/pathogens will not be removed solely for this reason. Trees deemed to be diseased or infested by the Forestry and Urban Landscaping Supervisor or 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 insurance companies are 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. Trees which are identified as having elevated levels of risk by the Forestry staff when performing the inventory update (or otherwise identified during the course of work) are directed to the Forestry Supervisor for further evaluation. Trees which are determined to present unacceptable levels of risk are scheduled for removal or other mitigation actions. If such risk can only be safely mitigated by tree removal, as opposed to pruning or other measures, then their timely removal is critical because of potential exposure of the public or property to potential harm.

The Forestry and Urban Landscaping Supervisor, Forestry Consultant or any other TRAQ Qualified Risk Assessor must assess the tree and prepare a Tree Risk Assessment Report which will 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 new lean of greater than ten degrees from vertical, has sustained a lightning strike, or other such issues directly related to storm events. The Forestry and Urban Landscaping Supervisor or Forestry Consultant shall determine the need for removal of a tree in these cases, although in an emergency situation such as a tree impacting a person, vehicle, home, power lines, or other such emergency, the Village 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

The Forestry and Urban Landscaping Supervisor 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 Forestry and Urban Landscaping Supervisor.

Reasonable Resident Request

Residents may request for the Village to assess parkway trees adjacent to their residence. Such requests will be reviewed by the Forestry and Urban Landscaping Supervisor and/or Forestry Consultant and evaluated on a case-by-case basis. The Village has a mechanism in place for resident to request permission to remove a parkway tree. There is a fee structure and replacement tree cost included. (see ordinance Ch 99.23 (B))

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 UFMP, Lombard will be enhancing their use of industry best management practices for 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 the Forestry and Urban Landscaping Supervisor and/or 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.

Basic Village Tree Removal Requirements and Standards

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

Village of Lombard

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 the Village of Lombard, as either Public Works and Forestry staff, or performing work as a contractor employed by the Village.
2. It is required that qualified incidental line clearance arborists (per the ANSI Z133-2017) may perform tree removal operations within ten feet of an electric utility line. Village of Lombard 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 from a transmission line.
3. The Village will not remove healthy trees in order to meet diversity goals, unless the tree poses a unacceptable level of risk as determined by the Village.
4. No trees can be rendered 100% risk free, particularly in extreme weather events.
5. The Village of Lombard shall not perform or assist, programmatically or financially, with the removal of trees on private property. Public/Private tree ownership is defined by Ordinance as having 51% or greater of its trunk diameter within the public right of way.

Tree Planting

Whereas tree removal is necessary to promote public safety, planting of new trees must happen in order to improve diversity and canopy cover. At present, the Village of Lombard has over 2,330 open planting spaces on its parkways with 681 already slated for replacement trees. As a means of attaining the goals of increasing canopy cover to 28%, and improving overall diversity, this plan calls for the planting of approximately 4,750 trees over the coming 10 years and these trees will be planted by Village staff or contractors. 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 replace most trees called out for removal above. After completing this, a gradual increase in trees planted per year increase is called for. After approximately 5 years, plantings begin to outpace removals in this plan. The Village has recently adjusted funds for tree planting to mitigate a backlog of 850 locations in the next 4 planting seasons (Spring 2022 & Fall 2022 and Spring& Fall 2023). Additionally, the long term planting budget as part of the Capital Improvement Plan (CIP) has been increased to prevent such a large backlog developing again in the future under normal circumstances. This budget modification will be periodically reviewed to ensure the funding is appropriate for the Village's goals.

For the costs of planting, the current average cost used by Village is $325-350 per tree. Based upon current STC tree, delivery and planting costs this is projected to reach $375-400 per tree by 2025. We will examine money saving proposals in further detail in the Strategic Partnerships section below.

Milestones	2022	2023	2024	2025	2026	2027-2032
Trees Planted	575	400	350	350	450	500/year avg
Planting Cost (2021)	$205,000	$140,000	$125,000	$125,000	$160,000	$175,000
Planting Cost (CPI)	$205,000	$140,000	$125,000	$125,000	$160,000	$201,250

The Importance of Planning Your Tree Planting

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 tree 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.

Due to Lombard's relationship with the STC, trees are on a 5 year pre order. There are usually some annual additions, but the list is fairly set well in advance, which will aid in helping the Village plan what species is appropriate to plant in which open site.

Playing an active role in your 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". As Lombard has an established planting budget, there is the opportunity to continually plan ahead and evaluate diversity. Being targeted about species selection allows the use of species which are slightly more difficult to find appropriate sites for. These species that are considered "less urban tolerant" can still be planted when the appropriate site is found.

The success of a tree depends on where and how it is planted. The Forestry and Urban Landscaping Supervisor or Urban Forestry Consultant should assess planting sites before trees are 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 the community can reap from this commitment. A list of acceptable species to be planted for all land use types 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. The Forestry and Urban Landscaping Supervisor or an Urban Forestry consultant should inspect and select every tree which is to be planted on Village 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 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. For this and other reasons, there may need to be occasional substitutions from the originally planned order. Any substitutions shall be approved by the Forestry and Urban Landscaping Supervisor based upon their appropriateness for the planting locations. 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 have structural damage to root balls incurred. 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 J. 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 qualified organization and trees are a smaller size such as containerized.

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 local specifications. In Lombard, 25' spacing is required for small or narrow (less than 30' mature width) stature tree. Spacing of 35' is required for large stature trees, but these are typically planted at minimum 40' spacing to allow for room to plant the next tree. This is adjusted based of what has been learned from the past where trees were planted strictly 35' on center and then replacement trees could not be installed due to stumps.

It is generally recommended that there be no less than 40 feet between plantings, with some exceptions for open spaces or smaller trees. This will allow trees to grow to their full potential. In addition, no tree should be planted within 10 feet of a driveway, 30 feet of an intersection and Lombard also has requirements regarding other above and below ground conflicts which are codified by ordinance (Ch. 99.04). Trees may be planted under aboveground powerlines, but must be from the "Small" selections listed in the Acceptable Species list in Appendix A. No evergreen species shall be considered acceptable for street trees, as they obscure views of the road and may lead to accidents. Evergreens are acceptable for parks, schools, and municipal campuses.

