2017 – 2021 Urban Forestry Management Plan

Village of Bellevue

July 2016

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Urban Forestry Management Plan
2016
Village of Bellevue
Parks, Recreation, and Forestry

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Introduction

The Village of Bellevue Urban Forestry Management Plan identifies existing public urban forestry resources within the Village along with recommendations for the successful management. This plan capitalizes on these resources in order to strengthen and enrich the conditions of the local urban forest and the benefits provided. Benefits of a healthy, sustained urban forest only occur when properly managed. The Village of Bellevue Arboricultural Specifications Manual outlines the obligations of the Village to maintain the urban forest and the policy tools that may be utilized to achieve arboricultural standards. Readers are encouraged to refer to Appendix A – Glossary of Terms as needed in order to develop an in-depth understanding of the components of urban forestry management.

Purpose: The purpose of the Village of Bellevue Urban Forestry Management Plan is to guide the implementation of the urban forestry program in order to provide residents and visitors benefits through the Village's many local urban forests.

Scope: This plan provides information on the Village's forestry resources and guidance on successful urban forestry management. Accompanying is a suggested five-year guideline for urban forestry management, which where able, provides cost estimates. All of the Village's street and public trees are encompassed in this plan with the intention of promoting greater awareness, health, and support.

Planning and maintaining the urban forest occurs on several levels. Generally, a community will adopt an Urban Forestry Strategic Plan as well as an Urban Forest Management Plan. Strategic Plans create a foundation and timeline for administration, management, and enforcement of the community tree program. Management Plans are based upon a tree inventory and identify site-specific tree planting, maintenance, and removal activities within a multi-year time-frame. In 2008, the Village adopted its first Urban Forest Strategic Plan and in 2010, the first Urban Forest Management plan. The Village Park Commission acts as the Village's authorized Tree Board, aiding and helping to guide urban forestry related decisions.

Mature tree assets at Josten Park

The components of an urban forest include street trees, green spaces, forested conservancies, park trees, vegetation on residential, commercial, and industrial sites within the entire village boundaries. Trees are managed in order to provide a continued level of economic, social, and environmental benefits. A healthy urban forest should be viewed as a "green infrastructure," reducing the costs and need to manage air quality and waste. Not only do trees provide oxygen and filter pollution, tree canopies provide shade and

influence the heating and cooling of homes. Storm water mitigation is also a benefit with a notable impact. It is important to note that trees increase in value over time as they mature and grow in size. As a result, the cost of removing and replanting a tree exceeds that of maintaining it properly.

Goal: The goal of this plan is to identify the strengths and weaknesses of local urban forestry management in order to ensure the local urban forest is being managed to its fullest potential.

Prioritized topics include:

- Fragmentation of monoculture neighborhoods
- Replacement of dead and declining trees
- Population of unplanted neighborhoods
- Increase in urban forestry staff
- Further risk abatement
- Continued staff training

The Village of Bellevue has a proud history of caring for the urban forest. Recently, the Village was Awarded Tree City USA status for the 13th year in a row. Additionally, the Village received its third growth award through Tree City USA in 2015 by providing exemplary programming through the Adopt-A-Tree, Buddy Tree, and Neighborhood Tree Planting programs. Arbor Day celebrations are common place and are annually celebrated with 3rd graders at McAuliffe Elementary School.

Summer Camp attendees help plant a tree in DeBroux Park.

Assessment of Tree Resources

In 2015, 4,017 trees were inventoried in public spaces including Village parks, facilities, and the right of way. Conservancies and leased properties are not included within the inventory. The majority of the Village's trees are located along improved streets in front of residential homes. The Parks, Recreation, and Forestry department maintains these trees with funding from the Storm Water Management Utility and General Fund.

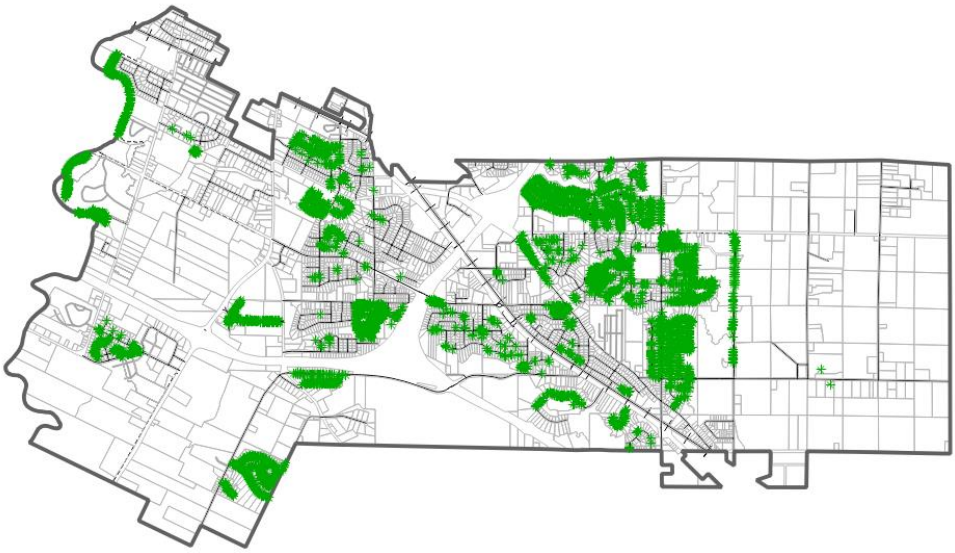


Figure 1. Approximate location of all public trees in green.

Summary

The Village is home to 40 different tree species encompassing 132 different varieties. Despite this vibrant array, variation in the urban forest canopy is poor as nearly 56% of all trees are either a type of maple or ash. Few trees are of an unidentified variety. These unidentifiable trees are predominately new plantings that were improperly tagged or left unrecorded after their original planting. There are currently 22 empty sites where stumps exist that are awaiting excavation and replacement. The Village's tree maturity spectrum is made obvious by the large, mature trees established in public parks on one end, and the new, young plantings in the Village's recently constructed and developing subdivisions on the other.

