

Urban Street Trees - Draft Reinvestment Strategy

Recommendation:

That Administration prepare an Asset Management Plan for the City's Tree Canopy, as outlined in the November 29, 2017, City Operations report CR_4125.

Previous Council/Committee Action

At the September 28, 2016, Urban Planning Committee meeting, the following motion was passed:

That Administration provide a report by the Second Quarter of 2017 on a draft Reinvestment Strategy for urban street trees with regard to the use of new technologies to improve soil volumes and growing conditions, as outlined in the September 27, 2016, City Operations report CR_3884.

Executive Summary

This report outlines the framework for an Asset Management Plan of the City's ornamental tree canopy to ensure sustainability of Edmonton's urban forest. This will be aligned with a City-wide Infrastructure Strategy currently under development by Integrated Infrastructure Services. The plan will encompass all street and park trees within the City, including a focus on trees whose renewal and sustainability would rely on soil improvement technologies.

The critical success factor to a healthy, thriving tree is to have soil volume. This can be achieved through soil improvement technologies that can cost up to \$10,000 per tree. A cost benefit analysis concluded that investing in these technologies would provide significantly more benefit over a 50 year timeframe than not doing so. The plan will include in its focus the reinvesting in soil improvement technologies in areas such as the downtown core and Business Improvement Areas. With over 20,000 existing tree vacancies in parks and along city boulevards, and an average annual mortality of 2,800 trees, Administration requires a strategy to clarify resource needs for renewal to ensure sustainability and growth of the existing inventory.

Report

Edmontonians value the City's urban forest. Trees create beautiful scenery, and also provide environmental, ecological, economic, and social benefits such as reduced air and noise pollution. Ensuring the health and well-being of the City's trees also ensures the health and well-being of its citizens. Trees provide shade, improve air quality, increase property value and biodiversity, and contribute to a sense of community.

There are approximately 270,000 street and park trees in neighbourhoods across Edmonton. Based on commitments made in the 2009 Urban Forest Management Plan to grow the urban forest canopy from 10 to 20 percent, there is a need to develop a comprehensive asset renewal strategy for street and park trees to ensure sustainability of the asset, given current pressures from climate change, pollution, development and densification.

While the majority of city-owned trees growing in parks and along streets experience similar environmental stresses and follow a similar life cycle with predictable asset renewal costs, approximately 7,700 are in poor condition due to reduced volume of uncompacted soil available for growing roots. When these trees eventually fail and are replaced, the poor growing conditions result in a tree that never thrives and dies before it reaches a size to provide the environmental, social and economic benefits of a mature tree. When compared to the rest of the street and park tree inventory, the costs associated with upgrading the growing conditions of these 7,700 trees is significantly higher. In developing a renewal strategy for all of the street and park trees of the urban forest, Administration would need to analyze this subset separately to ensure a proper review of reinvestment costs to benefits to adequately justify the expense.

In the fall of 2016, Parks and Roads identified 51 specific locations across the city where city trees currently have, or are predicted to have, health and growth restrictions due to limited volume of healthy, uncompacted soil (See Attachment 1, Pages 7 and 8 for a list of locations). An asset review of these locations was conducted and focused primarily on the downtown core, business improvement areas, and major transportation corridors. It found over 70 percent of the trees in these areas to be in fair to poor health and determined that the average lifespan of these trees was 20 years: far short of the average 50 year lifespan of an urban street tree in ideal growing conditions.

Street trees are an integral part of the City's urban infrastructure, one that increases the livability of our urban neighborhoods. Focused, results-based investment is needed to ensure the City meets its goals for sustainable and accessible infrastructure.

Sustainability

Administration has identified the opportunity to provide a sustainable approach to maintaining and renewing the City's urban street and park tree inventory. The principles that will guide the development of the plan include:

1. Sustainable and clearly-defined operational practices that ensure asset management best practices are used to preserve Edmonton's urban forest
2. A strategy for reinvestment into growing conditions that support the sustainability and growth of an urban canopy that maximizes benefits over investment costs and supports the City's commitment, under the Greenhouse Gas Management Plan, of a sustained 20 percent urban canopy cover to offset carbon emissions.
3. Adequate funding to support the asset renewal of the entire urban canopy to ensure sustainability and growth of the existing inventory of 270,000 street and park trees.
4. A resilient urban street tree inventory defined by its species richness and populated by trees that are well adapted to surviving Edmonton's climate.
5. An ornamental street and park tree inventory that is both healthy and diverse, thereby reducing the risks associated with the potential for introduced pests and disease to cause catastrophic loss

Improved growing conditions

Administration used external expertise to undertake a detailed reinvestment analysis of the 51 areas of the City that represent the poorest growing conditions for urban street trees. The analysis sought to determine the benefits versus costs of investing in improved growing conditions for the subset of 7,700 trees currently under the greatest environmental pressures. It used asset condition data collected as part of an asset review; growth curves derived for existing tree species in Edmonton's Urban Forest; social, environmental and economic benefits for trees, as calculated using the models developed by the United States Department of Agriculture; and costs of establishing trees using known soil improvement technologies such as soil cells, continuous trenching or soil vaults.

