2020
Urban Forest Strategic Management Plan

Appendix

OAKVILLE

Contents

APPENDIX A: Memo

To: Jalil Hashemi, Curtis Marcoux, Parks and Open Space
From: Kirk Biggar, Paul Barrette, Planning Services
CC: Chris Mark, Director, Parks and Open Space
    Mark Simeoni, Director Planning Services
Date: November 1, 2018
Subject: Classifying land use and zoning categories from the North Oakville Zoning By-law, 2009-189, in support of the Urban Forest Strategic Management Plan project.

Comments:
Per our meeting of August 30, 2018 (notes attached as Appendix A), this memo responds to the following tasks, as identified in that meeting:

    A) Comparative classification of the North Oakville Zoning By-law 2009-189 to the inZone (Livable Oakville) Zoning By-law 2014-014.

    B) Reconcile land use designations identified in North Oakville Master Plan with the North Oakville Zoning By-law 2009-189

A - Comparative classification: Zone classifications from Zoning By-law 2009-189 were matched with like zone classifications from Zoning By-law 2014-014.

This comparative classification is a continuation of previous work undertaken as part of the 2015 UFORE/i-Tree project, as detailed in Part B.

The 2015 work assumed that yard and set-back regulations in By-law 2014-014 could be used as a proxy for tree growing space. The same method was used to classify Bylaw

2009-189. Notations in the table appear at the end of the Memo.

Classification	Description	Zones in Zoning By-law 2014-014[1]	Zones in Zoning By-law 2009-189
Commercial and Mixed Use[2]	Lands designated and developed for concentrations of retail and service commercial uses Lands where residential, commercial, and office uses are integrated in a compact urban form at higher development intensities	Neighbourhood Commercial (C1) Community Commercial (C2) Core Commercial (C3) Service Station (C4) Business Commercial (E4) Central Business District (CBD) Main Street 1 (MU1) Main Street 2 (MU2) Urban Centre (MU3) Urban Core (MU4) Midtown Transitional Commercial (MTC)	Trafalgar Urban Core (TUC) Neyagawa Urban Core (NUC) Dundas Urban Core (DUC) Palermo Village North Urban Core (PUC) Neighbourhood Centre (NC)[3]
Employment	Lands for industrial, business, and office activities, including limited areas of service commercial uses	Office Employment (E1) Business Employment (E2) Industrial (E3) Midtown Transitional Employment (MTE)	Light Employment (LE) General Employment (GE) Service Area – Employment (SA) Automotive Service (AS)
Open Space and Parkway	Community lands used for parks, trails, and recreational activity, Private lands used for recreational activity -Lands protected under or regulated by Provincial legislation	Park (O1) Private Open Space (O2) Cemetery (CEM) Greenbelt (GB) Some Natural Area (N) Parkway Belt Public Use (PB1) Parkway Belt Complementary Use (PB2) Stormwater Management Facility (SMF) Some Institutional (I) Some Community Use (CU) Some Utility (U)	Cemetery (CE) Park (P) Stormwater Management Facility (SMF)
Public Use	Infrastructure and lands serving health, educational, religious, recreational, or cultural facility needs	Some Institutional (I) Some Community Use (CU) Some Utility (U)	Institutional (I)[4]
Residential Class A	Lands for housing with minimum front yard requirements of greater than 7.5 metres (primarily detached dwellings and apartment buildings on large lots)	Residential Low (RL1 and RL2) Some Residential High (RH) Some Institutional (I) Some Community Use (CU) Some Utility (U)	n/a

1 From the 2015 UFORE Land Use Classification memo, June 29, 2015 (Appendix A) in support of the 2015 i-Tree project, Growing Livability

2 "Mixed Use" added to Classification category through 2018 UFSMP comparison

3 Based on Regulation 7.5.3.2 All Other Buildings, i.e. non-residential

4 Includes some Service Commercial, Retirement Home

Classification	Description	Zones in Zoning By-law 2014-014[1]	Zones in Zoning By-law 2009-189
Residential Class B	Lands for housing with minimum front yard requirements equal to or greater than 3.0 metres and less than or equal to 7.5 metres (all housing forms)	Residential Low (RL3 through RL11) Residential Uptown Core (RUC) Residential Medium (RM1 through RM4) Some Residential High (RH) Some Institutional (I) Some Community Use (CU) Some Utility (U)	High Density Residential (HDR)[5]
Residential Class C	Lands for housing with minimum front yard requirements of less than 3.0 metres (primarily townhouse dwellings and detached dwellings on small lots)	Site-specific properties throughout all residential zones	Neighbourhood Centre (NC)[6] General Urban (GU) Sub-Urban (S)
Woodlots Natural Heritage System[7]	Rivers, streams, forests, and natural areas	Woodlots as identified by the Forestry Services Section, plus additional lands now zoned Natural Area (N)	Natural Heritage System (NHS)
Agriculture	Open areas used for agricultural purposes	Vacant lands remaining south of Dundas Street	n/a[8]

_____

5 Includes Mixed Use or Stand-Alone

6 NC/GU/S are residential and include detached, semi, duplex, triplex, townhouse and back-to-back townhouse, but NOT stacked townhouse

7 "Natural Heritage System" added to Classification category through 2018 UFSMP comparison

8 Any agricultural zoning in North Oakville exists as Existing Development (ED) and perhaps as NHS and coming into public ownership.

B - Reconcile land use designations: The following table takes land use designations identified on the North Oakville East and West Secondary Plans (Appendices 7.3 and 8.3 respectively) and matches them to their respective zones in By-law 2009-189.

The following table is adapted from the original presented in the meeting notes in Appendix A.

North Oakville East and West Secondary Plans (Master Plan Appendices 7.3 and 8.3 respectively)	Zoning By-law 2009-189
Trafalgar Road Urban Core Area	Trafalgar Urban Core (TUC)
Neyagawa Blvd. Urban Core Area	Neyagawa Urban Core (NUC)
Dundas Street Urban Core Area	Dundas Urban Core (DUC)
Palermo Village North Urban Core Area	Palermo Village North Urban Core (PUC)
Employment Area	Light Employment (LE)
Employment Area	General Employment (GE)
Employment Area	Service Area – Employment (SA)
Employment Area	Automotive Service (AS)
Cemetery Area	Cemetery (CE)
Community Park Area	Park (P)
Neighbourhood Park Area	Park (P)
Village Square / Urban Square	Park (P)
Stormwater Management Facility	Stormwater Management Facility (SMF)
Institutional Area	Institutional (I)
High Density Residential Area	High Density Residential (HDR)
Neighbourhood Centre Area	Neighbourhood Centre (NC)
General Urban Area	General Urban (GU)
Sub Urban Area	Sub-Urban (S)
Natural Heritage System Area	Natural Heritage System (NHS)
Transitional Area	Use Neighbourhood Centre (NC) ** No specific implementing zoning
Joshua Creek Floodplain Area	Use Natural Heritage System (NHS) ** No specific implementing zoning

We trust this is of assistance, please contact the undersigned if there are any questions:

Kirk Biggar, MCIP, RPP
Planning Services
kirk.biggar@oakville.ca
ext.3968

APPENDIX B: Summary of 2018 UFSMP Stakeholder Workshops

Town of Oakville Staff Workshops Summary

This report provides a high-level summary of participant feedback. This report is not intended to provide a verbatim transcript of the meeting. If you have any questions after reviewing this summary, please contact Curtis Marcoux, Supervisor-Invasive Species, Town of Oakville, at curtis.marcoux@oakville.ca or 905-845-6601.

Event Overview

On June 4, 2018, the Town of Oakville hosted a staff workshop for the Town of Oakville Urban Forest Strategic Management Plan (TOUFSMP). The workshop was held at the Queen Elizabeth Park Community and Cultural Centre at 2302 Bridge Road in Room 1 and 2 in Oakville from 9 to 11 a.m.

The same workshop was hosted for external stakeholders on June 4 (afternoon) and on June 5, 2018 (morning/afternoon). While the afternoon session on June 5 was directed at developers, out of the four attendees, three were town staff. As a result, the feedback gathered during this session has been summarized in the Town of Oakville staff workshop summary. A separate summary has been created for the external stakeholder workshops.

The event structure was:

- Welcome and Introductions
- Presentation – Town of Oakville Urban Forest Strategic Management Plan: Context and objectives for the TOUFSMP and past successes and challenges, including interactive 'Mentimeter' questions.[9]
- Break
- Strengthening our Urban Forest: Engagement activity identifying ways to strengthen urban forest management practices.
- Visioning Exercise: Engagement activity exploring attendees' vision for the urban forest in Oakville.
- Next Steps and Closing
- The purpose of the event was to gather feedback on the town's current urban forest management practices, discuss opportunities to strengthen the urban forest and its canopy cover, and to explore a vision for Oakville's urban forest in the future.

A total of 11 people attended the workshop on June 4 and a total of 4 people attended the workshop on June 5. Representatives from the Town of Oakville (e.g., Forestry,

---

9 Mentimeter is an interactive polling software.

Engineering and Construction, Development and Engineering), Halton Region, and BILD attended the workshops. Throughout the presentation, the facilitation team asked questions using mentimeter, an interactive and real-time polling tool.[10] Approximately 220 comments were gathered throughout the presentation and World Café exercise.

The presentation "Oakville Urban Forest Strategic Management Plan" highlighted the following:

Defining the Urban Forest: The urban forest is made up of all the trees growing in the Town of Oakville, including town-owned street and park trees, trees in forested areas, as well as trees on private property. Trees are an important part of Oakville's urban landscape, and provide a wide variety of social, health, aesthetic, economic and environmental benefits. The town's Forestry Services Section manages Oakville's urban forest using a long-term, sustainable strategy of development and maintenance in order to provide a perpetual green cover on public lands. In 2007, the Town of Oakville was named the Forest Capital of Canada by the Canadian Forestry Association.

Defining Urban Forestry: Urban forestry is the sustained planning, planting, protection, maintenance, and care of trees, forests, greenspace and related resources in and around cities and communities for economic, environmental, social, and public health benefits for people. The definition includes retaining trees and forest cover as urban populations expand into surrounding rural areas and restoring critical parts of the urban environment after construction. Expansion at the urban/rural interface raises environmental and public health safety concerns, as well

as opportunities to create educational and environmental links between urban people and nature. In addition, urban and community forestry includes the development of citizen involvement and support for investments in long-term on-going tree planting, protection, and care programs

Growing Oakville's Urban Forest: The following provides an overview of the development of urban forestry practices in Oakville:

- 2007 – Mayor's official goal to look at 40 per cent tree canopy coverage in 50 years

- 2008 – UFSMP (2008-2027) and Private Tree Protection By-law

- 2009 – Town Tree Protection Policy

- 2012 – NOUFSMP North

- 2014 – South Oakville Design Guidelines (Livable by Design Manual)

- 2015 – i-Tree Study

- 2016 – Growing Livability, A Comprehensive Study of our Urban Forests

- 2017 – UFSMP / Revised Private Tree Protection By-law

---

10 Mentimeter responses are in real-time and cannot be edited.

- Other existing policies and programs include:
  - The Livable Oakville Plan (2009 Town of Oakville Official Plan)
  - North Oakville East and West Secondary Plans (2006)
  - Town of Oakville Site Alteration By-law (2003)
  - Guidelines for Design of Accessible Facilities (2008)
  - Sustainable Design Guidelines (2010)
  - Urban Forest Health Monitoring Program (2014)
  - Invasive Forest Insect Management Program
  - Forest Stewardship Council Certification
  - Canopy Conservation, Hazard Abatement and Canopy Replacement programs
  - Public Tree Inventory (2009)
  - Oakville Backyard Tree Planting Program
  - Hydro Line Clearing Program
  - Emerald Ash Borer Woodlands Hazard Abatement Program
  - Decorative Tree Lighting Specifications

2008 Urban Forest Strategic Management Plan: The vision statement for the UFSMP (2008) states that Oakville's urban forest, an equal part of the community's infrastructure, contributes positively to the health of all residents. Oakville is a proud leader in urban forest stewardship. In 2005, the town had an average canopy cover of 26.5 per cent. The 2008 UFSMP resulted in 66 recommendations that were put forward for the Town of Oakville.

2012 North Oakville Urban Forest Strategic Management Plan: The NOUFSMP (2012) is the result of a UFSMP (2008). The NOUFSMP (2012) compliments and builds upon the 66 UFSMP

(2008) recommendations. The Plan resulted in 16 recommendations to reach a 40 per cent tree canopy cover target.

Urban Forest Strategic Management Plan: The Urban Forest Strategic Management Plan will guide tree planting, care, and protection in the urban area. The objectives of the plan include:

- To establish an urban forest strategy with implementation tools and action plans to guide town programs and activities for the protection, enhancement, restoration, expansion and sustainable management of Oakville's urban forest; and

- To provide recommendations and action plans towards achieving the targeted 40 per cent average forest canopy cover goal, broken down to each land-use type for the Town of Oakville.

The Plan will identify opportunities and challenges and a list of actions that are linked to strategic priorities.

Current Trends in Urban Forestry Practices: Between 2005 and 2015, the Town of Oakville has experienced an overall increase in its tree population from 1,849,300 trees in 2005 to 2,016,500 trees in 2015 on all land use types. Some of the challenges the town experiences with respect to managing the urban forest include streamlined definitions and policies; provincial statute to protect trees, but no mechanism to enforce; intensification and development pressure; reliance on industry to follow existing plans; invasive species (e.g., Buckthorn, Emerald Ash Borer, Asian Long-Horned Beetle); pest and disease; severe weather (climate change); and private tree removal. Some of the opportunities identified include setting targets for each land use across town, harmonizing delivery of urban forest programs across departments, and creating

a strategy based on collaboration between various stakeholders.

Urban Forest Strategic Management Plan Report Card: Together, the UFSMP (2008), the NOUFSMP (2012), and the i-Tree Study (2015) resulted in 104 urban forest recommendations. The results of the review of the recommendations are summarized below:

Plans	No of Recommendations	%
Completed	29	28
Partially completed or in progress	44	42
Not completed *(still relevant)*	20	19
Not completed *(no longer relevant)*	11	11
Total Recommendations	104	100

Ten draft themes emerged:

1	Integrate urban forest goals across all levels of planning.
2	Monitor and mitigate threats.
3	Improve forest resilience and biodiversity.
4	Optimize tree canopy cover.
5	Practice adaptive management.
6	Manage threats to forest health.
7	Maintain condition of individual trees.
8	Reduce risk to an acceptable level.
9	Increase public support.
10	Leverage strategic partnerships.

Following the presentation, participants engaged in a World Café exercise to explore the following:

- What can you do to increase urban forest canopy and health in the Town of Oakville?
- What opportunities do you see to increase coordination between the town and individuals/groups?
- What opportunities do you see to encourage residential and small commercial landowners to plant more trees?
- What opportunities do you see to encourage large commercial and industrial landowners to plant more trees?

Attendees rotated through each of the questions in groups of three for the June 4 workshop session and as a group for the June 5 workshop session (low number of attendees). The World Café style exercise was followed by a "vision" discussion, which was guided by the question "What does the future of urban forests in Oakville look like to you?" Attendees shared their thoughts using mentimeter.

A summary of the responses to the questions and the World Café exercise is provided in the "Summary of What We Heard" section below.

The town appreciates the participation and involvement of the community. Thank you to all who attended!

Consultation Promotion

The consultation was promoted through mailed distribution of a notice to Town of Oakville Staff, including the following:

- Executive Management
- Environmental Policy/Planning
- Planning
- By-Law
- Development Engineering
- Engineering and Construction
- Roads and Works
- Parks & Open Space

- Communications
- Strategic Business Services
- Public Works
- Water Resources & Management
- Forestry Services

Invitations to the external workshop in the afternoon on June 5 were sent to the development community. The meeting notice was sent electronically to all those who have provided email addresses and asked to join the email list.

Summary of What We Heard

Mentimeter Questions

As part of the presentation, the facilitation team asked participants to provide their input on a variety of interactive mentimeter questions on Oakville's urban forest. The following provides an overview of the input received during the Town of Oakville staff workshop on June 4 (morning) and the external stakeholder workshop on June 5 (afternoon) which was attended by three town staff and one external stakeholder.

What do you value most about Oakville's Urban Forest?

Town of Oakville Staff Workshop June 4

What do you value most about Oakville's Urban Forest?

Ecosystems Recreation Shade Biodiversity Air purification Recreational Use Healthy ecosystems Value Interconnectedness Animal habitat Diversity Habitats

👤 5

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 15 responses were collected on what attendees' value about Oakville's urban forest. The top three characteristics that attendees value about the urban forest include shade, habitat, and recreation. Other items listed include biodiversity, air pollution removal, and its interconnectedness, among others.

Which policies and programs offer the best opportunity to Improve the Urban Forest?

Policy/Program	Value
The Livable Oakville Plan	6.8
Private Tree Protection By-law	8.2
Town Tree Protection By-law	8.5
North Oakville East and West Secondary Plans	5.5
Town of Oakville Site Alteration By-law	7.2
Urban Forest Strategic Management Plan	7.4
Invasive Forest Insect Management Program	7.8
Forest Stewardship Council Certification	5.8

👤 11

Which policies and programs offer the best opportunity to Improve the Urban Forest?

Strongly disagree — Strongly agree

Policy/Program	Value
Guidelines for Design of Accessible Facilities	2.4
Sustainable Design Guidelines	4.3
Urban Forest Health Monitoring Program	4.5
Canopy Conservation, Hazard Abatement and Canopy Replacement Programs	4.6
Public Tree Inventory	4.3
Oakville Backyard Tree Planting Program	4.1
Hydro Line Clearing Program	3.4
Emerald Ash Borer Woodlands Hazard Abatement Program	4.4

👤 11

Town of Oakville Staff Workshop June 4

Which policies and programs offer the best opportunity to Improve the Urban Forest?

The Livable Oakville Plan — 5

Private Tree Protection By-law — 7.7

Town Tree Protection By-law — 7.3

North Oakville East and West Secondary Plans — 8.3

Town of Oakville Site Alteration By-law — 4.8

Urban Forest Strategic Management Plan — 7.3

Invasive Forest Insect Management Program — 7

Forest Stewardship Council Certification — 5.3

👤 6

Which policies and programs offer the best opportunity to Improve the Urban Forest?

Strongly disagree — Strongly agree

Guidelines for Design of Accessible Facilities — 2

Sustainable Design Guidelines — 3.2

Urban Forest Health Monitoring Program — 4.3

Canopy Conservation, Hazard Abatement and Canopy Replacement Programs — 4.2

Public Tree Inventory — 3.3

Oakville Backyard Tree Planting Program — 3.7

Hydro Line Clearing Program — 2

Emerald Ash Borer Woodlands Hazard Abatement Program — 3.3

👤 6
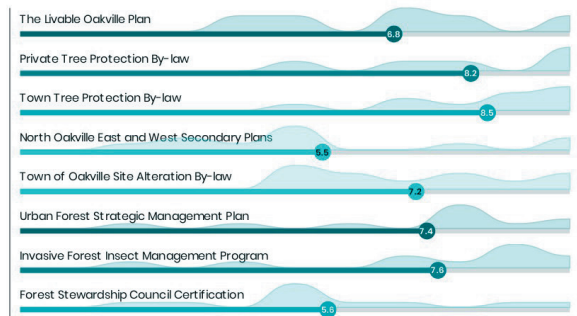
Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 17 responses were collected on the impact of town policies and programs on urban forestry practices. With regard to policies, based on a 10-point rating scale, with 10 being the highest impact and 1 being the lowest impact, the Town Tree Protection By-law (8.5 / 7.3) and the Private Tree Protection By-law (8.2 / 7.7) received the highest rating during the June 4 staff workshop and June 5 staff workshop, respectively. This was followed by the Invasive Forest Insect Management Plan and the Urban Forest Strategic Management Plan during both workshops.

