URBAN FOREST
Management Plan
2020-2040

Richmond Hill

ACKNOWLEDGEMENTS

We would like to thank Richmond Hill residents, other stakeholders and City Staff who provided helpful input, knowledge and advice as we developed this plan. The hard work and contributions of the project team were particularly valuable:

- Natural Environment Section, City of Richmond Hill, project lead
- Parks Operations Section, City of Richmond Hill
- Park and Natural Heritage Planning Section, City of Richmond Hill
- Natural Heritage and Forestry Division, York Region
- Toronto and Region Conservation Authority

For technical expertise and providing direction for the plan, we would like to thank Urban Forest Innovations Inc. with support from Beacon Environmental Limited and PlanIT Geo. Special thanks also go to Coutts & King Inc. for writing and editorial services, Céline Parisien for art direction and graphic design, and Daniel Cullen and Ash O'Malley for photography.

TABLE OF CONTENTS

1. THE VALUE OF AN URBAN FOREST

A natural solution to many urban challenges

Forward-thinking communities around the world recognize the value of a healthy, thriving urban forest.

> Urban forests do more than beautify the scenery. They represent an important investment in environmental condition, human health and the overall quality of life.
>
> *— TD Economics special report*

Trees offer a natural solution to many of the challenges that urban areas face: they clean the air and absorb stormwater run-off, moderate extreme heat and cold, help mitigate climate change, and make communities more attractive and livable.

What's more, a tree is the only municipal asset that increases in value and provides greater service as it ages. This means that the economic benefits gained from urban forests far outweigh the investment costs.

Continuing Richmond Hill's leadership in urban forest management will be vital as the City experiences unprecedented growth and urbanization over the next two decades. This plan describes how Richmond Hill will manage its urban forest cost effectively and ensure the City's growing population enjoys the maximum services possible.

The actions outlined in this plan support the following vision for 2040:

> "Richmond Hill and its urban forest grow and thrive together, each contributing to the health and vitality of the other."

Richmond Hill's Comprehensive Urban Forest Management

- Richmond Hill has effective tree protection by-laws, protecting trees with a trunk width of 20 cm (about 8 inches) or greater. This gives residents the flexibility to remove small trees and protects larger trees that are established, providing greater services.
- Richmond Hill was one of the first municipalities to include green infrastructure such as trees and woodlands into corporate asset management planning. This planning enables Richmond Hill to maximize the investment in trees by planning for their long-term growth and management.
- Richmond Hill's volunteer-based planting and care programs, such as the award-winning Community Stewardship Program and Healthy Yards Program, help to strengthen the urban forest on private and public lands, building a sense of community pride and ownership around Richmond Hill's urban forests.

What is the Urban Forest Management Plan?

Richmond Hill's Urban Forest Management Plan will guide the responsible management of all trees and their growing environments in the City over the next 20 years. Trees and woodlands are an essential component of our urban infrastructure, contributing to the high quality of life in Richmond Hill, for example:

- **Park trees** provide shade, wildlife habitat, and opportunities for creative play and recreation.
- **Street trees** in commercial and residential areas intercept stormwater to mitigate flooding, calm traffic, regulate extreme temperatures and make streetscapes more livable.
- **Trees around buildings** provide shading and cooling services in summer, act as windbreaks in winter, increase property values and visually enhance neighbourhoods.
- **Woodlands** absorb and clean stormwater, protect our valleylands from erosion, and offer opportunities for outdoor recreation, commuter trails, and shelter for birds and other wildlife.
- **Fruit trees/orchards** provide a source of healthy, locally grown food in addition to ecosystem services.

Trees offer a wealth of services

Trees and woodlands are part of what is called “green infrastructure,” – natural assets that provide many of the same services as traditional built (or “grey”) infrastructure, but typically less intrusively and at a lower cost. In an urban setting, trees provide a range of valuable services – potentially more than any other form of infrastructure.

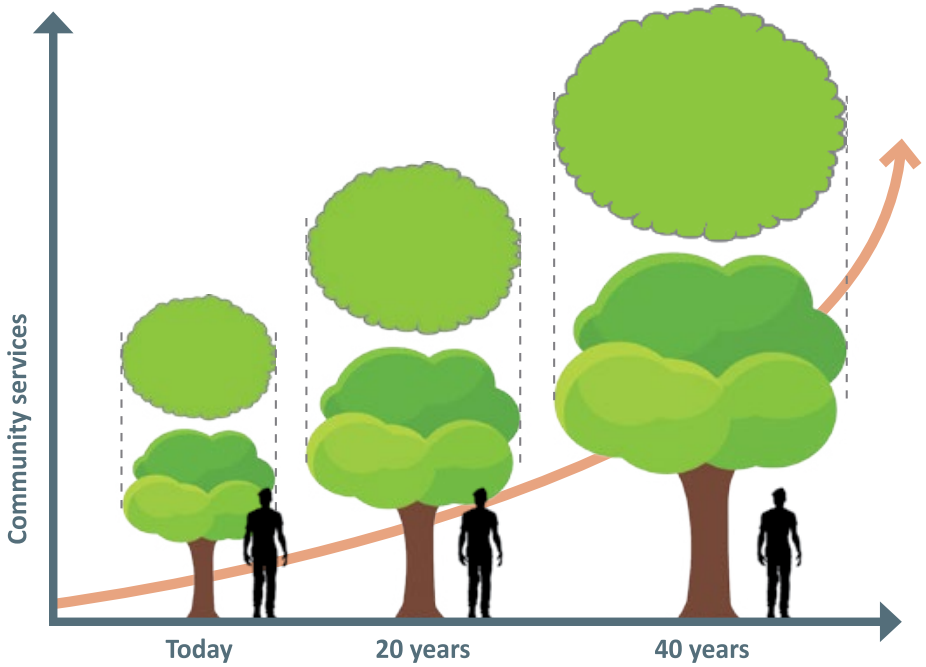
The services provided by a tree increase exponentially as it grows. A tree with a 30 cm wide trunk, for example, offers more than twice the services of a tree with a trunk half its width. This is because a tree’s total volume (trunk, branches and leaves) determines the services it provides, and explains why a central goal of urban forest management is to support the growth of large, mature trees.

A frequently used marker of a tree’s volume, and therefore services, is leaf area.

Tree size and leaf area

Trunk + branches + leaves = tree total volume

Larger trees have more leaves and provide more environmental, economic, community, and health services than smaller trees.



Trees services, valuable benefits

There are approximately 2,559,000 trees in Richmond Hill and the replacement value for all the trees is estimated to be $790 million.

Below are some of the environmental, economic, community and health services that trees provide:

Clean air

Richmond Hill's urban forest removes

180

tonnes of pollutants from the air every year — a service valued over $1.5 million.

Health and wellbeing

Trees and woodlands provide shade and cooling, reducing the impact of UV rays. They help improve mood and encourage physical activity.

Stronger communities

Treed spaces provide opportunities for people to interact, and urban forest stewardship activities promote community and a sense of ownership.

Fresh local food

Fruit trees provide fresh, local food to residents such as apples, pears, cherries, berries and nuts. One tree can produce over

45kg (100lbs)

of fruit each year!

Climate change

Urban forests help Richmond Hill mitigate climate change, removing over 1,700 tonnes of carbon every year — that's like taking

1,500

cars off the road!

Clean water and flood control

Trees absorb rainwater, slowing the movement of stormwater into drains and sewers, helping to protect water quality and reduce flash flooding.

Ecosystem connectivity and habitat

Urban natural areas provide nesting, refuge and forage sites for local and migratory wildlife, including rare, threatened and endangered species.

Protect Infrastructure

When appropriately sited, trees can reduce wear and tear on infrastructure, such as asphalt, by providing shade and shelter.

Economic activity

People stay longer and more frequently visit well-treed commercial areas.

Energy conservation

The shade and shelter provided by trees in Richmond Hill reduces annual energy demand for owners and tenants by 2500 MWH — a savings of over $550,000!

Canopy cover:

Canopy cover refers to the land area directly under the crowns of trees and shrubs. It includes woodland canopy and the canopy provided by trees and shrubs along streets, in parks, yards, cemeteries, on farms, around businesses, and in all other locations.

Woodland:

A woodland is a heavily treed area of at least 0.2 hectares (half an acre). Woodlands are biodiverse, complex ecosystems that provide recreational opportunities, storm-water management, and wildlife habitat. Unlike individual trees, woodlands are managed as a system and typically require far less resources per tree.

Policies support the urban forest

Support and strategic direction for this plan can be found in provincial statutes, City plans and other documents:

- **Municipal Act (2001)**: This Provincial legislation enables municipalities to regulate the destruction or injuring of trees, and amendments made in 2017 require municipalities to enact policy pertaining to "The manner in which the municipality will protect and enhance the tree canopy and natural vegetation in the municipality."

- **Planning Act (1990)**: This provincial legislation guides land use planning and empowers municipalities to regulate development. In the case of Richmond Hill, for example, new development must replace and/or include green infrastructure such as trees and shrubs.

- **York Region Official Plan (2010)**: This statutory planning document provides planning direction for all of York Region. Among numerous environmental management and protection policies, this plan requires that all local municipalities "shall develop an Urban Forest Management Plan" (Sec. 2.2.50), and establishes a woodland cover target of at least 25% for the region.

- **York Region Forest Management Plan (2016)**: This plan recommends long-term canopy cover and woodland cover targets for the entire region and local municipalities, including Richmond Hill. Targets for Richmond Hill include 14-15% woodland cover and 26-35% total canopy cover by 2051. It also outlines strategic goals and actions for forest management in York Region.

- **Richmond Hill Strategic Plan (2009) and related guiding documents**: This plan outlines four

high-level strategic goals for the community and establishes direction for improved environmental management, including increasing the urban tree canopy.

