



Waste Management Community Liaison Committee Agenda

Meeting #6 Monday August 20, 2018
 5:30 pm – Orientation for new members
 – Food, mingle/network time
 6:00 pm – Meeting
 7:30 pm – Adjournment

Location: City Hall, 10th floor boardroom

Previous Meeting February 26, 2018

Item #	Item	Approx. Amount of Time (min.)	Attach.
1	CALL TO ORDER	5	
a	Review of Agenda	2	
b	Items that Must be Added to this Agenda	2	
c	Copy of approved of notes from February 26, 2018 meeting (Attachment A) that were sent to the Waste Management Working Group on March 8, 2018	1	Yes
2	ITEMS FOR THIS AGENDA	5	
	<ul style="list-style-type: none"> Welcome new members, Colin and Pamela 	5	
3	STANDING ITEMS	30	
a	Update Resource Recovery Strategy (Between February 23 and August 19, 2018) <ul style="list-style-type: none"> Presentation of the 60% Waste Diversion Action Plan (Attachment B - advise Jane in advance of meeting if you would like a hard copy of report) 	20	Yes
b	Next Steps – Resource Recovery Strategy <ul style="list-style-type: none"> Feedback welcome on-line until September 24, 2018 https://getinvolved.london.ca/WhyWasteResource September 25, 2018 Public Participation meeting Implementation workplan/final costing (early 2018) 	3	

c	<p>Update – Residual Waste Disposal Strategy – EA for a Proposed Landfill Expansion (Between February 23, 2018 and August 19, 2018)</p> <ul style="list-style-type: none"> • Draft Proposed ToR (Attachment C) • Verbal update of the feedback to the Draft Proposed ToR 	5	Yes
d	<p>Next Steps – Residual Waste Disposal Strategy – EA for a Proposed Landfill Expansion</p> <ul style="list-style-type: none"> • September 25, 2018 Public Participation meeting • Submission of Proposed ToR 	2	
4	CLC DISCUSSION	45	
a	<p>60% Waste Diversion Action Plan</p> <ul style="list-style-type: none"> • Discussion about 60% Waste Diversion Action Plan and the individual components that will make up the plan. • Discussion on how CLC will provide feedback: <ul style="list-style-type: none"> o CLC members to go on-line and submit their answers/comments o collective CLC response o attendance at September 25, 2018 Public Participation meeting 	35	
b	<p>Draft Proposed Terms of Reference</p> <ul style="list-style-type: none"> • Discussion Draft Proposed Terms of Reference • Discussion on how CLC will provide feedback 	10	
5	ADDITIONAL BUSINESS	5	
b	Date of next meeting: TBD	5	



Waste Management Community Liaison Committee Meeting #5 Summary



Meeting #5 Monday February 26, 2018
6:00 pm – 7:30 pm
Location: Covent Garden Market

CLC Member Attendance: Skylar Franke (Co-Chair), Dave Raney, Mike George, Toni Krahn, Derek Armstrong, Marie Ross

City Staff Attendance: Jay Stanford, Wesley Abbott, Jane Kittmer

Previous Meeting November 20, 2017

Item #	Item
1	CALL TO ORDER
a	Review of Agenda <ul style="list-style-type: none"> <i>No items added</i>
b	Items that Must be Added to this Agenda <ul style="list-style-type: none"> <i>No items added</i>
c	Approval of notes from November 20, 2017 meeting <ul style="list-style-type: none"> <i>Notes approved</i>
2	ITEMS FOR THIS AGENDA
	Community Engagement Update including results of Open House 2 and Home Show <ul style="list-style-type: none"> <i>Home Show was very successful at obtaining feedback – over 550 responses. A small blue box was provided to those who provided feedback. 80% of people want changes to waste diversion programs.</i> <i>Open House 2 was also very successful with 72 visitors and 34 responses.</i> <i>Mattresses, carpet, wood furniture etc are considered as potential City of London driven diversion programs because producer funded programs are several years away for these items.</i>
3	STANDING ITEMS
a	Update Resource Recovery Strategy (Between November 20, 2017 and February 23, 2018)

	<ul style="list-style-type: none"> ▪ <i>Information provided</i> ▪ <i>The organics program must be ready to be implemented by 2022. This isn't enough time to implement a new process (mixed processing) in London. We need to choose an option that won't trap us into something long-term. Orgaworld, Stormfisher, perhaps something further away or a small organics handling facility around W12A would be short-term options.</i> ▪ <i>The steps to achieve 60% diversion won't be a big surprise. Options presented on the boards at the Open House and the Home Show result in enough diversion to reach 60%. Some of the options presented on the boards at the Open House and the Home Show will be community driven without City involvement. A detailed report will be created for council outlining the initiatives to achieve 60% diversion.</i>
b	<p>Next Steps – Resource Recovery Strategy</p> <ul style="list-style-type: none"> ▪ <i>Information provided</i> ▪ <i>The 60% Diversion Plan will aim for 60%, but will be flexible so that we can increase beyond 60% diversion.</i> ▪ <i>The Resource Recovery Strategy will be a document outlining a 10 year time frame which will be re-evaluated regularly and request public input.</i>
c	<p>Update – Residual Waste Disposal Strategy – EA for a Proposed Landfill Expansion (Between November 20, 2017 and February 23, 2018)</p> <ul style="list-style-type: none"> ▪ <i>Information provided</i> ▪ <i>General comments from the Open House included: preference for going up rather than out for the landfill expansion; the environmental components that people are most concerned about are groundwater quality, aquatic and terrestrial ecosystems and air quality; the environmental components that people are least concerned about are cultural heritage resources and landscapes and archaeology.</i> ▪ <i>We are creating the Draft Terms of Reference document to provide to the public and government review team. Hope to have this finalized and ready for submission to the Minister of the Environment and Climate Change by June 2018. The election could interfere if responses from the government review team aren't received quickly. Council may not be able to approve the report if it's too close to the election.</i>
d	<p>Next Steps – Residual Waste Disposal Strategy – EA for a Proposed Landfill Expansion</p> <ul style="list-style-type: none"> ▪ <i>Information provided</i> ▪ <i>Request for Information (RFI) will be issued to service providers to capture new, emerging and next generation waste diversion and resource recovery technologies.</i>
4	CLC DISCUSSION
a	<p>Discussion about 60% Diversion Plan and the individual components that will make up the plan (i.e., encourage any remaining CLC members to go on-line and submit</p>

	<p>their answers/comments. Also, consider creating a collective CLC response that considers all questions and is based on the average score of the CLC).</p> <ul style="list-style-type: none"> ▪ <i>CLC members group response is shown on Attachment A</i>
b	<p>Discuss 2018 plan for the CLC group</p> <ul style="list-style-type: none"> ▪ <i>Meetings will be held when there is new information to provide to the group.</i> <p>Meeting dates for 2018</p> <ul style="list-style-type: none"> ▪ <i>Next meeting will likely be in April when the Draft Terms of Reference is ready to submit to public and government review team.</i> ▪ <i>Meeting date will be decided by Doodle Poll.</i> <p>Fill vacancies in membership</p> <ul style="list-style-type: none"> ▪ <i>5 vacant spots will be advertised on getinvolved.london.ca specifically looking for 1 or 2 members from a community association, 1 member from the local business community, 1 member from the W12A PLC and 1 member at large</i>
5	ADDITIONAL BUSINESS
a	<p>Key items for next meeting</p> <ul style="list-style-type: none"> ▪ Status of Draft Terms of Reference
b	<p>Date of next meeting: in April 2018, exact date to be determined by Doodle Poll</p> <p>5:30 pm Food, mingle/network time</p> <p>6:00 pm Meeting</p>

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Attachment A
CLC Members Group Response to 60% Diversion Plan

60% Diversion Plan Feedback Results of CLC Members

#1 Getting to 60% by 2022		Count	Percentage
\$0 per household per year		0	0%
\$1 to \$25 per household per year		3	50%
\$26 to \$50 per household per year		3	50%
\$51 to \$75 per household per year		0	0%
\$76 to \$100 per household per year		0	0%
Total Votes		6	

#2 Food Waste Avoidance		Count	Percentage
No Change	\$0, 0% Diverted	0	0%
Moderate Program	\$1 per household, 0.12% Diverted	5	83%
Significant Program	\$7 per household, 1.3% Diverted	1	17%
Total Votes		6	

#3 Home Composting		Count	Percentage
No Change	\$0, 0% Diverted	2	33%
Moderate Program	\$0.75 per household, 0.2% Diverted	3	50%
Significant Program	\$1.20 per household, 0.7% Diverted	1	17%
Total Votes		6	

#4 Community Composting		Count	Percentage
No Change	\$0, 0% Diverted	3	50%
Low Tech, Private	\$0.01 per household, 0.01% Diverted	2	33%
Low Tech, Public	\$0.15 per household, 0.01% Diverted	1	17%
High Tech, Public	\$0.45 per household, 0.1% Diverted	0	0%
Total Votes		6	

#5 City Wide Organics - Curbside Program		Count	Percentage
No Change	\$0, 0% Diverted	0	0%
Green Bin Program	\$20 per household, 9% Diverted	6	100%
Mixed Waste Program	\$40 per household, 14% Diverted	0	0%
Total Votes		6	

#6 City Wide Organics - Multi-Residential Program		Count	Percentage
No Change	\$0, 0% Diverted	1	17%
Green Bin Program	\$7 per household, 1.5% Diverted	5	83%
Mixed Waste Program	\$14 per household, 5% Diverted	0	0%
Total Votes		6	

#7 A&B Other Recyclables		Count	Percentage
No Change	\$0, 0% Diverted	0	0%
	\$0.30 to \$0.80 per household, 0.1%		
Carpet	Diverted	6	100%
Mattresses and Box Springs	\$3 to \$6 per household, 0.3% to 0.6%		
	Diverted	6	100%
	\$0.05 to \$0.50 per household, 0.1%		
Wood Furniture	Diverted	6	100%
	\$0.10 to \$0.60 per household, 0.1% to 0.2%		
Electrical Equipment	Diverted	6	100%
	\$0.0 to \$0.60 per household, 0.2% to 0.5%		
Textiles	Diverted	6	100%
	\$0.01 to \$0.40 per household, <0.1%		
Bulky Plastics	Diverted	0	0%
	Total Voters*	6	

* all voters preferred "significant" resources to be invested

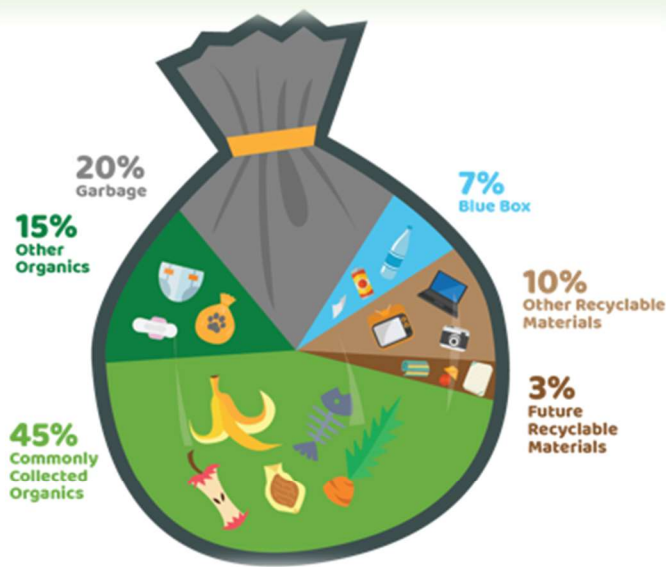
#8 Other Waste Reduction Initiatives		Count	Percentage
Lending Libraries	\$0.25 to \$0.50 per household	5	83%
Repair Workshops	\$0.25 to \$0.50 per household	5	83%
Promote Reuse			
Events	\$0.25 to \$0.50 per household	5	83%
Waste Reduction			
Education/Outreach	\$0.55 to \$1.10 per household	6	100%
	Total Voters**	6	

** 17% of voters preferred "significant" resources to be invested, 66% of voters preferred "moderate" resources to be invested, 17% of voters preferred "low" resources to be invested

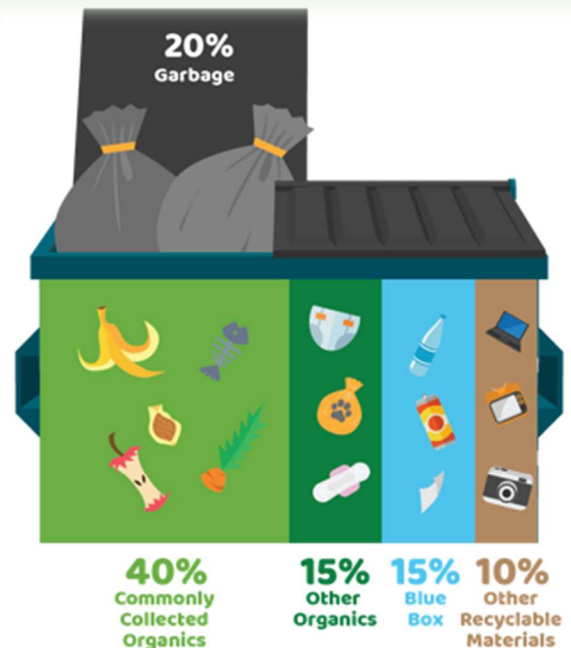
#9 Waste Reductions Policies and By-Laws		Count	Percentage
Expand and enforce material bans		5	83%
Clear bags for			
garbage		2	33%
Reduce garbage container limits		4	67%
User pay (pay per bag or container)		3	50%
Performance - based incentives		2	33%
	Total Votes	6	

60% Waste Diversion Action Plan

What's in the garbage?



Single Family Homes



Apartments

Waste Management Working Group: July 13, 2018

Civic Works Committee: July 17, 2018

Municipal Council: July 24, 2018

Community Engagement: July 25 – September 27, 2018



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Appendix F – Overview of Key Environmental, Social, Financial and Technical Considerations for Various Diversion Programs/Initiatives
Appendix G – Summary of Ontario Green Bin Programs
Appendix H – Mixed Waste Processing Pilot

EXECUTIVE SUMMARY

Background

In London more than one tonne of waste is produced annually per person. This includes waste generated at home as well as waste generated by businesses. About a third of this waste is diverted through numerous waste reduction, reuse, recycling and composting programs. The overall waste diversion rate for London is between 30% and 35%. The residential (household) diversion rate is 45%.

To plan for the future, the City is developing a long term Resource Recovery Strategy. The Strategy involves the development of a plan to maximize waste reduction, reuse, recycling and resource recovery in an economical viable and environmentally responsible manner. The Resource Recovery Strategy includes a commitment by City council to increase the household waste diversion rate from 45% to 60% by the end of 2022. This report, 60% Waste Diversion Action Plan, details the actions required to meet this commitment. Work on the broader Resource Recovery Strategy continues with a focus on how to go beyond 60% diversion. Both projects also address the Strategic Plan for the City of London (2015-2019) and The London Plan (2016-2035).

Development of the Action Plan draws on a variety of sources of information, experience and insight from other waste management and environmental professionals. This included a review of other Ontario and other municipalities in Canada and the United States; consideration of regional resource recovery opportunities; engagement and feedback from the public; consideration and alignment with provincial strategies, direction and legislation; updating local waste composition data for curbside and multi-residential homes; and gathering information from the waste management and resource recovery industry.

Waste Composition

Single families make up about 70% of London's households and generate about 61,000 tonnes of the residential garbage each year that is collected and landfilled. A large percentage of this waste could be composted or recycled. About 7% is material that should have been placed in the Blue Box. A further 13% of the garbage, including textiles, scrap metal, electronics, renovation materials and plastic bags, which could have been dropped off at a depot, taken to a store for recycling or are materials that have been identified in the province's Strategy for a Waste-Free Ontario for future diversion programs.

About 60% of landfill garbage is primarily organic matter and is compostable/digestible. The organics are made up of food scraps (36% of all waste), non-recyclable paper like paper towel & paper napkins, yard waste, pet waste and sanitary products (e.g., diapers). About 30% of London's households live in multi-residential (apartment/condominium) buildings and generate approximately 23,000 tonnes of garbage per year. The garbage composition from multi-residential buildings is similar to the garbage from single family households with some key differences (e.g., more recyclables, less food and organic waste).

Action Plan

This report proposes the following set of actions to achieve this goal (Table ES-1):

Table ES-1 Proposed Actions to Achieve 60% Residential Waste Diversion

Blue Box (Blue Cart) Programs	
1.	Increase capture of recyclables from 63% to 75% (less placed in the garbage)
New (or Expanded) Recycling Programs and Initiatives	
2.	Bulky Plastics <ul style="list-style-type: none"> a) Continue with existing pilot project b) Consider implementation of an expanded program once long term stable markets have developed
3.	Carpets <ul style="list-style-type: none"> a) Wait to see if the Province develops a provincial program for carpets under the <i>Waste-Free Ontario Act</i> as there are limited markets for recycling carpets in the province b) If no provincial program exists by 2021, implement a pilot project
4.	Ceramics <ul style="list-style-type: none"> a) Provide a drop-off location for ceramics at no cost at the City's EnviroDepots b) Ban toilets from curbside garbage collection
5.	Clothing and Textiles <ul style="list-style-type: none"> a) develop a textile awareness strategy to promote existing reuse opportunities b) pilot depot collection at select multi-residential buildings
6.	Small Metal (Small Appliances/Electrical Tools/Scrap Metal) <ul style="list-style-type: none"> a) implement semi-annual curbside collection of small metal items b) pilot depot collection at select multi-residential buildings
7.	Furniture <ul style="list-style-type: none"> a) Begin semi-annual collection of wooden furniture b) Provide a drop-off location at W12A EnviroDepot for wooden furniture c) Ban wooden furniture from curbside garbage collection
8.	Mattresses <ul style="list-style-type: none"> a) Wait to see if the Province develops a provincial program for mattresses under the <i>Waste-Free Ontario Act</i> as there are limited markets for recycling mattresses in the province b) If no provincial program exists by 2021, implement a pilot project
Curbside Organics Management Program	
9.	Implement a curbside Green Bin program
10.	Implement bi-weekly garbage collection
Multi-Residential Organics Management Program	
11.	Implement a mixed waste processing pilot (to recover organics and other materials) on a portion of the waste from multi-residential homes

Table continues

Table ES-1 Proposed Actions to Achieve 60% Residential Waste Diversion

Other New Organics Management Programs
<ul style="list-style-type: none"> 12. Develop and implement a food waste avoidance strategy 13. Reduce the cost of composters at the EnviroDepots and undertake additional sale events at select community locations 14. Provide financial support to community groups or environmental organizations that want to set up a community composting program
Waste Reduction and Reuse Initiatives and Policies
<ul style="list-style-type: none"> 15. Create a Waste Reduction and Reuse Coordinator position within the Solid Waste Management Division 16. Provide financial support for community waste reduction and reuse initiatives 17. Reduce the container limit to two or three containers per collection when the Green Bin program with bi-weekly garbage collection is operational 18. Further explore the use of clear bags for garbage collection if London does not move to a roll-out cart based garbage collection system 19. Further explore a full user pay garbage system if London moves to a roll-out cart based garbage collection system 20. Further examine other incentive and disincentive initiatives (best practices) from other municipalities (e.g., mandatory recycling by-law, reward systems, user fees, etc.) 21. Provide additional feedback approaches to residents (including how waste reduction and waste diversion are calculated when providing waste management progress reports)

Benefits and Costs

By taking the steps outlined in this Action Plan, a number of environmental, social and financial benefits will be achieved. These include increased waste diversion (33% more diversion); creation of jobs (between 125 and 170 direct and indirect; within and outside London); reduced greenhouse gas emissions (equivalent of removing 4,200 to 6,800 cars from the road); reduced landfill impacts; better use of material and resources; residents will feel satisfaction or pride of living in an environmentally progressive community; and short-term landfill cost savings.

It is expected that approval of any expansion of the landfill by the Ministry of Environment, Conservation and Parks (MECP) would be unlikely unless the City has programs in place to achieve 60% waste diversion. The increase in waste disposal costs will be significant if the City must export its waste to a private landfill elsewhere in Ontario. The increase in disposal costs for the City to export its waste is estimated to be approximately \$5 to \$7 million per year.

The approximate cost, expected diversion and timeline for implementation for the actions listed above are summarized in Table ES-2.

Table ES-2 - Summary of Diversion, Estimated Operating Costs and Schedule

Program Category	Diversion Rate		Annual Estimated Operating Cost			Schedule
	Range	Likely	Range	Likely	\$/Hhld ^a	
Blue Box Recycling Improvements	1% - 3%	2%	\$0	\$0	\$0	Likely not under City control ^b in the future
New Recycling Programs and Initiatives	0.4% - 0.8%	0.6%	\$350,000 - \$550,000	\$450,000	\$2.00 - \$3.00	2019 ^c - 2021
Curbside Organics Management Program	8% - 12%	10%	\$3,900,000 - \$5,500,000	\$5,000,000	\$21.75 - \$30.50	2020 - 2022
Multi-Residential Organics Management Pilot Program	0.5% - 0.7%	0.6%	\$400,000 - \$700,000	\$500,000	\$2.25 - 4.00	2020
Other Organic Management Programs	0.3%-0.6%	0.4%	\$250,000 - \$350,000	\$300,000	\$1.50 - \$2.00	2019 ^c - 2021
Waste Reduction, Reuse Initiatives and Policies	1% - 4%	1.4%	\$150,000 - \$350,000	\$250,000	\$0.50 - \$2.00	2019 ^c - 2021
Total^d	11% - 21%	15%	\$5,050,000 - \$7,450,000	\$6,500,000 (\$36.00)	\$28.00 - \$41.50	2019^c - 2022

Notes:

a) Based on 180,000 households.

b) The provincial Waste-Free Ontario Strategy calls for a transition from the current Blue Box program, which is municipally managed and co-funded by industry and municipalities, toward a full extended producer responsibility (EPR) and/or individual responsibility (IPR) program by 2023. The EPR program will require producers to take full financial and operational responsibility for all Ontario municipal Blue Box programs.

c) 2019 Multi-year budget has \$140,000 assigned to new waste diversion initiatives.

d) Totals may not add due to rounding.

