

TO:	CHAIR AND MEMBERS SERVICE REVIEW COMMITTEE MEETING ON NOVEMBER 22, 2011
FROM:	PAT MCNALLY EXECUTIVE DIRECTOR-PLANNING, ENVIRONMENTAL AND ENGINEERING SERVICES
SUBJECT:	EMERALD ASH BORER 2012 BUSINESS CASE TREE REPLACEMENT OPTION IMPLICATIONS AND MANAGEMENT STRATEGY FUNDING

RECOMMENDATION

That, on the recommendation of the Executive Director – Planning, Environmental and Engineering Services, with the advice of the City Planner and the Manager of Urban Forestry, that:

- (i) The following report **BE RECEIVED** which recognizes the Emerald Ash Borer Strategy endorsed by Municipal Council and the previously submitted Emerald Ash Borer Business Case within the context of Council's 2012 budget targets;
- (ii) Recognizing the significant risk exposure associated with dead and dying trees that result from the Emerald Ash Borer, and the need to re-plant streetscapes where trees have been removed, and also recognizing Council's desire to meet budget targets in 2012, the following existing budgets **BE UTILIZED** as sources of financing to fund the 2012 Emerald Ash Borer program:
 - a. Street Tree Planting Program - \$229k of the \$260k budget for 2012 – meaning that there will be significant delays for infill tree-planting that has previously been planned for 2012;
 - b. Woodland Management Program - \$150k – meaning that there will be no funds dedicated to the management of woodlands with respect to the cutting of invasive species, trail building or maintenance, etc.
 - c. EAB designated tree planting - \$443k – which includes surplus from previous years EAB re-planting and \$200k planned EAB planting in 2012
 - d. \$272k from Downtown street tree planting – meaning that planned planting programs in support of the 2013 World Figure Skating Championships will not be completed
- (iii) The Coordination, Administration and Education components of the Emerald Ash Borer program **BE DELAYED** for 1 year, eliminating \$100,000 of cost from the endorsed EAB strategy.
- (iv) Municipal Council **BE ADVISED** that the above-noted approach will have significant impacts on street tree planting, and Woodland management and downtown tree planting in London in 2012 and a similar approach is not sustainable for 2013 and beyond.

RELATED REPORTS PERTINENT TO THIS MATTER

Council Resolution – October 3, 2011
 8th Report of the Trees and Forests Advisory Committee – September 28, 2011
 16th Report of the Community and Neighbourhoods Committee – September 27, 2011
 22nd Report of the Committee of the Whole – June 21, 2011
 Emerald Ash Borer Update - Report to the ETC - July 19, 2010
 2nd Report of the Trees and Forests Advisory Committee - February 25, 2009
 Emerald Ash Borer Strategy - Report to the ETC - May 26, 2008

BACKGROUND

A new Business Case for funding the management of Emerald Ash Borer (EAB) was submitted in summer of 2011 for consideration in the development of the 2012 budget because current funding levels are insufficient to adequately manage the EAB infestation impacts. This Business Case identified a preliminary estimate of \$750,000 for the management of EAB in 2012 as a “placeholder” until a more detailed management strategy was developed. A detailed management strategy was submitted to the Community and Neighbourhoods Committee in September and endorsed in principle by Council. Table 1 below is the endorsed EAB management strategy and associated implementation budget. The budget identified in Table 1 replaces the preliminary budget estimate identified in the original Business Case.

Council directed staff to identify the program budget impacts of different levels of replacement planting to removals and these are presented in Table 2 below. Council also directed staff to explore potential sources of financing and revenues for this initiative. Staff reviewed current management practices and consulted with other municipalities, consultants and agencies to identify potential sources of funding that could be derived from the operations associated with the wood from Forestry related operations. These are discussed and potential options are identified.

DISCUSSION

Endorsed EAB Management Strategy and Planting Option Impacts

Table 1 identifies the endorsed Emerald Ash Borer (EAB) strategy and associated program costs. Table 2 compares budget impacts at different levels of planting. It should be noted that planting represents the largest single annual management cost even at a 1:1 replacement ratio.