Watering

Watering of newly planted trees is essential to their establishment, growth, and survival, particularly during the first 3-5 years of their lives. Since watering is not included in our budget figures, this responsibility generally falls on the property owners. A tree care door hanger shall be delivered when trees are mulched by Forestry staff on day of planting. Such simple information can make the difference between a tree dying from drought stress, a tree dying form overwatering, and a happy, healthy tree. Lombard staff waters trees that are not adjacent to residences.

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. The Village's participation in the STC ensures a 1 year replacement warranty for 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.

Tree Planting Requirements and Standards

Village of Lombard

1. Planting sites shall be determined and monitored using the Village's tree inventory, in conjunction with staff and Forestry Consultant input.
2. New planting sites shall be planted in accordance with Village ordinance. If proper spacing 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 the Village'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.
4. All planting stock shall be grown within 150 miles of the Village/planting site.
5. Acceptable nursery stock shall conform to the following standards:
   - **A.** Minimum of 2-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 the Village of Lombard
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 the Village of Lombard and its approved contractors.
7. Residents are currently not allowed to plant trees on Village ROWs. If Village can achieve and maintain replanting of removed trees within 12-18 months of removal, then not allowing residents to plant in right-of-way is preferred.
8. 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.
9. A minimum of a one-year replacement guarantee shall be extended from approved nurseries and plantsmen 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.

Currently, the Village's tree population is broken into six geographical areas and the areas are pruned on a cyclic basis. Village staff prunes all trees 6" and under on a 3 year cycle. Trees over 7" DBH are pruned on a 6 year cycle. The bottom limit of contractor's pruning is based upon budget and actual tree count. Contracts are based upon a price per diameter inch in four groups: 6-14", 15-24", 25-35", and 36"+. Additionally, Village staff prunes all ornamental trees, evergreen trees, Kentucky Coffeetrees, and Ginkgoes regardless of size as well. There are other trees which may be added to the in-house list as well from time to time.

For cost projections below, $50 per small tree (less than 12" DBH) 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.

In Lombard, the average in the last five years for cycle pruning is about 3,250/year. The range is from 2700/year to 4400/year, and this plan a gradual increase in annual pruning numbers over time as the Village moves to a 5 year pruning cycle. This does not include service request pruning at about 300-400 trees per year. This makes the budget estimates below fairly liberal, but designed to ensure proper budgeting.

Milestones	2022	2023	2024	2025	2026	2027-2032
Trees Pruned	3500	3550	3600	3650	3750	4,000/yr average
Notes	3,500 Cycle Prunes	3,550 Cycle Prunes	3,600 Cycle Prunes	3,650 Cycle Prunes	3,750 Cycle Prunes	4,000 Cycle Prunes in Perpetuity
Cost (2021)	$145,000	$150,000	$155,000	$160,000	$170,000	$200,000
Cost (CPI)	$145,000	$150,000	$155,000	$160,000	$170,000	$230,000

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. note these are estimates and should be reviewed periodically to ensure accuracy.

2022 Cost Breakdown – Pruning 3,500 Trees/Year by 2022

	Total Trees	Avg %	Cost/Tree	Pruned/year	Cost/year
Evergreen	417	2.19%	$20	77	$ 1,536.48
Large (>24")	1791	9.43%	$125	330	$ 41,244.47
Medium (13-24")	5238	27.57%	$50	965	$ 48,249.82
Small (1-12")	11552	60.81%	$25	2128	$ 53,205.60
					$ 144,236.37

2027 Cost Breakdown – Pruning 3,750 Trees/Year by 2027

	Total Trees	Avg %	Cost/Tree	Pruned/year	Cost/year
Evergreen	350	1.81%	$20	68	$ 1,356.59
Large (>24")	2300	11.89%	$125	446	$ 55,717.05
Medium (13-24")	6400	33.07%	$50	1240	$ 62,015.50
Small (1-12")	10300	53.23%	$25	1996	$ 49,903.10
					$ 168,992.25

2032 Cost Breakdown – Pruning 4,000 Trees/Year by 2032

	Total Trees	Avg %	Cost/Tree	Pruned/year	Cost/year
Evergreen	300	1.53%	$20	61	$ 1,227.62
Large (>24")	3000	15.35%	$125	614	$ 76,726.34
Medium (13-24")	7250	37.08%	$50	1483	$ 74,168.80
Small (1-12")	9000	46.04%	$25	1841	$ 46,035.81
					$ 198,158.57

Pruning Activities

Maintenance of a Cycle Pruning Program

Currently there is a 6 year pruning cycle for trees 7" and over and 3 year cycle for trees 6" and under. Based upon current budget forecasts, moving to a 4 year cycle is unrealistic but a 5 year cycle might be possible within the course of this Plan. As noted above, the number of trees as well as their overall sizes will be changing over that time period, hence above tables showing adaptive management of the pruning program. We believe this is a realistic goal based on communications with Village 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. 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 Lombard continue to budget for this essential expense.

Pruning of Young Trees

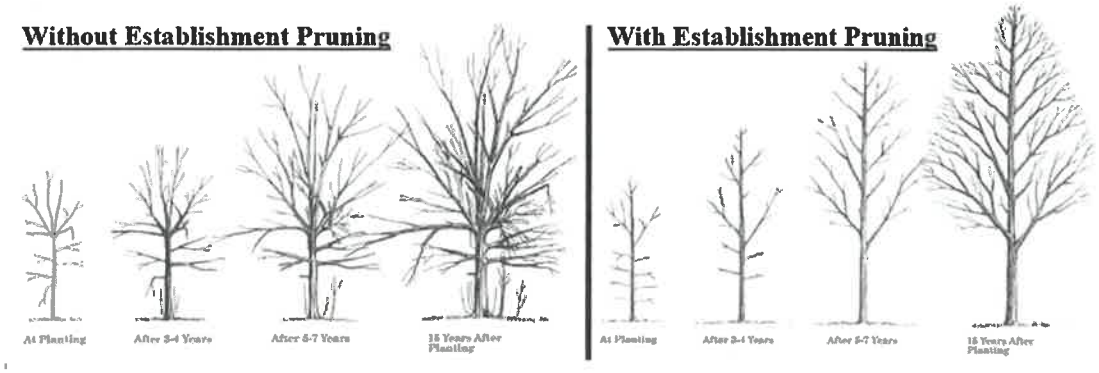
For the purposes for this Plan, a young tree is considered to be under 12" DBH. Young trees are still trying to acclimate to their sites. The pruning of young trees has different goals and outcomes than the pruning of larger, mature trees. Standard nursery stock has been meticulously pruned for four 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. Currently Village staff performs most of the pruning on young trees to allow for a high level of oversight and attention to establishing good branch structure. This focus early in the tree's life can prevent potentially costly defects and damage decades later.