Trees in public spaces maintained and planted by the Village are replaced upon removal or decline unless conflict with location was determined. The cost of the replacement is covered by the Village as per Village Ordinance. This policy helps to maintain the urban forest in the Village and encourages the reporting of diseased or damaged trees in accordance with the Arboricultural Specifications Manual. While trees are currently being removed and replaced as necessary, some trees used for replacement planting were originally intended for other sites, or are donations from local organizations. Parks, Recreation, and Forestry does not currently

purchase new replacement trees for this specific purpose unless they are deemed an emergency removal with replacement.

The Village of Bellevue utilizes GIS software and previously collected information to assist in the management of the urban forest. In 2009, a complete tree inventory was conducted by an outside contractor, resulting in an electronic inventory of all public trees including their location (coordinates), species, variety, size (DBH and height), and approximate condition. Updates were made in 2015 by Village staff and an Emerald Ash Borer intern. As the 2015 update was funded by the WI Department of Natural Resources, the main focus was the Village's ash tree population and special attention to their locations and health was given.

The tree inventory is utilized as a reference in many day to day urban forestry decisions. It may be used as a standalone reference or it can be utilized in conjunction with programs such as i-Tree to produce information on canopy cover, species diversity, and areas of need in order to guide the management of the urban forest. Updates must be completed manually to reflect new plantings and removals and are intended to be completed annually.

Tree Diversity

Top 3 Most Common Species in Village of Bellevue

Family	Number Based on Public Tree Inventory	Percentage	Common Pests
Maple	1,204	30%	Asian Longhorn Beetle
Ash	1,048	26.1%	Emerald Ash Borer, WI Native Borers
Linden	517	12.9%	Linden Borer, Japanese Beetle

Figure 2

Despite efforts taken in recent years to diversify planting efforts, the Village of Bellevue suffers from monoculture neighborhoods. The Village of Bellevue's Arboricultural Specifications Manual requires planting to follow guidelines as recommended by the International Society of Arboriculture (ISA): no more than 10% in any one species, no more than 20% in any one genus, and no more than 30% from any one family. According to the GIS tree inventory, the local canopy does not meet these guidelines. While annual plantings follow this ratio, prior to the 2009 development of the Arboricultural Specifications Manual, practices were not adhered to. Lack of monitoring perpetuated homogeneity in the local urban forest. As a result, ash (26.1%) and maple (30%) trees dominate the urban forest, creating large and problematic monocultures in subdivisions and parks. While monocultures can appear aesthetically pleasing along streets, the International Society of Arboriculture warns against them due to their susceptibility to pests and the chance for high impact events such as drought or heat to damage intolerant species.

Given the known Emerald Ash Borer infestations in nearby communities and plight of ash trees, the impact of monocultures has already proven harmful to the local urban forest. As §427-1

dictates under the Municipal Code, the Village of Bellevue regulates and controls the planting, removal, maintenance, and protection of trees and shrubs upon or in all public areas of the Village in order to guard all trees and shrubs, both public and private, within the Village against the spread of disease, insects, or pests. These categories include the Emerald Ash Borer, Dutch elm disease, and oak wilt. In light of this, the continued monitoring of the monocultures within the Village is crucial.

Since 2009, the developer tree policy, the Neighborhood Tree Program, and Buddy Tree planting initiative has helped to increase species diversification by encouraging the incorporation of new species into the Village canopy including, but not limited to, the Kentucky Coffeetree, London Planetree, Redbud, and Swamp Oak. Diversification efforts have positively modified the local urban forest at locations such as Josten Park and the East River Trail. In particular, the Buddy Tree program is helping to reduce ash tree numbers in order to reduce the number of pest susceptible trees in the Village.

Incorporation of New Trees

In light of growing monocultures, actions have been taken to diversify planting on public lands. Species are considered based on their existing population in the Village, the presence of fruit or persistent litter, salt tolerance, and durability as a street or urban tree. Trees known to produce excessive litter are planted primarily in parks in order to keep walkways and streets clear of debris. Tree planting suggestions have been incorporated into the Arboricultural Specifications Manual and are adhered to as possible.

In accordance with the Village Street Tree Planting Plan, new subdivisions are populated with trees after approximately 70% of houses in the development have received occupancy permits and have established lawns. Funding is secured through a linear curb fee included in the developer agreement. The number and location of each tree, species, and size of stock are to be determined by the Village Forester. This policy has populated much of the urban forest since its incorporation and helps maintain the ratio of canopy growth to urban development. Oversight by the Village Forester assists in slowing and eliminating existing monocultures. However, in some cases, developer fees collected do not adequately reflect the cost of tree planting following lawn establishment. As the amount of time between collection and planting may vary, the change in cost is difficult to predict.

Many homes established before the Village adopted the developer tree policy as part of the Street Tree Planting Plan have yet to receive trees in the right of way. As a result, a number of residents and homes are not receiving the passive benefits of street trees including reductions in electricity costs and enhanced storm water management and runoff mitigation. Trees also help to improve property values and invite aesthetically pleasing and ecologically important species such as birds. Trees are not to be planted along unimproved streets as outlined by the Village of Bellevue Arboricultural Specifications Manual.

As roads are reconstructed or improved, trees are planted in accordance with the Street Tree Planting Plan. Unfortunately, prior opportunities to plant street trees during street improvements have been missed, and greater attention and collaboration is required in order to ensure trees are planted and maintained in accordance with the Street Tree Planting Plan.

Residents may apply for and purchase their own street trees at wholesale price for planting through the Neighborhood Tree Planting Program. These purchases may populate tree barren neighborhoods, or add additional street trees to the right of way as space permits. While this program is utilized with some frequency, the popularity of the program is limited. Order forms

Neighborhood Tree Program Frequency (Resident Orders)

Year	# of Homes (# of Total Trees)
2011	2 homes (3 trees)
2012	Not Utilized
2013	Not Utilized
2014	1 home (4 trees)
2015	2 homes (3 trees)

Figure 3

may be acquired in person at the Village Office, or found online on the Village website under Urban Forestry. Figure 3 displays the frequency of program use in the past five years.

Residents may complete a waiver to opt out of developer planting. Waived plantings are relocated and used to replace trees outside of the developer warranty. Residents who decline to receive street trees may no longer receive a tree unless they fund the planting at a later date themselves. Waivers have been used with limited frequency in the past five years.