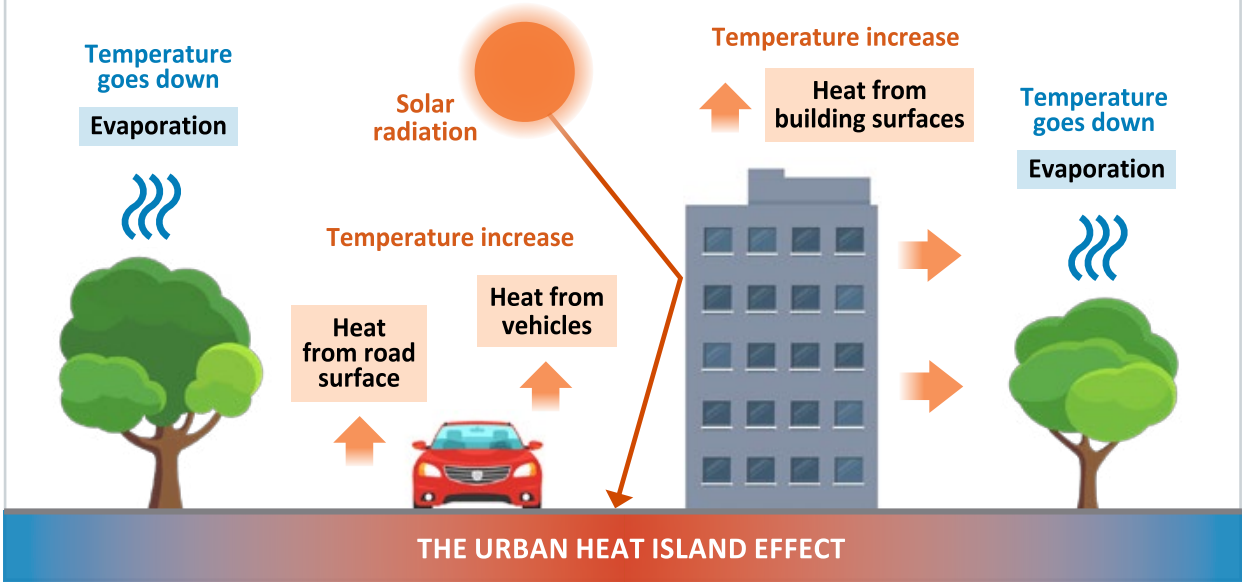
- **Richmond Hill Official Plan (2010) and supporting policy documents**: This statutory planning document outlines the City's land use vision and corresponding policies. It recognizes the important role of trees in improving air quality and reducing the urban *heat island effect*, and provides policy direction for tree and woodland protection and planting during land development. It also establishes a canopy cover target of 25%, promotes the use of native species, supports public engagement, and includes policies related to managing the urban forest, preserving mature trees, and planting trees as part of sustainable design.
- **Greening the Hill: Our Community, Our Future (Environment Strategy, 2014)**: The City's Environment Strategy provides a framework to achieve the vision of protecting, enhancing and restoring Richmond Hill's air, water, and land resources. Many of the strategic actions are aligned with and provide direction for sustainable urban forest management. The Environment Strategy includes developing an urban forest management plan as one of its actions.

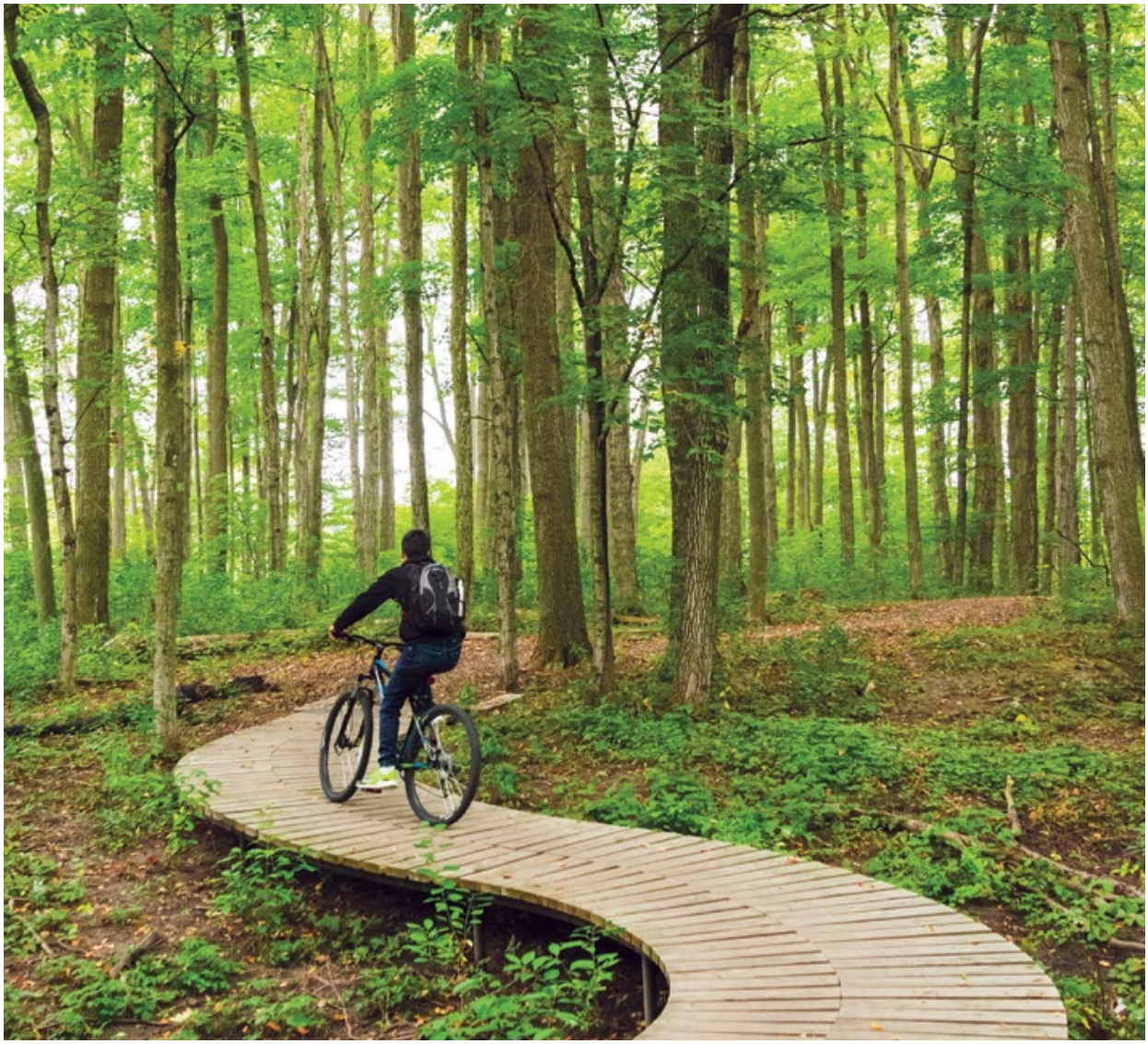
How this plan was developed

In developing this Urban Forest Management Plan, Richmond Hill staff worked with external stakeholders, consultants, and members of the community, whose knowledge, expertise and insights were extremely helpful.

The urban heat island effect:

Refers to the warming impacts of hard surfaces like brick and pavement, which can be up to 25° C hotter to the touch than shaded surfaces. These hard surfaces also radiate heat into the surrounding environment and raise the local air temperature. Shade and evapotranspiration from trees helps to counteract the urban heat island effect and can lower the air temperature by as much as 5° C.





Participants voiced their opinions about what matters most for the City's urban forest through workshops and an online survey, and identified issues that the plan could address. Frequently raised topics included:

- Recognizing the value of services provided by the urban forest and the greater level of service provided by older and larger trees.
- Promoting connections to nature and building awareness and engagement through education and outreach.
- Increasing urban forest diversity for greater resiliency.
- Being bold and innovative in urban forest management.

Stakeholders also provided insights into the urban forest's challenges and guided staff as they developed many of the actions included in this plan.

In developing the plan, City policies, practices and programs were reviewed, urban forest data was collected and analyzed, and accepted best practices were researched and gathered to provide concrete examples. Preparation also included a City-wide assessment of existing urban forest canopy cover and a look at areas not currently treed that have the potential for planting.

2. THE URBAN FOREST TODAY

This chapter describes how trees and woodlands in Richmond Hill have evolved into today's urban forest, and how the urban forest's current condition and challenges helped shape this 20-year plan.

The chapter draws heavily on the findings of a comprehensive study of Richmond Hill's urban forest undertaken in 2010 in partnership with the Toronto and Region Conservation Authority and York Region. The study looked at the urban forest on City-owned land, as well as trees on private lands and in natural areas.

One important caveat since the completion of the study relates to the emerald ash borer, an invasive insect that has severely damaged the ash tree population. While this change means that some metrics are out of date, such as the abundance of the ash tree population, the general findings of the 2010 study still hold true.

This chapter also reflects the City's 2016 canopy cover assessment (which includes all private and public trees), and the City's tree inventory (which lists all street trees and many trees planted in City parks and around municipal facilities).

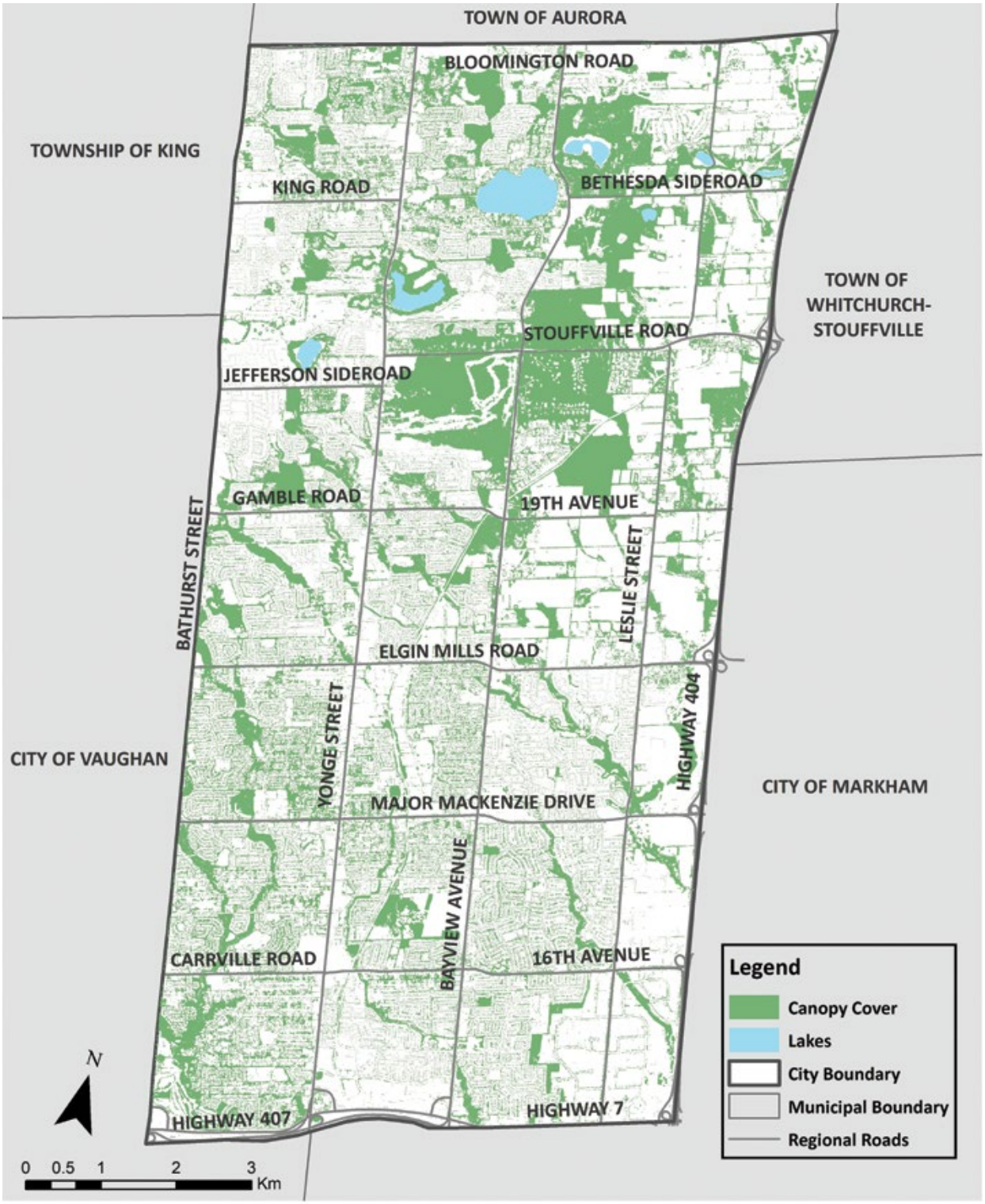
Trees have regrown after clearing, but not evenly

Like much of southern Ontario, the area that Richmond Hill now encompasses was once largely forested with a mix of trees, dominated by maple, oak and pine. With widespread European settlement starting in the late eighteenth century, as much as 90% of this original forest cover was cleared, primarily for agriculture.