Financial Considerations – Funding 60% Waste Diversion

Potential funding sources to lower the annual cost of \$5.05 - \$7.45 million by \$1.8 to \$3 million per year are highlighted below.

Operating Costs

As shown in Table ES-2, annual operating costs for the 60% Waste Diversion Action Plan will range from \$5.05 million to \$7.45 million and will depend on final program design, market competition, etc. The most likely annual operating cost is estimated to be \$6.5 million.

City staff continue to examine a number of financing approaches. The change in government in Ontario has created additional uncertainty as a number of potential revenue sources for waste diversion are on hold. Besides taxes, potential sources of revenue currently include:

- Additional recycling program costs paid by industry - potential cost savings from expected transition from the current Blue Box program, which is municipally managed and co-funded by industry and municipalities, toward a full EPR program paid 100% by industry by 2023. This is expected to reduce the City's current waste diversion program costs by \$1.5 to \$1.8 million. In addition there is the potential of one time capital funding for recycling infrastructure. It is not clear when full funding would be paid to the City.
- Other extended producer responsibility revenues - for items such as branded organics (e.g., diapers, soiled paper, tissues/toweling) carpets, textiles, furniture and other consumer goods. These sources could range between \$50,000 and \$150,000 per year.
- W12A Landfill levy to support diversion - a specific amount charged per tonne of garbage disposed of at the landfill that is placed in a dedicated fund for waste reduction and diversion. The amount that could be collected is based on many factors (e.g., which garbage is it applied to, what fee, etc.). Levies between \$2 and \$20 per tonne are in place in some jurisdictions. Revenue from this source could range between \$250,000 and \$1 million per year.
- Greenhouse gas offset credits associated with organics diversion – the Government of Ontario was working on introducing an emissions offset protocol for aerobic composting into Ontario's Cap & Trade program, based on an existing protocol used in Alberta (e.g., five composting projects currently listed on the Alberta Emissions Offset Registry). The value of these offsets would have been between \$100,000 and \$500,000 per year based on an assumed value of around \$20 per tonne of GHG emissions offset (and increasing over time). It is unclear at this time how/if this funding opportunity will be replaced by the current provincial government.

A summary of estimated operating costs and potential annual funding is identified on Table ES-3.

Table ES-3 – Summary of Estimated Costs and Potential Funding

	Low	High	Likely (Anticipated)
Costs (Table ES-2)	\$5,050,000	\$7,450,000	\$6,500,000
Revenues	\$1,800,000	\$2,950,000	\$2,000,000
Total Estimated Costs			\$4,500,000

Capital

Capital costs for the 60% Waste Diversion Action Plan will depend on program design, technology considerations, etc. The largest capital expenditure will be for the Green Bin Program. A capital cost of \$12 million for the Green Bin program had previously been estimated (January 2016, Multi-year Budget deliberations). Other waste diversion initiatives listed in the Action Plan may require new investment in the order of \$500,000 to \$3 million for a total of \$12.5 to \$15 million in capital expenditures.

It is expected that capital costs for the 60% Waste Diversion Action Plan will be able to be funded from the existing capital budget. The current ten-year capital program includes \$35 million in 2020 for new solid waste diversion technologies to increase diversion. After allocating up to \$15 million for the Action Plan, there would be \$20 million left for advanced waste diversion and/or resource recovery technologies.

Additional Community Engagement

The community engagement proposed for the 60% Waste Diversion Action Plan is presented in Table ES-4.

Table ES-4 – Community Engagement for 60% Waste Diversion Action Plan

Date	Event	Comments
July 17, 2018	CWC Meeting	<ul style="list-style-type: none"> • Approve in Principle Draft Action Plan to achieve 60% waste diversion by 2022 • Approve to circulate and receive feedback on the 60% Waste Diversion Action Plan
July 24	Council	
July 25 to September 10	Provide feedback opportunities on WhyWaste Resource Recovery Strategy website	<ul style="list-style-type: none"> • Advertise in the London Free Press, The Londoner and on social media
	Circulate to Community Stakeholder Groups	<ul style="list-style-type: none"> • Circulate and ask for feedback from Waste Management Community Liaison, Committee (WMCLC), W12A Landfill Public Liaison Committee, Urban League and Advisory Committee on the Environment (ACE)

Table ES-4 – Community Engagement for 60% Waste Diversion Action Plan

Date	Event	Comments
	Circulate to Waste Management/ Recycling Companies	<ul style="list-style-type: none"> • Circulate and ask for feedback from local companies including Emterra, Green Valley Recycling, Miller Waste, Orgaworld, StormFisher, Try Recycling, Waste Connections and Waste Management
	Community Festival	<ul style="list-style-type: none"> • Attend Gathering on the Green II, Sunday August 19, 2018
	Presentations	<ul style="list-style-type: none"> • Present to WMCLC in early August (TBD) • Present to ACE on September 5, 2018
September 27	Public Participation Meeting	<ul style="list-style-type: none"> • CWC receives comments from the public and other stakeholders
January/ February 2019	CWC Meeting	<ul style="list-style-type: none"> • Approval of 60% Waste Diversion Action Plan • Implementation details and final cost estimates to be provided at this time

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1) INTRODUCTION

1.1 BACKGROUND

General

In London more than one tonne of waste is produced annually per person. This includes waste generated at home as well as waste generated by businesses. About a third of this waste is diverted through numerous waste reduction, reuse, recycling and composting programs. The overall waste diversion rate for London is between 30% and 35%. The residential (household) diversion rate is 45%.

To plan for the future, the City is developing a long term Resource Recovery Strategy. The Resource Recovery Strategy involves the development of a plan to maximize waste reduction, reuse, recycling and resource recovery in an economically viable and environmentally responsible manner.

The Resource Recovery Strategy will identify:

- areas of continuous improvement to maximize waste diversion and resource recovery including increasing the current London household waste diversion rate to 60% by the end of 2022 from the current rate of 45%;
- opportunities for advanced resource recovery and increased waste diversion through new, emerging and next generation technologies and where these technologies may play a role in London and area;
- areas to reduce or maintain current costs of City programs;
- ways in which to support local job creation efforts;
- ways in which to maximize program convenience to Londoners; and,
- methods to align with Provincial direction and the *Waste Free Ontario Act, 2016*.

This report addresses the portion of the Resource Recovery Strategy dealing with increasing London's household waste diversion rate to 60% by the end of 2022.

60% Waste Diversion Goal for Household Waste

- Was approved by City Council in the Fall 2017
- Consistent with Waste-Free Ontario Strategy
- Considered practical limit for a large Ontario municipality
- Average diversion rate for large municipalities in Ontario with a Green Bin was 53% in 2016 (Resource Productivity & Recovery Authority)
- Three municipalities have a diversion rate of about 60% (Simcoe County, Dufferin County, City of Kingston) and only the Region of York (including Markham at 71%) has exceeded 60%

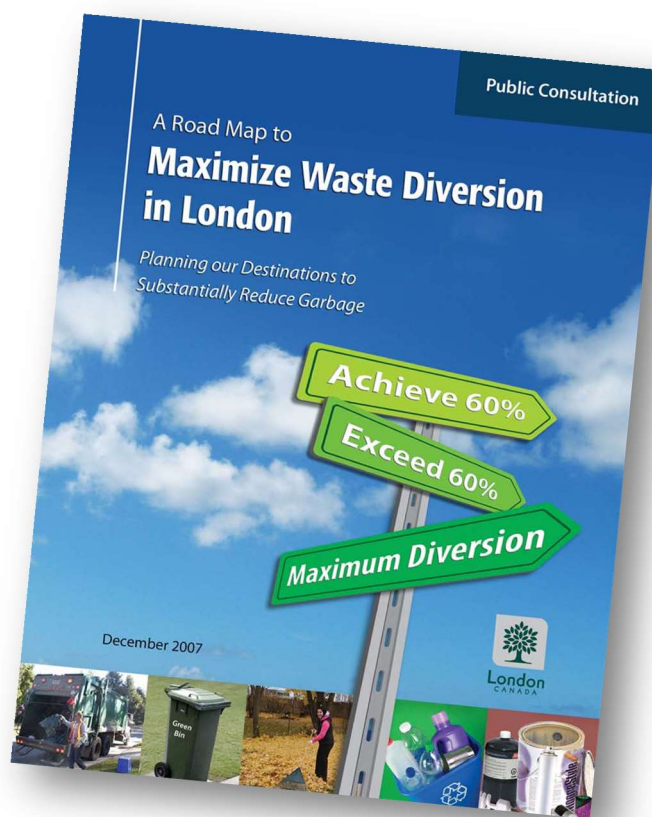
Increasing waste diversion is consistent with the *Strategic Plan for the City of London (2015 - 2019)* goals of “Building a Sustainable City” and Growing our Economy and *The London Plan (December 28, 2016)* direction to “Become one of the greenest cities in Canada” which includes “Minimize waste generation, maximize resource recovery, and responsibly dispose of residual waste”.

Previous Planning Exercises

Since the mid-1990s, the City’s Waste Management System has been based on a Continuous Improvement Strategy (management philosophy) and Sustainable Waste Management. This strategy, which was approved by Municipal Council in 1997, has been the foundation for going forward. It uses an active framework that recognizes integrated waste management as an important environmental service in the community. By effectively allocating financial and human resources, this environmental service contributes to the protection of human health and the environment. By supporting an integrated system of waste reduction (i.e., not producing waste in the first place), recovery of materials that can be recycled and composted, and ensuring that what remains is handled in an environmentally responsible manner, this strategy provides the mechanism for continuous improvement of the waste management system. Since this strategy was approved over twenty years ago, London has steadily increased its performance to the current level of 45% waste diversion while having one of the lowest total waste management costs in Ontario for urban centres (based on statistics compiled by the Municipal Benchmarking Network Canada).

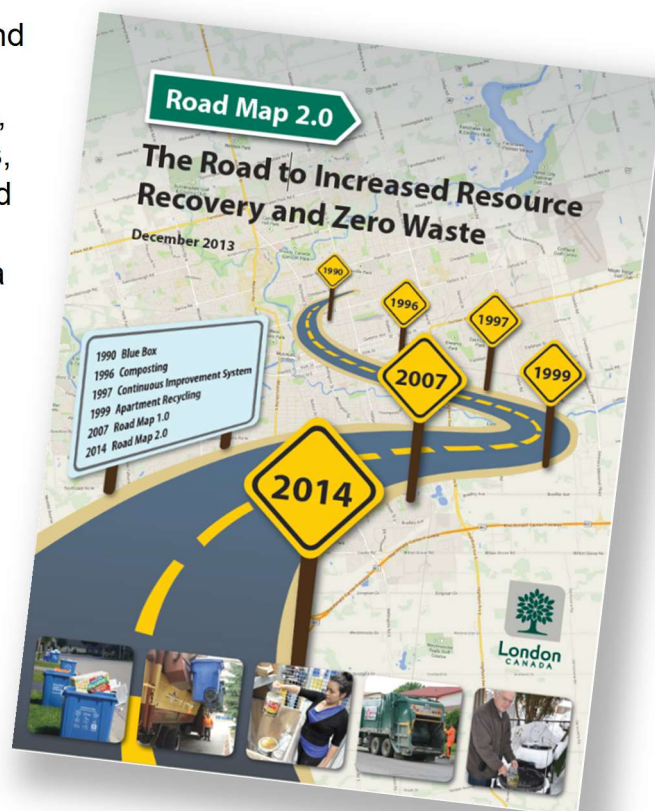
The 60% Waste Diversion Action Plan builds on previous waste diversion planning documents; *A Road Map to Maximize Waste Diversion in London* (2007) and *Road Map 2.0 The Road to Increased Resource Recovery and Zero Waste* (2013).

A Road Map to Maximize Waste Diversion in London (2007) outlined a number of options to achieve higher diversion rates and asked for feedback from the public. Diversion measures implemented as a result of this process included new materials added to the Blue Box program (e.g., milk and juice cartons, drinking boxes, mixed plastics, steel paint cans, aerosol cans and cardboard cans), new materials



added to the EnviroDepots (e.g., tires, appliances, fluorescent tubes and bulbs), second Blue Box provided to single family homes, reusable blue bags provided to apartment units, more blue carts supplied to apartment buildings, expansion of the Oxford EnviroDepot, increased days open at the Household Special Waste depot from one to five days and completion of a Green Bin pilot study.

Road Map 2.0 The Road to Increased Resource Recovery and Zero Waste (2013) also outlined a number of options to achieve higher diversion rates and asked for feedback from the public. Diversion measures implemented as a result of this process included the reduction in the garbage container limit from 4 to 3 containers per collection, construction of a fourth EnviroDepot to serve the north end of the city, new materials added to the Blue Box program (mixed polycoat), completed community composting pilot projects, completed food reduction awareness pilot projects and instituted the curbside collection and composting of Christmas trees.



Current Diversion

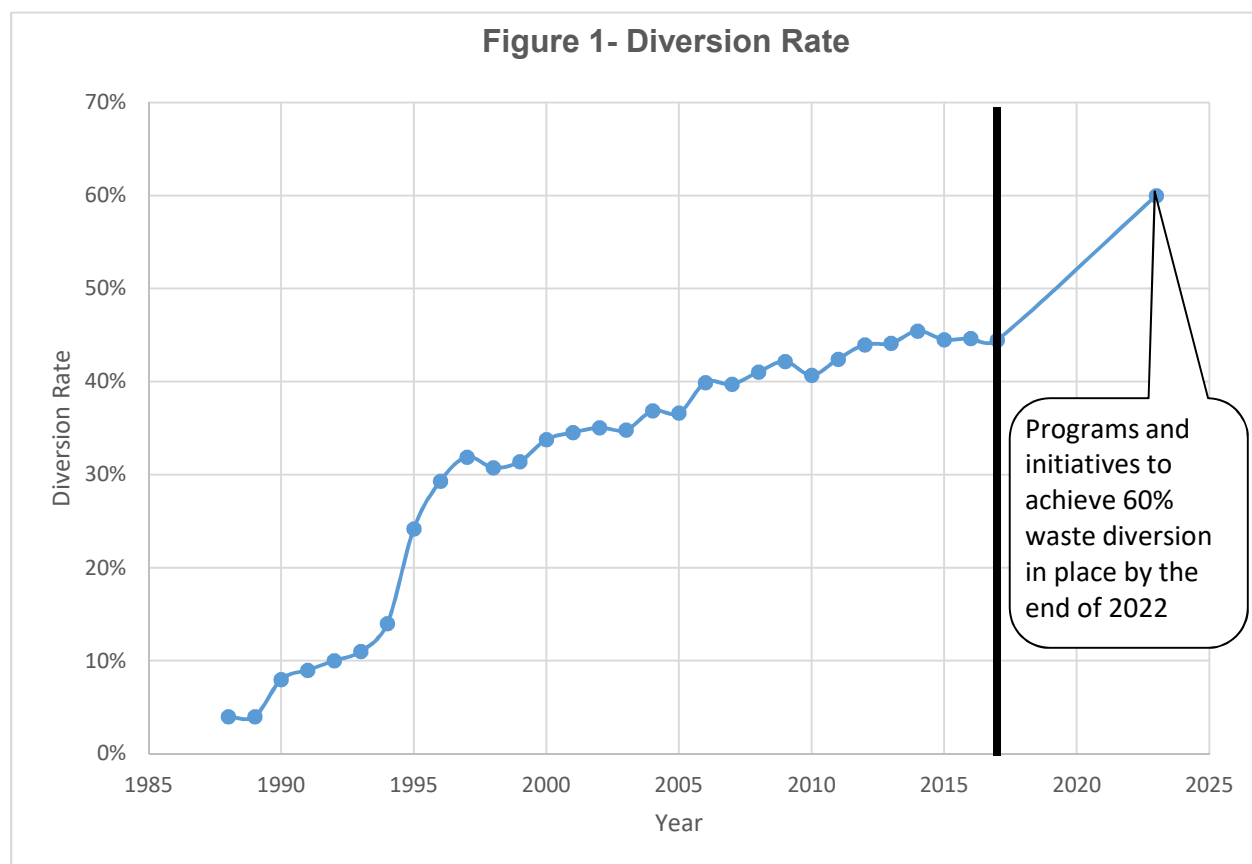
Since 1990 with the introduction of the curbside Blue Box program, the City has continuously implemented new programs and initiatives and improved existing programs to help residents divert waste away from disposal. Key changes are listed in Table 1 and their effect on waste diversion is shown in Figure 1.

As shown in Figure 1, London's average household diversion rate was 45% in 2017. This was achieved by diverting approximately 72,000 tonnes of materials through various existing recycling, reuse, reduction and composting programs. Approximately 67,000 tonnes were diverted from single family (curbside) homes for a waste diversion rate of 50% while approximately 5,000 tonnes were diverted from multi-residential (apartment) homes for a waste diversion rate of 20%.

In 2017, 23,000 tonnes (15% of all waste) of Blue Box recyclables, 36,000 tonnes (22% of all waste) of yard waste organics and 13,000 (8% of all waste) from other diversion programs (e.g., electronics recycling, tire recycling, etc.) were diverted from disposal. A detailed breakdown of the amount diverted and a description of these programs is presented in Appendix A.

Table 1 - Key Waste Diversion Programs and Initiatives

Year	Program/Initiatives
1990	<ul style="list-style-type: none"> • Curbside Blue Box pickup introduced city-wide
1994	<ul style="list-style-type: none"> • Appliances banned from garbage collection
1995	<ul style="list-style-type: none"> • Added new items to Blue Box • Grass clippings banned from garbage collection
1996	<ul style="list-style-type: none"> • Curbside pickup of yard materials (waste)
2000	<ul style="list-style-type: none"> • Multi-Residential Building Recycling Program started
2002	<ul style="list-style-type: none"> • Electronics Recycling introduced at the EnviroDepots
2003	<ul style="list-style-type: none"> • Public Space Recycling started
2005	<ul style="list-style-type: none"> • Renovation Material accepted for recycling at the EnviroDepots
2006	<ul style="list-style-type: none"> • 4 Container Limit for Garbage introduced for curbside collection
2009	<ul style="list-style-type: none"> • Added more items to Blue Box Program • Tires, propane tanks and batteries accepted for recycling at the EnviroDepots
2010	<ul style="list-style-type: none"> • Fluorescent tubes and bulbs accepted for recycling at the EnviroDepots
2011	<ul style="list-style-type: none"> • Added more items to Blue Box Program • Provided residents with a second larger Blue Box • Completed construction and started operations of London Regional Materials Recovery Facility (MRF), increasing scale, efficiency and recovery of collected Blue Box Materials • Started signing agreements with a number of neighbouring municipalities to send recyclables to the MRF
2014	<ul style="list-style-type: none"> • Added more items to the Blue Box Program
2016	<ul style="list-style-type: none"> • 3 Container Limit for Garbage introduced for curbside collection
2017	<ul style="list-style-type: none"> • Curbside Christmas Tree collection for composting started



1.2 COUNCIL DIRECTION

The Resource Recovery Strategy includes a commitment by City council to increase the residential waste diversion rate to 60% by 2022. This commitment was made at the October 30, 2017 City Council meeting by passing the following resolution:

“The W12A Landfill expansion be sized assuming the residential waste diversion rate is 60% by 2022 noting this does not prevent increasing London’s residential waste diversion rate above 60% between 2022 and 2050.”

Other key documents that highlight waste diversion and resource recovery and provide further context for the 60% Waste Diversion Action Plan include:

- Strategic Plan for the City of London (2015-2019) – next page
- The London Plan (December 28, 2016) – next page

The 60% waste diversion goal will be included in the environmental assessment as part of the commitments made by the City. It will be a key consideration in the Ministry of the Environment, Conservation and Parks (MECP formerly called the Ministry of the Environment and Climate Change - MOECC) approval of the environmental assessment for expansion of the W12A Landfill.

City Council – Strategic Plan (2015-2019) and The London Plan

[Extracts from]

Strategic Plan for the City of London (2015-2019)

Building a Sustainable City

1. Robust Infrastructure

What are we doing?

Increase efforts on more resource recovery, long-term disposal capacity, and reducing community impacts of waste management.

How are we doing it?

Long-Term Waste Management Plan

Growing our Economy

3. Local, regional, and global innovation

What are we doing?

Lead the development of new ways to resource recovery, energy recovery, and utility and resource optimization with our local and regional partners to keep our operating costs low and assist businesses with commercialization to help grow London's economy.

How are we doing it?

London Waste to Resources Innovation Centre

[Extracts from]

The London Plan

London 2035: Exciting Exceptional, Connected

Key Directions

Direction #4 *Become one of the greenest cities in Canada*

#12 *Minimize waste generation, maximize resource recovery, and responsibly dispose of residual waste.*

Solid Waste Management

479_ The following policies are separated into two primary areas: Diversion and Disposal.