Table 1. Recommended EAB Management Strategy Program and Costs (in thousands of dollars) endorsed in Principle by Council

YEAR	Treatment [†] *	Removal (Streets and Manicured Mark Areas)*	Removal (Wooded Park Areas)*	Inventory and Survey (Wooded Park Areas)*	Risk Inspections (Wooded Park Areas)*	Restoration and Rehabilitation (Wooded Park Areas)#	Plant 2:1 (Streets and Manicured Park Areas)#	Coordination, Administration & Education#	TOTAL
2012		184	145	50			715	100	1194
2013	109	187	145	50		30	751	100	1372
2014		191	145		20	30	828	100	1314
2015	115	195	145		20	30	828	100	1433
2016		199	145		20	30	869		1263
2017	122	203	145			30	912		1412
2018		207	145			30	1007		1389
2019	130	211	145			30	1005		1521
2020		215	145			30	1056		1446
2021	137	219	145			30	1108		1639
2022									0
2023	146								146
2024									0
2025	155								155
TOTALS	914	2011	1450	100	60	270	9079	400	14284

*Risk related activities

#Restoration related activities

Discussion of Planting Ratio Implications

It is anticipated that the majority of ash trees will die within the next 10 years with a significant impact on leaf cover. The majority of ash trees on boulevards and manicured portions of parks were initially planted and are not expected to regenerate naturally. EAB is indiscriminate in the size of trees of trees it infests. It kills all sizes of trees; however, large trees have incrementally more leaf area and provide correspondingly greater environmental benefits than small trees.

The four tree planting level options in this report only reflect the replacement of boulevard and manicured portions of parks. Additional research is required to identify restoration and regeneration requirements for woodlands and wooded areas of parks such as Springbank and Helen Mott Shaw Parks. The development of management plans and identification of future planting and natural regeneration requirements for these areas is estimated separately in the recommended strategy.

A. Replace trees based on a diameter ratio of 1:1 (Planting to removal ratio of 3:1)

This option assumes that if a tree of a particular diameter is removed, it will be replaced with a number of trees whose total diameter corresponds to that of the original tree. For example if a 50 cm diameter tree is removed, it will be replaced with ten 5 cm trees. Based on the current diameter distribution of trees identified in our inventory system, the average number of replacement trees required for this option is approximately 3:1 or planting 3 trees for every tree removed.

Pros:

- Some municipalities have recommended this approach to mitigate leaf cover losses.
- Leaf cover and environmental will be replaced in a shorter time period.
- Immediate effects of tree loss on boulevards will be reduced.
- Allows for the planting of areas currently without trees and distributing the future leaf cover more uniformly across the City.
- Will mitigate natural mortality of planted trees as not all trees survive to an age where they will produce significant leaf cover.

Cons:

- This equates roughly to a replanting rate of 3:1 for every tree removed from boulevards or manicured portions of parks.
- Planting costs are 3 times more expensive than at a 1:1 tree removal to replanting ratio regardless of the size of the removed tree.
- May have tree and contractor availability issues in the first few years of the program.
- May have difficulty identifying sufficient planting areas initially.

B. Replace trees based on a 2:1 planting to removal ratio

This option assumes that two trees will be planted for each tree that is removed regardless of the size of the original tree.

Pros:

- Immediate effect of tree loss on boulevards will be reduced.
- Allows for the planting of areas currently without trees and distributing the future leaf cover more uniformly across the City.
- Leaf cover and environmental benefits will be replaced in a shorter time period.
- Will mitigate natural mortality of planted trees as not all trees survive to an age where they will produce significant leaf cover.

Cons:

- Planting costs higher than replanting at 3:2 ratio.
- May have tree and contractor availability issues in the first few years of the program.
- May have difficulty identifying sufficient planting areas initially.

C. Replace trees based on a 3:2 removal to planting ratio

This option assumes that two trees will be planted for every three trees that are removed regardless of the size of the original tree. This option was requested by Council.