Occasionally trees are acquired before they may be planted through either the purchase of extra stock or through programs such as First Down for Trees. These trees are held in the tree holding area where they are watered and allowed to improve root growth. This holding area is primarily composed of mulch with a basic irrigation system. Despite this set up, the Village's capacity to hold onto excess tree stock is limited and trees are planted as soon as possible to minimize losses.

Figure 4 - Residents enjoying the East River Trail.

Assessment of Tree Risks

Trees that are found to be damaged, structurally unsound, or otherwise identified to be declining in health are removed routinely in order to promote public safety and to prevent disease and the invasion of pests. These trees are considered public nuisances, and authority for their removal is given under Municipal Code §427. In some specific instances as outlined in Municipal Code, authority to abate private public nuisances is also given. Residents are encouraged to report concerns about public and private trees in order to create a network of citizens and staff monitoring the urban forest.

Tree Conditions Fall 2015

Condition*	Description	Number Based on Public Tree Inventory	Percentage
0 to .3	Consideration for Removal	59	1.5%
.31 to .5	Poor	157	3.9%
.51 to .7	Declining	1165	29%
.71 to 1	Good Health	2636	65.6%

Figure 5 **scale based on tree inventory values*

As part of the internal public tree inventory, trees were rated based on visual health from a scale of 0 to 1. Figure 5 displays the distribution of conditions based on the 2015 tree inventory. Over 65% of trees in the Village are considered in be in good health by displaying either full crowns, not supporting obvious wounds, or showing signs of disease. While 29% of trees are thought to be in declining health, they are not considered to be of immediate risk to the public though they may show early signs of disease that threatens other trees. Trees noted to be in poor health (3.9%) may pose risks to the public if they have weak or brittle limbs and should be under routine observation. 1.5% of trees are candidates for removal due to proximity to death, long term canopy loss, or obvious wounds. These trees pose the greatest risk as dead and declining trees may turn brittle. These brittle trees may drop limbs, or fall in extreme weather conditions. Their removal should be prioritized over other tree work.

Causes of Decline

Trees in the Village have seen decline from a number of natural and unnatural causes, some as a result of their location in urban areas and close proximity to human activities. Common causes of trunk damage include wounds created by lawn mowers and string trimmers and the insertion of foreign objects into the bark such as staples and cosmetic decorations. Girdling root is another common cause of death in mature trees as the result of inappropriate planting (often related to ball and burlap style). Other seasonal concerns that have led to premature death include inadequate watering at time of planting, lack of supplemental watering during crucial times of growth, or absence of water during instances of drought. Deer and rodent browse on immature bark is a common occurrence, damaging and sometimes killing young trees. Due to

the incorporation in urban areas, trees also perish as a result of salt intolerance in light of winter road maintenance. As able, tree conditions and damage sources are noted in the GIS tree inventory.

Tree Pruning

Annually, trees are trimmed and pruned November through March in order to thin canopies, remove dead, diseased, or dying limbs, and create better clearance and accessibility of sidewalks and roadways. This pruning process is important for maintaining the health of local urban forest and safety of residents as it promotes tree growth, and removes hazards from low or weak limbs. Pruned trees are often noted to prove more resilient in severe weather conditions, further reducing risks in the community. An individual tree receives routine pruning every four years with emergency pruning as discovered.

Pruning is performed by the Village's ISA Certified Arborist, following ANSI Standard Practices for Tree Care Operations-Pruning (ANSI A 300 (Part I) Current Edition) as identified by the Village's Tree Ordinance and Arboricultural Specifications Manual. Pruning is based on the Village's ten tree zones, with a select number being serviced each year in rotation based on tree zone densities and time since last prune. Currently, pruning is completed on a four-year rotation in order to allow previous pruning cuts to heal and reduce tree stress and instances of disease. Trees are not pruned within a cycle until two years have passed since planting. Once incorporated into the pruning cycle, young trees receive training pruning at the same time as routine pruning until no longer required. Residents are notified in advance via letter that routine maintenance will occur for their street trees when their zome is scheduled for prune. Appendix C includes a current map of the Village's tree zones.

Tree Debris

When a tree is removed, the trunk and limbs cannot remain behind. Village Staff oversee the removal the trees and ensure debris has been cleared (limbs, leaves, and the trunk) to the fullest extent post removal. Logs and branches are taken to the Village yard waste site wherein they are stored. Currently street tree pruning byproducts and debris are chipped by Village Staff for local use as mulch. Yard waste debris is chipped through a contractor.

Tree Removals and Stumps

Fig. 6 – A Tree Stump Marked with Paint

The Village of Bellevue does not own or operate a stump grinder. Machinery is contracted out annually upon the accumulation of stumps at the discretion of Village staff in the timeliest manner possible. Currently, given staff restrictions, available time, and the cost effectiveness of large stump grinding orders, stumps may exist for 6 to 8 months before removal occurs. Leftover stumps may pose trip hazards within the community and have the potential to invite in tree diseases if not disposed of in the timely manner. This is considered a risk that requires greater attention in the community.

Invasive Species and Disease

In 2015, the Village of Bellevue created and adopted an Emerald Ash Borer Management Plan detailing the maintenance and removal of ash trees infested by the Emerald Ash Borer (EAB). As ash trees ravaged by EAB are often quick to decline and turn brittle, the swift removal of diseased and deceased ash trees is imperative for maintaining safety in public spaces. While EAB has yet to be identified in the Village, the adoption of this plan allows for swift action once infestation occurs. A total of 1,048 ash trees exist in public spaces and right of ways across the community. Should infestation onset quickly, a large portion of the urban forest has the potential to be lost. In light of this, Adopt-A-Tree and Buddy Tree programs have been developed in order to begin species diversification in the Village, and to establish young trees in areas most likely to be effected. No further action will be detailed in this plan.

No other steps are currently being taken in response to other invasive species or to ward against pests and disease. Trees noted to be showing signs of disease are recorded within the GIS tree inventory, and if suspected, determinations are made by the Village Forester on actions to be taken. As needed, disease and pest identification and consultation is sought through the UW Horticulture Extension and WI DNR.