Overall, the Town Tree Protection By-law and the Private Tree Protection By-law were identified to have the most significant impact on sustaining and enhancing the urban forest.

With regard to programs, based on a 10-point rating scale, Canopy Conservation, Hazard Abatement and Canopy Replacement Programs (4.6 / 4.2) and the Urban Forest Health Monitoring Program (4.5 / 4.3) received the highest rating, followed by the Public Tree Inventory, Emerald Ash Borer Woodlands Hazard Abatement Program, and the Oakville Backyard Tree Planting Program.

Overall, the Canopy Conservation, Hazard Abatement and Canopy Replacement Programs and the Urban Forest Health Monitoring Program were identified to have the most significant impact on sustaining and enhancing the urban forest.

Which private land areas offer the best opportunities to improve the Urban Forest?

Town of Oakville Staff Workshop June 4

Which private land areas offer the best opportunities to improve the Urban Forest?

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 17 responses were collected on attendees' perception on which private land uses (land not owned by the Town of Oakville) offer the best opportunities to improve the urban forest. Commercial lands were identified as one of the main opportunities to improve the urban forest. Other opportunities identified include residential, provincially owned, old mall parking lots, and Ministry of Transportation (MTO) lands.

Based on the staff workshop on June 4, commercial lands were believed to offer the best private opportunities to improve the urban forest. The results of the staff workshop on June 5 were evenly distributed, but the general trend of responses also focused on commercial lands.

Which Urban Forest stressors are most prevalent in Oakville?

Town of Oakville Staff Workshop June 4
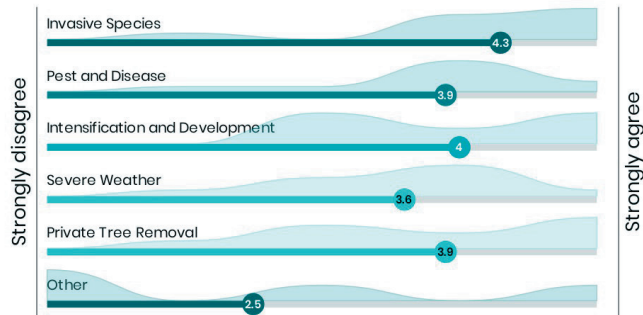
Which Urban Forest stressors are most prevalent in Oakville?
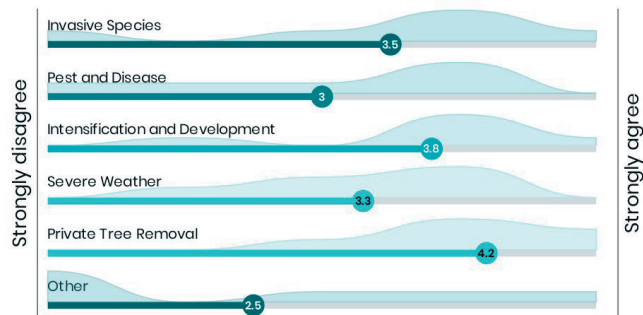
Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 16 responses were collected on urban stressors that workshop attendees consider most prevalent in Oakville. Based on a 10-point rating scale, with 10 being the highest impact and 1 being the lowest impact, invasive species (4.3) received the highest rating during the June 4 staff workshop, followed by a second response cluster including intensification and development (4.0), pest and disease (3.9), and private tree removal (3.9) as the second most prevalent stressors. During the June 5 staff workshop, private tree removal (4.2) received the highest rating, and intensification and development (3.8), invasive species (3.5), and sever weather (3.3) as the runner up responses.

Workshop attendees noted roadwork, development, pollution (e.g., air quality, water quality, salt on roads, etc.), flooding, and encroachment as other forms or urban forest stressors in the Town of Oakville.

Overall, private tree removal and invasive species were identified to be the most prevalent urban forest stressors in Oakville.

Are there other Urban Forest stressors in Oakville?

👤 10

Town of Oakville Staff Workshop June 4

Are there other Urban Forest stressors in Oakville?

👤 6

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 16 responses were collected on other urban forest stressors. Some of the top responses by attendees include vandalism, poor construction/design/maintenance practices, climate change and encroachment.

What is the most effective way to encourage Urban Forest protection, creation and enhancement on private lands?

👤 11

Town of Oakville Staff Workshop June 4

What is the most effective way to encourage Urban Forest protection, creation and enhancement on private lands?

👤 6

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 17 responses were collected on workshop attendees' perception of the most effective way to encourage urban forest protection, creation and enhancement on private lands.

Attendees at both workshop sessions identified incentives and education as the most effective way to promote a healthy urban forest on private lands. Other responses include bylaws and enforcement, staff development and stewardship programs.

From your perspective, what are the most significant challenges to meeting the Town's objectives for strengthening the Urban Forest?

Competing mandates
Inter agency approach
Development entitlement
Real time
Alignment of plans
Development
Cash
Values
Climate change
Invasive species
Available ROW space
Enforcement
canopy cover monitoring
Lack of incentives
Funding
Department alignment
Tools
Residents
Education

👤 11

Town of Oakville Staff Workshop June 4

From your perspective, what are the most significant challenges to meeting the Town's objectives for strengthening the Urban Forest?

LARGE FOOTPRINTS
Provincial support
Aesthetics
Attitude toward trees
Invasives
Violations
Coordination alignment
Individual Preference
Maintenance Cost
Desp
Site plan
Town space

👤 6

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 17 responses were collected on workshop attendee's perception of the most significant challenges to meeting the town's objectives for strengthening the urban forest.

Attendees at the staff workshop session on June 4 identified climate change, development, and invasive species as the most significant challenges. The results of the staff workshop on June 5 were evenly distributed, and attendees identified attitude towards trees, maintenance costs, provincial support, and coordination alignment as the most significant challenges for strengthening the urban forest.

From your perspective, what are the most significant opportunities for strengthening the Urban Forest?

Town of Oakville Staff Workshop June 4

From your perspective, what are the most significant opportunities for strengthening the Urban Forest?

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

A total of 16 responses were collected on workshop attendees' perception of the most significant opportunities for strengthening the urban forest.

Attendees at both workshop sessions identified education as the most effective way to strengthen the urban forest. Other responses identified stewardship programs, planting incentives, a town nursery (a town-owned nursery only carrying plant species native to the region) and tree planting as opportunities to strengthen the urban forest.

Based on the 10 suggested opportunities , assign a number to each priority with 1 being least important and 10 being most important?

Strongly disagree — Strongly agree

- Manage threats to forest health — 3.7
- Maintain condition of individual trees — 3
- Reduce risk to an acceptable level — 3.3
- Increase public support — 3.5
- Leverage strategic parternships — 3

👤 11

Based on the 10 suggested opportunities , assign a number to each priority with 1 being least important and 10 being most important?

Strongly disagree — Strongly agree

- Integrate urban forest goals across all levels of planning — 3.9
- Monitor and mitigate threats — 4.1
- Improve forest resilience and biodiversity — 4.1
- Optimize tree canopy cover — 3.6
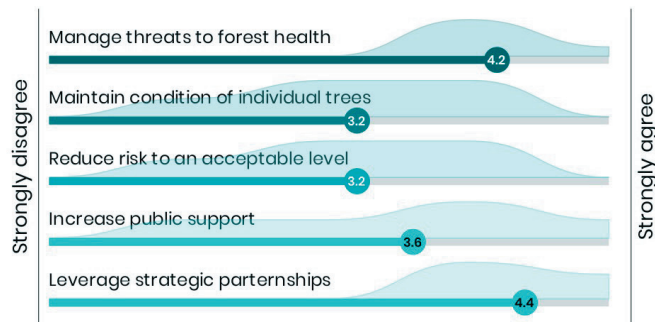- Practice adaptive management — 2.9

👤 11
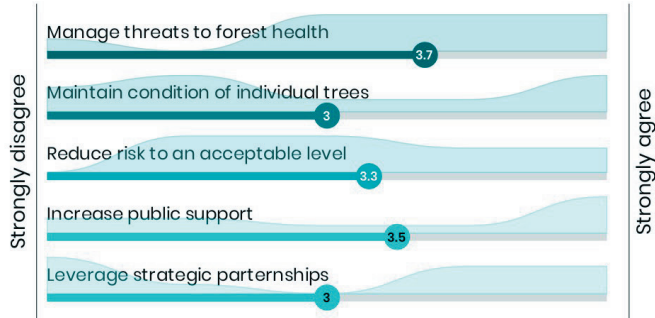
Town of Oakville Staff Workshop June 4

Based on the 10 suggested opportunities , assign a number to each priority with 1 being least important and 10 being most important?

Integrate urban forest goals across all levels of planning — 4.3

Monitor and mitigate threats — 3.8

Improve forest resilience and biodiversity — 4.3

Optimize tree canopy cover — 3.5

Practice adaptive management — 3.5

Strongly disagree — Strongly agree

👤 6

Based on the 10 suggested opportunities , assign a number to each priority with 1 being least important and 10 being most important?

Manage threats to forest health — 4.2

Maintain condition of individual trees — 3.2

Reduce risk to an acceptable level — 3.2

Increase public support — 3.6

Leverage strategic parternships — 4.4

Strongly disagree — Strongly agree

👤 5

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

Towards the end of the presentation, attendees were asked to rank the ten themes that emerged as part of the review of the UFSMP (2008), the NOUFSMP (2012), and the i-Tree Study (2015). A total of 17 responses were collected. Between the two workshop groups, integrate urban forest goals across all levels of planning, improve forest resilience and biodiversity, and mange threats to forest health were scored slightly higher than some of the other themes.

World Café Exercise

Attendee input was also collected during a lively and collaborative World Café exercise. Attendees at the staff workshop (June 4) were placed into three groups and each group had the opportunity to engage in discussion and write down their thoughts on the questions below. Due to the lower turnout at the June 5th workshop session attendees provided their responses using mentimeter.

The following sections provide an overall summary of all feedback received.

What can you do to increase urban forest canopy and health in the Town of Oakville?

Responses gathered at the Town of Oakville Staff Workshop June 4

- Increase installation capacity (e.g., financial support, staffing, planting materials, contractors)
- Tools to monitor plans and reports (noted 3x)
- More actively include different actors such as institutional, industrial and educational stakeholders
- Finding measures for reforestation of wood
- Adapt – be resilient

- Damage to trees by operations
- Setting the "targets" for plans (development)
- Streamlining the planting of tree species
  - Setting detailed tree planting specifications
  - Setting minimum growing space for trees
  - The right tree in the right place
  - Goal alignment
  - Densification vs. tree protection

Responses gathered at the June 5 (afternoon) Town of Oakville Staff Workshop with One External Stakeholder

What can you do to increase the urban forest canopy and health in the Town of Oakville?

Deny trees
Deny removals
Adopt a town tree
Control invasives   Plant a tree
Tell Industry to Plant
Educate
Strict replacement
Preserve existing
Plant a lot

👤 5

What opportunities do you see to increase coordination between the town and individuals/groups?

Responses gathered at the Town of Oakville Staff Workshop June 4

- Invasive species – recruit vetted contractors and operational resources at more favourable rate

- While property owners are well-intentioned a key concern is where trees are planted (e.g., retroactive tree planting in right of way)

- Engagement, consultation , and follow-up with property owners

- At a staff level the town and region work well together

- While it was noted that coordination exists at the staff level, need for greater coordination within the town was identified

- Program coordination rather than focusing on a specific area

- Property owners are the greatest asset/opportunity

- Opportunities to improve education and facilitation (e.g., monitor and maintenance, application form and modifications, online application)

- Streamlining and formalizing (e.g., application deadlines consolidated, one time frame, circulation, sign-off)

- Fixed budget

- Increase number of events

- Town to hire a partnership specialist to liaise between stakeholders

- The question was raised: Is it possible to apply the idea of a hierarchy in setting priorities and making decisions vis-à-vis infrastructure in the right-of-way? Where does green infrastructure fit?

- Users of the facility (e.g., pedestrians, cyclists, transit, goods movement, and private cars)

- Infrastructure hierarchy
    - Trees
    - Shrubs
    - Wildflowers
    - Pipes, wires
    - Above and below ground
    - Concrete – sidewalk
    - Asphalt – road

Responses gathered at the June 5 (afternoon) Town of Oakville Staff Workshop with One External Stakeholder

What opportunities do you see to increase coordination between the Town and individuals/groups?

Ward Workshops
A tree ambassador
Homeowner Packages
Realty package   Coordinated education
Pre-Consultation Meetings
Partnership specialist   Education   Planting 101
Desk clarity   Developers show up
Regional meetings
Clear processes

What opportunities do you see to encourage residential and small commercial landowners to plant more trees?

Responses gathered at the June 4 Town of Oakville Staff Workshop

- Funding to landowners (incentives)
  - Coordinate with Region to address both woodlands and private/canopy cover – incentives
  - Underutilization of provincial and other funding (e.g. 50 million tree program through Conservation Halton, grants for protecting species at risk program)
  - 50 per cent cost sharing program for planting with agreements for maintenance
  - Financial incentives need to be beneficial to landowners (e.g., buying in bulk to offer cheaper trees)
  - Town to establish 'nursery business' as a service that carries native trees
  - Recognize value of large trees (e.g., rebates on converting parking lots, rebate on taxes with registry of large statue trees, build on residential participation for street tree replacement program)

- Education about where and what should be planted (e.g., better coordination with development and road construction and business owners and property owners)
  - Must take into consideration long term impacts, maintenance (salt)
- Parking lot regulations
  - Challenging to enforce and better enforcement is needed (e.g., longer follow up periods and larger hold backs for non-compliance). While planning and policies are good, getting trees planted and maintaining them is an issue.

Responses gathered at the June 5 (afternoon) Town of Oakville Staff Workshop with One External Stakeholder

What opportunities do you see to encourage residential and small commercial landowners to plant more trees?

Contract admin

Carbon tax reduced

Incentives

Increased property value

Emphasize benefits

Land value

👤 5

What opportunities do you see to encourage large commercial and industrial landowners to plant more trees?

Responses gathered at the June 4 Town of Oakville Staff Workshop

- Ownership – provide assistance – town provide assistance to other stakeholders (companies)
- Government lands under provincial act – town does not necessarily have authority
- Are there any legislative tools for large commercial/industrial landowners
  - Support through development to secure landscaping (without application can't do much)
- Invasive Species Act – province has some legislation but enforcement is not quite there yet
- Existing development – make staff more aware of urban forest on company property
- Expand tree planting programs - e.g., Silva cells, green roofs, roof top terrace (lack of incentives/ enforcement)

- Underground space concerns (e.g., sewer)
- Lots of opportunity (e.g., business development with those companies / draw on volunteer groups)
- Transition from planting public towards private (more available space)
- Coordination
- Target big companies
- Volunteers
- Hospital and Sheridan College
- Parking lot requirements
- "People planting where they shouldn't"
- Alignment

Responses gathered at the June 5 (afternoon) Town of Oakville Staff Workshop with One External Stakeholder

What opportunities do you see to encourage large commercial and industrial landowners to plant more trees?

Resource center
Partnership specialist
Contract admin services
Eco minded Incentives
Marketing
Volunteer engagement
Competing Standards
Recognition Publicity

👤 5

Once every group had a chance to discuss each of the three questions, everyone came together to report back on what was discussed at each table.

"Vision" Discussion

The workshop concluded with a "vision" discussion which was guided by the question "What does the future of urban forests in Oakville look like to you?" The following provides the input received through a Mentimeter exercise.

What does the future of Urban Forests in Oakville look like to you?

Ornamental trees
Parks with lots of divers
Stocked
Continuing to be a leader
Challenging
Collaborative
Tree lined ROWs
Sustainable
Challenged
Resilient
Canopy increases
Stressed
Dense
Invasives increases
Diverse
Exciting
Growing
Well stocked on pub lands
Evolving
Green
Engaging everyone

👤 11

Town of Oakville Staff Workshop June 4

What does the future of Urban Forests in Oakville look like to you?

Improving
Innovation
Improving over time
Challenging
Loss of mature trees
Lush
Difficult
Hopeful
Greater than 40

👤 5

Town of Oakville Staff Workshop June 5 (afternoon) with One External Stakeholder

Other verbal and written comments and questions collected as part of the workshop presentation and exercise not captured above include:

- General confusion exists with what "private land uses" entail. Clarification was provided by Town of Oakville staff that private land uses refers to land uses that are not Town of Oakville property.

- Incentives (e.g., monetary, tax return, certification).

- Attention must be paid to staff training to ensure everyone has the same general level of understanding when it comes to the urban forest.

- Real time – town would benefit from real time canopy cover tools to monitor how the canopy cover is changing. The town's i-Tree Study is carried out every five years and therefore only provides a snapshot of the tree canopy cover at a certain point in time.

APPENDIX C: Developing Canopy Cover Targets for South Oakville

Methodology Used to Determine Urban Tree Canopy Targets for South Oakville to Support 40% Canopy Cover Goal

Determination of urban tree cover percent targets by land use for South Oakville

The Town of Oakville has a goal of reaching 40 per cent tree canopy cover by 2050. In order to realize this goal, the Town has engaged in numerous projects to describe and quantify existing tree canopy cover and explore the feasibility of achieving the 40 per cent canopy cover goal in Oakville, both north and south of Dundas (North Oakville and South Oakville, respectively). The 2015 Growing Livability study used a satellite remote sensing analysis to map the spatial distribution of urban tree cover (UTC) and potential plantable areas (PPA) for South Oakville. The Town of Oakville subsequently developed a land use classification map in 2018 to delineate areas zoned for different land uses, such as residential class A, residential class B, employment, transportation corridor, etc. (Table 1). This Appendix describes in detail the approach taken to set UTC targets by land use type for South Oakville as part of the 2020 UFSMP, for which UTC mapping data from the 2015 Growing Livability study were combined with the Town's 2018 land use classification map to support related analyses.

An iterative approach was used to arrive at the new UTC targets by land use that relied on established methodologies complemented by local knowledge and experience to develop UTC targets by land use that, if met, will achieve the 40 per cent tree canopy cover target for South Oakville

Target-setting began by looking at targets using the "75th percentile rule". This was used in a preceding study[11] of the feasibility of achieving the 40 per cent canopy cover goal in South Oakville. The "75th percentile rule" was first introduced for the City of Portland, Oregon in 2003 as a technique for setting canopy cover goals based on what currently exists in ownership-defined parcels within any given land use type or defined geographic area. It is based on the concept that it should be possible to achieve an average UTC per cent for the land use type in questions that, at minimum, would be equivalent to the UTC per cent currently met in 75 per cent, or three quarters of the parcels designated as belonging to the land use type in question.

---

11 *PlanIt Geo feasibility of 40% canopy cover goal study, unpublished*

Using 2015 UTC and PPA data[12], overlain on the 2018 land use map for South Oakville to complete these calculations, UTC per cent targets based on the 75th percentile rule were determined for all eight designated land use types (Table 1). At the same time, the current UTC per cent and increase in UTC per cent required to meet the 75th percentile-based UTC per cent targets were calculated, as well their representative area in hectares for each land use type.

Current UTC area and increase in UTC area required to arrive at the total target UTC area, by land use, and the total target UTC area for all land use types combined were summed. These totals represent what would be the resulting UTC area, by land use and overall, if the 75th percentile based UTC targets were met. Following these area-based calculations, the overall target UTC area (ha) was converted back to a percentage of total land area to determine the overall UTC% for South Oakville represented by the 75th percentile rule. This analysis determined that by using the 75th percentile rule to set UTC targets across all land use types, the Town would only achieve UTC equivalent to 35.1% tree canopy cover, falling short of the 40% canopy cover goal (Table 1).