>>DIVERSION - REDUCING, REUSING, RECYCLING, COMPOSTING AND RECOVERY

480_ The City will promote the reduction, re-use, recycling, composting, and recovery of materials from solid waste, wherever possible, through the use of innovative means, new technology, conservation measures, and public education and community engagement programs.

continued

City Council – Strategic Plan (2015-2019) and The London Plan

481_ The City will support the reduction, re-use, recycling, composting and recovery of materials by:

- 1. Initiating, participating and collaborating in public education, awareness, and community engagement programs with residents, Londoners, businesses and other agencies and organizations.*
- 2. Collaborating with other municipalities to develop long-term strategies to reduce, reuse, recycle, and recover materials from the waste stream.*
- 3. Encouraging development proposals to provide adequate recycling and composting facilities, and support innovative waste collection and diversion programs.*
- 4. Increasing waste diversion through existing technologies and new, emerging and next-generation technologies as they become available, practical, and financially feasible for London.*
- 5. Exploring energy from waste opportunities.*

482_ In addition to municipal waste management facilities within the Waste Management Resource Recovery Area Place Type, City Council will support the adequate provision of lands for solid waste diversion and resource recovery within the Heavy Industrial Place Type or on lands with specific policies.

1.3 PROVINCIAL DIRECTION

Waste-Free Ontario Strategy

The Province approved a road map for resource recovery and waste reduction known as the *Strategy for a Waste-Free Ontario: Building the Circular Economy* in February 2017. The Strategy:

- has a long term goal of zero waste and zero greenhouse gas emissions from the waste sector,
- sets interim waste diversion goals for 2020 (30%), 2030 (50%) and 2050 (80%) for combined waste streams; and,
- lists a number of objectives and actions to achieve long term and interim goals.

One of the key proposed actions was to make companies that produce or import products responsible for managing their end-of-life requirements. This is called full Extended Producer Responsibility (EPR). Initially EPR will be applied to products and packages that have existing mandated recycling programs such as tires, municipal hazardous and

special waste, electronics and Blue Box materials. Other materials such as carpets, mattresses and furniture will be considered in the future. A second key proposed action was the development of a *Food and Organic Waste Action Plan* by the Province which will contain actions directed at reducing and diverting food and organic waste away from disposal facilities. The complete Waste-Free Ontario Strategy can be found at: www.ontario.ca/page/strategy-waste-free-ontario-building-circular-economy.

Full EPR and the Blue Box Program

The Waste-Free Ontario Strategy calls for a transition from the current Blue Box program, which is municipally managed and co-funded by industry and municipalities, toward a full EPR program by 2023. The EPR program will require producers to take full financial and operational responsibility for all Ontario municipal Blue Box programs.

Current Blue Box Funding

- ✓ Net cost of the Blue Box program split approximately 50/50 between municipalities and industry.
- ✓ In 2017 London received \$3.1 million from industry funding to cover operating and long term capital costs of \$6.2 million.

Industry and municipalities have been working on a transition plan (known as the amended Blue Box Program Plan) to gradually shift the full financial and operational responsibility of the Blue Box Program to industry. This transition plan, prepared by Stewardship Ontario (i.e., businesses responsible for items collected in the Blue Box) is expected to establish goals and targets aimed at improving environmental performance and program experience for Ontario residents by:

- Including new materials;
- Setting a general provincial capture rate of 75% of Blue Box materials (currently 63% of Blue Box materials are captured province wide);
- Looking at how to develop end-markets and collection systems for difficult to recycle materials (e.g., chip bags); and
- Standardizing the program across the province to attempt to achieve a consistent experience for all Ontario residents.

Details of the proposed plan can be found at rprr.ca/amended-blue-box-program. The transition plan is currently on hold until further details are provided by Stewardship Ontario, Resource Productivity & Recovery Authority (RPRA), and the Ministry of the Environment, Conservation and Parks (MECP) (formerly the Ministry of the Environment and Climate Change).

Food and Organic Waste Action Plan

The Strategy for a Waste-Free Ontario called for implementation of an action plan to reduce the volume of food and organic wastes going to landfill. This resulted in development of the Food and Organic Waste Framework which was released on April 30, 2018.

Highlights of the Framework include:

- Ontario Food Recovery Hierarchy that consists of the following steps in order of importance:
 1. Reduce: prevent or reduce food and organic waste at the source.
 2. Feed People: safely rescue and redirect surplus food before it becomes waste.
 3. Recover Resources: recover food and organic waste to develop end-products for a beneficial use.
- Organizations (entities) identified must meet the targets assigned to them.
- A 70% target for waste reduction and resource recovery of food and organic waste for municipalities (like London), educational institutions and hospitals by 2025.
- A 50% target for waste reduction and resource recovery of food and organic waste for multi-residential buildings by 2025.
- Larger retail shopping establishments, office buildings, restaurants, hotels and manufacturing establishments are responsible for having source separated food and organic waste programs by 2025.

Food and Organics Waste Framework

The Framework consists of two complementary components:

- ✓ *Food and Organic Waste Action Plan*, which outlines strategic commitments to be taken by the province to address food and organic waste.
- ✓ *Food and Organic Waste Policy Statement*, which provides direction to the province, municipalities, producers, businesses and others to further the provincial interest in waste reduction and resource recovery as it relates to food and organic waste.

The complete Food and Organic Waste Framework can be found at:

www.ontario.ca/page/food-and-organic-waste-framework

1.4 GUIDING PRINCIPLES

Guiding principles have been developed by the City and approved by City Council to direct the development of the Resource Recovery Strategy and the 60% Waste Diversion Action Plan.

Over the last ten years, there have been numerous community engagement activities with respect to solid waste management in London including:

- 2006 to 2009 – W12A Landfill Area Plan and W12A Landfill Site Community Enhancement and Mitigative Measures Program
- 2007 – *A Road Map to Maximize Waste Diversion in London*
- 2013 – *Road Map 2.0: The Road to Increased Resource Recovery and Zero Waste (and the Interim Waste Diversion Plan 2014 – 2015)*
- 2014 – Public Feedback on Different Garbage and Recycling Collection Frequency Schedules
- 2015 to 2016 – Streamlined EA (Environmental Screening) for Waste Disposal regarding service area expansion
- 2016 – Garbage Container Limits

Based on these previous community engagement activities and ongoing input received from City Council, a number of Council Advisory Committees, community and business groups, and the W12A Landfill Public Liaison Committee (PLC), the eleven guiding principles (Table 2) were identified that reflect community values, concerns and priorities at this point in time.

Community and stakeholder input on the guiding principles was completed as part of the community engagement processes. Various community engagement tools (e.g., traditional media, social media, getinvolved.london.ca website, the City's website, open houses, etc.) were used and the final guiding principles were approved in October 2017.

All guiding principles received general support from the public with the following ones receiving the most support:

- Make waste reduction the first priority
- Be socially responsible
- Ensure financial sustainability

1.5 HOW THIS REPORT WAS PREPARED

The 60% Waste Diversion Action Plan outlines the steps that the City and residents of London will need to take in order to reach 60% waste diversion by the end of 2022. The Action Plan is part of a broader Resource Recovery Strategy. Both projects are being led by City staff with most reports prepared internally. Technical expertise has been obtained in areas where City staff have less familiarity and/or additional advice is key.

Both projects draw on a variety of sources of information, experience and insight from others in the activity areas listed below. It is important to note that many of these initiatives are ongoing as the fields of waste diversion, resource recovery and waste management continue to evolve.

Table 2 - Guiding Principles

<i>Be Socially Responsible</i> – Develop socially acceptable and fair solutions that minimize social impacts, encourage participating and maximize social benefits for residents and businesses and take into account input from residents and businesses.
<i>Ensure Financial Sustainability</i> – Develop financially sustainable solutions that are easy and affordable to maintain by current and future generations and also help to stimulate economic growth within the community.
<i>Ensure Responsibility for Waste Management</i> – Waste management is a fundamental service provided by municipal governments. London should manage residential waste and resources generated within its boundaries. London should ensure that local businesses have access to competitive resource recovery and residual waste disposal options.
<i>Ensure Impacts of Residual Waste Disposal are Minimized</i> – Waste disposal facilities must meet, and if possible, exceed all applicable regulatory standards. London will make all reasonable efforts to reduce and address negative effects of any future residual waste disposal facility through proper design and operation of the facility, as well as providing appropriate mitigation measures to the surrounding community.
<i>Implement more Resource Recovery Solutions</i> – Residual waste needs to be minimized and any waste that is generated needs to be treated as a resource, when practical. Resource recovery includes reuse, recycling, composting, anaerobic digestion and waste conversion to create energy and energy products. Resource recovery will balance environmental, social and financial needs along the road to a waste-free Ontario in the future.
<i>Make the Future System Transparent</i> – Future decisions on the implementation of the Resource Recovery Strategy and Residual Waste Disposal Strategy will continue to be open, accessible, based on best practices and facts, and follow the Corporation of the City of London by-laws, policies and practices to find solutions.
<i>Make Waste Reduction the First Priority</i> – The City's first goal is to reduce the amount of material being generated by residents and businesses that requires management (e.g., encourage food waste avoidance, composting at home, local policies to encourage waste reduction, supporting producer responsibility and other provincial and federal programs).
<i>Prioritize the Community's Health and Environment</i> – The health of London's residents and the environment is a priority in decision-making to minimize negative impacts and to maximize the benefits.
<i>Support Development of Business (contractual) Partnerships</i> – Working together with the private sector will ensure that roles, responsibilities and skills are assigned appropriately such that municipal resources are maximized and the best opportunities for London and potential partners are created.
<i>Support Development of Community Partnerships</i> – Working together with local community groups and organizations will help London reach its waste diversion goals and maximize resource recovery more effectively and efficiently.
<i>Work to Mitigate Climate Change Impacts</i> – To reduce the impact on climate change London will identify, assess and implement solutions that reduce GHG emissions associated with its waste management system.

1. Preliminary Review of Potential Programs, Initiatives and Technologies

Preliminary review of potential programs, initiatives and technologies to develop a long list of waste diversion programs, initiatives and technologies that required further investigation. The Internet contains numerous municipal-led and/or consultant-led waste diversion strategies including background research.

2. (Ongoing) Review of Other Ontario Municipalities

A comprehensive review of waste diversion programs/initiatives in other large Ontario municipalities, other cities in Canada and a few cities in the United States was undertaken. City staff have many direct municipal contacts in Ontario municipalities and other cities in Canada that help to obtain important details. Staff are actively involved in the following associations:

- Regional Public Works Commissioners of Ontario (RPWCO)
- Municipal Resource Recovery & Research Collaborative (M3RC) including representatives from Association of Municipalities of Ontario (AMO), Municipal Waste Association (MWA), City of Toronto and RPWCO
- Ontario Waste Management Association (OWMA)
- Canadian Biogas Association (CBA)

3. (Ongoing) Consideration of Regional Resource Recovery Opportunities

In 2017, the City canvassed nearby municipalities (Elgin County, Huron County, Lambton County, Middlesex County, Oxford County and Perth County) responsible for waste management to determine their interest in using any future resource recovery facility(ies). All municipalities expressed an interest in being included in discussions about any new resource recovery facilities and indicated they would consider using the facility depending on the cost. The potential for a regional facility may make it possible to consider technologies that require larger waste quantities in order to be economically feasible.

4. (Ongoing) Community Feedback

Residents had a number of opportunities to provide feedback on what should be included in the Action Plan (Chapter 2.0). Information and feedback has also been sought from various City advisory committees and the Waste Management Community Liaison Committee.

5. (Ongoing) Alignment with Provincial Strategies and Legislation

Development of the Action Plan aligns with the provincial *Strategy for a Waste-Free Ontario: Building the Circular Economy* as well as new provincial waste management planning initiatives including the *Proposed Food and Organic Waste Framework* and the *Amended Blue Box Program Plan*.

6. Comparative Analysis

A comparative analysis of the potential programs/initiatives was completed looking at environmental (diversion rate, greenhouse gas reduction benefits); social (public support, resident benefits/issues); financial (costs, revenue) and technical (collection/processing issues, stability of end markets, proven technology) considerations.

7. (Ongoing) Consideration of Learnings from the Mixed Waste Processing Working Group Formed in early 2017, the Region of Peel is the coordinator of a Mixed Waste Processing Working Group comprised of eight Ontario municipalities representing about half of Ontario's population. The Working Group shares updates, research results, Committee/Council reports, site visit experience and related operational experiences. Members (and estimated 2017 population) currently include:

City of London (380,000)	Region of Peel (1,400,000)	Region of Waterloo (538,000)
Region of Niagara (450,000)	County Simcoe (306,000)	Region of York (1,112,000)
County of Oxford (111,000)	City of Toronto (2,800,000)	

8. (Ongoing) Consideration of learnings from London Waste to Resources Innovation Centre

Input and advice acquired through the working relationships established as part of the Innovation Centre. The primary goals of the Innovation Centre are to:

- build on the existing foundation of traditional and innovative projects to divert waste from landfill and create value added products from residues and waste;
- create a focal point (location or locations) for the ongoing examination of innovative solutions for waste reduction, resource recovery, energy recovery and/or waste conversion into value-added materials, chemicals, heat and power;
- establish partnerships and collaborations between government, academia and businesses to synergistically build on existing strengths to create opportunities to prevent waste, to create products of value from waste, and to solve existing waste management challenges; and
- be known as an innovative centre of excellence with shared facilities and resources providing leadership, implementing best practices, undertaking leading edge research, providing knowledge and support to industry, while educating and training students, researchers and postdoctoral fellows in the various fields of resource and waste management.

Key research work that has been undertaken includes:

- Food waste avoidance research with Western University, PhD Candidate Paul van der Werf and 2cg Consulting;
- Anaerobic digestion of source separated organics (SSO) and facility separated organics (FSO) to create renewable natural gas (RNG); and
- Literature review, analysis, and site visits for new, emerging and next generation technologies (e.g., gasification, pyrolysis, mixed waste processing)

9. (Ongoing) Peer Review

GHD, an engineering, architecture, environmental and construction services firm, and specializes in waste management technologies, has been retained to conduct a peer review of portions of the Action Plan dealing with any technical analysis and newer resource recovery technologies.

10. Request for Information

The City released a Request for Information (RFI) to obtain information about resource recovery (i.e., waste processing) technologies that might be suitable for the City of London to divert waste away from the City's Landfill. It is expected that the 60% diversion could be achieved by a combination of enhanced waste reduction initiatives, increased capture of Blue Box materials, the introduction of recycling of various bulky items and the introduction of an organics management program.

Data collected as part of this RFI will be used to assist City staff in determining if there are other options for reaching 60% diversion, how likely is it to increase diversion beyond 60% diversion in the near term, and how a transition program to advanced resource recovery can be designed now. Specifically the City is looking for technology providers for Mechanical Biological Treatment (MBT) or Waste Conversion systems. MBT systems refer to systems that separate mixed garbage in two or more waste streams for further processing. Further processing can include anaerobic or aerobic processing of an organics rich stream, capture of low quality recyclables, and production of a solid refuse fuel. Waste Conversion refers to technologies such as gasification, pyrolysis, etc. that typically produce a syngas, biochar and/or other products from garbage.

2) COMMUNITY ENGAGEMENT

2.1 OVERVIEW

Engagement and feedback from the public and other stakeholders is a key component in developing the 60% Waste Diversion Action Plan. It enabled stakeholders to participate in the planning of the programs and initiatives that will be part of the action plan and enhanced the quality of the plan.

2.2 ACTIVITIES AND FEEDBACK TO DRAFT 60% WASTE DIVERSION ACTION PLAN

The approaches used to engage the public and other stakeholders in development of the Action Plan included open houses, booths at community events, interactions with City of London Advisory Committees, the Resource Recovery Strategy website, creation of the Waste Management Community Liaison Committee and newspaper and social media advertisements. These events/initiatives are summarized in Table 3 with full details presented in Appendix B.



Table 3 - Community Engagement Activities

Event	Date/Location	Description/Comments
<i>Open Houses</i>		
Open House 1	May 24 (Horton Street Goodwill, 2 – 4 p.m, 5 – 8 p.m) May 25 (Lambeth Community Centre, 2 – 4 pm, 5 – 8 pm)	Background information provided on existing diversion programs, waste composition and potential new diversion programs. Feedback opportunities provided. City staff were available to answer questions.
Open House 2	November 29 (Horton Street Goodwill, 2 – 4 p.m, 5 – 8 p.m) November 30 (Lambeth Community Centre, 2 – 4 p.m, 5 – 8 p.m)	Updated information on changes to waste management and waste diversion from the Province, potential programs and initiatives to achieve 60% diversion and key technologies to achieve advanced diversion and resource recovery. Feedback opportunities provided. City staff was available to answer questions.

Table 3 - Community Engagement Activities

Event	Date/Location	Description/Comments
<i>Community Events</i>		
Gathering on the Green	June 3, 2017	Simple display promoting the getinvolved.london.ca website, Environmental Assessment (EA) process for expanding the W12A Landfill and waste composition. City staff was available to answer questions.
The Big Leak: Water Brothers	June 5, 2017	
Sesquifest	June 29 to July 2, 2017	
Sunfest	July 6 to July 9, 2017	
Home County Folk Festival	July 15 to July 16, 2017	
Inspiration Fest	July 23, 2017	
Forest Festival	August 19, 2017	
Gathering on the Green 2	August 20, 2017	
Neighbourhood Service Days	August 28 - September 1, 2017 Northwest London Resource Centre, Glen Cairn Community Centre	
London Home Show	January 26 - 28, 2018	Visitors requested to provide feedback on proposed waste diversion activities that could be implemented to achieve 60% waste diversion. A desk-side Blue Box was given to all participants.
<i>City of London Advisory Committees</i>		
Waste Management Community Liaison Committee (CLC)	June 5, 2017 to present	The Waste Management CLC was advised on Resource Recovery changes and initiatives as new information was available. Committee feedback was provided in support of the proposed initiatives.
Advisory Committee on the Environment (ACE)	May 3, 2017 and November 1, 2017	ACE was provided with updates as the project moves forward. Committee feedback was provided in support of the proposed initiatives.

Table 3 - Community Engagement Activities

Event	Date/Location	Description/Comments
Resource Recovery Strategy website		
	Live on April 25, 2017	Information about the Resource Recovery Strategy is available online on the getinvolved.london.ca website. Feedback can be provided. To date, over 3,000 visitors have accessed the website.

Through these community engagement activities, the City was soliciting feedback on specific topics and questions as well as asking for general comments and suggestions. Feedback on the specific topics and questions is presented in Tables 4 and 5. A summary of the popular comments and ideas are listed in Table 6.

Further details on the feedback for the specific topics and questions as well as all the general comments and suggestions provided are presented in Appendix C.

It is key to understand that this is a compilation of feedback. It is not a random sample of Londoners and has no statistical validity. Section 2.3 contains the results of a public opinion poll. However, it is very important to capture comments and feedback in an understandable format.

Table 4 - Feedback on First Round of Questions¹

Question	Response	
Is new organic management program(s) the key to reaching 60% waste diversion by 2022?	Yes	86%
	Maybe	14%
	No	0%
Do you think it is acceptable to allow neighbouring municipalities to use any new waste resource recovery facilities developed by the City of London?	Yes	57%
	Maybe	14%
	No	29%
Do you think that the Resource Recovery Strategy needs to be able to accommodate transition to new technology in the future, if appropriate?	Yes	100%

Notes 1: Questions posed at Open House and online. Seven total responses.

Table 5 - Feedback on Key Second Round of Questions¹

What Level of Investment Are You Willing to Make?		Response	Summary Comment
Greater levels of waste diversion and resource recovery will require additional financial investments. On a household basis, how much more in municipal taxes and fees would you be prepared to pay per year?	\$0	17%	Over 80% of the respondents indicated they are prepared to pay more for waste diversion.
	\$1 - \$25	44%	
	\$26 - \$50	24%	
	\$51 - \$75	7%	
	\$76 - \$100	8%	
How much more in municipal taxes and fees would you be prepared to pay per year for Potential New Programs and Initiatives (including the approximate annual cost per household)		Level of Support	Summary Comment
Food Waste Avoidance	No change: \$0	16%	Almost 85% support for some kind of program.
	Moderate Program: \$1	46%	
	Significant Program: \$7	38%	
Home Composting	No change: \$0	25%	75% support for all proposed options
	Moderate Program: \$0.75	38%	
	Significant Program: \$1.20	37%	
Community Composting	No change: \$0	20%	80% support for all proposed options
	Low Tech, Private: \$0.01	25%	
	Low Tech, Public: \$0.15	28%	
	High Tech, Public: \$0.45	27%	
City Wide Organics – Curbside Program	No Change: \$0	19%	Stronger support for Green Bin. Green Bin also preferred by CLC and ACE.
	Green Bin Program: \$20	62%	
	Mixed Waste Program: \$40	19%	
City Wide Organics – Multi-Residential Program	No Change: \$0	17%	Stronger support for Green Bin
	Green Bin Program: \$7	61%	
	Mixed Waste Program: \$14	22%	

1. Questions posed at Open House 2, online, London Home Show and to the Waste Management Community Liaison Committee. The number of responses varied by question, but ranged from 615 to 956.

Table 6 - Popular Comments and Suggestions from the Community¹

Comment/Suggestion	% of Responses	City Response
Pro green bin/source separated composting program; many comments asked for immediate implementation	39%	Yes, considered in the 60% Waste Diversion Action Plan.
Pro alternative resource recovery method (incineration, mixed waste processing, landfill mining)	6%	Options considered as part of the EA process for the expansion of W12A Landfill and will be discussed in the Resource Recovery Strategy.
Support bans on packaging/manufacturers responsible	5%	In Ontario, this activity has generally occurred at the provincial government level.
Expand recycling program (Blue Box, public space, downtown)	4%	Being considered as part of extended producer responsibility (EPR) discussions.
Implement policies & by-laws (pay per bag, bag limit, clear bag)	4%	Yes, considered in the 60% Waste Diversion Action Plan.
Support home composting	4%	Yes, considered in the 60% Waste Diversion Action Plan.
London should stop taking Toronto's garbage	3%	London doesn't take Toronto's garbage.
Education on waste reduction/diversion is key	3%	Yes, considered in the 60% Waste Diversion Action Plan.
Opposed to green bins	2%	Provincial Statement requires London to implement organics management program.
Encourage reuse	2%	Yes, considered in the 60% Waste Diversion Action Plan.
Implement textile recycling	1%	Yes, considered in the 60% Waste Diversion Action Plan.