Accomplishing Management Goals

The Urban Forestry Management Plan is intended to be used in conjunction with the Urban Forestry Strategic Plan, Street Tree Planting Plan, and Emerald Ash Borer Management Plan following Arboricultural Specification Manual guidelines and Municipal Code in order to maintain and grow urban forestry efforts into the future. Timelines included in respective plans may be used as benchmarks for management practices. Working within these plans will help support and maintain the urban forest and is crucial for forest health. Relevant portions of these accompanying plans have been included where applicable.

Upkeep and utilization of the Village maintained public GIS tree inventory will allow for staff to track species diversity within the community, provide information on tree health, and aid in visualizing areas in need. Prior to major planting efforts in both the spring and fall, tree varieties for planting are reviewed by the Village Forester for approval. Tree species for bid through contractors is also monitored, and companies capable of providing greater species diversity should get preference within reason. The Village of Bellevue's Arboricultural Specifications Manual requires planting to follow the following guidelines: no more than 10% in any one species, no more than 20% in any one genus, and no more than 30% from any one family.

Tree Maintenance

As able, trees are purchased or acquired as either bare root or ball and burlapped (B&B). However, B&B trees may develop girdling root issues as they mature due to their burlap baskets, leading to the premature death of an otherwise healthy tree years after planting. Conflict with ball and burlap plantings has led to the death of public trees and is not a recommended option for future plantings. B&B trees are currently avoided when able. B&B trees are more commonly utilized in the fall for planting.

In order to capitalize on investments and protect the health of young trees during vulnerable times, newly planted trees in the Village receive special maintenance for their first two years in accordance with the Arboricultural Specifications Manual. Newly planted trees are watered at the time of planting, and residents are asked to water newly planted street trees for the first year. Trees planted in parks and other public spaces are watered by Village staff. Recently, language requiring contractors to water new plantings has been incorporated into development guidelines and bids.

Young trees with soft bark are protected with a plastic or mesh shield in order to discourage pests and animals from eating and destroying the new tree. This guard may also protect from wounds created by residents from the use of lawn mowers and string trimmers too close to the base of the tree. Trees may also be staked and tethered for the first two years following planting in order to encourage upright growth. All trees planted receive a layer of mulch in order to reduce competition from grasses and weeds and to improve soil moisture around the

roots. Mulch is supplied by the Village and currently is a byproduct of tree pruning and maintenance, and is chipped by the Village staff using in-house equipment.

Community knowledge and involvement in managing the local urban forest is crucial in order to ensure the longevity of community resources. Information is available to residents for free through the Village office including alternatives to saturated species, and ISA educational brochures. Tree planting permits help monitor species being planted and encourage smart and conscious tree planting in the Village. The Village of Bellevue maintains active social media accounts, and features a regularly updated Urban Forestry page upon the Village website. These digital resources help provide information on urban forestry efforts and can be used to publish alerts on emergency response activities, invasive species, or natural disasters that impair tree health such as high winds, drought, and lightning.

Recommended Action

In order to continue the successful management of the Village's urban forest, recommendations have been created based on resident suggestions and input from the Village Forester and other staff. As Bellevue hosts an already successful forestry program, no one recommendation is crucial to the programs survival but all are encouraged in order to continue efficiency, growth, and improvement.

Tree Acquisition and Planting

The Village of Bellevue is required as able by Municipal Code §427-6 under the Street Tree Planting Plan to remove and replace dead or diseased public trees at the expense of the Village. As it currently exists, accommodations have not been made in the operational budget to specifically fund replacement trees, hindering the rate of replacement and utilizing monies intended for other forestry needs.

Recommended Budgeted Amounts for Replacement Trees

Rate of Attrition	Number of Tree Deaths Based on Public Tree Inventory	Cost of Replacement (Per Tree)			Total Cost
		B&B Tree*	Stump Grind	Labor	
1%	40	$325	$75	$80	$19,200
1.5%	60	$325	$75	$80	$28,800
2%	80	$325	$75	$80	$38,400

*While B&B trees are not recommended, most expensive scenario for planting is provided for demonstrative purposes

Figure 7

It is recommended the Parks, Recreation, and Forestry department anticipates the loss of 40 to 80 trees per year based on a 1% to 2% attrition rate. This range aligns with the number of suggested removals based on the 2015 tree inventory. Since 2010, the average number of trees removed and replaced annually has been 21. However, trees replaced have primarily been street trees. Trees in parks and other public areas have not been consistently replaced. The creation of a budget to accommodate for more than 21 trees would allow for the incorporation of trees in parks and public spaces and the replanting of previously removed trees. In the future, the growing size of the tree population should be taken into consideration when determining the replacement tree budget.

Fig. 8 – Volunteers Planting Bare Root Tree

The acquisition of bare root trees is preferred to balled and burlapped due to potential root conflicts that lead to premature deaths. B&B trees are often more expensive to purchase and plant as they require heavy machinery to lift the dense root balls. Bare root trees may be planted with ease by Village staff, and plantings such as at Josten Park and the East River Trail have been accomplished by volunteers using minimal labor. It has been observed through received tree bids that B&B trees planted cost approximately $325 while bare root trees planted cost $225. For this reason, the continued use of bare root trees when available for purchase is recommended in order to promote tree longevity and cost savings. B&B are often associated through the use of contractors for tree planting. When using Village staff to plant bare root trees, the cost of staff time and labor must be considered. Additional staff may be needed if these trees are to be planted by staff.

Presently, trees are contracted to be planted once a year in the fall. It is recommended that planting is switched to spring plantings only in order to capitalize on cost savings and promote the wellbeing of the trees. Bare root trees are also more common for purchase in spring than fall, increasing the likelihood of their obtainment. Accommodations anticipating this switch currently are being incorporated into forestry routine.

Opportunities for street tree planting have been missed in neighborhoods developed before the incorporation of the Street Tree Planting Plan and along roads that have been reconstructed and improved. Focus should be placed on these areas in the future in order to create a more cohesive and evenly distributed forest canopy. It is recommended these plantings work within the replacement tree budget. For one year, re-planting efforts should focus on unplanted neighborhoods, and the second, street reconstruction. If further planting is required, these areas should be planted in rotation with street and park tree replacements. Care should be taken not to neglect other routine replacements in favor of these initiatives. The existing tree inventory and GIS data for the Village may be used in order to identify these neighborhoods in need.