For this reason, further adjustments to UTC targets were made in consideration of both the potential canopy and probable constraints in each land use type. Final UTC% targets by land use type were arrived at in consultation with the Core Working Team that reflect what the Town believes to be possible in a planning context that would, if implemented, achieve the canopy cover goal of 40% for South Oakville. Depending upon land use type and total area by land use, UTC% targets were adjusted either up or down from the 75th percentile baseline targets to arrive at the final UTC% targets. The final overall UTC% targets, current UTC%, and increase in UTC area (ha) required to meet UTC% targets by land use type for South Oakville are shown in Table 2.

The additional canopy required to meet the new UTC% targets was also compared to the possible planting area (PPA) by land use type, which is synonymous with pervious vegetated areas that could potentially support canopy, to determine if the targets were feasible to implement. All proposed UTC% targets by land use were found to be feasible from an available area perspective except for the "Woodlots Natural Heritage System" land use type, which fell short of the 90% UTC target by 2.8% (Table 2). This difference is negligeable, and can be overcome by planting in areas that were not in 2015 identified as vegetative PPA but could support trees, such as areas of bare soil. There may also have been expansion of canopy in woodlots and natural heritage system lands in the years since the UTC was mapped in 2015 that would negate such a small difference.

12 PlanIt Geo land cover data from Growing Livability Study.

Table 1. Urban tree cover (UTC) targets by land use – 75th percentile-based vs. initial targets for South Oakville

Land use	Target UTC% based on 75th percentile	Current UTC%	UTC% increase to meet 75th percentile target	UTC% increase to meet targets	Total land area (ha)	Current UTC area (ha)	Increase in UTC area required to meet 75th pct target (ha)	Total 75th pct target UTC area (ha)	Total proposed target UTC area (ha)	Overall UTC% if 75pct targets are met
Commercial and mixed use	14.8	6.3	8.5	13.7	439.4	27.7	37.2	64.9	87.9	
Employment	12.2	9.4	2.7	10.6	1505.0	141.9	41.1	182.9	301.0	
Open space and parkway	41.0	34.3	6.7	15.7	1387.7	476.0	93.2	569.2	693.9	
Public use	27.0	12.6	14.3	7.4	226.3	28.6	32.4	61.0	49.8	
Residential class A	56.7	44.2	12.5	0.8	890.9	394.0	111.2	505.2	400.9	
Residential class B	28.2	22.1	6.0	7.9	3103.7	687.1	187.7	874.8	993.2	
Transportation Corridor	9.9	5.9	3.9	9.1	274.1	16.3	10.8	27.1	41.1	
Woodlots natural heritage system	74.1	64.6	9.5	25.4	1182.7	764.0	111.8	875.9	1064.4	
Area totals and UTC% with targets met					**9009.7**	**2535.6**	**625.4**	**3161.0**	**3632.1**	**35.1**

Table 2. Final overall urban tree cover (UTC) targets by land use for South Oakville

Land use	South Oakville Overall UTC Target	Current UTC%	UTC% increase to meet overall targets	Total land area (ha)	Current UTC area (ha)	Current PPA (ha)	Increase in UTC area to meet target UTC (ha)	Potential UTC (ha) = current UTC + PPA (ha)	Potential UTC% (ha) = current UTC + PPA (%)	Total target UTC area (ha)	Overall UTC% if targets are met
Commercial and mixed use	20	6.3	13.7	439.4	27.7	87.3	60.2	115.0	26.2	87.9	
Employment	20	9.4	10.6	1505.0	141.9	431.3	159.1	573.2	38.1	301.0	
Open space and parkway	50	34.3	15.7	1387.7	476.0	684.2	217.8	1160.2	83.6	693.9	
Public use	20	12.6	7.4	226.3	28.6	78.2	16.7	106.8	47.2	45.3	
Residential class A	45	44.2	0.8	890.9	394.0	287.1	6.9	681.2	76.5	400.9	
Residential class B	30	22.1	7.9	3103.7	687.1	1088.8	244.0	1775.9	57.2	931.1	
Transportation Corridor	15	5.9	9.1	274.1	16.3	148.9	24.9	165.1	60.2	41.1	
Woodlots natural heritage system	90	64.6	25.4	1182.7	764.0	273.6	300.4	1037.6	87.7	1064.4	
Area totals and UTC% with targets met				**9009.7**	**2535.3**	**3079.3**	**1029.9**	**5614.9**		**3565.5**	**39.6**

Determination of Urban Tree Cover Percent Targets by Land Use for Privately Owned Parcels

While the final UTC per cent targets by land use for South Oakville (Table 2) provide high-level strategic direction to meet the 40 per cent canopy cover goal, the reality is that the proposed UTC targets for residential land use types are very ambitious in a private land development/redevelopment context. This is due to primarily to the fact that lot space is limited, and there is a tendency for development/redevelopment projects to minimize the pervious lot area that could support trees in favor of increasing dwelling size and "hardscaping".

However, if the analysis considers the contribution of current UTC on all publicly owned lands towards the UTC per cent targets by land use for South Oakville, it becomes possible to reduce UTC per cent targets by land use for private lands and still meet the overall UFC targets by land use for South Oakville. In other words, by counting the canopy cover on public lands towards the proposed overall UTC per cent targets by land use, the UTC per cent targets required on private lands can be reduced such that the associated adjusted UTC per cent cover requirements, if met, in combination with existing UTC on public lands within each land use, will reflect the final UTC per cent targets. Achieving the Town's 40 per cent canopy cover goal is possible using adjusted private land targets so long as the UTC targets for public lands are maximized where possible to account for any deficits. This approach rests on two assumptions: 1) that the adjusted private land canopy cover targets will be met in the longer term as trees mature, and 2) that the Town maximizes potential canopy on all Town owned and managed public lands.

The determination of UTC targets by land use for privately owned parcels relied on a series of UTC area based calculations that considered existing UTC alongside final UTC targets by land use. The steps involved were as follows:

1. Determine total land area by land use type for all of South Oakville;

2. Calculate existing UTC area (ha) by land use type for all publicly owned lands, by aggregating "Town owned and managed", "other public agency owned and managed", and other agency owned but Town managed" lands;

3. Calculate the proportion of the proposed target UTC area (ha) that was met by the existing UTC area (ha) on publicly owned lands for each land use type;

4. Multiply the inverse proportion of UTC target met, or in other words the proportion of UTC target remaining by the overall final UTC target area for each land use type, resulting in the "adjusted" private land UTC target for each land use type;

A flow chart of the sequence of calculations and corresponding results when implementing such an approach to set private land-specific UTC targets is shown below (Figure 1). For illustrative purposes and to demonstrate that all of the UTC area associated with final UTC (ha) targets has been accounted for, Figure 1 also shows the reverse calculation pathway, i.e., a determination of the contribution of existing UTC area on private lands to the final UTC targets and the corresponding adjusted public land UTC% target for the same land use type (Residential B; Figure

1). Note that the adjusted public land UTC target shown here represents the inverse scenario for which UTC on private lands is counted towards achieving the final UTC target on public lands. This is included for illustrative purposes only.

Figure 1. Calculation of Private Land UTC targets for the "Residential B" land use type adjusted for the contribution of existing UTC on all publicly owned lands, and vice-versa. Adjusted Public Land UTC target calculation pathway included to demonstrate that achievement of adjusted private land and public land UTC targets adds up to the proposed site plan 30% UTC target across all ownership types, e.g., Adjusted Public Land Target (12.7% of total land area = 394 ha) + Adjusted Private Land Target (25.1% of total land area = 779 ha) = 30% UTC target (931 ha).
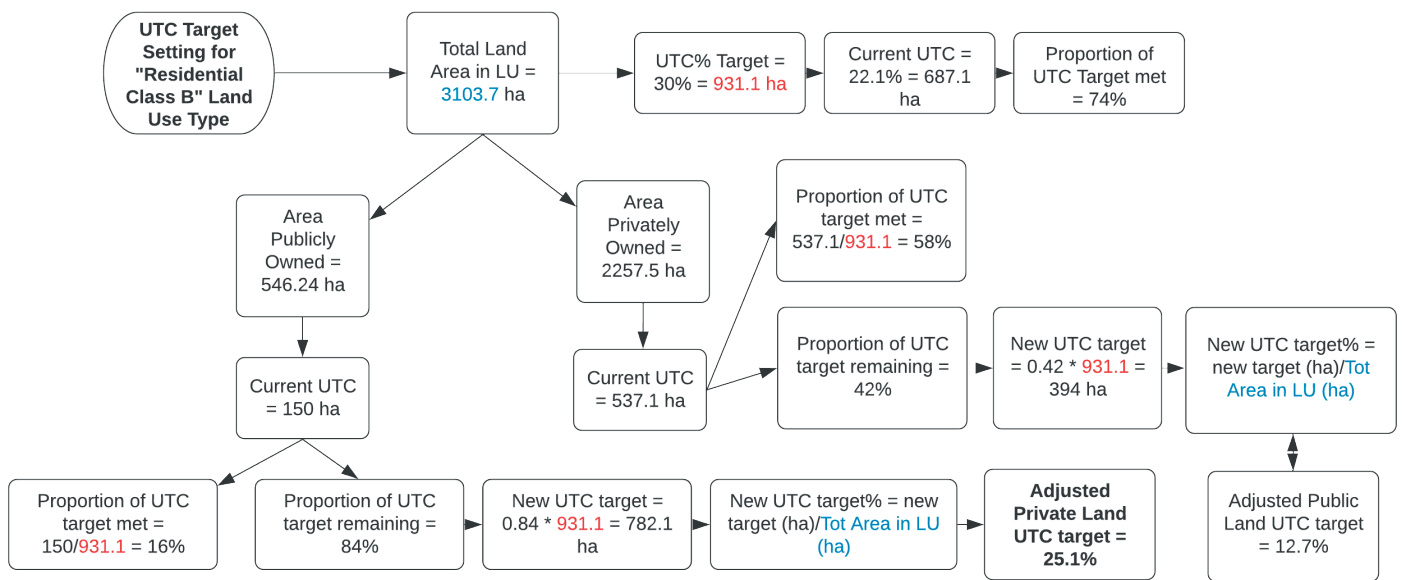
Table 3 summarizes the overall UTC targets and adjusted private land UTC targets, by land use, for South Oakville. Included also are summaries of current and target UTC percent and area, and changes in UTC percent and area required to meet UTC targets for private lands.

Table 3. Overall UFC targets and adjusted private land UFC targets by land use for South Oakville

Land Use	South Oakville Overall Target UTC (%)	Private Land Canopy Targets (%)	Current Private Land UTC (%)	UTC % Change to Meet Private Land Targets	Total Private Land Area (ha)	Current Private Land UTC Area (ha)	Current Private PPA (ha)	UTC Area Change Needed to Meet Targets (ha)	Potential UTC (ha) = Current UTC + PPA (ha)	Potential UTC% = Current UTC + PPA (%)	Total Private Land Target UTC Area (ha)	Private Land UTC% if Targets Are Met
Commercial and Mixed Use	20	19.0	5.5	13.5	388.4	21.3	67.717	52.5	89.0	22.9	73.8	
Employment	20	20.0	8.9	11.1	1352.5	120.6	358.501	149.9	479.9	35.4	270.5	
Open Space and Parkway	50	21.0	28.6	-7.6	254.5	72.8	116.867	-19.3	189.6	74.5	53.4	
Public Use	20	18.0	12.4	5.6	193.9	24.1	65.786	10.8	89.9	46.3	34.9	
Residential Class A	45	35.0	43.3	-8.3	753.0	326.3	226.221	-62.7	552.5	73.4	263.6	
Residential Class B	30	25.0	21.0	4.0	2557.5	537.1	862.487	102.3	1363.6	53.3	639.4	
Transportation Corridor	15	11.0	7.9	3.1	70.7	5.6	28.552	2.2	34.1	48.3	7.8	
Woodlots Natural Heritage System	90	32.0	39.8	-7.8	203.7	81.1	73.141	-15.9	154.2	75.7	65.2	
Area totals and UTC% with targets met					5774.2	1188.8	1763.3		2952.1		1408.5	
Canopy cover % revised targets met												24.4

APPENDIX D: Area Summary of Existing and Potential UTC by Forestry Zone

The following table summarizes the area of existing UTC in the town, breaking it down by four categories of land ownership and by Forestry Zone.

Table 1. Area of Existing UTC by Forestry Zone and Land Ownership (Source data: 2015 Land Cover Data for Oakville, derived for Growing Livability Study by Plan It Geo).

UTC – AREA IN HECTARES

Zone	Town Owned & Managed	Private	Other Public, Town-managed	Other Public, Not Town-managed	Road	Grand Total
1	17	56	-	7	4	85
2	10	41	0	0	4	56
3	64	40	4	3	6	116
4	48	91	0	13	9	161
5	32	141	-	0	10	183
6	31	67	-	2	8	108
7	36	106	0	6	10	159
8	17	68	-	1	4	90
9	13	51	-	0	5	70
10	9	62	0	6	4	81
11	13	29	0	3	4	49
12	22	52	34	17	7	132
13	27	19	0	2	2	50
14	25	88	0	6	7	126
15	97	83	1	3	8	192
16	15	31	73	9	3	130
17	1	145	-	19	3	169
18	6	18	0	1	1	25
19	38	27	22	0	2	89
20	22	12	0	0	2	36
21	100	49	1	0	7	157
22	68	26	0	18	3	115
23	30	13	0	0	3	45
24	36	4	0	69	2	111
Grand Total	**778**	**1,318**	**136**	**186**	**119**	**2,537**

The following table describes areas of opportunity for tree planting in pervious land covers, in other words open areas comprised of grass, soil or non-tree land covers.

Table 2. Area of Potential UTC (Pervious Possible Planting Area or PPA) by Forestry Zone and Land Ownership.

POTENTIAL UTC – PERVIOUS AREA IN HECTARES (GRASS AND SOIL LAND COVER, OR POSSIBLE PLANTING AREA – PPA)

Zone	Town Owned & Managed	Private	Other Public, Town-managed	Other Public, Not Town-managed	Road	Grand Total
1	14	41	-	2	5	62
2	12	39	2	0	5	57
3	29	51	1	6	7	94
4	30	99	0	3	10	142
5	23	92	-	1	10	125
6	18	52	-	1	6	77
7	33	119	0	8	15	175
8	22	85	-	8	10	125
9	24	92	-	5	10	131
10	22	149	4	3	10	188
11	18	61	1	16	12	108
12	19	75	1	13	16	124
13	13	25	0	5	5	49
14	21	108	1	5	11	145
15	37	127	2	4	18	187
16	14	62	31	20	9	136
17	5	158	-	47	5	215
18	23	91	0	14	11	139
19	30	71	14	0	9	124
20	11	30	1	1	5	47
21	68	107	3	1	20	199
22	36	67	0	2	10	115
23	46	73	1	1	11	132
24	26	30	2	123	6	188
Grand Total	**594**	**1,904**	**63**	**288**	**235**	**3,084**

The following table describes areas of opportunity for tree planting in hard surfaces, in other words impervious land cover not occupied by buildings or roads.

Table 3. Area of Potential UTC (Impervious Possible Planting Area or PPA)
by Forestry Zone and Land Ownership.

POTENTIAL UTC – IMPERVIOUS AREA IN HECTARES (ALL IMPERVIOUS LAND COVER OTHER THAN ROADS AND BUILDINGS OR PPA)

Zone	Town Owned & Managed	Private	Other Public, Town-managed	Other Public, Not Town-managed	Road	Grand Total
1	4	13	-	2	2	22
2	4	22	3	0	3	32
3	12	27	0	2	6	47
4	9	56	0	2	6	72
5	7	75	-	0	3	86
6	13	65	-	0	6	84
7	19	117	1	3	11	150
8	16	91	-	0	7	115
9	9	106	-	2	6	124
10	6	92	0	1	8	107
11	8	37	1	4	7	56
12	10	106	1	3	15	135
13	5	21	0	1	3	30
14	7	51	0	1	7	66
15	14	78	0	2	11	105
16	7	20	1	18	8	53
17	1	11	-	0	1	14
18	5	117	1	2	5	130
19	13	53	3	0	12	80
20	5	25	0	0	4	34
21	20	87	3	2	17	129
22	13	37	1	0	9	60
23	19	61	1	0	15	97
24	7	28	2	2	8	47
Grand Total	**234**	**1,396**	**17**	**48**	**181**	**1,876**

APPENDIX E: 2018 Land Cover in the Town of Oakville

The following land cover estimates were derived using the United States Department of Agriculture (USDA) i-Tree Canopy Tool and a total point sample size of 4496 for the Town of Oakville (combined North and South Oakville). The tool uses a mosaic of most recently available Google Earth leaf-on imagery from which the estimates for tree/shrub cover are derived. The data provides updated information about the status of the town's canopy cover.

NORTH OAKVILLE

Cover class	n =# points	n =Total points	% Cover	SE %	95% CI	Accuracy lower	Accuracy upper	95% CI Upper	95% CI Lower
Grass and Low Vegetation	790	1303	60.6%	1.4%	0.0265	0.5928	0.6198	0.6328	0.5798
Building	26	1303	2.0%	0.4%	0.0076	0.0161	0.0238	0.0275	0.0124
Trees and shrubs	359	1303	27.6%	1.2%	0.0243	0.2631	0.2879	0.2998	0.2513
Road	72	1303	5.5%	0.6%	0.0124	0.0489	0.0616	0.0677	0.0429
Impervious other	29	1303	2.2%	0.4%	0.0080	0.0182	0.0263	0.0303	0.0142
Water	15	1303	1.2%	0.3%	0.0058	0.0086	0.0145	0.0173	0.0057
Parking Lots	12	1303	0.9%	0.3%	0.0052	0.0066	0.0119	0.0144	0.0040
	1303								
Total Points	1304								
Null points	1								

SOUTH OAKVILLE

Cover class	n =# points	n =Total points	% Cover	SE %	95% CI	Accuracy lower	Accuracy upper	95% CI Upper	95% CI Lower
Grass and Low Vegetation	746	3192	23.4%	1.3%	0.0262	0.2203	0.2471	0.2599	0.2075
Building	488	3192	15.3%	1.1%	0.0223	0.1415	0.1643	0.1752	0.1306
Trees and shrubs	1042	3192	32.6%	1.5%	0.0291	0.3116	0.3413	0.3555	0.2974
Road	321	3192	10.1%	1.0%	0.0186	0.0911	0.1101	0.1192	0.0819
Impervious other	361	3192	11.3%	1.0%	0.0196	0.1031	0.1231	0.1327	0.0935
Water	30	3192	0.9%	0.3%	0.0060	0.0063	0.0124	0.0154	0.0034
Parking Lots	204	3192	6.4%	0.8%	0.0152	0.0562	0.0716	0.0791	0.0487
	3192								
Total Points	3195								
Null points	3								

COMBINED – TOWN OF OAKVILLE

Cover class	n =# points	n =Total points	% Cover	SE %	95% CI	Accuracy lower	Accuracy upper	95% CI Upper	95% CI Lower
Grass and Low Vegetation	1536	4496	34.2%	0.7%	0.0139	0.3346	0.3487	0.3555	0.3278
Building	514	4496	11.4%	0.5%	0.0093	0.1096	0.1191	0.1236	0.1050
Trees and shrubs	1401	4496	31.2%	0.7%	0.0135	0.3047	0.3185	0.3251	0.2981
Road	394	4496	8.8%	0.4%	0.0083	0.0834	0.0919	0.0959	0.0794
Impervious other	390	4496	8.7%	0.4%	0.0082	0.0825	0.0909	0.0950	0.0785
Water	45	4496	1.0%	0.1%	0.0029	0.0085	0.0115	0.0129	0.0071
Parking Lots	216	4496	4.8%	0.3%	0.0063	0.0449	0.0512	0.0543	0.0418
	4496								
Total Points	4496								
Null points	4								

APPENDIX F: Oakville 2019 UFSMP Mapping Methodologies

All maps produced for this UFSMP were generated using the ESRI ArcGIS Desktop 10.6.1 software suite and its companion applications (e.g., ArcMap 10.6.1). Generally, the maps in this report were derived from multiple, overlapping geo-spatial datasets, which have been processed to reveal trends in the distribution of urban tree cover (UTC) and potential plantable areas (PPA), among other attributes of interest, within different target geographies within town boundaries.