Concerns about the impacts of widespread deforestation, starting in the late nineteenth century, led to efforts to encourage landowners to plant trees. It is also likely that some areas where farming was abandoned began to reforest naturally.

Restoration efforts were bolstered in the 1950s following Hurricane Hazel with the creation of conservation authorities, which are mandated to restore and maintain the natural functions of watersheds. Parts of the Humber, Rouge and Don River watersheds lie within the City's borders and are regulated by the Toronto and Region Conservation Authority.

City of Richmond Hill: Canopy Cover



Today, Richmond Hill's urban forest is made up of approximately 2.6 million trees, providing a canopy cover measured at roughly 29% across the City.

Distribution is uneven, however, with the greatest coverage in the largely rural northern half of the City. This includes the Oak Ridges Moraine, where most of the City's woodlands and natural areas are found. In the north, canopy cover is about 35% while in the more heavily populated south, canopy cover averages 23%. Canopy cover also varies greatly by land use:

- Canopy cover in residential areas ranges from 20% in high-density residential areas to 29% in low-density residential areas.
- Commercial and industrial land uses have, on average, the lowest canopy cover at 8%, and highest level of impervious areas, such as paved parking lots.

What this means for the plan:

Trees and woodlands in and around urban areas work together to provide vital services to communities such as intercepting and storing stormwater to reduce the likelihood of flooding around our homes and downstream areas. In addition, trees located where people live and work reduce energy requirements, reduce the urban heat island effect, and improve public health. Maintaining, protecting and increasing canopy cover in heavily populated areas will make more of these services available to more residents. Better distribution of trees and woodlands would also strengthen the ecological integrity and resilience of our natural heritage system. With limited resources and planting locations, setting priorities to get the best return on investment will be important.

Increasing species diversity would improve resiliency

The 2012 Urban Forest Study found that tree species across the City had relatively little variety, meaning low biodiversity. The five most abundant species were European buckthorn, eastern white cedar, white ash, sugar maple and trembling aspen. Together, they accounted for 56% of the total number of trees.

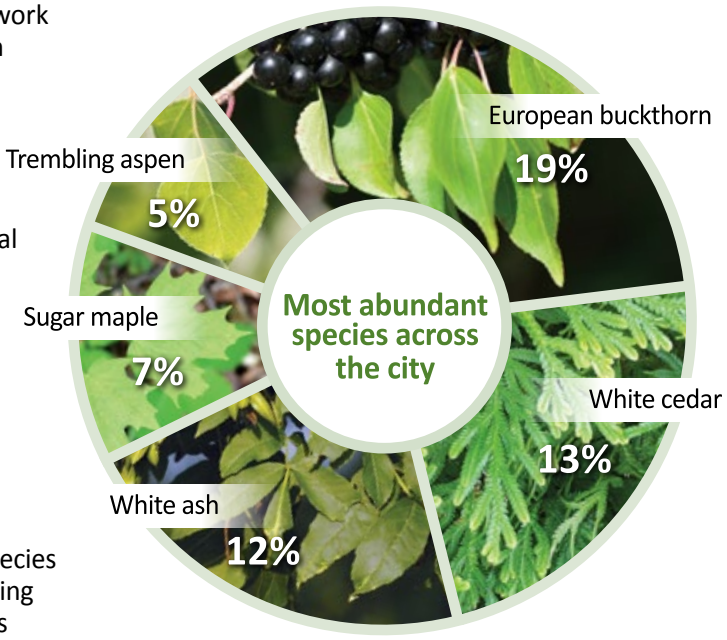
In the City's inventory of publicly owned trees, five species – Norway maple, little-leaf linden, sugar maple, honey locust and ash – make up almost half the total number of trees.

Low biodiversity makes the urban forest more susceptible to stressors, such as climate change, pests and diseases. For example, a forest having many different tree species would suffer few losses from an outbreak of Dutch elm disease, while a woodland planted with mostly elm trees would be devastated.

Dominance by certain species can also signal the spread of invasive, non-native trees. For example, European buckthorn and Norway maple rank high because they produce large numbers of saplings that can suppress native tree species.

The spread of invasive species lowers biodiversity, reduces natural habitat, and disrupts forest ecology.

Top 5 species by stem count
(with % of total)



Native plants:

Native plants are important because they are suited to local conditions, requiring less water, saving time and money. They also provide vital habitat for local birds and many other species of local wildlife.

Addressing damage from invasives can be costly, as it requires removing invasive saplings so that a wider variety of native trees and plants can grow in their place. Invasives have the greatest negative impact on public lands like parks and natural areas, and private lands like farms, tourist destinations, golf courses and cemeteries.

The Urban Forest Study found that almost one-quarter of the trees in the City are considered invasive species. As the table [right] shows, these trees tend to be concentrated in areas where there is little or no management, including on farms, in wooded areas, and along utility corridors and rail lines.

Almost all invasive trees are non-native. This is because they have been introduced into a new ecosystem, sometimes for their ornamental value, and conditions from their place of origin that would help suppress their spread do not exist here.

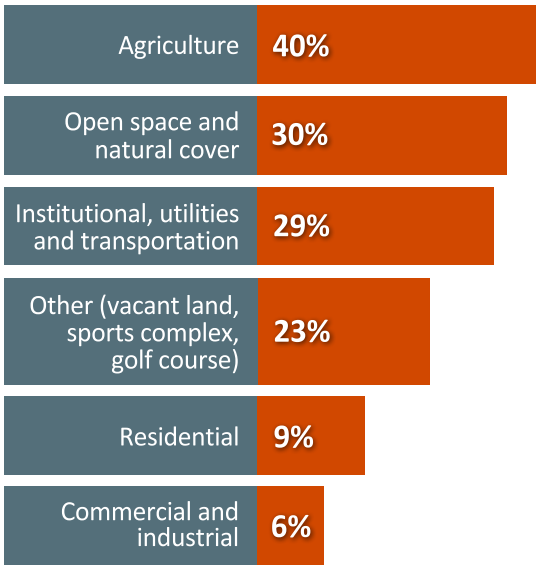
Not all non-native species are undesirable, however. While native species are generally preferred because they strengthen local ecosystems, some non-natives may be better able to tolerate harsher conditions such as drought or compacted soil. This can make them more suitable for planting in urban areas, as long as they pose no risk of spreading to natural areas.

Among trees in the City inventory, 56% are non-native species. About 20% are Norway maples, which are considered invasive. Others, however, such as linden, gingko, blue spruce, Austrian pine and common pear, have been planted deliberately for their ability to survive where native species might not.

What this means for the plan:

Greater diversity will make the urban forest healthier and less susceptible to costly impacts of pests, diseases and climate change. Also, increasing native species, combined with control of invasive species when possible, will better support native pollinators and birds. The judicious planting of non-native species may be needed where growing conditions are more challenging.

Percentage of invasive species by land use



*Based on 2012 Municipal Property Assessment Corporation land use categorization.

Today's young trees are tomorrow's forest

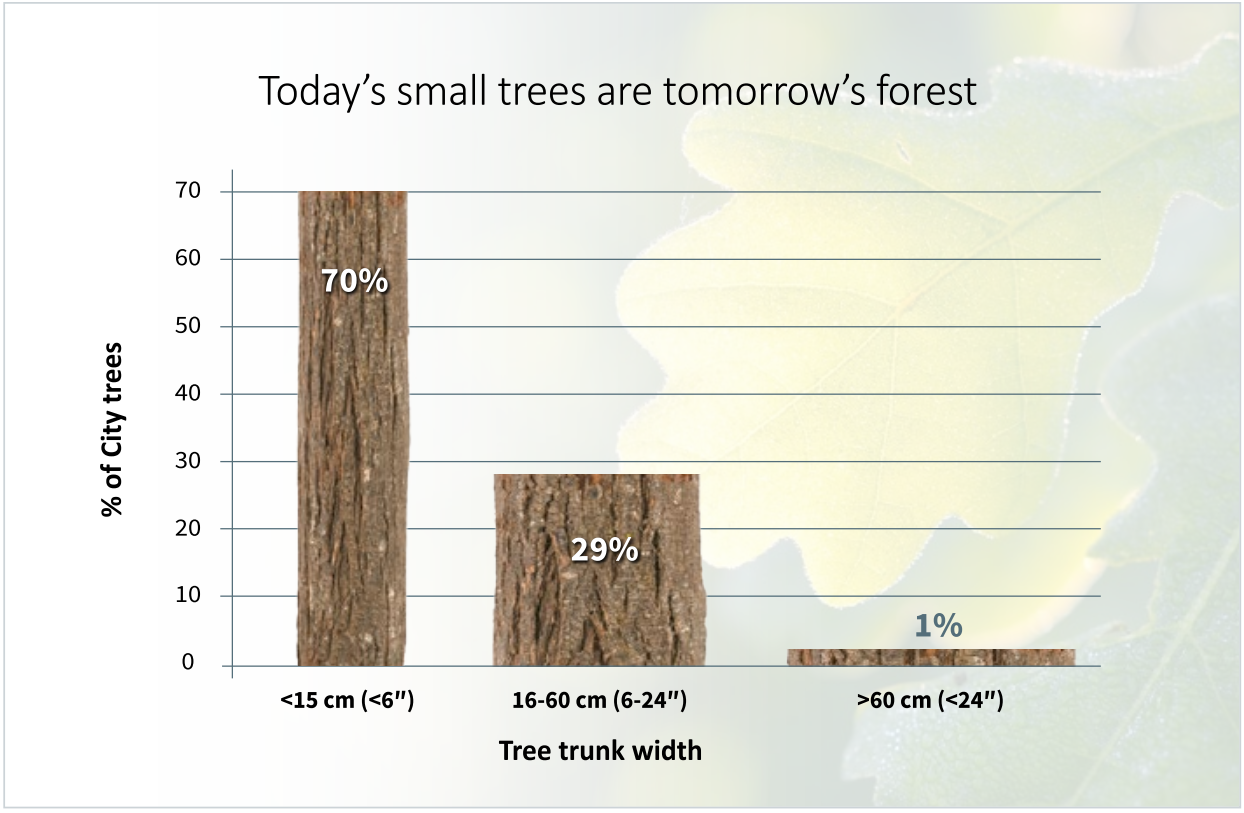
Richmond Hill's urban forest is largely made up of small (young) trees. The Urban Forest Study found that 70% of trees have a trunk width of less than 15 cm (6 inches), 29% are between 16 and 60 cm (6 and 24 inches) and only about 1% are wider than 60 cm (24 inches).