Pros:

- Immediate effects of tree loss on boulevards may be reduced.
- Less expensive replacement option in the short term than the Council endorsed strategy.
- Allows for the planting of areas currently without trees and distributing the future leaf cover more uniformly across the City
- Leaf cover and environmental benefits will be replaced in a shorter time period than at 1:1 planting ratio.
- Will mitigate natural mortality of planted trees as not all trees survive to an age where they will produce significant leaf cover. In the long term, this will more closely reflect the number of ash trees prior to the EAB infestation.

Cons:

- May not have immediate effect of tree loss on boulevards.
- Leaf cover loss due to EAB will not be recovered as quickly as 3:1 or 2:1 planting ratios due to natural mortality.
- Planting costs higher than replanting at 1:1 ratio.

D. Replace trees based on 1:1 removal to planting ratio

This option assumes that each tree removed will be replaced by another planted tree regardless of the size of the original tree.

Pros:

- Immediate effects of tree loss on boulevards may be reduced.
- Least expensive replacement option in the short term.

Cons:

- May not have immediate effect of tree loss on boulevards.
- Does not account for natural tree mortality over time.
- Leaf cover loss due to EAB will not be recovered due to natural mortality.

Table 2. Annual Program Cost at Four Levels of Planting Ratios (in thousands of dollars)

YEAR	Program Cost with No Planting	Unit Cost per 50mm Tree (\$x1000)	Number of Trees To Plant (1:1)	Total Program Cost at 1:1 Planting Ratio (\$x1000) ¹	Total Program Cost at 3:2 Planting Ratio (\$x1000) ²	Total Program Cost at 2:1 Planting Ratio (\$x1000) ³	Total Program Cost at 3:1 Planting Ratio (\$x1000) ⁴
2012	479	399	896	836	1015	1194	1552
2013	621	419	896	997	1187	1372	1747
2014	486	462	896	900	1107	1314	1728
2015	605	462	896	1019	1226	1433	1847
2016	394	485	896	828	1045	1263	1698
2017	500	509	896	956	1184	1412	1868
2018	382	562	896	885	1137	1389	1893
2019	516	561	896	1018	1269	1521	2024
2020	390	590	896	918	1182	1446	1974
2021	505	619	896	1085	1362	1639	2193
2022	0					0	
2023	146			146	146	146	146
2024	0					0	
2025	155			155	155	155	155
TOTALS	5205		8958	9743	12015	14284	18825

¹ 1 tree planted for every tree removed.

² 2 trees planted for every 3 trees removed. Additional option requested by Council.

³ 2 trees planted for every 1 tree removed. Endorsed option.

⁴ 3 trees planted for every 1 tree removed. Represents an equal (+/-) replacement of tree diameter removed with an equal diameter of trees replanted. Preferred option recommended by Trees and Forests Advisory Committee.

Current Utilization and Cost Recovery From Forestry Related Operations

All funding for Forestry related operations associated with EAB management are from approved operational or capital project funds. There are currently no outside funding sources available to support the implementation of the management strategy.

All the wood removed is recycled at no additional cost to the program and wood products support internal programs in other Divisions, an established small business firewood industry, local tree care companies, community programs and individual residents.

Chips When trees are removed, the smaller woody material is chipped on site and used to build chip trails in parks, as the top dressing in our dog parks and as fill for the W12A landfill site. These represent tens of thousands of dollars in cost savings to parks and environmental programs as the chips would otherwise have to be purchased. Chips are also provided free-of-charge to schools and for community planting projects. Any minor amounts of remaining chips are taken to TRY Recycling facility for processing at no cost to the program.

Larger Woody Material Although there is no direct cost recovery from the sale of the wood, there are significant impacts in terms of cost savings to the program due to reduced hauling, storage and disposal costs associated with other utilization options. There are also significant benefits to residents, small business and institutions.

The larger woody material from removals is often left on-site at the request of residents who use it for firewood. The City also provides firewood for free to firewood cutters in and around the City. Through a permitting process firewood cutters request wood and larger suitable is delivered to approved yards within 5 kilometers of City limits. The Forestry program currently supports a dozen established firewood cutting businesses that rely on City wood and dozens of smaller operators and residents who request wood throughout the year. Wood is delivered directly from the worksite to the nearest approved firewood yards to minimize operational costs. Almost all the larger woody material is disposed of in this manner. A minor amount of wood not suitable for any of the above programs is stockpiled until there is sufficient woody material to economically and efficiently chip and recycle as chips.