The Town of Oakville provided the project team with map layers that delineated town boundaries, including separate boundary files for North Oakville, and Oakville south of Dundas St. (a.k.a. South Oakville). The boundaries of the town's 32 operational "forestry zones", distributed across both North and South Oakville, were provided in a separate stand-alone map layer. In addition, the town delineated the boundaries of the focal developed area in North Oakville that was used for the "grow out" analysis (See Appendix E).

Other town-wide map layers included the town's "streets" layer, which was used as an overlay to extract road area from road rights of way, which were majority town owned. This was important to isolate the spatial extent of areas outside of the roadways themselves, as these offer plantable space and are also where the majority of town owned and managed street trees in the street tree inventory are located. A point feature-based town-wide "trees" layer was also provided that had the geographic coordinates of inventoried trees located in close proximity to roadways, which

included some front yard trees on private land in addition to trees located within town-owned and managed road rights of way. The "trees" layer was accompanied by attribute information for individual trees including information on species, size and condition.

The town also provided a town-wide "parcel fabric" map layer that contained boundaries for all registered parcels within town boundaries. This layer was accompanied by simplified ownership attribute data that identified town-owned and managed lands, and lands owned by other public agencies (e.g., Bronte Provincial Park), some of which are also managed by the town. From these data, a simplified "ownership" map layer was developed. To this end, parcel ownership for subsequent analyses was categorized as follows:

- Class 1: Town-owned and managed (a.k.a. Town Managed)
- Class 2: Public agency-owned and town managed (a.k.a. Public Managed)
- Class 3: Public agency owned and managed (a.k.a. Public Unmanaged)
- Class 4: Privately owned and managed (a.k.a. Private; including all parcels not classified to classes 1-3)

In order to analyze the correspondence of urban tree cover and plantable space with different designated land uses, the town undertook a land use type classification exercise based on parcel zoning designations that resulted in a continuous "land use fabric" map overlay to allow for such analyses. The production of the land use fabric map layer is described in detail

in Appendix B. In short, multiple zoning types within North and South Oakville (as both differ) were amalgamated to arrive at a town-wide eight class land use type classification:

5. Commercial and mixed-use
6. Employment
7. Open space and parkway
8. Public use
9. Residential class A
10. Residential class B
11. Transportation corridor
12. Woodlots and Natural Heritage System lands

Lastly among the geo-spatial data provided by the town was an Urban Forest Cover (a.k.a. UFC layer) for South Oakville that was produced as part of Oakville's 2015 Growing Livability Study. It summarized results of an automated continuous land cover type classification for South Oakville and was focused specifically on areas of urban tree cover (UTC) and areas identified as possible planting area (PPA). The latter was further subdivided into pervious/vegetative possible planting area (PPA_V), and impervious possible planting area (PPA_I). We calculated the area (m) of UTC, PPA_V, and PPA_V within individual parcels by overlaying this map layer on the parcel fabric layer so as to be able to summarize the area of UTC and PPA_V and PPA_I at the level of individual parcels, which could be rolled up to zone and land use type level summaries for reporting. We termed the resulting layer the "UFC parcels" map layer.

Custom Maps and Map Products

The results of the point sample-based photo-interpreted land cover classification undertaken for this study using the i-Tree Canopy tool provided estimates of different land cover classes that can be summarized at multiple spatial scales. In summary, based on a sample of 4496 randomly distributed photo-interpreted points within town boundaries, we calculated the percentage of points classified as "trees and shrubs" versus other land cover classes. In essence, the proportion of points classified as "trees and shrubs"

provides a pseudo spatial representation of the distribution and extent of urban canopy cover that we summarized at multiple spatial scales, e.g., town-wide, for North and South Oakville, respectively, and by forestry zone to produce various map products. Being the only land cover classification dataset available for the entire town, these data were leveraged to produce town-wide maps of relative tree and shrub cover (%), and its variability among forestry zones, for the UFSMP (Figure 2).

Figure 1. Tree and shrub cover (%) by Forestry Zone for the Town of Oakville.
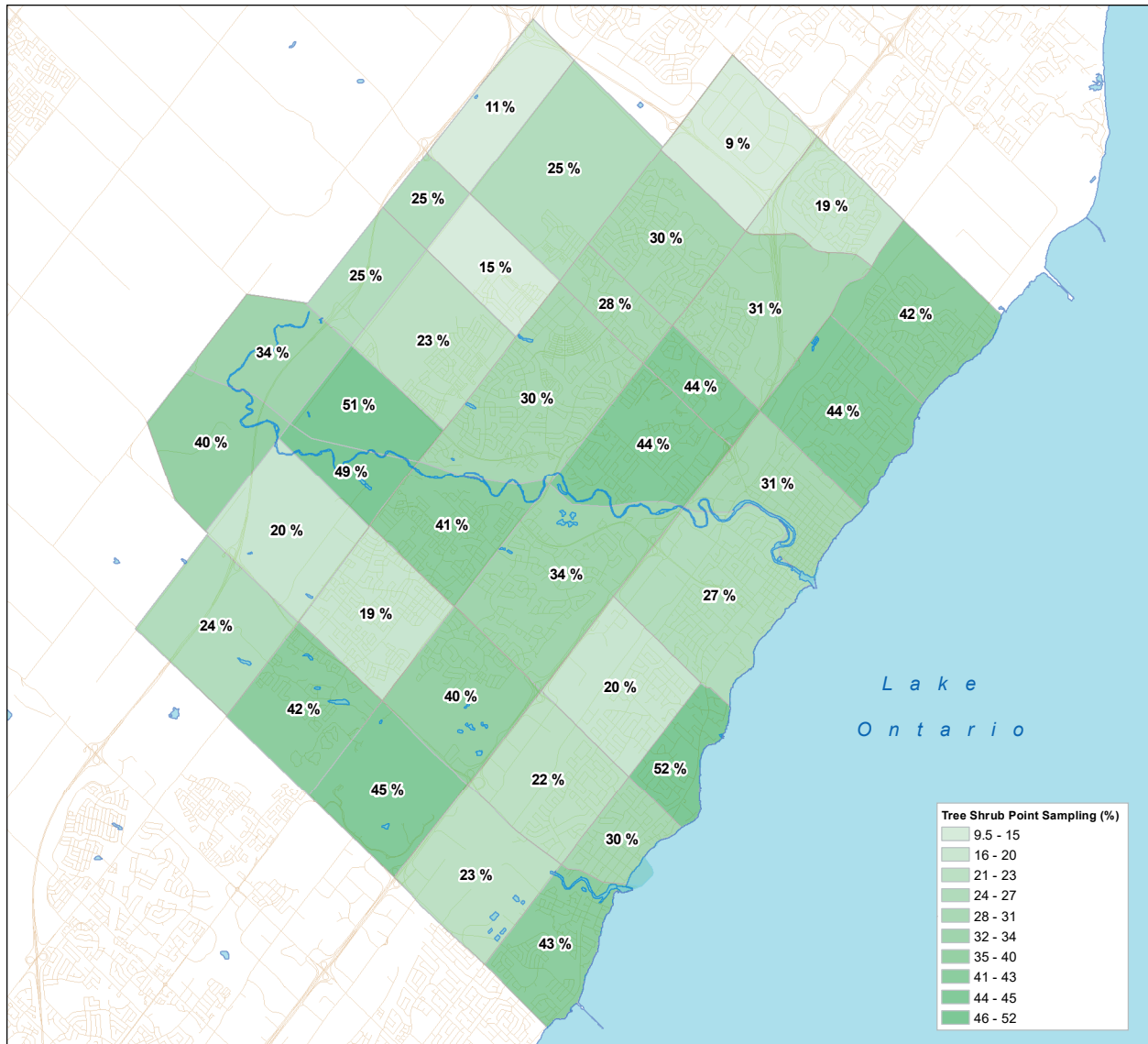
Point Sampling: Tree and Shrub (%) By Forestry Zones
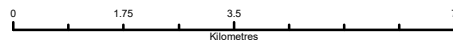
Calculation of Urban Forest Cover and Potential Plantable Areas at the Parcel Level

The Potential Plantable Areas (PPA) analysis layer was generated by merging multiple map layers into a single layer. The layers were sequentially merged together using the "Identity" geoprocessing tool in ArcMap in the order listed below. The identity tool computes the geometric intersection between the two input layers. This process combines the boundary of two layers while still mainlining the original polygon attributes. The process results in split polygons due to overlapping polygon boundaries.

Figure 2. Graphic illustration of the combination of multiple map layers, in ordered sequence, into a single map layer with parcel-level ownership category, land use type, and area (m) of urban tree cover (UTC) and pervious and impervious possible planting areas (PPA_V, and PPA_I, respectively).

1) Forest Zones
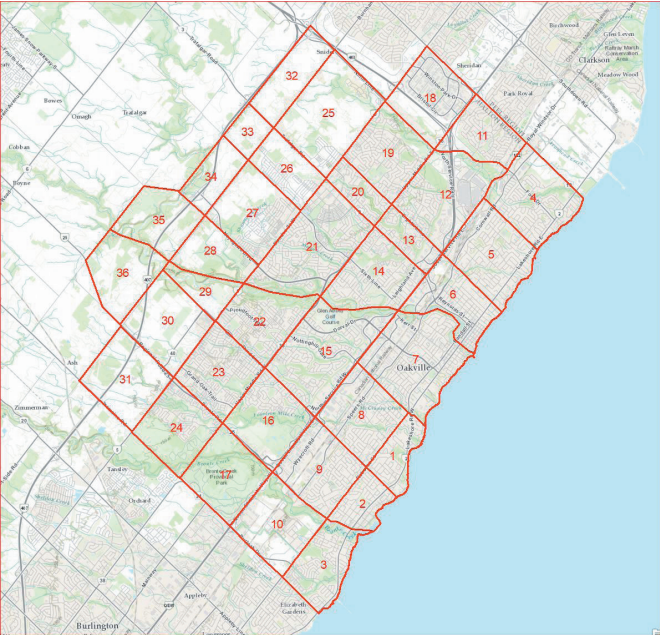
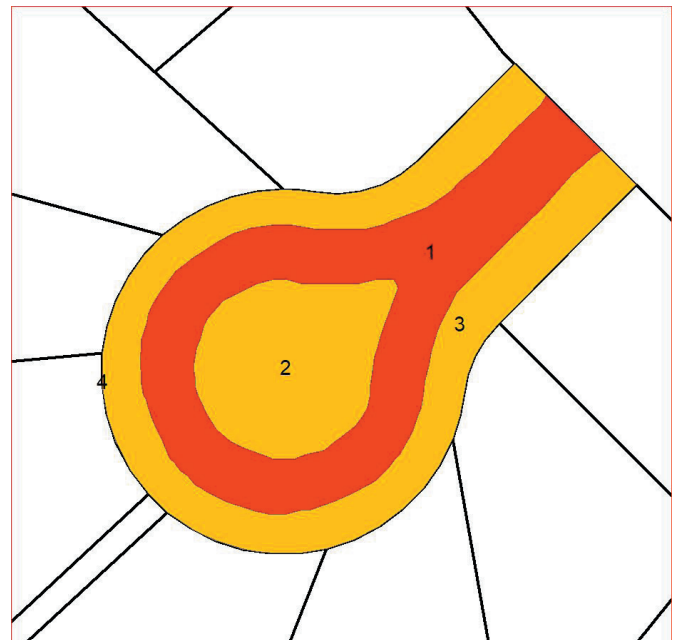## 2) UFC Parcels
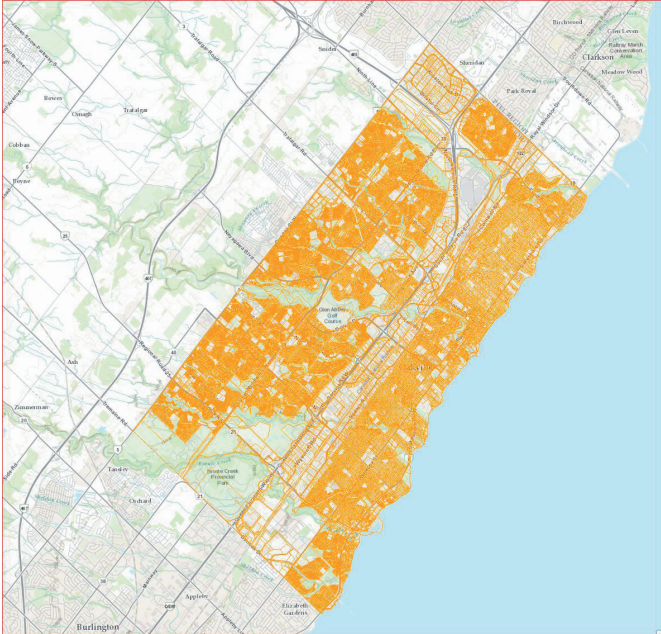
3) Ownership
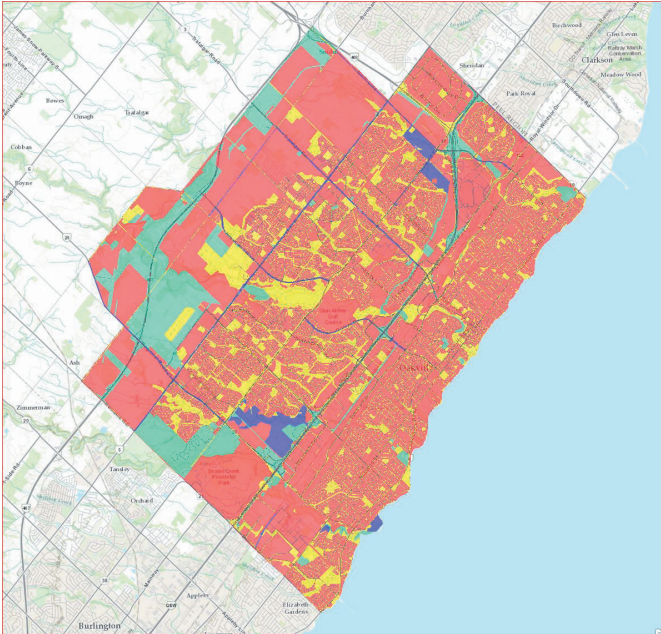
4) Land use (2018)
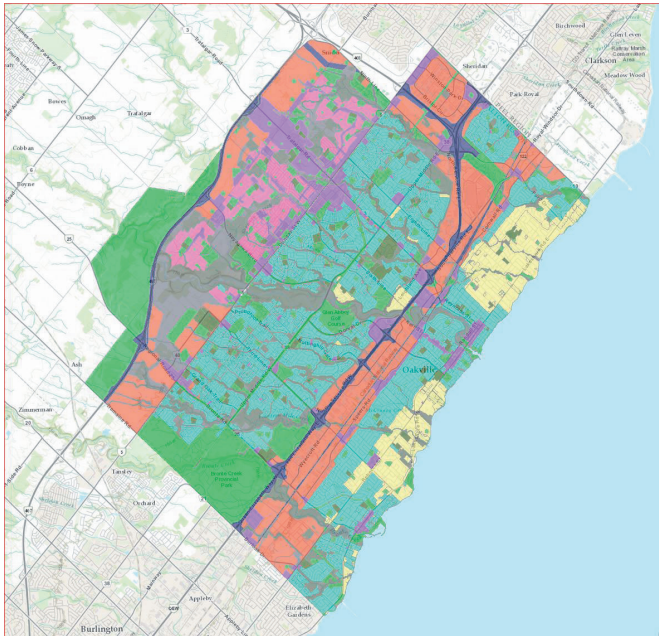
Possible Plantable Area values are based on the proportion (m2) or percentage of the parcel polygon and required adjusting if the original parcel geometry (i.e., split polygon) changed as a result of the combining of the multiple layers.

The following graphic example illustrates the method used to adjust UTC, PPA V and PPA I values for a sample polygon.

Parcel ID: 1967
Area (m2): 1934
UTC (m2): 447
PPA V (m2): 598
PPA I (m2): 492
PPA Total (m2): 1090
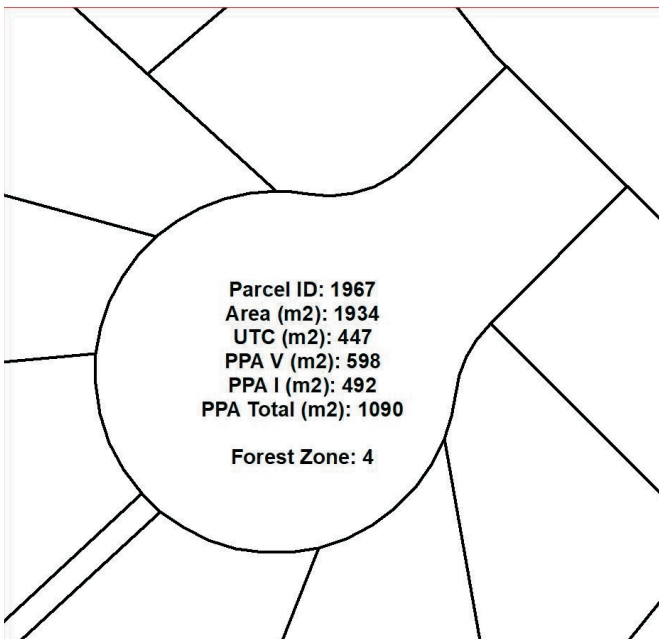
Forest Zone: 4

As noted above, the forestry zone layer was merged with the parcel layer which spatially combined the forestry zone layer and parcel data. Since our example parcel falls completely within a forestry zone, in this case zone 4, the parcel geometry remained intact as one single polygon.

Next, the UFC-Parcels layer was combined with the ownership layer. In this example, this resulted in our original polygon being split into 4 polygons with ownership attributes being added:

- Yellow (2,3) = Owned managed
- Red (1) = Road
- Private (4) = Sliver not shown

Finally, the Forest-Parcel-Ownership layer was combined with the land use layer with all 4 polygons falling within the Residential Class A category.

The UTC and PPA values were then adjusted using the formulas below based on the proportion of the split polygon area (derived from the GIS Shape Area value) relative to the original parcel area.

Poly ID	ZONE	Landcover	A Parcel (m2)	B UTC (m2)	C PPA V (m2)	D PPA I (m2)	PPA Total (m2)	Ownership	E Proportion of Parcel	F Adjusted UTC (m2)	G Adjusted PPA V (m2)	H Adjusted PPA I (m2)	Polygon Area (m2)
1	4	Residential Class A	1,934	447	598	492	1,090	Road	0.4135	185	247	203	799.8
2	4	Residential Class A	1,934	447	598	492	1,090	Owned Managed	0.1961	88	117	96	379.3
3	4	Residential Class A	1,934	447	598	492	1,090	Owned Managed	0.3902	174	233	192	754.8
4	4	Residential Class A	1,934	447	598	492	1,090	Private	0.0001	0	0	0	0.2
									1	447	598	492	1934

Proportion of Parcel = I / A
Adjusted UTC (m2) = B*E
Adjusted PPA V (m2) = C*E
Adjusted PPA I (m2) = D*E

APPENDIX G: Modelling Achievement of Land Use Targets (North Oakville "Grow Out" Analysis)

North Oakville Development Grow Out Analysis

Part of the 2020 UFSMP included an analysis of the forecast canopy cover percent represented by trees at maturity in a recently developed subdivision north of Dundas Street. More specifically, an assessment of trees planted within new high-density residential areas developed under site plan control guidelines. The purpose was to determine whether associated canopy plans that projected 20 per cent urban canopy cover at tree maturity were achievable, based on required tree planting as part of the subdivision design.