Currently Parks, Recreation, and Forestry staff maintain a mulch based tree holding area for the short term holding of tree stock. As this area has already been established, it is recommended action is taken to maintain the practice. Care should be taken to ensure stock in holding receives proper irrigation and protection from pests and animals that eat young bark and tree buds through the use of tree guards and fencing.

Tree Pruning

Tree pruning is completed annually November through March by Parks, Recreation, and Forestry staff with additional staff help from Public Works. As not all staff come from a forestry background, time and consideration is needed for forestry training so that pruning may be completed in a safe and efficient manner for both the operator and tree. Training and reminders on safe pruning practices are recommended before pruning begins in November and should be completed in-house alongside the Village Forester so that expectations are consistent and adequate.

Tree Pruning Schedule

Zones	Pruning Years
5,7	2016, 2020, 2024, 2028, 2032, 2036
6	2017, 2021, 2025, 2029, 2033, 2037
2, 3, 4	2018, 2022, 2026, 2030, 2034, 2038
1, 8, 9, 10	2019, 2023, 2027, 2031, 2035, 2039

Figure 9

ANSI 3000 standards recommend pruning during the dormant (winter) season in order to maximize growth in spring, and to reduce the spread of disease such as oak wilt and Dutch elm disease. This guideline is followed by the Village. As pruning goals have been met in previous years utilizing current staff ratios, changes to the pruning schedule are not recommended. The current pruning schedule based on the four year rotation is displayed in Figure 9.

Residents should continue to receive a pruning notification letter in order to continue sharing information about the Urban Forestry program and the work completed.

Staff Training

To continue to reduce risks within the Village and alleviate potential liabilities, it is recommended one forestry staff member receives an ISA Tree Risk Assessment Qualification (TRAQ). This program is certified by the International Society of Arboricultural and educates on tree husbandry that promotes the safety of people and property. As registration is often limited, care should be taken to schedule the course and exam in advance. Cost for this course is $625 for ISA members. Price may fluctuate based on location. The required tree risk assessment manual may be purchased for approximately $60 through the ISA website. The Village Forester is a recommended candidate.

Equipment Resources

Included in the Village Capital Improvement Plan (CIP) is the purchase of an aerial lift and stump grinder attachment for existing machinery. These machines are recommended to be utilized to meet urban forestry needs including assessing for tree risks through the use of the aerial lift and canopy inspection, to remove stumps on an as-needed basis in order to mitigate tripping hazards and the potential for disease, and to improve community aesthetics. Machinery should be used to perform tree maintenance as able in order to increase the frequency of spot maintenance and to reduce costs associated with emergency contracting. More routine

monitoring can further reduce tree hazards and allow for the early detection of pests and diseases such as the Emerald Ash Borer, Linden Borer, and oak wilt.

Urban Forestry Intern

In order to assist the Village Forester seasonally with urban forestry tasks and the associated field and office work, an urban forestry intern is recommended to be hired annually. This intern would be expected to begin work in mid-May and remain until early September with an expectation of 640 total hours (approximately 16 weeks). A student with an arboricultural or environmental background is encouraged and preferred. An hourly rate of $14 is suggested with a table of costs provided in Figure 10. Suggested duties and hourly breakdown for the Urban Forestry Intern is included in Figure 11.

Recommended Budget for Urban Forestry Intern

Hourly Rate	Hours	Total Cost
$12	640	$7,680
$13	640	$8,320
$14	640	$8,960

Figure 10

Duties and Hourly Breakdown for Urban Forestry Intern

Duty	Hours	Description
Stump Grinding and Top Soil*	120	Operation of stump grinder attachment and the required clean-up post extraction (top soil application)
Grant Acquisition	60	Seeking out and completing applications to relevant and approved Urban Forestry Grants
Pest Management	80	EAB ash tree inspections and monitoring; other pests as applicable
Tree Watering	80	Tree watering and care as needed and determined by Village Forester; typically occurs twice over summer period
Application of Tree Guards	32	Application of plastic/mesh tree guards around the base of trees susceptible to damage and rodent/deer browse
Staking of Trees	20	Application of stakes around immature trees in order to guide growth direction
Booth Maintenance	68	Creation of materials for promotional booths; operate booths at community and public events in order to provide information to residents on Urban Forestry issues/activities
GIS Tree Inventory Updates	80	Collection of data on tree removals, plantings, and replacements annually and update of GIS data
Kiosk Maintenance	20	Create slides and materials for kiosk at 2828 Allouez Avenue; physical materials for residents and slides for digital screen
Public Correspondence	80	Assist Village Forester in resident calls and tree visits; produce materials as needed for residents

Figure 11

*dependent on purchase of stump grinder attachment

Duties and hours are determined based on current need. Stump grinding and top soil application would be dependent on the acquisition of a stump grinder attachment. If acquired, the Urban Forestry intern would aid in stump removal and the following clean up. Other duties include time dedicated to seeking out grants that may benefit the urban forest and strengthen community ties, the watering of public trees as needed, tree assessments, home owner tree inspections as requested, providing information to the public about forestry activities and pests (kiosk and booth maintenance), and the organization of routine processes such as stump grinding, new development, and replacement tree lists. This intern may also assist in updating the tree inventory if they have sufficient GIS and computer knowledge.

Continuing Programming

The Village of Bellevue maintains several small urban forestry programs with existing infrastructure. These programs include the Neighborhood Tree Planting, Buddy Tree, and Adopt-A-Tree programs. In order to best serve the urban forest, the continuation and growth of these programs is encouraged. In particular, it is recommended the Neighborhood Tree Planting program is capitalized upon and promoted in order to encourage resident involvement in urban forestry, and to help cover costs of tree planting. While this program has had limited interest in the past, minimal staff time and labor is required to maintain the program as tree planting is contracted. However, as most homes built after the adoption of the Street Tree Planting Plan have received trees in the right of way in respect to space available, the number of qualifying homes or residents without street trees is limited.

Volunteer Resources

Volunteers have been utilized in urban forestry in order to aid in the planting at locations such as Josten Park and the East River Trail. Such community partnerships help foster support for the forestry program and create ties between citizens and public spaces. Volunteer opportunities should be offered as appropriate in order to continue enhancing spaces and grow a relationship between residents and community trees. Volunteers may be utilized for bare root tree planting, and in educational campaigns such as EAB Green Ribbon tying.

