City of Guelph

Urban Forest Management Plan Implementation Update and Second Phase Plan Report

August 2020

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Executive summary

Guelph's urban forest provides a wide-range of benefits that contribute to a livable and sustainable community. Trees, considered green infrastructure, in the City cool our homes, beautify our parks, provide wildlife habitat, increase property values, contribute to walkable neighbourhoods, and clean our water and calm traffic.

In 2012, the City approved Guelph' Strategic Urban Forest Management (UFMP) with the goal of increasing our canopy cover to 40 per cent set out in the Official Plan. The UFMP provides direction for urban forest management, planning, protection, planting, maintenance, and community collaboration and engagement.

The 20-year plan is structured to give us opportunity to monitor, reflect and report on our achievements and reassess priorities based on our performance, condition of the urban forest, new opportunities and challenges.

In the first phase of the plan (2013-2019) we made significant progress in building the foundations of a comprehensive urban forestry program including completing a tree inventory, hiring qualified staff, building community partnerships, increasing community stewardship opportunities, increasing communication and outreach, acquiring capital funding sources, increasing interdepartmental collaboration and increasing our capacity to undertake tree maintenance and natural area management.

We cannot understate the significance of the challenges that the City faced in first five-years of the UFMP implementation. For example, the increased frequency and intensity of weather events, the most notable being the 2013 ice storm, and the invasive emerald ash borer, the most significant pest threat to Guelph's trees since Dutch elm disease in the 1960's. Extensive resources were dedicated to these issues, which ultimately hindered our ability to initiate or complete other priority actions/recommendations. However, the undertaking of the efforts related to storms and pests is a success in the fact that we had the resources to keep the community safe and move ahead with recovery from those events.

The next phase of the UFMP (2020-2023) builds from our assessment of the first phase and additionally prioritizes urban forest protection, preservation, enhancement and restoration, increasing proactive management and maintenance, increasing the value of the benefits the tree canopy provides, strengthening the community framework, funding operational impacts and monitoring our progress.

In 2019, the City undertook an urban forest study and report, the first of its kind in Guelph. The study revealed that the urban forest canopy cover is 23.3 per cent and in good condition. The report reveals that the original target date of 40 per cent by 2031 was ambitious, however, achievable with a more realistic timeframe.

Key findings of UFMP report

Key findings of this report are as follows:

- The city is making significant progress towards achieving the strategic goals of the UFMP;
- Critical gaps in key priority areas include urban forest canopy increase, risk management, proactive maintenance and forest health monitoring;

- The effectiveness of current tree-related tree policies, plans and guidelines are unknown;
- The majority of stakeholders support the vision and strategic goals of the UFMP and long-term investment in the urban forest however many believe that the City is not doing enough to meet the vision of the UFMP. The UFMP aligns with stakeholder priorities;
- Guelph has a total tree population of approximately 2,973,000 with a replacement value of about $803 million. Fifty-three per cent are located on private property while the remaining 47 per cent are located on public land. Guelph's urban forest has a total of 14,400 hectares (ha) of leaf area;
- The projected 40 per cent canopy cover target set in 2012 is not likely achievable by 2031 with current resources; and
- The urban forest faces a number of threats such as pests and storms that will likely have a significant impact on the health of the urban forest and the ability to achieve a 40 per cent target.

Background

The 2012 approval of the strategic Urban Forest Management Plan (UFMP) marked the commitment to foster the health and sustainability of the urban forest. The plan is an expression of the community's recognition for a more comprehensive and strategic approach to the management of the urban forest. Continued leadership and support throughout the implementation of the plan has resulted in the significant and effective achievements to this point.

The original development of the UFMP's framework in 2007 addressed initiatives in City plans that were supportive of urban forest resources and natural heritage assets such as the Official Plan (2002), Natural Heritage Strategy (2006), Smart Guelph (2003), Environmental Action Plan (2003) and Strategic Plan (2006).

Since then, updated and new City plans, bylaws and policy, such as Guelph's updated Official Plan (2018) and Strategic Plan (2019), have recognized the urban forest as "green infrastructure" as well as continued to support the importance of protecting and enhancing the urban forest and the associated benefits.

Guelph's UFMP is a 20-year renewable roadmap for understanding and improving the management of Guelph's urban forest, particularly that which is owned by, or under management agreement with the City. The plan is a long-term plan with nested short-term management and operating plans. The plan has 22 recommendations as described in Appendix A, which address gaps and opportunities in four key areas:

- Management and monitoring;
- Legislation, policies and guidelines;
- Protection, establishment and enhancement; and
- Outreach, stewardship and partnerships.

The UFMP recommendations inform day-to-day urban forest policies, annual work plans, initiatives and operations of City staff. The responsibility for implementing the UFMP lies primarily with Parks Operations and Forestry, with support from other City departments. Therefore, the vast majority of the funding for the UFMP comes from Parks Operations and Forestry Capital and Operating budgets.

The second phase of the plan prioritizes recommendations based on available resources, alignment with other City plans and strategies, budget processes, community priorities, continuing efforts on ongoing projects and developing comprehensive management strategies.

This report summarizes the progress that has occurred since the plan's inception. The report also identifies gaps and challenges in working towards our goals, and recommends opportunities for improvement and suggests approaches to achieving those goals.

Alignment with Strategic Plan

The City's Strategic Plan is a plan built on the community's vision for Guelph's future. The UFMP aligns with the following Strategic Plan priorities and associated directions:

Sustaining our future

- Create and execute an ambitious and achievable climate adaptation plan
- Plan and design an increasingly sustainable city as Guelph grows
- Mitigate climate change by reducing Guelph's carbon footprint

By investing in green infrastructure to prepare Guelph for the effects of climate change, increasing Guelph's tree canopy cover, ensuring there is adaptable green infrastructure in physical areas such as the Guelph Innovation District and Clair-Maltby to support population and economic growth for future generations and protecting the green infrastructure provided by woodlands, wetlands, watercourses and other elements of Guelph's natural heritage system. We expect to enhance the preservation of existing tree canopy and increase the area of new tree canopy cover across the City to meet our 40 per cent target within the next four to five decades to increase the benefits of the urban forest such as mitigating the impacts of climate change and increasing the social, economic and environmental benefits provided by trees and green infrastructure.

Powering our future

- Help businesses to succeed and add value to the community

Powering our future strategic priority through ensuring policies and zoning bylaws support a healthy economy and are consistent with environmental priorities as the recommendations will lead to:

- Planting more trees in our boulevards and in increasingly dense urban developments through by implementing new green infrastructure technology through alternative design standards and low impact development standards; and
- Maintain and increase urban forest canopy cover to meet the City's Official Plan urban forest objective of achieving 40 per cent canopy cover, and the intent of the City's Private Tree Protection By-law.

Building our future

- Maintain existing community assets and secure new ones

Building our future strategic priority through continuing working to develop new assets that respond to Guelph's growing and changing social, economic and environmental needs, such as the Baker District redevelopment and the South End Community Centre. The urban forest is an asset with specific structural and functional value (i.e. goods and services) that provides social, economic and environmental benefits. The urban forest will be accounted for in the City's Corporate Natural Asset Plan, which was initiated in 2019 and identified in the state of the urban forest report prepared in 2020.

The recommendations contained in this report may contradict:

Navigating our future priority by limiting the ability to "Improve local transportation and regional transit connectivity" as recommendations will lead to more trees being planted within transportation corridors (e.g. boulevards, medians, and rights-of-ways). This potential contradiction can be mitigated through the development and

implementation of a "complete streets" strategy, which incorporates the needs of all roads users and includes street trees within standard road cross-sections.

Alignment with the Natural Heritage Action Plan

The Natural Heritage Action Plan (NHAP), approved 2018, is an implementation plan for protecting our natural resources as part of complete, healthy communities. The NHAP provides a framework of supporting actions to implement the City's Official Plan policies specific to the natural heritage system and watershed planning. There are points of intersection between the UFMP and NHAP with regards to protection, preservation, long-term monitoring, stewardship and sustainability. Recommendations provided in the UFMP's second phase will be aligned and coordinated with NHAP actions, where required. Tables 12-15 include reference to NHAP actions for each UFMP action projected for the second phase of implementation.

State of the urban forest

The UFMP recommends producing a state of the urban forest report throughout each phase of implementation. This is the first state of the urban forest report undertaken for the City of Guelph. The City recognizes that the urban forest is a valuable part of our green infrastructure system and most importantly, that it is an integral part of a sustainable community.

The City retained L'allemand/Bioforest with KBM to undertake the City's first ever comprehensive urban forest study for the purpose of collecting, studying and reporting detailed information about Guelph's urban forest resource including

- Baseline data on the structure of Guelph's urban forest and the ecological services it provides;
- A detailed land cover and tree canopy map; and
- Priority tree planting maps for the City of Guelph.

The study is an important component of the City of Guelph's efforts to improve urban forest resilience and vitality, and to enhance the social, ecological, and environmental benefits the urban forest provides to the City's residents.

The report highlights some of the key benefits the urban forest provides and outlines opportunities and challenges of caring for and growing our urban forest. The report also makes links between the study findings and possible management implications. This information has been used to inform Guelph's next phase and beyond.

Key findings

The urban forest is vital part of Guelph's green infrastructure

- Guelph's urban forest canopy cover is 23.3 per cent;
- Total number of trees in Guelph is estimated to be 2,973,000;
- The replacement value of Guelph's urban forest is $803 million; and
- The replacement value of Guelph's street trees is $105.6 million.

Urban forest assets provide valuable benefits

- Guelph's tree canopy provides a total estimated $9.7 million in environmental benefits;
- Provide home energy savings of approximately $1.9 million;
- Remove 156 tonnes of pollutants and 6,455 tonnes of carbon dioxide; and
- Prevent nearly 400,000 cubic metres of rainwater runoff.

The urban forest is vulnerable

- Guelph's urban forest is under threat from climate change, extreme weather events, pests, diseases and pressure from development and urbanization

City of Guelph Land Cover

Building   Soil

Canopy Cover   Water

Other Impervious   Transportation

Non-Canopy Vegetation

The City of Guelph, its employees and agents, do not undertake to guarantee the validity of the contents of the digital or hardcopy map files, and will not be liable for any claims for damages or loss arising from their application or interpretation, by any party.

0   1.5   3   6

Kilometres

1:75,000

NAD 1983 UTM Zone 17N

Produced by KBM Resources Group

Figure 1: City of Guelph canopy cover map (Source: 2019 Guelph Urban Forest Study land cover mapping, City of Guelph).

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Overview

There are approximately 2.9 million trees in Guelph with a canopy cover of 23.3 per cent of the total land area. This is low to average compared to other municipality estimates completed in the last five years. The replacement cost of those trees is estimated at $803 million. This amount does not include the $2.9 million worth of benefits and services provided annually or the invaluable ecosystems associated with urban forests. Street trees have a replacement value of $105.6 million.

The urban forest canopy is distributed widely across the City covering approximately 1976 ha of total land area.

Guelph's urban forests include all trees in the city, both public and private. Trees in parks, along boulevards, in backyards, woodlands or commercial settings are all part of a green infrastructure system that supports a healthy and sustainable community. The challenges faced by trees on City property are no different from trees on other public or privately owned lands. This emphasizes the need for a collaborative approach with shared goals to protect and grow the urban forest.

The majority of trees are in smaller size categories, with 93 per cent between 2.5 and 30.5 centimetres diameter at breast height (DBH). The small percentage of mature trees emphasizes the need for effective policy and practices to protect their retention and survival. Multi-residential lands had the highest proportion of large diameter trees, with 31.4 per cent measuring greater than 30.5 cm DBH and other residential land was second with 9.3 per cent greater than 30.5 cm DBH.

Guelph is dominated by eastern white cedar, European buckthorn and ash tree species. Most concerning is that the highly invasive buckthorn is the second most abundant tree. When ranked by leaf area eastern white cedar also dominated (16.6 per cent). Norway maple (9.1 per cent) was second followed by sugar maple (8.1 per cent). Diversifying the urban forest canopy and implementing an invasive species management plan is required to build resilience to disturbances and overall health of the canopy.
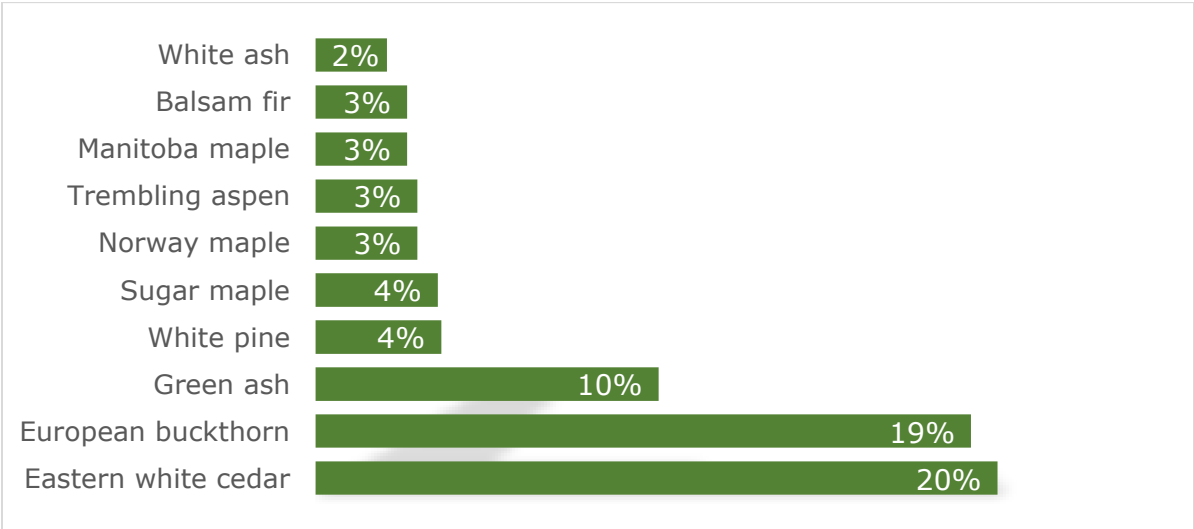
Figure 2: Top ten trees in Guelph by population (number)

The distribution of canopy cover across the City is not equal and is most often related to the type of land use. The highest percentage, 42 per cent, of the canopy cover is located on vacant land, which includes open space and the natural areas. The lowest percentage is on commercial and industrial lands combined at 20 per cent. Prioritizing tree planting opportunities and canopy protection in areas with low income and low canopy distribution can provide canopy and access to green spaces that need it the most.

Land use	Percentage
Industrial	8%
Transportation	12%
Commercial	12%
Multi-residential	18%
Special and exempt	19%
Institutional	23%
Residential	25%
Farm	27%
Government	41%
Vacant	42%
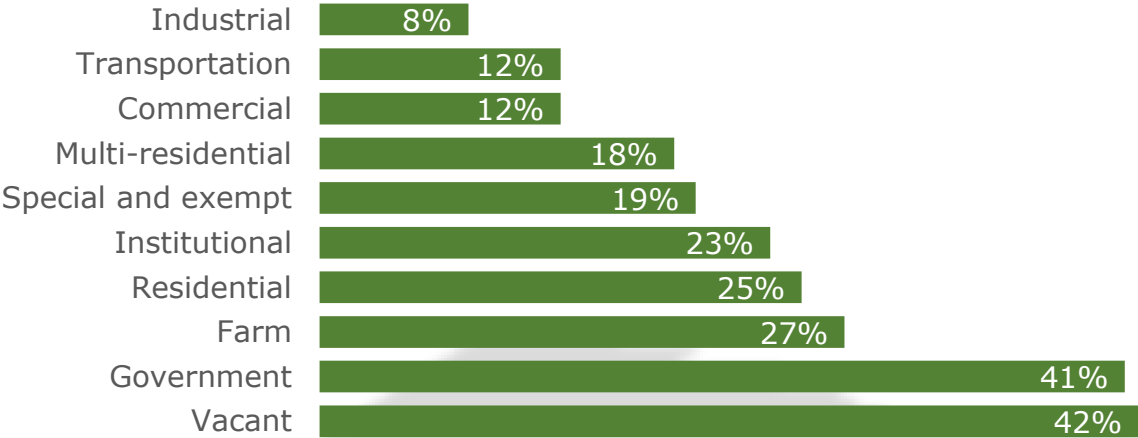
Figure 3: Tree canopy distribution by land use

Trees in urbanized areas face a variety of natural and manmade stresses including heat, exposure to salt, construction and poor growing conditions. There are also emerging threats such as climate change, new invasive pests and development pressures. Sixty-three per cent of Guelph's trees are susceptible to non-native pests. Trees in Guelph can only continue to provide benefits if we increase their resilience to these threats by practicing sound and proactive tree management and plan our City in a way that recognizes the value of trees and woodlands in the urban context.