1. Written comments or suggestions provided to the City at an open house, on the getinvolved.london.ca website or on the City's Facebook page. The number of comments or suggestions were 233. Some respondents provided more than one comment.

2.3 PUBLIC OPINION SURVEY

To complement the community engagement discussed in Section 2.2, a survey of the opinions of London residents towards waste diversion was undertaken by Ipsos Public Affairs.

The survey was conducted online and the sample was drawn using Ipsos proprietary panel. To qualify for the survey, the respondent had to be a resident of the City of London and 18 years of age or older. The results of the survey are based on a total of n=301 online interviews completed between May 31 and June 4, 2018.

The precision of Ipsos online surveys is calculated via a credibility interval. According to Ipsos, the sample is considered accurate within +/- 6.4 percentage points, 19 times out of 20, had all London residents been surveyed.

Complete details of the survey are presented in Appendix D and summarized below. The survey included eight questions. Most of the questions were similar to questions asked of residents as part of the community engagement process. These questions, the results and how they compare to the feedback received during the community engagement process are presented in Table 7.

Table 7 - Results of Ipsos Public Affairs Survey

How important is waste diversion to you?		Response	Comment
Waste diversion is the process of reducing the quantity of waste landfilled and creating new materials of value. How important is waste diversion to you?	Very important	53%	Over 90% of residents think waste diversion is important.
	Somewhat important	40%	
	Not very important	5%	
	Not important at all	0%	
	Don't know	2%	
What Level of Investment Are You Willing to Make?		Response	Comment
On a per household basis, how much more would you be prepared to pay in municipal taxes and fees per year to pay for increased waste diversion?	\$0	24%	Over 75% of the respondents indicated they are prepared to pay more for waste diversion.
	\$1 - \$25	47%	
	\$26 - \$50	18%	
	\$51 - \$75	4%	
	\$76 - \$100	7%	

Table 7 - Results of Ipsos Public Affairs Survey

Potential New Programs and Initiatives (including the approximate annual cost per household)		Level of Support	Comment
Food Waste Avoidance	No change: \$0	12%	Almost 90% of the respondents are interested in seeing some kind of program implemented.
	Moderate Program: \$1	41%	
	Significant Program: \$7	57%	
City Wide Organics – Curbside Program	No Change: \$0	24%	3 of every 4 respondents want a new program. Green Bin has marginally more support than mixed waste program.
	Green Bin Program: \$20	42%	
	Mixed Waste Program: \$40	32%	
City Wide Organics – Multi-Residential Program	No Change: \$0	19%	4 of every 5 respondents want a new program. Equal support for Green Bin (essentially on-site source separated organics) and Mixed Waste.
	Green Bin Program: \$7	40%	
	Mixed Waste Program: \$14	41%	
Are you prepared to deliver more materials (e.g., old furniture, carpet, small appliances, mattresses, etc.) to drop off-depots?	Yes	65%	2 of every 3 respondents are willing to deliver more materials to the EnviroDepots.
	No	35%	
Would you support banning additional materials from garbage pickup (e.g., old furniture, carpet, small appliances, mattresses, etc.) if you could drop them off at a depot for recycling?	Yes	60%	3 of every 5 respondents support banning materials that have a recycling option.
	No	40%	

2.4 COMMUNITY ENGAGEMENT ON THE 60% WASTE DIVERSION ACTION PLAN

The following community engagement is proposed for the 60% Waste Diversion Action Plan.

Table 8 - Community Engagement for 60% Waste Diversion Action Plan

Date	Event	Comments
July 17, 2018	CWC Meeting	<ul style="list-style-type: none"> • Approve in principle Draft Action Plan to achieve 60% waste diversion by 2022
July 24	Council	<ul style="list-style-type: none"> • Approve to circulate and receive feedback on the 60% Waste Diversion Action Plan
July 25 to September 10	Provide feedback opportunities on WhyWaste Resource Recovery Strategy website	<ul style="list-style-type: none"> • Advertise in the London Free Press, The Londoner and on social media
	Circulate to Community Stakeholder Groups	<ul style="list-style-type: none"> • Circulate and ask for feedback from Waste Management Community Liaison, Committee (WMCLC), W12A Landfill Public Liaison Committee, Urban League and Advisory Committee on the Environment (ACE)
	Circulate to Waste Management/ Recycling Companies	<ul style="list-style-type: none"> • Circulate and ask for feedback from local companies including Emterra, Green Valley Recycling, Miller Waste, Orgaworld, StormFisher, Try Recycling, Waste Connections and Waste Management
	Community Festival	<ul style="list-style-type: none"> • Attend Gathering on the Green II, Sunday August 19, 2018
	Presentations	<ul style="list-style-type: none"> • Present to WMCLC in early August (TBD) • Present to ACE on September 5, 2018
September 27	Public Participation Meeting	<ul style="list-style-type: none"> • CWC receives comments from the public and other stakeholders
January/ February 2019	CWC Meeting	<ul style="list-style-type: none"> • Approval of 60% Waste Diversion Action Plan
	Council	<ul style="list-style-type: none"> • Implementation details and final cost estimates to be provided at this time

3) RESIDENTIAL GARBAGE COMPOSITION

3.1 OVERVIEW

The key to developing new programs and initiatives to achieve 60% waste diversion is understanding what currently makes up garbage and how it may change in the future.

3.2 CURRENT GARBAGE COMPOSITION

What is currently in the garbage is shown on the next pages and discussed below. A more detailed breakdown on what is in garbage is provided in Appendix E. Single families make up about 70% of London's households and generate about 61,000 tonnes of the residential garbage each year that is collected and landfilled. A large percentage of this waste could be composted or recycled.

A breakdown of what is in the typical garbage bag from a single family residence is illustrated on Figure 2 (next page). About 7% is material that should have been placed in the Blue Box. A further 13% of the garbage, including textiles, scrap metal, electronics, renovation materials and plastic bags, which could have been dropped off at a depot, taken to a store for recycling or are materials that have been identified in the province's Strategy for a Waste-Free Ontario for future diversion programs.

About 60% of landfill garbage is primarily organic matter and is compostable. The organics are made up of food scraps (36% of all waste), non-recyclable paper like paper towel & paper napkins, yard materials, pet waste and sanitary products (e.g., diapers).

About 30% of London's households live in multi-residential (apartment/condominium) buildings and generate approximately 23,000 tonnes of garbage per year. A breakdown of the garbage collected from multi-residential buildings is illustrated in Figure 3.

Garbage Collection

The City collects garbage from 124,000 single family households and 56,000 multi-residential households.

Single family households are limited to 3 containers per collection plus bulky items (e.g., couches, mattresses, etc.).



Multi-residential households do not have container restrictions. Bulky items are handled separately by tenant/owner or the building owner.



Figure 2 - What Are We Throwing Away? (single family homes)**Commonly Collected Organics**

Organics that are easily composted. They include food waste and non-recyclable paper (soiled paper, tissues, paper towels).

Other Organics

Pet waste and sanitary products (e.g., diapers) which typically require pre-processing to remove the plastic bag that contains the pet waste and plastic covering of the diaper.

Blue Box

Items that were placed in the garbage but should have gone in the Blue Box.

Other Recyclable Materials

Items that were placed in the garbage but should have been dropped off at a depot or returned to retailer for recycling such as textiles, scrap metal, electronics, renovation materials and plastic bags.

Future Recyclable Materials

Items that may have local recycling options in the future such as carpets, mattresses and furniture.

The garbage composition from multi-residential buildings is similar to the garbage from single family households. The main difference is a higher percentage of recyclables in the garbage (15% versus 7% for single family) but less of the garbage is compostable (55% versus 60% for single family).

Figure 3 - What Are We Throwing Away? (multi-residential homes)



Commonly Collected Organics

Organics that are easily composted. They include food waste and non-recyclable paper (soiled paper, tissues, paper towels).

Other Organics

Pet waste and sanitary products (e.g., diapers) which typically require pre-processing to remove the plastic bag that contains the pet waste and plastic covering of the diaper.

Blue Box

Items that were placed in the garbage but should have gone in the Blue Box.

Other Recyclable Materials

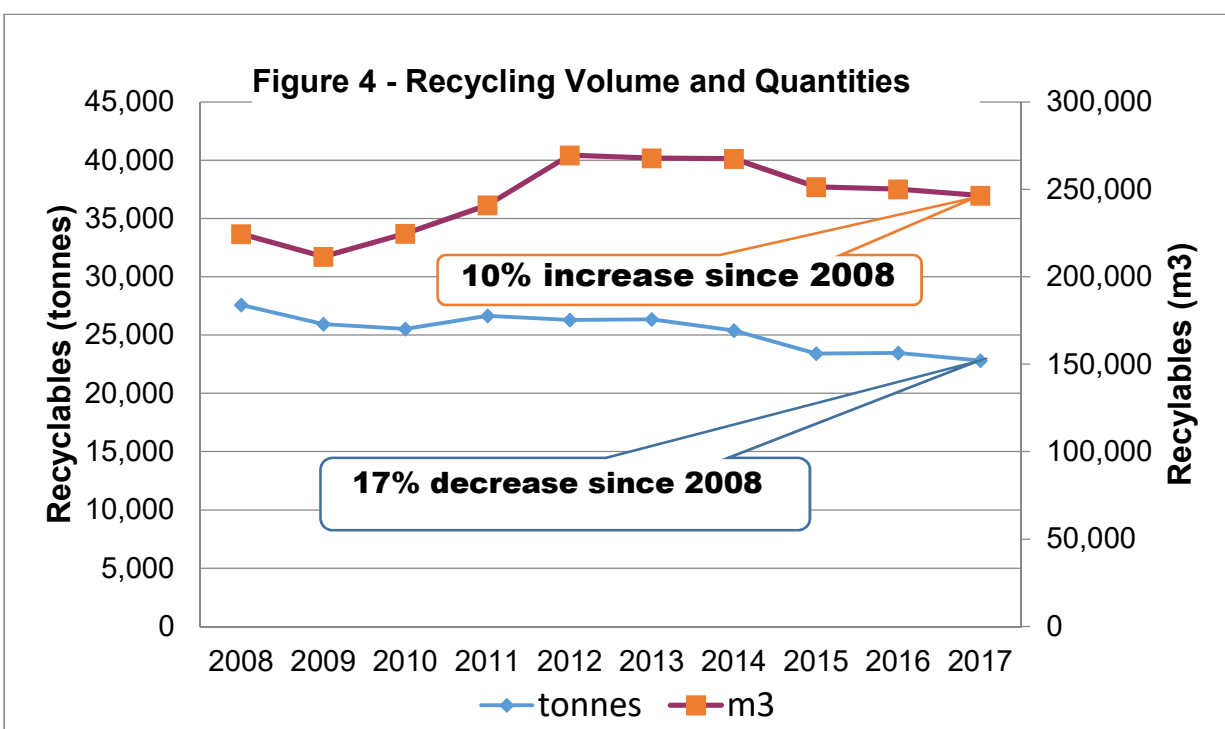
Items that were placed in the garbage but should have been dropped off at a depot or returned to retailer for recycling such as textiles, scrap metal, electronics, renovation materials and plastic bags.

3.3 FUTURE GARBAGE COMPOSITION

The waste stream is constantly changing. These changes are a result of:

- Shifting habits and behaviours - fewer people reading printed newspapers resulting in less newsprint to recycle; more people ordering online resulting in more cardboard boxes; changes in eating habits, attitudes toward cooking and busier lifestyles have resulted in a growing demand for convenience foods and ready-to-go meals.
- Light-weighting of product packaging to reduce manufacturing costs - companies find ways to reduce the weight of product packaging, to reduce their costs. Examples include; the quantity of polyethylene terephthalate (PET) plastic in beverage containers (e.g., water bottles) has decreased by 50% over the last several years; more concentrated products which use less packaging.
- Material substitution - some companies are switching packaging materials such as steel cans or glass containers to plastic or aseptic packaging.
- Composite packaging design - there is an increase in single-serve and convenience packaging which results in challenges for recycling and composting operations (e.g., coffee pods, multi-layer freezer packs).

The majority of these changes will impact Blue Box recycling and result in less “easy to recycle” materials (e.g., newspapers, steel cans, etc.) and more “difficult to recycle” materials (e.g., plastics, pouches, etc.). The changes will also reduce the weight of recyclables collected while at the same time increasing the volume of recyclables (Figure 4) and the cost of recycling.



4) ANALYSIS AND PROPOSED ACTIONS

4.1 BLUE BOX (BLUE CART) PROGRAM

Summary - Proposed Actions, Diversion and Savings

It is expected:

- the responsibility for the Blue Box program will be transferred to industry in the future (as early as 2023 based on current legislation and policy timelines;
- the province will mandate increased capture of recyclables from the current 63% (provincial average) to 75%; and
- other proposed initiatives (bi-weekly garbage collection, reduced container limits, consideration of user pay or clear bags) will encourage more use of the existing program.



These changes will increase London's diversion rate by an additional 2% to 3% and the transition of all Blue Box costs to industry will reduce the City's waste diversion costs by \$1.5 to \$1.8 million dollars per year.

Background

Existing Program

The City provides opportunities to recycle Blue Box materials through its curbside, multi-residential, depot and public space recycling programs. The City diverted approximately 23,000 tonnes of recyclables in 2017. This is approximately 14% of all residential garbage.

The City collects a wide range of materials which has increased over the years.

Most items in the Blue Box are common to municipalities, with the key differences being: plastic film (e.g., plastic bags) and expanded polystyrene (e.g., Styrofoam™). London has not added plastic film and expanded polystyrene to its program due to the high costs and limited markets.

It is expected that a common basket of materials to be recycled will be established once responsibility for the program is transferred to industry. For this reason, no changes to the materials collected are planned for London in the near future.

Why doesn't the City recycle Expanded Foam Polystyrene (EPS) and film plastic?

- ✓ EPS does not have stable markets and can contaminate other materials at the recycling facility.
- ✓ Film plastic wraps around moving equipment parts at the recycling facility and is costly to collect and process.

Information on materials collected in the City's Blue Box program can found in Appendix A.

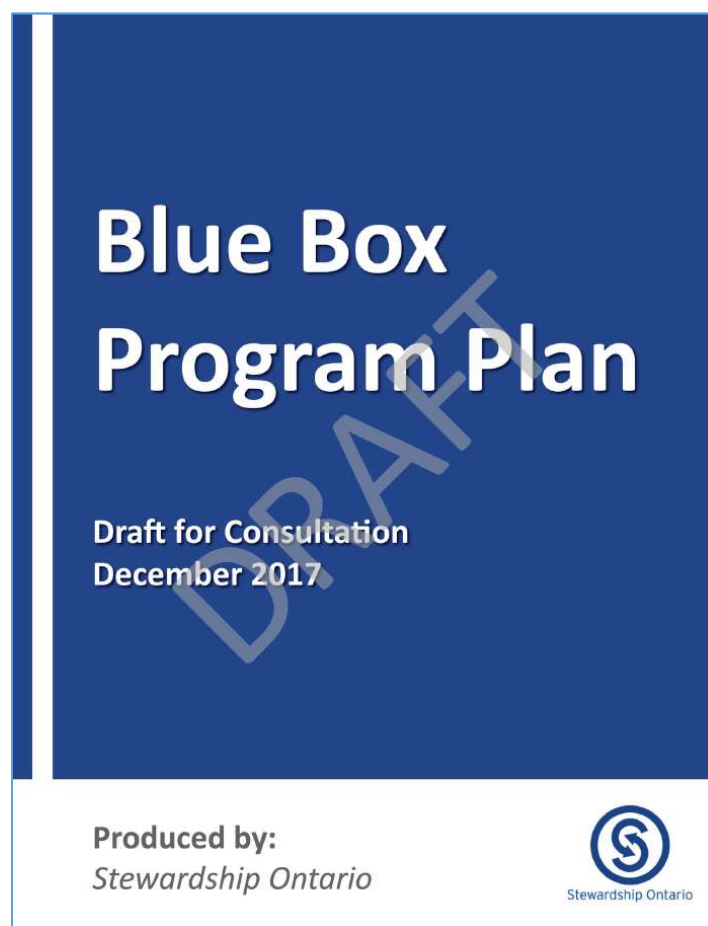
New Provincial Direction

The existing Blue Box Program Plan (2003) is based on a cost share model of 50/50 between municipal governments and the companies that produce the Paper Products and Packaging (PPP) collected in the Blue Box Program. The programs are being managed and operated by Ontario municipalities.

The new proposed model is a combination of extended producer responsibility (EPR) and eventually moving to Individual Producer Responsibility (IPR) (also commonly called full producer responsibility). It is based on individual producers being legally and fully responsible for meeting outcomes set by the government, which would include waste diversion targets, service standards, promotion and education requirements and administrative penalties. Industry would fund 100% of the recycling costs of their products and product packaging.

The current Blue Box program diverts approximately 63% of all designated recyclables. The province has indicated that a capture rate of 75% of all designated recyclables may be more appropriate under the new model.

The Strategy for a Waste-Free Ontario (2017) shows the transition of the Blue Box Program to the new model being completed by 2023. In February 2018, Resource Productivity and Recovery Authority (RPRA) announced that “In light of comments received on this consultation draft [the report cover above], Stewardship Ontario and the Authority have determined that more time is needed to address the comments received.” As of end of June 2018, no further details have been released.



4.2 NEW (OR EXPANDED) RECYCLING PROGRAMS AND INITIATIVES

Summary - Proposed Actions, Diversion and Costs

The proposed program for materials collected in the garbage that are potentially recyclable is summarized in Table 9.

Table 9 – Summary of Proposed New (or Expanded) Recycling Programs and Initiatives

Material	Proposed Actions	Implementation Schedule
Bulky Plastics	<ul style="list-style-type: none"> • Continue with existing pilot project • Consider implementation of an expanded program once long term stable markets have developed 	in progress
Clothing and Textiles	<ul style="list-style-type: none"> • Develop a textile awareness strategy • Pilot depot collection at select multi-residential buildings 	2019
Ceramics (e.g., Toilets)	• Drop-off at W12A EnviroDepot at no cost	2019
	• Ban from garbage collection	2020
Small Metal (e.g., Appliances, Electrical Tools and Scrap Metal)	• Pilot curbside collection methods	2019
	• Semi-annual collection of from single family home	2020
	• pilot depot collection at select multi-residential buildings	2020
Furniture (Wooden)	• Drop-off at W12A EnviroDepot at no cost	2019
	• Semi-annual curbside collection from single family homes	2020
	• Ban from garbage collection	2021
Carpets, Mattresses	• Wait to see if the province develops an EPR program under the <i>Waste-Free Ontario Act</i>	2018 to 2021
	• If no EPR program, implement a pilot project for voluntary recycling of materials at the EnviroDepots on a fee for service basis	2022
	• Consider implementation of ban on curbside collection with either a depot or curbside collection service	2023

It is estimated that the above programs for wooden furniture; small appliances, electrical tools and small scrap metal; large ceramics and textiles would divert approximately 0.4% to 0.8% of residential waste and cost approximately \$350,000 to \$550,000 annually.

Background

Existing Programs

There are many opportunities to recycle items in the residential waste stream in addition to materials recycled through the Blue Box program. In total approximately 13,000 tonnes of Other Recyclables were diverted from landfill in 2017. Details on these City programs are provided in Appendix A.

Waste-Free Ontario Strategy

Information on the Waste-Free Ontario Strategy was previously provided in Section 1.2. The strategy lists a number of products and materials that will be considered for recycling under a full EPR program.

“The province will designate new materials under the new producer responsibility regime. When identifying potential candidate materials for full producer responsibility, the province will consider products and packaging whose recovery helps fulfil one or more of the following three broad results:

- *recovering high-volume resource streams to increase diversion*
- *keeping hazardous materials out of landfills to protect our environment*
- *reducing domestic and global greenhouse gas emissions to fight climate change*

...Materials will be designated through regulations made under the Resource Recovery and Circular Economy Act, 2016. Based on previous consultations, the first set of materials will include, but is not limited to

- *small appliances*
- *electrical tools*
- *batteries*
- *fluorescent bulbs and tubes*
- *mattresses*
- *carpets*
- *clothing and other textiles*
- *furniture and other bulky items”*

Potential Products/Materials

The status of programs to manage each of the materials listed in the Waste-Free Ontario Strategy as well as other potential recyclable materials are presented in Table 10.