In order to incorporate the public into urban forestry and increase civic engagement, it is recommended a resident based volunteer group is formed with an emphasis and interest in the community's trees. Currently, a volunteer based park group exists (Friends of Bellevue Parks) that assists at community events. Development of such a group for urban forestry could aid in the promotion of the trees, and help in the distribution of educational materials. This group may be overseen by the Parks, Recreation, and Forestry Department, along with the Village of Bellevue Tree Board. However, as participation in this group would be voluntary, recruitment and engagement levels cannot be guaranteed. A survey of community interest would need to occur and then be capitalized upon if interest in shown.

Urban Wood Partners

Partnerships with local programs and organizations are encouraged in order to utilize urban wood. Urban wood refers to local wood removed for a variety reasons other than for profit, and includes trees of all species. In the future as removals and replacements become routine, more wood debris will be produced. Community partnerships can facilitate the utilization of this wood for woodworking projects and community spotlight pieces such as benches and signs. These uses are preferred to the complete chipping and mulching of all waste products as it is more environmentally friendly. Any type of wood may be utilized in this partnership, but ash is encouraged in order to mitigate the potential influx in the waste stream after the discovery of EAB. Collaboration with school programs and local hobby groups is encouraged.

Managing Invasive Species and Disease

Unfortunately, many species of trees in the Village are susceptible to disease including ash (emerald ash borer), oak (oak wilt), and elm trees (Dutch elm disease). These diseases and pests have varying levels of intensity and infestation within the county. For all applicable invasive species, the Wisconsin NR 40 Invasive Species Rule should be adhered to. A current version of the NR 40 guidelines may be found online at http://dnr.wi.gov/topic/Invasives/classification.html.

Fig. 12 – Ash trees have a notable presence in the Village.

The Emerald Ash Borer (EAB) has already received extensive review by staff and an Emerald Ash Borer Management Plan has been developed detailing possible actions to be taken upon confirmation of infestation. Adopted in 2015, it is recommended ash trees are monitored routinely for EAB under the plan's suggested guidelines. Once incorporated upon infestation, it should be reviewed in order to be fully incorporated into the Urban Forestry Management Plan.

In order to prevent the spread of oak wilt, oak trees are to be pruned during dormancy in accordance with the current pruning schedule. Care should be taken to avoid wounding oak from April to October as recommended by WI Department of Natural Resources. Oak wilt has been located in Brown County. For this reason it is recommended procedures are taken to minimize the spread of this disease. As oak wilt may spread through the contact of roots below ground as well as by insect, oaks should not be planted in close proximity to each other. Highly susceptible varieties are not recommended for planting (red oaks). In their place, less susceptible white oak varieties are available including swamp and burr oak. The Village Forester should consider oak proximity to other oaks when reviewing planting sites as they are still utilized under the Street Tree Planting Plan.

Elm trees have been largely phased out of the Village landscape. 56 elm trees are documented within the public tree inventory. In 2009, one tree was noted to be a possible candidate of Dutch elm disease. Due to the low number of elm within the Village, it is suggested they are annually inspected for signs of Dutch elm disease. No further action is recommended beyond the swift removal of dying and diseased elm trees. As of recent, the discovery of potentially disease resistant elm varieties exist and are recommended for harsh landscapes as available and as long as cost-effective.

While Linden Borers have been found on the Village's linden trees, no action is recommended at this time to deal with this pest. As with any other species, lindens should be spaced at a considerable distance from others of the same variety in order to reduce the transmission of disease and pests.

Technical Invasive Species and Disease Mitigation

In order to mitigate and prevent invasive species and disease, pesticides and herbicides may be used. Currently, no member of Village Staff has a pesticide applicator license. This license allows for the application of commercial pesticide. It is recommended this license is obtained in order to better equip the Parks, Recreation, and Forestry department to manage the urban forest and maintain parks. Pesticide applicator training is $47.00 per certification category and $12.00 for each sub-category. Cost for the license is $51.20 per year per individual. Certification is valid for five years.

To handle the direct injection of trees, an Ecoject insecticide injection system is recommended for purchase. This pesticide microapplicator features small canisters that are inserted into the base of the tree, and then removed once application is finished. Canisters are inserted through the use of a drill and leave a small hole in the trunk. Ecoject systems are less invasive than other injection systems as they do not leave plastic plugs behind in the wood. A large scale kit was quoted for $7,500. The Ecoject system may be used in Emerald Ash Borer, Gypsy Moth, and Elm Leaf Beetle prevention among others. Some insecticides applied through the Ecoject system do not require a pesticide applicators license.

Evaluating and Updating Plan

The Village of Bellevue Urban Forestry Management Plan is intended to be a five-year plan outlining the urban forestry needs of the Village. Progress of goals should be evaluated annually by Parks, Recreation, and Forestry Staff in order to successfully follow the objectives. Goals that have been rendered infeasible should be addressed early and reasons for failure should be properly identified to avoid conflict with other goals. The Urban Forestry Strategic Plan should be considered in conjunction with this plan in order to ensure cohesive goals and minimal conflict.

During the 5th year of implementation, time should be taken to review the existing plan and make revisions. A new Urban Forestry Management Plan should be created from these revisions, and should extend the Urban Forestry another five years upon the conclusion of the current plan once adopted. This will help to alleviate “gap years” and keep a consistent plan of action for the Village with direction.

It is suggested this plan is updated through the use of an intern with the potential to be included as part of the Urban Forestry intern duties if hired. 150 hours are recommended for this task.

Schedule of Recommended Action

Plans are unlikely to be implemented without clear guidelines on how they will be implemented and by whom. The implementation schedule below identifies who is responsible for each strategy (action and task), when each will be completed, and what each will cost. Decidedly important recommendations outlined have been included with their approximate costs. It should be noted implementation of any objectives may be hindered by infestation or major disasters and tree resources will need to be reallocated in order to handle immediate needs and hazard abatement.

It is assumed that annually efforts will be made to identify and utilize existing and applicable grants in order to fund urban forestry efforts. Community grants have made a large difference in the Village's urban forest, including sponsoring the planting of street and Buddy trees.

