File No.
Planner:

TO:	CHAIR AND MEMBERS PLANNING AND ENVIRONMENT COMMITTEE MEETING ON May 7, 2012
FROM:	J. M. FLEMING DIRECTOR, LAND USE PLANNING AND CITY PLANNER
SUBJECT:	UFORE PROJECT SUMMARY AND DEVELOPMENT OF URBAN FOREST STRATEGY

RECOMMENDATION

That on the recommendation of the Director Land Use Planning and City Planner:

(a)   That this report on the UFORE analysis and development of the Urban Forest Strategy, **BE RECEIVED** for information;

PREVIOUS REPORTS PERTINENT TO THIS MATTER

ETC Report UFORE Project Summary and Urban Forest Strategy Update, June 21, 2010.

ETC Report Urban Forest Effects (UFORE) Model and Update of Urban Tree Inventory, November 26, 2007

Planning Committee Report Tree Cover Statistics May 8, 2006

BACKGROUND

Purpose:
This report serves as a key milestone in the development of an Urban Forest Strategy in support of the London's Official Plan. It highlights some key findings and recommendations of the UFORE study and outlines the process for the development of London's Urban Forest Strategy which is currently under way.   The final UFORE analysis report "*Our Forest, Your Trees: London's Growing Assets*" is currently in print and will be available on line by May, 9, 2012.

Context:

Over 80% of Canadians and 90% of Londoners live in urban areas and we all live in the *Forest City*. There is a new and growing awareness of the value of trees and the urban forest. This shift in attitude from trees being liabilities to being assets, and a recognition of trees as a public utility, as assets, part of green infrastructure and natural capital are relatively new concepts.

An urban forest includes tree-dominated vegetation and related features found within an urban area and includes woodlots, plantations, shade trees, fields in various stages of succession, wetland and riparian areas (*Ontario Professional Foresters Act. 2000*). The urban forest can be considered a continuum of trees that ranges from individual trees in planters in our downtown core or boulevards to backyard trees, to treed areas in parks such as Victoria Park to more

1

natural wooded areas such as the Warbler Woods Environmentally Sensitive Area, to more spread out woodlots interspersed in our agricultural areas. It is an ecosystem that is highly influenced by planning decisions and characterized by human action and movement and alteration of landscape features.

UFORE is a statistical model and sampling protocol developed by the United States Department of Agriculture (USDA) Forest Service to identify the structure, environmental functions and structural value of urban forests. It is a snapshot in time of the urban forest. The City of London is now among a select group of municipalities (Vancouver, Calgary, Toronto, Oakville and most of the municipalities within the Greater Toronto Area (GTA), New York, Washington D.C., Chicago, Philadelphia and Atlanta to name a few) that have completed a UFORE analysis. A summary of key findings and recommendations of the UFORE analysis are provided in this report.

Without knowing what we have, we cannot adequately manage it to meet our current needs, or future needs. The Urban Forest Strategy is the critical element in professionally managing these assets and issues. The Urban Forest Strategy supports London's Official Plan as it provides the vision for the urban forest and the direction with respect to policies and other legislation such as by-laws, multi-disciplinary planning requirements, budgetary requirements, operational practices, monitoring changes and reporting on the state of the urban forest. The strategy identifies long- and short-term goals with a 20-year framework in order to provide sufficient time for continuity across the planning horizon and accommodate changes due to changing political and environmental conditions and unforeseen events. It is supported by a series of 5-year program management plans, annual operating plan and their associate budgets.

UFORE Analysis Results:

Urban Forest Structure

1) We have 4.4 million +/- 11% individual trees.

2) The leaf cover within the Urban Growth Boundary is 24.7% +/- 1%.

   It is significantly influenced by land use type. Parks/natural areas and low density residential land use areas have the highest % leaf cover while commercial and industrial land use types have the lowest.

   When the total area of each land use type is taken into consideration, low density residential contributes 41% of the total leaf cover.

3) Approximately 87% of all the trees are in parks, natural areas and low density residential land use areas.

4) Most of our trees are healthy
   78% are good to excellent   11% are poor to fair   11% are dead.

5) The 3 most common tree species by are buckthorn, eastern white cedar and sugar maple. Ash species account for 10% of all the trees.

6) We identified 126 different species. Approximately 50% of all our trees are native to Ontario.

7) The 3 tree species that have the most leaf area are Norway maple, sugar maple and black walnut.