Pruning of Mature Trees

A mature tree, for the purposes of this Plan, is considered to be greater than 12" 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, windstorms 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 loose 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

The Village of Lombard shall not be responsible for the pruning of trees located on private property. The Village reserves the right to prune portions of trees overhanging public property, but is under no legal obligation to do so, and will perform such pruning at the discretion of the Forestry and Urban Landscaping Supervisor and/or 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, Village staff will perform establishment pruning of young trees. In most instances, the establishment pruning of trees under six inches in diameter will occur during the Village's annual cycle pruning program.

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. During cycle pruning trees will also be raised to prevent or eliminate conflicts with vehicular traffic or traffic control devices. 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, 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 the Village, 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, the Village 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.

Tree Pruning Requirements and Standards

Village of Lombard

1. All activities directly related to the operation of a chainsaw, bucket truck, limb rigging, or tree climbing shall be performed by a qualified 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 accomplished by a Village of Lombard employee unless certified as a qualified incidental line clearance arborist.
3. Lombard employs cabling, bracing, and other such support systems in order to preserve Village-owned trees when practical.
4. No heading, pollarding or espalier pruning shall be conducted on Village-owned trees without a permit and prior written approval of the Village of Lombard.
5. Wound paint shall be used when Elms and Oaks need to be pruned between April 15 and Oct 15 to prevent spread of DED and Oak Wilt, respectively.
6. The need for pruning and maintenance of individual trees and parkways shall be at the discretion of the Village of Lombard and its designated contractors.
7. No more than 25% of a tree's live crown shall be removed during pruning operations to preserve the health of the tree. Any more than 25% of the live crown being removed may 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 establishing or enhancing a robust Urban Forestry program can be difficult! There may be many new challenges and learning curves, contracts to renegotiate, bid documents to create, resident concerns to manage, and other responsibilities which may require the assistance of a professional.

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 Village staff on tree health and risk assessments, assisting in explaining policies to homeowners, preparing contract and bid specifications, and teaching residents how to help the Village in caring for their trees. 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, the Village does not currently treat for any pests or diseases. Residents and HOAs of Lombard may perform chemical applications on the parkway trees, such as treatment for Emerald Ash Borer, Dutch Elm Disease, Apple Scab, or other common disorders. No formal permit application process in place with regard to residents treating trees, but creating one would be a good step forward for the program. The Village will not bear any financial responsibility associated with the costs of such treatments, and treatments should be performed by a Certified Arborist who holds a valid Pesticide Applicators license.

Such an allowance would be strictly informational, to allow the Village to be aware of chemical treatments occurring on trees that it owns. Such work may be denied or revoked for utilizing unqualified contractors, potentially hazardous chemicals, or any other reason at the discretion of the Village. Additionally, trees being treated by residents may still be removed at the discretion of the Village for any of the reasons listed above.

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.

Based upon recent changes to the tree planting budget we estimate that 4200 trees will be planted over the next 10 years and the vast majority of these are anticipated to be replacements for removed trees. This means the concept of water management becomes very important. A watering program paid for by the Village, using contracted labor, is likely beyond the scope of current budgets. Watering of new trees is generally delegated to residents. Upon receiving a newly planted tree on the parkway in front of their homes, residents are supplied with information which explains how often to water their new tree during the first 2-3 years. It is also suggested that the Village, acting in conjunction with the Forestry Consultant, hold basic tree maintenance classes open to all residents.

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 and/or soil against the trunk in excess of 3" deep. This causes moisture build up against the trunk, and can cause decay of the trunk tissue, promotes the development of stem encircling roots, and can lead to premature tree 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.

Fortunately, mulch is a commodity most communities can get for free so long as they are pruning and removing trees each year. Lombard has a small chip dump site and a temporary dump site for removal chips to be aged to provide better chips for new plantings. A permanent site with sufficient capacity to stockpile and age chips has not yet been located. If such a site is established, these chips could be made available for free to residents as well as planting contractors. This arrangement works well for everyone: Contractors do not have to pay to dispose of chips or for transportation, residents get free woodchips, and the Village doesn't have to pay for mulch when new trees are planted. All newly planted trees should have mulch applied appropriately. A goal for Lombard 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

In many municipalities, ordinances exist to protect trees and shrubs from construction activities. The intent of these ordinances is to protect the benefits those tree and shrubs provide to the community. Trees and shrubs are a community resources that provide benefits such as aesthetics, storm water benefits, energy savings, carbon sequestration and increased property values. Currently, the Village does not regulate activities affecting private trees during construction at this time, but there are established tree protection standards for ROW trees during construction. 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 L are industry standards with a proven record of success.

Right-of-Way Tree Preservation/Protection Requirements and Standards

Village of Lombard

1. All right-of-way trees regardless of size shall be indicated on the site plans submitted to the Village of Lombard and all relevant architects, engineers, and workers, detailing the following:
    a. Trees to be removed (see 99.23 for required fees)
    b. Trees to be preserved
    c. Location and size of the Tree Protection Zone (TPZ) delineated according to the Village of Lombard's Manual of Standard Specifications for each tree
2. The Tree Protection Zones for each right-of-way tree shall be visibly delineated by the site engineer, using chain link fence, orange snow fencing, or other high visibility exclusion material per Chapter 800 of the Village of Lombard's Manual of Standard Specifications. When such a delineation is not possible, all workers on site shall be made aware of the TPZ verbally. A 3' gap allows for the mowing of enclosed turf.
3. The Village does not have a tree protection code for private property trees

Tree Risk Assessment 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, the Village of Lombard always must always assume some degree of risk. It is up to the Village to track that risk to ultimately decide which steps to take to mitigate trees which pose such risk 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 form can be found in Appendix G at the end of this report. All trees in Lombard are assessed for a basic level of risk during inventory updates. These are limited visual assessments. Based upon data gathered during the inventory update process, an additional more detailed assessment may be recommended for individual trees.