Year 1 of Full Implementation

Task	Performed By	Cost/Funding Source	Completion Date
TRAQ Training and Qualification	ISA Member on Staff (Village Forester)	$685 course fee (PRF Staff Training)	As class schedule offering allows
Acquire aerial lift	Parks, Recreation, and Forestry and Public Works	Village Capital Improvement Plan (CIP)	By June for use in pest and disease detection in July
Acquire stump grinder attachment	Parks, Recreation, and Forestry and Public Works	CIP	By June for use in replanting and hazard abatement
Urban Forestry Intern	Works with Parks, Recreation, and Forestry Staff	$7,680 to $8,960 (640 hours)	Fill position by May

Year 2 of Full Implementation

Task	Performed By	Cost/Funding Source	Completion Date
Replacement tree budget	Department of Parks, Recreation, and Forestry	$19,200 to $38,400	Prior to next applicable operating budget
Urban Forestry Intern	Works with Parks, Recreation, and Forestry Staff	$7,680 to $8,960 (640 hours)	Fill position by May
Pesticide Applicator License	Parks, Recreation, and Forestry Staff	$98.20 year/individual (PRF Staff Training)*	By June for use in UF and park maintenance

*Following certification, price is $51.20 per year/per individual

Year 3 of Full Implementation

Task	Performed By	Cost/Funding Source	Completion Date
Focus on planting along re-constructed and improved roads	Department of Parks, Recreation, and Forestry in time with Public Works projects	Replacement tree budget	As road reconstruction occurs
Urban Forestry Intern	Works with Parks, Recreation, and Forestry Staff	$7,680 to $8,960 (640 hours)	Fill position by May

Year 4 of Full Implementation

Task	Performed By	Cost/Funding Source	Completion Date
Urban Forestry Intern	Works with Parks, Recreation, and Forestry Staff	$7,680 to $8,960 (640 hours)	Fill position by May
Focus on planting in neighborhoods built prior to Street Tree Plan	Department of Parks, Recreation, and Forestry	Replacement tree budget	Begin during spring planting cycle

Year 5 of Full Implementation

Task	Performed By	Cost/Funding Source	Completion Date
Revise UF Management Plan in order to develop an additional five years	Department of Parks, Recreation, and Forestry and intern	$2,100 for Intern (150 hours)	As soon as possible before completion of year 5 of adoption
Urban Forestry Intern	Works with Parks, Recreation, and Forestry Staff	$7,680 to $8,960 (640 hours)	Fill position by May
Implement volunteer tree group	Department of Parks, Recreation, and Forestry and Tree Board oversight	$100 for group promotional materials	As citizen interest is received
Replant Street and Public trees as needed	Department of Parks, Recreation, and Forestry	Replacement tree budget	Begin during spring planting cycle

Appendix A – Glossary of Terms

ANSI A3000 – in the United States, industry-developed, national consensus standards of practice for tree care.

arboricultural specifications manual – the urban forestry document for the Village that serves as a standard for the planting, maintaining, removing and protecting of all trees in public areas by identifying specific practices, policies and procedures.

balled and burlapped (B&B) – form a tree may be purchased in. Root ball is compacted and wrapped in burlap.

buddy tree - a young, non-ash variety planted beside an existing ash tree. When the ash is later removed, the "Buddy Tree" remains to maintain the urban forest canopy.

canopy – cover created by the crown portion of the trees that provides shade and other benefits through the tree's leaves. Canopy cover is an important deliverable of tree benefits and is included in calculations such as those done by i-Tree.

genus – a group of trees with similar characteristics but are not uniform in nature. Classifications such as maple or ash.

girdling root – when roots establish themselves around the base of the tree or other roots, limiting the trees ability to uptake water and nutrients through strangulation. May lead to death of the tree or declined health.

homogeneity –being identical or composed of like parts. In reference to trees, this is the existence of multiple trees of the same genus, species, and/or variety.

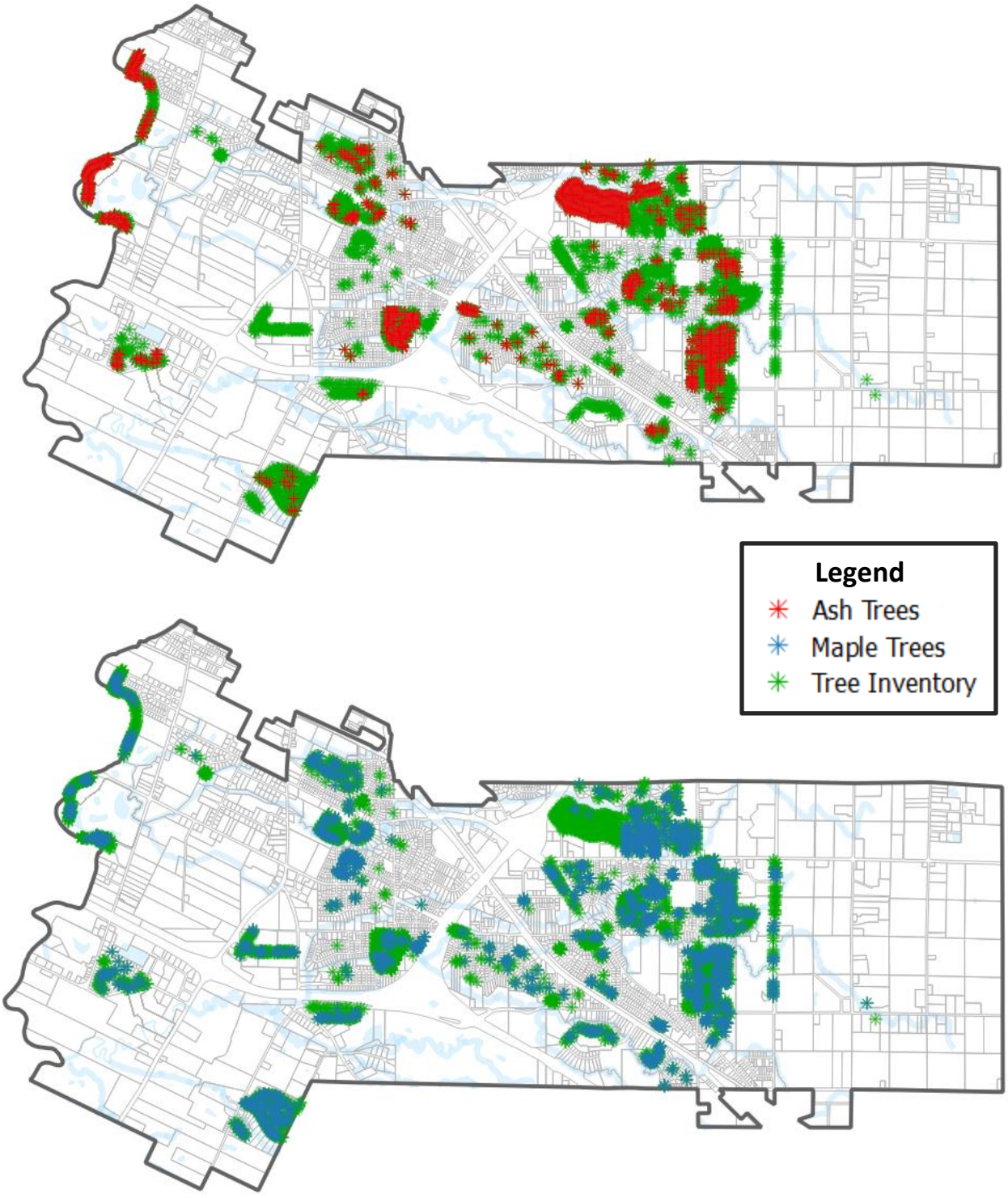
monoculture – the extensive planting of a single species within the urban landscape. In practice, monocultures are often seen as rows of similar and identical trees along streets or in parks. Susceptibility to disease and increased risk for tree loss is a possible result of homogeneity.