Projected tree canopy was based on crown diameter at maturity of individual tree species (from the town's street tree inventory), which is different from the approach used in site plan where a diameter is assigned based on tree stature (small, medium, large). The intent was to provide a more accurate reflection of conditions based on the town's street tree inventory of trees actually planted.

Street trees planted within the developed area were planned to contribute to over 19 per cent of the target 20 per cent urban canopy cover for residential areas. Data from the town wide "streets" map layer and map layer of all registered parcels (a.k.a. parcel fabric layer) were also leveraged within the boundaries of the developed area to provide all the necessary data for the "grow-out" analysis, with visual points of reference showing property boundaries and tree locations relative to streets.

Projected crown area at maturity was converted to square metres and mapped for each inventoried street tree, using tree coordinates as centroids. Street tree information was limited to land assumed by the town within the study area, so only areas with available street tree data were included in the total land area used to determine projected canopy cover percent at maturity.

Figure 1. Model of projected tree crown area (m2) at maturity in the southwest corner of the study area in North Oakville.

Projected tree crown area from grow-out analysis

This modeling exercise is consistent with the town's requirements for canopy cover plans and calculations. In this case, the results (based on total crown area at maturity relative to the total study area) suggest that the residential tree cover target of 20 per cent for North Oakville would be met by tree planting in the town's right-of-ways. This approach assumes that any trees lost to mortality would be replaced with a similar tree.

APPENDIX H: Status of Past Plan and Study Recommendations

The following tables summarize the status of past plan and study recommendations, including the 2008 Urban Forest Strategy Management Plan (South Oakville), the 2012 North Oakville Urban Forest Strategy Management Plan and the 2016 Growing Livability Study. Status is indicated as either: complete, partially complete or in progress (reflecting the complexity and longer timelines of some action items), not complete and still relevant or not complete and no longer a priority because the management context has changed.

Status of all recommendations	Total #	% completion
Completed	41	40%
Partially completed or in progress	42	41%
Not completed (priority)	6	6%
Not completed (low priority/no longer applicable	13	13%
Total recommendations all plans	102	100%

Overall, Forestry has achieved completion or partial completion on 80 per cent of the recommendations. 13 per cent are considered no longer relevant or a priority and 7 per cent are incomplete and carried forward in the 2019 UFSMP. A brief description of achievement on each recommendation is provided.

Legend: 2008 Urban Forest Strategic Management Plan

Status of all recommendations	Total #
Completed	24
Partially completed or in progress	25
Not completed (priority)	6
Not completed (low priority/no longer applicable)	11
Total Recommendations	66

Table 2. Status of 2008 UFSMP Recommendations

No	Recommendation	Comments
2	The town should develop a separate Urban Forest Strategic Management Plan for the lands north of Dundas Street consistent with the principles outlined in this document.	Completed in 2012.
3	The town should use the vision and mission statements cited in this plan to guide urban forest management in the Town of Oakville.	Town is supporting the UFSMP vision and mission statements through its urban forestry program.

No	Recommendation	Comments
4	The town should use the series of criteria and indicators in Table 1 to track progress towards short- and long-term objectives. This should be used to report to Council on the State of the Urban Forest every 5 years. Furthermore, the Criteria and Indicators Table should be added to the town's 2007-2010 Corporate Strategic Plan in order to help track the Town of Oakville's progress on managing its urban forest on a sustainable basis.	C&I status update included in 2019 UFSMP & more comprehensive indicators added for future reporting. The C&I table (by another name) has been made part of key performance indicators to extent possible. These are open to review and modification.
7	The town will develop each 5-year management plan. The second, third and fourth 5-year management plans will be developed based on a review of the successes and challenges of the preceding management plans.	Regular review of plans, objectives and progress are carried out. The 2020 UFMSMP is informed in part by a review of past plan implementation.
8	The town will adopt the principle of active adaptive management to accomplish urban forest policy objectives in light of the constantly changing ecological, social and regulatory environment.	Studies and plans have been updated on a regular basis, and management activities are adjusted in accordance with recommendations.
9	The town should change the name of the "Large Tree Heritage Business Unit" and "Small Tree Heritage Business Unit" to avoid confusion with other common uses of the term "heritage tree".	This was completed.
10	The town's Official Plan, Section 10.3(b) should be amended to read: "It is the objective of the Town that there will be no net loss of existing urban forest…sufficient trees will be replanted to replace the lost square metres of leaf area."	OP Part C: Making Oakville Livable (General Policies) Pg C-48 10.12.1 reads: "For every square metre of leaf area that is removed from town property or from town road rights-of-way, sufficient trees will be replanted to replace the lost square metres of leaf area."
13	The town will complete a tree inventory for all street trees within the first 2 years of the first management plan with a focus on collecting information on trees in the oldest and youngest age classes in the first year.	An inventory was completed in 2010 but needs to be updated due to significant changes since 2010 (e.g., ice storm and EAB).
16	The town should ensure that there is adequate species diversity throughout the urban forest and where possible, ensure that the seed source is within the Collection Zone for Oakville as established by the Forest Gene Conservation Association.	Starting in 2015, all tenders issued by ToO for forest regeneration require that vendors should provide genetically appropriate seed as possible. The town is looking at future challenges with sourcing given the Angus seed facility closure.
17	The town will complete a tree inventory for all woodlands based on accepted forest stand inventory protocols within the first 5-year management plan.	A inventory was completed in 2010 but needs to be updated due to significant changes since 2010 (e.g., ice storm and EAB).

No	Recommendation	Comments
18	The town should establish 1 permanent sample plot (PSP) per hectare in each woodland tract so that the woodlands can be monitored systematically over time.	A total of 239 long-term forest health monitoring plots were installed from 2014-2016 across the Town of Oakville's woodlands. Beginning in 2017, a subset of these plots is re-surveyed on a 3-year cycle. Focus of plots is forest health.
19	The town should hire an urban forestry specialist with GIS training to administer the tree inventory software and database as well as other asset management systems in the Department in 2008.	A forest analyst was hired in 2012.
20	The town should consider configuring CItyWorks to display a version of the tree layer including location, species and size (crown width, DBH), on the corporate web site for use by the public.	Tree maps are online for the Town of Oakville, using available spatial Forestry data.
33	The town should conduct a feasibility study for the creation of a municipal arboretum.	A preliminary investigation suggested this was not an effective use of the town's resources.
38	The town should develop an urban forestry emergency response plan that integrates with the corporate emergency plan.	Forestry has developed an emergency response plan and a business process to modify data collection in emergency situations. Corporation has established an emergency group working team that Forestry participates in as needed.
39	The town should adopt a 5-year pruning cycle for all intermediate and mature trees and a 3-year cycle for all juvenile trees. Line clearing operations should be consistent with these pruning cycles.	This program has been implemented as of 2019. It is included in ToO 10-year capital projects forecast to do rotational pruning and maintenance. Currently, a 9-year pruning cycle is forecast based on available information. This will be revised as more data becomes available through program implementation.
40	The town must complete the update to its Tree Protection Policy and Street Tree Bylaw.	This was completed in 2013 as part of a regular review.
42	The town should hire four additional inspectors to enforce tree protection on both public and private land.	Three additional inspectors were hired between 2010 and 2016.
44	The town should investigate the feasibility of developing and implementing a private tree preservation by-law based on the principle of no net loss of leaf area/canopy cover within the urban forest.	The Private Tree Protection By-law was revised in 2017 based on these principles. Recommendations on how to achieve consistent implementation and mitigate the temporal effects of tree removal are made in the 2020 UFSMP.
46	The town will use the forest stand inventory data to complete a Forest Management Plan for its remaining 47 woodland properties under the FSC program.	Completed - all woodlands properties are now FSC certified, south of Dundas. 2019 recommends extending certification to lands north of Dundas.
50	The town should provide the staff and equipment resources required to implement hazard abatement strategies.	Two new staff were hired and contractor services in EAB and street Tree Operations have been increased. Woodland hazard abatement for North Dundas is funded.

No	Recommendation	Comments
52	The Tree management software (CityWorks) should provide an annual summary of all risk trees to be inspected.	CityWorks provides a summary every month on risk trees that have been inspected and marked as high risk.
53	The town should hire additional staff to undertake inspections of risk trees in the street and park tree population, in woodlands and along nature trails.	Forestry hired two additional arborists in Forest Operations business units and included hazard abatement along trails within the scope of the EAB program.
58	The town should ensure that the sites on which volunteer planting projects have taken place are not sold or developed.	Forestry checks property status before planning an event and advises town to avoid selling those properties.
1	The town should consider amending its Official Plan to designate its municipally owned urban forest as 'green infrastructure'.	Partially completed - this is referenced in Official Plan. The town has already designated forest as green infrastructure in policy and plans (Part C: Making Oakville Livable (General Policies) Pg. C-48, Section 10.12 (Urban Forests)) but is not financing it the same way as grey infrastructure.
5	The stocking level in all land use types (except woodlots) should be increased by 10 per cent (based on the assumptions of the UFORE GrowOut simulation) to achieve an estimated overall canopy cover of 30 per cent.	Objective revised to 40 per cent tree canopy and a feasibility assessment as part of 2020 UFSMP has identified land use targets and area required to achieve 40 per cent cover.
11	The town should amend the Environmental Strategic Plan to refer to the Urban Forest Strategic Management Plan where appropriate.	Oakville has completed a Biodiversity Strategy, which is cross-referenced with the urban forest management plan.
21	The town's Planning, Development Services, Engineering & Construction and Parks and Open Space Departments should consider adopting minimum soil volume standards into existing departmental drawings where trees affected.	Has been done for North of Dundas, but greenfield and intensification areas (e.g., South of Dundas) are different. This is a subject to be addressed by IITAC in more detail e.g., review different technologies to address challenges with infrastructure, utilities, etc. in intensification areas.
23	The town's Interdepartmental Technical Advisory Committee (ITAC) should discuss and consider for adoption the canopy cover targets proposed in the UFSMP.	Committee has met three times and canopy targets for North Oakville have been integrated in the town's Livable by Design Manual and implemented town-wide, in the interim. Developing canopy targets for South Oakville was part of the 2020 UFSMP core working team and are included in the plan.
24	The town's Interdepartmental Technical Advisory Committee (ITAC) should establish canopy cover targets for parking lots and should develop design and implementation guidelines to achieve these targets.	Guidelines for Greening Surface Parking are included in the town's Livable by Design Manual (Section 2.0: Soft Landscaping). Implementation has been moderately successful and improvements will be subject to discussion at future ITAC meetings and likely at time of the next review of the LbD manual.

No	Recommendation	Comments
25	The town's Interdepartmental Technical Advisory Committee (ITAC) should collaborate in the development of guidelines for the protection of tree habitat during the maintenance and upgrading of grey infrastructure.	This is addressed through inspections and procedures undertaken by Forest Protection under the town's Public Tree By-law (By-law Number 2009-025). Improvements are ongoing to better protect and preserve trees impacted by capital projects.
28	The town should develop removal and replacement plans to increase the age class and species diversity in areas identified as having a canopy dominated by mature Norway and silver maples.	This is in progress - the town is underplanting in streets and parks when trees are aging e.g., areas of Southeast Oakville.
30	The town should establish a project that will identify (through GIS) areas at risk for exotic invasions (i.e. near natural areas such as woodlots, wetlands, ravines, etc.)	This is difficult to implement using only GIS tools as tracking requires visual and site inspections. Forestry maintains a GIS database for known invasions. Delineation of invasive species has begun through forest health monitoring and report cards.
34	The town should outline the creation of a pro-active under planting program in those communities at risk of decreasing urban forest canopy cover due to aging trees (Town of Oakville 2008, Action Item 4).	This is in progress - the town is underplanting in streets and parks when trees are aging e.g., Southeast Oakville. Planting priority maps developed as part of 2020 UFSMP include consideration for low levels of canopy cover as part of the prioritization process.
35	The town's Forestry Section should work with the Forest Gene Conservation Association to create a gene conservation program for the town (Town of Oakville 2006, Action Item 9).	See #16.
36	The town's Parks and Open Space Department will identify opportunities for Parks Naturalization that contribute to the forest canopy and prepare capital budget costs (Town of Oakville 2006, Action Item 10).	Currently Parks does not have naturalization mandate under that definition and there are competing interests for space in parks. However, in 2017 the ToO planted over 2000 trees in Parks without changing park use. Forestry continues to look for opportunities to increase tree cover on town lands in parks and other open areas.
45	The town should develop a strategy for the monitoring and control of alien invasive species. Coordinate with other agencies where appropriate.	Monitoring is in progress through forest health survey program. Developing a strategy is carried forward as an action in the 2020 UFSMP. Management of some invasive species (e.g. buckthorn in woodlands) has been undertaken under the town's EAB program as it relates to the removal of dead ash trees and regeneration in these areas.

No	Recommendation	Comments
47	The town should develop a Tree Risk Management Plan and establish an inspection protocol based on the data from the Municipal Tree Inventory.	The town carries out hazard abatement for trails through EAB program. Service standards are in place for identified high risk trees. Rotational pruning program will reduce street/park tree risk in the longer term. More comprehensive risk assessment in street trees would be part of an updated street tree inventory.
48	The Tree Risk Management Plan will prioritize trees requiring further investigation by a tree risk assessment specialist.	Service standards are in place for identified high risk trees. Current CRM software allows for prioritization of service requests based on potential hazard level prior to inspection.
51	The town should develop a tree cabling policy that includes the provision of an inspection cycle. This policy will incorporate risk and heritage value.	All arborists and lead hands have tree risk assessment and training - one lead and one arborist are doing inspections on annual basis.
54	The town should develop a private urban forest stewardship education program (Town of Oakville 2006, Action Item 3).	This recommendation is being addressed through the town's ongoing communications and community engagement efforts, as well as volunteer programs, annual tree protection workshop and Forest Health Ambassador program. A new PLANT program encourages tree planting on private lands and includes an online tree counter where residents can document tree planting. The town would like to move toward improved partner and landowner engagement – the 2020 UFSMP identified the need for a partnerships specialist to do this.
56	The town's Urban Forestry Services should work with the Parks Horticultural Section to formalize a methodology for Public Engagement, based on their existing Volunteer Recognition Program.	Both sections have different volunteer programs i.e. Forest health Ambassador and Parks ambassador programs. They also host separate tree planting events. At this moment, inter-sectional partnership and communication include providing woodchips and identifying the location prior to the event. The 2020 UFMSP action to add a partnerships and outreach coordinator would increase opportunities for better coordination.
59	The town should develop stronger partnerships with NGOs to implement effective volunteer coordination with respect to Urban Forest initiatives.	The town has established working relationships with OakvilleGreen, is co-ordinating a Forest Health Ambassador Program, and supported the LEAF backyard tree program in 2017-2018. See above (#56) re: partnerships.
60	The town's Corporate Communications Department should work with Urban Forestry Services to develop effective, wide-spread marketing strategies and branding for various events and workshops.	See #54.

No	Recommendation	Comments
61	Consider an amendment to the Zoning By-law for Employment, Commercial (excluding C3R), and Industrial land use types to regulate the planting area for trees (i.e., the tree growing area) in support of the town's canopy cover target.	The town amended the zoning by-law 2014-014 to provide for a larger, contiguous landscape buffer in these zones. That decision was appealed but the regulation was successful defended at the Local Planning and Appeal Tribunal (LPAT) by the town (LPAT Case No PL140317).
62	The town should undertake a study to assess the impact on the town-wide canopy cover of implementing a "Planting Area for Trees" policy on all land uses which are subject to site plan approval.	See above.
63	The town's Forestry Section should chair an Interdepartmental/Interagency Technical Advisory Committee (IITAC)	See #23 - Committee has met three times. IITAC recommendations have been consolidated to reflect requirement for more regular meetings to discuss specific urban forest challenges and solutions.
64	Finance Department/Parks & Open Space Department should review the Forestry Section Business Plan and the 10 Year Capital Forecast to ensure that operating costs for street trees and park trees and Woodland Parks are captured.	This happens on an annual basis. The 2020 UFSMP includes a recommendation to forecast future resource requirements as lands in North Oakville are assumed by the town.
65	The town should hire the staff and equipment resources necessary to implement this Plan as detailed in Appendix I.	This is ongoing, as new management requirements and issues are identified.
14	The town should develop an approach to identifying and designating heritage trees based on the approach of the Ontario Heritage Tree Alliance.	The town has a heritage planning section which has designated trees under the Ontario Heritage Act but does not have a formal heritage tree protection strategy. The development of this strategy is identified in the Heritage Planning Work Program.
27	The town should develop a set of engineering road cross sections using root zone modifications for implementation in difficult sites.	The current drawing dates back to 2003 and needs to be updated. The standards are being implemented in greenfields but not in intensification areas.
29	The town should conduct a study to determine the feasibility of producing its own nursery stock versus entering into a long-term relationship with a local grower.	The town has started considering seed source in tree planting tenders. Developing a Tree Seed and Seedling program is a significant undertaking. The cost/benefit of developing a program must be further examined in a separate study to determine if it is a practical and cost-effective solution for the town. This has been carried forward as an action in the 2020 UFSMP.
31	The town's tree asset management system, CityWorks, should include a system of tracking survivorship to inform species selection and management.	This will be more implementable with an updated street tree inventory, which currently dates from 2010.

No	Recommendation	Comments
57	The town should hire a Volunteer Coordinator to specifically address the needs of the urban forest.	The need for a partnerships specialist to engage with a range of stakeholders, including private landowners and other public agencies, has been identified again in the 2020 UFMSP and carried forward.
66	The town should implement the Tree Seed and Seedling Development Program to support the Town of Oakville's Urban Forest Canopy Cover.	See #29.
6	The town should consider incorporating an assessment of potential leaf area by land use type into the 2009 UFORE study.	Will continue to refer to canopy areas as a measure in plans as this is difficult to calculate and apply practically.
12	The town should create five urban forest management units in such a manner that their areas are distributed more-or-less equally. These management units will be used to allocate activities within the 5-year management plans.	Forestry has designated operational zones for work allocation.
15	The town should enter into a partnership with the USDA Forest Service to establish Oakville as a Reference City for STRATUM in Southern Ontario.	Framework has changed since 2008 and there is little practical benefit to implementing this recommendation.
22	The town's Interdepartmental/Interagency Technical Advisory Committee (IITAC) should collaborate in a review of Tree Habitat Design Guidelines, and the potential role of zoning by-laws in reserving sufficient good tree habitat.	This recommendation is consolidated with other related IITAC recommendations in 2020 UFSMP.
26	The town's Forestry staff and the ITTAC should host a workshop on the use of enhanced rooting environment techniques.	See above.
32	The town should develop a Prime Site strategy which will identify priority sites to amend the soil quantity and quality in accordance with the Town of Oakville's Our Solution to Our Pollution report.	Other management actions and approaches have been deemed higher priority for 2020 UFSMP.
37	The town should produce a GIS-based planting plan taking into consideration the "Best Species for Air Quality Improvement" and species best suited to the changing climate.	Recent literature suggests that the links between trees, air quality and human health are tenuous. A planting priority plan considers factors such as presence of existing and potential tree canopy as well as land ownership to prioritize future tree planting site. Species selection is reviewed as part of operational planting strategies.
41	The town should consider transferring the responsibility for private tree protection from the Development Services Department to the Parks and Open Space Department.	Transfer of departmental responsibilities is outside the scope of the UFSMP.
43	Development Services should create guidelines for the implementation of the Tree Protection Policy as it applies to various permitting processes and where possible utilize conditions of approval to protect trees on private property.	This is redundant with Recommendation #40 – updates are done every 5 years.