Table 10 - Status of Potential Materials to Recycle

Product/ Materials		Status	Estimated Quantity in Garbage (tonnes/year)
Batteries		<ul style="list-style-type: none"> most batteries end up in the garbage provincial recycling program already exists 	<50
Bulky Plastics		<ul style="list-style-type: none"> Some bulky plastics are collected at the curb and from multi-residential buildings City operates a pilot recycling program 	50 to 100
Carpets		<ul style="list-style-type: none"> carpets collected at the curb for single family homes carpets not collected from multi-residential buildings No existing recycling opportunities 	600 to 800
Ceramics		<ul style="list-style-type: none"> ceramics (including toilets) are collected at the curb ceramics (excluding toilets) are collected at multi-residential buildings ceramics can be recycled at local Construction, Renovation and Demolition (CR&D) recycling companies 	500 to 600
Clothing and other textiles		<ul style="list-style-type: none"> 50% of material in garbage may have reuse potential many drop-off depot locations already exist 	2,500 to 3,000
Small Metal	Electrical tools	<ul style="list-style-type: none"> most electrical tools end up in the garbage most are recyclable as scrap metal 	<100
	Small appliances	<ul style="list-style-type: none"> most small appliances (e.g., toasters, hand mixers, etc.) end up in the garbage many of these are recyclable as scrap metal or electronics 	200 to 250
	Scrap Metal	<ul style="list-style-type: none"> many smaller pieces of scrap metal from households (e.g., frying pans, baking pans, bottle caps, etc.) end up in the garbage instead of being recycled 	600 to 700

Table 10 - Status of Potential Materials to Recycle

Product/ Materials	Status	Estimated Quantity in Garbage (tonnes/year)
Fluorescent bulbs and tubes	<ul style="list-style-type: none"> • many bulbs end up in the garbage • provincial recycling program already exists 	<50
Furniture	<ul style="list-style-type: none"> • furniture in general is primarily wood, metal, upholstered or plastic • metal furniture is banned from collection and can be recycled as scrap metal • wood and upholstered furniture is collected from single family homes but not multi-residential buildings (that have City bulk bin collection) 	300 to 500
Mattresses	<ul style="list-style-type: none"> • mattresses collected at the curb for single family homes • mattresses not collected from multi-residential buildings (that have City bulk bin collection) • no existing recycling opportunities 	600 to 800

A detailed assessment of recycling the items in Table 10 is presented in Appendix F and summarized below.

Batteries

There are over 20 retail locations, 30 businesses and schools and 4 EnviroDepots where single-use and rechargeable batteries are collected for recycling in London.

Several municipalities in Ontario have implemented semi-annual collection of batteries in conjunction with their Blue Box program. It is estimated a similar program in London would divert approximately 20 to 30 tonnes of batteries. Semi-annual collection is not recommended for London because the expected transition of the Blue Box program to industry will complicate collection. In addition the province will likely develop new provincial programs for batteries under the *Waste-Free Ontario Act*.

It is recommended not to make any changes to the current program in the City at this time.

Bulky Plastics

The City has been piloting the recycling of bulky plastics at the Manning Drive Regional Material Recovery Facility.

Recently, the scrap plastics market has increased quality requirements. Bulky plastic loads must now have no or minimal metal, fabric, paper and other contaminants or they will be rejected. This standard is difficult to achieve since many bulky plastics like toys are multi-material items and may also contain some metal or fabric components.

The pilot project could become a city-wide program by banning collection of bulky plastics at the curb coupled with accepting bulky plastics at the EnviroDepots. There are insufficient bulky plastics to warrant occasional (e.g., semi-annual) collection at the curb. The cost of collecting bulky plastics using a depot system would be approximately \$8,000 to \$16,000 per year.

It is recommended that the City not make changes to its pilot project for recycling bulky plastic recycling until long term stable markets have developed.

Carpets

It is estimated that approximately 600 to 800 tonnes of carpet are discarded by homeowners and collected curbside annually as garbage.

The City could ban the collection of carpet at the curb coupled with accepting carpet discards at the EnviroDepots. Occasional (e.g., semi-annual) collection at the curb is not recommended because of the added cost (cannot be collected with existing garbage collection vehicles) and the reduced recyclability of the carpet if it is left at the curb for an extended period prior to collection.

Bulky Plastics

- Bulky Plastics refers to all larger plastic household items that are not suitable for the Blue Box. Typical bulky plastic items includes plastic lawn furniture, large toys and 20 litre pails.
- It is estimated that 50 to 100 tonnes of bulky plastics placed in the garbage annually.



Carpet Recycling

- There is one carpet recycling facility in Ontario located in Toronto.
- There are no municipal programs for recycling carpets in Ontario.
- California has the most extensive carpet recycling program in North America:
 - Captures 11% of discards
 - 80% of captured material is diverted from landfill (equal amounts sent to reuse/recycling facilities and energy production through energy-from-waste facilities).



It is estimated that a depot service would capture at least 600 to 800 tonnes per year if collection of carpets at the curb was banned and accepted at no cost at the EnviroDepots. The cost of the program would be approximately \$220,000 to \$290,000 per year (excluding initial capital costs).

It is expected that a depot system would only collect 200 to 300 tonnes per year if a fee was charged to recover the cost of the program as some of the carpets would be taken to cheaper disposal locations within and outside of the City.

It is recommended that the City:

- Wait to see if the Province develops a provincial program for carpets under the *Waste-Free Ontario Act* as there are limited markets for recycling carpets in the province.
- If no provincial program exists by 2021, implement a pilot project for voluntary recycling of carpets discards at the City EnviroDepots at no cost while continuing to collect carpets at the curb.

Data from the pilot project would be used to confirm the costs, operational needs, and logistics of moving to a ban of carpet collection at the curb and whether to offer the program for free, on a partial recovery basis or on a full cost recovery basis. The cost of a one year pilot project is estimated to cost \$80,000 to \$100,000.

Ceramics

It is estimated that there is between 500 and 600 tonnes of ceramics in the garbage annually. Ceramics can be easily crushed and recycled as aggregate, which is how ceramics like ceramic tiles and toilets taken to local Construction, Renovation & Demolition (C,R&D) recycling companies are recycled.

Occasional (e.g., semi-annual) collection at the curb is not recommended because of the low quantities coupled with the likelihood that residents would be unwilling to hold onto ceramics (including toilets) for an extended period.

It is recommended that the City:

- Provide a drop-off location for ceramics at no cost at the City's EnviroDepots in 2019; and,
- Ban collection of toilets at the curb in 2020.

It is estimated the above measures will divert 100 to 150 tonnes of ceramics (predominately toilets) and cost \$10,000 to \$15,000 per year (excluding initial capital costs).

Clothing and Textiles

An active community-based clothing and textile program already exists in London handling about 50% of the available material. It is estimated that there is 2,500 to 3,000 tonnes of textiles in the garbage annually of which approximately 50% has potential to be reused/recycled. Approximately 70% of this material comes from single family homes and 30% from multi-residential buildings. This means there is approximately 900 to 1,050 tonnes of reusable textiles in the garbage from single family homes and 350 to 450 tonnes in the garbage from multi-residential homes.

There are many options for donating textiles in good condition. They include un-staffed drop-off bins at stores and mall parking lots, staffed drop-off depots (Goodwill, Mission Store, St. Vincent de Paul, etc.), door to door collections (Diabetes Canada's 'In The Bag' program) and picked up at your home (Diabetes Canada's reusable goods donation program).

There are no major municipalities in Ontario that offer regular curbside collection of textiles. Some large municipalities have textile drop-off bins in select multi-residential buildings or at key locations through the municipality (e.g., City of Markham).

The province may develop a new provincial program for clothing and textiles under the *Waste-Free Ontario Act* in the future but many municipalities are taking measures to increase diversion of clothing and textiles in the interim as there are markets for textile reuse and recycling.

It is recommended that the City:

- Develop a textile awareness strategy to promote existing reuse opportunities; and,
- Pilot depot collection at select multi-residential buildings beginning in 2019.

It is estimated that a textile awareness program would cost \$10,000 to \$30,000 annually and be required for 3 to 5 years followed by less investment when the practice has become the norm. A pilot depot collection project would cost between \$5,000 and \$10,000. It may be possible to generate enough textiles from multi-residential buildings to pay for the on-going cost of a permanent program. These programs are estimated to divert 150 to 400 tonnes of clothing and textiles annually.

Textile Recycling

- London has an active community-based program that reuses/ recycles approximately 3,300 tonnes of clothing and textiles annually
- There are approximately 1,200 to 1,500 tonnes of useable clothing and textiles in the garbage.
- The overall diversion rate of useable clothing and textiles is approximately 70% (3,300 tonnes reused/ recycled of a total of 4,500 to 4,800 tonnes of useable clothing and textiles).



Small Metal (Small Appliances/Electrical Tools/Scrap Metal)

It is estimated that 800 to 1,000 tonnes of small appliances (e.g. toasters, hand mixers, etc.), electrical tools and small pieces of scrap metal end up in the garbage annually even though these materials can be taken to an EnviroDepot or scrap metal yard to be recycled. Approximately 75% of this material (600 to 750 tonnes) comes from single family homes and 25% (200 to 250 tonnes) from multi-residential buildings.

The province may develop a new provincial program for small appliances and electrical tools under the *Waste-Free Ontario Act* in the future but measures to increase diversion of these materials can be taken in the interim. There are strong markets for scrap material and collection can be provided at a reasonable cost.

In order to divert more of this material from the waste stream, it is recommended that the City:

- Implement semi-annual curbside collection of small metal items beginning in 2020, and;
- Pilot depot collection at select multi-residential buildings beginning in 2020.

A few Ontario municipalities allow residents to put metal cookware in their Blue Box and some offer a call-in service for the pickup of large appliances, but none offer a dedicated collection of small appliances, electrical tools and small pieces of scrap metal. Various methods of curbside collection could be piloted in 2019 prior to implementing a City-wide program.

It is estimated that a semi-annual curbside collection program would capture 250 to 400 tonnes of material, cost \$70,000 to \$80,000 to collect and generate \$40,000 to \$60,000 in revenue. It is likely much of the metal will be collected by private scrap haulers before City collection crews arrive. This will reduce potential revenue but also reduce collection costs.

Possible Curbside Collection Parameters

- Limit items to the size of a Blue Box or smaller.
- Accept all appliances, electrical tools, small electronics or other items with a cord.
- Consider use of the Blue Box or similar container to place materials at the curb.

Fluorescent bulbs and tubes

Fluorescent bulbs and tubes are accepted for recycling at several retail locations and the City's four EnviroDepots. The four EnviroDepots received 20 tonnes of fluorescent bulbs and tubes in 2017. The amount being received is expected to gradually decrease over time as most light bulbs currently being sold are LED. It is expected the province will likely develop new provincial programs for fluorescent bulbs and tubes under the *Waste-Free Ontario Act*.

It is recommended not to make any changes to the current program in the city at this time.

Furniture

Furniture is generally comprised of wood, metal, plastic and/or upholstery. Metal furniture is banned from collection and can be recycled as scrap metal. Wood, plastic and upholstered furniture is collected from single family homes for disposal but not multi-residential buildings (with bulk bin garbage collection).

Wood and upholstered furniture in poor condition is placed at the curb for disposal. It is estimated that the City collects 300 to 500 tonnes of furniture annually from single family homes and about one third is wood furniture. Wood, plastic and upholstered furniture in good condition should be donated for reuse but some is placed at the curb for disposal.

There are no recycling options for upholstered furniture in poor condition. Plastic furniture would likely be part of the bulky plastics recycling program discussed early.

The only recycling option for wood furniture, at this time, is to use as wood chips for daily cover at the landfill. The minor metal and plastic components (e.g., handles, drawer sliders, etc.) coupled with the wood being painted or stained prevents the wood chips from being used as fuel or for landscaping purposes.

The province may develop a new provincial program for furniture under the *Waste-Free Ontario Act* in the future. It is recommended by 2020 the City:

- Wait to see if the Province develops a provincial program for upholstered furniture under the *Waste-Free Ontario Act* as there are no markets for recycling upholstered furniture in the province;
- Provide a drop-off location at W12A EnviroDepot for wood furniture in 2019;
- Begin semi-annual collection of wooden furniture in 2020; and,
- Ban wooden furniture from curbside garbage collection in 2021.

It is estimated the above measures will divert 100 to 150 tonnes of waste to be used as landfill cover and cost \$70,000 to \$80,000 annually. Having all the wooden furniture collected semi-annually, instead of a call-in service, will provide an opportunity for re-use of the furniture by residents who see furniture on the street they could use.

Furniture Recycling

Metal

Several large Ontario municipalities offer a call-in service for the collection of large metal items for recycling including furniture.

Upholstered

There is no recycling of upholstered furniture by municipalities in Ontario.

Plastic Furniture

There is no recycling of plastic furniture by municipalities in Ontario.

Wood

There are no large Ontario municipalities that collect wood furniture for processing into wood chips. The Municipality of Thames Centre provides semi-annual collection of wood, including furniture and ships to Try Recycling for processing.

Mattresses

It is estimated approximately 1,000 to 1,200 tonnes of mattresses and box springs are discarded by homeowners annually or about 50,000 to 60,000 units. About 60% of these are placed at the curb for garbage collection.

The City could ban the collection of mattresses and box springs at the curb coupled with accepting them at the EnviroDepots.

Providing occasional (e.g., semi-annual) or on-request collection at the curb is not considered practical at this time due the cost of providing such a service.

It is estimated that a depot service would capture at least 600 to 800 tonnes per year if collection of mattresses and box springs at the curb was banned and accepted at no cost at the EnviroDepots. The cost of the program would be approximately \$600,000 to \$700,000 per year (excluding initial capital costs).

It is expected that a depot system would only collect 200 to 300 tonnes per year if a fee was charged to recover the cost of the program as some of the mattresses would be taken to cheaper disposal locations within and outside of the City.

It is recommended that the City:

- Wait to see if the Province develops a provincial program for mattresses under the *Waste-Free Ontario Act* as there are limited markets for recycling mattresses in the province.
- If no provincial program exists by 2021, implement a pilot project for voluntary recycling of mattresses and box springs at the City EnviroDepots at no cost while continuing to collect mattresses and box springs at the curb.

Data from the pilot project would be used to confirm the costs, operational needs and logistics of moving to a ban of mattress collection at the curb and whether to offer the program for free, on a partial recovery basis or on a full cost recovery basis. The cost of a one year pilot project is estimated to cost \$150,000 to \$250,000.

Mattress Recycling

- There are two mattress recycling facilities in Ontario (located in Barrie and Toronto).
- Over 90% of the material in mattresses and box springs can be recycled.
- The largest municipality with a recycling program is the City of North Bay. Residents must take mattress to a drop-off depot and are charged \$20 to cover costs.



4.3 CURBSIDE ORGANICS MANAGEMENT PROGRAM

Summary - Proposed Actions, Diversion and Costs

The proposed organics collection program for curbside homes is:

- Implement curbside Green Bin program
- Implement bi-weekly garbage collection

It is estimated that the proposed program will increase London's diversion rate by approximately 8% to 12% and have an annual operating cost \$3.9 to \$5.5 million.

Background

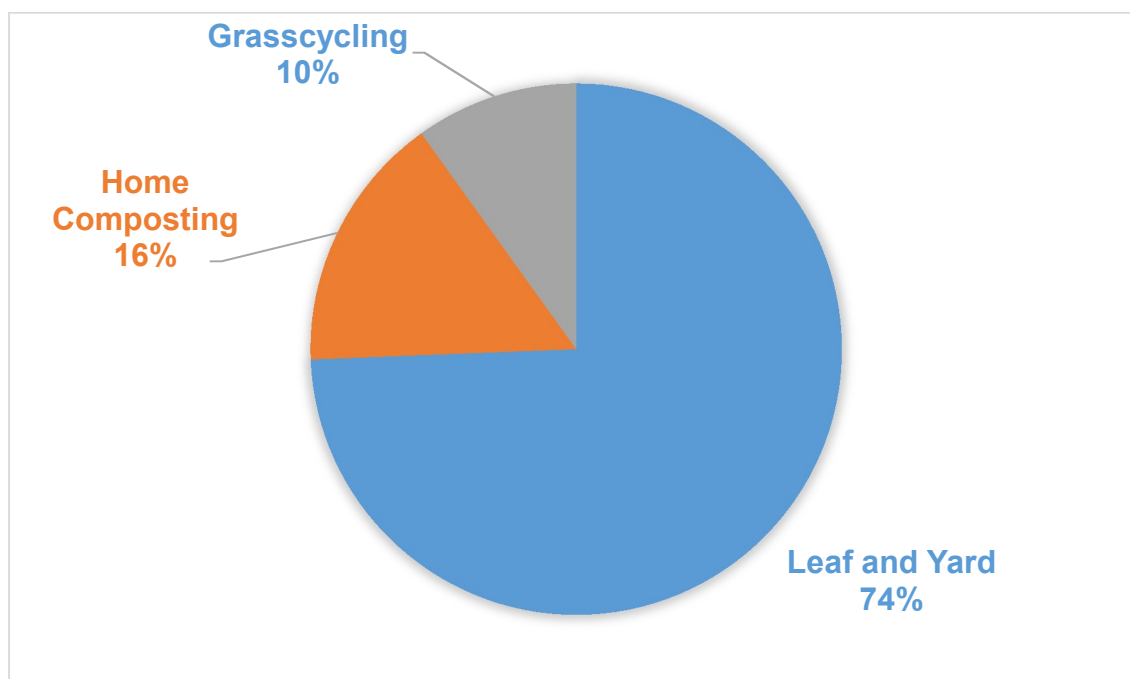
Existing Programs

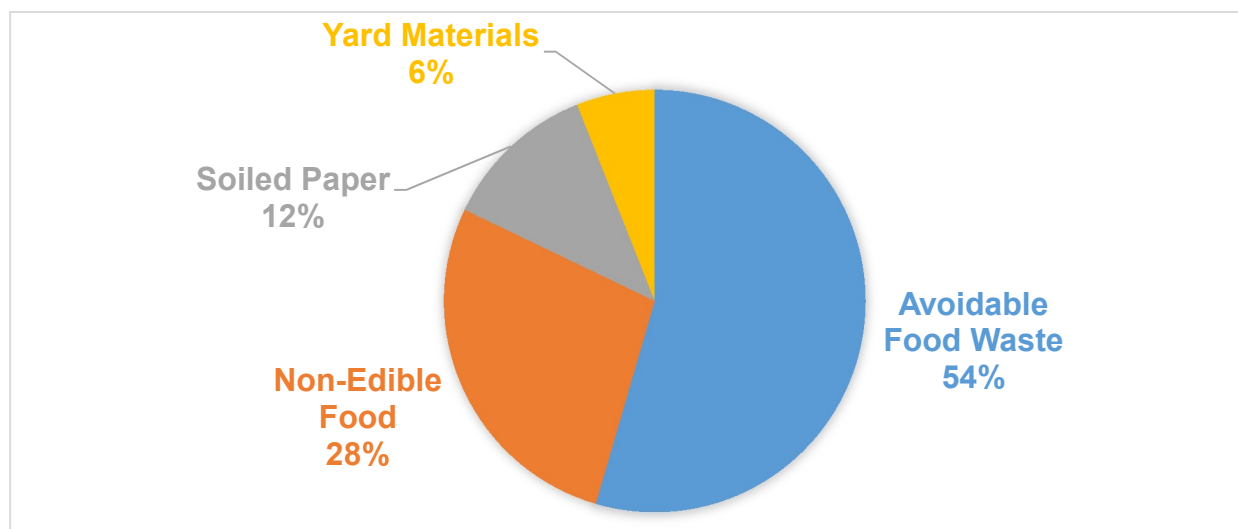
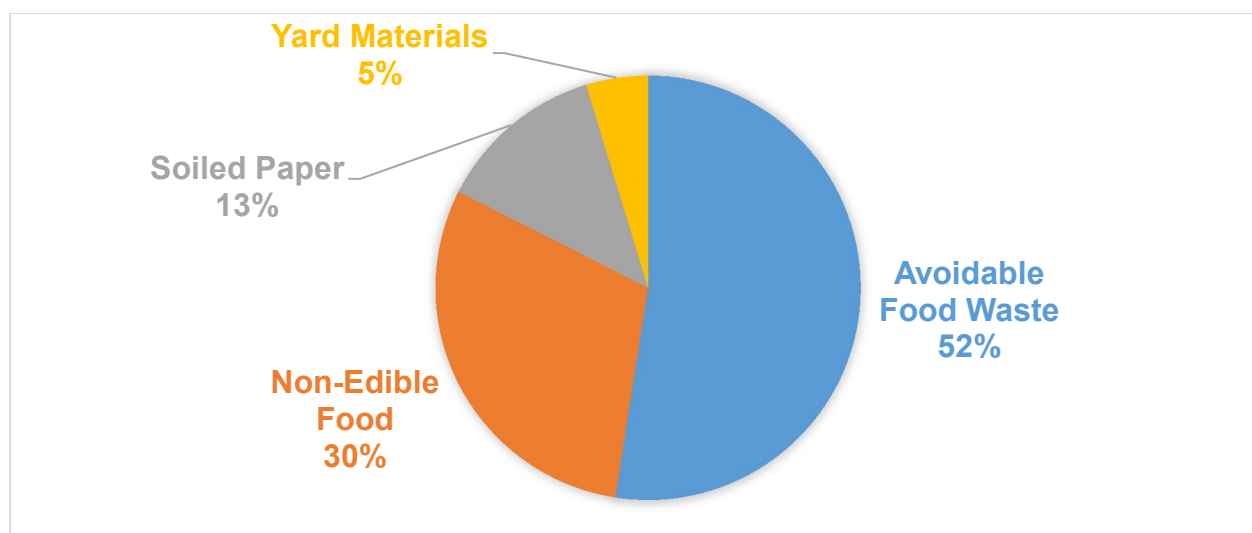
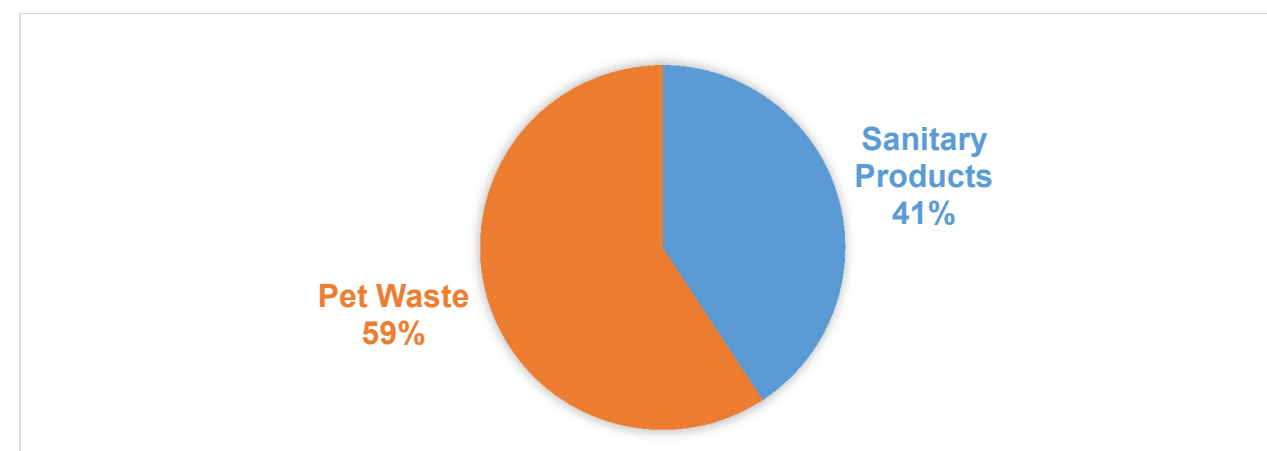
The City has a number of programs in place to divert organics from single family residences; home composting, grasscycling (ban on the collection of grass trimmings and pay-per-bag to drop-off grass at EnviroDepots), curbside collection of yard waste, drop-off of yard waste at EnviroDepots and a Christmas tree collection program. The City currently diverts 36,000 tonnes of organics. This represents 50% of commonly collected organics. Commonly collected organics refers to yard waste, food scraps, soiled paper, tissues, etc. but does not include pet waste and sanitary products.