Many of these small trees are the saplings of invasive species and are only removed as part of large construction projects such as the development of parks and trails, or as part of projects to restore or create woodlands. Native trees and shrubs are then planted in their place. Invasive species are monitored and managed for a few years after to increase the likelihood of survival of the new plantings.

Other small-diameter trees represent relatively recent plantings along streets, in parks and publicly owned natural areas, as well as on private land. These trees, as they grow and mature, will form the heart of Richmond Hill's future urban forest.

Protecting and caring for young trees is critical to enjoying the full services provided by the urban forest, and is ultimately very cost-effective. Trees are especially vulnerable in their first few years. Caring for them properly in the early years is far less costly than having to plant replacement trees. Within five to 10 years, the level of care needed falls dramatically, while the level of service they provide goes up exponentially.

It is also important to recognize the full value of the relatively few trees in the urban forest that are large and mature. Not only are they already providing a high level of ecological services, but they have a heritage, cultural and aesthetic value that has taken decades – sometimes more than a century – to develop.



What this means for the plan:

Ensuring young trees reach their full size is the most important and cost-effective approach to achieving Richmond Hill's vision for its urban forest services. This includes providing adequate growing conditions (such as adequate, good-quality soil) and protecting trees to realize the greatest return on investment. The value of existing mature trees should also be recognized.

Landowners take differing approaches

Almost 70% of Richmond Hill's tree canopy is located on private property. Private landowners include homeowners, businesses, and other public agencies, that each manage urban forest trees on their own properties. Private landowner activities vary widely in intensity and purpose, ranging for example from pruning a single specimen in a front yard, to caring for shade trees around a parking lot, to minimally managing wooded areas.

The City of Richmond Hill undertakes and oversees a wide range of urban forest management activities on public land, some of which include:

- Gathering data about the urban forest through inventories and studies to inform decisions that maximize urban forest health and value to the community.
- Developing urban forest management policies and related guidelines.
- Ensuring compliance with by-laws relating to tree protection and development-related requirements.
- Managing the urban forest day-to-day by pruning, planting, watering and, when necessary, removing trees, and combatting pests and diseases.
- Creating and restoring City-owned woodlands as well as other natural areas and planting trees and shrubs along streets and in parks.
- Offering community volunteer stewardship programs.

The most intensive management by the City takes place where trees are located closest to human activity, such as along streets and in heavily used parks.

The City also partners with not-for-profit groups and other public agencies to help make the most of the City's investment in stewardship and tree planting initiatives.

More than 700 hectares (or 1,700 acres) of natural areas in Richmond Hill are in public ownership, and are managed by the City or by the Toronto and Region Conservation Authority.

The Urban Forest Study estimated that roughly two-thirds of trees across the City (both private and public) were in good to excellent condition (at the time of the study, the emerald ash borer was only an emerging concern). The study found, however, that City-managed trees were generally healthier than those on private land.

The urban forest's ability to provide the services described earlier is a function of the health of the trees within it. The findings of the Urban Forest Study suggest there are opportunities to improve the stewardship of trees across the City.

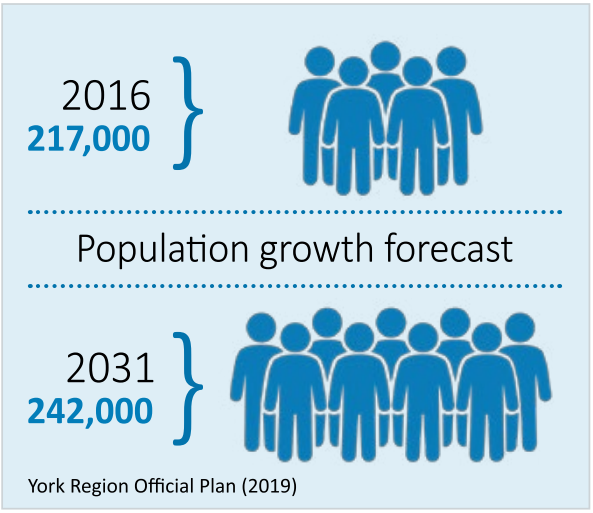
What this means for the plan:

Better alignment of goals and coordinating efforts across all landowners would improve the overall health and sustainability of the urban forest and help to maximize services.

The urban forest faces several challenges

The urban forest faces challenges from environmental stressors and human activity. The most pressing of these are:

- **Development and intensification**: Richmond Hill is located in one of the fastest-growing regions in North America, with the City's population forecast to grow to approximately 242,000 by 2031 from 217,000. The City's Official Plan foresees new housing needs being met largely through intensification, or development at a higher density. This parallels a greater emphasis on intensification and infill in various provincial and regional plans and policies, such as the Oak Ridges Moraine Conservation Plan and Greenbelt Plan, the Growth Plan for the Greater Golden Horseshoe Area, and the York Region Official Plan. While the overarching goal is environmental protection, especially outside already settled areas, intensification often leads to the removal of trees and can reduce the space available for future trees in urban areas.



- **Difficult growing conditions**: Even without intensification, the urban environment is challenging. Trees are often planted in compacted soils and face the stresses of excessive heat, pollution and even vandalism. With increased levels of hardscaping, trees can experience drought and/or flooding. They may also be injured during construction or infrastructure/utility maintenance.

- **Climate change**: Models predict that Southern Ontario's climate will become warmer and be marked by more extreme wind, ice and rain storms. This will stress trees and compound other challenges, making climate change one of the most serious threats to the urban forest. Conversely, however, a healthy urban forest will be highly effective at reducing climate change impacts on the City by providing much-needed shade and cooling in summer, and helping to manage stormwater effectively. Trees also mitigate the build-up of greenhouse gases in the atmosphere by absorbing and storing carbon. The City has started to develop a Climate Change Framework. This Urban Forest Management Plan supports the framework and, by guiding strategic investments now, will help to avoid higher climate change-related costs in the future.

Emerald ash borer infested tree

- **Invasive species, pests and diseases**: Urban forests are particularly susceptible to invasive species, pests and diseases, as urban trees are already stressed by challenging environmental factors. A recent example is the emerald ash borer, which is well on its way to destroying an expected 12% of the City's urban forest and costs millions of dollars to manage potentially hazardous trees (trees at risk of dropping limbs or falling) on streets and in parks. Other biological threats will likely emerge over the period of this plan. Oak wilt, a disease that affects all oak trees, has been spreading throughout the eastern U.S. and is expected to enter Ontario in the future.

What this means for the plan:

If the urban forest is to continue to provide a consistent level of services, Richmond Hill and its partners must address these challenges in a cost-effective, coordinated way. Innovative solutions will be key to addressing the challenges facing the urban forest while balancing the needs of a growing community.

3. THE PLAN

This plan was developed with the recognition that Richmond Hill benefits from a strong foundation of urban forest management, and has already put in place many of the approaches, policies and practices needed to reach the desired outcomes. The City has also forged valuable partnerships with the community, businesses, agencies, non-profit organizations, and other levels of government. The focus of the plan is therefore on being more strategic and innovative to achieve even more with available resources.

This focus is critical in the face of ongoing challenges and changes, especially increasing urbanization. The activities outlined in this plan ensure that we maximize the services that trees provide and take a strategic approach to sustain these services in the face of challenges.

The plan also acknowledges the important roles of multiple City departments and divisions tasked with achieving urban forestry goals. The work to develop the plan helped to pinpoint and address gaps and overlaps in current processes and see opportunities for better coordination. It also identified how existing enterprise-wide tools can be used to create greater efficiencies in urban forest management.

By taking this strategic approach, the plan put all available resources to best use to achieve valuable outcomes for Richmond Hill's residents and its urban forest.

Overview

The actions outlined in this plan support the following vision for 2040:

> "Richmond Hill and its urban forest grow and thrive together, each contributing to the health and vitality of the other."

This vision acknowledges the services that trees provide to Richmond Hill, and the importance of

public and private stewardship of our trees as the City continues to grow.

The plan sets out four major goals to achieve this vision:

- Build knowledge to make wise decisions
- Plan and protect to preserve canopy cover
- Strengthen the urban forest to increase resilience
- Grow partnerships to strengthen stewardship

These goals respond to the opportunities and challenges outlined earlier. Each goal is supported by objectives and actions, as detailed in the next section.

The plan also outlines how results will be monitored and measured, and allows for adjustment in approaches to ensure the vision is achieved efficiently and effectively as Richmond Hill evolves and grows.

Our Vision:

Richmond Hill and its urban forest grow and thrive together, each contributing to the health and vitality of the other.

Goal 1:

Build knowledge to make wise decisions

Better and more complete information will allow Richmond Hill to take an informed, strategic approach for both day-to-day operations and longer-term planning. This will help ensure wise management of our urban forest assets.

Current activities and Opportunities

Urban Forest Study and canopy cover assessments

In 2010 Richmond Hill partnered with York Region and the Toronto and Region Conservation Authority on an in-depth study of the urban forest. The study included a mapping exercise to assess the City's total canopy cover, as well as its distribution by land use and location.

The study used modelling tools (urban tree canopy spatial analysis and i-Tree, a highly regarded software suite developed by the United States Department of Agriculture Forest Service) to better understand species diversity, tree size distribution and the value of the services that trees provide. As one example of the value of services, the study found that trees in Richmond Hill remove about 7,200 tonnes of carbon from the air every year, which is equivalent to removing 1,500 cars from the road.

Richmond Hill repeated the canopy cover assessment using 2016 data to track and understand changes in canopy cover over time. The analysis showed that canopy cover had increased from 25% in 2010 to 29% in 2016, largely due to the growth of smaller trees and ongoing restoration programs.

Staff have been using these results to inform management decisions, such as which species to select to increase diversity. Additionally, the Urban Forest Study was critical to understanding the impact of the emerald ash borer on both private and public land and formulating an appropriate strategy to address this challenge.

City staff have also used the study and assessment to better understand the urban forest and prioritize actions for this plan. For example, the canopy cover assessment includes the identification of potential plantable areas, which helps to understand how much canopy cover can be established and where – on both private and public property.

Development of a flexible planting prioritization tool will incorporate this and additional information to assist staff in identifying planting areas that offer the greatest services, using existing resources more efficiently. Such a tool could be developed in partnership with other municipalities, York Region, or conservation authority(ies). The tool will be used to identify areas where trees will have the greatest impact to the community, such as mitigating potential flood areas and reducing urban heat islands.

Tree inventory

Richmond Hill's tree inventory currently provides information on more than 65,000 City trees, including all street trees. It details, for each tree, the species, size, height, location and general condition rating.

City staff use the inventory to inform such activities as pruning, managing pests and diseases, planning tree planting, reviewing development applications, and responding to residents' questions and concerns. Having the inventory available to other City departments makes coordination easier and ensures that existing trees are considered in decisions and plans.