No	Recommendation	Comments
49	The town's Forestry staff should conduct a pilot project to fine-tune IR photography as a cost saving technique to identify areas that contain hazard trees (Town of Oakville 2006, Action Item 23).	This was investigated and not deemed practical as an approach to identifying hazard trees.
55	The town should establish a Citizen Urban Forest Advisory Committee (CUFAC).	The town has developed other programs (e.g. Forest Health Ambassador) and communications (PLANT program) to engage with citizens on urban forestry. A partnerships and outreach specialist is recommended as an action in the 2020 UFSMP.

Legend

Status 2012 NOUFSMP recommendations	Total #
Completed	6
Partially completed or in progress	9
Not completed (priority)	0
Not completed (low priority/no longer applicable)	1
Total Recommendations	**16**

Table 3. Status of 2012 North Oakville USFMP Recommendations

No	Recommendation	Comments
1	Amend the Development Review Process to check for compliance with the canopy cover targets.	The development review process has been modified for the evaluation of North Oakville Site Plans to ensure that canopy cover targets are being met. A consulting team was retained in February 2016 to complete an assessment of NOUFSMP implementation. This assessment identified key challenges observed to date and made a few specific revisions to the original recommendations. The 2020 UFSMP included a review of achievement of canopy targets in North Oakville subdivisions for which data was available.
4	Revise the spacing for street trees on landscape plans to reflect the optimal growth opportunity of the site.	Spacing has changed for both large stature and small/medium stature trees respectively from 12m/8m to 8m/6 m.
6	Amend the zoning by-law to include one (1) shade tree for five (5) parking spaces in surface parking lots.	This has been integrated into the Livable by Design Manual.
10	Trees planted in the NHS should be 100 per cent native and conform to best management practices in natural areas.	This reflects current practice.
13	Conduct periodic site reviews during construction and regular inspections to monitor tree health.	Development Engineering provide inspection services during construction.

No	Recommendation	Comments
14	Review maintenance securities such as 'maintenance holdback' to ensure that ongoing care is provided to support growth.	Forestry takes a deposit to be held through the implementation of a Tree Protection Plan.
2	Implement new Landscape Standards.	Tree planting requirements identified in the NOUFSMP are being enforced through plan submission process. Liveable by Design Manual - Site Design and Development Standards (2017) includes Section 5.1 Trees (p.49). Soil volume requirements identified in the NOUFSMP and Livable by Design Manual are not applied to the Road Cross-section Standard. Different canopy cover targets for areas south of Dundas are included in 2019 UFMSP.
3	Adopt new Tree Planting Standard Detail to reflect an increase in soil volume to 30 cubic metres and soil depth in continuous tree planting trenches to 750 mm depth (Appendix B).	Soil volume and depth requirements are reflected in the Livable by Design Manual (p.49). These standards are applied town-wide. The development of new Standard Planting Details was part of the 2020 UFSMP.
5	Implement design guidelines for 'green parking lots'.	These have been implemented, but future improvements should be part of IITAC discussions.
7	Review to incorporate the tree planting details, landscape standards, and green parking lot landscape standards outline in the NOUSFMP into the development standards south of Dundas Street.	This has largely been done through the Livable by Design Manual and ongoing work in this area is an outcome of 2020 UFMSP.
8	Provide staff training in landscape architecture, planning, urban design and forestry for the implementation of the new requirements and standards; this may require new resources.	Ongoing – initial outcomes have been verified through 2016 and 2020 UFMSP reviews.
9	Establish incentives or support voluntary stewardship activities (e.g., tree give away for residential landowner(s) to enhance tree canopy on low and medium density residential lots.	The town currently supports a variety of tree programs aimed at planting on both private and town properties. An action to hire a partnerships specialist addresses the critical need to ramp up engagement with private landowners in Oakville. The town has supported LEAF's tree planting programs.
12	Work with Conservation Halton so that agricultural fields not assigned a management prescription in the Glenorchy Conservation Area draft Master Plan to be considered for future forest cover.	Discussions are ongoing between Halton Region and Forestry Services to identify areas of potential future tree cover.
15	Monitor oak dominated forests and provide silvicultural treatment if oak savannas, woodlands and forests are to be maintained in north Oakville.	Ongoing as the town assumes ownership. Some silvicultural work has been conducted on newly assumed woodlands in the north (e.g. for buckthorn control, hazard abatement). From a cost perspective, it is important to complete as much work as possible prior to build-out of lands in the north.

No	Recommendation	Comments
16	Form partnerships with Non-Government Organizations whose grassroots greening initiatives include planting events, parkland stewardship and green space planning.	The town will leverage existing relations to initiate partnerships in North Oakville as the town assumes ownership of parks and green space.
11	Consider partnering with a university (e.g., University of Toronto, Faculty of Forestry).	Recommendation updated in UFSMP to reflect general need for partnerships that support the urban forest.

Legend

Status 2016 Growing Livability Study recommendations	Total #
Completed	11
Partially completed or in progress	7
Not completed (priority)	1
Not completed (low priority/no longer applicable)	1
Total Recommendations	**20**

Table 4. Status of 2016 Growing Liveability Recommendations

No	Recommendation	Comments
5	Continue to maintain high percentages of trees in good condition through routine maintenance pruning, hazard pruning, and removing dying or dead trees.	This is occurring through the town's new rotational pruning program.
6	The Town of Oakville should continue to invest in the protection of its street ash trees in order to prevent significant reductions to environmental benefits.	This recommendation is being fulfilled on an ongoing basis. In 2017, Oakville treated 3,516 trees and the ash tree treatment program continued in 2018.
7	The Town of Oakville should establish internal street tree size diversity targets and plant large-stature trees where possible.	The town has Large-Medium-Small stature tree lists that they draw from for planting projects (Livable by Design Manual, part C). In sites that accommodate large-stature trees, an appropriate tree is planted by default.
10	The Town of Oakville should continue to conduct annual forest health monitoring activities.	Ongoing through forest health monitoring program.
13	The Town of Oakville should consider developing an action plan for post-storm survey.	Completed and in progress. Forestry has already started adopting a business process and modifying data collection in emergency situations to take less time to collect data for trees. Forestry has created a system in City Works tailored for emergency response. The town also has a Parks & Open Space emergency plan for severe storm events, which is in the process of being updated.
14	The Town of Oakville should conduct periodic reassessments of its urban forest.	This has occurred on a regular basis since 2005.

No	Recommendation	Comments
15	The Town of Oakville should integrate the findings and recommendations of this study and future assessments into the periodic reviews of plans.	Completed at each plan review.
17	The Town of Oakville should maintain high stocking levels by continuing to replace every tree removal where site conditions permit.	Ongoing through street tree and EAB forest regeneration programs.
18	Discontinue planting hawthorn as a street tree species. It is not a good performer in Oakville, and the sharp thorns on its branches make it suited to public spaces.	Hawthorn is not planted.
19	Gradually replace American elms, which are susceptible to Dutch Elm Disease (DED), with other species and varieties of elm.	American elms are not actively planted as street trees. Accolade elms are planted more prevalently than other varieties, but multiple varieties are on the active planting list.
20	Due to high-performance and currently low numbers, the Town of Oakville should consider increasing the number of London plane, hop-hornbeam, European beech.	Species list are reviewed annually to develop species recommendations.
1	The Town of Oakville should consider developing an outreach program to local businesses, a view to increasing urban forest canopy cover on these land uses.	The town does not have a dedicated staff or program for outreach and incentives but would like to pursue programs with other stakeholders where it makes sense to do so. Staff from individual departments work toward these goals, but there is not yet a cohesive effort. The 2020 notes this gap by identifying need for a partnerships/outreach specialist dedicated to these activities.
2	The Town of Oakville should consider investigating the feasibility of establishing incentive programs to encourage tree planting on private property.	OakvilleGreen partnered with LEAF's backyard tree planting program to promote tree planting on private property in 2017-2018. The town has implemented a new PLANT program to encourage tree planting on private land. Town Forestry staff routinely field questions from residents about private tree planting and offers expertise.
4	The Town of Oakville should relate tree planting efforts to greater town-wide initiatives and priorities e.g. sustainable community design and ecological footprint.	Minimizing the town's ecological footprint is a general sustainability goal of the Livable Oakville plan (Section C, p. C-41). Tree planting is considered in Environmental Strategic Plan (for which a council update is required each year). The town hopes to expand the ESP and has implemented the "PLANT" Initiative with a website launched in spring 2018. The 2020 UFSMP includes an action to continue to assess how the urban forest can be better integrated into urban design in Oakville to support the town's climate resilience goals.

No	Recommendation	Comments
8	The Town of Oakville should devise and implement a targeted European buckthorn management strategy.	This is being done through the EAB forest regeneration program. 2020 UFSMP notes need to expand control efforts to more woodlands with high levels of buckthorn.
9	The Town of Oakville should devise and implement a scheduled process for updating its street tree inventory.	In progress and carried forward as an action in the 2020 UFSMP.
12	The Town of Oakville should consider adopting a canopy growth tool to address priority planting areas and assist in its efforts to expand urban forest cover.	Addressing priority planting areas is to be incorporated into the 2020 UFSMP, supported by data from the results of the 2016 Growing Livability report.
16	The Town of Oakville should review its approach to street tree species selection and devise a planting strategy.	Town has been planting a range of species in recent years, but there is no protocol in place to calculate species diversity. The street tree planting supervisor incorporates increased diversity in regular planting and the planting list is reviewed annually.
11	The town should consider implementing a study to ensure a better understanding of the causes contributing to tree mortality.	Updated street tree inventory would afford a chance to look at street tree mortality rates by species. This action has been carried forward in the 2020 UFSMP. Understanding root cause will help target useful policy and program improvements.
3	The Town of Oakville should consider investigating the feasibility of establishing an incentive program to encourage green roof installation on private property.	Not in scope of UFSMP.

APPENDIX I: 2020- Adaptation of USDA-Criteria and Indicators for Assessing Sustainable Urban Forest Management-UFSMP Oakville

Overview of Purpose and Findings

The following report outlines a revised approach to incorporating criteria and targets into the 2019 Oakville UFSMP, which is consistent with a methodology proposed by the USDA Forest Service in its guide "*The Sustainable Urban Forest: A Step-by-Step Approach*".

While the 2008 UFSMP did include a set of criteria and indicators for assessing progress, these are different than the revised approach, which is more comprehensive and being used by other municipalities to track urban forest sustainability and the effectiveness of forestry programs under a list of 28 criteria.

This report includes a review of progress made under the 2008 criteria in order to have a way to assess where the town has made progress since the first UFSMP for South Oakville. It includes outstanding action items and indicates which of these are still relevant and require further investments of time and resources to resolve.

Update on Status of 2008 Indicators

The 2008 UFSMP included a set of Criteria and Indicators of Sustainable Urban Forest management, with an estimate of the town's level of achievement at the time. Below is the table of C&I, showing where the town is ranked in 2018 based on discussions and a review of available data with Forestry staff.

Progress has been made in most categories, moving the town from low or moderate into a good performance category. This progress demonstrates the value of investing in the Urban Forestry program and the outcomes following on those investments.

This trend is supported by the most recent tree canopy study (2016 Growing Liveability). That study found that despite significant pressures on the town's tree cover (including EAB and a damaging ice storm), an increase in tree cover of 1.3 per cent was measured between 2005 and 2015.

Exceptions noted where the town did not complete action items include:

1. Updates to the town's outdated forest inventories;

2. Implementation of a regular pruning and maintenance program for juvenile, intermediate and mature trees;

3. A comprehensive urban forest management plan completed for the entire Town of Oakville (North and South of Dundas).

Items 2 and 3 are anticipated to be among the outcomes of the 2019 UFSMP planning exercise. The need to update inventories has been noted as an action item in the UFSMP.

Table 1. Review of progress on Sustainable Urban Forest C&I from 2008 UFSMP to current status in 2018 (grey = 2008, green = 2018)

MANAGEMENT APPROACH   Legend: ▮ Status in 2008   ▮ Status in 2018

Criteria	Low	Moderate	Good	Optimal	Key objective
1. Tree Inventory	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.	Complete inventory of publicly owned trees AND sample-based inventory of privately-owned trees included in city-wide GIS.	Complete inventory of the tree resources to direct its management. This includes age distribution, species mix, tree condition, risk assessment.
2. Canopy Cover Inventory	No inventory.	Visual assessment.	Sampling of cover using aerial photographs or satellite imagery.	Sampling of tree cover using aerial photographs or satellite imagery included in city-wide GIS.	High resolution assessments of the existing and potential canopy cover for the entire community.
3. City-wide management plan	No plan.	*Existing plan limited in scope and implementation.	Comprehensive plan for publicly owned trees accepted and implemented.	Comprehensive plan for ALL components of the urban forest (private and public assets) accepted and implemented.	Develop and implement forest management plans for private and public property.
4. Municipality-wide funding	Funding for reactive management.	Funding to optimize existing urban forest.	Funding to provide for net increase in urban forest benefits.	Adequate private and public funding to sustain maximum urban forest benefits.	Develop and maintain adequate funding to implement a city-wide urban forest management plan.
5. City staffing	No staff.	No training of existing staff.	Certified arborists and professional foresters on staff with regular professional development.	Multi-disciplinary team within the urban forestry unit.	Employ and train adequate staff to implement city-wide urban forestry plan.
6. Tree establishment planning and implementation.	Tree establishment is ad hoc.	Tree establishment occurs on an annual basis.	Tree establishment is directed by the needs derived from a tree inventory.	Tree establishment is directed by needs derived from a tree inventory and is sufficient to meet canopy cover objectives.	Urban Forest renewal is ensured through a comprehensive tree establishment program driven by canopy cover, species diversity, and species distribution objectives.
7. Pruning of publicly owned, intensively managed trees.	No pruning of publicly owned trees.	Publicly owned trees are pruned on a request/reactive basis. No systemic (block) pruning.	**All publicly owned trees are systematically pruned on a cycle longer than five years.	All mature publicly owned trees are pruned on a 5-year cycle. All immature trees are structurally pruned.	All publicly owned trees are pruned to maximize current and future benefits. Tree health and condition ensure maximum longevity.
8. Hazard tree management	No tree risk assessment/remediation program. Request-based/reactive system. The condition of the urban forest is unknown.	Sample-based tree inventory which includes general tree risk information. Request-based/reactive risk abatement program system.	Complete tree inventory which includes detailed tree failure risk ratings; risk abatement program is in effect eliminating hazards within a maximum of one month from confirmation of hazard potential.	Complete tree inventory which includes detailed tree failure risk ratings; risk abatement program is in effect eliminating hazards within one week from confirmation of hazard potential.	All publicly owned trees are safe.
9. Tree Protection Policy Development and Enforcement	No tree protection policy.	Policies in place to protect public trees.	Policies in place to protect public and private trees with enforcement.	Integrated municipal wide policies that ensure the protection of trees on public and private land are consistently enforced and supported by significant deterrents.	The benefits derived from large-stature trees are ensured by the enforcement of municipal-wide policies.
10. Publicly owned natural areas management planning and implementation.	No stewardship plans or implementation in effect.	Reactionary stewardship in effect to facilitate public use (e.g., hazard abatement, trail maintenance, etc.)	Stewardship plan in effect for each publicly owned natural area to facilitate public use (e.g., hazard abatement, trail maintenance, etc.)	Stewardship plan in effect for each publicly owned natural area focused on sustaining the ecological structure and function of the feature.	The ecological structure and function of all publicly owned natural areas are protected and, where appropriate, enhanced.

The Sustainable Urban Forest: A Step-by-Step Approach

In order to move toward a more sustainable urban forest, municipalities must have a way to assess program achievements using defined criteria, or "targets." In their 2016 guide (*The Sustainable Urban Forest, A Step-by-Step Approach*) the USDA puts the targets in three main categories:

1. **Trees and Forest** – Targets related to the status of the vegetation resource itself and/or knowledge of that resource.

2. **Community Framework** – The necessary engagement of stakeholders at all levels, and collaboration among them.

3. **Resource Management Approach** – Plans, practices, and policies to improve and sustain the forest resource.

The advantage of using a consistent assessment framework are twofold: a) it will allow for regular and comparable assessments of progress toward urban forest targets and b) it allows comparison of similar metrics across municipalities, to understand relative performance in a larger urban forest management context. The current status of each target is evaluated here, with reference to the 2008 baseline and in 2018 updates from discussion with Town of Oakville staff. Table 2 provides a summary of where the town currently ranks in 2018 in each of three evaluation categories.

Table 2. 2020 UFSMP assessment of Town of Oakville urban forest resource and management program.

Target/Rating	Low	Fair	Good	Optimal
T1 – Relative Tree Canopy Cover			G	
T2 – Age Diversity (size class distribution)		F	G	
T3 – Species Diversity (street trees)		F		
T4 – Species Suitability		F	G	
T5 – Publicly Owned Trees (managed "intensively")		F	G	
T6 – Publicly Owned Natural Areas (managed "extensively")			G	
T7 – Trees on Private Property			G	
C1 – Municipal Agency Cooperation		F		
C2 – Utilities Cooperation			G	
C3 – Green Industry Cooperation		F		
C4 – Involvement of Large Private and Industrial Landowners	L			
C5 – Citizen Involvement and Neighborhood Action			G	O
C6 – Appreciation of Trees as a Community Resource			G	O
C7 – Regional Collaboration		F		
R1 – Tree Inventory		F	G	
R2 – Canopy Cover Assessment Goals			G	O

Target/Rating	Low	Fair	Good	Optimal
R3 – Environmental Justice and Equity			G	
R4 – Municipality-wide Urban Forest Management Plan			G	
R5 – Municipality-wide Urban Forestry Funding			G	
R6 – Municipal Urban Forest Program Capacity			G	
R7 – Tree Establishment Planning and Implementation			G	
R8 – Growing Site Suitability			G	
R9 – Tree Protection Policy Development and Enforcement			G	
R10 – Maintenance of Public Managed Trees		F	G	
R11– Management of Publicly Owned Natural Areas		F	G	
R12– Tree Risk Management		F		
R13– Urban Wood and Green Waste Utilization		F		
R14– Native Vegetation			G	

Category: Trees and Forest

Target T1 – Relative Tree Canopy Cover

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

Rationale and Interpretation:
Assessing tree cover change over time provides a metric for managers to determine whether program objectives are being met e.g., positive or negative trends in tree canopy over time if a target has been set. However, the percent cover does not assess quality, so it has limitations for providing information about the quality of forest cover e.g., species composition, condition of forest.

Performance Indicators:

- Low – The existing canopy cover for entire municipality is <50 per cent of the desired canopy.

- Fair – The existing canopy is 50 per cent-75 per cent of desired.

- Good – The existing canopy is >75 per cent-100 per cent of desired.

- Optimal – The existing canopy is >75 per cent-100 per cent of desired – at individual neighborhood level as well as overall municipality.

Current Level of Performance (2018): Good

- The Town of Oakville has set a tree cover target of 40 per cent by 2056. The 2019 UFSM also identifies separate land use targets for North and South Oakville.

- The most recent point sampling of tree cover using the USDA i-Tree Canopy Tool[13] shows overall tree canopy estimated at 31.2 per cent for North and South Oakville combined, which represents 75 per cent-100 per cent of the target 40 per cent.

Figure 1. Trends in tree cover for Town of Oakville from 2005-2018 (Source: Tree canopy estimates from previous and current reporting period).

Oakville: Urban Forest Cover (2005-2008)

Methodology:

All three estimates shown here were derived using the USDA Forest Service i-Tree Canopy tool[14], applied to three different years of imagery. The number of sample points was increased for 2018, in part because the study included the area of Oakville North of Dundas St. for the first time. An increased number of sample points reduces the standard error in the sample, but in this case should not generally affect the overall results significantly.

Notes:

- Increases in canopy cover have been noted since 2005 for South Oakville (from a baseline of 26.5 per cent in 2005).

- This represents the first baseline assessment of tree canopy for North Oakville.