Recommendations of the Urban Forest Study

- Increase canopy cover;
- Improve forest structure and function;
- Increase quality of sites for optimal tree growth;
- Increase resilience to climate change and other threats;
- Increase coordination across City departments and external agencies;
- Use adaptive management to make evidence based decisions;
- Empower community members;
- Invest in green infrastructure; and
- Prioritize tree planting based on benefit needs.

Implementation

Since the implementation of the UFMP in late 2013, our understanding of Guelph's urban forest has substantially improved and we have consistently transitioned towards proactive management. The tree inventory and monitoring of natural areas has significantly improved our knowledge of the City's urban forest structure, composition and value. Coordination of tree issues across the corporation and with external stakeholders has increased through the formation of the tree team and urban forest working group and the addition of management, operational and technical staff. Updated tree related policy in the 2018 Official Plan provides enhanced protection for trees both inside and outside the Natural Heritage System. Outreach and communication about urban forest initiatives have brought awareness and engagement in urban forest issues within the community. New research partnerships include green infrastructure, climate change and forest health research initiatives on a provincial scale.

In the first phase, of the twenty-two recommendations, three were completed and 15 initiated due in large part to Council's budget approvals supporting increased staffing capacity in Forestry and support from other City departments.

Key recommendations in the first phase focused on developing urban forest policy, standards and guidelines, dedicating additional resources to urban forest initiatives, gaining comprehensive understanding of City-managed trees and forested natural areas, and building community frameworks through partnerships, engagement and stewardship.

The notable achievements of the UFMP include:

- Addition of technical and professional urban forestry and natural areas capacity via five new positions;
- Implementation of Guelph's Emerald Ash Borer Plan;
- Completion of the Urban Forest Study;
- Development and implementation of new and updated tree related plans, policies and guidelines;
- Increased management of natural areas;
- Creation of the urban forest working group of external stakeholders;
- Creation of a tree team comprised of internal stakeholders;
- Completion of forest inventory; and
- Increased capacity for community engagement and coordination of community stewardship activities.

Since 2013:

- Seventy-seven ha of invasive buckthorn killed across the city;
- Approximately 25,000 trees planted with community groups and volunteers including community orchards in local parks;
- The City expanded partnerships with Ontario Public Interest Research Group Guelph (OPIRG), Trees for Guelph (TFG) and Pollination Guelph to facilitate 35 plantings at 31 sites;
- Over 7500 volunteers were engaged in tree planting and natural areas stewardship;
- Four-thousand street and park trees planted by City Forestry crews; and

- City Forestry crews carried out approximately 6000 tree work requests (including planting, removing and trimming).

Accomplishments

The following section describes the outcome of the first phase of implementation of the 22 recommendation in each management of the four key management areas of the UFMP.

Management and monitoring

Internal coordination, tree inventory, canopy cover assessment, proactive tree maintenance, tree establishment, and ongoing monitoring.

- Internal coordination improved through the forming of a Tree team of internal stakeholders in 2014 comprised of key staff from all departments involved in tree related issues to foster tree-related dialogues and act as a coordinating and problem-solving influence. The team meets quarterly;
- The street and park tree inventory was completed in 2018. This is the direct result of the addition of technical staff. This is an invaluable tool for improving customer service, tracking the condition of trees and coordinating operational activities. The inventory includes a tree ownership map on the City's website in addition to a publicly available open source database. Staff continually update the inventory through ongoing monitoring, service requests and tree maintenance. Moving forward the complete inventory is necessary to direct management of trees, service levels and asset management;
- The City entered into a partnership project with University of Toronto and Ontario Ministry of Natural Resources and Forestry to establish permanent sample plots within City-owned forests in 2016 and 2018. These plots will help form the basis for long-term monitoring of forest health within Guelph, helping to flag health trends related to climate change, invasive exotic organisms, and the impacts of urban intensification. Data from plots will directly feed into forest management plans.
- The City's capacity for planting and maintenance of municipal trees expanded through the hiring of two Forestry Technologists and one of two recommended Arborists. Additionally, replacement equipment purchased in 2018 specified upgraded features to allow for safer and more efficient maintenance and removal of large caliper tree;
- The Urban Forest Study report was completed in 2020.The study quantified current canopy cover, identify potential plantable spaces and assessed the feasibility of the City's 40 per cent canopy cover target. The study's purpose is also to quantify and qualify goods and services provided by the urban forest canopy;
- The sixth year of the 10-year Emerald Ash Borer Plan was completed in 2019. Significant achievements included managing increased inspections and removals generated by the critical levels of mortality. The estimated number of ash removals by 2019 was 2267 on streets and in parks and 4336 in seven wooded natural areas. An external contractor was required to

undertake woodland removals due to the large volume of trees marked for removal in a limited amount of time;

- Removal of significant amounts of invasive vegetation (Buckthorn, Japanese Knot weed, Poison Ivy) in various locations throughout the City. This includes projects ongoing since 2016 such as Crane Park and Silvercreek Park buckthorn removal to allow for establishment of natural forest elements in place of invasive vegetation;
- The broader Invasive Species and Pest Management Strategy has been included as a future action in the NHAP. Planning is the lead on this initiative with Parks Operations and Forestry as implementation support;
- Forestry will continue to monitor for threats from pests and diseases as part of our ongoing inspection and maintenance programs; and
- Parks Operations and Forestry responded to 6 major weather/storm events, which included ice accumulation, heavy rains and excessive winds.

Legislation, policies and guidelines

Planning for trees with legislation, policies, guidelines and regulations for City-owned/managed and private lands.

- Council approved the 2017 Tree Ownership and Maintenance Standards that details maintenance practices for City managed trees. This includes trees on City lands, trees shared with properties adjacent to City land and lands under maintenance agreements;
- The Urban Design Manual was approved 2017 includes provisions for street trees;
- Brooklyn College-Hill Heritage Conservation District approved in 2017 includes provisions for protection of trees within the district;
- New tree related policy in the 2018 Official Plan provides protection and preservation for trees both inside and outside the Natural Heritage System via OPA 42; and
- Passing of Municipal Act amendments in Bill 68, Adoption of policies, 270 (1) A municipality shall adopt and maintain policies with respect the manner in which the municipality will protect and enhance the tree canopy and natural vegetation in the municipality.

Protection, Establishment and Enhancement

Best practices for tree protection, establishment and urban forest enhancement.

- The Tree Technical Manual (TTM) was completed in December 2019 and implemented in January 2020. The manual establishes guidelines, standards and specifications for the preservation, protection and operational activities involving trees on public and private land;
- The City's capacity to undertake tree-related plan review and site inspections expanded with the hiring of a Forestry Field Technologist in 2014. New processes and protocols were developed and implemented place to ensure better oversight of tree protection, establishment and maintenance during development and construction activities;
- Hiring of a Forestry GIS Technologist in 2014 expanded the City's capacity to undertake tree inventory and data management; and

- New internal and interdepartmental processes and protocols were developed and implemented place to ensure better oversight of tree protection, establishment and maintenance during development and construction activities.

Outreach, Stewardship and Partnerships

Forestry staff attended City and community led events to engage with community members to deliver information about the benefits of the urban forest, how the City manages our trees and how residents can take action to ensure a healthy urban forest;

- Hired new Trails and Natural Areas Program Manager in 2016 resulted in increased management of natural areas, trail maintenance and invasive removals;
- Reallocation of the existing Community Garden Coordinator to Community Stewardship Coordinator in 2017 resulted increased capacity for coordination of volunteers for stewardship activities;
- Developed protocol for beaver protection and damage mitigation implemented by community volunteers;
- Increased volume of stewardship activities;
- The Urban Forest Working Group of external stakeholders, formed in 2014, meet quarterly, generating great ideas and collaborations;
- Pursued targeted stewardship initiatives, partnerships and funding sources;
- Collaborated with the University of Toronto in 2015 for natural forested area monitoring using "Vegetative Sampling Protocol" method as part of a research project for settled landscapes of southern Ontario;
- University of Guelph master student undertook Potential Plantable Spaces Analysis in 2015; and
- Received 2017 TD Green Streets grant for tree planting.

Guelph recognized as 2019 Tree City of the World

The City of Guelph is recognized with the Tree Cities of the World designation. This honour has been given on behalf of the Food and Agriculture Organization of the United Nations (FAO) and the Arbor Day Foundation.

Tree Cities of the World is an international program that celebrates cities for the care and planning they put into their urban forests. Staff applied for the designation in December 2019, knowing that our strategic work towards sustaining our future supports the growth, maintenance and enhancement of our urban forest.

The City met all five-core standards of the designation:

- Establish responsibility;
- Set the rules;
- Know what you have;
- Allocated resources; and
- Celebrating achievements.

Appendix A provides a summary of status for all 22 UFMP recommendations at the end of the first phase along with recommended actions for the second phase.

Funding first phase of implementation

The Council approved 2012 UFMP was forecasted to require funding of $6 million over the first phase (five years) of the plan. The first phase was shifted to 2013-2019, during this period Council approved capital spending of $2,664,000. Almost one hundred per cent of the funding was dedicated to manage the devastating impacts of the emerald ash borer. This impact and the reduced total funding, approximately 44 per cent of the original estimate, limited our ability to complete or initiate all the priority recommendations in the first phase of the 20-year plan.

Monitoring and adaptive management

Monitoring progress towards sustainability

The City will monitor, evaluate and report on the progress and effectiveness of the UFMP throughout the implementation of the plan. This adaptive management approach allows us to assess how we are doing and to make adjustments to how we manage the urban forest.

The City adopted a framework developed by the USDA Forest Service and Davey Tree Ltd. - "A Sustainable Urban Forest Management Guide: A Step-by-Step Approach" (SUFG) to use for monitoring the UFMP. According to the SUFG, "The Sustainable Urban Forest includes everything needed to assure that the entire forest system achieves and maintains a healthy overall extent and structure sufficient to provide the desired benefits, or ecosystem services, over time."

The three pillars of the SUFG framework include vegetation assets, community framework and resource management. Within each pillar are specific criteria with performance levels ranked from low to optimal performance. Our performance in each of the 27 criteria will help develop or implement new or revised actions to address challenges and achieve the desired objectives set out in the UFMP. The list of sustainability criteria and indicators are available in the UFMP report card as Appendix B.

Current assessment indicates that the City has increased the sustainability of the urban forest between 2012 and 2019 by:

- Implementing the UFMP and specific associated actions;
- Increasing our understanding of the health and structure of the urban forest including street and park trees and natural wooded areas;
- Building a strong community framework through education, community engagement and stakeholder collaboration;
- Improving and implementing best practice management approaches; and
- Continuing support from Council and the community in all aspects of the urban forest.

Tables 1, 2 and 3 compare the performance of Guelph's urban forest sustainability at the end of 2019 against the baseline rating in 2012 when the UFMP was approved. The "n/a" rating indicates that there was no or inadequate information available evaluate our performance. The status column indicates if our performance has increased, decrease or stayed the same (no change).

Table 1: Vegetation assets criteria performance rating

Criteria	2012 rating	2019 rating	Status
Relative Canopy Cover	n/a	moderate	no change
Age distribution	n/a	n/a	increase

Criteria	2012 rating	2019 rating	Status
Species suitability	moderate	n/a	increase
Species distribution	moderate	n/a	increase
Condition of publicly owned trees	low / moderate	n/a	increase
Publicly-owned natural areas	moderate	moderate	no change
Trees on private property	n/a	n/a	increase

Table 2: Community framework criteria performance rating

Criteria	2012 rating	2019 rating	Status
Public agency cooperation	low / moderate	good	increase
Utilities cooperation	n/a	moderate	no change
Involvement of large private institutional land holders	moderate	Moderate	no change
Green industry cooperation	low / moderate	moderate	no change
Neighbourhood cooperation	moderate	good	increase
General awareness of trees as a community asset	low / moderate	good	increase
Regional cooperation	low	moderate	increase

Table 3: Management approach criteria performance rating

Criteria	2012 rating	2019 rating	Status
Tree inventory	low / moderate	good	increase
Canopy cover inventory	moderate	moderate	increase
City-wide management plan	low	optimal	increase
Municipality-wide funding	low	good	increase
City staffing	moderate	good	increase
Tree establishment planning and implementation	moderate	moderate	no change
Tree habitat suitability	n/a	moderate	no change
Maintenance of publicly-owned, intensively managed trees	moderate	good	increase
Tree risk management	moderate	good	increase
Tree protection policy development and enforcement	moderate	moderate	increase
Publicly-owned natural areas management planning and implementation	n/a	low	no change
Environmental justice and equity	n/a	low	no change
Native vegetation	good	optimal	increase

Figure 4 below illustrates the difference and overall increase in performance of the criteria of sustainability listed above since the implementation of the UFMP. The initial overall performance score for the City of Guelph in 2012 was a "low" rating. The overall score increased to a "moderate" rating at the end of 2019. The increased rating is a direct result of the progress Parks Operations and Forestry has made during the first phase of the UFMP based on a weighted score.
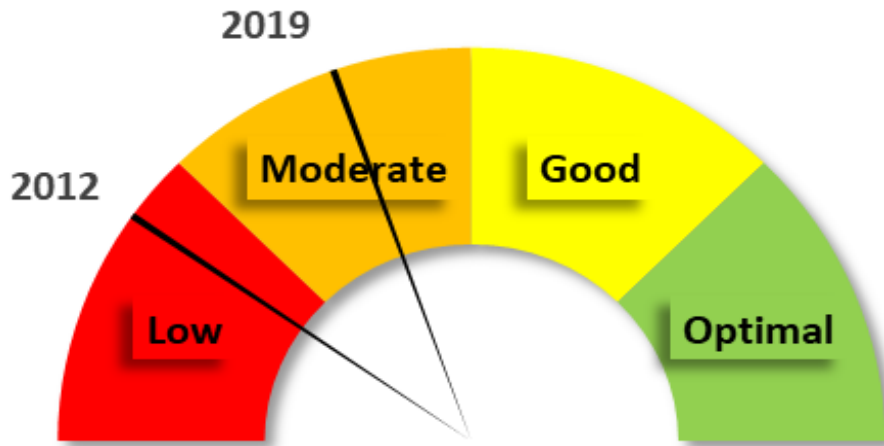
Figure 4: Performance of sustainability indicators: 2012 versus 2019

The detailed performance report (UFMP report card) is available in Appendix B.

Gap Analysis

A gap analysis was carried out by a core team of internal staff with leadership and support roles in the UFMP. This process helped us understand where we are, what we are missing and what actions are required to achieve success, which in our case are the optimal performance targets for sustainability criteria. The team first identified gaps in the current state of the urban forest with associated strategies or actions and then identified actions required to achieve the key objectives of related sustainability criteria.

The section below lists related categories of sustainability criteria from the SUFG with a description of key objectives for each criteria followed by a discussion of findings of the gap analysis within the category and a related tables.

Tree Canopy Cover and assessment

Canopy cover: Achieve desired degree of tree cover, based on potential or according to goals set for entire municipality and for each neighbourhood or land use.

Canopy cover assessment: High-resolution assessments of the existing and potential canopy cover for the entire community or at smaller management scales.

The amount of canopy cover alone is not an indicator of a sustainable urban forest. Optimizing canopy cover includes setting meaningful canopy cover targets depending on the actual potential for canopy and balancing the needs of the community.

The City's official plan sets a canopy cover goal of 40 per cent by the year 2031. The original canopy cover was estimated in previous studies in 2011 and 2015; however, these estimated were not considered for use as a baseline for technical reasons. The City undertook an Urban Forest Study in 2019 that includes Urban

Tree Cover (UTC) analysis and plantable spaces priority analysis. The Study was completed in February 2020. The study identifies the current and potential canopy cover by land use.

Table 4: Tree canopy cover and assessment - gap analysis

Current	Goal	Gap description	Action
Existing canopy estimated at less than 75 per cent of desired canopy objectives and no neighbourhood canopy objectives.	The existing canopy greater than 75 per cent to 100 per cent of desired canopy at individual neighborhood level as well as overall municipality.	Canopy currently estimated at less than optimal, missing canopy goals at a neighbourhood or land use level, and does not consider equitable distribution among neighbourhoods.	Complete Urban Forest Study for City canopy cover assessments, set canopy cover goals at multiple scales based on actual potential canopy possible, and identify priority areas for optimizing canopy benefits.
Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery and limited or no goal setting.	High-resolution assessments of the existing and potential canopy cover for the entire community or at smaller management scales.	Urban Tree Canopy (UTC) assessment not completed using high-resolution imagery.	Complete a detailed and spatially explicit UTC assessment based on high-resolution imagery and/or LIDAR.