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 Village trees during the inventory data collection, but this information will help the reader 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. 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 Tree Failure Impacting a Target

Determining the likelihood of impacting a target is figuring out the occupancy rate, or the amount of time that targets (particularly people or high value property) are within the fall zone. 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. Most of the Village's inventoried 18,998 trees are in rights-of-way adjacent to roads. where failure of a tree not only impacts motorists, but it also has a potential effect on pedestrian traffic and utilities within right-of-way.

Consequences of a Tree Failure Impacting a Target

The potential consequences of the tree failure impacting a target are 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 parkway tree were to fail, that a car, utility line, and person are all underneath it at the time of failure, and the consequences 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 (see the table below).

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 Lombard Tree Risk Assessment Policy

The Village of Lombard has created this policy to maintain an acceptable level of risk from its municipal tree population. In order to maintain a high level of public safety, while mitigating undue burden, the Village shall adopt the following risk assessment protocols:

1. The Village of Lombard maintains a tree inventory detailing the species, size, and condition of all trees on Village Parkways. The UFMP recommends that the trees observed as being in elevated risk categories during the initial inventory be audited on an ad hoc basis. During these audits, the Forestry and Urban Landscaping Supervisor and/or 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. During subsequent years, staff shall perform limited visual assessments on an ad hoc basis by driving by 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 of a concern about a potentially high-risk tree, the Forestry and Urban Landscaping Supervisor and/or Urban Forestry Consultant 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 the Forestry and Urban Landscaping Supervisor and/or Forestry Consultant as to what the appropriate mitigation measures are, if any.

4. All trees determined to need mitigating actions (removal, pruning, etc.) should be documented in writing by the Forestry and Urban Landscaping Supervisor and/or Urban Forestry Consultant. The 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 copy of any TRAQ form is to be scanned and attached to task record in Cartegraph once completed. This creates a "permanent record" easily accessed for future comparison.

6. 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 the Village.

The TRAQ Form can be found in Appendix G at the end of this report.

TRAQ Tree Risk Assessment Matrices

Likelihood of Tree Failure Impacting Target

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

Risk Rating Matrix

Likelihood of Failure and Impact	Consequences			
	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 should all pruning, planting, and removals be contracted. Based on input from Village staff, the budget begins this year with a dollar amount that is within their current annual budget for tree related expenses. Actual budget numbers will likely be lower due to the fact that the Village performs some of this work using in-house labor. From there, generally the budget increases slightly each year, and projects through 2032. This represents a necessary budget increase for such an increase in values of the Urban Forest.

	Milestones	2022	2023	2024	2025	2026	2027-2032
REMOVALS	Trees Removed	350	375	400	425	450	450/year avg
	Diameter Inches	4025	4312.5	4600	5460	5175	
	Notes	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates	Removals Identified During Inventory Updates
	Removal Cost (2021)	$90,090	$96,514	$102,948	$122,195	$115,817	$115,817
	Removal Cost (CPI)	$90,090	$96,514	$102,948	$122,195	$115,817	$133,190

	Milestones	2022	2023	2024	2025	2026	2027-2032
PLANTINGS	Trees Planted	575	400	350	350	450	500/year avg
	Planting Cost (2021)	$205,000	$140,000	$125,000	$125,000	$160,000	$175,000
	Planting Cost (CPI)	$205,000	$140,000	$125,000	$125,000	$160,000	$201,250

	Milestones	2022	2023	2024	2025	2026	2027-2032
PRUNING	Trees Pruned	3500	3550	3600	3650	3750	4,000/yr average
	Notes	3,500 Cycle Prunes	3,550 Cycle Prunes	3,600 Cycle Prunes	3,650 Cycle Prunes	3,750 Cycle Prunes	4,000 Cycle Prunes in Perpetuity
	Cost (2021)	$145,000	$150,000	$155,000	$160,000	$170,000	$200,000
	Cost (CPI)	$145,000	$150,000	$155,000	$160,000	$170,000	$230,000

	Milestones	2022	2023	2024	2025	2026	2027-2032
FORESTRY CONSULTANT	Notes	Basic Assistance with contract prep, etc	Appraisals and Risk Management	Inventory Updates / Risk Management	Inventory Updates / Risk Management	Inventory Updates / Risk Management	Inventory Updates / Risk Management
	Cost (2019)	$5,000	$5,000	$10,000	$10,000	$10,000	$10,000
	Cost (CPI)	$5,000	$5,000	$10,000	$10,000	$10,000	$11,500

TOTALS	**TOTALS - 2021 $**	**$445,090**	**$391,514**	**$392,948**	**$417,195**	**$455,817**	**$500,817**
	TOTALS - CPI 3%	**$445,090**	**$391,514**	**$392,948**	**$417,195**	**$455,817**	**$575,940**

Summary / Conclusion

The Village of Lombard has a long and storied history of maintaining a top-tier urban forest, and in fact, trees are even a part of its branding, with Lombard's motto being "The Lilac Village". The current status of the urban forest resource in Lombard is that it is extraordinarily well cared for, and a highly diverse tree population overall, which provides its residents with nearly $3 Million in benefits each year, or over 6x the money invested in it on an annual basis!

That said, there are always areas where improvements can be made, and this Urban Forestry Management Plan has attempted to do so. Such goals as reducing the number of Maples and other overplanted species, attempting to grow some nursery stock on Village-owned land, and increasing overall tree canopy, among many others, are areas where the Village could make a great program even better.