Minor data quality issues make some uses more challenging or time-consuming, and some data is out-of-date, since data collection began nearly 10 years ago. Assessing trees on a regular basis will improve the accuracy of information that feeds into management decisions. In addition, identifying vacant spaces where trees can be planted will support strategic planting decisions.

Natural Area Inventory and Assessment

A Natural Area Inventory and Assessment of publicly owned natural areas was completed by the Toronto and Region Conservation Authority in 2014. The project mapped vegetation communities, inventoried observed plants and animals, including invasive species, and reported on the quality of natural spaces.

This information is used to inform policies, plans and studies to manage and protect our urban forest and natural systems. Updating the inventory and assessment on a regular basis will capture changes over time and allow the City to assess the impact of projects, programs and policies on these areas. Updates will also incorporate any new land that comes into public ownership as the City develops.

Asset Management Plan

The City's Asset Management Plan, adopted in 2016, recognizes trees and natural areas as valuable environmental assets. The goal of asset management is to provide quality services while minimizing the cost of maintaining assets over their lifecycle. By including trees and natural areas in the Asset Management Plan, staff use data to analyze long-term maintenance and rehabilitation needs and establish plans to manage the urban forest in the best way possible for the lowest cost. Having access to reliable urban forest data ensures that funds are spent in the right way, at the right time.

Asset management planning itself is evolving, particularly at the municipal level. Applying asset management principles to urban forestry is also a relatively new practice. New methods of determining the value of services that trees and other green infrastructure provide are also being developed.

Staying up-to-date on these developments and incorporating them into urban forest management will increase the value of asset management planning for urban forestry and ensure the urban forest is managed effectively and efficiently.

Planting trials

As our climate warms, some existing tree species may move north from their current range, and it may be necessary to strategically plant more southern tree species to fill those gaps. The City has undertaken some informal planting trials to test suitability of various tree species for such purposes as urban planting or to replace ash trees. To further this work, it will also be beneficial to investigate and understand which species will be at risk as a result of climate change, and systematically test species that will be suitable to replace them.

Building on these activities in the plan:

The discussion [above] demonstrates that building a more comprehensive knowledge base will make urban forest management more cost-effective, strategic and measurable. The objectives and actions [on the next page] focus on addressing those needs.

Objectives and Actions:

1. Regularly monitor the state of the urban forest to track progress and make wise management decisions.

Every 5 years	In partnership with York Region, assess canopy cover and woodland cover.
Every 10 years	In partnership with York Region, complete an urban forest study for Richmond Hill.

2. Refine and improve urban forest inventories to better inform planning and management.

Ongoing	Regularly update the City tree inventory as changes are made and improve data quality.
Short-term	Further develop the City tree inventory to include trees in parks and around municipal facilities, such as community centres.
Short-term	Inventory vacant plantable spaces for City trees.
Every 10 years (partial update of new lands every 5 years)	Regularly update the Natural Area Inventory and Assessment of publicly owned natural areas.

3. Conduct targeted assessments and develop tools to support a strategic approach to planting and management.

Ongoing	Investigate and test new cultivars, less common, and/or typically more southern tree species for suitability in Richmond Hill.
Ongoing	Continue planning for tree and woodland assets in the context of the City's asset management program.
Short-term	Explore partnership opportunities to develop a planting prioritization tool.
Medium-term	Assess the urban forest for vulnerability to climate change.

Goal 2:

Plan and protect to preserve canopy cover

Trees in the urban forest are at risk from climate change, diseases and pests. Increasing population, more intensive development, and changes in land use will add to these already serious challenges.

As a result, protecting trees and the environments in which they grow will be key to maintaining a suitable level of canopy cover and protecting the City's investments in the urban forest. Planning strategically for trees in areas where people live, work and play will improve the overall quality of life and increase the levels of service trees provide.

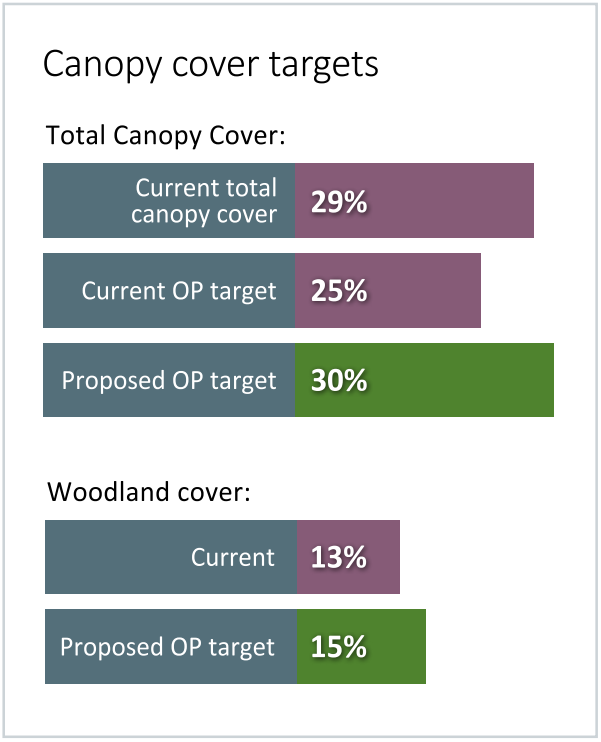
Current activities and opportunities

Municipalities are responsible for shaping and regulating local development through policies, plans, procedures and by-laws. Taking direction from the provincial and federal governments, both York Region and Richmond Hill have put in place several safeguards for trees as development occurs, including an Official Plan, Strategic Plan, Urban Forest Management Plan, development processes and by-laws. These set out specific requirements and targets to protect and maintain canopy cover.

Canopy cover targets

Richmond Hill's Official Plan includes a set of policies and guidelines for development, including protection for the urban forest. Significant woodlands and other natural features are protected in line with the Oak Ridges Moraine Conservation Plan, Greenbelt Plan and Provincial Policy Statement. The Official Plan also recognizes the importance of the City's Greenway System, which is a linked series of natural areas and parks across the City, and guides development in a way that integrates and respects it.

The Official Plan, developed in 2010, identifies a canopy cover target of 25%. When last formally measured, canopy cover was 29% in 2016. This plan proposes that the next Official Plan update include a total canopy cover target of 30% to maintain the current level of service provided by the urban forest.

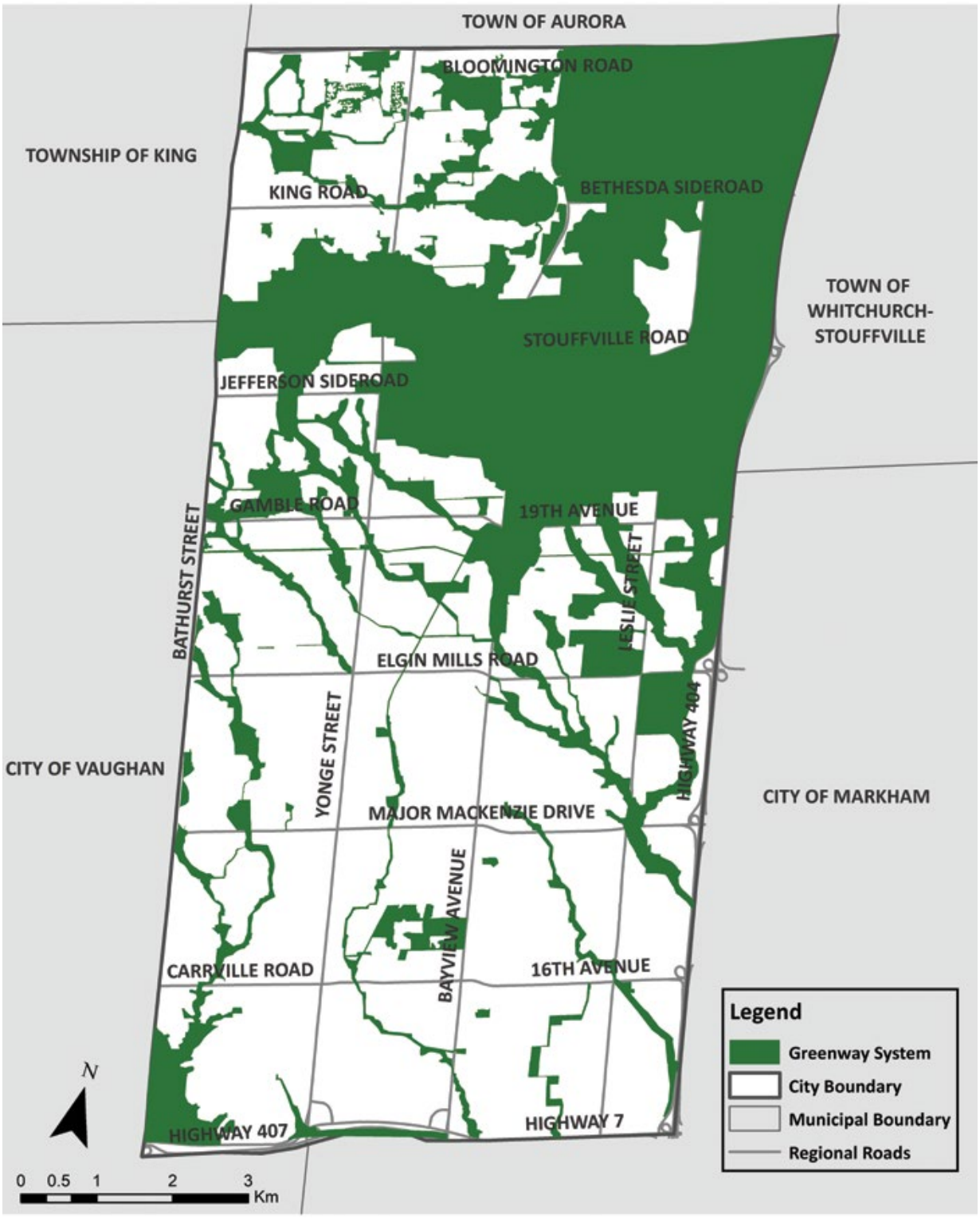


This target is in line with the York Region Forest Management Plan, which sets a broad target range of 26-35% total canopy cover for Richmond Hill, as well as a woodland cover target of 14-15%.

In 2014, Richmond Hill's woodland cover was assessed at 13%. This plan proposes consideration of including a woodland canopy cover target of 15% in the Official Plan, also to protect and maintain the current level of service. Woodlands provide additional services that single trees cannot (such as recreational trails, habitat, and biodiversity) and require less resources to manage per tree. It is expected that the 15% target can be achieved through existing programs and partnerships.

The Official Plan also identifies the priority of increasing tree cover within the settlement area in order to enhance linkages to the Greenway System.

City of Richmond Hill: Greenway System



However, there are currently no land-use specific canopy cover targets that will ensure room for trees where the community will receive the most benefit.

Protecting trees and planning canopy

The City of Richmond Hill regulates and encourages the protection of trees and planning for canopy cover on City and private lands during development and construction. A collaborative approach with proponents is most effective to ensure trees are protected and replacements planted when necessary. In addition to the Official Plan, relevant policies, by-laws, and guidelines are outlined below.