Urban Forest Inventory and Assessment

Tree Inventory: Current and comprehensive inventory of urban forest assets to direct its management. This includes age distribution, species mix, tree condition, and risk assessment.

The City has an inventory that includes individual street and park trees. This inventory serves mainly as spatial reference for tree maintenance activities, risk and asset management. Natural wooded areas have a sample-based inventory for the purpose of natural areas monitoring.

Table 5: Urban forest inventory and assessment – gap analysis

Current	Goal	Gap description	Action
Complete inventory of City owned street and	Systematic comprehensive inventory system	Limited point based inventory of private trees.	Complete sample based inventory of private trees.

Current	Goal	Gap description	Action
park trees and sample based inventory of publicly owned trees in forested natural areas used to guide planning and management decisions.	of entire urban forest with information tailored to users and supported by mapping in municipality-wide GIS system.		Develop protocol-driven GIS based inventory integrated with asset management software.

Urban Forest Characteristics

Age distribution: Provide for an ideal un-even age distribution of all "intensively" managed trees municipality-wide as well as at the neighbourhood level.

Species suitability: Establish a tree population suitable for the urban environment and adapted to the local environment.

Species distribution (diversity): Establish a genetically diverse tree population citywide as well as at the neighbourhood level.

Publicly owned trees: Current and detailed understanding of the condition and risk potential of all publicly owned trees that are intensively managed.

Publicly owned natural areas: Detailed understanding of the ecological structure and function of all publicly owned natural areas that are extensively managed.

Trees on private property: Understanding of extent, location, and general condition of privately owned trees across the urban forest.

The Sustainable Urban Forest Guide defines intensively manage trees are considered trees that are managed individually using arboricultural techniques, while extensively managed trees are trees in woodlands or natural areas managed as a group using silvicultural practices (e.g. selective thinning, stocking).

This information is available through various disconnected resources such as the street and park tree inventory and the natural area sampling. A comprehensive analysis of the all city trees needs to be undertaken to provide accurate and meaningful information that can be used to drive management decisions.

Table 6: Urban forest characteristics - gap analysis

Current	Goal	Gap description	Action
No information about age distribution.	Total population approaches that ideal distribution municipality-wide as well as at the neighborhood level.	Age distribution analysis not available.	Complete age distribution analysis through UFS.

Current	Goal	Gap description	Action
No information about species suitability.	All trees are of species considered suitable for the area.	Species suitability list not available.	Develop species suitability list and carry out suitability analysis.
No information.	No species represents more than 20 per cent of the entire tree population and at the neighbourhood level.	Species distribution analysis not completed.	Complete species distribution analysis through UFS.
Sample-based inventory indicating tree condition and risk level.	Complete tree inventory that is GIS based and includes detailed tree condition and risk ratings.	Limited, reactive, sample of risk assessments in asset management system not linked to GIS.	Develop and implement inspection cycles. Link tree inventories with asset management system.
Ecological land classification (ELC) is available although only at the Eco-site level. Permanent sample plot data is available for forest communities on city-owned land.	In addition to usage patterns, the ecological structure and function of all publicly owned natural areas documented and included in the citywide GIS.	No information on usage of publicly owned natural areas.	Coordinate natural areas monitoring program with the NHAP for collection of comprehensive and detailed data for ecological structure and function. Collect trails and public usage information.
Limited point-based information about privately owned trees.	Bottom-up, sample-based assessment on private property, as well as detailed Urban Tree Canopy (UTC) analysis of entire urban forest, integrated into municipality-wide GIS system.	The City only tracks information for private trees in street and park inventory that potentially affect City highways (e.g. vehicle clearance, hazards).	Complete sample based inventory through UFS.

Engaging peers and residents

Municipal agency (local boards, agencies and associations) cooperation: All municipal departments and agencies cooperate to advance goals and objectives related to urban forest issues.

Citizen involvement and neighbourhood action: At the neighbourhood level, citizens understand and collaborate with the City and/or non-government (NGO) partners in urban forest management plans.

General awareness of trees as a community resource: Stakeholders understand, appreciate and advocate for the role of the urban forest.

Regional cooperation: Provide for cooperation and interaction among neighbouring municipalities and regional groups.

City efforts alone cannot achieve urban forest sustainability goals such as canopy cover targets. The UFMP recognizes that the engagement and actions of peers, residents and stakeholders is essential and that community-wide commitment to the urban forest is required to make sustainability possible.

The City has good interdepartmental cooperation through a multi-disciplinary team of city staff formed in 2014 and continues to meet quarterly. Communication and collaboration also occurs on both an ad-hoc and project based need. Existing tree related policies do not effectively advance urban forest goals and objectives where conflicts exist with other City policies or standards. For example current engineering standards for road cross sections do not incorporate trees or landscaping in the road right-of-way

There are many groups engaged on both private and public land, with some coordinated by the city or in partnership with local organizations. However, the average homeowner not engaged and there are no neighbourhood stewardship plans with defined goals and objectives. Current City partner, non-government agency, lead for both private and public lands is Trees for Guelph.

Table 7: Community framework - gap analysis

Current	Goal	Gap description	Action
Informal teams among departments and agencies communicate regularly and collaborate on a project-specific basis.	Municipal policy implemented by formal interdepartmental / interagency working teams on all municipal projects.	Co-operating agencies and informal teams but conflicting goals exist.	Implement TTM. Implement formal review process for all municipal projects. Align goals in City policies, guidelines and standards.
At the neighbourhood level, citizens understand and	Proactive outreach and coordination by City and non-government	Limited City outreach. Ad-hoc outreach and	Develop neighbourhood level stewardship plans and carry

Current	Goal	Gap description	Action
collaborate with the City and / or non-government (NGO) partners in urban forest management plans.	agency partners resulting in citywide coverage and interaction including neighbourhood stewardship strategies.	coordination by non-City groups.	out proactive outreach in all neighbourhoods. Coordinate with related NHAP actions.
Trees acknowledged as providing environmental, social and economic services.	Stakeholders understand, appreciate and advocate for the role of the urban forest.	Awareness does not always result in action or advocacy in support of the urban forest. Engaged stakeholders are primarily a few advocates or critics.	Collect measurable results of actions and engagement. Develop engagement measures through an Engagement Plan. Develop Communication Plan.
Municipalities and regional groups share similar policies and plans.	Wide-scale planning beyond municipal boundaries is in effect.	Guelph is a member of Municipal Arborists and urban foresters (MAUF) working group and the Regional Public Works Commissioners of Ontario (RPWCO) – Urban Forestry Sub-Committee, but otherwise limited wide-scale, regional cooperation or interaction.	Continue to participate in existing working groups. Foster new working relationships with neighbouring municipalities and regions bordering Guelph.

Creating public and private partnerships

Utilities Cooperation: All utilities, above and belowground, employ best management practices and cooperate with municipality to advance goals and objectives related to urban forest issues and opportunities.

Involvement of large private and institutional landholders: Large private landholders embrace citywide goals and objectives through specific asset management plans.

Green industry cooperation: Green industry works together to advance municipality-wide urban forest goals and objectives, and adheres to high professional standards.

Coordination of construction activities with utilities is limited to City construction, private development under agreement with the City, and ad-hoc communication/collaboration for vegetation management activities carried out by the local and provincial hydro utilities. Additional outreach, collaboration and providing incentives for planting or managing trees would be beneficial.

Table 8: Creating public and private partnerships - gap analysis

Current	Goal	Gap description	Action
Utilities employ best management practices, recognize potential municipal conflicts, and reach out to City staff on projects on an ad hoc basis.	Utilities help advance urban forestry goals and objectives by participating in formal interdepartmental and/or interagency working teams on all municipal projects.	No formal interagency coordination on urban forestry related matters. Forestry has established relationships with select utilities to create awareness of forest goals and objectives	Provide workshops to utility providers for use of TTM. Continue to foster positive relationships with local utilities and increase awareness of forest issues.
Limited, ad-hoc tree/forest management plans on private property.	Landholders develop comprehensive tree management plans (including funding) with active community engagement and access to the property's forest resource.	City does not have policies or outreach resources to support private landowners with urban forest stewardship.	Identify and prioritize opportunities for stewardship on private land and develop partnerships and incentive programs to advance urban forestry goals.
Some cooperation with Green industry to advance urban forest goals and objectives, and adherence to high professional standards.	Shared vision, goals, and extensive committed partnerships in place. Solid adherence to high professional standards.	City has not clearly communicated or enforced best practices.	Provide workshops to Green industry for use of TTM.

Resource management: Planning

Citywide management plan: Develop and implement a comprehensive urban forest management plan for private and public property.

The strategic UFMP was approved by Council in 2012 and implemented in 2013. Since then Parks Operations and Forestry staff with support from many other departments have achieved significant progress in building the foundations of a sustainable urban forest. Next steps should include implementing previous and new priority actions again supported by Council and the community.

Table 9: Resources management: Planning - gap analysis

Current	Goal	Gap description	Action
Completed 7th year of Strategic UFMP implementation.	Strategic multi-tiered plan for public and private intensively- and extensively- managed forest assets accepted and implemented with adaptive management mechanisms.	UFMP objectives not recognized in all relevant City department policies or plans. While a significant number of recommendations of the UMFP are complete or are ongoing, the effectiveness of plan is unknown. Alignment with regional planning not formalized in plan.	Align all City policies and plans with UFMP. Complete second phase of the plan with an implementation report. Develop UFMP objectives that integrate regional goals: specifically in relation to those along Guelph municipal boundaries.

Resource management - Implementation

Municipality-wide funding: Develop and maintain adequate funding to implement a citywide urban forest management plan.

Municipal Urban Forestry Program Capacity: Maintain sufficient well-trained personnel and equipment – whether, in-house or through contracted or volunteer services – to implement municipality-wide urban forest management plan.

Tree establishment planning and implementation: Ensure urban forest renewal through a comprehensive tree establishment program driven by goals such as canopy cover, species diversity, and species distribution.

Environmental justice and equity: Ensure that the benefits of urban forests are made available to all, especially to those in greatest need of tree benefits.

The current funding and support for the UFMP enabled the completion of a limited number of priority initiatives. There has been limited transition to proactive management. The core of urban forest management program is based on mostly

reactive maintenance work and responses to weather events or EAB risk mitigation. One Arborist is still outstanding from the first five-year plan. Without additional resources, the City will not be able to fully implement risk management strategies such as regular inspection and grid pruning cycles or maintain the anticipated increase in trees that are expected to be planted as we recover from EAB and increase tree canopy cover.

Tree planting is currently undertaken based on available opportunities on an ad-hoc basis. A tree planting strategy is required plan for growing Guelph's canopy in a way that maximizes the benefits to the community in a reasonable timeline with dedicated resources.

Trees provide benefits that should be accessible to all. Equitable urban forest management focuses on increasing the benefits in areas with the greatest need such as neighbourhoods with low canopy cover, socio-economic factors such as low income, areas with high population density or lack of access to green spaces.

Table 10: Resources management: Implementation - gap analysis

Current	Goal	Gap description	Action
Funding sufficient for some proactive management based on urban forest management plan.	Sustained funding from public and private sources implement comprehensive urban forest management plan.	Funding reductions in the last 5 years have limited the ability to expand the City's capacity for planting and maintenance of trees. Majority of funding allocated to EAB efforts. However, limited grant funding was available for smaller stewardship (restoration) projects.	Develop budget for implementation of second phase of plan. Additional funding asks and pursuit of private grants. Transition funding for UFMP from project based to sustained programming and long-term investment in sustainability.
Qualified team able to implement many of the goals and objectives of the urban forest management plan.	Team able to implement all of the goals and objectives of the urban forest management plan.	Outstanding Arborist FTE (1) required to increase capacity to plant and maintain trees.	Hire qualified staff as required to effectively increase and proactively maintain urban forest canopy.
Some tree planting and establishment occurs with post planting care, but	To have a comprehensive tree establishment plan guided by	No citywide planting strategy.	Develop and implement a planting/greening strategy using

Current	Goal	Gap description	Action
with limited overall municipality-wide planning.	needs derived from canopy and other assessments, maintains species and age diversity, includes both planting and young tree care, and is sufficient to make progress toward canopy cover objectives.		plantable space analysis and canopy cover targets from the UFS. Coordinate with NHAP actions (e.g., Ecological restoration internal committee). Continue staff oversight of City projects. Implement TTM.
Tree planting and outreach not determined equitably by canopy cover or need for benefits.	Equitable tree planting and outreach at neighbourhood level guided by strong community engagement in high canopy needs areas.	Tree planting and outreach undertaken based on available opportunities and neighbourhood engagement and interest in stewardship.	Develop and implement tree-planting strategy to achieve 40 per cent target including prioritizing planting based on planting in areas of low canopy or limited access to green spaces.

Resource management: Monitoring and maintenance

Maintenance of city-owned, intensively managed trees: All city-owned trees maintained to maximize current and future benefits. Tree health and condition ensure maximum longevity.

Tree risk management: Comprehensive tree risk management program fully implemented, according to ANSI A300 (Part 9) "Tree Risk Assessment" standards, and supporting industry best management practices.

Tree protection policy development and enforcement: The benefits derived from trees on public and private land are ensured by the enforcement of municipality wide policies, including tree care "best management practices."

Tree habitat suitability: All publicly owned trees planted in habitats that maximize current and future benefits provided to the site.

City-owned natural areas management, planning and implementation: Protect and, where appropriate, enhance the ecological structure and function of all city-owned natural areas.

Native vegetation: Preservation and enhancement of local natural biodiversity maintains the biological integrity of native remnant forests and maintain wildlife corridors to and from the city.

Monitoring and maintenance of the urban forest is at the core of any effective urban forest management program. Monitoring our progress provides the opportunity to assess and evaluate our actions with opportunities to make adjustments where needed. Proactive maintenance is required to grow healthy, long-living trees.

Promoting the use of native trees and shrubs is important as they are the best adapted to local growing conditions and promote ecological health and function of natural areas. Regardless, many of our native species are not suited to urban environments and so non-native, non-invasive tree species recommended in areas such as parking lots or boulevards where native trees will not thrive.

Table 11: Resources management: Monitoring and maintenance - gap analysis

Current	Goal	Gap description	Action
Street and park trees maintained based on a combination of reactive response and proactive maintenance programs. Backlog resulting from ash tree removals.	All mature city-owned trees maintained on a proactive 7-year cycle. All immature trees structurally pruned. Reactive maintenance time three - six months.	Current tree inventory and the work order and asset management software (Oracle WAM) not linked. Limited maintenance protocols. Lack of resources to initiate proactive maintenance.	Develop and implement routine maintenance protocol and standards using current standards and best practice – identify resource needs.
Existing Tree Maintenance protocol. However, no tree risk management strategy. Most response is on a reactive/complaints basis.	Level II (basic assessment) conducted routinely, according to defined cycle and intensive follow-up (i.e., priorities and timelines for mitigation established based on the characterization of risk).	Limited proactive risk assessment protocols not using current standards and best practice. Lack of resources to carry out proactive risk assessment.	Develop and implement routine risk assessment protocol and standards using current standards and best practice – identify resource needs.
City has existing policy, regulatory tools (bylaws) and best management	Integrated municipal wide policies that ensure the	Limited and inconsistent application of best practice. Limited	Provide workshops to internal and external stakeholders for

Current	Goal	Gap description	Action
practices in place but with inconsistent implementation or enforcement.	protection of trees on public and private land consistently enforced and supported by significant deterrents.	information on effectiveness of policies. Existing tree policies are not completely aligned alignment.	use of TTM. Consistent enforcement and procedures for Private Tree By-law to all properties in the City larger than 0.2 ha. Review tree related bylaws.
Appropriate species considered based on site conditions. However, frequent conflicts with infrastructure.	All trees planted in sites with adequate soil quality and quantity, and with sufficient growing space and overall site conditions to achieve their genetic potential and thus provide maximum ecosystem services.	No soil quality or volume standards for tree planting. City engineering road cross-sections standards do not include trees.	Develop complete streets strategy that incorporates green infrastructure.
Ecological function of forested natural areas and NHS are unknown.	NHS and forested natural areas managed based on known state of ecological function.	No studies or analysis available. Knowledge limited to ecological land classification information.	Update ELC data and develop management / restoration plans (NHAP).
Native tree species are required for use in all development and construction projects. Use of non-invasive exotics permitted in areas with little risk to natural areas. Use of invasives is	Native species are widely used on a project-appropriate basis in all areas; invasive species proactively managed for eradication to the fullest extent possible.	Native or preferred species lists not available for reference for development proponents.	Develop native tree species lists for use in development and construction. Implement TTM preferred street tree list.

Current	Goal	Gap description	Action
strongly discouraged.			