And it is worth mentioning as we conclude this plan that urban forestry and care and maintenance of trees is a journey, and not a destination. It is of the utmost importance that this plan and its goals be reviewed every year or every other year so that evaluation of goals can be made, and the urban forestry program can be adaptively managed. Trees are long-lived organisms, and must fight through many circumstances, both known and unforeseen. Therefore, this document is meant to be a starting point, and not an ending point. Now with goals established, those goals can continually be reevaluated for success or failure, and altered as necessary.

We hope that the value of trees to the community has been shown here, both in terms of hard dollars as well as some of the intangible services such as pollution reduction and carbon sequestration. These are things that many people do not consider in their daily lives, and we hope that reading this document has helped to establish a sense of wonder about trees and the benefits they provide society.

We also hope that this document helps to advance the field and science of Arboriculture, and the culture of safety that it thrives on. All too often, we see people looking at the urban forest as "just a bunch of trees", when in reality, and as hopefully this document has shown, the situation is far more complex than that. There are excellent careers to be had in the green industry and specifically in Arboriculture, and it is hoped that maybe this document has inspired or will at some point inspire people to consider this as a career option.

We thank the Village of Lombard and its staff and local stakeholders for their partnership in writing this plan, as well as the funding streams from the US Forest Service and Illinois Department of Natural Resources. The Village of Lombard has a bright future ahead if it in terms of Urban Forestry, and it has been a pleasure being part of that process.

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 Indiana, 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 (CPI): 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 the Village as part of an independently owned and operated private company which performs work for the Village, but who are not directly employed by the Village

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 the Village

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 the Village 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, street lamps, etc.

Hazard: A known and documented state of imperiling public safety

Healthy Tree: Any tree which is successfully adapting to it's environment, and shows no signs of negative impact from disease, pests, pathogens, or other such maladies, as determined by the Village or Forestry Consultant(s)

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 Lombard, 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 northeastern Illinois, and outcompetes native species, or negatively alters its new environment.

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

J.U.L.I.E. (811): 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 the Village 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 Lombard 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.

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

Part-Time: An employee who has regular employment through the Village 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 Lombard

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 the Village 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 Lombard Staff.

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

Staff: Those employees retained by the Village 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 Village staff

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

Unmanaged: A tree or shrub which is in an area of the Village of Lombard 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.

Village Property: Land which, by deed or title, belongs to the Village of Lombard

Appendix A: Acceptable and Unacceptable Species

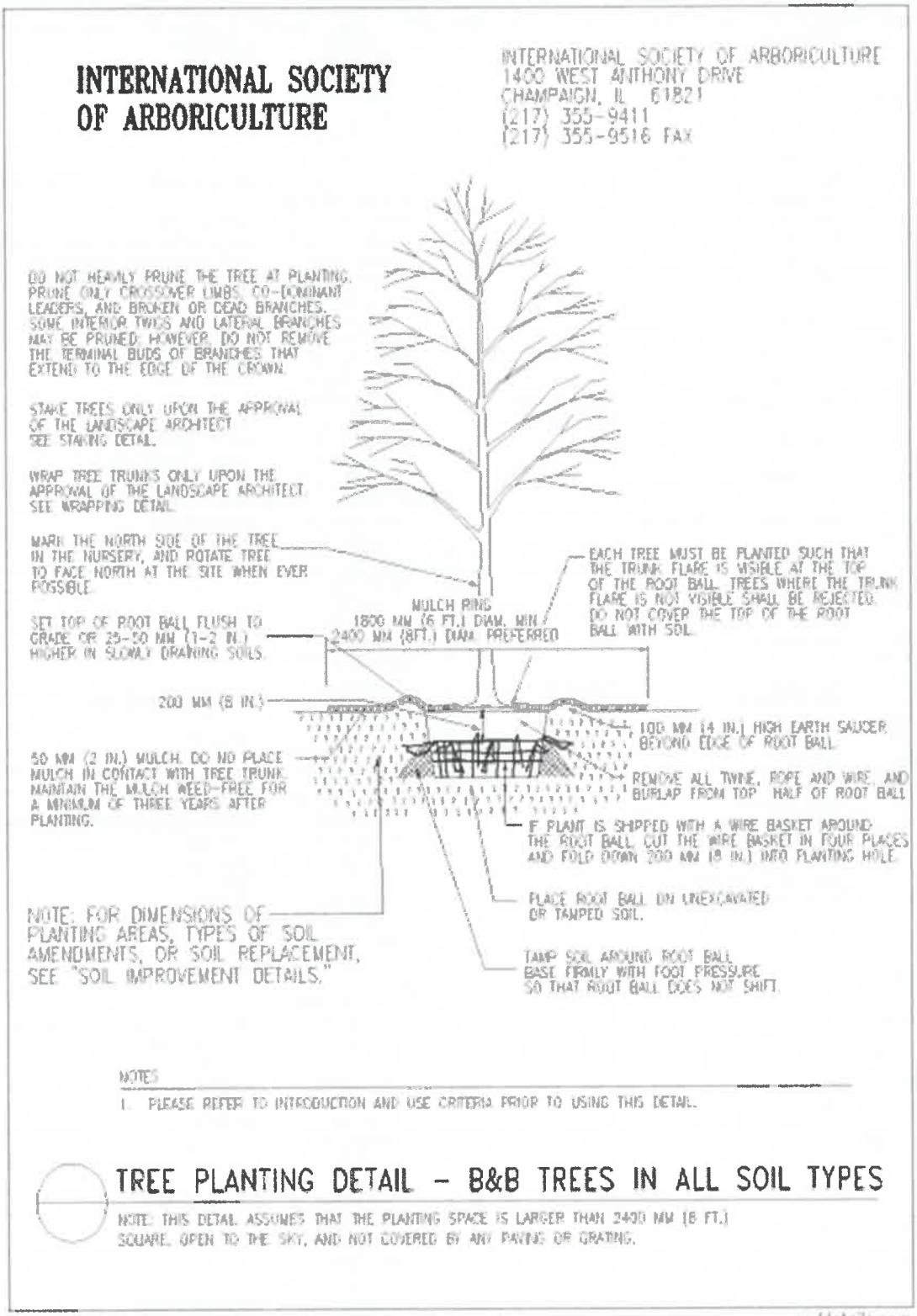
Species not appearing on this list can be approved or disallowed by consensus of the PWECC, acting under the supervision of the Forestry and Urban Landscaping Supervisor and/or Forestry Consultant