Tree protection during development

The City works with developers to protect trees during all stages of development and has clear expectations for tree protection on private property through the subdivision and site plan process:

- **Planning**: The City encourages applicants to retain an arborist and/or landscape architect at project outset to evaluate trees on-site, and requires the applicant to develop a tree inventory and preservation plan, tree restoration plan, arborist's report, and/or landscape plan. Planning must consider the impacts of construction on trees and delineate Tree Protection Zones (designated areas/barriers around the trees to protect the roots and trunk). In addition, planning must provide for either replacing any large trees that are approved for removal or financially compensating the City for trees that cannot be replaced. The developer provides securities to the City to ensure compliance with approved plans for tree protection, maintenance, and/or planting.

- **Construction**: The arborist/landscape architect is responsible for erecting and checking on Tree Protection Zones and monitoring tree health before, during, and after construction. The City inspects Tree Protection Zones before construction starts and in response to resident inquiries.

- **Assumption/release of securities**: After the project is built, the arborist/landscape architect provides a letter of substantial completion to the City. The City then inspects the site to check whether protection and other landscaping activities were provided as required. If the site passes inspection, a percentage of the securities are released back to the developer. The developer then maintains the landscaping generally for a two-year period, after which the City inspects again. If the landscaping is healthy and growing well, the balance of the securities are released. If a City inspection notes deficiencies at any stage, the developer must rectify them.

The development application process is time-sensitive and involves staff review and approval from various City departments. Continued cooperation between departments will ensure the process is efficient and staff will evaluate using IT enterprise systems to streamline the process. This will also help to ensure that appropriate staff can review projects with potential tree impacts at the appropriate stage in order to ensure adequate protection and/or planting.

Creating tree planting and protection standards, as discussed in the section on Urban Forest Planting Guidelines [below], will ensure tree protection zones are applied more widely and consistently through all development and building activities.

Tree planting during development

Richmond Hill requires that trees be established in new subdivisions and other developments. Typically, one street tree must be planted for each new detached or semi-detached dwelling unit, and enough trees planted to achieve 50% projected shade cover over parking lots.

Trees may be planted by the developer or by the City, with the developer covering the costs.

Developer-planted trees must be maintained for two years by the developer and be in acceptable condition before the City becomes responsible for their care.

Urban Forest Planting Guidelines

The City drafted the Urban Forest Planting Guidelines in 2016 to guide developers and others in selecting

and planting new trees on public lands such as road right-of-ways and parks. These guidelines provide detailed designs for how trees should be planted in various situations. However, because they are only guidelines, they cannot be enforced and consequently have not been used consistently. Additionally, tree planting in higher density areas and stratified planting, such as planting over an underground parking garage, are missing from this document.

Creating a set of comprehensive approved standards will ensure high-quality tree planting with appropriate soil quantity in these situations.

The City should consider integrating planting standards into zoning by-laws, which would ensure that making space for trees is a priority early in the planning stages, rather than trying to accommodate them later.

Sustainability Metrics Tool

In partnership with the cities of Brampton and Vaughan, Richmond Hill has developed an award-winning Sustainability Metrics tool (2013), which takes an innovative approach to encouraging sustainable building and design elements in developments.

The tool includes mandatory items and then awards points for exceeding the mandatory minimums. These points are used to calculate an overall sustainability score for each development. Water and waste-water servicing allocation priority is given to developments with a higher score when the City has to limit the number of projects that can proceed in a given year.

Some of these elements relate to the urban forest. For example, additional points are awarded for elements such as:

- Planting a diverse selection of tree species
- Preserving a large number of healthy, mature trees
- Exceeding soil quality and quantity minimums
- Shading a large portion of walkways and sidewalks using tree canopy
- Protecting natural areas, through actions such as enhanced ecological protection zones or invasive species management.

Forest and tree protection by-laws

Four by-laws regulate tree injury and removal in Richmond Hill. These by-laws are meant to protect existing trees when possible and to direct the

replacement of removed trees in order to protect the overall canopy cover. In general, these by-laws do not apply to the development process, as tree protection and planting during development is typically regulated by the *Planning Act* (1990). However, the City generally requires development plans to identify and, where possible, protect trees in a manner consistent with the provisions of these by-laws.

City-owned trees (where at least 50% of the trunk is on City property) must be protected from injury or destruction through the City's street tree by-law (Chapter 821). This may require adequate tree protection barriers to be erected around trees when construction is happening nearby. A permit may be issued to remove a tree, in which case the proponent must pay the cost of removal and replacement of that tree.

Trees on private property with a trunk width of 20 cm (8 inches) or greater are also protected through the City's *Private Tree Preservation By-law* (Chapter 1015). Trees that are dead, dying or hazardous are exempt from this by-law provided an Arborist Certificate is submitted to the City confirming the condition of the tree. Permits must be requested to remove and/or injure a tree and, if approved, conditions such as requirements to replant trees or pay a fee if trees cannot be replanted on site, are included as part of the permit.

The City's *Site Alteration By-law* requires a permit to make changes to a site, including grading or tree removal, often for minor construction work on the property (for example, building a deck, shed or house addition). This by-law includes a definition of a boundary tree, which is a tree on another property close enough to potentially be harmed by the site alteration, and outlines requirements for erecting Tree Protection Zones around boundary trees and other trees at risk.

Woodlands are regulated by the York Region *Forest Conservation By-law*, which requires permits for sustainable forest management, tree harvesting and clearing. The by-law does not apply to approved developments under the *Planning Act*.

In combination, the four tree by-laws are as effective or more effective than similar by-laws in comparable municipalities. However, compliance could be improved by increasing public and staff awareness. By-laws will also be reviewed and updated on a regular basis to ensure consistency with other by-laws, policies and procedures as well as considering best practices within the industry.

Currently, the above City by-laws are enforced by City Planning and Community Services staff rather than through By-Law Enforcement staff. Training more staff to identify and ticket infractions and using the new Administrative Monetary Penalty System, which provides for a civil penalty payment as an alternative to a fine, will help to improve compliance and create efficiencies in enforcement.

Building on these activities in the plan:

The current planning and protection framework will be updated to recognize existing canopy cover, help ensure a better distribution of trees, and achieve a higher level of by-law compliance. The objectives and actions [on the next page] focus on addressing those needs.

Objectives and Actions:

1. Protect existing urban forest canopy cover and facilitate better distribution of trees across Richmond Hill.

Short-term	Update City-wide total canopy cover target to 30% in the Official Plan to protect existing canopy.
Short-term	Explore a woodland cover target of 15% and investigate supporting policies in the Official Plan to protect existing woodlands.
Short-term	Explore implementation of land-use-based tree canopy cover targets in the Official Plan to better serve developed areas.

2. Increase staff cooperation and knowledge to better support urban forest protection.

Ongoing	Increase staff understanding and knowledge of tree preservation requirements.
Ongoing	Improve business processes and staff coordination around urban forest protection-related matters.

3. Improve processes and policies to more effectively implement tree protection.

Short-term	Develop urban forest planting and protection standards, specifications and details.
Short-term	Review and update tree-related City by-laws and implementation processes.
Short-term	Implement the use of the Administrative Monetary Penalty System for tree-related City by-laws.
Medium-term	Explore opportunities to incorporate standards in Comprehensive Zoning By-law to provide space for tree protection and/or establishment.
Annually	Continue reviewing fees and charges associated with tree permits, conditions, and landscape inspections.

Goal 3:

Strengthen the urban forest to increase resilience

Successfully establishing new trees where needed, increasing species diversity, and supporting growth of mature, healthy trees are essential elements of creating a resilient urban forest that provides maximum services. Achieving this cost-effectively involves careful planning to fill gaps and ensure best use of resources.

Current activities and opportunities

City tree planting

The City, homeowners, businesses, and not-for-profit groups support tree planting along streets and in parks, back yards, near businesses, and other locations where space is available:

- The City's staff and contractors plant roughly 800 trees a year, mainly to replace trees that have been removed, with the balance responding to residents' requests for a tree in the City right-of-way in front of their property.
- Additional trees are planted through the City's capital projects, such as road reconstruction or park development.
- Funding collected through the development process for tree compensation is dedicated to help restore woodlands harmed by the emerald ash borer, as well as other woodland restoration projects.
- The City also works with not-for-profit groups to plant trees in City-owned parks and natural areas.

City staff and/or consultants select which tree species to plant, depending on the purpose (replacing a street or park tree, planting in new/re-developed parks, restoring a woodland) which also determines who does the planting. While staff strive to ensure species diversity, developing a coordinated approach will ensure no opportunities are missed and diversification is being implemented in a consistent and effective manner.

Street and park tree care operations

After planting, young trees are watered, mulched and added to the pruning schedule, with at least two prunings within ten years of planting. Pruning generally takes place once in the first five years and again in the second five years. Early pruning is key, as it helps young trees develop good branching structure, which lowers the risk of later structural problems, breakage, and the need for more costly and complicated pruning and/or tree replacements.

In 2015, Richmond Hill instituted a ten-year street pruning and inspection cycle for established trees that it actively manages. Initially the cycle included only street trees, but trees in parks were

subsequently added. Trees are inspected at least once every 10 years and pruned if necessary, further improving the health of the urban forest and reducing risks to the public. Trees are also inspected and maintained in response to resident requests.

The current 10-year cycle, however, does not meet best practices for pruning frequency. Many municipalities cite a pruning cycle of 5 to 8 years for established trees as optimal. The experience in other jurisdictions and some research suggests that this schedule can achieve better outcomes and reduce risks without significant resource implications. This is because the investment in pruning can prevent more costly maintenance and replacement expenses as trees mature.

Exploring a 7 to 8 year average inspection and pruning cycle may allow for similar outcomes in a more efficient and cost-effective manner. Depending on species and age, some trees/streets can wait longer to be inspected and pruned while others will benefit from a shorter cycle. This strategic approach will be explored once the City's tree inventory update is completed.

Some street trees, located within utility right-of-ways (eg. electricity infrastructure) are also pruned by the local utility company. Better coordination between the utility company regarding schedules and best pruning practices will increase the efficiency and quality of pruning.

Tree risk management

Every year, staff undertake "windshield surveys" of street trees after leaves emerge in spring and also inspect trees along formal trails in City-managed natural areas, looking for such problems as large dead limbs or dead trees that could pose a risk to the public. Trees are also assessed during pruning and in response to resident requests.

When a risk is identified, the City responds by removing any potential target (such as a park bench) or by pruning or removing the tree. It does not use such measures as cabling or bracing, which can help save large, older trees. Creating criteria for when additional preservation measures could be used will help the City extend the life of much-needed large trees.


Emerald ash borer


Asian longhorned beetle

Pest, disease and invasive species management

Pests and diseases harm trees directly, while invasive plant species may crowd them out. Both types of risk therefore need to be assessed and managed.