Identification of challenges and opportunities

Managing trees and forests in an urban setting is already inherently difficult; especially in an urbanized area that is expanding while we are attempting to protect and increase the extent of the urban canopy cover. Key challenges remain in achieving the strategic goals of the UFMP.

While our achievements have established the foundations of a modern urban forestry program, there have been significant challenges in all key areas of the plan. Most issues are due to increasingly conflicting community growth priorities and cannot be resolved without significant balancing of priorities, good planning, coordination and collaboration across City and community stakeholders.

Challenges:
Management and monitoring

- **Lack of resource knowledge:** Gaps in our understanding of the urban forest limited our ability to make evidence-based management decisions;
- **Limited resources:** Parks Operation and Forestry must be adequately resourced to undertake implementation and monitoring of initiatives;
- **Invasive pests:** The combination of resource burden and canopy losses due to EAB limited the City's ability to increase canopy cover, achieve proactive levels of maintenance to increase the health of the urban forest and reducing risk to public. Additionally, the extent of buckthorn and other emerging invasive plants is a serious threat to the ecological integrity of the City's and natural heritage system;
- **Unpredictable climate/weather:** Guelph experienced several extreme weather events that resulted in the loss of trees and damage to property; and
- **Asset management:** Limited ability to manage tree assets due to lack of functional link between corporate work order asset management software and tree inventory in GIS spatial database. Trees are not yet included in corporate asset management system.

Legislation, policies and guidelines

- **Densification:** Ongoing development pressures and competition with other land uses makes it increasing difficult to establish new canopy. The lack of canopy target policies integrated into planning process and zoning bylaws limits tree planting and excludes development properties from contributing to the City's overall canopy cover target;
- Lack of maintenance for private street trees results in an increased risk to public property;
- **Limited regulation of trees on private and public property:** Properties not regulated by the Private Tree By-law saw losses of large mature trees because of development or construction (e.g., Committee of Adjustment,

building permits). Damage to City owned-owned or boundary trees often occurred because there is no of regulation of trees on public property;

- **Unknown effectiveness of Official Plan policies and tree protection regulations:** The City does not have enough information to determine if tree related policies or bylaws are effective in protecting or enhancing of tree canopy cover; and
- **Lack of tree planting strategy:** Tree planting is currently opportunistic without consideration for prioritizing tree planting in locations where benefits would have the most impact. For example, tree planting is not directed to areas with known low canopy or heat islands specifically but where an available planting space has been identified.

Protection, Establishment and Enhancement

- **Conflicting infrastructure:** Significant losses or severe impact to health of trees occurred because of utility vegetation management. Additionally, conflicts with utilities and hard surfaces, reduced widths and inclusion of bike lanes in right-of-ways has almost completely eliminated the option to plant street trees in boulevards. Loss of permeable surfaces for groundwater recharge and tree growth;
- **Limited coordination:** Limited implementation of best practice and coordination of operational activities and construction with Forestry staff;
- **Drought:** Increased demand for watering new trees during establishment periods due to hotter, drier summers;
- **Limited quality of tree stock:** Increasing demand on nurseries to supply trees for development has resulted in limited quantity and quality of tree stock. Most importantly, there has been an increase in the tree stock with unknown providence, which means that trees may not being suited to local growing conditions and will not survive long-term; and
- **Inadequate care for trees on private land:** Subdivision tree planting is now the responsibility of the Developer and takes place on private property that is not often regulated by the Private Tree Bylaw. Trees are planted on private property because there is typically no room in the City's right-of-way. Limited quality control for new subdivision plantings on private after two-year warranty period means that the health of those trees is not guaranteed.

Outreach, Stewardship and Partnerships

- Capacity for outreach and stewardship has not yet been fully realized;
- Limited awareness and engagement of the community in urban forest surveys and outreach events; and
- The City does not currently undertake outreach, or provide incentives for tree planting, on private property.

Opportunities:
Management and monitoring

- Identification and implementation of resources;
- Commitment to monitoring progress of UFMP;
- EAB plan;

- Planting trees species that are suited for urban areas and have low maintenance needs;
- Implementation of policies, guidelines and standards (e.g. TTM, tree maintenance protocol); and
- Tree inventory.

Legislation, policies and guidelines

- Zoning bylaw review – regulation of canopy cover objectives, requirements, soil volumes, planting areas, street trees, subdivision approval process, surface parking lots;
- Site plan approval process;
- Official plan review;
- Alignment with Community plan, Strategic plan and NHAP priorities;
- Alignment with Municipal Act Bill 68, enhanced policies for protection of urban forests; and
- New Planning guidelines for commercial built form standards and preparation of environmental impact studies.

Protection, Establishment and Enhancement

- Implementation of TTM; and
- Subdivision plan review, inspections and assumption process.

Outreach, Stewardship and Partnerships

- Increased engagement and leadership of community groups;
- Non-city lead events;
- Grants and funding (e.g. Forests Ontario);
- Research partnerships with institutions and research groups (e.g. University of Guelph and Toronto)
- Partnerships with environmental charity groups, non-profit groups, etc. (e.g. Reep Green Solutions, Infrastructure Ontario)

Engagement

An online survey was completed between December 12, 2019 and January 8, 2020, using Guelph's "Have your say" online community engagement site. The survey was made available to the public and was also e-mailed directly to over 140 key stakeholders including City of Guelph staff, developers, consultants, green industry contractors, members of the building community, forestry and arboriculture professionals, landscapers, non-profit organizations and environmental interest groups. The purpose of the survey was to gain insight about the community's:

- Awareness of the City's 20-year strategic UFMP;
- Support and opinions of the vision of the UFMP;
- Opinions on the City's progress to meet goals to support the vision;
- Opinions on the strategic direction and priorities of the UFMP;
- Opinions on continued investment in the urban forest; and
- Engagement or involvement in UFMP initiatives.

The survey is only one part of the City's approach to adaptive management, which uses a systematic, practical approach to improving resource management policies and practices. A total of 170 people from across the City completed the survey.

Key findings of survey:

Most respondents are aware of the UFMP and agree with the vision

- Sixty-seven per cent know that the City has an approved urban forest management plan; and
- Sixty-two per cent agree with the plan's vision.

Respondents believe that the City needs to do more to meet the vision

- Only seven per cent strongly feel that we are meeting the vision; with most specifically saying that the we need to plant more trees and protect and preserve more trees and woodlands; and
- Sixteen per cent do not know if the City is doing enough.

Respondents agree that the City should continue UFMP actions and invest in the urban forest

- Ninety-five per cent support in the long-term investment in the urban forest; and
- Eighty-nine per cent agree that there are benefits of in continuing current initiatives and actions as well as prioritizing new initiatives and actions; most importantly the implementation of a proactive monitoring and maintenance program, development of a tree planting strategy and building community partnerships.

Key themes of UFMP survey comments are as follows:

- Increase tree canopy cover through robust compensation requirements for development, providing incentives for tree planting and maintenance on private property, planting more trees;
- Increase the protection and resilience of the urban forest (individual trees and woodlands) through effective tree related policies, enhanced and enforceable regulations, standards and guidelines across all agencies;
- Proactively implement best practice management approaches for tree planting, maintenance and protection; and
- Increase communication and engagement to increase awareness of the state of urban forest and encourage action with measurable results.

These priority themes of protecting our natural heritage as part of complete healthy communities are reoccurring across both tree and non-tree related consultations. For example, the current results align with community engagement results from the original UFMP framework (2009), Clair-Maltby secondary plan (2018), Community plan (2019) and the NHAP (2018).

Overall, the results of the survey suggest that the respondents agree with the current vision of the UFMP and the City's management approaches and are supportive of the UFMP vision, strategic goals, ongoing initiatives and long-term investment in the urban forest. The results indicate that the UFMP recommendations still align with the priorities and needs of the community. However, most priority recommendations – protect, maintain and increase canopy

cover - were not completed or started in the first phase. The second phase has identified these priorities for completion or initiation.

Monitoring and reporting schedule

The following is an outline of the UFMP monitoring, update and reporting schedule.

Annually:

- Operational activities

Every three years:

- Report on forest management plan implementation and priorities
- Report on state of the urban forest

Every ten years:

- Urban forest studies and report (2019, 2029, 2039)
- UFMP reviewed and updated (2023)

Second phase plan

Prioritized actions

The first phase of the plan focused on growing staff capacity, building knowledge and understanding of our resources, developing best practices, reducing the impacts from EAB and promoting stewardship.

The next phase (2020 – 2023) will continue to build on our successes, and ongoing initiatives/actions and community priorities. New initiatives/actions have been identified through the gap analysis. Priority for implementation of initiatives/actions is given to those that are ongoing, provide support for other currently approved City plans and strategies, and those that would most effectively improve our ability to sustain or increase the multiple environmental, economic and social benefits of the urban forest.

Based on the above prioritization, the next phase focuses on:

- Maintaining ongoing initiatives/actions;
- Preserving and increasing urban forest canopy cover;
- Proactive risk management and maintenance;
- Monitoring the effectiveness of how we manage the urban forest;
- Valuation of the goods and services of trees; and
- Building community collaboration and engagement.

Actions for the next phase of the UFMP by key management area are listed in the tables below.

Management and monitoring

Table 12: Actions for management and monitoring

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Review street and park tree inventory protocol; Link GIS inventory to existing work order asset management system (Oracle WAM)	-	Sustaining our future	2021	Presently supported in operating budget	Parks Operations and Forestry

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Compile Forested areas monitoring data to feed into future comprehensive natural area monitoring (NHAP)	3	Sustaining our future	2021	Presently supported in operating budget	Environmental Planning/Parks Operations and Forestry
Develop forest management plans in conjunction with NHAP related plans	23	Sustaining our future	2023	Presently supported in operating budget	Parks Operations and Forestry/Environmental Planning
Implement Tree Allocation Fund (cash-in-lieu from Private Tree By-law compensation)	26	Sustaining our future, Building our future	2020	Presently supported in operating budget	Environmental Planning/Parks Operations and Forestry
Implement TTM	-	Sustaining our future	2020	Presently supported in operating budget	Parks Operations and Forestry

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Hire new Arborist (1 FTE) outstanding from first phase of plan to support tree planting and maintenance program	-	Sustaining our future	2022	To be recommended in 2021-2024 operating budget	Parks Operations and Forestry
Hire seasonal staff for tree planting and maintenance in natural areas	-	Sustaining our future	2021-2023	Funded through tree compensation funds	Parks Operations and Forestry
Initiate pest and disease monitoring	-	Powering our future, Sustaining our future, and Building our future	2020	Presently supported in operating budget	Parks Operations and Forestry/Environmental Planning
Develop invasive management strategy (implement in 2024)	14	Sustaining our future	2021	Presently supported in operating budget	Parks Operations and Forestry/Environmental Planning

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Develop forest health plan including integrated pest management strategies for tree related pests and diseases (implement 2024 / 2025)	-	Sustaining our future	2023	Presently supported in operating budget	Parks Operations and Forestry
Continue implementation of EAB plan	-	Sustaining our future	2020-2023	Presently supported in capital budget	Parks Operations and Forestry
Develop Risk Management Strategy (RMS) (implement in 2024)	-	Sustaining our future and Building our future	2022	Presently supported in operating budget	Parks Operations and Forestry/IT, Legal (Risk)
Develop Storm Response Plan	-	Sustaining our future	2023	Presently supported in operating budget	Parks Operations and Forestry/ Legal (Risk)

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Hire new Inspector Arborist (1 FTE) to support proactive inspection and maintenance work	-	Sustaining our future	2023	To be recommended in 2021-2024 operating budget	Parks Operations and Forestry
Update Maintenance Protocol	-	Sustaining our future	2023	Presently supported in operating budget	Parks Operations and Forestry
Prepare 10-year update of UFMP	-	Sustaining our future and Building our future	2023	Presently supported in capital budget	Parks Operations and Forestry/Tree Team
Prepare third phase plan	-	Powering our future, Sustaining our future, and Building our future	2023	Presently supported in operating budget	Parks Operations and Forestry/internal stakeholders

Legislation, policies and guidelines

Table 13: Actions for legislation, policies and guidelines

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Review and enhance Private Tree By-law and need for public tree bylaw	-	Sustaining our future and Building our future	2022	Presently supported in operating budget	Parks Operations and Forestry/Planning, Legal, Bylaw
Hire New Forest Technologist (1 FTE) to administer tree related bylaw and undertake tree-related review and site supervision	-	Sustaining our future and Building our future	2023	To be recommended in 2021-2024 operating budget	Parks Operations and Forestry/Planning, Legal, Bylaw
Align City policy, plans and guidelines (e.g. Community Plan; Strategic Plan; Official Plan Update; Commercial Built Form Standards)	-	Powering our future, Sustaining our future, and Building our future	2020-2023	Presently supported in operating budget	Various

Protection, establishment and enhancement

Table 14: Actions for protection, establishment and enhancement

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Implement TTM	-	Sustaining our future and Building our future	2020	Presently supported in operating budget	Parks Operations and Forestry/Environmental Planning, Communications
Audit design and implementation of existing soil cell structures	-	Sustaining our future and Building our future	2023	Presently supported in capital budget	Parks Operations and Forestry/Tree Team
Develop and implement tree planting strategy to increase canopy cover; explore tree planting incentives for private land	-	Sustaining our future and Working our future	2021	Presently supported in operating budget	Parks Operations and Forestry / Environmental Planning, Communications, Community Engagement
Coordinate tree plantings and restoration work through ERIC	-	Sustaining our future	2020-2023	Presently supported in operating budget	Parks Operations and Forestry/ERIC, Tree Team

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Implement data tracking for tree removals and replacements	-	Sustaining our future	2021	Presently supported in operating budget	Parks Operations and Forestry/Environmental Planning
Implement Subdivision Street Tree Plan and Park Planting Plan inspections	-	Sustaining our future	2020	Presently supported in operating budget	Parks Operations and Forestry

Outreach, education and partnerships

Table 15: Actions for outreach, education and partnerships

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Develop UFMP Communications strategy and Engagement Plan	-	Sustaining our future	2021	Presently supported in operating budget	Parks Operations and Forestry/Communications, Community Engagement

Actions	Related NHAP action	Related Strategic Plan priority	Target date(s)	Budget status	Lead and support
Celebrate achievements (National Forestry Week, Earth Day)	37	Building our future	2021-2023	Presently supported in operating budget	Parks Operations and Forestry/Communications, Community Engagement, Environmental Planning
Pursue regional coordination of urban forest management	22	Sustaining our future and Working together for our future	2020-2023	Presently supported in operating budget	Parks Operations and Forestry

Financial implications

Implementation of the second phase of the UFMP, which is to be aligned with the upcoming four-year budget cycle, will require continued investment through both operating and capital budgets. Approval of specific annual capital investment and associated operating impacts will be included in future budget requests.

The capital requirements identified in the second phase of the UFMP are the same as presented in the 2021 capital budget: $14,000 (2021), $657,000 (2022), $833,000 (2023) and $1,081,000 (2024). The associated operating impacts for 2021 to 2024 were not included. They are estimated to be as follows: $0 (2021), $90,000 (2022), $255,000 (2023), and $420,000 (2024). This total of $765,000 increase in operating budget impacts equates to approximately a 0.30 per cent tax rate increase, without any other adjustments within the Parks Operations and Forestry operating budget. This tax rate increase includes the addition of three FTEs between 2021 and 2023. Requests for FTEs in 2024 is yet to be determined and will be taken to Council through the annual budget cycles.

Table 16: Summary of financial impacts of UFMP implementation 2021-2024

Budget and FTEs	2021	2022	2023	2024	Total
Capital budget	$14,000	$657,000	$833,000	$1,081,000	$2,585,000

Budget and FTEs	2021	2022	2023	2024	Total
Operating budget	$0	$90,000	$255,000	$420,000	$765,000
FTE additions	**0**	**1**	**2**	**TBD**	**3**

The forecasted financial impacts are required due to the:

- Expected direct and indirect impacts from the alignment with existing and new plans and strategies (e.g. strategic plan, natural heritage action plan) with the Urban Forest Management Plan;
- Requirements to achieve targets within the recommended timeframe of the Urban Forest Management Plan such as the 40 per cent canopy cover target; and
- Need to provide resources to implement underfunded priority actions identified in the Urban Forest Management Plan such as expanding the City's capacity for planting and maintaining municipal trees, and development and implementation of an invasive species and pest management strategy beyond the immediate threat associated with emerald ash borer.

Combined with current projects under way, the funding identified above will mean an estimated spending of $3.7 million from now until 2024. This level of funding will allow progress to be made on identified priorities and achievement of targets as identified in the Corporate Strategic Plan. Endorsement of the UFMP will prioritize these requests for funding during budget preparation and ensure that Council is asked to approve sufficient funding to see this work completed as required.