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

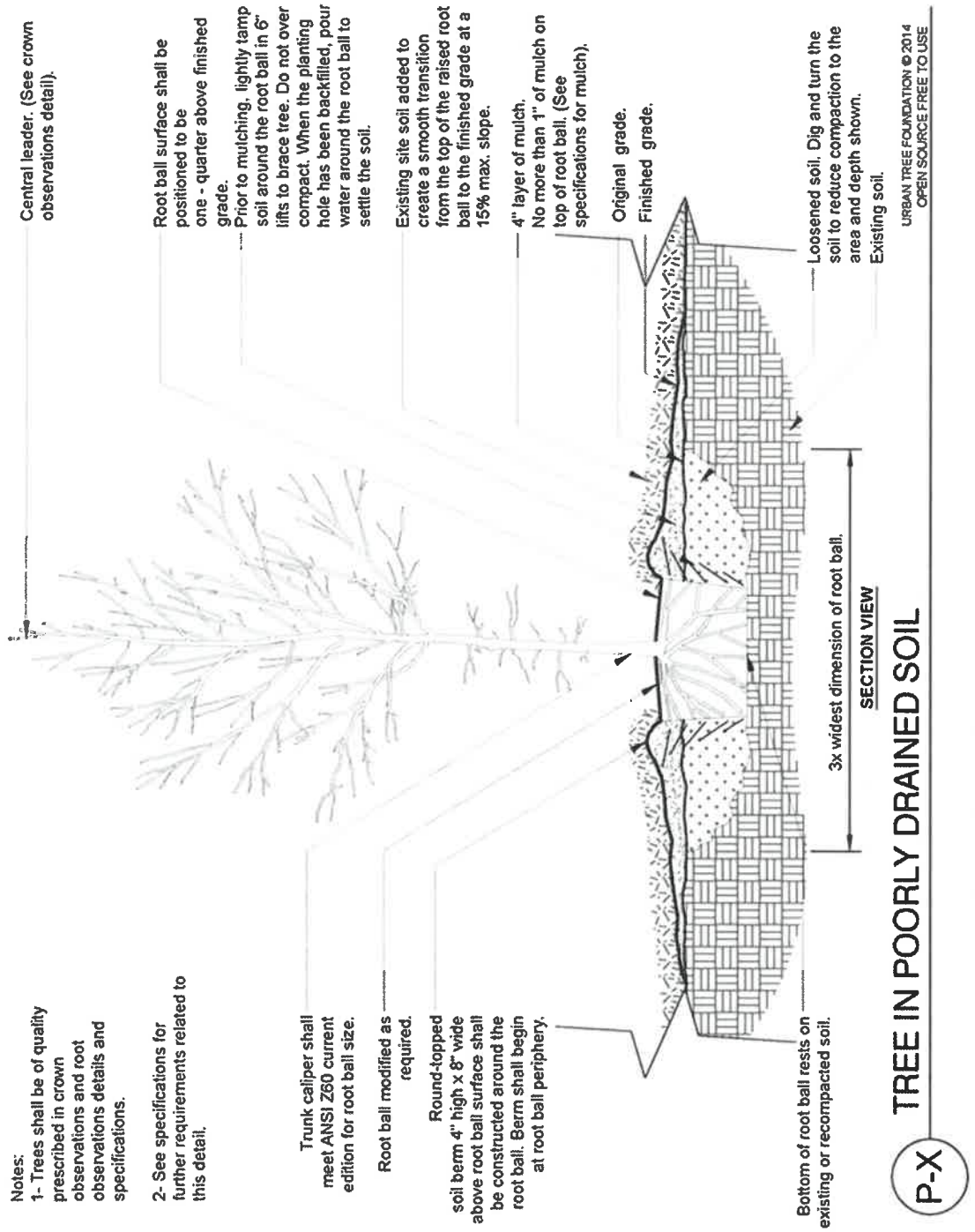
Appendix B: Additional Comments on Species

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	
ARBOR VITAE	Parks only		MAGNOLIA-SAUCER	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 newintroductions		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 'Ft. 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-PEEGEE			TULIPTREE	
IRONWOOD			VIBURNUM	Tree form only
JUNIPER-COMMON	Parks Only		WALNUT-BLACK	NOT APPROVED
KATSURA			WILLOW-SPP	NOT APPROVED
KENTUCKY COFFEETREE	I		YELLOWWOOD	
LARCH			YEW	Parks Only
			ZELKOVA	Prefer 'Green Vase'

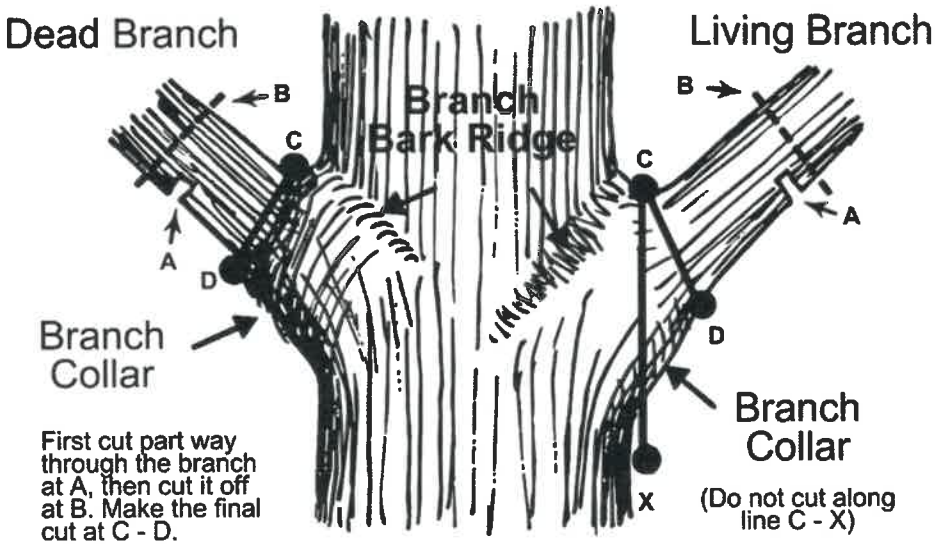
Appendix C: Balled and Burlapped Planting Detail