The most serious invasive pest problem to emerge in decades is the emerald ash borer. This insect is now widespread across southwestern and eastern Ontario and in some areas of Quebec. Ongoing destruction in Richmond Hill alone will ultimately kill more than 300,000 ash trees. The City has removed more than half of the infested and potentially hazardous ash trees along streets and in parks, and has treated 1,500 high-value trees to prolong their lives so that removals can be staggered. Total cost of these activities to the City is expected to reach more than $7.4 million.

Major emerging concerns include hemlock woolly adelgid, Asian longhorned beetle and, perhaps most serious, oak wilt.

Not yet present in Ontario, oak wilt is caused by a fungus spread by a sap beetle or through the roots of closely-spaced trees. Its appearance in Richmond Hill would be devastating for the urban forest's oaks, which make up 8% of street and park trees and include many large and mature specimens. There are few effective treatments, and management focuses mainly on prevention and containing damage.

The most prevalent invasive plant species currently impacting trees in the City include garlic mustard and dog-strangling vine, which can smother young saplings, as well as the European buckthorn and Norway maples mentioned earlier.


Dog-strangling vine

The City supports management of pests, diseases and invasive species through various means:

- Urban forest operations staff and contractors are trained in integrated pest management practices, and use them when they find significant pest or disease problems in City-managed trees.
- Invasive species in more naturalized public areas are typically only removed as part of large construction projects such as the development of parks and trails, or as part of projects to restore or create woodlands. Native trees and shrubs are then planted in their place. Invasive species are monitored and managed for a few years to increase the likelihood of survival of the new plantings.
- The Community Stewardship Program also involves volunteers in the removal of invasive plants while planting desirable tree species.

Developing an overarching Invasive Species Management Plan will provide direction for the City to address existing and anticipated threats in a cohesive manner and allow the City to respond quickly and effectively to new challenges. Such a plan will also outline best practices for management and include an outreach strategy to educate and guide private landowners. Developing and implementing a City-wide Invasive Species Management Plan is also consistent with recommendations and actions included in Richmond Hill's Environment Strategy.

Natural area management

The City has developed several management programs for its natural areas:

- The award-winning Community Stewardship Program focuses on working with partners and volunteers in naturalization efforts such as planting, mulching, removing invasives and stream restoration.
- The long-term woodland restoration program, developed in response to emerald ash borer, provides direction to manage woodlands with a significant number of ash trees – primarily through removal of dead ash trees, planting new native trees, and invasive species management. The first woodland being restored under this program is Beaver Woodland.
- Over the next decade extensive woodland restoration and creation will take place in David Dunlap Observatory Park. This long-term project will include restoration of approximately 24 hectares (59 acres) of woodland and the creation of over 8 hectares (20 acres) of new woodland. Funding to carry out this work was secured through a mediated settlement with the developer when the former David Dunlap Observatory lands were being planned and going through the development process.

Natural areas management will be more effective when guided by an overall strategy. The strategy will focus on better understanding the condition of natural areas

and using that information to set management priorities. This is in line with the recommendations of the Environment Strategy.

Building on these activities in the plan:

Trees in the urban forest will benefit from changes in current maintenance practices, as well as strategic planning to improve long-term health and resiliency and reduce risks. An overall strategy for natural areas will allow the City to be more proactive in addressing threats and maintaining biodiversity. The objectives and actions [below] focus on addressing those needs.

Objectives and Actions:

1. Update urban forest maintenance operations to improve tree health.

Medium-term	Explore implementation of a 7 to 8 year average inspection/pruning cycle for all City-managed trees.
Medium-term	Formalize and continue young tree structural pruning program.
Ongoing	Refine tree risk assessment and mitigation practices.
Long-term	Foster collaboration between City staff and local utility and transportation providers to improve installation, maintenance and protection of green infrastructure within right-of-ways.

2. Increase resilience in the face of invasive species, pests and pathogens.

Short-term	Investigate and implement best practices to increase species diversity through tree establishment planning.
Medium-term	Develop an Invasive Species Management Plan for invasive species, pests and diseases.

3. Adopt a strategic approach to managing natural areas.

Short-term	Create a Natural Heritage Strategy that will help set priorities for natural area management.
Medium-term	Refine and formalize a plan and approach for creating and restoring natural wooded areas.

Goal 4:

Grow partnerships to strengthen stewardship

Richmond Hill's urban forest is a shared resource that exists on both public and private land. In order for the urban forest to thrive, the City must work collaboratively with residents, businesses, organizations, and other levels of government. Private land also offers some of the best opportunities and space to grow large mature trees that will sustain the canopy cover for future generations.

Current activities and opportunities

Engaging the public

Richmond Hill works closely with community groups and volunteers by providing opportunities to get involved in environmental stewardship activities and workshops, and by providing access to information about the local environment. As part of the Environment Strategy, the "Greening the Hill" campaign was launched as a way to engage residents on environmental topics. This is achieved through social media, information booths at community events and presentations at schools and other special events. Additionally, educational displays at community centres share information about the urban forest, invasive species, tree planting events, urban wildlife and other natural-environment themes.

The City's website includes a comprehensive "Trees and Yards" section, which provides information about a wide range of urban forest topics, including City operations, by-laws, and engagement opportunities. The website also provides comprehensive information about tree care and planting. Information about specific trees in Richmond Hill's tree inventory can be viewed by completing an online tree service request. Expanding the availability of the tree inventory, so that residents can more easily call up information about City-owned trees in any location, would help improve engagement and education about the urban forest.

A City-produced educational video about the emerald ash borer won a digital production award in 2017.

Other municipalities and organizations have created interactive programs to encourage community engagement such as through recognition of heritage trees and through Citizen Science – where residents are asked to report sightings of specific plants or animals, usually through a mobile device application. These programs help to raise awareness of urban forest issues, such as reporting invasive species and having a better understanding of the value of heritage trees. As an added benefit, they also have the potential to provide valuable information to staff that could inform management activities.

Opportunities to get involved

The City's keystone engagement program is the Community Stewardship Program, which has as its goal to "build stronger connections in Richmond Hill by establishing healthier natural corridors and green space connections throughout Richmond Hill's greenway system."

Since this award-winning program started in 1998, more than 20,000 volunteers have been engaged in over 1,100 naturalization projects, planting over

216,000 trees and shrubs, restoring more than 38 hectares (94 acres) of land, and controlling litter and invasive species in natural areas.

Locations for activities are selected using established conditions and criteria that take into account environmental, logistical and community factors.

The program also includes education and outreach, invasive species management, and post-planting monitoring components, and is strongly supported by partners and the community.

In 2018 and 2019, the Community Stewardship Program was recognized with 3 awards:

- Tree Canada Public Education Award, celebrating excellence in furthering the understanding of urban forestry and encouraging best practices in the urban forestry sector.
- International Society of Arboriculture's Harry J. Banker Gold Leaf Award, celebrating outstanding landscape beautification activities which have had a significant impact upon a community.
- North American Native Plant Society Founders Conservation Award which recognizes extra-ordinary contributions to the conservation, protection and restoration of North America's natural heritage and native flora at the community, regional, provincial, national or continental level.

The Community Stewardship Program is currently limited to City lands. There may be excellent restoration opportunities on other lands. In particular, there are opportunities to build partnerships with other public agencies, such as school boards. Such initiatives will achieve many goals for community and environmental sustainability, as well as

improving physical and mental health for people at schools, hospitals and other public buildings.

Community members may also wish to volunteer on their own time in an ongoing manner in their own neighbourhood. One program that has become popular in other municipalities is an Adopt-a-Tree program where residents dedicate time to monitoring, watering and mulching a few select trees in their neighbourhood. This could include trees along commercial streetscapes, trees in the right-of-way in residential neighbourhoods, or even park trees. This program will foster a shared sense of ownership and allow residents to take an active role in caring for trees that will thrive from the extra attention.

The Healthy Yards Program, established in 2006, promotes ecological stewardship on private lands through the sale of subsidized native tree, shrub and perennial plant kits, composters and rain barrels, and offering community workshops. This successful program has engaged hundreds of residents and distributed thousands of native plants throughout the community. The Healthy Yards event also brings together local environmental organizations to share information about urban forest related topics with residents, such as learning about invasive species

and the actions that residents can take to support a healthy urban forest.

Providing recognition and incentives

Incentives that support urban forest stewardship in Richmond Hill include:

- An annual celebration of volunteer achievements.
- Planting of commemorative trees in the Celebration Forest in Phyllis Rawlinson Park.
- Prizes and recognition through the Healthy Yards Program and the Richmond Hill Blooms contest.
- Promotion of external programs such as the Canadian Wildlife Federation's City-supported Backyard Habitat Certification Program and the David Suzuki Foundation's Butterflyway project.

Recognition and incentives can be a very cost-effective way of improving the urban forest. For example, incentives could be used to encourage tree establishment on institutional, commercial, and industrial lands.

Leveraging partnership opportunities

Richmond Hill maintains a range of well-established and successful partnerships with organizations, agencies and community members to increase awareness and promote stewardship.

Existing and potential partners include other agencies, residents and businesses. Partnership activities include planting, monitoring, research, education and awareness.

Among these relationships, one of the most important is with York Region, which supports programs such as the LEAF (Local Enhancement and Appreciation of Forests) Backyard Tree Planting Program and Richmond Hill's Healthy Yards Program.

Another key partnership is with the Toronto and Region Conservation Authority, which has resulted in the collection of important natural environment data for the City and support for the Community Stewardship Program and other public engagement initiatives.

Richmond Hill's other urban forest partners include Ontario Streams, the Ontario Ministry of Natural Resources and Forestry, Tree Canada, TD Friends of the Environment Foundation, LEAF, Richmond Hill Naturalists, York Region Environmental Alliance, and many others.

In addition to logistical, technical and operational support, Richmond Hill has received financial support for engagement and stewardship through partner grants and/or matching funding. Expanding existing partnerships and seeking new partnerships will allow the City to achieve more with the same amount of resources, and support innovation in urban forest management, such as partnering on demonstration and pilot projects, or with academic institutions to conduct research and develop tools.

Building on these activities in the plan:

Many opportunities exist to better educate and engage residents, strengthen existing partnerships and build new connections to benefit the urban forest and maximize the services it provides. The objectives and actions [on the next page] focus on addressing those needs.

Objectives and Actions:

1. Continue and develop new public engagement and education initiatives.

Short-term	Develop an urban forest public education and engagement strategy.
Medium-term	Explore creating a heritage tree recognition program.
Medium-term	Promote the existing practice to plant trees by request on residential boulevards.
Long-term	Facilitate and promote urban forest "Citizen Science".
Long-term	Provide public access to information about City-owned trees.

2. Encourage residents to become urban forest stewards.

Ongoing	Continue the delivery of existing successful tree establishment and stewardship programs on public and private residential lands.
Medium-term	Develop recognition/incentive programs for urban forest stewardship.
Long-term	Investigate an "Adopt-a-Tree" or similar stewardship program for City trees.
Long-term	Investigate expanding the delivery of existing tree establishment programs to suitable institutional, industrial and commercial lands.