For recommendations within the 20-year UFMP to be fully achieved, their impacts to current operational challenges will need to be addressed. For instance, due to the significant operating impacts associated with COVID 19 staff ability to manage the work order volume has been negatively impacted. This has added to the delay in work order submission to timing of completion. Through continued implementation of the UFMP and future capital and operating budgets staff will take steps to mitigate these impacts.

Appendices

Appendix A: UFMP recommendations update

Table 17: UFMP recommendations update – management and monitoring

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
1	Create a Senior Urban Forester position	2013	Complete	• Nov 2013, position since March 2015 overseeing Parks Operations in addition to Forestry	• Senior Forester position in place
2	Create an interdepartmental "Tree Team" of City staff	2014	Complete	• Quarterly meetings since June 2014 – combined with Urban Forest Advisory Committee since 2015	• Ongoing quarterly meetings
3	Increase capacity to complete an inventory of municipal street and park trees	2013	Complete	• Technical staff added (2014) • On-line tree ownership map available to the public (2016) • Completed comprehensive sample, GIS based (spatial data base) inventory of urban forest	• Ongoing management of urban forest inventory • Review street and park tree inventory protocol
4	Undertake targeted vegetation assessment and management of City parks and natural areas	2015	Ongoing	• Natural Areas Monitoring established and baseline report/data complete (2016 and 2018) • Implement beaver (tree) protection protocol	• Compile forested areas monitoring data to feed into future comprehensive natural area monitoring (NHAP) • Develop forest management plans in conjunction with NHAP related plans
5	Expand the City's capacity for planting and maintenance of municipal trees	2013	Partial	• One of two recommended additional arborists approved in 2015 budget	• Ongoing pursue increased funding to achieve canopy cover targets • Implement Tree Allocation Fund (cash-in-lieu from

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
				• Purchase of upgraded equipment/vehicles for additional operational capacity	Private Tree By-law compensation) • Implement TTM • Undertake tree survivorship surveys • Hire new Arborist (1 FTE) outstanding from first phase to support street and park tree planting and maintenance program • Hire seasonal staff for tree planting and maintenance in natural areas • Implement grid pruning cycles
6	Undertake an urban tree cover (UTC) and potential plantable spaces analysis	2019	Ongoing	• Carry out land cover and plantable spaces analysis through Urban Forest Study (Report)	• Urban Forest Study used to feed into tree planting strategy
7	Develop and implement an Invasive Species and Pest Management Strategy, starting with an Emerald Ash Borer Strategy	2013	Partial / Ongoing	• Addition of Program Manager, Trails and Natural Areas (2016) • Removal of 2267 street and park ash trees • 1500 replacements planted • Emerald Ash Borer Plan, completed year six of implementation • Continued progress on several projects ongoing since 2016 such as Crane Park and Silvercreek Park	• Ongoing EAB plan • Initiate interim pest and disease monitoring • Develop invasive management strategy (NHAP) • Develop integrated pest management strategies for tree related pests and diseases

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
				buckthorn removal to allow for establishment of natural forest elements	
8	Develop tree risk management policy and train City Arborists in risk assessment	2015	Partial	• Hired Inspector Arborist, November – Tree Risk Assessment Qualification (TRAQ) training through the International Society of Arborists (ISA) completed • Response to 6 major weather events and 20 claims of damage by trees	• Develop and implement Risk Management Strategy (RMS) including proactive inspection cycles • Develop and implement storm response plan • Update tree maintenance protocol
9	Complete a State of the Urban Forest report every five years	2019	Ongoing	• Included in UFMP implementation report (2019)	• Include state of the urban forest in implementation updates.
10	Establish a green infrastructure asset valuation	2019	Ongoing	• Trees included in Corporate Asset Management Process (2019)	• Corporate Asset Management undertaking natural heritage asset management plan (NHAP) – incorporate data from Urban Forest Study

Table 18: UFMP recommendations update – legislation, policies and guidelines

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
11	Assess the effectiveness of current tree-related policies and legislation	2013	Pending	• Deferred to phase two	• Prepare second phase Urban Forest Management Plan • Review and enhance Private Tree By-law; New (1/2 FTE) required to administer Tree By-law (See recommendation 13, 2022) • Prepare third phase Urban Forest Management Plan • Provide input upcoming to Official Plan and zoning bylaw reviews
12	Update City documents to be consistent with new tree-related policies, guidelines and legislation	2014	Ongoing	• Council approved Urban Design Manual (2017) • Council approved Tree Ownership and Maintenance Standards (2017) • Annual update of tree-related items in Linear Infrastructure Standards	• Ongoing • NHAP and Strategic Plan alignment of UFMP
13	Develop and implement a public tree bylaw	2018	Pending		• Consider development City-wide tree bylaw in lieu of separate private and public tree bylaws (1/2 FTE) (see recommendation 11 and 18)

Table 19: UFMP recommendations update – protection, establishment and enhancement

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
14	Implement and assess use of the new TTM	2013	Partial	• Completed TTM	• Implement TTM
15	Implement and monitor success of new rooting technologies	2013	Ongoing	• Re-work and monitor tree cells on Carden Street • Integration of cell technology (Silva Cell) into Wilson Street reconstruction (2018) • Revise recommendation to include all green infrastructure (going forward for 2019)	• Ongoing - implement and monitor rooting technologies • Audit design and implementation of existing soil cell structures
16	Develop a greening strategy building on the potential plantable spaces analysis	2018	Pending	• Completed potential plantable spaces analysis	• Develop and implement tree planting strategy to increase canopy cover
17	Track municipal tree removals and plantings	2018	Ongoing	• Annual tracking ongoing	• Coordinate tree plantings and restoration work through ERIC • Tracking data for tree removals and replacements
18	Expand the City's capacity to undertake tree-related plan review and site inspections	2015	Ongoing	• Capacity improved with the 2014 hiring of two technologists	• Implement subdivision street tree plan and park planting plan inspections • Formalize protocols for coordination of tree-related plan review and inspection and assumption process

Table 20: UFMP recommendations update - outreach, stewardship and partnerships

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
19	Create an Urban Forest Advisory Committee	2013	Ongoing	• Meeting quarterly since early 2014–combined with internal Tree Team (City staff) since 2015 • Renamed urban forest working group	• Ongoing working group • Natural Heritage Advisory Committee (NHAC) (2019) to engage on UFMP matters
20	Pursue targeted urban forest education and outreach	2012	Ongoing	• Hosted 2017 Ontario Professional Foresters Association Conference and City Tours • Forests Ontario: Forestry in the Classroom – deliver forestry education at local schools	• Support Communications for Environment Webpages Audit • Attend community events • Develop Communications and Engagement Plans • Celebrate achievements (National Forestry Week, Earth Day)
21	Increase municipal capacity for coordination of volunteers for stewardship activities	2014	Ongoing	• Increased with technical staff (2014),Trails and Natural Areas Program Manager (May, 2016) and Part-time Community Stewardship coordinator position (2017) – formerly Community Gardens Coordinator • Developed protocol for beaver protection and damage mitigation; implemented by community volunteers • Increased volume of stewardship activities	• Ongoing coordination of stewardship activities • Pursue new and build existing partnerships

UFMP recommendation number	Recommendation description	Year initiated	Status	Phase one	Phase two
22	Pursue targeted stewardship initiatives, partnerships and funding sources	2015	Ongoing	• University of Toronto (Vegetative Sampling Protocol) (2015) • University of Guelph (Potential Plantable Spaces Analysis) (2015) • Received 2017 TD Green Streets grant for Tree Planting and Stormwater Education in partnership with Engineering and Waterworks • University of Toronto (Vegetative Sampling Protocol) continued • Federation of Canadian Municipalities (FCM) partnership with Green Infrastructure (GI) Foundation to provide education and awareness of green infrastructure to municipalities	• Participate in provincial coordination of urban forest management (Regional Public Works Commissioners of Ontario - Urban Forest Subcommittee) • Pursue regional coordination of urban forest management • Continue to pursue funding grants • Develop incentives for tree planting on private and public lands • Explore partnership with Reep Green Solutions for stormwater fee tree-rebate (led by Engineering)

Appendix B: Urban Forest Management Plan Report Card

Vegetation assets – knowledge of resources

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
1.	Relative Canopy Cover	Achieve desired degree of tree cover, based on potential of according to goals set for entire municipality and for each neighbourhood or land use.	The existing canopy cover for entire municipality is <50% of the desired canopy.	The existing canopy is 50%-75% of desired.	The existing canopy is >75%-100% of desired.	The existing canopy is >75%-100% of desired – at individual neighborhood level as well as overall municipality.
2.	Age distribution	Provide for an ideal un-even age distribution of all "intensively" managed trees municipality-wide as well as at the neighbourhood level.	Even-age distribution, or highly skewed toward a single age class (maturity stage) across entire population.	Some uneven distribution, but most of the tree population falls into a single age class.	Total tree population across municipality approaches an ideal age distribution of 40% juvenile, 30% semi-mature, 20% mature, and 10% senescent.	Total population approaches that ideal distribution municipality-wide as well as at the neighborhood level.
3.	Species suitability	Establish a tree population suitable for the urban environment and adapted to the local environment.	Less than 50% of trees are of species considered suitable for the area.	50% to 75% of trees are of species considered suitable for the area.	More than 75% of trees are of species considered suitable for the area.	All trees are of species considered suitable for the area.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
4.	Species distribution	Establish a genetically diverse tree population citywide as well as at the neighbourhood level.	Fewer than 5 species dominate the entire tree population citywide.	No species represents more than 20% of the entire tree population.	No species represents more than 10% of the entire tree population citywide.	No species represents more than 20% of the entire tree population and at the neighbourhood level.
5.	Publicly owned-owned trees	Current and detailed understanding of the condition and risk potential of all publicly-owned trees that are **intensively managed**.	The condition of the urban forest is unknown.	Sample-based inventory indicating tree condition and risk level.	Complete tree inventory that includes detailed tree condition ratings.	Complete tree inventory that is GIS based and includes detailed tree condition and risk ratings.
6.	Publicly-owned natural areas	Detailed understanding of the ecological structure and function of **extensively managed** publicly owned natural areas.	No information about publicly owned natural areas.	Publicly owned natural areas identified in a "natural areas survey" or similar document.	Survey document also tracks level and type of public use in publicly owned natural areas.	In addition to usage patterns, the ecological structure and function of all publicly owned natural areas documented and included in the citywide GIS.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
7.	Trees on private property (new for second phase plan)	Understanding of extent, location, and general condition of privately owned trees across the urban forest.	No information about privately owned trees.	Aerial, point-based assessment of trees on private property, capturing overall extent and location.	Bottom-up, sample-based assessment of trees on private property, as well as basic aerial view (as described in "Fair" rating).	Bottom-up, sample-based assessment on private property, as well as detailed Urban Tree Canopy (UTC) analysis of entire urban forest, integrated into municipality-wide GIS system.

Community Framework – engagement and collaboration of stakeholders

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
8.	Municipal agency (local boards, agencies and associations) cooperation	All municipal departments and agencies cooperate to advance goals and objectives related to urban forest issues.	– Municipal departments/agencies take actions impact urban forest with no cross-departmental coordination or consideration of the urban forest resource.	Municipal departments/agencies recognize potential conflicts and reach out to urban forest managers on an ad hoc basis – and vice versa.	Informal teams among departments and agencies communicate regularly and collaborate on a project-specific basis.	Municipal policy implemented by formal interdepartmental / interagency working teams on all municipal projects.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
9.	Utilities Cooperation (new for second phase)	All utilities – above and below ground – employ best management practices and cooperate with municipality to advance goals and objectives related to urban forest issues and opportunities.	Utilities take actions impact urban forest with no municipal coordination or consideration of the urban forest resource.	Utilities employ best management practices, recognize potential municipal conflicts, and reach out to urban forest managers on an ad hoc basis – and vice versa.	Utilities are included in informal municipal teams that communicate regularly and collaborate on a project-specific basis.	Utilities help advance urban forestry goals and objectives by participating in formal interdepartmental/interagency working teams on all municipal projects.
10.	Involvement of large private and institutional land holders	Large private landholders embrace citywide goals and objectives through specific asset management plans.	Generally uninformed or ignorance of issues.	Educational materials and technical assistance available to landholders.	Clear goals for treed assets by landholders. Incentives for preservation of private trees.	Landholders develop comprehensive tree management plans (including funding) with active community engagement and access to the property's forest resource.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
11.	Green industry cooperation	Green industry works together to advance municipality-wide urban forest goals and objectives, and adheres to high professional standards.	Little or no cooperation among segments of green industry or awareness of municipality-wide urban forest goals and objectives.	Some cooperation among green industry as well as general awareness and acceptance of municipality-wide goals and objectives.	Specific collaborative arrangements across segments of green industry in support of municipality-wide goals and objectives.	Shared vision, goals, and extensive committed partnerships in place. Solid adherence to high professional standards.
12.	Citizen involvement and neighbourhood action	At the neighbourhood level, citizens understand and collaborate with the City and / or non-government (NGO) partners in urban forest management plans.	Little or no citizen involvement or neighborhood action	Isolated or limited number of active neighbourhood groups engaged, but with little or no coordination by municipality or its partnering non-government partners.	Many number of active neighbourhood groups engaged, but with actions coordinated or led by municipality and/ or its partnering non-government partners.	Proactive outreach and coordination by City and non-government agency partners resulting in citywide coverage and interaction including neighbourhood stewardship strategies.
13.	General awareness of trees as a community resource	Stakeholders understand, appreciate and advocate for the role of the urban forest.	Trees seen as a problem, a drain on budgets.	Trees seen as important to the community.	Trees acknowledged as providing environmental, social and economic services.	Urban forest recognized as vital to the communities environmental, social and economic well-being.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
14.	Regional cooperation	Provide for cooperation and interaction among neighbouring municipalities and regional groups.	Municipalities and regional groups operate independently.	Municipalities and regional groups share similar policies and plans.	Wide-scale planning beyond municipal boundaries is in effect.	Regional planning, coordination and / or management plans.