- There has been an overall increase in canopy cover (including all trees and low vegetation other than grass) of 4.8 per cent across the Town of Oakville. Further investigation will be required to understand what proportion of this increase consists of suitable or desirable species.

14 https://canopy.itreetools.org/

Year	Imagery	# points sampled	Tree Cover Estimate (with Standard Error)
2005	B&W imagery provided by Town of Oakville, cross-referenced to Google Earth historic imagery for 2005 where gaps or cloud cover	2800	26.5% (*SE 0.83%)
2015	High resolution multi-spectral aerial imagery provided by the Town of Oakville	2800	27.8% (SE 0.84%)
2018	Google maps base imagery (May 2018)		

*Standard Error

T2 – Age Diversity (size class distribution)

Key Objective:
Provide for ideal uneven age distribution of all "intensively" (or individually) managed trees – municipality-wide as well as at neighborhood level.

Rationale and Interpretation:
Having a diverse age class distribution ensures a continuous flow of maximum benefits from the urban forest.

Performance Indicators:

- Low – Even-age distribution, or highly skewed toward a single age class (maturity stage) across entire population.

- Fair – Some uneven distribution, but most of the tree population falls into a single age class.

- Good – Total tree population across municipality approaches an ideal age distribution of 40 per cent juvenile (0-8cm), 30 per cent small (8-16cm), 20 per cent medium (16-24cm), and 10 per cent large (>24cm).

- Optimal – Total population approaches that ideal distribution municipality-wide as well as at the neighborhood level.

Current Level of Performance (2018): Fair to Good

- Distribution is uneven across age classes, with a larger proportion of the tree population falling into the smallest age class than is ideal (52 per cent juvenile trees compared to recommended 40 per cent)

- There is an overrepresentation of large trees as well, with the overrepresentation at the small and large end of the distribution creating a gap in the middle age classes need to provide continuity of benefits.

Figure 2. Tree size distribution by diameter class (Source: 2015 Growing Liveability study).
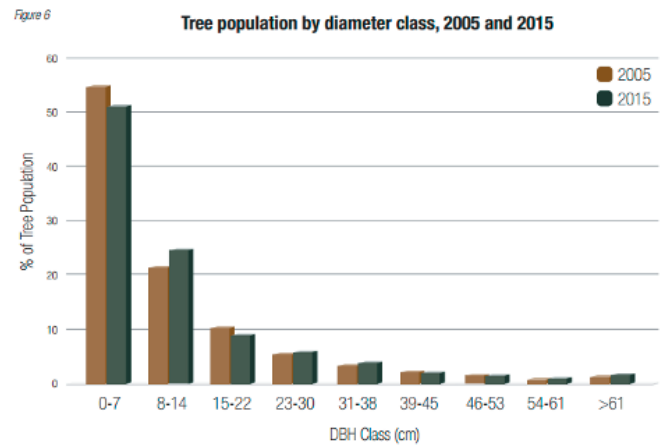
Notes:

- Size is used here as a proxy for age.

- This data includes young trees and natural regeneration that occurs in woodlots, but these do not skew the demographics dramatically.

- If woodlot trees are removed from the analysis, 72.7 per cent of Oakville's trees still measure less than 15 cm DBH.

- Target is based on generalized size categories in the Sustainable Urban Forest Guide

- Oakville-specific categories that reflects average tree sizes based on Oakville's generalized species – age – size relationships would be a desirable modification.

- Nonetheless, at current performance levels against targets there are still considerable gaps to be closed achieving the ideal age class distribution.

- Currently, there is a high number of young trees and fewer trees in the medium and larger age classes, which provide the most urban forest benefits.

T3 – Species Diversity

Key Objective:
Establish a genetically diverse tree population across municipality as well as at the neighborhood level.

Rationale and Interpretation:
An urban forest with high species diversity is better equipped to absorb the effects of species-specific disease or pest outbreaks than an urban forest with lower species diversity. At the same time, a high number of non-native or exotic species in land uses with more species diversity entails a risk that one or more of these species may prove to be invasive, or not support local flora and fauna in which case they could pose a risk to the ecological integrity of natural systems. The diversity must be weighed against local context – how many species can the urban area support, and what is expected species diversity in natural areas?

Performance Indicators:

- Low – Five or fewer species dominate the entire tree population across municipality.

- Fair – No single species represents more than 10 per cent of total tree population; no genus more than 20 per cent; and no family more than 30 per cent.

- Good – No single species represents more than 5 per cent of total tree population; no genus more than 10 per cent; and no family more than 15 per cent.

- Optimal – At least as diverse as "Good" rating (5/10/15) municipality-wide – and at least as diverse as "Fair" (10/20/30) at the neighborhood level.

Current Level of Performance (2018): Fair

- For the most part, an assessment of the street tree population indicates that Oakville's streets largely conform to the 10-20-30 standard[15]. Of the ten most abundant species in Oakville's street tree population (Figure 23), Norway maple (Acer *platanoides*) and northern white cedar (Thuja occidentalis) both exceed the recommended species population limit of 10 per cent.

- Sugar maple, European buckthorn (invasive) and white ash were still too abundant at time of last assessment to meet a good rating (e.g., 5 per cent or less of population).

- The prevalence of northern white cedar is likely due to the extensive use of this species as hedging along private property boundaries.

- Invasive species are making up a growing proportion of the tree canopy (European buckthorn increased from about 5-13 per cent of overall leaf area between 2005 and 2015)

Figure 3. Top ten tree species in Oakville by population and leaf area (Source: 2016 Growing Liveability study).

---
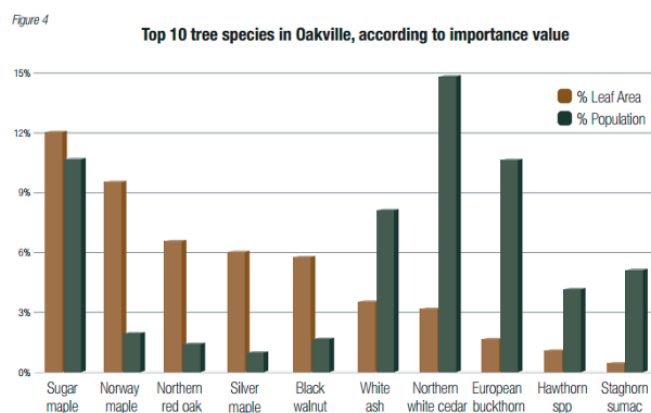
15 Town of Oakville Growing Liveability Study, 2016.

Notes:

- The proposed thresholds of tree diversity are better suited to the street tree population, as appropriate species diversity is more complex to assess in natural woodlands which may be naturally dominated by certain species or genus (e.g., maple) as part of natural succession and development of woodlands in the region.

- Diversity targets in woodlands are assessed and managed through silvicultural prescriptions developed by a professional forester with a sound understanding of native forest diversity and local site conditions.

T4 – Species Suitability

Key Objective:
Establish a tree population suited to the urban environment and adapted to the overall region.

Rationale and Interpretation:
The use/presence of suitable species will make the urban forest more resilient to change and environmental stressors. However, the definition of 'suitable' may change over time, as factors like pests, disease and climate change impact the 'suitability' of a given species for planting, as does a planting site. For example, Oakville makes best efforts to plant only native trees in woodlots but may use exotic (non-invasive) species as street trees. This may change as environmental factors change.

Performance Indicators:

- Low – Fewer than 50 per cent of all trees are from species considered suitable for the area.

- Fair – >50 per cent-75 per cent of trees are from species suitable for the area.

- Good – More than 75 per cent of trees are suitable for the area.

- Optimal – Virtually all trees are suitable for the area.

Current Level of Performance (2018): Fair - Good

- Approximately 76.9 per cent of the trees across the urban forest (based on a sample-based inventory carried out in 2013) are broadly suitable species, in that they are either native, or non-invasive exotic species. 14.3 per cent fall into the invasive and in that respect, definitely 'not suitable' category (in large part European buckthorn)

- 8.8 per cent of species could not be categorized because they were identified only to the genus level (e.g., oak, maple).

- The town makes best efforts to plant only native species from appropriate (local) seed sources in natural areas.

- Starting in 2015, all tenders issued by the town for forest regeneration require that vendors use stock from genetically appropriate seed sources, to the extent possible.

- Currently, this is challenging to verify other than through informal processes.

Figure 4. Composition of Oakville urban forest by percent native, exotic and invasive species.
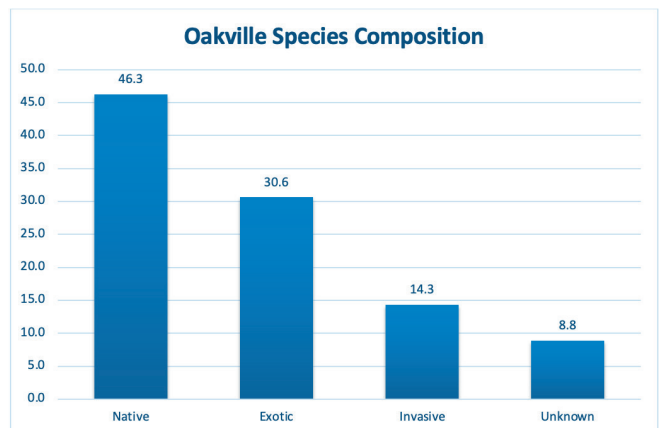
Notes:

- This assessment is based on comparing the Oakville tree inventory to the Conservation Halton planting guidelines and species lists (2010)

- Separating street trees from natural areas may change this ranking within those categories (e.g., likely more invasive species as well as more native species in woodlands)

- A finer assessment of tree species suitability can be determined by consulting published guidelines on regional suitability and/or review of planting lists by local practitioners, who have experience assessing what works in the Oakville context.

- Conditions vary between urban and natural areas, which needs to be taken into account in a more detailed assessment of suitability.

- The determination should also take into account concerns such as adaptability to local climate, invasive potential, soils, moisture demands, and management considerations.

T5 – Publicly Owned Trees (trees managed "intensively")

Key Objective:
Current and detailed understanding of the condition and risk potential of all publicly owned trees that are managed intensively (or individually).

Rationale and Interpretation:
Understanding tree condition assists managers in developing management strategies for managing hazards and reducing risk. Carrying out a comprehensive risk assessment for every tree is not realistic and generally limited by available resources, however, a risk management program can help reduce risk to acceptable levels.

Performance Indicators:

- Low – Condition of urban forest is unknown.
- Fair – Sample-based tree inventory indicating tree condition and risk level.
- Good – Complete tree inventory that includes detailed tree condition ratings.
- Optimal – Complete tree inventory that is GIS-based and includes detailed tree condition as well as risk ratings.

Current Level of Performance (2018):
Low to Fair
Oakville has a complete street tree inventory, which does include condition ratings but not have detailed risk ratings. A sample-based inventory of the town's forest (completed through 2016 i-Tree study) similarly provides assessment of general tree condition for the entire town by species and size class, but not an assessment of risk level. However, CityWorks provides a summary every month on risk trees that have been inspected and marked as high risk. The town has a service standard with defined response times based on risk levels.

Notes:

- Low to Fair assessment reflects discussions with 2018 UFSMP core working team on current status of street tree inventory and updates, as well as need to formalize a consistent risk assessment approach across the entire town.

- Street tree inventory, first completed in 2010, is outdated and needs to be redone for the areas south of Dundas.

- North Oakville currently lacks a comprehensive tree inventory for street and park trees, as the town is still in the process of assuming responsibility for lands in the area.

T6 – Publicly Owned Natural Areas (trees managed "extensively")

Key Objective:
Detailed understanding of the ecological structure and function of all publicly owned natural areas (such as woodlands, ravines, stream corridors, etc.), as well as usage patterns.

Rationale and Interpretation:
Having an understanding of the structure and function of natural areas and use patterns informs management priorities, both from a risk management perspective as well as supporting native biodiversity through habitat management.

Performance Indicators:

- Low – No information about publicly owned natural areas.

- Fair – Publicly owned natural areas identified in a "natural areas survey" or similar document.

- Good – Survey document also tracks level and type of public use in publicly owned natural areas.

- Optimal – In addition to usage patterns, ecological structure and function of all publicly owned natural areas are also assessed and documented

Current Level of Performance (2018): Fair to Good

- Fair- There is little available information about use levels and patterns in natural areas

- Good - Stewardship plan in effect for each publicly owned natural area owned by town in South Oakville to support public use (e.g., hazard abatement, trail maintenance, etc.) and native biodiversity through silvicultural prescriptions and targets.

Notes:

- FSC certified woodlots meet international third-party standards for planning, management and monitoring.

- Currently, management plans are only in place for woodlands South of Dundas owned by town (natural areas North of Dundas have not been assumed by town as yet)

- So far, EAB funding has supported hazard abatement along publicly used trails in natural areas

T7 – Trees on Private Property

Key Objective:

- Understanding of extent, location, and general condition of privately-owned trees across the urban forest.

- Rationale and Interpretation:

- Understanding the entire forest resource (public and private) is key to developing programs that will optimize the health and extent of the urban forest.

Performance Indicators:

- Low – No information about privately owned trees.

- Fair – Aerial, point-based assessment of trees on private property, capturing overall extent and location.

- Good – Bottom-up, sample-based assessment of trees on private property, as well as basic aerial view (as described in "Fair" rating).

- Optimal – Bottom-up, sample-based assessment on private property, as well as detailed UTC analysis of entire urban forest, integrated into municipality-wide GIS system.

Current Level of Performance (2018): Good

- Oakville has completed a sample-based inventory of trees on private land through 2016 i-Tree study, updated from 2005 for the area south of Dundas

- Detailed, parcel-level UTC mapping is available to Forestry for planning and prioritization purposes through Forestry GIS system

- A GIS layer for public trees is available to other departments town-wide

Notes:

- To date, Oakville has been committed to updating private and public tree inventory data through repeat studies on a 10-year cycle.

- Performance may be optimized once UTC assessment and inventories are completed for the entire town, including areas north of Dundas.

Category: Community Framework

C1 – Municipal Agency Cooperation

Key Objective:
All municipal departments and agencies cooperate to advance goals related to urban forest issues and opportunities.

Rationale and Interpretation:
Co-operation across municipal divisions will lead to better forestry outcomes, including the integration of urban forest objectives starting at the front end of planning. Regular communications can also assist in identifying opportunities and creating efficiencies for other divisions.

Performance Indicators:

- Low – Municipal departments/agencies take actions impacting urban forest with no cross-departmental coordination or consideration of the urban forest resource.

- Fair – Municipal departments/agencies recognize potential conflicts and reach out to urban forest managers on an ad hoc basis – and vice versa.

- Good – Informal teams among departments and agencies communicate regularly and collaborate on a project-specific basis.

- Optimal – Municipal policy implemented by formal interdepartmental/interagency working teams on all municipal projects.

Current Level of Performance (2018): Fair

- Some municipal departments/agencies recognize potential conflicts and reach out to forest managers on an ad hoc or project-specific basis – and vice versa.

- A town forestry committee was established (Interdepartmental/Interagency Technical Advisory Committee or IITAC) - however, meetings are infrequent.

- Formal collaboration is occurring through some town initiatives (Biodiversity Strategy) but not others (Stormwater Master Plan).

Notes:

- This assessment is based on the UFSMP core working team review of recommendations.

- Formalizing communications between departments (through existing Forestry committee) could improve this ranking.

C2 – Utilities Cooperation

Key Objective:
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.

Rationale and Interpretation:
Co-ordination on utility work offers opportunities for protection and proper maintenance of the urban forest.

Performance Indicators:

- Low – Utilities take actions impacting urban forest with no municipal coordination or consideration of the urban forest resource.

- Fair – Utilities employ best management practices, recognize potential municipal conflicts, and reach out to urban forest managers on an ad hoc basis – and vice versa.

- Good – Utilities are included in informal municipal teams that communicate regularly and collaborate on a project-specific basis.

- Optimal – Utilities help advance urban forestry goals and objectives by participating in formal interdepartmental/interagency working teams on all municipal projects.

Current Level of Performance (2018): Fair

- Hydro has a line pruning program, where money is provided to the Town of Oakville, which hires subcontractors to do the work and offering opportunity for quality control

- There is an opportunity to link with Hydro pruning program and share that info

with Urban Forestry unit's work on risk management.

- Town water realignment projects also now provide budget to Forestry to do related tree planting

C3 – Green Industry Cooperation

Key Objective:
Green industry[16] works together to advance municipality-wide urban forest goals and objectives and adheres to high professional standards.

Rationale and Interpretation:
A wide range of professions undertake work that impacts the urban forest. Improved co-ordination among players will lead to better outcomes for the urban forest, and possibly for other town environmental key performance indicators.

Performance Indicators:

- Low – Little or no cooperation among segments of green industry or awareness of municipality-wide urban forest goals and objectives.

- Fair – Some cooperation among green industry as well as general awareness and acceptance of municipality-wide goals and objectives.

- Good – Specific collaborative arrangements across segments of green industry in support of municipality-wide goals and objectives.

- Optimal – Shared vision and goals and extensive committed partnerships in place. Solid adherence to high professional standards.

---

16 According to the USADA Sustainable Urban Forest Guide: The "green industry" is understood to encompass all professions and businesses that routinely support or engage in tree and vegetation management activities. Among others, these can include landscapers, nurseries, garden centers, contractors, maintenance professionals, tree care companies, landscape architects, foresters, planners, even developers.

Current Level of Performance (2018): Fair

- Fair – Oakville has an "Arborist Licensing By-law that requires arborists to have a licence to operate in Oakville.

- Developments under site plan or subdivision agreements are required to work with the town to ensure canopy targets on met in development applications.

Notes:

- More information needed on longer-term performance of trees planted on private property to asses effectiveness of current policies.

- Close cooperation with the green industry presents an excellent opportunity for municipal urban forest managers to influence management of the forest resource on private property.

C4 – Involvement of Large Private and Industrial Landowners

Key Objective:
Large private landholders embrace and advance municipality-wide urban forest goals and objectives by implementing specific resource management plans.

Rationale and Interpretation:
Much of the future tree cover potential in the Town of Oakville is located on private property. Reaching out to private landowners will be a key aspect of the town meeting its long-term tree canopy targets and shifting focus to afforestation of private lands can create long-term cost savings for the town as well.

Performance Indicators:

- Low – Large private landholders are generally uninformed about urban forest issues and opportunities.

- Fair – Municipality conducts outreach directly to landholders with educational materials and technical assistance, providing clear goals and incentives for managing their tree resource.

- Good – Landholders develop comprehensive tree management plans (including funding strategies) that advance municipality-wide urban forest goals.

- Optimal – As described in "Good" rating, plus active community engagement and access to the property's forest resource.

Current Level of Performance (2018): Low

- Large private landholders are generally uninformed about urban forest issues and opportunities.

Notes:

- The UFSMP carries forward a recommendation to create an outreach position to engage with private land owners on stewardship and tree canopy protection and growth in Oakville.

C5 – Citizen Involvement and Neighborhood Action

Key Objective:
At the neighborhood level, citizens participate, and groups collaborate with the municipality and/or its partnering NGOs in urban forest management activities to advance municipality-wide plans.

Rationale and Interpretation:
Citizen engagement is a good predictor of the success of urban forestry programs and can support the town's forestry objectives and achievement of tree canopy goals.

Performance Indicators:

- Low – Little or no citizen involvement or neighborhood action.

- Fair – Some neighborhood groups engaged in advancing urban forest goals, but with little or no overall coordination with or direction by municipality or its partnering NGOs.

- Good – Many active neighborhood groups engaged across the community, with actions coordinated or led by municipality and/or its partnering NGOs.

- Optimal – Proactive outreach and coordination efforts by municipality and NGO partners resulting in widespread citizen involvement and collaboration among active neighborhood groups engaged in urban forest management.

Current Level of Performance (2018): Good

- There are local groups engaged in advancing urban forest goals (OakvilleGreen, LEAF, Town Forest Health Ambassadors) that are either supported by or coordinated by the town.