species – trees within a genus that have a specific characteristic that makes them unique. Classifications such as sugar maple or green ash.

training pruning – pruning completed in order to guide a tree to specific growth. Typically applies to young trees mature enough for pruning.

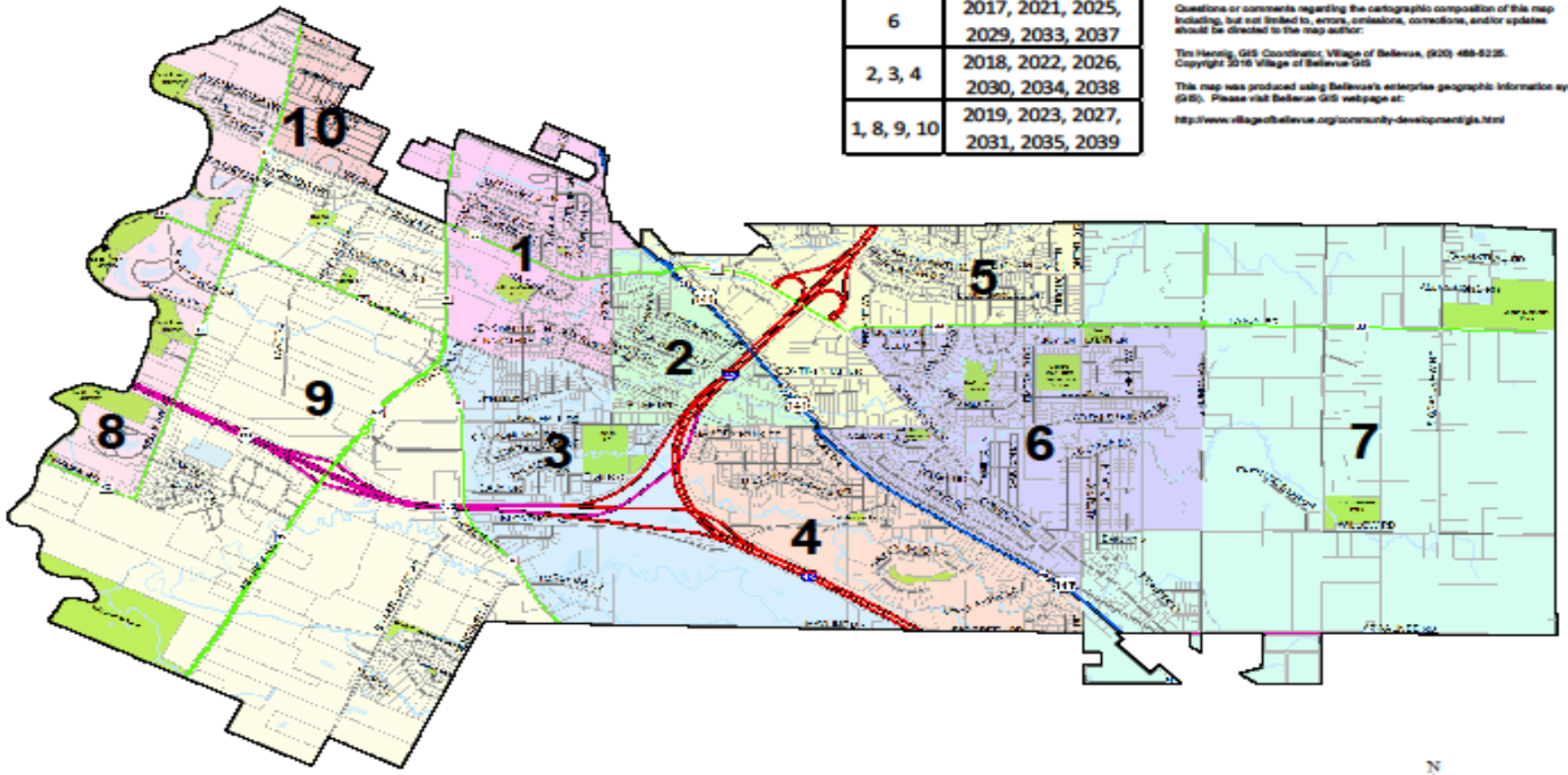
village forester - the person designated by the Village under Municipal Code §427-2B or his/her duly authorized representative designated to perform inspection or otherwise enforce the provisions of §427 (tree and shrub ordinance).

Appendix B – Tree Monoculture Maps



Schedule for Tree Pruning by Zone

Zones	Pruning Years
5,7	2016, 2020, 2024, 2028, 2032, 2036
6	2017, 2021, 2025, 2029, 2033, 2037
2, 3, 4	2018, 2022, 2026, 2030, 2034, 2038
1, 8, 9, 10	2019, 2023, 2027, 2031, 2035, 2039



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