Figure 5 provides a breakdown of the various types of organics in the waste stream.

Figure 5 – Organics Breakdown

5a) Organics Diverted 36,000 tonnes



5b) Commonly Collected Organics Curbside in the garbage - 27,000 tonnes**5c) Commonly Collected Organics Multi-Residential in the garbage - 9,000 tonnes****5d) Other Organics in the garbage - 14,000 tonnes (11,000 tonnes curbside, 3,000 tonnes multi-residential)**

Getting to 60% waste diversion will not be possible without an organics program because so much of the garbage currently collected is organics. As shown in Figure 5b and 5c, approximately 40% to 45% of garbage consists of “commonly collected organics” such as food waste and tissues/towelling and a further 15% of more “difficult to manage” organics like pet waste and sanitary products. Some of these organics will be reduced by proposed food waste avoidance, community composting and home composting programs (see Section 4.5) but the majority of organics will remain in the garbage without a city-wide collection program to divert this waste. Options for managing these organics are a Green Bin (source separated organics) program or a mixed waste processing program.

Green Bin Program – Homeowners place organics from their household in a “Green Bin” container which is collected separately from garbage. Green Bin programs typically capture 50% to 60% of the organics when garbage is collected bi-weekly and less if garbage is collected weekly. Details on existing programs in Ontario are presented in Appendix G.

The organics can be processed anaerobically or aerobically. Most existing processing facilities in the Province are at capacity or too far away to be practical. Available processing options for London include:

- Orgaworld (London)
- Seacliffe (Leamington, 2 hours away)
- Pre-process at Waste Management Resource Recovery Area beside the W12A Landfill site and ship to StormFisher (London) or several small farm digesters
- Build a facility in the Waste Management Resource Recovery Area beside W12A Landfill



Mixed Waste Processing – Garbage is separated into two or more waste streams for further processing. Further processing can include anaerobic or aerobic processing of an organics rich stream, capture of low quality recyclables, and production of a refuse derived fuel (RDF) or solid recovered fuel (SRF).

There are two permanent facilities in Canada (Edmonton and Halifax). There is one facility in Ontario that is piloting mixed waste processing (Canada Fibers Dongara High Diversion Facility in Toronto). It may be able to process London’s mixed waste and remove the organic fraction and other materials.



The City also has the option of building its own facility.

Food and Organic Waste Policy Statement

As discussed in Section 1.2, the Ministry of the Environment and Climate Change (now the Ministry of Environment, Conservation and Parks) issued the Food and Organic Waste Policy Statement on April 30, 2018. The document establishes the following targets and timelines:

- larger municipalities that currently do not have a Green Bin program (like the City of London) need to implement an organics management program that will achieve at least a 70 per cent waste reduction and resource recovery of food and organic waste generated by single-family dwellings by 2025.
- multi-residential buildings need to implement an organics management program that will achieve at least a 50 per cent waste reduction and resource recovery of food and organic waste by 2025.

The document states the:

“collection of source separated food and organics waste is the preferred method of servicing single family dwellings” but notes that “alternatives to the collection of source separated food and organics waste may be used if it is demonstrated that provincial waste reduction and resource recovery targets can be achieved efficiently and effectively”.

Mixed Waste Processing Pilot

In 2016, Canada Fibers bought the idle Dongara waste processing facility which previously had been used to process garbage into refuse derived fuel (RDF) pellets. The facility closed partly due to the regulatory and approval issues with using the RDF. Canada Fibers repurposed the facility and has run pilot projects using the facility as a mixed waste processing facility and as a material recovery facility. Toronto, Peel and London have all sent garbage to this facility to learn more about mixed waste processing. Details of the London pilot project are provided in Appendix H. Capture rates from the pilot project are summarized in Table 11. Estimated capture rates for a new purpose-built mixed waste processing area also provided in Table 11.

Table 11 - Summary of Mixed Waste Processing Pilot Capture Rates

Component	Canada Fibers MWP Facility	New Mixed MWP Facility
Organic Rich Fraction (including moisture loss)	25% to 30%	35% to 45%
Recyclables	3% to 5%	5% to 15%
RDF or upgraded to SRF	0% to 10%	0% to 20%
Total Percentage Captured ¹	30% to 40%	50% to 70%

Notes: 1. Cannot add maximum value for individual components. For example, facilities that maximize SRF production will have decreased organic rich fraction.

Comparison

A comparison of a Green Bin program versus a mixed waste processing program for managing curbside organics is presented in Table 12.

Table 12 - Comparison of Green Bin and Mixed Waste Processing Programs

Factor	Comment
Environmental	<ul style="list-style-type: none"> A mixed waste processing program potentially captures 25% to 80% more organics, reduces greenhouse gases (GHG) by a corresponding amount and opens up the possibility of producing solid recovered (SRF).
Financial	<ul style="list-style-type: none"> A Green Bin program costs approximately \$30 to \$45 per year to service a curbside household (about 124,000 households) compared to \$70 to \$115 per year to undertake mixed waste processing for the same households.
Social	<ul style="list-style-type: none"> Mixed waste processing program offers more convenience to residents (no change to how they manage waste).
Technical	<ul style="list-style-type: none"> The rules and regulations around mixed waste processing are evolving as current regulations do not explicitly address mixed waste processing or the products produced. There is limited experience with mixed waste processing in Canada. Past experience has not been positive in Canada and parts of North America. Facilities have either been closed (e.g., Three County (Total Recycling) System, Aylmer, Ontario; Plasco Energy Group, Ottawa, Ontario; SUBBOR, Guelph, Ontario; Dongara Pellet Plant, Vaughan, Ontario; Conporec Integrated Waste Management & Composting, Sorel-Tracy, Quebec; and several facilities in the United States) or retooled away from partially mixed waste processing or similar systems to source separated systems (e.g., City of Guelph wet/dry recycling; City of Moncton wet/dry recycling). This includes a recent decision in the City of Edmonton (March 2018) not to re-open its mixed waste processing facility in favour of progressing with a source separated organics collection program (see additional details on the next two pages). Modern mixed waste processing systems in Europe appear to have addressed many of the earlier challenges; however, the track record in North America is very limited at this time. This is expected to change in the next two to five years. Green Bin is the preferred method in the provincial Food and Organic Waste Framework and Policy Statement.

Recent information and/or decisions on mixed waste processing**[Extracts from]****Metro Vancouver, British Columbia**

To: Zero Waste Committee

From: Paul Henderson, General Manager Solid Waste Services

Date: May 29, 2013 Meeting Date: June 6, 2013

Subject: **Review of Mixed Waste Material Recovery Facilities**

CONCLUSION

Staff from Metro Vancouver and the City of Vancouver visited mixed waste processing facilities in California in late April 2013 to examine their governance, operation, and performance. Mixed waste processing facilities visited were found to be high cost and recover limited recyclables. Facilitating the development of private sector MWMRFs in Metro Vancouver would be inconsistent with the ISWRMP and disadvantage local recyclers that depend on source separated materials.

[Extracts from]**THE REGIONAL MUNICIPALITY OF PEEL****WASTE MANAGEMENT STRATEGIC ADVISORY COMMITTEE AGENDA**

DATE: Thursday, November 30, 2017

Mixed Waste Processing

Staff completed a feasibility study of Mixed Waste Processing to process Peel's garbage as a complement to source separation programs to help meet the Region's target of 75 percent 3Rs waste diversion.

Across North America (and within Canada) there are many examples of Mixed Waste Processing facilities that did not meet expectations. This is especially true of the low carbon fuel component but also true of the organics fraction. Removing grit and contamination from the organics fraction will not be easy but there are examples in Europe where this is done successfully, so staff believes it can be done. Producing low carbon fuel that consistently meets market specifications is even more difficult, with very few examples of this being done successfully.

- Mixed Waste Processing may not be able to successfully divert organics if the province applies new product quality requirements that preclude the use of material derived from mixed waste. The quality requirements applicable to the organic output of Mixed Waste Processing must be confirmed.
- The organic output of Mixed Waste Processing may not consistently meet product quality requirements, particularly for heavy metals, so long as items of household hazardous waste are present in the garbage. Programs or policies to eliminate household hazardous waste from the garbage should therefore be maintained and enhanced.

continued

Recent information and/or decisions on mixed waste processing

- Mixed Waste Processing may not be able to produce a marketable Low-Carbon Fuel product if the coal-burning industries are unable or unwilling to adjust their fuel quality requirements, particularly with respect to chlorine concentration.

Costs

In order to process all of its garbage, Peel would need to secure 250,000 tonnes per year of Mixed Waste Processing capacity. Options for securing Mixed Waste Processing capacity are developing a wholly Region-owned facility, partial ownership of a facility developed in partnership with other municipalities or private companies, and procuring capacity at a privately owned facility.

The capital cost of a 250,000 tonnes per year Mixed Waste Processing facility is estimated to be \$250 million, excluding land. The cost to operate and maintain the facility and manage output materials, excluding potential revenues from the sale of recyclables, Renewable Natural Gas or Low-Carbon Fuel, is estimated to be in the range of \$190 per tonne. All estimated costs are expressed in 2017 dollars.

[Extracts from]**CITY OF EDMONTON COUNCIL
MINUTES**

March 20, 2018 – Council Chamber

Waste Management Strategy Update

3. That Administration proceed with initial planning for a source-separated organics program for organic waste processing and collection, with planned implementation starting in Fall 2020 for the units receiving curbside collection.

Using limited cost information on mixed waste processing followed by either composting or anaerobic digestion, very preliminary estimates for London suggest the following:

- Capital costs for a 100,000 tonnes per year facility will be between \$50 and \$100 million (depending on what facilities would be new versus existing facilities); and
- Net operating costs, assuming reasonable revenues from recyclables, production of renewable natural gas and the sale of SRF, would be between \$100 and \$150 per tonne.

City are recommending that a curbside Green Bin is the best direction for London. More evidence is required on mixed waste processing in Ontario before the uncertainty around the technical and regulatory risks can be removed. For all the recent progress made in the field of mixed waste processing, there are as many if not more examples that highlight the challenges of this approach. For these reasons, City staff is recommending to proceed with a mixed waste processing pilot project in the multi-residential sector and continued monitoring of ongoing work in a few Ontario municipalities (e.g., Region of Peel, City of Toronto, Region of Durham, County of Oxford).

Previous cost estimates for a Green Bin program include: initial capital of \$12 million and on-going annual operating costs of \$3.9 million. These estimates are based on a weekly collection of organics comprised of food waste and tissues/paper towelling (diapers/sanitary products would not be included) and bi-weekly collection of garbage. It is estimated that 13,000 to 15,000 tonnes of organics would be collected per year. Almost all the material collected would be diverted.

A Green Bin program that includes pet waste and sanitary products is expected to collect 18,000 to 22,000 tonnes of material. Some of the material collected would not be diverted (e.g., plastic bags containing pet waste, portion of diapers). A preliminary estimate of costs of this type of program is approximately \$5 million annually.

It is expected that the cost of mixed waste processing may decrease in the future because of improved technology and potential revenues from producing renewable natural gas from the organics.

In the future a mixed waste processing program may be preferred if the technical and regulatory risks are addressed. For this reason, it is recommended that the City's Green Bin program be designed to offer flexibility to transition to a mixed waste processing program in the future.

Flexibility can be achieved by the City:

- not building its own processing facility for the organics from the Green Bin Program or entering into a long term contract (e.g., ten or more years) for processing capacity; and,
- having the processing contract(s) match the expected service life of the trucks (about seven years).

Garbage Collection Frequency

Nine of the 13 largest Ontario municipalities with a Green Bin program have transitioned to bi-weekly garbage collection (Table 13), and at least two of the other programs are reviewing the option to go to bi-weekly collection. Municipalities have found that the amount of organic material collected increases by 50% to 100% with the introduction of bi-weekly garbage collection. Collection of Blue Box recyclables also increases with the introduction of bi-weekly garbage collection.

It is recommended that London switch to bi-weekly, same day garbage collection and weekly recycling collection with the introduction of source separated organics collection.

Implementation Plan

If the City proceeds with a Green Bin program, an implementation plan will be developed to refine

cost estimates, determine operational requirements and finalize an implementation schedule. Decisions on operational requirements are presented in Table 14.

Table 13 - Garbage Collection Frequency for Large Municipalities with Green Bin Collection

Frequency of Garbage Collection	Municipalities
Weekly	Hamilton ¹ , Niagara ¹ , Simcoe County, Kingston
Bi-weekly	Durham, Halton, Ottawa, Toronto, Peel, Waterloo, York, Guelph, Barrie

¹ Reviewing bi-weekly

Table 14 - Green Bin Operational Decisions

Operational Decisions	Options
What is collected?	<ul style="list-style-type: none"> Commonly collected organics (food waste and tissues/paper toweling) Yard waste (none or top up cart) Other organics (pet waste and sanitary products)
How it is collected?	<ul style="list-style-type: none"> Co-collected with garbage Separate collection vehicles (e.g., one person side loaders)
Who processes material?	<ul style="list-style-type: none"> Private facility (e.g., Orgaworld) Pre-process at Waste Management Resource Recovery Area and ship to anaerobic digester (e.g., StormFisher) Build City facility operated by the private sector
Bin size	<ul style="list-style-type: none"> Small (35 to 45 litre) Medium (50 to 60 litre) Large (greater than 60 litre); will require semi-automatic or automatic collection
Liners/bags	<ul style="list-style-type: none"> Paper (paper bags, paper towels, newspaper) Compostable plastics Plastics (typically only allowed if collecting pet waste and/or sanitary products)

The draft implementation schedule for a curbside Green Bin Program is identified on Table 15.

Table 15 - Draft Green Bin Implementation Schedule

Date	Task
January 2019	Finalize Operational Details
February 2019	Finalize Costs and Approval of Authorization to Spend Funds from Approved Capital Budget
Spring 2019	Request for Proposals (RFP) for Processing of Green Bin Materials
Winter 2019/2020	Award Processing Contract Release Request for Tenders (RFT) for new Waste Collection Vehicles
Spring 2020	Award Collection Vehicle Contract Release RFT for Supply and Delivery of Green Bins
Fall 2020	Award Green Bin Supply Contract
Spring/Summer 2021	Start of Major Promotion and Awareness Program Distribution of Green Bins
Fall 2021	Begin Roll-out of Program

4.4 MULTI-RESIDENTIAL ORGANICS MANAGEMENT PROGRAM

Summary - Proposed Actions, Diversion and Costs

The proposed organics collection program for multi-residential homes is a:

- Mixed waste processing pilot on a portion of the waste from multi-residential homes

It is estimated that the proposed program will increase London's diversion rate by approximately 0.5% to 0.7% and have an annual operating cost \$0.4 to \$0.7 million. The learnings from the pilot project will help the City in future decisions about whether or not to implement a full scale mixed waste processing program in multi-residential buildings and/or curbside homes.

Background

Municipal Program versus Individual Building Programs

The provincial Food and Organic Waste Policy Statement requires individual multi-residential buildings and not the municipality to provide an organics management program by 2025. This requirement is similar to the requirement for multi-residential buildings not the municipality to provide a Blue Box program.

Most municipalities, including London, do provide Blue Box programs for multi-residential buildings because of the improved service and lower programs costs that are possible through “economies of scale” and having a consistent service for all citizens in the municipality. Some larger municipalities in Ontario already provide an organics management program to multi-residential buildings and are expected to continue to do so in the future.

Considering the above, it is recommended that the City provide an organics management program for multi-residential buildings.

Comparison

Just as in the curbside program, a Green Bin program is less expensive and offers less technical and regulatory risk where as a mixed waste processing program offers more convenience to residents and will capture more organics.

A multi-residential Green Bin program is much less effective in terms on increasing waste diversion, than a comparable curbside Green Bin program, (see Table 16). For this reason it is not recommended to proceed with a multi-residential Green Bin program.

Table 16 - Comparison of Typical Curbside and Multi-Residential Green Bin Programs

Consideration		Curbside	Multi-Residential
Capture Rate		50% to 60%	20% to 25%
Cost per Tonne Diverted		\$250 to \$350	\$500 to \$600
Contamination Levels	Commonly Collected Organics	2% to 5%	5% to 15%
	All Organics	5% to 15%	15% to 25%

A multi-residential mixed waste processing program is preferred but for all the recent progress made in the field of mixed waste processing, there are as many if not more examples that highlight the challenges of this approach. This is why it is recommended to proceed with a small scale one to two year pilot project in the multi-residential sector and

to continue to monitor work being undertaken in a few key Ontario municipalities (e.g., Region of Peel, City of Toronto, Region of Durham, County of Oxford).

The pilot project will allow to the City to confirm operational requirements, determine technical constraints and consult with the MECP about regulatory requirements. The learnings from the pilot project will help City in future decisions about whether or not to implement a full scale mixed waste processing program in multi-residential buildings and/or curbside homes.

Preliminary details for a mixed waste processing pilot are presented below:

- include both low-rise and high-rise buildings;
- process approximately 15% of multi-residential waste (60 tonnes waste per week);
- cost approximately \$500,000 per year (between \$330 and \$550 per tonne diverted); and
- divert between 900 tonnes per year (30%) and 1,500 tonnes per year (50%) of the waste to beneficial uses

4.5 OTHER NEW ORGANICS MANAGEMENT PROGRAMS

Summary - Proposed Actions, Diversion and Costs

The following additional organics management programs are proposed:

- Food Waste Avoidance – Develop a food waste avoidance strategy;
- Home Composting - Reduce the cost of composters at the EnviroDepots and undertake additional sale events at select community locations; and
- Community Composting – Provide financial support to community groups or environmental organizations that want to set up a community composting program.

It is estimated that approximately 0.3% to 0.6% of residential waste will be diverted by the above measures and cost \$250,000 to \$350,000 per year.

Background

Food Waste Avoidance

On average London households throw out 105 kilograms per year of avoidable food waste (i.e., food that at one point could have been eaten). The monetary value of this wasted food is estimated to be between \$450 to \$600 per household annually which is worth between \$60 to \$100 million city-wide, per year. This food waste also represents a considerable part of our household carbon food print not to mention lost nutrition. Food waste avoidance entails better management of the food that we buy so that less of it ends up in the garbage. In short, this means optimizing household food planning, purchase, storage, preparation and serving of food.

The City in conjunction with Western University, PhD Candidate Paul van der Werf and 2cg Consulting piloted two outreach projects for reducing the amount of avoidable food waste thrown into the garbage.

Pilot Project #1 focused on reminding people of the annual value of household food waste using a 'Reduce Food Waste, Save Money' campaign. Homeowners were provided with a package of information including a fridge magnet with tips and over the pilot project study period were sent a series of email messages reinforcing the saving money theme, each highlighting a unique food waste reduction tip and directing households to the www.foodwaste.ca website for more detailed information.

Pilot Project #2 provided households with a range of containers they could use to manage their food. The kit included plastic containers, mason jars, and Ziploc bags. This included a fridge magnet with food saving tips, a grocery list note pad and freezer bag stickers. These households also had access to the www.foodwaste.ca website.

The lower cost program, Pilot Project #1, was determined to be more effective in reducing the amount of avoidable food waste thrown into the garbage.

Based on research, local data in London, community feedback and survey data, it is recommended that the City:

- develop a food waste avoidance program in 2019 based on a 'Avoid Food Waste, Save Money' campaign

For planning purposes it is estimated that a food waste avoidance program will result in a 10% reduction in food waste in 10% to 30% of London households and will cost \$150,000 to \$200,000 per year. This would divert 200 to 600 tonnes of food scraps and save residents \$900,000 to \$2,700,000.