Results from the analysis identified an opportunity to not only increase forest canopy in these areas but also significantly increase the ratio of benefits these trees would provide to residents of the city, versus the costs of installing the technologies. By running the subset inventory of 7,700 trees through an asset management optimization algorithm, based on a 50 year projected lifespan of a tree post-investment in upgraded conditions, the analysis predicted the benefits to costs to be more than twice as much than if these trees were to be simply replaced without any improvements. The benefits included in this analysis were storm water management, reduced energy consumption due to regulation of temperatures and wind, carbon sequestration, and financial benefits from improved aesthetics and livability.

Adequate Growing conditions

For the remaining ~260,000 trees in the inventory, renewal costs have been increasing and outpacing budgets. The cost of installing and maintaining a tree has been steadily increasing; however, these costs have been keeping pace with inflation and are not a significant source of concern. The pressures on budgets have come primarily from historical losses, the increased number of trees reaching the end of their lifecycle, or trees failing prematurely due to environmental pressures. The average annual losses for the inventory over the past ten years has been 2,800 trees/year with an upward trend. Further, major tree losses from droughts and pests in the 1990s and early 2000s left the inventory with tens of thousands of vacancies, many of which have yet to be replanted.

More analysis is required to understand and better predict losses to the existing inventory, and to understand the impacts of additions to the inventory from capital projects, developer plantings and plantings using funds recovered into the Tree Reserve. This information can then be used to identify gaps in the existing replacement planting program to support a comprehensive plan for renewal of the asset.

Conclusion

In order to properly preserve and manage Edmonton's current and future tree canopy, Administration has determined that a more comprehensive approach is needed, beyond only addressing assessment ratings and immediate priorities for the urban canopy. In addition, Integrated Infrastructure Services is developing a city-wide Infrastructure Strategy that will include all City assets with the objective to achieve an improved and integrated approach towards asset management and defined levels of service. The opportunity exists to identify key level of service considerations and preservation objectives for existing assets.

Administration recommends that an Asset Management Plan for the City's Tree Canopy be prepared based on the findings outlined in this report, as well as further analysis to be completed on tree mortality, and inputs into the inventory from all sources. This work will identify a reinvestment strategy to support the sustainability of the urban street and park tree inventory.

Public Engagement

The Office of Public Engagement utilized the Insight Community to obtain feedback on the importance to citizens of growing and sustaining mature trees in dense urban areas of the City, and opinions around a reinvestment strategy to achieve this.

97 percent of respondents felt that growth and preservation of large trees in our urban forest, especially in downtown and mature neighbourhoods, was important to them. 73

percent of respondents were in support of a temporary tax levy increase to support a reinvestment strategy that would ensure proper growing conditions required to grow large trees in the downtown core, business improvement areas and transportation corridors.

Corporate Outcomes and Performance Management

Corporate Outcome: The City of Edmonton’s operations are environmentally sustainable			
Outcome(s)	Measure(s)	Result(s)	Target(s)
Leading by example, the City of Edmonton strives to minimize significant adverse environmental impacts caused by its operations.	<ul style="list-style-type: none"> • Average lifespan of trees in hard surface environments 	<ul style="list-style-type: none"> • 20 years 	<ul style="list-style-type: none"> • 50 years (avg. for ideal conditions in harsh urban environment)
	<ul style="list-style-type: none"> • Canopy cover 	<ul style="list-style-type: none"> • 10.3% canopy cover 	20% canopy cover
Corporate Outcome: Edmonton is an environmentally sustainable and resilient city			
A sustainable urban forest	<ul style="list-style-type: none"> • Average condition rating of street and park trees in Edmonton 	<ul style="list-style-type: none"> • An inventory of 270,000 street and park trees with an average 70% condition rating 	<ul style="list-style-type: none"> • 80% condition rating across the inventory of 270,000 street and park trees

Risk Assessment

Risk Element	Risk Description	Likelihood	Impact	Risk Score	Current Mitigations	Potential Future Mitigations
Environmental - strategy not authorized	To not have an active draft reinvestment strategy in place risks threatening the City’s urban forest canopy and decreasing its environmental health.	5 - Almost Certain	3 - Major	15 - High	Working with developers and existing capital projects (through design standards) to encourage use of new technologies	
Technology/Equipment	The new technologies to improve soil volumes and/or growing conditions for urban street trees can be costly. They are	5 - Almost Certain	3 - Major	15 - High	The City credits a portion of the asset value recovered for removal of trees to the developer, under an	Economies of scale result in reduced unit costs.

	required, however, to grow mature trees in environments with inadequate, uncompacted soil volume (e.g. downtown or other hard surface environments).				agreement that the developer will use these funds to subsidize the replanting of trees with these expensive technologies.	
Corporate Governance - strategy not authorized	To not have an active draft reinvestment strategy in place shows a disconnect between Administration's directives and citizens' goals.	4 - Likely	3 - Major	12 - Medium		
Political	A draft reinvestment strategy could have impacts on other Council-supported programs.	4 - Likely	3 - Major	12 - Medium	A thorough consultation with Business Partners to identify and address challenges.	

Attachment

1. Draft Urban Street Trees Investment Strategy Report

Others Reviewing this Report

- T. Burge, Chief Financial Officer and Deputy City Manager, Financial and Corporate Services
- L. McCarthy, Deputy City Manager, Urban Form and Corporate Strategic Development
- A. Laughlin, Deputy City Manager, Integrated Infrastructure Services
- R. Smyth, Deputy City Manager, Citizen Services
- C. Campbell, Deputy City Manager, Communications and Engagement