- A reporting tool on the town's website allows citizens to enter locations of trees planted on private property, providing some measure of canopy growth on private lands.

C6 – General Appreciation of Trees as a Community Resource

Key Objective:
Stakeholders from all sectors and constituencies within municipality – private and public, commercial and non profit, entrepreneurs and elected officials, community groups and individual citizens – understand, appreciate, and advocate for the role and importance of the urban forest as a resource.

Rationale and Interpretation:
Strong public sector and citizen support of urban forests result in better urban forestry outcomes.

Performance Indicators:

- Low – General ambivalence or negative attitudes about trees, which are perceived as neutral at best or as the source of problems. Actions harmful to trees may be taken deliberately.

- Fair – Trees generally recognized as important and beneficial.

- Good – Trees widely acknowledged as providing environmental, social, and economic services – resulting in some action or advocacy in support of the urban forest.

- Optimal – Urban forest recognized as vital to the community's environmental, social, and economic well-being. Widespread public and political support and advocacy for trees, resulting in strong policies and plans that advance the viability and sustainability of the entire urban forest.

Current Level of Performance (2018): Good to Optimal

- There is strong Council support for protecting and enhancing the urban forest.

- Local groups are active and collaborating with town staff, citizens are engaged.

- A survey in the Residential Character study showed that citizens place high value on trees and vegetation for contributing to the character of neighbourhoods.

- Inventories and studies are reviewed periodically to update the state of knowledge about the town's forest resource and adapt management practices.

Notes:

- The Sustainable Urban Forest Guide states: "Having public agencies, private landholders, the green industry, and neighborhood groups all share the same vision of the city's urban forest is a crucial part of sustainability. This condition is not likely to result from legislation. It will only result from a shared understanding of the urban forest's value to the community and commitment to dialogue and cooperation among the stakeholders." – Clark et al, 1997

C7 – Regional Collaboration

Key Objective:
Cooperation and interaction on urban forest plans among neighboring municipalities within a region, and/or with regional agencies.

Rationale and Interpretation:
Cooperation can capitalize on efficiencies and synergies in program objectives, and lead to better urban forestry outcomes.

Performance Indicators:

- Low – Municipalities have no interaction with each other or the broader region. No regional planning or coordination on urban forestry.

- Fair – Some neighboring municipalities and regional agencies share similar policies and plans related to trees and urban forest.

- Good – Some urban forest planning and cooperation across municipalities and regional agencies.

- Optimal – Widespread regional cooperation resulting in development and implementation of regional urban forest strategy.

Current Level of Performance (2018): Fair to Good

- Some urban forest planning and cooperation across municipalities and regional agencies (ongoing co-operation with Conservation Halton on as one example)

- There has been increasing co-operation (e.g. with adjacent municipalities) on co-ordinating response to forest health threats like Gypsy Moth.

Notes:

- Guide states: By way of example, regional disaster management planning follows this type of model – and some funders require regional cooperation.

- Increased co-ordination on invasive species management will be critical to effectiveness of programs in coming years.

Category: Resource Management Approach

R1 – Tree Inventory

Key Objective:
Current and comprehensive inventory of tree resource to guide its management, including data such as age distribution, species mix, tree condition, and risk assessment.

Rationale and Interpretation:
Up-to-date resource inventories provide information that allows managers to adapt programs in response to changes in the forest resource.

Performance Indicators:

- Low – No inventory.
- Fair – Complete or sample-based inventory of publicly owned trees.
- Good – Complete inventory of publicly owned trees and sample-based privately-owned trees that is guiding management decisions.
- Optimal – Systematic comprehensive inventory system of entire urban forest – with information tailored to users and supported by mapping in municipality-wide GIS system.

Current Level of Performance (2018): Fair to Good

- The town has a complete (though outdated) 2010 street tree inventory for areas south of Dundas, and a sample-based inventory of privately-owned trees that guides management decisions.
- The information is integrated into the Forestry GIS and asset management system (CityWorks)

Notes:

- The need to update the street tree inventory is recognized and efforts to secure funding are ongoing
- Gaps include a complete inventory of street and park trees for areas North of Dundas, which have not been included as part of previous town-wide inventories
- The timing of a North Oakville inventory is complicated by the assumption of lands in North Oakville by the town, which is ongoing.

R2 – Canopy Cover Assessment Goals

Key Objective:
Urban forest policy and practice driven by accurate, high-resolution, and recent assessments of existing and potential canopy cover, with comprehensive goals municipality-wide and at neighborhood or smaller management level.

Rationale and Interpretation:
Assessing current and potential canopy cover at different scales offers insight to trends, which can assist managers in adapting programs in response to changes in tree cover. It also assists the town in understanding how it can meet tree canopy goals.

Performance Indicators:

- Low – No assessment or goals.
- Fair – Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery – and limited or no goal setting.
- Good – Complete, detailed, and spatially explicit, high-resolution UTC assessment

based on enhanced data (such as LiDAR) – accompanied by comprehensive set of goals by land use and other parameters.

- Optimal – 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.

Current Level of Performance (2018): Good to Optimal

- The town completed a parcel-level UTC assessment (2015) and has developed and revised land use targets for tree canopy that are applied town-wide through the development review process.

- The town has set an overall tree canopy goal of 40 per cent by 2056.

- To date, LiDAR has not been used to assess tree canopy but may be in future updates if available.

Notes:

- Enhanced data is not fully described in the Sustainable Urban Forest Guide; the example of LiDAR data is all that is provided.

- We interpret enhanced data to include (geo-referenced) high resolution digital aerial photography that was used in Oakville's Canopy Cover Assessment i.e., LiDAR not required to meet "Good" level of performance.

R3 – Environmental Justice and Equity

Key Objective:
Ensure that the benefits of urban forests are made available to all, especially to those in greatest need of tree benefits.

Rationale and Interpretation:
In the local context, this indicator looks broadly at distribution of tree canopy in different areas of the town and whether there are significant gaps in some areas.

Performance Indicators:

- Low – Tree planting and outreach is not determined equitably by canopy cover or need for benefits.

- Fair – Planting and outreach includes attention to low canopy neighborhoods or areas.

- Good – Planting and outreach targets neighborhoods with low canopy and a high need for tree benefits.

- Optimal – Equitable planting and outreach at the neighborhood level is guided by strong citizen engagement in those low-canopy/high-need areas.

Current Level of Performance (2018 re-assessment): Good

- The current UFSMP has identified priority areas for planting and outreach to private landowners, based on an assessment of UTC levels and possible planting area to achieve a more equitable distribution of tree cover.

- A 'tree canopy feasibility' study has defined land use targets based on an assessment of what is feasibly in different land uses.

- The plan review process looks for opportunities to achieve these targets across different land uses, through the development

of separate "tree canopy plans" for proposed developments.

R4 – Municipality-wide Urban Forest Management Plan

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

Rationale and Interpretation:
A comprehensive plan provides a road map for management programs, including a means to monitor progress against a set of criteria and indicators.

Performance Indicators:

- Low – No plan.

- Fair – Existing plan limited in scope and implementation.

- Good – Recent comprehensive plan developed and implemented for publicly owned forest resources, including trees managed intensively (or individually) and those managed extensively, as a population (e.g., trees in natural areas).

- Optimal – Strategic, multi-tiered plan with built-in adaptive management mechanisms developed and implemented for public and private forest resources.

Current Level of Performance (2018): Good

- Plans have been developed and implemented for publicly owned forest resources for entire town, including trees managed intensively (or individually) and those managed extensively, as a population (e.g., trees in natural areas).

- Some gaps in management approach remain due to ongoing change and development in North Oakville.

- Optimal performance is an anticipated outcome of the current and future TOUFSMP planning process, as town assumes lands north of Dundas and integrates all town lands into the forest management program.

R5 – Municipality-wide Urban Forestry Funding

Key Objective:
Develop and maintain adequate funding to implement municipality-wide urban forest management plan.

Rationale and Interpretation:
Adequate capital and operating funds are critical to maintaining a sound urban forest management program, based on the town's objective of achieving 40 per cent tree cover by 2056, managing risk and maintaining a healthy urban forest.

Performance Indicators:

- Low – Little or no dedicated funding.

- Fair – Funding only for emergency, reactive management.

- Good – Funding sufficient for some proactive management based on urban forest management plan.

- Optimal – Sustained funding from public and private sources to fully implement comprehensive urban forest management plan.

Current Level of Performance (2018): Good

- Current funding is sufficient for proactive management based on urban forest management plan.

- However, funding needs to keep pace with expanding urban forest, for example where the town will begin assuming management responsibility for lands north of Dundas.

Notes:

- Changes in level of funding for different initiatives and action plans occur in response to changing priorities and environmental conditions (e.g., EAB)

- Funding to carry out invasive species management will be a key concern moving forward.

R6 – Municipal Urban Forest Program Capacity

Key Objective:
Maintain sufficient well-trained personnel and equipment – whether in-house or through contracted or volunteer services – to implement municipality-wide urban forest management plan.

Rationale and Interpretation:
Trained staff are required to properly implement forestry programs, from pruning to pest monitoring and management to chemical applications. Many aspects of forest management required specialized knowledge, training and equipment.

Performance Indicators:

- Low – Team severely limited by lack of personnel and/or access to adequate equipment. Unable to perform adequate maintenance, let alone implement new goals.

- Fair – Team limited by lack of trained staff and/or access to adequate equipment.

- Good – Team able to implement many of the goals and objectives of the urban forest management plan.

- Optimal – Team able to implement all of the goals and objectives of the urban forest management plan.

Current Level of Performance (2018): Good

- The town has sufficient staff to achieve many of the last UFSMP objectives.

- However, there are ongoing challenges with recruiting and retaining qualified arborists in the town.

- Future assumption of town lands north of Dundas as well as environmental change (including growth of invasive species) has implications for future staffing levels that need to be evaluated as part of current plan implementation.

Notes:

- Achieving the Optimal performance level for this Target is likely unrealistic for most municipalities, due to common budget limitations.

- Exploring alternative funding streams can be part of maintaining optimal funding and staff levels.

R7 – Tree Establishment Planning and Implementation

Key Objective:

Comprehensive and effective tree planting and establishment program is driven by canopy cover goals and other considerations according to plan.

Rationale and Interpretation:
A comprehensive program should consider aspects of planting including matching species to site condition, long-term survival and growth rates, genetic conservation and biodiversity, availability of suitable stock among other factors. This will ensure best use of resources and optimal outcomes.

Performance Indicators:

- Low – Little or no tree planting; tree establishment is ad hoc.

- Fair – Some tree planting and establishment occurs, but with limited overall municipality-wide planning and post-planting care.

- Good – Tree planting plan is guided by municipality-wide goals, with some post-planting establishment care.

- Optimal – Comprehensive tree establishment plan is 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.

Current Level of Performance (2018): Good

- Tree planting plan is guided by municipality-wide goals, with some post-planting establishment care.

- Efforts are made to use suitable, native stock from appropriate seed sources in natural areas as available.

- A planting prioritization plan is part of the UFSMP and will direct planting priorities in the next plan term.

Notes:

- Guide States: Where existing growing site conditions are poor, retrofitting can also be performed to improve soil volume, soil quality, and other limiting factors.

- Optimal performance likely requires enhanced public engagement and partnerships to promote tree establishment on private lands.

- The UFSMP includes an action to incorporate more engineered soils/structures in town capital projects as possible.

R8 – Growing Site Suitability

Key Objective:
All publicly owned trees are selected for each site and planted in conditions that are modified as needed to ensure survival and maximize current and future tree benefits.

Rationale and Interpretation:
This indicator supports the goal of avoiding tree planting in unsuitable site conditions, which is a common issue across municipalities (e.g., plantings in road ROWS, where soil and moisture conditions can be challenging for establishment and survival).

Performance Indicators:

- Low – Trees selected and planted without consideration of site conditions.

- Fair – Appropriate tree species are considered in site selection.

- Good – Municipality-wide guidelines in place for the improvement of planting site conditions and selection of suitable species.

- Optimal – 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.

Current Level of Performance (2018 re-assessment): Good

- Selection of tree species is done in accordance with a town planting list

- Some town-wide guidelines are in place for the improvement of planting site conditions (e.g., soil volume and quality requirements for subdivisions).

- Standardized planting specifications to be implemented town-wide are an outcome of the UFMSP planning process.

Notes:

- Optimal performance is challenging in an urban environment but Urban Forestry should still strive towards achieving this target.

- Growing site suitability is a sub-component of tree establishment planning and implementation; hence it is somewhat redundant.

- Redundancy aside, setting focused targets surrounding growing site suitability and measuring performance moving forward has stand-alone value since understanding actions taken towards ensuring growing site suitability is an important component of tree establishment that merits focused objectives and actions.

- The UFSMP includes an action to incorporate more engineered soils/structures in town capital projects as possible.

- Growing site suitability should be a component of town -led public outreach and education to promote success of planting on private land.

R9 – Tree Protection Policy Development and Enforcement

Key Objective:
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".

Rationale and Interpretation:
Strong tree protection policies with proper enforcement and deterrents provide best protection for existing tree canopy, which is a key part of meeting tree cover objectives along with planting trees.

Performance Indicators:

- Low – No tree protection policy.

- Fair – Policies in place to protect public trees and employ industry best management practices, but inconsistently enforced.

- Good – Policies and practices in place to protect public and private trees, generally enforced.

- Optimal – Integrated municipality-wide policies and practices to protect public and private trees, consistently enforced and supported by significant deterrents.

Current Level of Performance (2018): Good

- Policies and practices are in place to protect public and private trees, and these are generally enforced.

- Enforcement and protection have improved with the additional enforcement officers since recommended in the last plan.

- There remain some gaps related to optimizing tree protection under certain aspects of the town's development and review processes.

Notes:

- Enhanced public outreach and education could result in a greater number of reports of tree protection concerns and/or violations.

- CWT should consider evaluating current deterrents in the case of violations to determine if these are "significant", a requirement for optimal performance.

R10– Maintenance of Publicly Owned, "Intensively" Managed Trees

Key Objective:
All publicly owned, intensively (or individually) managed trees are well maintained for optimal health and condition in order to extend longevity and maximize current and future benefits.

Rationale and Interpretation:

- Regular maintenance improves overall forest condition and resilience and creates opportunities for cost efficiencies in moving away from a reactive approach to tree maintenance.

Performance Indicators:

- Low – No maintenance of publicly owned trees, or on a reactive basis only.

- Fair – Publicly owned trees receive only periodic inspection and maintenance.

- Good – Publicly owned trees are inspected and proactively maintained on a cyclical basis.

- Optimal – All publicly owned, intensively managed trees are routinely and thoroughly maintained on ongoing basis according to comprehensive management plan.

Current Level of Performance (2018): Fair

- Fair – Publicly owned trees receive only periodic inspection and maintenance.

- A rotational pruning program has been funded and will be implemented over the next plan cycle (target is a 9—year return interval until next evaluation).

Notes:

- Because the program is new, there is currently no supporting data to assess productivity and predict a return interval at this time.

- An assessment of the program will be undertaken following implementation, to determine budgets and the required return cycle to optimize the benefits of regular pruning for forest health and risk management.

R11– Management of Publicly Owned Natural Areas

Key Objective:
The ecological integrity of all publicly owned natural areas is protected and enhanced – while accommodating public use where appropriate.

Rationale and Interpretation:
Natural areas management supports habitat and biodiversity objectives, as well as contributes to ecological services and recreational values for the entire town. The management approach reflects known values and use pressures.

Performance Indicators:

- Low – No natural areas management plans or implementation in effect.

- Fair – Only reactive management efforts to facilitate public use (e.g., hazard abatement,

trail maintenance).

- Good – Management plan in place for each publicly owned natural area to facilitate appropriate public use.

- Optimal – Management plan for each publicly owned natural area focused on sustaining and, where possible, improving overall ecological integrity (i.e., structure and function) – while facilitating appropriate public use.

Current Level of Performance (2018): Good

- Management plans are in place for each town-owned natural area to facilitate appropriate public use.

- Woodlands (south of Dundas) are third-party certified under the Forest Stewardship Council standard to demonstrate sustainable management.

- Efforts are being made to restore and manage native biodiversity in woodlots and address invasive species as resources permit (e.g., European buckthorn).

- EAB hazard abatement and woodlot tree marking addresses potential tree hazards related to public use.

- Currently, there is little data to describe use levels and specific pressures in natural areas.

Notes:

- There is some overlap in the Resource Management Targets outlined in the Sustainable Urban Forest guide. For example R-12 (Tree Risk Management) is a necessary component of R-11 (Management of Publicly owned Natural Areas).

R12– Tree Risk Management

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

Rationale and Interpretation:
A risk management program addresses potential tree hazards and is intended to reduce risk of injury or damage to property.

Performance Indicators:

- Low – No tree risk assessment or risk management program. Response is on a reactive basis only.

- Fair – Level I (limited visual assessment) inspection and follow-up conducted periodically.

- Good – Level II (basic assessment) conducted periodically, resulting in scheduled follow-ups.

- Optimal – 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).

Current Level of Performance (2018): Fair

- EAB hazard management program has been systematically addressing risk in natural areas, including ash and other potential hazard trees along trails.

- Risk management is otherwise generally reactive, however, service standards have been established based on known risk status.

- Some information on tree condition is available in the street tree inventory and used to prioritize maintenance.

- A rotational pruning program is being implemented, and will help the town reduce future risk in the street and park tree population.

Notes:

- The next street tree inventory is intended to collect information on the structural condition of trees, to support systematic risk management in the street tree population.

- A rotational maintenance program being implemented over the next plan cycle is also part of the town's risk management approach.

R13– Urban Wood and Green Waste Utilization

Key Objective:
Create a closed system diverting all urban wood and green waste through reuse and recycling.

Rationale:
A majority of waste wood and by-products of forest management activities should be diverted from landfill through other uses. Benefits include[17]:

- Reducing tree-disposal fees for cash-strapped municipalities;

- Encouraging the expansion and development of niche urban wood-based businesses, and urban and community utilization programs;

- Developing strong markets for urban wood recycling and utilization;

- Converting urban "waste" wood into useful and locally produced products;

- Increasing environmental consciousness.

Performance Indicators:

- Low – No utilization plan; wood and other green waste goes to landfill with little or no recycling and reuse.

- Fair – While most green waste does not go to landfill, uses are limited to chips or mulch.

- Good – The majority of green waste is reused or recycled – for energy, products, and other purposes beyond chips or mulch.

- Optimal – Comprehensive plan and processes in place to utilize all green waste one way or another, to the fullest extent possible.

Current Level of Performance (2018): Fair

- While most green waste does not go to landfill, uses are currently limited to chips or mulch.

Notes:

- Public outreach and partnerships with outside organizations will be required to advance towards the new plan target for urban wood and green waste utilization.

- There may be some limitations to the use of wood waste due to invasive species restrictions.

---

17 http://biomassmagazine.com/articles/5414/twins-cities-a-model-for-urban-wood-waste-utilization

R14– Native Vegetation

Key Objective:
Preservation and enhancement of local natural biodiversity.

Rationale:
The town has policies and objectives to support and enhance local biodiversity. A new Biodiversity Strategy outlines priority areas of focus.

Performance Indicators:

- Low – No coordinated focus on native vegetation.

- Fair – Voluntary use of native species on publicly and privately-owned lands; invasive species are recognized.

- Good – Use of native species is encouraged on a project-appropriate basis in all areas; invasive species are recognized and discouraged on public and private lands.

- Optimal – 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.

Current Level of Performance (2018): Good

- Use of native species is encouraged on a project-appropriate basis in all areas; invasive species are recognized and discouraged on public and private lands.

Notes:

- Identified forestry actions and priorities link to elements of the town's Biodiversity Strategy as well as Conservation Halton biodiversity objectives and management activities.