8) At chest height, 77.5% of trees are less than 15 cm (6 inches) in diameter. Most of these are our most common species like buckthorn, cedar, hawthorn and other ornamental species which cannot grow much bigger.

Urban Forest Functions (Ecological Goods and Services)

1) **Carbon Storage**

Carbon storage is an important way that trees influence global climate change.

London's 4.4 million trees can be considered a carbon bank storing 360,000 tonnes of carbon.

Over their lifetime, they have removed 1.3 million tonnes of carbon dioxide (CO_2) from the atmosphere.

Artificial removal of that much carbon from the air has a value of $10.3 million.

2) **Carbon Sequestration and Reduction of Greenhouse Gasses**

This carbon bank grows by 12,500 tonnes per year by converting 45,800 tonnes of CO_2, one of the major greenhouse gasses.

The value of removing this much CO_2 is $355,000 per year.

3) **Air Quality and Pollution Control**

Poor air quality caused by pollution can lead to human health problems, smog and damage to ecosystem processes.   Trees remove air pollution by trapping the particles on their tissues, directly absorbing gasses, and reducing hydrocarbon emissions and ozone formation.

Our trees remove 370 tonnes of air pollutants each year.

This removal value is $4.5 million per year

4) Energy Use and Conservation

Trees are nature's air conditioners. They reduce air temperature by providing shade, giving off moisture and altering wind speed.

As for air conditioning residential homes, energy savings, valued at $1.7 million, are 'made in the shade' annually.

This avoids generating an additional 3,200 tonnes of carbon emissions per year and produces a corresponding saving of $92,500 of carbon removal costs

Structural or Replacement Value

One method by which urban forests are valued is by recognizing trees as physical assets and "infrastructure" and to base their value on the species, size, health, location and cost to replace the tree with the largest available tree of the same species (structural value). The structural value of an urban forest tends to increase with a rise in the number and size of healthy trees.

The structural value, including the replacement cost with acceptable tree species, of our 4.4 million trees is $1.5 billion.

Silver maple, Norway maple, northern white cedar, sugar maple and white ash have the highest structural value.

In any given year, the total of environmental goods and services provided by our urban forest is $17million. **This value can increase as the number and size of healthy trees increases.**

Potential Insect and Disease Impacts

The impact of four exotic species were analyzed.

Emerald ash borer (EAB) was first discovered in London in 2006. This insect has the potential to affect 10% of all our live trees, thus reducing the structural value by $130 million and reducing the leaf cover to 22.9%. This is a reduction of the total leaf cover of 7% within the next 10 years. Subsequent to the analysis, an EAB management strategy has been developed and endorsed by Council.

Asian longhorned beetle (ALHB) bores into and kills a wide range of tree species. Although it has not been identified in London, it has been found in the Toronto/Vaughan area where the most seriously infested stands were treated. It has the potential to affect 41% of our live trees and reduce the structural value by $1.1 billion.

Gypsy moth is a defoliator that feeds on many species. By eating the leaves, it weakens the trees. It can kill trees if the outbreak conditions last for several years. Large outbreaks were identified in 1998 and 2007. It can infest 13% of our live tree population and result in a loss of $303 million in structural value.

Dutch elm disease has devastated one of our most important native tree species. Many of the elm trees identified in this study were already dead. This disease threatens approximately 0.8 % of the live trees resulting in a potential loss of $8 million

Major Recommendations from the UFORE Analysis:

Based on the results of this analysis, the following policy and practices recommendations are referred to the Urban Forest Strategy for inclusion and prioritization in order maintain and enhance the environmental services provided by London's urban forest in a planned, strategic manner. They are grouped into four general categories – Protect, Plant and Maintain, Monitor and Public Education

Protect

1. Establish leaf cover goals

2. Maintain or increase existing leaf cover through policies and best management practices

3. Sustain and protect large, healthy trees because large trees provide the greatest per-tree effects to optimize per-tree effects for air quality, greenhouse gas reduction and energy conservation benefits

4. Establish and maintain a planned, integrated tree life cycle maintenance program that includes watering, pruning, fertilization and monitoring to increase the number of healthy trees and maximize benefits

Plant and Maintain

5. Water trees and other vegetation on a regular basis to enhance pollution removal and reduce temperature

6. Protect and increase the amount of plantable spaces to maintain and increase the number of trees and leaf cover over time

7. Plant the right trees in the right place to satisfy management criteria (i.e. air pollution reduction, carbon sequestration, aesthetics, etc.)