On request, the City provides larger tree trunks to schools and other institutions to be used for playground, or landscaping fixtures. Bark from trees have also been donated to artisans who carve it and donate a portion of the proceeds to cancer research.

Trees that are removed as a result of City construction projects are taken by the contracted tree care company and disposed of or recycled.

Trees that are cut by London Hydro are removed and recycled by City Forestry operations as noted above.

Trees that are cut down in wooded areas of parks and in Environmentally Significant Areas (ESAs) are bucked into smaller sections and left on the forest floor to rot. This provides coarse woody debris as wildlife habitat and long-term nutrient cycling.

Potential Sources of Funding and Revenues From Outside Sources

Approximately 12 years ago, the City issued a Request For Proposal (RFP) for the disposal of wood. There were no successful applicants and a large quantity of wood that was stored for that purpose was chipped and recycled in 2007.

Further attempts to sell the wood were not successful. The City hired staff to also split some of the wood in order to sell it. This program cost more than the program recovered and was discontinued. However, when the current firewood program that provided a free source of wood to specified locations of the firewood cutters choice was established, it was successful in removing and recycling the woody material at no cost to the City.

The City removes approximately 1400 trees per year from Forestry related operations. This does not include the additional ash trees that will be removed as part of the EAB management program. There is a market for ash and other species such as oak and maple by sawmills to produce high quality products such as flooring, furniture, moulding and sporting goods such as baseball bats. However, City trees are not suitable for producing high quality products. Many of the trees that the City removes are dead or have structural issues that greatly reduce utilization potential the suitability for these products. They also contain buried material such as nails and rocks that damage sawmilling equipment and create worker safety issues. Wood that would be purchased by the sawmills would have a high risk associated with it and would bring low purchasing costs compared to high quality wood from other private sources. The closest sawmills are in Tillsonberg, Bedford, and Waterloo, and the combination of trucking costs and small amount of suitable high quality wood are economically prohibitive.

An option to purchase and mill City wood into products, such as park benches, picnic tables or wood for boardwalks and wood chips for park landscaping projects, which are currently purchased by other internal programs, was reviewed. Initial start up costs of the purchase of a mill, an operator and associated equipment was estimated at \$160,000 with an annual operational cost of approximately \$120,000. Additionally the wood would require a suitable shelter to be built in order to properly dry or season prior to milling. The amount of suitable product that could be produced was considered to be cost prohibitive. Parks Operations currently spends approximately \$15,000 per year to purchase wood chips for landscaping projects. The chips currently produced from our forestry operations are too coarse for these landscaping projects.

Staff contacted the municipalities of Toronto, Brampton, Hamilton and Chatham-Kent to identify other opportunities for wood utilization and cost recovery. Most of the municipalities have a program that allows individual residents to take the wood from a removed boulevard tree for their own use. Brampton, Hamilton and Chatham-Kent stockpile wood at yards and either chip the wood at their cost and provide it for free to residents or have a contractor chip or remove the wood at the contractor's cost. In either case, neither residents nor contractors pay for the wood products. Toronto has recently issued a Request For Proposal for the purchase and removal of EAB-killed and other wood and is currently reviewing the proposals.

Three potential opportunities for utilizing London's wood and recovering some of the operational costs were identified. The first is to further study the cost/ benefits of double grinding some of our chips to provide the quality material required for Parks Operations landscaping projects.

The second potential opportunity is to include woody material from Forestry Operations as part of the City's Request For Expression of Interest (REOI) for the utilization of biogas. Although the REOI focuses on the utilization of landfill gasses, it also includes the provision to include other organic products that can be turned into biogas. This initiative could potentially become a source of financing but may result in severe impacts to the local firewood industry and incur additional costs associated with chipping the wood into suitable feeder material. Additional research will be conducted to assess the full impacts of this initiative.