It is noted that the food waste reduction program has the potential to reduce significantly more food waste. This would result in additional savings for residents and increased greenhouse gas reductions but have a smaller impact on increased diversion as it is expected that the food waste going to the Green Bin would decrease as food waste avoidance increased. This would however reduce the cost of the Green Bin program.

Home Composting

Home (or "backyard") composting has played an important role in waste reduction in London since the mid-1990s. Between 1995 and 1999 the city of London participated in a provincial grant program to provide subsidized home composters to residents. Through this program, the City sold approximately 53,000 subsidized composters. Since 2007 the City has sold composters at cost from the EnviroDepots. The units are sold for \$35 and approximately 400 to 800 units per year are sold. Home composting is promoted on the City's website and through information flyers.

Two pilot projects were undertaken in 2013 to learn more about the potential to increase waste diversion by increasing home composting. The pilot projects tested strategies to increase the uptake of home composting units by residents. One pilot project in Northridge involved door-to-door sales of composters at a subsidized rate (\$10 per composter). The other pilot project in Old South included the pre-order and pick up at a local community school and a higher price for the composters (\$20 per composter).

It is estimated that home composting currently diverts between 5,000 and 6,000 tonnes of material annually and approximately 40% to 50% of households do some composting.

Initial estimates suggest that an additional 500 to 1,500 tonnes per year of food scraps could be diverted (up to 1% increase in overall diversion) with an aggressive home composting program modeled on the Northridge pilot project. It is estimated that it would take 3 years to canvass the City and cost approximately \$400,000 to \$500,000. Similarly, initial estimates suggest that less than 500 additional tonnes would be diverted (less than 0.5% increase in overall diversion) with a home composting program modeled on a local community pick up location. It is estimated this program would cost approximately \$40,000 to \$100,000.



It may be possible to increase home composting by reducing the cost of the home composter at the EnviroDepots to \$20, \$10 or free and doing additional promotion and outreach. Reducing the cost of composters to \$20 per unit would cost \$10,000 to \$50,000 per year. Reducing the cost of composters to \$10 would cost \$20,000 to \$100,000 per year. It is expected that reducing the cost of composters would result in less than 500 additional tonnes being diverted (less than 0.5% increase in overall diversion).

It is recommended that the City:

- reduce the cost of composters at the EnviroDepots from \$35 to \$20 per unit for one year to determine the impact on up-take of composters and estimated waste diversion; and,
- undertake additional sale events at \$10 per unit at several community locations (e.g., community centres) and community events (e.g., Home County Music and Art Festival) for one year to determine the impact on waste diversion.

A decision on whether or not to continue the programs would be made following the first year. For planning purposes it is assumed that the above measures will continue on, result in an annual diversion of 300 tonnes and cost \$80,000 to \$100,000 per year to operate.

Community Composting

The City could consider composting operations in locations where community members can compost their garden or kitchen waste using large bin composters, small scale in-vessel composters or vermicomposting. Organic waste collection bins could be located at different participating sources, e.g., churches, community gardens, coffee shops, etc. Collected waste would be dropped off to the community composting area. Final compost could be used in community gardens or for local landscaping needs.

The City of Toronto provides funding to FoodShare, a non-profit food security organization that supports Toronto Compost Leaders, a grass roots initiative to build community composting capacity in multi-residential buildings using food waste. No other large municipality in Ontario has a formal community composting program.

Community composting may require provincial approvals depending on the location and where the food waste is coming from.

It is recommended that the City:

- set aside funding for community groups or environmental organizations that want to set up a community composting program; and
- funding would cover 100% of capital costs.

It is suggested that City set aside \$10,000 to \$20,000 per year to support community composting initiatives. For estimating purposes, it is assumed that 10 community composting sites will be established by 2022 diverting approximately 20 to 40 tonnes per year.

4.6 WASTE REDUCTION AND REUSE INITIATIVES AND POLICIES

Summary - Proposed Actions, Diversion and Costs

The following waste reduction and reuse initiatives and policies are proposed:

- create a Waste Reduction and Reuse Coordinator position within the Solid Waste Management Division;
- \$150,000 to 250,000 per year in increased funding be allotted to waste reduction and reuse initiatives;
- reduction of the container limit to 2 or 3 containers per collection when the Green Bin program with bi-weekly garbage collection is implemented;
- further explore the use of clear bags for garbage collection if London does not move to roll-out cart based garbage collection system;
- further explore a full user pay garbage system if London moves to roll-out cart based garbage collection system;

- further examine other incentive and disincentive initiatives (best practices) from other municipalities (e.g., mandatory recycling by-law, reward systems, user fees, etc.); and
- include the calculation of waste reduction in addition to waste diversion when providing waste management progress reports to Council.

In addition to the City measures, it is expected that additional province wide measures as part of their Waste-Free Ontario Strategy will be undertaken and many residents will take additional actions on their own to reduce their waste.

It is estimated that the above measures will cost the City \$150,000 to \$350,000 per year. For planning purposes, it is estimated all waste reduce and reuse initiatives and policies will divert approximately 1% to 4% of residential waste.

Background

Waste Reduction and Reuse Initiatives

There are numerous initiatives that could be introduced that focus on raising awareness and engaging citizens to make small changes in their daily life to reduce waste and increase reuse of materials. Initiatives include lending libraries, repair workshops, promotion of reuse events and increased waste reduction education and outreach.

As some of the initiatives listed above are already underway in London through other organizations, the City could explore options to build partnerships with these organizations. This could include providing financial support for new waste reduction and reuse programs and initiatives.

The most effective way of increasing diversion through waste reduction and reuse is often by increasing community engagement, education and providing feedback to residents. The impact of any one community engagement or education initiative may not be significant but together these small changes contribute to cultivating a culture of waste reduction and over time could make a significant difference to how we manage resources. To accomplish this, it is proposed to increase funding and staff resources for waste reduction and reuse initiatives.

Waste Reduction Success Story

In 2007, the Ontario government introduced a goal to reduce the number of carry-out plastic bags in the province by 50% by 2012.

A number of initiatives were introduced by industry and municipalities including promotion of reusable bags and bins, improved bagging practices at check-outs, charging for plastic bags.

By 2009 there was a 70% drop in Ontario's per-capita use of plastic bags.

It is hoped the City's initiatives coupled with any provincial and industry initiatives will reduce per capita garbage going to landfill. Currently, overall the diversion rate is reported to council on a regular basis. The diversion rates for specific programs are also provided to Council as required. It is not possible to measure the reduction/reuse achieved by individual initiatives but is possible to calculate

the overall change in per capita waste generation from year to year. Including this measure in future reports to Council will allow us to track progress being made in waste reduction and reuse and highlight their importance.

Summary

It is recommended that the City:

- create a Waste Reduction and Reuse Coordinator position within the Solid Waste Management Division;
- \$150,000 per year in increased funding be allotted to waste reduction and reuse initiatives; and
- the City include the calculation of waste reduction in addition to waste diversion when providing waste management progress reports to Council.

Waste Reduction and Reuse Policies

Although there are high levels of resident participation in City diversion programs, participation is voluntary, and does not require residents to first minimize the quantity of waste being generated in the home. There are a number of "behaviour change initiatives" that could be undertaken to encourage both waste reduction (i.e., not produced in the first place) and waste diversion of recyclables and compostables. As waste diversion programs mature and all practical programs have been implemented, behaviour change initiatives become the key tools remaining to increase diversion.

Some of these programs are not costly to implement and may generate revenue (e.g., user pay for garbage) or reduce costs (e.g., lower container limits). Other programs would require support by businesses and residents, and could range from tougher enforcement of waste by-laws (e.g., garbage container and weight limits) to City policies and by-laws that would impact how business is conducted and consumers must abide by (e.g., restricting/banning certain business transactions). Some residents and businesses may see these programs as inconvenient or "going too far".

Below are some common behaviour change/adjustment initiatives that may have a role in London in the future. Most of these initiatives will require a change to current Council policies and practices and be implemented through a by-law.

Bag Limits

Reducing the container limit encourages participation in the various waste diversion programs as well as reducing garbage generation.

The City of London currently has a 3 Container Limit (included in taxes) for garbage collection for single family households. The City's container limit takes into consideration the longer cycle times between collections which varies from 8 to 12 days throughout the year. This is equivalent to 1.8 containers per week for a 12 day cycle to 2.6 containers per week for an 8 day cycle with an average of 2.4 containers per week over the entire year.

Most large Ontario municipalities with a source separated organics program have a garbage container limit equivalent to one or two containers per week. It is recommended that the City implement a 2 or 3 Container Limit per collection if the City implements a source separated organics collection program with bi-weekly garbage collection.

Residents will still have the option of paying to dispose of extra garbage at the curb or the EnviroDepots.

Clear Bags

Some municipalities have residents use clear bags so that recyclables or compostables could be easily spotted in the garbage. This is more common in the Maritimes but the City of Markham has had a clear bag program for five years and credits this program for a significant reduction in the amount of garbage and an increase in recycling and composting. London is currently looking at garbage collection options including collection of garbage in roll-out carts. A clear bag program is not compatible with a roll-out cart program for garbage collection.

London should further explore the use of clear bags for garbage collection if London does not move to a roll-out cart based garbage collection system.

User Pay

Some smaller municipalities have gone to full user pay systems where residents pay for every container of garbage placed to the curb. Full user pay systems encourage participation in the various waste diversion programs as well as reducing one's garbage generation.

A full user pay system is typically not practical in larger municipalities unless the municipality has a cart based garbage collection system. In Toronto, residents pay an annual fee ranging from \$255 to \$487 per year per household depending on the size of cart they select.

A full user pay garbage system should be explored further if London moves to roll-out cart based garbage collection system.

Other Incentive and Disincentive Programs

The vast majority of Londoners participate in various diversion programs although there are those that refuse to participate in these voluntary programs. There are various incentive and disincentive programs that will encourage greater participation.

For example, the City could explore developing a mandatory by-law for the diversion of materials for which there are recycling or composting programs. Enforcement of the by-law may require additional staff. Mandatory diversion by-laws usually work best in conjunction with a clear garbage bag program.

Alternatively, some municipalities ban recyclables or other materials from garbage collection. The City currently has banned a number of materials from garbage collection including renovation materials, grass clippings, blue box recyclables, scrap metal, electronics, tires and yard materials. These materials were banned because reasonably convenient recycling options exist. As new programs are developed, consideration could be given to banning materials accepted by these programs.

There are incentive programs that the City could consider to encourage greater program participation like the Gold Box program in Hamilton or Recycle Bank (rewards program) in the United States.

Summary

It is recommended:

- reduction of the container limit to 2 or 3 containers per collection when the Green Bin program with bi-weekly garbage collection is operational;
- further explore the use of clear bags for garbage collection if London does not move to a roll-out cart based garbage collection system;
- further explore a full user pay garbage system if London moves to roll-out cart based garbage collection system; and
- further examine other incentive and disincentive initiatives (best practices) from other municipalities (e.g., mandatory recycling by-law, reward systems, etc.).

4.7 ENVIRONMENTAL, SOCIAL AND COST SUMMARY

In summary, this report proposes the set of actions identified on Table 17 to achieve 60% waste diversion. By taking these actions, the City and Londoners receive a number of environmental social and financial benefits which are listed below.

Environmental Benefits

1. Increased Waste Diversion

The Province's *Strategy for a Waste-Free Ontario: Building the Circular Economy* in February 2017 identifies two key aspirational long term environmental goals. One of these environmental goals is zero waste. Going from 45% to 60% waste diversion is a significant step towards this goal.

2. Reduced GHG

The other key aspirational long term environmental goal identified by the Province is zero GHG emissions from the waste sector. The measures in this Action Plan will reduce GHG emissions by 17,000 to 27,000 tonnes annually. This is equivalent to removing 4,200 to 6,800 cars from the road.

Table 17 - Proposed Actions to Achieve 60% Residential Waste Diversion

Blue Box (Blue Cart) Programs	
1.	Increase capture of recyclables from 63% to 75% (less placed in the garbage)
New (or Expanded) Recycling Programs and Initiatives	
2.	Bulky Plastics <ul style="list-style-type: none"> a) Continue with existing pilot project b) Consider implementation of an expanded program once long term stable markets have developed
3.	Carpets <ul style="list-style-type: none"> a) Wait to see if the Province develops a provincial program for carpets under the <i>Waste-Free Ontario Act</i> as there are limited markets for recycling carpets in the province b) If no provincial program exists by 2021, implement a pilot project
4.	Ceramics <ul style="list-style-type: none"> a) Provide a drop-off location for ceramics at no cost at the City's EnviroDepots b) Ban collection of toilets at the curb
5.	Clothing and Textiles <ul style="list-style-type: none"> a) develop a textile awareness strategy to promote existing reuse opportunities b) pilot depot collection at select multi-residential buildings
6.	Small Metal (Small Appliances/Electrical Tools/Scrap Metal) <ul style="list-style-type: none"> a) implement semi-annual curbside collection of small metal items b) pilot depot collection at select multi-residential buildings
7.	Furniture <ul style="list-style-type: none"> a) Begin semi-annual collection of wooden furniture b) Provide a drop-off location at W12A EnviroDepot for wooden furniture c) Ban wooden furniture from curbside garbage collection
8.	Mattresses <ul style="list-style-type: none"> a) Wait to see if the Province develops a provincial program for mattresses under the <i>Waste-Free Ontario Act</i> as there are limited markets for recycling mattresses in the province b) If no provincial program exists by 2021, implement a pilot project
Curbside Organics Management Program	
9.	Implement a curbside Green Bin program
10.	Implement bi-weekly garbage collection
Multi-Residential Organics Management Program	
11.	Implement a mixed waste processing pilot (to recover organics and other materials) on a portion of the waste from multi-residential homes

Table continues

Table 17 - Proposed Actions to Achieve 60% Residential Waste Diversion

Other New Organics Management Programs
<ul style="list-style-type: none"> 12. Develop and implement a food waste avoidance strategy 13. Reduce the cost of composters at the EnviroDepots and undertake additional sale events at select community locations 14. Provide financial support to community groups or environmental organizations that want to set up a community composting program
Waste Reduction and Reuse Initiatives and Policies
<ul style="list-style-type: none"> 15. Create a Waste Reduction and Reuse Coordinator position within the Solid Waste Management Division 16. Provide financial support for community waste reduction and reuse initiatives 17. Reduce the container limit to two or three containers per collection when the Green Bin program with bi-weekly garbage collection is operational 18. Further explore the use of clear bags for garbage collection if London does not move to a roll-out cart based garbage collection system 19. Further explore a full user pay garbage system if London moves to a roll-out cart based garbage collection system 20. Further examine other incentive and disincentive initiatives (best practices) from other municipalities (e.g., mandatory recycling by-law, reward systems, user fees, etc.) 21. Provide additional feedback approaches to residents (including how waste reduction and waste diversion are calculated when providing waste management progress reports)

3. *Reduced Landfill Impacts*

Reducing the amount of waste going to the W12A Landfill will reduce nuisance impacts such as traffic, litter, vermin, noise and odours; and the amount of additional land and/or height of the proposed expansion of the W12A Landfill.

4. *Better Use of Material and Resources*

Materials diverted will be turned into useful products instead of being landfilled. For example, if organics from a Green Bin program were composted, it would result in the production of approximately 350,000 to 500,000 bags of compost with a market value of \$700,000 to \$1,100,000. If the organics were anaerobically digested, it would result enough biogas to generate 1 to 1.5 million m³ of renewable natural gas.

Social Benefits

5. *Creation of Jobs*

Studies have also shown that Ontario's existing waste diversion programs can create up to 10 times more jobs than waste disposal. The MECP estimates that for every 1,000 tonnes of waste diverted in Ontario, seven jobs are created through the existing waste diversion programs. California's Department of Resources, Recycling and Recovery estimates that up to 5 jobs every 1,000 tonnes of waste diverted. These

“rules of thumb” suggest that approximately between 125 and 170 jobs will be created (direct and indirect; within and outside London).

6. *Social Satisfaction*

Undertaking the proposed actions in this plan, will allow many residents to feel additional satisfaction or pride living in an environmentally progressive city.

Financial Benefits

7. *Short-term Landfill Savings*

Reducing the quantity of waste to the landfill reduces the capital and operating cost of the landfill.

The average capital and operating cost for the W12A Landfill is estimated to be approximately \$30 to \$40 per tonne. Some of these costs are variable costs that vary directly with the quantity of waste going to the landfill. In other words, the cost goes up the same amount for every additional tonne of waste going to the landfill. An example of this would be leachate collection system costs.

Some of the costs are fixed costs and do not change with the quantity of waste going to the landfill. An example of this would be groundwater monitoring costs.

It is estimated that the average landfill savings for each tonne of waste diverted from the landfill after accounting for fixed costs and variable costs is approximately \$15 to \$20 per tonne.

The annual landfill savings is projected to be approximately \$360,000 to \$480,000 per year. The majority of these savings would be in capital costs (about 75%) which could be used to reduce the annual contribution from general taxes required for the Sanitary Landfill Reserve Fund. City staff are recommending that W12A Landfill costs and savings be handled separately as more details become known through the environmental assessment process and current and future capital cost impacts associated with landfill operations.

8. *Avoid Increase in Long Term Disposal Costs*

The existing landfill has less than 11 years of capacity remaining and it is expected that approval of any expansion of the landfill by the MECP would be unlikely unless the City has programs in place to achieve 60% waste diversion.

The increase in waste disposal costs will be significant if the City must export its waste to a private landfill elsewhere in Ontario. The increase in disposal costs for the City to export its waste is estimated to be approximately \$5 to \$7 million per year.

Cost Summary

The approximate cost, expected diversion and timeline for implementation for the actions listed in Table 17 are summarized in Table 18. The cost to implement the 60% Waste Diversion Action Plan is estimated to range from \$5.05 to \$7.45 million with the most likely cost being \$6.5 million.

Table 18 - Summary of Diversion, Estimated Operating Costs and Schedule

Program Category	Diversion Rate		Annual Estimated Operating Cost			Schedule
	Range	Likely	Range	Likely	\$/Hhld ^a	
Blue Box Recycling Improvements	1% - 3%	2%	\$0	\$0	\$0	Likely not under City control ^b in the future
New Recycling Programs and Initiatives	0.4% - 0.8%	0.6%	\$350,000 - \$550,000	\$450,000	\$2.00 - \$3.00	2019 ^c - 2021
Curbside Organics Management Program	8% - 12%	10%	\$3,900,000 - \$5,500,000	\$5,000,000	\$21.75 - \$30.50	2020 - 2022
Multi-Residential Organics Management Pilot Program	0.5% - 0.7%	0.6%	\$400,000 - \$700,000	\$500,000	\$2.25 - 4.00	2020
Other Organic Management Programs	0.3%-0.6%	0.4%	\$250,000 - \$350,000	\$300,000	\$1.50 - \$2.00	2019 ^c - 2021
Waste Reduction, Reuse Initiatives and Policies	1% - 4%	1.4%	\$150,000 - \$250,000	\$150,000	\$0.50 - \$2.00	2019 ^c - 2021
Total^c	11% - 21%	15%	\$5,050,000 - \$7,450,000	\$6,500,000 (\$36.00)	\$28.00 - \$41.50	2019^c - 2022

Notes:

- a) Based on 180,000 households.
- b) The provincial Waste-Free Ontario Strategy calls for a transition from the current Blue Box program, which is municipally managed and co-funded by industry and municipalities, toward a full EPR program by 2023. The EPR program will require producers to take full financial and operational responsibility for all Ontario municipal Blue Box programs.
- c) 2019 Multi-year budget has \$140,000 assigned to new waste diversion initiatives.
- d) Totals may not add due to rounding.

Table 19 provides a comparison of waste management system costs for London and other municipalities that are part of the Municipal Benchmarking Network Canada initiative. The table also highlights London's expected costs after implementation of the 60% Diversion Action Plan.

Table 19 – 2016 Municipal Waste Management Costs^a

Municipality	Cost per Tonne		Cost per Household		
	Collection & Disposal	Diversion	Collection & Disposal	Diversion	Total
Calgary	216	346	150	89	239
Durham	324	205	127	106	232
Halton	248	201	97	106	203
Hamilton	344	151	150	69	218
Montreal	230	249	129	82	211
Niagara	195	138	90	102	192
Regina ^b	150	331	150	59	209
Sudbury (Greater)	349	181	168	92	260
Toronto	240	442	90	158	248
Waterloo	226	195	142	94	236
Windsor ^b	204	123	118	45	163
Winnipeg ^b	107	260	83	82	165
Average	236	235	124	90	215
London (existing programs) ^b	121	123	89	50	139
London (60% - likely cost) ^c	156	161	87	87	174
London (60% - high cost) ^d	156	171	87	92	179

Notes

- a) From Municipal Benchmarking Network Canada. Includes all costs including amortization, landfill liability costs and municipal overhead. Includes Blue Box recycling revenue but excludes all other revenue (e.g., landfill tipping fees, WDO funding, waste collection fees, EnviroDepot fees, etc.).
- b) No Green Bin program.
- c) City of London current program cost with Likely Cost from the 60% Waste Diversion Action Plan (Table 18).
- d) City of London current program cost using the High end of the Range from the 60% Waste Diversion Action Plan (Table 18).

Table 19 shows that if London implemented all parts of the 60% Waste Diversion Action Plan using the Likely costs estimate of \$6.5 million it would have the 3rd lowest overall waste system cost on a per household basis and lowest cost among municipalities that have a Green Bin program. It would also be one of the few municipalities to reach 60% waste diversion.

Using the High end of the Range (\$7.25 million) from the 60% Waste Diversion Action Plan (Table 18) London would still have the 3rd lowest overall waste system cost on a per household basis and lowest cost among municipalities that have a Green Bin program.