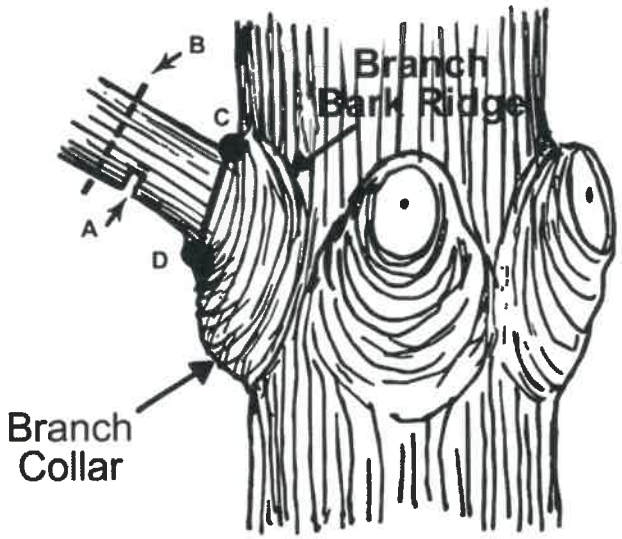
Appendix D: Containerized Planting Detail



Proper Pruning Principles



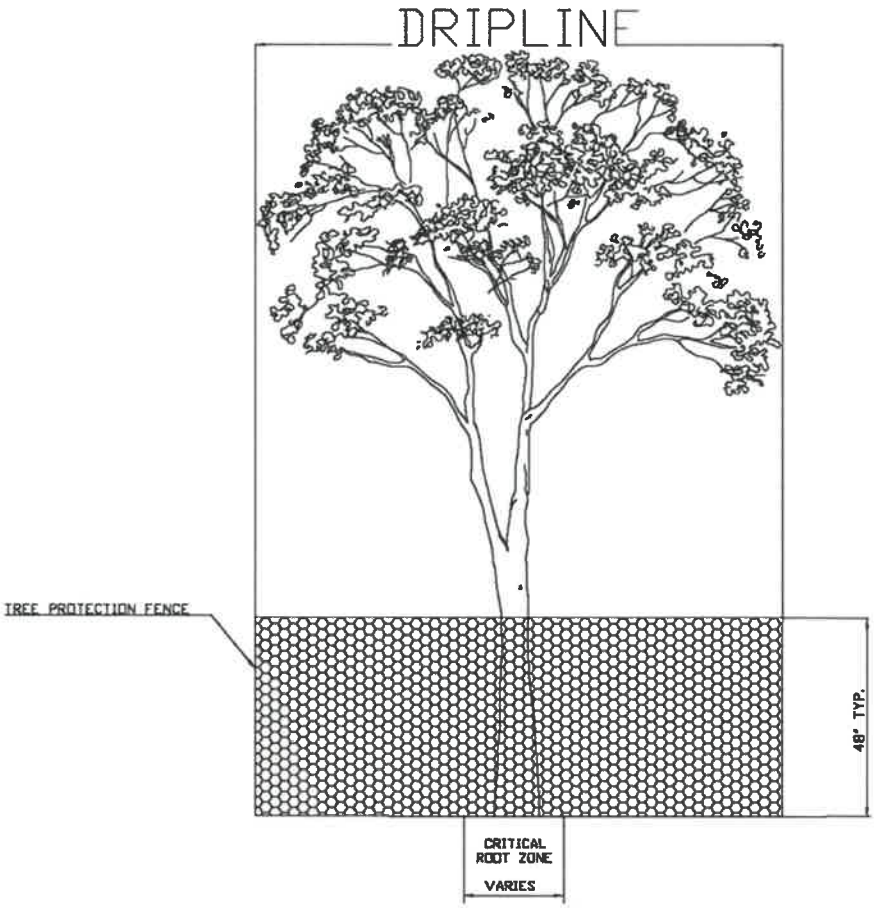
Hardwoods



Conifers

Arbor Day Foundation®

Appendix F: Tree Protection Detail



GENERAL NOTES

1. Within the Drip Line, which extends as far as the canopy, parkway trees shall be protected from construction activities by means of a see-through plastic, chain-link or wire mesh fence with the possible exception of a 3-ft gap for lawn mower access. Within the Drip Line, any construction activity that has not been accurately depicted on a permitted plan must be expressly authorized beforehand by the Engineer, and any such construction is conditional upon root pruning and limiting excavation only for the minimum necessary width.
2. Within the Critical Root Zone (CRZ), which is one foot of radius per caliper-inch and measured from the edge of the tree trunk, these prohibitions apply: (1) alteration or disturbance to existing grade; (2) storage of materials, equipment, soil, or debris; (3) disposal of any liquids besides water; and (4) construction unless expressly approved by the Engineer beforehand and conditional upon directional boring, root pruning, and/or protective material (e.g. 6 inches of wood chips or 3/4" plywood) to the furthest extent possible.
3. Any damages to roots, trunk, or branches within the Drip Line may be subject to forfeitures and fines per Village of Lombard Code Chapter 99, up to the valuation of the tree.