The third potential opportunity is to take advantage of new technology (called pyrolysis) currently being developed by University of Western Ontario and the Institute for Chemicals and Fuels from Alternative Resources (ICFAR). The process uses woody and agricultural plant material to create biologically derived oil as an alternative to non renewable petroleum products, charcoal as high quality fertilizer and gases suitable for fuel (biooil, biochar and biogas respectively). The technology includes superheating wood chips with hot sand and then extracting gases, chemical compounds and charcoal from the sand in order to further refine them. This process is similar to creating oil sands, but in minutes rather than millenia. A portable pyrolysis processing machine is currently available that could be taken to various yards to process the wood chips on site. Initial discussions between City and UWO/ICFAR staff indicate that this technology and cooperation/partnership may have mutual benefits. Additional discussion and research will be conducted to assess the full potential and impacts of using this technology to utilize wood in a leading edge program that could also generate additional income to fund London's Forestry program.

Potential Sources of Funding and Revenues From Existing Budgets

Staff recognizes Council's direction for no additional tax burden. An option is presented below for consideration that redirects existing operational and capital funding sources to support the EAB management strategy endorsed by Council. This funding option would only apply for 2012 as it is not sustainable in the short-or long- term without additional funding over and above current budget levels. The recommended sources of funding for 2012 may address the immediate risk associated with EAB mortality, however, the delivery of services currently provided by the City and the future state of the urban forest will be significantly and negatively affected. These foregone or delayed services will need to be restored to their current Forestry and Parks program levels and additional replacement funding for these will need to be identified in the future.

The endorsed strategy addresses two key areas of management -risk (which includes treating trees with TreeAzin to protect them, removal in boulevards, parks and woodlands, inventories and risk inspections) and restore (which includes restoration and rehabilitation of woodlands, planting and coordination and support for the management program. Existing operational and capital sources of funding were reviewed to identify potential funding sources that could be redirected to support the endorsed management strategy identified in Table 1.

Risk Related Activities (TreeAzin Treatment, Removals, Inventory and Inspections)

The likelihood of damage occurring and of the City being found liable for negligence when an injury or property damage occurs varies by the nature of the property the tree is located on. The City’s maintenance trim cycle is a planning tool to manage tree health, to protect it from weather risks and to minimize risks to persons and property and that prioritizes resources systematically to maintain the urban forest. Trees on City property represent a significant investment for the City so it is critical that this green infrastructure is adequately maintained. Under the current maintenance trim cycle it requires ten to twelve years to completely cycle across the entire city. The International Society of Arboriculture recommends an inspection cycle of 5 years where there is a potential for damage or injury. Early preventative maintenance may produce future cost savings and improves tree health.

In the fall of 2008, a comprehensive Review of all Forestry related operations was conducted by Management Support and Audit Services in response to a tree-related injury and the current tree maintenance program supports the recommendations of the Review. The Emerald Ash Borer represents an immediate and significantly level of risk than the current level of maintenance can support.

The current operational budget for the maintenance trim cycle is @\$2.4m per year. The endorsed EAB strategy (Table 1) identifies additional long term risk related funding requirements of \$4.5m with \$379 required in 2012. There are several funding sources identified that collectively could be redirected to achieve the risk related targets identified in the endorsed strategy for 2012. These will have significant impacts on the programs from which the funding was obtained (Table 3).

Table 3. Risk related EAB management strategy program and costs (in thousands of dollars), endorsed in principle by Council, and potential sources of funding from existing budgets for 2012

YEAR	TreeAzin Treatment	Removal (Streets and Manicured Mark Areas)	Removal (Wooded Park Areas)	Inventory and Survey (Wooded Park Areas)	Risk Inspections (Wooded Park Areas)	TOTAL	Potential Sources of Funding
2012		184	145	50		379	
Pros: <ul style="list-style-type: none"> Existing maintenance trim cycle program is not compromised Immediate risk to people and property is addressed in boulevards, parks and woodlands 		Cons: <ul style="list-style-type: none"> Fewer trees will be planted. Trees removed through maintenance program will not be replaced. Current 6 month waiting period for replanting endorsed by Council is extended Residents will be frustrated due to replanting delays from tree removals Leaf cover goals and benefits will be delayed Planting funding will need to be replaced No additional funds available for existing and planned projects such as invasive species management and trail establishment and upgrades in woodlands. Projects in woodlands and ESAs will need to be postponed until funds are replaced 		Street Tree Planting (PD 1235) – \$229K of the projected \$260K 2012 budget Woodland Management (PD 2754) - \$150 K Total: \$379K			