8. Plant a diversity of species, sizes, and ages to reduce the impacts of disturbances (e.g. pests, climate change, etc.)

9. Plant trees in polluted or heavily populated areas to maximize tree air quality benefits

10. Plant trees in parking lots, along streets, etc. to shade parked cars and reduce vehicular VOC emissions

11. Use long-lived trees to reduce long-term pollutant emissions

12. Use low maintenance tree species to reduce pollutant emissions from maintenance activities

13. Avoid pollution-sensitive species to maintain long-term tree health

14. Maximize the use of low VOC-emitting tree species to reduce ozone and carbon monoxide formation

15. Utilize evergreen (conifer) trees for year-round particulate matter removal

16. Plant trees in strategic locations to minimize cooling and heating costs, and to reduce pollutant emissions from power plants

17. Reduce fossil fuel use when maintaining vegetation to reduce pollutant emissions

Monitor

18. Conduct a UFORE analysis every 4 years to monitor state of the urban forest

19. Conduct bi-annual assessment of changes to leaf cover using aerial photography analysis

20. Recognize the importance and contribution of woodlands outside the Urban growth Boundary as part of London's urban forest and quantify the ecological goods and services provided by them

21. Quantify mortality rates of trees

Public Education

22. Launch a public education campaign to increase public awareness of the direct relationship between environmental quality and tree canopy

23. Encourage and support private citizens to protect and plant trees on private property

Additional pressures and issues (such as impacts of global warming) on the health and long term sustainability of the urban forest have been identified in the report and recommendations related to them should be included in the development of the Strategy.

Urban Forest Strategy Overview:

An Urban Forest Strategy answers the following questions:
- What have we got? *The UFORE analysis addressed much of this question.*
- What do we want?
- How do we get what we want?
- Are we getting what we want?

The development of an Urban Forest Strategy   includes an 8-stage process incorporating a set of criteria and objectives with measurable performance indicators and

The strategic planning process includes:
1. Identification of the urban forest attributes (UFORE analysis)
2. Assessment of relevant resource data where it exists
3. Creation of vision reflecting community values
4. Determination of the current status of various components
5. Identifying gaps between vision and current status
6. Creation of administrative vehicles to close the gaps
7. Formation of operational plans incorporating the vision and goals
8. Implementation and monitoring of the plan

Clark et al. (1997) identified three key components of the urban forest: 1) the community framework, 2) the vegetation resource and 3) resource management. These components serve as the basis for developing the vision and strategic direction. Public buy-in and the recognition of trees and the urban forest as assets and green infrastructure are key to the development of the urban forest strategy. The community develops a shared vision of their forest, agrees on the forest benefits, with the private landowners recognizing the benefits of their trees and sharing in the cost of management. A sustainable vegetation resource provides continuous, high level benefits across the entire community. The philosophy of resource management includes the development of policies and appropriate strategies that support the Official Plan and vary with the objectives and urban forest structure across different land use types and management areas.

The strategy therefore determines the direction, size and scope of the urban forestry program for the next 20 years. The strategy supports the adoption of public policies, regulations, and incentives to maintain and improve our green infrastructure and natural capital. It allows the development of 5-year program management goals, annual operational plans and identifies associated budgets. Council direction will be sought on the ultimate strategy.

Figure 1. below identifies the various elements of an Urban Forest Strategy and Figure 2. shows how 5-year management plans and budgets are linked to implement a 20 year Urban Forest Strategy (van Wassenaer. 2009). Five year management plans allow for a consistent review and monitoring of attainment of the vision and goals. It allows for new information or issues to be incorporated into the strategy over time and for the review of the