Resource management approaches – plans, policies, practices, support and funding

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
15.	Tree inventory	Current and comprehensive inventory of the treed asset to direct its management. This includes age distribution, species mix, tree condition, and risk assessment.	No inventory.	Complete or sample based inventory of publicly owned trees.	Complete inventory of publicly owned trees AND sample-based inventory of privately owned trees that is guiding management decisions.	Systematic comprehensive inventory system of entire urban forest – with information tailored to users and supported by mapping in municipality-wide GIS system
16.	Canopy cover assessment and goals	High-resolution assessments of the existing and potential canopy cover for the entire community or at smaller management scales.	No assessment or goals.	Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery and limited or no goal setting.	Complete, detailed, and spatially explicit, high-resolution Urban Tree Canopy (UTC) assessment based on enhanced data (such as LiDAR) accompanied by comprehensive set of goals by land use and other parameters.	As described for "Good" rating – and all utilized effectively to drive urban forest policy and practice municipality-wide and at neighborhood or smaller management level.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
17.	City-wide management plan	Develop and implement an adaptive, comprehensive urban forest management plan for private and public property.	No plan.	Existing plan limited in scope and implementation.	Comprehensive plan for publicly owned intensively and extensively managed forest assets accepted and implemented.	Strategic multi-tiered plan for public and private intensively- and extensively-managed forest assets accepted and implemented with adaptive management mechanisms.
18.	Municipality-wide funding	Develop and maintain adequate funding to implement a citywide urban forest management plan.	Little or no dedicated funding.	Funding only for emergency, reactive management.	Funding sufficient for some proactive management based on urban forest management plan.	Sustained funding from public and private sources to support implantation of proactive comprehensive urban forest management plan.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
19.	Municipal Urban Forestry Program Capacity	Maintain sufficient well-trained personnel and equipment – whether, in-house or through contracted or volunteer services – to implement municipality-wide urban forest management plan.	No staff.	Team limited by lack of trained staff and/or access to adequate equipment.	Qualified team able to implement many of the goals and objectives of the urban forest management plan.	Team able to implement all of the goals and objectives of the urban forest management plan.
20.	Tree establishment planning and implementation	Urban forest renewal ensured through a comprehensive tree establishment program driven by goals such as canopy cover, species diversity, and species distribution.	Little or no tree planting or tree establishment is ad-hoc.	Some tree planting and establishment occurs with post planting care, but with limited overall municipality-wide planning.	Tree planting plan is guided by municipality-wide goals	A comprehensive tree establishment plan guided by needs derived from canopy and other assessments, maintains species and age diversity, includes both planting and young tree care, and is sufficient to make progress toward canopy cover objectives.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
21.	Tree habitat suitability	All publicly owned trees planted in habitats that will maximize current and future benefits provided to the site.	Trees planted without consideration of site conditions.	Appropriate tree species are considered in site selection.	Municipality-wide guidelines in place for the improvement of planting site conditions and selection of suitable species.	All trees planted in sites with adequate soil quality and quantity, and with sufficient growing space and overall site conditions to achieve their genetic potential and thus provide maximum ecosystem services.
22.	Maintenance of city-owned, intensively managed trees	All city-owned trees maintained to maximize current and future benefits. Tree health and condition ensure maximum longevity.	No maintenance of City-owned trees, or on a reactive basis only.	City-owned trees are maintained on a request/reactive basis and receive periodic inspection and maintenance.	All city-owned trees systematically inspected and proactively maintained on a cycle longer than five years.	All mature city-owned trees maintained on a proactive 7-year cycle. All immature trees structurally pruned. Reactive maintenance time 3-6 months.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
23.	Tree risk management	Fully implemented, comprehensive tree risk management program, according to ANSI A300 (Part 9) "Tree Risk Assessment" standards, and supporting industry best management practices.	No tree risk assessment or remediation program. Request based/reactive system.	Level I (limited visual assessment) inspection and follow-up conducted periodically. Request based or reactive risk abatement program system.	Level II (basic assessment) conducted periodically, resulting in scheduled follow-ups.	Level II (basic assessment) conducted routinely, according to defined cycle and intensive follow-up (i.e., priorities and timelines for mitigation established based on the characterization of risk).
24.	Tree protection policy development and enforcement	The benefits derived from trees on public and private land ensured by the enforcement of municipality wide policies, including tree care "best management practices."	Tree protection policies do not exist.	Policies or tools in place to protect public trees and employ best management practices, but inconsistently enforced.	Policies or tools and practices in place to protect public and private trees, generally enforced.	Integrated municipal wide policies that ensure the protection of trees on public and private land consistently enforced and supported by significant deterrents.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
25.	City-owned natural areas management, planning and implementation (new for second phase plan)	The ecological structure and function of all city-owned natural areas protected and, where appropriate, enhanced.	No natural area management plans or implementation in effect.	Reactionary management in effect to facilitate public use (e.g. hazard abatement, trail maintenance, etc.)	Management plan in place for each publicly owned natural area to facilitate appropriate public use.	Management plan in effect for each publicly owned natural area focused on sustaining the ecological structure and function of the feature – where facilitating appropriate public use.
26.	Environmental justice and equity (new for second phase plan)	Ensure that the benefits of urban forests made available to all, especially to those in greatest need of tree benefits.	Tree planting and outreach not determined equitably by canopy cover or need for benefits.	Planting and outreach includes attention to low canopy neighborhoods or areas.	Planting and outreach targets neighborhoods with low canopy and a high need for tree benefits.	Equitable planting and outreach at the neighborhood level guided by strong citizen engagement in those low-canopy/high-need areas.

Criteria number	Criteria	Key objective	Low performance	Moderate performance	Good performance	Optimal performance
27.	Native vegetation	Preservation and enhancement of local natural biodiversity maintain the biological integrity of native remnant forests and maintain wildlife corridors to and from the city.	No coordinated focus on native vegetation.	Voluntary use of native species on publicly and privately- owned lands; invasive species are recognized.	The use of native species is encouraged on a project appropriate basis in both intensively and extensively managed areas; invasive species are recognized and their use is discouraged.	The use of native species is required on a Native species are widely used on a project-appropriate basis in all areas; invasive species are proactively managed for eradication to the full extent possible.

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Appendix C: Urban Forest Management Plan survey analysis

Survey report

City of Guelph

Urban forest management plan survey

Parks Operations and Forestry, January 2020

Background

The City is preparing to report on the implementation of the first phase of the 2012 approved strategic Urban Forest Management Plan (UFMP) and developing the next phase of the plan.

The original development of the UFMP's framework in 2007 addressed community priorities identified through a series of workshops as well as initiatives in City plans that were supportive of urban forest resources and natural heritage assets such as the Official Plan (2002), Natural Heritage Strategy (2006), Smart Guelph (2003), Environmental Action Plan (2003) and Strategic Plan (2006).

Since then, updated and new City plans, bylaws and policy, such as Guelph's updated Official Plan (2018) and Strategic Plan (2019), have recognized the urban forest as "green infrastructure" as well as continued to support the importance of protecting and enhancing the urban forest and associated benefits.

An online survey was completed between December 12, 2019 and January 8, 2020, using Guelph's "Have your say" online community engagement site. The survey was made available to the public but was also emailed directly to over 140 key stakeholders including city council and executive team, City of Guelph staff, developers, consultants, green industry contractors, members of the building community, forestry and arboriculture professionals, landscapers, non-profit organizations and environmental interest groups. The purpose of the survey was to gain insight about the community's:

- Awareness of the City's 20-year strategic UFMP;
- Support and opinions of the vision of the UFMP;
- Opinions on the City's progress to meet goals to support the vision;
- Opinions on the strategic direction and priorities of the UFMP;
- Opinions on continued investment in the urban forest; and
- Engagement or involvement in UFMP initiatives.

The survey is just one part of the City's approach to adaptive management, which uses a systematic, practical approach to improving resource management policies and practices.

A total of 170 people from across the City completed the survey.

The results of the survey suggest that overall the respondents agree with the current vision of the UFMP and the City's management approaches and are supportive of the UFMP vision, strategic goals, ongoing initiatives and long-term investment in the urban forest.

Key findings

Most respondents are aware of the UFMP and agree with the vision

- Sixty-seven per cent know that the City has an approved urban forest management plan; and
- Sixty-two per cent agree with the plan's vision.

Respondents believe that the City needs to do more to meet the vision

- Only 7 per cent strongly feel that we meeting the vision; with most specifically saying that the we need to plant more trees and protect and preserve more trees and woodlands; and
- Sixteen per cent do not know if the City is doing enough to meet the vision.

Respondents agree that the City should continue to implement UFMP actions and invest in the urban forest

Ninety-six per cent support in the long-term investment in the urban forest; and

Eighty-nine per cent agree that there are benefits of in continuing current initiatives and actions as well as prioritizing new initiatives and actions; most importantly the implementation of a proactive monitoring and maintenance program, development of a tree planting strategy and building community partnerships.

Survey results

UFMP vision and strategic goals

The guiding vision and strategic goals were developed with consideration for the approved Framework for Guelph's Strategic Urban Forest Management Plan (2007), Guelph's environmental and land use context, and input from City staff, various stakeholders and the community. The vision statement reflects the desired outcomes of the successful implementation of this Plan, while the strategic goals are intended to guide the implementation of this Plan over the 20-year planning period (2013 to 2032).

The following questions relate to the current vision and strategic goals.

Q1

Question: Do you know that the City has a Council-approved urban forest management plan?

- sixty-seven per cent of respondents are aware that the City has a Council approved urban forest management plan

Q2

Question: Do you agree with the urban forest management plan's vision?

The vision statement:

The City of Guelph will foster the health and sustainability of its community by increasing its urban forest cover. Continually pursuing and promoting the implementation of best practices for tree protection, tree establishment and tree maintenance will provide a range of environmental, economic and health benefits for residents, and habitat for a diversity of plant and animal species. By setting an example on its own lands and supporting expanded local stewardship, the City will enjoy and sustain its urban forest for the long- term.
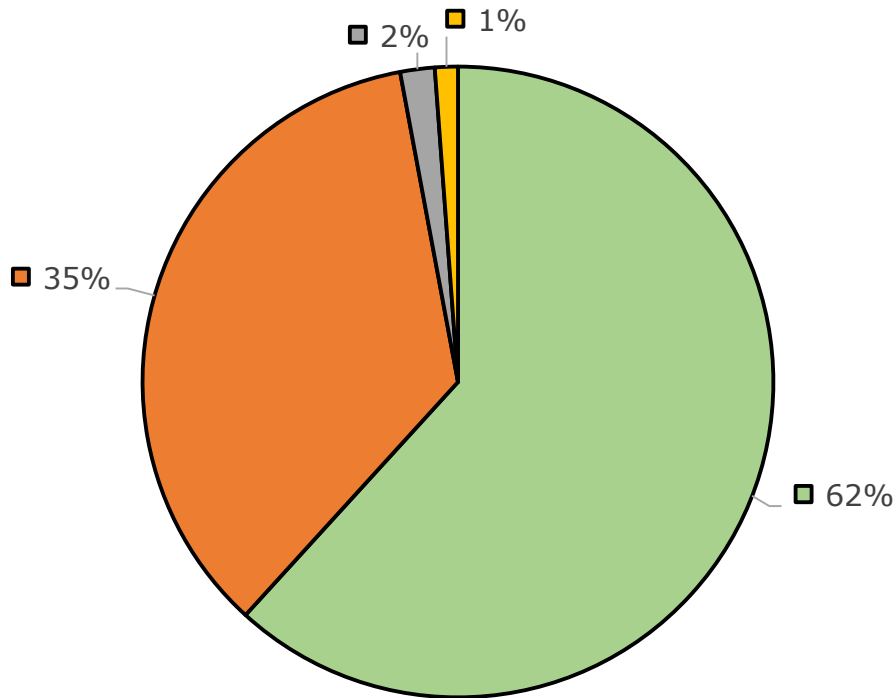
Figure 1: Question 2, level of agreement with current vision of the UFMP

Ninety-seven per cent agree with the vision statement (of those, 62 per cent strongly agree)

Q3

Question: Do you have any further thoughts on the vision statement?

Comments received about the vision statement spoke more to the strength, or lack there-of, of the vision than the wording, although a few did suggest it is too wordy. In response to the vision statement, respondents would like to see prioritization of stronger regulations for the protection of trees during development and increasing diversity of trees planted across the City. Although the vision statement is based on the 3 pillars of good urban forest management - enhance, protect, engage - comments reflect more the concerns of respondents for the City's lack ability to achieve the vision rather than having issue with the statement itself.

Q4

Question: How well do you think the City is doing in meeting this vision? Tell us how much you agree with the following statements:
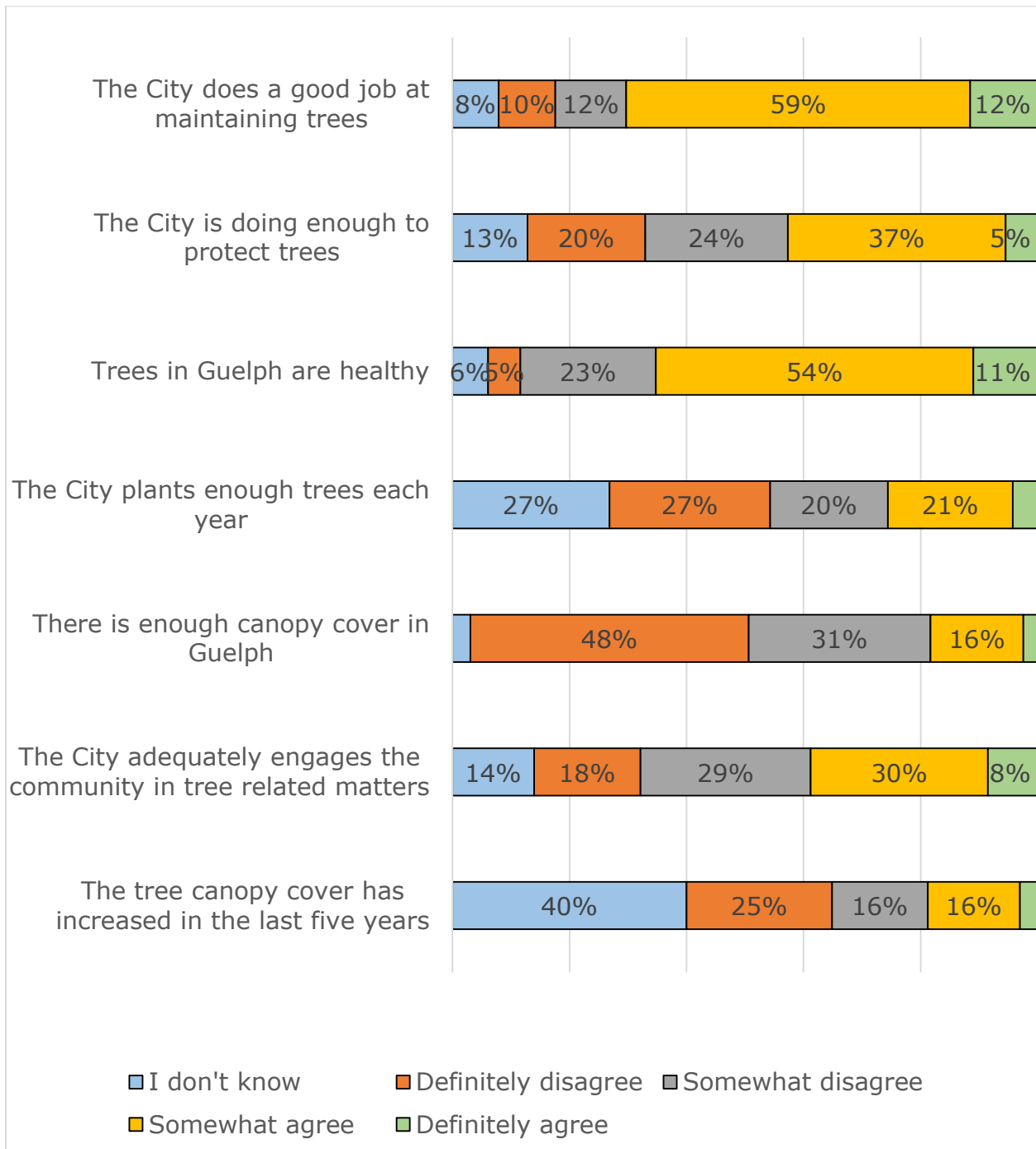
Figure 2: Question 4, how well do you think the City is doing in meeting the vision?

While there is some agreement that the City has achieved some progress in meeting the vision of the UFMP it is apparent that many respondents do not feel that the City has done enough with respect to tree planting, engaging the community and tree protection. Most concerning is that 40 per cent of respondents do not have sufficient knowledge of the City's progress; knowing if the tree canopy has increased in the last 5 years or if we have planted enough trees.
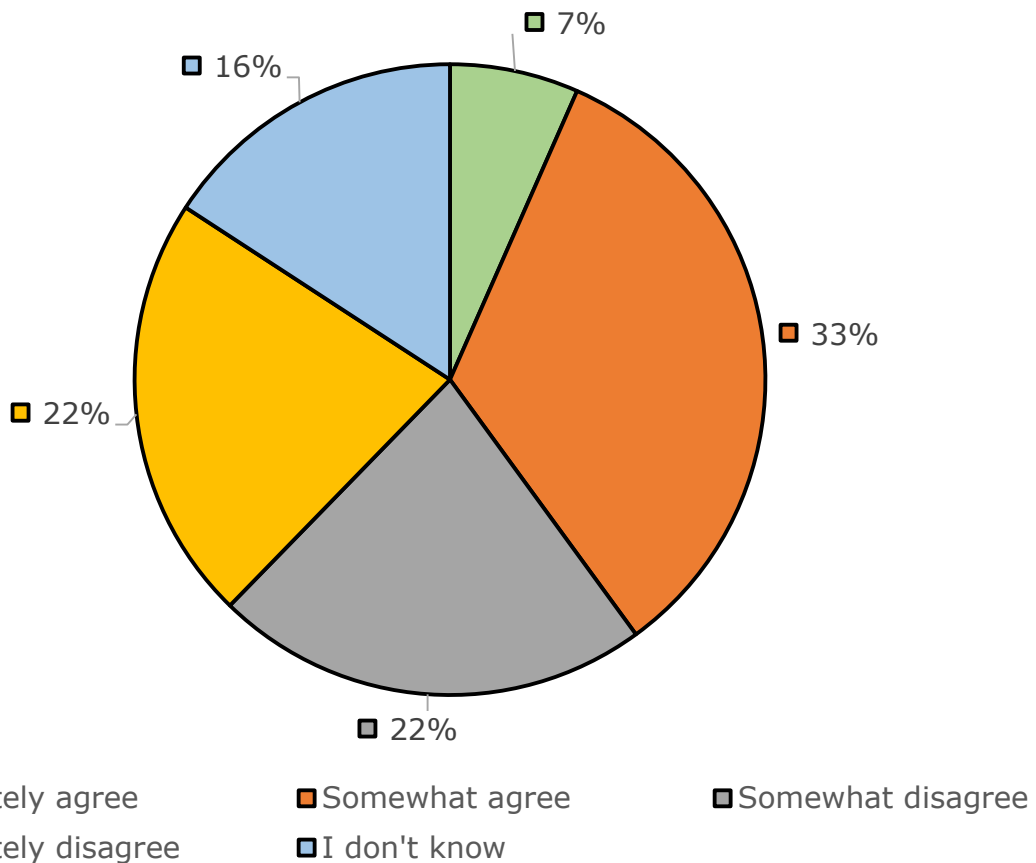
Figure 3: Cumulative responses for Q4

- Only about half of respondents somewhat feel that we are achieving the vision. These results are concerning;
- Only 7 per cent feel that overall we are meeting the vision;
- Twelve (12) per cent of respondents definitely do not agree that there is enough canopy cover in Guelph; and
- Only 20 per cent of respondents definitely agree that the City does a good job at maintaining trees, while 59 per cent only somewhat agree with that statement.