DRAWN BY: RAH	DATE: 4-23-2018	PARKWAY TREE PROTECTION	VILLAGE OF LOMBARD LANDSCAPING 1

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: Target within drip line	Target zone: Target within 1 x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1 – rare, 2 – occasional, 3 – frequent, 4 – constant)	Practical to move target?	Restriction practical?
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 ☐

Page 1 of 2

Risk Categorization

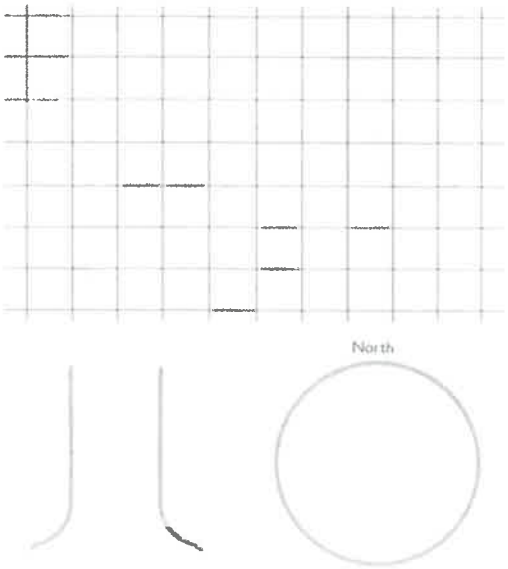
Condition number	Tree part	Conditions of concern	Part size	Fall distance	Target number	Target protection	Likelihood												Consequences				Risk rating of part (from Matrix 2)
							Failure				Impact				Failure & Impact (from Matrix 1)								
							Improbable	Possible	Probable	Imminent	Very low	Low	Medium	High	Unlikely	Somewhat	Likely	Very likely	Negligible	Minor	Significant	Severe	
1																							
2																							
3																							
4																							

Matrix 1. Likelihood matrix.

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

Matrix 2. Risk rating matrix.

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



Notes, explanations, descriptions _____

Mitigation options _____ Residual risk _____

Residual risk _____

Residual risk _____

Residual risk _____

Overall tree risk rating Low ☐ Moderate ☐ High ☐ Extreme ☐ Work priority 1 ☐ 2 ☐ 3 ☐ 4 ☐

Overall residual risk Low ☐ Moderate ☐ High ☐ Extreme ☐ Recommended inspection interval _____

Data ☐Final ☐Preliminary Advanced assessment needed ☐No ☐Yes-Type/Reason _____

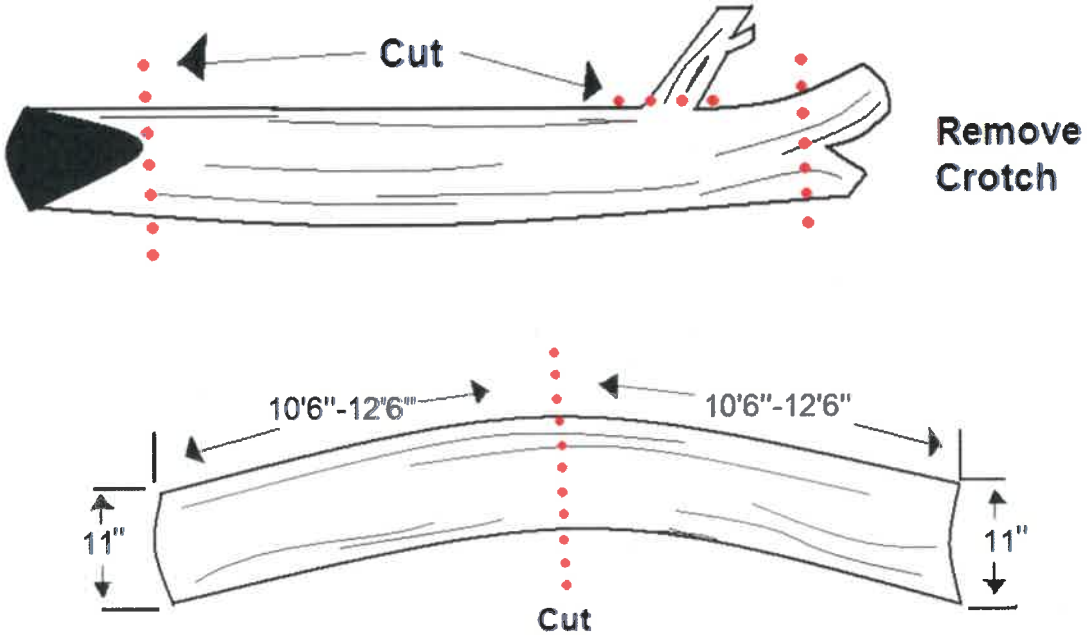
Inspection limitations ☐None ☐Visibility ☐Access ☐Vines ☐Root collar buried Describe _____

Appendix H: Urban Timber Harvesting

Log Removal Specification for Urban Timber Harvesting

This tree removal standard shall not take precedence over applicable industry safe work practices and shall be implemented by a qualified arborist, urban forest manager, and /or practitioner who, through related training or on-the-job experience, or both, are familiar with the standards, practices and hazards of recovering urban forest products and the equipment used in such operations. Additionally:

- Logs shall be felled to obtain minimum 8', 10', or 12' lengths with an additional 6" of trim on each log to a minimum diameter of 11" inside the bark. Maximum log length shall be 20'6".
- If a tree must be removed in sections, every effort should be made to retain the lowest log, at the longest possible length that can be safely felled.
- Branches should be trimmed flush with the bole/trunk, root flares should be trimmed flush with the bole/trunk, and the ends of the log should be square.
- Logs shall be flush cut with no crotches or splits. All obvious defects such as decay, large holes, and rot shall be removed.
- Logs with significant sweep shall be cut in order to eliminate as much sweep as possible while yielding the longest possible straight logs to ensure logs are flush for proper milling.



Appendix I: 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 Lombard 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 on the ground.
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 Village 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 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, the Forestry Technician or the felling arborist 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 J: 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 the Village, 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 the Village 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 rootball 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. 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.
8. 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.
9. 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.
10. 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 Lombard.
2. All employees and contractors employed by or working for the Village of Lombard 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. It is desirable that sites should 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. For balled and burlapped trees, 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. For all types, ensure any encircling (girdling) roots are removed, and root ball is shaved as necessary.
8. As soil is added, wet and tamp each layer down to ensure good moisture and reduction of air bubbles.
9. 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.
10. 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 K: 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 extensive 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 Lombard and its approved contractors.

Appendix L: 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 who is knowledgeable 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
   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.

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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.