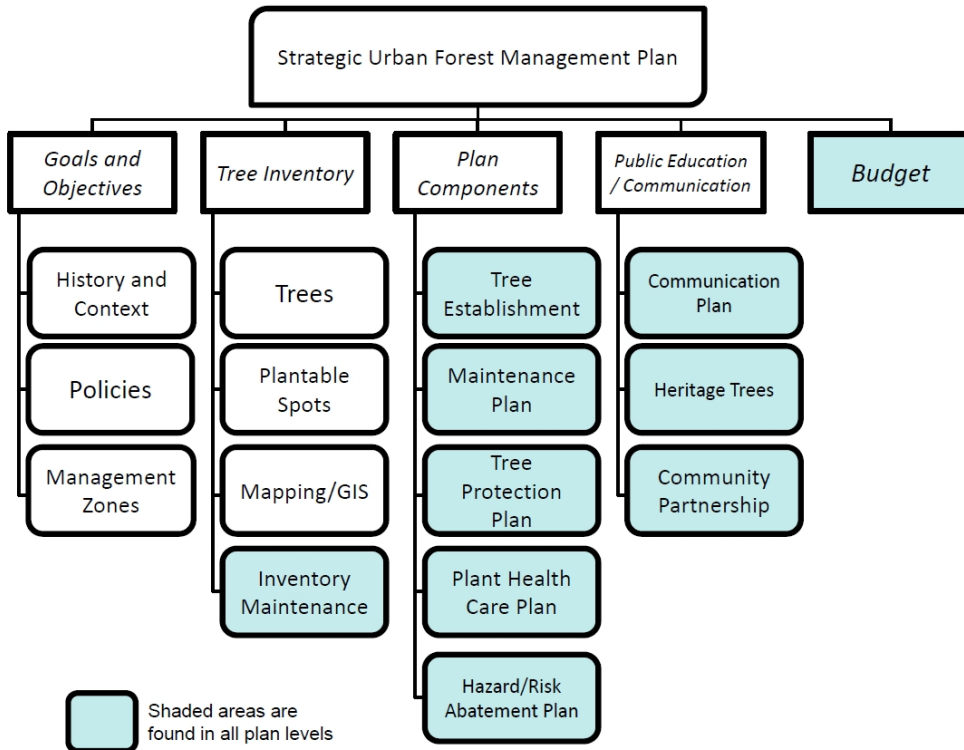Figure 1. General elements of an Urban Forest Strategy (taken from Van Wassenaer, 2009).

Figure 2. Implementation of the urban forest strategy showing the relationship of 5-year management plans and annual operating plans (taken from Van Wassenaer, 2009).

London's Urban Forest Strategy Development:

The City of London issued an RFP and awarded a contract to B.A. Blackwell and Associates Ltd. from Vancouver to assist us in the development of the Strategy.

The strategy development includes two phases that are consistent with the above approach. The first phase includes:

- A review of current urban forest strategies and programs in other municipalities.

- Definition of the urban forest in consultation with the Trees and Forests Advisory Committee (TFAC), stakeholders, staff and the general public. It will include spatial and descriptive parameters such as land use types, ecological values (such as natural heritage features) for which goals, targets and specific management strategies will be

developed.

- Review of current urban forest performance. It will include a review and evaluation of existing policies, practices, by-laws, vision statements, relevant reports, etc. to assess the current performance in meeting relevant goals and objectives. The strengths and weakness of current performance will be identified in relation to best management practices.

- Consultation with the community, stakeholders and staff from multiple Departments. Public consultation will include at least two open houses and an on-line or other format survey. The first open house will be to identify public concerns and priorities and to provide the public with relevant information regarding the urban forest. The second open house will communicate the draft Strategy, and the results of existing program, stakeholder and staff reviews and feedback from the initial public consultation.

  External stakeholder workshops, including TFAC, and interviews with staff will provide additional specific information that will be incorporated into the Strategy.

- Development of a Vision of the urban forest will be based on a synthesis of the previous processes and input.

- A report that summarizes the results of the previous phases, including a draft urban forest vision will be developed and presented to TFAC.

- A draft Strategy, that includes the elements outlined in Figures 1 and 2, will be developed and circulated for public review. It will be presented to TFAC and other committees as required.

The second phase includes:

- Refinement of the vision, goals and draft strategy based on the review of the draft strategy.

- Development of the implementation plan, 5-year management plans and budgets for the next 20 years.

- Presentation of a revised Strategy and implementation plan to TFAC, other Committees as required and Council for input.

- A recommended Strategy and implementation plan will be presented to the appropriate Standing Committee and then full Council for endorsement.

Completion of the Urban Forest Strategy is expected in December 2012.

File No.
Planner:

PREPARED BY/SUBMITTED BY:	RECOMMENDED BY:
IVAN LISTAR R.P.F. **MANAGER, URBAN FORESTRY**	**J. M. FLEMING, MCIP, RPP** **DIRECTOR, LAND USE PLANNING AND** **CITY PLANNER**

May 2, 2012

Cc: TFAC