Q5

Question: The following are Council-approved strategic goals listed in the Urban Forest Management Plan. Please tell us the degree to which you support the strategic goal as a way to meet our vision for Guelph's urban forest cover?

Strategic Goals:

A. Improve knowledge of the City's urban forest assets through a more comprehensive inventory program.
B. Monitor and review the status of the City's urban forest management every five years using established criteria and indicators, and revise planning and

practices as required to ensure ongoing progress towards realizing the vision.

C. Foster a "tree-friendly" culture among City staff through interdepartmental coordination on tree issues and sharing of ideas and best practices for tree protection, maintenance and planting.

D. Foster a "tree-friendly" culture in the community through exemplary programs and activities on municipal lands, sharing best practices and techniques, and providing support and incentives for tree protection, maintenance and planting on private lands.

E. Prioritize protection of mature, healthy trees and preservation of older large-canopied species to the greatest extent possible.

F. Explore transition towards proactive tree establishment and replacement whereby all potential plantable spots in the City.

G. Explore the use of new technologies in selected areas for integration of trees in hardscapes such as downtown and parking lots.

H. Move towards proactive tree risk assessment and Plant Health Care practices on municipal lands, and reduce the need for emergency responses.

I. Improve the resilience of the urban forest to current and anticipated stressors, including climate change, by implementing policies and management practices that optimize tree species diversity, structure and age classes.

J. Build on existing initiatives, and expand partnerships and funding related to urban forest initiatives on private lands, including building partnerships with local industries and businesses.
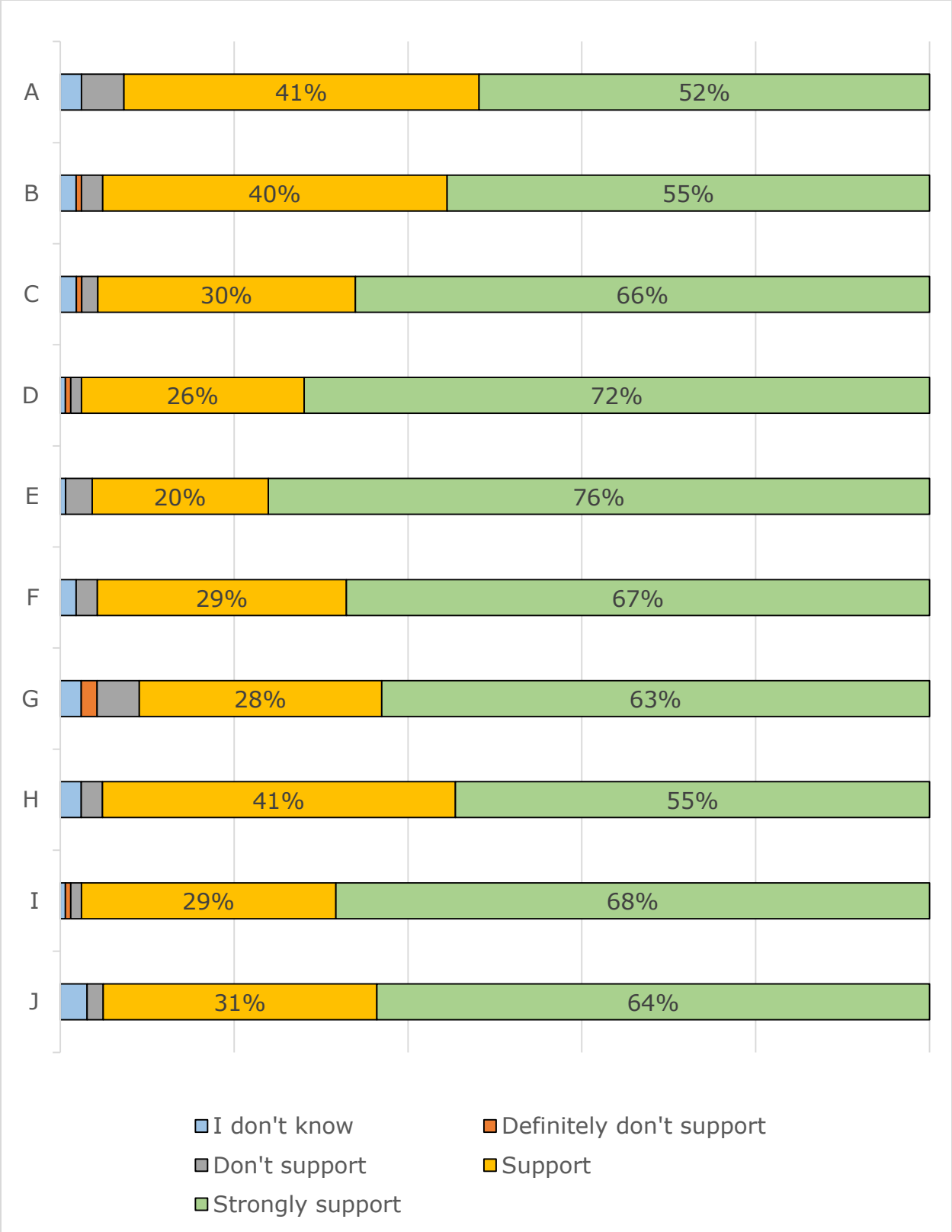
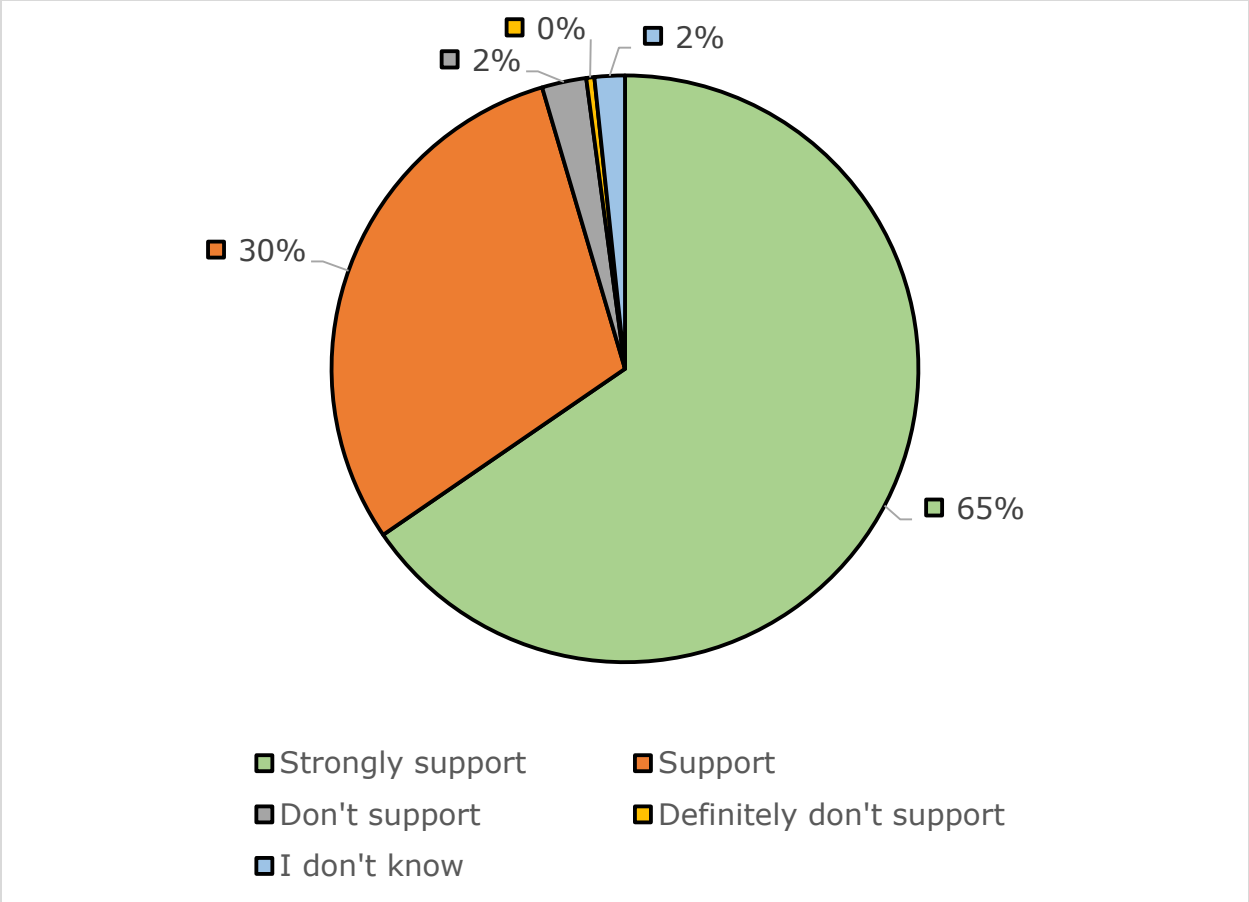Figure 4: Level of support for strategic goals

Figure 5: Cumulative responses for questions 6-10

Strong support for the strategic goals in the UFMP suggests that respondents are of the opinion that the goals are the pathway to enhancing and protecting the urban forest and fostering engagement of the community.

UFMP priority actions and initiatives

Q6-10

Question: Do you agree that there is benefit in:

Maintaining ongoing initiatives and actions such as:

- The removal of invasive buckthorn from forested natural areas
- The emerald ash borer plan

Enhancing preservation and protection of trees through a review of tree-related policies such as:

- The current private tree bylaw
- A potential future public tree bylaw
- The Technical Tree Manual

Increasing tree canopy cover (and urban forest health) by:

- Developing a city-wide tree planting strategy and planting more trees

- Increasing the health and resilience of existing trees by implementing a proactive monitoring and maintenance program

Increasing communication and collaboration by:

- Developing and implementing a long-term communication plan
- Continuing to build community partnerships

Monitoring our progress to deliver a "state of the urban forest" report after each five-year plan by:

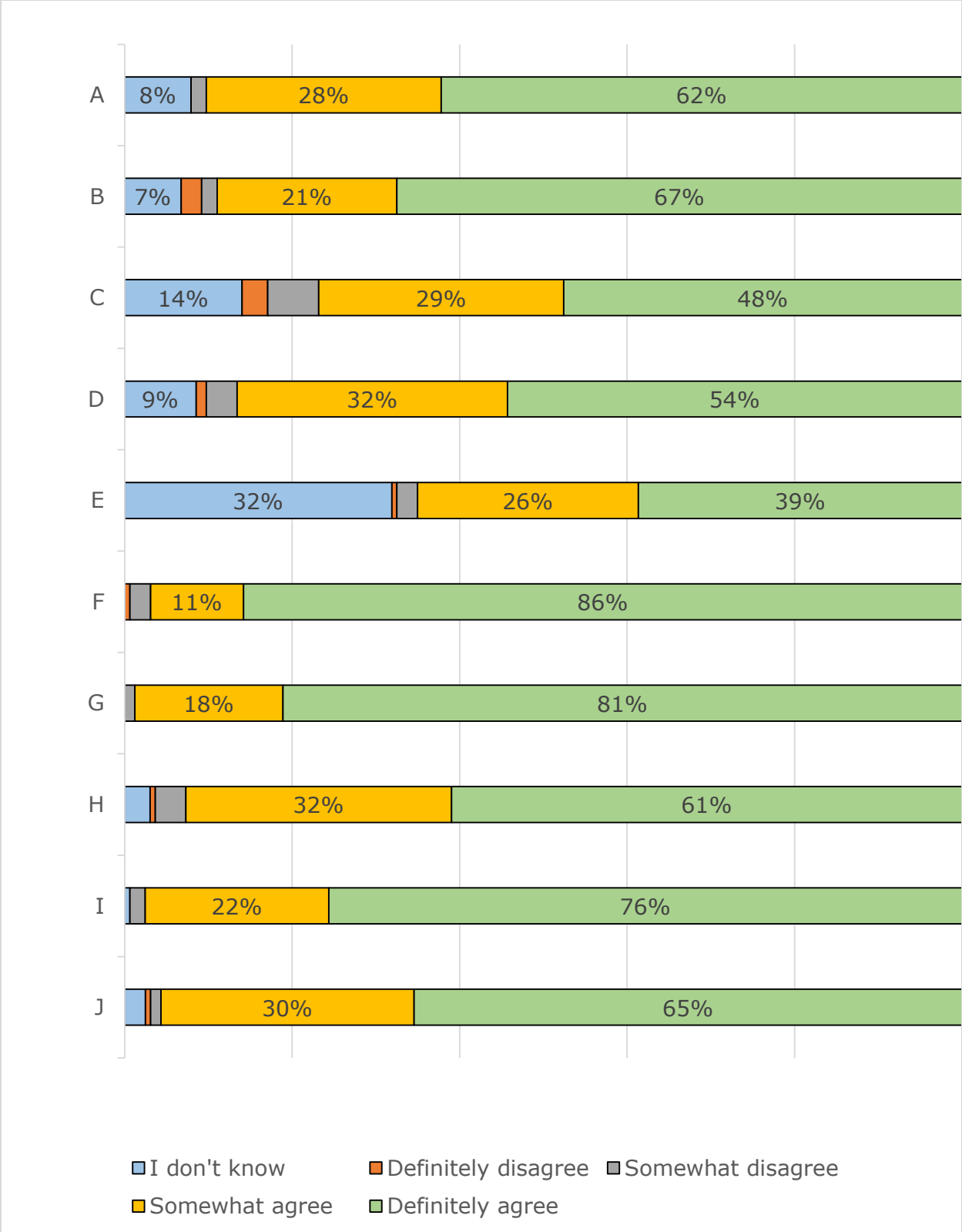- Monitoring our progress to deliver a "state of the forest" report after each five-year plan

Figure 6: Questions 6-10, level of agreement in benefits of priorities, initiatives and actions

Respondents are of the opinion that the top three most beneficial actions are:

- Developing a city-wide tree planting strategy and planting more trees;
- Increasing the health and resilience of existing trees by implementing a proactive monitoring and maintenance program; and
- Continuing to build community partnerships.

Thirty-two per cent are unsure if the Tree Technical Manual will be effective.

Q11

Question: Is there anything you would add as a priority over the next 5 years?

Questions 11, 12, 13 and 15 elicited very similar comments. The comment themes were combined for all three questions. Respondents think increasing canopy, protection of trees, monitoring progress, good planning, increasing resilience and implementing best practice are top priorities. Comments aligned with the strategic goals of the UFMP and recommended prioritized actions for the 2019-2023 plan. Tthe themes of comments – ranked highest to lowest – across all key areas of the UFMP:

- Management and monitoring;
- Legislation, policies and guidelines;
- Protection, establishment and enhancement; and
- Outreach, stewardship and partnerships.

Q12

Question: Do you have any further comments about the prioritized action for the next five-years of the urban forest management plan?

See Question 11

Q13

Question: Is there anything you would add as a priority over the next 5 years?