3. Strengthen and leverage existing urban forest partnerships and secure new partnerships.

Ongoing	Continue to work with existing partners and engage new partners to support delivery of Richmond Hill's urban forest stewardship programs.
Ongoing	Foster partnerships with academic institutions to support urban forest research.
Ongoing	Continue support of partner agency urban forest and stewardship programs.
Ongoing	Partner with development industry, public agencies, and others on demonstration and pilot projects.

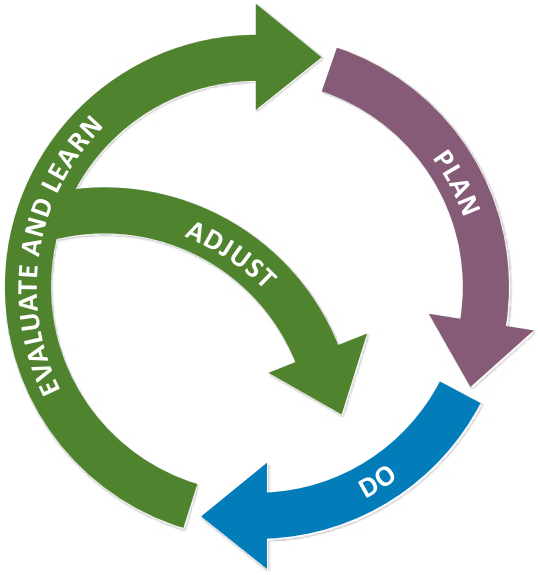
4. ADAPTIVE MANAGEMENT

Richmond Hill will undertake a program of adaptive urban forest management, which means changing our approaches in response to changing circumstances, new information, or shifting Council priorities, while ensuring progress towards achieving the Urban Forest Management Plan vision, goals, objectives and targets.

To support adaptive management, the Urban Forest Management Plan will be reviewed and updated at appropriate intervals. This may include:

- Benchmarking the current status of the urban forest and its management relative to Urban Forest Management Plan targets and action items
- Compiling technical assessments of key urban forest metrics
- Undertaking periodic assessments to identify changes in performance indicators developed in preparation of this plan
- Stakeholder and public consultation to reassess challenges, values and priorities

This information will assist the City to periodically update the plan, reprioritize existing action items and, if necessary, develop new objectives and action items to reflect changing needs.



5. CONCLUSION

Consensus is growing at the global level on the value of trees and forests, especially in an urban setting. Trees provide valuable services that built infrastructure cannot provide nearly as cost-effectively, or cannot provide at all. They clean the air and water, reduce flood risk, conserve energy, counteract the urban heat island effect, increase property values, and build stronger and healthier communities. What's more, the value of those services increases exponentially as trees grow and flourish.

This plan takes a strategic approach to leveraging the value of the services provided by the urban forest. It sets out actions to achieve four important goals:

- Build knowledge to make wise decisions
- Plan and protect to preserve canopy cover
- Strengthen the urban forest to increase resilience
- Grow partnerships to strengthen stewardship

These goals support the over arching vision of the plan: "Richmond Hill and its urban forest grow and thrive together, each contributing to the health and vitality of the other."

By monitoring and measuring the progress and impact of this plan, the City will be able to adjust its actions and approaches to ensure the vision is achieved efficiently and effectively as Richmond Hill evolves and grows.

This plan focuses on the smart, strategic decisions that will maximize the City's investments in financial, social and environmental sustainability through urban forestry. This will be key to getting the maximum services possible from the urban forest in the most cost-effective way over the coming decades as the City grows and intensifies.

BIBLIOGRAPHY

Ambrose, M.J. 2016. *The 10-20-30 rule revisited: Is it a useful standard for urban forest diversity*. Presentation at Partners in Community Forestry, Indianapolis, IN, November 16-17, 2016.

Ball, J. 2015. *American Nurseryman - Using a 5 percent rule for tree selection*. Available online at https://www.amerinursery.com/american-nurseryman/the-5-percent-rule/. Last accessed March 30, 2018.

Berman, M.G., Jonides, J., and S. Kaplan. 2008. *The cognitive benefits of interacting with nature*. Psychological Science 19: 1207-1212.

City of Richmond Hill. 2007a. *By-Law No. 40-07, Tree – Planting*. Municipal Code, Property Maintenance, Chapter 1015, March 2007.

City of Richmond Hill. 2007b. *By-Law No. 41-07, Trees – Private Property Protection*. Municipal Code, Highway - Street, Chapter 821, March 2007.

City of Richmond Hill. 2008. *Dumping – Fill – Site Alterations*. Municipal Code, Property Maintenance, Chapter 967, October 2008.

City of Richmond Hill. 2009. *Richmond Hill Strategic Plan 2009: A Plan for People, A Plan for Change*. April 27, 2009.

City of Richmond Hill. 2010. *Richmond Hill Official Plan: Building a New Kind of Urban*. July 2010, partially approved by York Region May 19, 2011, partially approved by the OMB March 31, 2017 (Case No. PL110189). Office Consolidation to April 26, 2017.

City of Richmond Hill. 2013. *Richmond Hill Urban Design Guidelines: Building A New Kind of Urban*. September 2013.

City of Richmond Hill. 2014*. Greening the Hill. Our Community, Our Future: Environment Strategy*.

City of Richmond Hill. 2015. *Business Case – Operating Parks Operations: Block Planning*. Community Services: Public Works Operations Division. Pp. 152- 154.

City of Richmond Hill. 2016a. *Urban Forest Planting Guidelines*. February 2016.

City of Richmond Hill. 2016b. *2016 Asset Management Plan*. December, 2016.

City of Richmond Hill. 2017. *Emerald Ash Borer Budget Strategy Update* SRCFS.17.001. Staff Report for Budget Committee of the Whole Meeting.

City of Toronto. 2017. *Toronto's Forest Health Threats*. City of Toronto Parks, Forestry and Recreation. 61 pp.

City of Vaughan. 2014. *City-Wide Streetscape Implementation Manual and Financial Strategy For Intensification Areas and Heritage Conservation Districts*. November 2014. 236 pp.

Donovan, G. H., and D. T. Butry. 2009. *The value of shade: estimating the effect of urban trees on summertime electricity use*. Energy and Buildings 41: 662-668.

Donovan, G.H., Burty, D.T., Michael, Y.L., Prestemon, J.P., Liebhold, A.M., Gatziolis, D. and M.Y. Yao. 2013. *The relationship between trees and human health: Evidence from the spread of the Emerald Ash Borer*. American Journal of Preventive Medicine 44: 139-145.

DTAH, ARUP, Urban Trees + Soils and Urban Forest Innovations Inc. 2013. *Tree Planting Solutions in Hard Boulevard Surfaces Best Practices Manual*. City of Toronto. February 2013. 270 pp

Elliott, K.A. 1998. *The forests of southern Ontario*. The Forestry Chronicle 74: 850-854.

Faeth, S.H., Bang, C. and S. Saari. 2011. *Urban biodiversity: patterns and mechanisms*. Annals of the New York Academy of Sciences, 69-81.

Fernandez-Juricic, E. 2000. *Avifaunal use of wooded streets in an urban landscape*. Conservation Biology 14: 513-521.

Kenney, W.A. 2000. *Leaf Area Density as an urban forestry planning and management tool*. The Forestry Chronicle 76: 235-239.

Kuhlberg, M. 1998. *Ontario's nascent environmentalists: Seeing the foresters for the trees in southern Ontario, 1919-1929*. The Forestry Chronicle 74: 533-540.

Kuo, F.E., Sullivan, W.C., Coley, R.L., and L. Brunson. 1998. *Fertile ground for community: Inner-city neighborhood common spaces*. American Journal of Community Psychology 26: 823-851.

Municipal Act, 2001. S.O. 2001, c. 25.

Ontario Ministry of Municipal Affairs and Housing. 2014. 2014 *Provincial Policy Statement under the Planning Act*. Toronto: Queen's Printer for Ontario.

Ontario Ministry of Municipal Affairs. 2017a. *Oak Ridges Moraine Conservation Plan, 2017*. Toronto: Queen's Printer for Ontario.

Ontario Ministry of Municipal Affairs. 2017b. *Greenbelt Plan 2017*. Toronto: Queen's Printer for Ontario.

Ontario Ministry of Municipal Affairs. 2017c. *Growth Plan for the Greater Golden Horseshoe, 2017*. Toronto: Queen's Printer for Ontario.

Plan-It Geo. 2016. *Urban Tree Canopy Assessment Richmond Hill, ON*. City of Richmond Hill. December 2016.

Planning Act, 1990. R.S.O 1990, c. P13, s 16.

Rae, R.A., Simon, G. and J. Braden. *Public reactions to new street tree planting*. Cities and the Environment 3(1): 1-21.

Regional Municipality of York. 2010. *The Regional Municipality of York Official Plan 2016 Office Consolidation*. Modified York Region Official Plan 2010.

Regional Municipality of York. 2013. *York Region Forest Conservation Bylaw Bill No.70, Bylaw No. 2013-68*.

Regional Municipality of York. 2016. *York Region Forest Management Plan*. 36 pp.

Santamour, F.S. 1990. *Trees for urban planting: Diversity, uniformity, and common sense*. Metropolitan

Tree Improvement Alliance Proc. 7: 57-65.

Simpson, J.R. 1998. *Urban forest impacts on regional cooling and heating energy use: Sacramento County case study*. Journal of Arboriculture 22(1): 10-18.

Sullivan, W.C., Kuo, F.E. and S. DePooter. 2004. *The fruit of urban nature: Vital neighborhood spaces.* Environment and Behavior 36: 678-700.

Taylor, A. F., Kuo, F.E. and W.C. Sullivan. 2001. *Coping with ADD: The surprising connection to green play settings.* Environment and Behavior 33: 54-77.

TD Economics. 2014. Special Report. *Urban forests: The value of trees in the City of Toronto*. TD Bank Group. June 2014.

TRCA (Toronto and Region Conservation Authority). 2012. *Richmond Hill Urban Forest Study Technical Report*. October 2012.

TRCA (Toronto and Region Conservation Authority). 2015. *City of Richmond Hill: Terrestrial Biological Inventory and Assessment*. September, 2015.

United States Environmental Protection Agency - https://www.epa.gov/heat-islands/using-trees-and-vegetation-reduce-heat-islands

U.S. Environmental Protection Agency. 2008. *Urban Heat Island Basics*. Reducing urban heat islands: Compendium of strategies, Chapter 1. October 2008

Urban Forest Innovations, Inc., Beacon Environmental Ltd. And Plan-it Geo, LLC. 2018. *City of Richmond Hill Urban Forest Management Plan, Phase 1: Background and baseline conditions report*. July 2018.

Urban Forest Innovations, Inc., Beacon Environmental Ltd. And Plan-it Geo, LLC. 2018. *City of Richmond Hill Urban Forest Management Plan, Phase 2: Consultation summary report*. September 2018.

Whitchurch-Stouffville. 2017. *The Whitchurch forest*. On the Road to Whitchurch-Stouffville. April 2017.

Wolf, K.L. 2007. *City Trees and Property Values*. Arborist News 16(4): 34-36.

URBAN FOREST
Management Plan
2020-2040

Richmond Hill