Restore Related Activities (Restoration, Planting, Coordination, Administration, Education)

The Emerald Ash Borer threatens to reduce London's leaf cover from 24.7% to 22.9% within the 7-10 years. The functional and structural values of London's trees and leaf cover have already been identified in previous reports to Council. It takes trees 30-40 years to achieve significant environmental benefits. Therefore it is imperative to restore the dead trees and lost leaf cover as soon as possible to ensure the sustainability of the urban forest.

Four different replanting to removal levels have been identified in support of the EAB management strategy (Table 2.). The endorsed replanting ratio of 2:1 could be achieved for 2012 from an allocation of funds from existing planting programs (Table 2). However this is at the expense of other established planting programs.

Table 4. Restoration related EAB management strategy program and costs (in thousands of dollars), endorsed in principle by Council, and potential sources of funding from existing budgets for 2012

YEAR	Restoration and Rehabilitation (Wooded Park Areas)	Plant 2:1 (Streets and Manicured Park Areas)	Coordination, Administration & Education	TOTAL	Proposed Sources of Funding
2012	0	715	0*	715	
<p>Pros:</p> <ul style="list-style-type: none"> • Endorsed planting ratio of 2:1 can be met • Commitments to replant EAB removed trees as soon as possible can be met • Planting operations to replace trees removed through maintenance program and due to EAB will prioritize those neighbourhoods that are most affected by EAB removals <p>Cons:</p> <ul style="list-style-type: none"> • Additional planting funding will need to be replaced in order to meet endorsed planting goals • Only a small portion of ash trees removed are in the Downtown area. Potential funding identified for downtown tree planting associated with the Downtown Master Plan goals and in Support of the World Figure Skating Championships and Canadian Urban Forest Conference may be reduced • Public education, such as brochures, public meetings will be deferred for one year <p>EAB Designated Tree Planting (PD 1132) – \$243K remaining from previous years surplus and \$200K from the projected 2012 budget = \$443K Downtown Street Tree Planting (PD 1129) – \$272K from the from previous year's surplus plus</p> <p>Coordination, Admin and Education will be done with existing staff</p> <p>Total: \$715K</p> <p>*The endorsed strategy allocated \$100K for these activities. Coordination and Administration can be partially covered by existing budgets in the short term and Education will be deferred for one year</p>					

It is also noted that the endorsed EAB management strategy places increased stress on and depletes existing planting budgets to ensure risk is managed accordingly.

Summary

An Emerald Ash Borer management strategy has been endorsed by Council in principal. Staff have presented tree replacement and potential funding source options for consideration by the Service Review Committee in the development of future budgets.

Currently London's Forestry operations provide various wood products in support of internal operational programs, local firewood industry, local tree care companies, community programs and individual residents. Although there is no actual income from these sources to support the Forestry programs, including EAB management, there are significant, widespread and positive community benefits and operational cost savings.

A review of current operational practices was conducted and potential revenue generating initiatives have been identified. Although traditional utilization of wood has limited opportunities for revenue generation, new technologies, such as pyrolysis, hold some potential. This technology will require additional research and discussion to fully understand and realize their potential. Staff will continue to work internally with other Divisions and with external agencies and potential partners to further develop and realize these opportunities where possible. There is a recognition that if some of these new initiatives are realized, current services provided to some of our existing clients may be affected.

Although the endorsed EAB management targets can be met for 2012 through the redistribution of existing operational and capital funds, there will be significant impacts on other programs from which the funding was drawn. Additional sources of funding will need to be identified to restore the affected programs to their existing levels. Current funding sources cannot support the EAB management strategy beyond 2012. Additional funding, in addition to the reallocation of existing budgets is required to implement the endorsed strategy.

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