See Question 11

Funding the long-term vision

Q14

The urban forest management plan requires financial resources that has budget impacts. This is a multi-million dollar plan that spans 20-years. This investment has long-term benefits well past the 20-year plan. Do you agree that Council continue to financially support this plan?
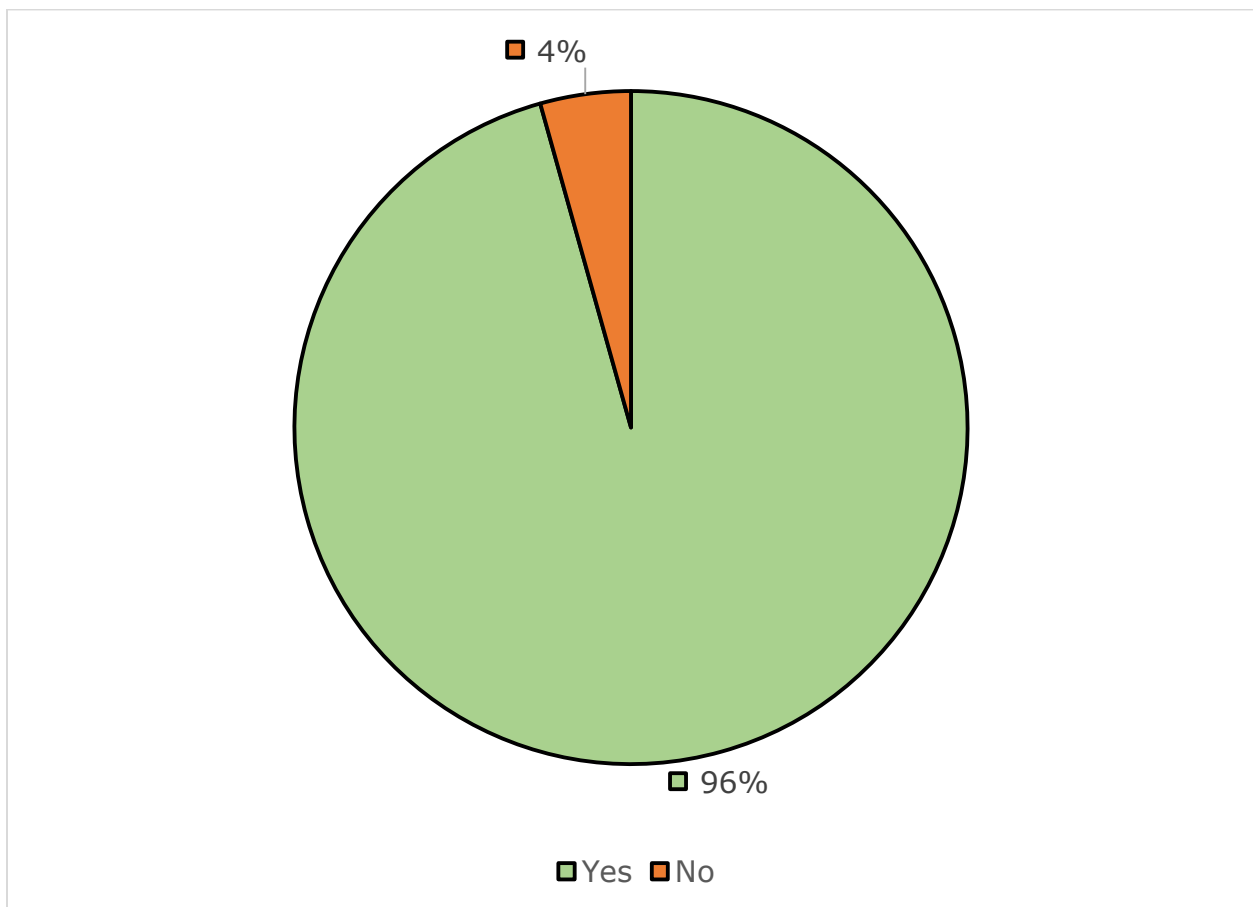

Figure 8: Question 14, should Council invest in the urban forest long-term?

An overwhelming majority (96 per cent) of respondents agree that Council should continue to support the long-term investment in the urban forest.

General comments and feedback

Q15

Question: Do you have any other comments for us?

Refer to question 11

Getting to know survey participants
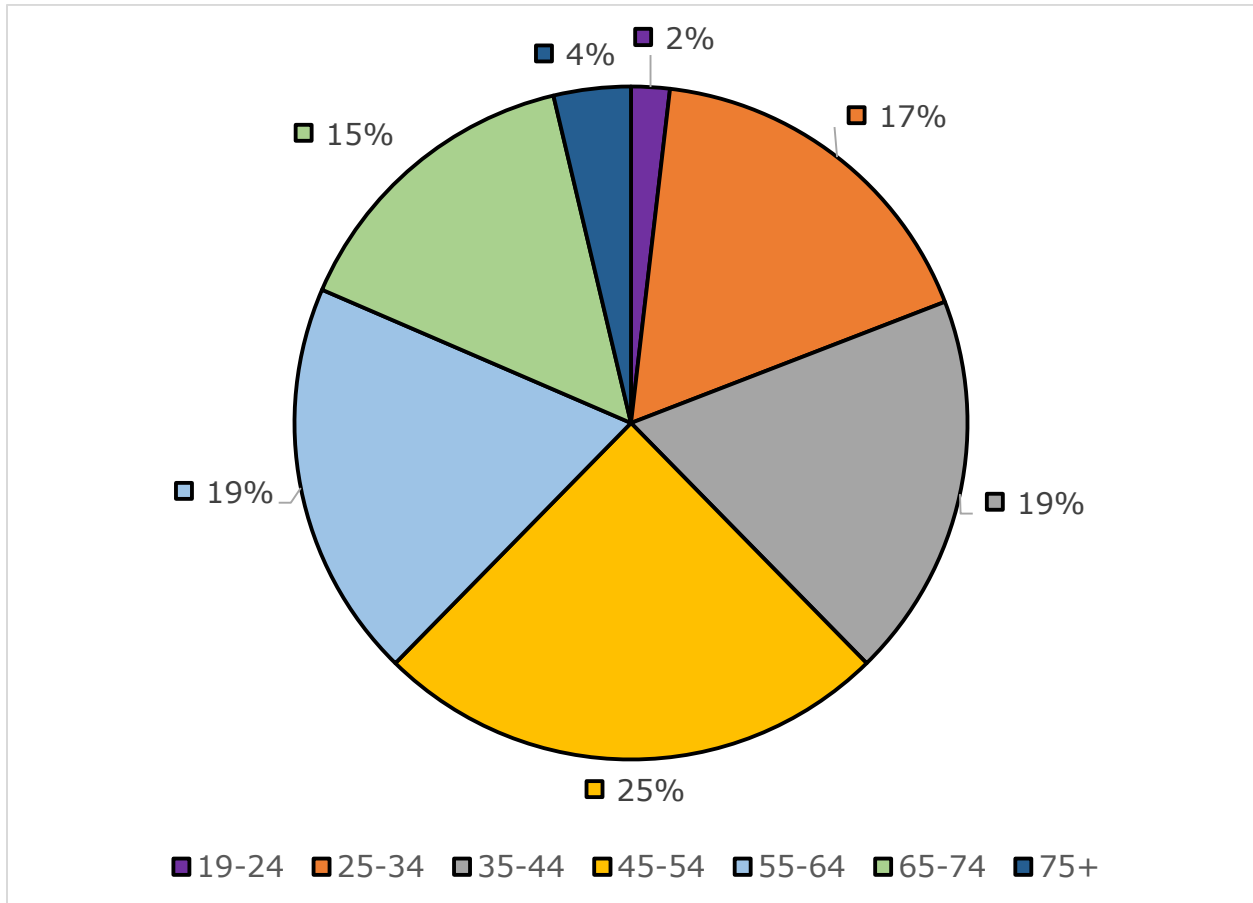
Q16

Question: What is your age range?

Figure 9: Age range of survey participants

The survey participants evenly spread across a wide range of age groups with no gaps in any one specific range.

Q17

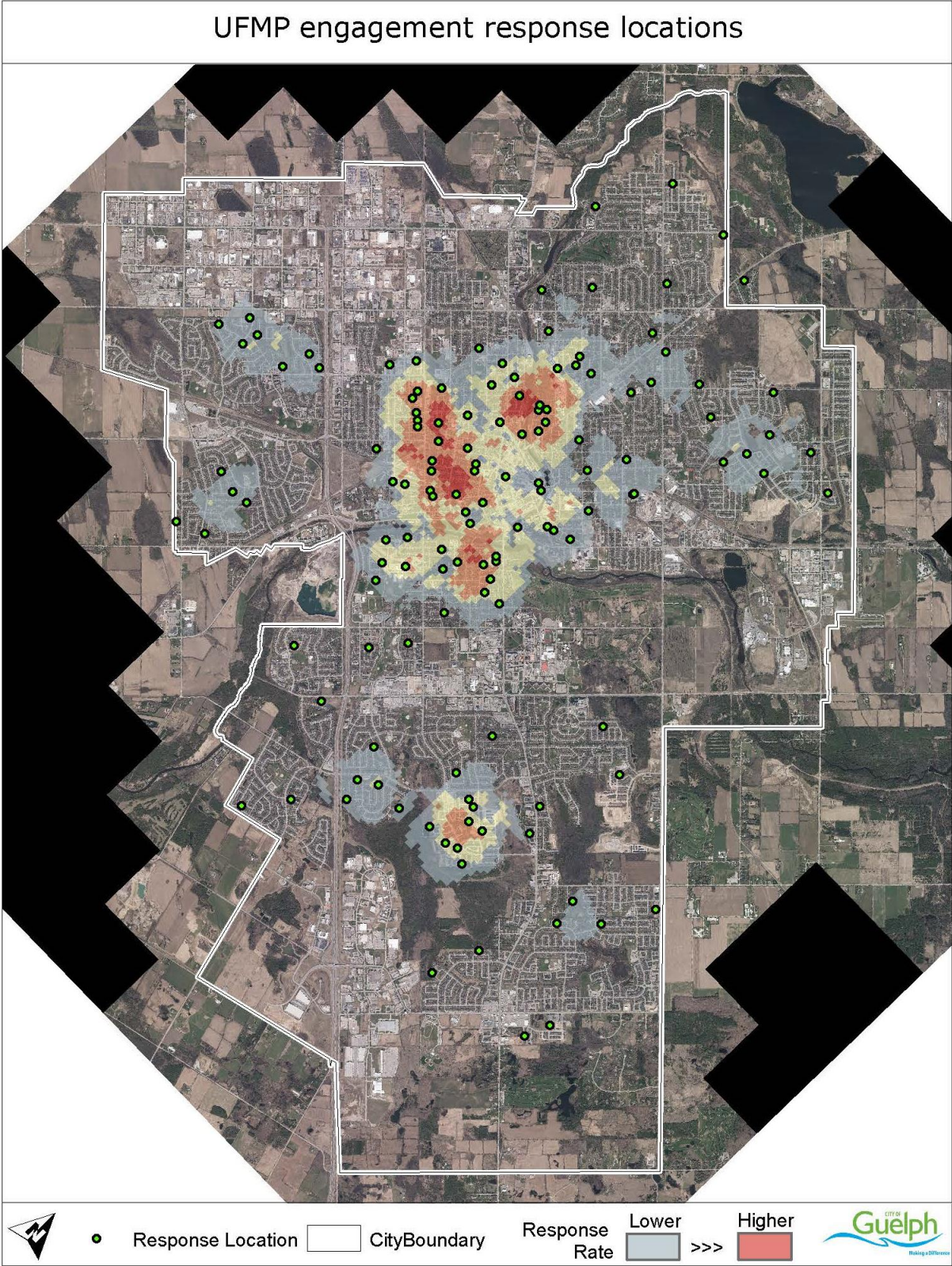Question: What is your postal code?

Figure 10: Survey response rates by postal code

Urban forest engagement and stewardship

Q18

Question: Have you participated or been involved in any activities that support healthy trees in Guelph?
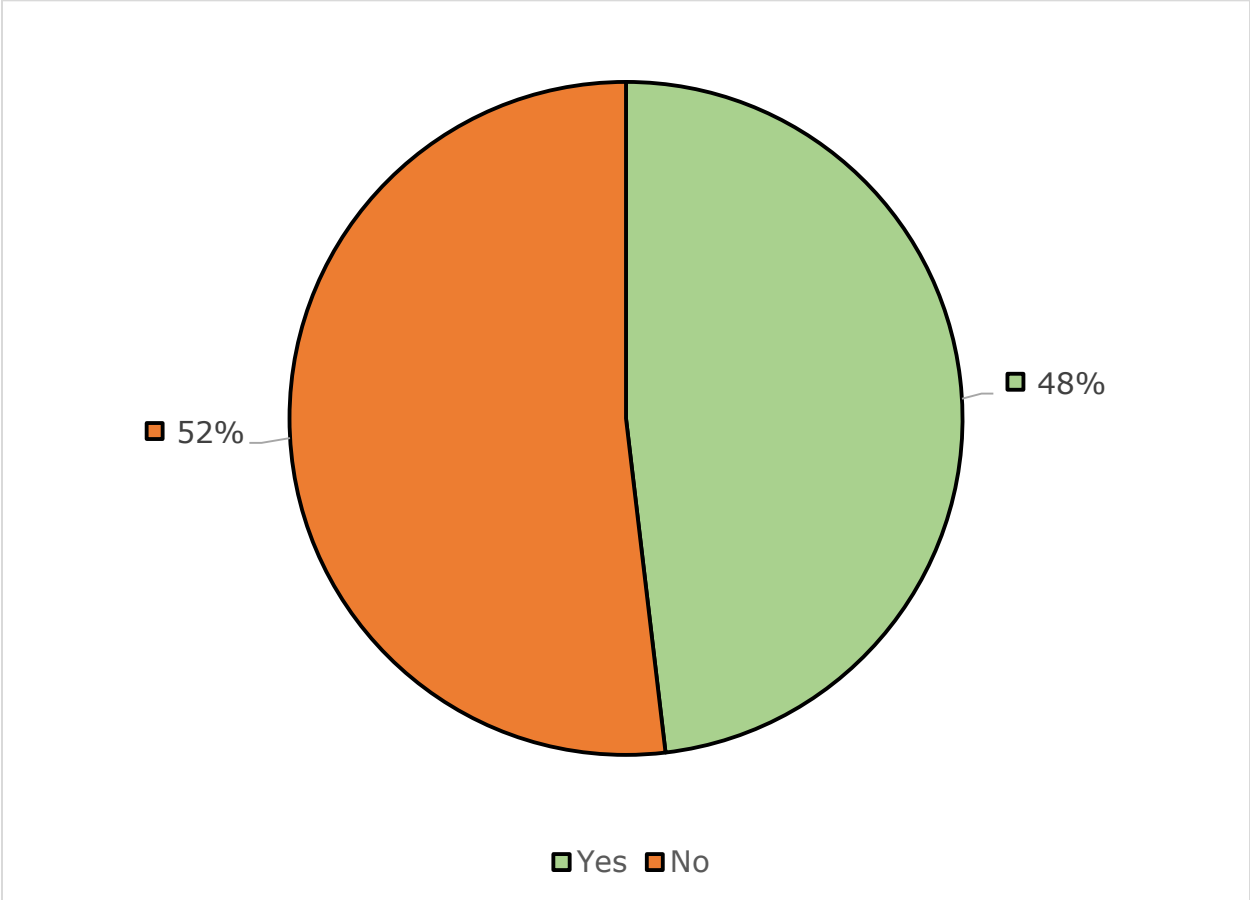

Figure 11: Question 18, per cent participation in activities that support healthy trees

Q19

Question: What were you involved in?

Most respondents listed tree planting as the top activity with 67 per cent of respondents taking part in a variety of tree planting and related activities led by the City, led by non-profit groups, on personal property or other. Other tree related activities included involvement or activities related to:

- Tree planting;
- Buckthorn removal;
- Urban forest advocacy/activism;
- Development application process;
- Tree related professional;
- Policy, plans and guidelines; and
- Environmental clean-up events.

Discussion

The survey results indicate a general agreement of the UFMP's vision, support of strategic goals, support for continuing priorities and long-term funding. The respondents would like to see more tree planting, tree protection and overall better planning of development to protect the integrity of natural areas including all natural heritage features, not just trees.

An overwhelming majority (89 per cent) of respondents agree that there are benefits to sustainably managing the urban forest through enhancing tree protection policies, increasing canopy cover, communicating effectively, collaborating with partners and the community and monitoring our process to make adjustments in our management approaches.

Results of question four indicate there is limited information on the state of the urban forest and awareness of the implementation of the UFMP regardless of annual reports to Council and various communications initiatives and that the UFMP has not yet resulted in significant progress towards achieving the vision.

Key themes of UFMP survey are as follows:

- Increase tree canopy cover through robust compensation requirements for development, providing incentives for tree planting and maintenance on private property, planting more trees;
- Increase the protection and resilience of the urban forest (individual trees and woodlands) through effective tree related policies, enhanced and enforceable regulations, standards and guidelines across all agencies;
- Proactively implement best practice management approaches for tree planting, maintenance and protection; and
- Increase communication and engagement to increase awareness of the state of urban forest and encourage action with measurable results.

These priority themes of protecting our natural heritage as part of complete healthy communities are reoccurring across both tree and non-tree related consultations. For example, the current results align with community engagement results from the original UFMP framework (2009), Clair-Maltby secondary plan (2018), Community plan (2019) and the NHAP (2018).

Overall, the results of the survey suggest that overall the respondents agree with the current vision of the UFMP and the City's management approaches and are supportive of the UFMP vision, strategic goals, ongoing initiatives and long-term investment in the urban forest. The results indicate that the UFMP recommendations still align with the priorities and needs of the community. However, most priority recommendations – protect, maintain and increase canopy cover - were not completed or started in the first phase of the plan. This survey will be used in the development of priorities in the second phase of the UFMP.