Funding 60% Waste Diversion

Potential funding sources to lower the annual cost of \$5.05 to \$7.45 million by \$1.8 to \$3 million per year are highlighted below.

Operating Costs

As shown in Table 18, annual operating costs for the 60% waste diversion action plan will range from \$5.05 million to \$7.45 million and will depend on final program design, market competition, etc. The most likely annual operating cost is estimated to be \$6.5 million.

City staff continue to examine a number of financing approaches. The change in government in Ontario has created additional uncertainty as a number of potential revenues sources for waste diversion are on hold. Besides taxes, potential sources of revenue currently include:

- Additional recycling program costs paid by industry - potential cost savings from expected transition from the current Blue Box program, which is municipally managed and co-funded by industry and municipalities, toward a full EPR program paid 100% by industry by 2023. This is expected to reduce the City's current waste diversion program costs by \$1.5 to \$1.8 million. In addition there is the potential of one time capital funding for recycling infrastructure.
- Other extended producer responsibility revenues - for items such as branded organics (e.g., diapers, soiled paper, tissues/toweling) carpets, textiles, furniture and other consumer goods. This sources could range between \$50,000 and \$150,000 per year.
- W12A Landfill levy to support diversion - a specific amount charged on every tonne of garbage that is placed in dedicated fund for waste reduction and waste diversion. The amount that could be collected is based on many factors (e.g., which garbage is it applied to, what fee, etc.). Levies between \$2 and \$20 per tonne are noted in some jurisdictions. This source could range between \$250,000 and \$1 million per year.
- Greenhouse gas offset credits associated with organics diversion - The Government of Ontario was working on introducing an emissions offset protocol for aerobic composting into Ontario's Cap & Trade program, based on an existing protocol used in Alberta (e.g., five composting projects currently listed on the Alberta Emissions Offset Registry). The

- value of these offsets would have been between \$100,000 and \$500,000 per year based on an assumed value of around \$20 per tonne of GHG emissions offset (and increasing over time). It is unclear at this time how/if this funding opportunity will be replaced.

A summary of estimated operating costs and potential annual funding is identified on Table 20.

Table 20 – Summary of Estimated Costs and Potential Funding

	Low	High	Likely (Anticipated)
Costs (Table 18)	\$5,050,000	\$7,450,000	\$6,500,000
Revenues	\$1,800,000	\$2,950,000	\$2,000,000
Total Estimated Costs			\$4,500,000

Capital

Capital costs for the 60% Waste Diversion Action Plan will depend on program design, technology considerations, etc. The largest capital expenditure will be for the Green Bin Program. A capital cost of \$12 million for the Green Bin program had previously been estimated (January 2016, Multi-year Budget deliberations). Other waste diversion initiatives listed in the Action Plan may require new investment in the order of \$500,000 to \$3 million for a total of \$12.5 to \$15 million in capital expenditures.

It is expected that capital costs for the 60% Waste Diversion Action Plan will be able to be funded from the existing capital budget. The current ten-year capital program includes \$35 million in 2020 for new solid waste diversion technologies to increase diversion. After allocating up to \$15 million for the Action Plan, there would be \$20 million left for advanced waste diversion and/or resource recovery technologies.

5) RESOURCE RECOVERY STRATEGY

As referred to in this Action Plan, the City of London has three major projects underway:

1. The Resource Recovery Strategy involves the development of a plan to maximize waste reduction, reuse, recycling, resource recovery, energy recovery and/or waste conversion in an economically viable and environmentally responsible manner. Resource Recovery strategies (i.e., often known as waste diversion strategies) are developed and approved at the local government level and do not require Provincial government approval. This is the focus of this chapter.
2. The 60% Waste Diversion Action Plan, the purpose of this overall report, is both a standalone plan and part of the larger Resource Recovery Strategy. It essentially covers the period from 2018, through implementation and measurement in 2023 (when all projects and initiatives are in place as per current timelines).
3. The Residual Waste Disposal Strategy involves the development of a long-term plan to manage residual waste (waste after resource recovery) and involves completion of an Individual Environmental Assessment (EA) as prescribed by the Ministry of the Environment & Climate Change (MOECC). The Individual EA requires approval by the Minister of Environment & Climate Change and Cabinet.

Traditional Waste Diversion and Waste Management Technologies and Practices

Generally, in Ontario, waste management systems include variations on the following practices to reach higher levels of waste diversion:

- Waste avoidance/prevention/minimization (not created in the first place)
- Reuse/refurbish/repurpose (for use again)
- Source separated recyclables (to be collected, processed, marketed and re-manufactured)
- Source separated leaf and yard waste (to be collected, processed and marketed)
- Source separated organics (food and other organics wastes) (to be collected, processed and marketed). Processing technologies generally include aerobic composting and anaerobic digestion (AD) technologies
- Energy from waste (EFW) through combustion
- Landfill

To go beyond 60% waste diversion will require the use of more advanced waste diversion and resource recovery technologies and practices. The purpose of this chapter is to provide a brief update on:

- Definitions and Terminology
- Overview of Steps to Develop a Resource Recovery Strategy for London
- Current Timetable for Resource Recovery Strategy

5.1 DEFINITIONS AND TERMINOLOGY

The field of solid waste management has a plethora of definitions that fall into different categories including:

- Regulatory definitions usually defined by the Province of Ontario although some are defined at the Federal Government;
- By-law definitions usually defined by municipalities (and not always consistent from one municipality to the next); and
- Definitions created by waste management, recycling and other related organizations that have no legal foundation; however, they are often used by the members and adopted by others.

Some definitions often have a historical basis and have not been modernized; although the technologies within the definition are different than in the past. The inconsistency in legal definitions can be problematic when different provinces are compared. In addition, different technologies can be lumped together in some definitions with little understanding as to why that is the case. The remainder of this section highlights a number of terms and some different definitions.

Resource Recovery and Resource Recovery System

“Resource recovery means the extraction of useful materials or other resources from things that might otherwise be waste, including through reuse, recycling, reintegration, regeneration or other activities. This includes the collection, handling, and processing of food and organic waste for beneficial uses. Although energy from waste and alternative fuels are permitted as waste management options, these methods are not considered resource recovery. The recovery of nutrients, such as digestate from anaerobic digestion, is considered resource recovery.

Resource recovery system means any part of a waste management system that collects, handles, transports, stores or processes waste for resource recovery purposes, but does not include disposal.”

* source – Ministry of the Environment & Climate Change, Food and Organic Waste Policy Statement, April 2018, <https://www.ontario.ca/page/food-and-organic-waste-framework>

Integrated Solid Waste Management

“Integrated Solid Waste Management (ISWM) is a comprehensive waste prevention, recycling, composting, and disposal program which works cohesively to prevent, recycle, and manage solid waste in ways that most effectively protect human health and the environment. ISWM considers local needs and conditions, and then applies the most appropriate combination of waste management approaches for that situation. The major components of ISWM activities are waste prevention, recycling and composting, resource recovery, and, disposal in properly designed, constructed, and managed landfills.”

* source - based on the EPA definition noting that determining a date of this definition is difficult because many current documents are now archived on the USEPA website.

* Environment Canada and the Ministry of the Environment & Climate Change do not have specific definitions; however, many municipalities in Ontario and across Canada have created definitions to meet their needs.

Advanced Resource Recovery Technologies and Practices

Generally, advanced resource recovery technologies and practices fall under one of these categories:

- Anaerobic Digestion (AD - Biogas)
- Mixed Waste Processing (MWP)
- Mechanical/Biological Treatment (MBT)
- Waste Conversion Technologies (WCT)
- Energy from Waste (EFW)

The literature does not contain consistent definitions for these technologies and sometimes groups of technologies may be classified under a single heading.

Anaerobic Digestion (AD - Biogas)

AD facilities can be listed under both traditional (as noted above because it is a proven technology in Ontario) and advanced in the case of Ontario as most AD experience has been associated with farm operations. With respect to AD as part of Mechanical-Biological Treatment (MBT) or as part of a mixed waste processing (MWP) system, this would be considered advanced and belongs in this section.

“Anaerobic digestion means the decomposition of organic matter by bacteria in an oxygen-limiting environment (as defined in Regulation 347 under the Environmental Protection Act). The biogas generated through anaerobic digestion can be used to fuel electrical generators, or it can be further processed into renewable natural gas. The digestate may also be used as a soil amendment that is most commonly used in agricultural operations.”

* source – Ministry of the Environment & Climate Change, Food and Organic Waste Policy Statement, April 2018, <https://www.ontario.ca/page/food-and-organic-waste-framework>

“What is Biogas? Biogas is a renewable source of methane, the main ingredient in natural gas. It can be used for heating and cooling, or to generate electricity that can be used on-site or fed into the distribution grid. It can be refined into renewable natural gas that can be injected into gas pipelines or compressed and used as a vehicle fuel. The entire system, including the energy generating components, is typically referred to as a biogas facility or a biogas plant.

Biogas is produced when organic materials — anything from municipal organic wastes or bio-solids, food processing by-products, or agricultural manure and crop residues —

break down in an oxygen-free environment. The process is called anaerobic digestion (AD) and usually occurs in a specialized tank or vessel – the anaerobic digester. AD is also the process that generates biogas or landfill gas (LFG) within landfills.

Anaerobic digesters have a number of end products, including digestate, a nutrient-rich slurry that can be applied directly on agricultural land, or material that is composted and then used for a range of purposes. Digester solids are materials from after de-watering that can be composted, and are well suited to be mixed with leaf and yard waste.”

*Source - Canadian Biogas Association, Municipal Guide to Biogas, March 2015
<https://www.biogasassociation.ca/>

Mixed Waste Processing

Mixed-waste processing involves no generator separation of waste, with all waste processed at what's been called a “dirty” material recovery facility (MRF).¹ Recyclables are then pulled out at the MRF through a combination of manual and mechanical sorting. The sorted recyclable materials may undergo further processing required to meet technical specifications established by end-markets while the balance of the mixed waste stream is sent to a disposal facility such as a waste-to-energy facility or landfill”.²

* source(s)

¹ Waste 360 <http://www.waste360.com/mrfs/10-points-explain-mixed-waste-processing>

² Wikipedia https://en.wikipedia.org/wiki/Materials_recovery_facility

“Mixed waste processing means resource recovery processes that recover food waste or organic waste from waste streams where food and organic waste is co-mingled with other wastes.”

* source – Ministry of the Environment & Climate Change, Food and Organic Waste Policy Statement, April 2018, <https://www.ontario.ca/page/food-and-organic-waste-framework>

Mechanical/Biological Treatment (MBT)

“Mechanical Biological Treatment (MBT) technologies are pre-treatment technologies which contribute to the diversion of MSW from landfill when operated as part of a wider integrated approach involving additional treatment stages. Mechanical Biological Treatment (MBT) is a generic term for an integration of several mechanical processes commonly found in other waste management facilities such as Materials Recovery Facilities (MRFs), composting or Anaerobic Digestion plant. MBT plants can incorporate a number of different processes in a variety of combinations. MBT therefore compliments, but does not replace, other waste management technologies such as recycling and composting as part of an integrated waste management system. MBT plants include the:

- *Pre-treatment of waste going to landfill;*

- *Diversion of non-biodegradable and biodegradable MSW going to landfill through the mechanical sorting of MSW into materials for recycling and/or energy recovery as refuse derived fuel (RDF);*
- *Diversion of biodegradable MSW going to landfill by:*
- *Reducing the dry mass of MSW prior to landfill;*
- *Reducing the biodegradability of MSW prior to landfill;*
- *Stabilization into a compost-like output (CLO) for use on land;*
- *Conversion into a combustible biogas for energy recovery; and/or*
- *Drying materials to produce a high calorific organic rich fraction for use as RDF.”*

* source - Mechanical Biological Treatment of Municipal Solid Waste, February 2013, Dept. of Environment, Food and Rural Affairs, www.defra.gov.uk

Waste Conversion Technologies (WCT)

Waste Conversion Technologies (WCT) include the broad range of technologies which are applied to recover the inherent stored resource value of targeted waste feedstocks and/or MSW and to make these resources available for use rather than for disposal.

“There are a large number of technologies on the market at the moment and the use of many terms and definitions, with often different meaning. This reduces the possibility of comparing the different options. This chapter lists the most important concepts used in this field alphabetically.

- *Gasification is the thermal breakdown of waste under oxygen starved conditions (oxygen content in the conversion gas stream is lower than needed for combustion), thus creating a syngas (e.g. the conversion of coal into city gas).*
- *Plasma gasification is the treatment of waste through a very high intensity electron arc, leading to temperatures of > 2,000°C. Within such a plasma, gasifying conditions break the waste down into a vitrified slag and syngas.*
- *Pyrolysis is the thermal breakdown of waste in the absence of air, to produce char, pyrolysis oil and syngas (e.g. the conversion of wood into charcoal).”*

* source - International Solid Waste Association (ISWA), [Alternative Waste Conversion Technologies, 2013](#)

“New technologies to convert municipal and other waste streams into fuels and chemical commodities, termed conversion technologies, are rapidly developing. Conversion technologies are garnering increasing interest and demand due primarily to alternative energy initiatives. These technologies have the potential to serve multiple functions, such as diverting waste from landfills, reducing dependence on fossil fuels, and lowering the environmental footprint for waste management. Conversion technologies are particularly difficult to define because their market is in development and many of their design and operational features are not openly communicated by vendors. EPA’s Office of Research and Development conducted research to evaluate and develop a “State of Practice” report for State and local decision-makers on the suite of emerging waste conversion technologies.”

* source - USEPA State of Practice for Emerging Waste Conversion Technologies, 2012 https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=305250

Energy-from-Waste (EFW)

EFW is “A facility that generates steam and/or electricity through the combustion of municipal solid waste.”

* source – Canadian Resource Recovery Council, <http://www.resourcerecovery.ca/info/glossary/>

“Energy-from-Waste is any technology, which recovers energy from the management/processing of waste materials. This includes Anaerobic Digestion, Mass Burn, Gasification, Plasma Gasification, and Landfill Gas Recovery.

Waste Derived Fuel is any technology designed to turn waste materials into a fuel product with the recovery of recyclables materials as part of the fuel development process.”

* source – Ontario Waste Management Association, Guiding Principles Integrated Solid Waste Resource Recovery and Utilization (OWMA EFW/WDF Committee, November 2011) <https://www.owma.org/articles/guiding-principles-on-integrated-solid-waste-recovery-and-utilization>

Energy can be recovered from waste by various (very different) technologies. It is important that recyclable material is removed first, and that energy is recovered from what remains, i.e. from the residual waste. Energy from waste (EFW) technologies include:

- *Combustion in which the residual waste burns at 850°C and the energy is recovered as electricity or heat*
- *Gasification and pyrolysis, where the fuel is heated with little or no oxygen to produce “syngas” which can be used to generate energy or as a feedstock for producing methane, chemicals, biofuels, or hydrogen (see also landfill gas and sewage gas)*
- *Anaerobic digestion, which uses microorganisms to convert organic waste into a methane-rich biogas that can be combusted to generate electricity and heat or converted to biomethane. This technology is most suitable for wet organic wastes or food waste. The other output is a biofertilizer.*

* source – Renewable Energy Association, United Kingdom <https://www.r-e-a.net/renewable-technologies/energy-from-waste>

Energy recovery from waste is the conversion of non-recyclable waste materials into usable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolyzation, anaerobic digestion and landfill gas recovery. This process is often called waste to energy (WTE).

* source - US EPA website, no date provided <https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw>

5.2 OVERVIEW OF STEPS TO DEVELOP A RESOURCE RECOVERY STRATEGY FOR LONDON

The Resource Recovery Strategy will outline the concepts, requirements, challenges, opportunities and timeframes for increasing waste diversion and resource recovery beyond 60%. Development of the Resource Recovery Strategy, as of June 2018, includes activities in the following areas:

1. Preliminary Review of Advanced Resource Recovery Initiatives and Technologies

Complete:	75%	In Progress:	25%	Not Started:	0%
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Preliminary review of initiatives and technologies to develop a long list of advanced resource recovery opportunities that require further investigation. This was undertaken through literature review, Internet search, work completed by the Institute for Chemical and Fuels from Alternative Resources (ICFAR)/Western University and several site visits.

2. Consideration of Regional Resource Recovery Opportunities

Complete:	25%	In Progress:	0%	Not Started:	75%
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In 2017, the City canvassed nearby municipalities (Elgin County, Huron County, Lambton County, Middlesex County, Oxford County and Perth County) responsible for waste management to determine their interest in using any future resource recovery facility(ies). All municipalities expressed an interest in being included in discussions about any new resource recovery facilities and indicated they would consider using the facility depending on the cost.

The potential for a regional facility may make it possible to consider technologies that require larger waste quantities in order to be economically feasible.

3. Alignment with Provincial Strategies and Legislation

Complete:	25%	In Progress:	25%	Not Started:	50%
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Development of the Resource Recovery Strategy will need to align with the provincial Strategy for a Waste-Free Ontario: Building the Circular Economy as well as the new Food and Organic Waste Framework and additional documents that are forthcoming.

4. Consideration of Learnings from the Mixed Waste Processing Working Group

Complete:	0%	In Progress:	100%	Not Started:	0%
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As noted in Section 1.5, formed in early 2017, the Region of Peel is the coordinator of a Mixed Waste Processing Working Group comprised of eight Ontario municipalities representing about half of Ontario's population. The Working Group shares updates,

research results, Committee/Council reports, site visit experience and related operational experiences.

5. Consideration of Learnings from London Waste to Resources Innovation Centre (LWRIC)

Complete:	0%	In Progress:	100%	Not Started:	0%
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The primary goals of LWRIC are noted in Section 1.5. The City of London currently has signed Memorandum of Understanding (MoUs) with the following organizations:

- University of Western Ontario (Institute of Chemicals and Fuels from Alternative Resources); approved December 2016 with a current expiry date of December 31, 2019;
- Bio-TechFar Inc; approved June 2017 with a current expiry date of December 31, 2019;
- Hawthorne Green Key Group; approved June 2017 with a current expiry date of June 30, 2020;
- Try Recycling; approved June 2017 with a current expiry date of December 31, 2019;
- Canadian Plastics Industry Association; approved March 2018 with a current expiry date of March 31, 2020; and
- Try Recycling; approved June 2017 with a current expiry date of December 31, 2019;
- Resource Energy Development of Canada Ltd.; approved March 2018 with a current expiry date of March 31, 2021.

One MoU has expired:

- Green Shields Energy; expired December 31, 2017.

The City (LWRIC), Canadian Biogas Association and Union Gas worked together in 2016/2017 to assess the economic feasibility and environmental benefits of producing biogas by anaerobically digesting the organic fraction of the London's residential waste stream, and subsequently converting the biogas to renewable natural gas (RNG) for use in compressed natural gas vehicles. Two scenarios were considered: collecting and anaerobically digesting source separated organic (SSO) materials or anaerobically digesting organic materials separated from a mixed waste stream at a processing facility (facility-separated organics - FSO). This study included sending out a Request for Information (RFI) to anaerobic digestion technology suppliers. Details of this work can be found at:

https://biogasassociation.ca/images/uploads/documents//2017/CBA_London_Report.pdf

6. Request for Information

Complete:	0%	In Progress:	50%	Not Started:	50%
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As noted in section 1.5, the City released a Request for Information (RFI) to obtain information about resource recovery (i.e., waste processing) technologies that might be suitable for the City of London to divert waste away from the City's Landfill. As noted in the 60% Waste Diversion Action Plan, it is expected that the 60% diversion could be achieved by a combination of enhanced waste reduction initiatives, increased capture of Blue Box materials, the introduction of recycling of various bulky items and the introduction of an organics management program.

About 50 technology/vendors requested/received the RFI document. Twenty-six (26) submissions were received by the City by the closing date of June 22, 2018. The review period will take place between July and September. In alphabetical order, the City received submissions from the following organizations:

- | | |
|--|--|
| 1. 3Wayste North America | 14. Enerkem Inc. |
| 2. AIM Environmental Group Inc. | 15. Envac OPTibag AB |
| 3. Anaergia Inc. | 16. EverGreen Energy Corp |
| 4. BHR Resource Recovery Inc. | 17. Fresh Technologies, Inc. |
| 5. Bradam Canada Inc. | 18. Green Shields Energy |
| 6. Canada Fibers Ltd | 19. Groupe Bioenertek Inc |
| 7. CCI BioEnergy Inc | 20. Miller Waste Systems Inc. |
| 8. CHAR Technologies Ltd. | 21. Orgaworld Canada a division of Renewi |
| 9. Clearblue Ltd. | 22. Pivotal Integrated Resource Management Inc |
| 10. Clorox Company of Canada | 23. Sacyr Environment USA, LLC |
| 11. Corporation of the City of Stratford | 24. Stormfisher |
| 12. Cole Engineering Group Ltd. | 25. Tucker Engineering Associates, Inc. |
| 13. Eco Burn Inc. | 26. Walker Environmental Group |

7. Preliminary Analysis

Complete:	0%	In Progress:	20%	Not Started:	80%
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A preliminary analysis of the potential programs/initiatives will be completed looking at environmental (diversion rate, Greenhouse Gas benefits); social (public support, resident benefits/issues); financial (costs, revenue) and technical (collection/processing issues, stability of end markets, status of technology) considerations.

8. Peer Review

Complete:	0%	In Progress:	0%	Not Started:	100%
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A consulting firm that specializes in waste management technologies will be used to conduct a peer review of the portions of the Resource Recovery Strategy dealing with any technical analysis and newer resource recovery technologies.

5.3 CURRENT TIMETABLE AND PROPOSED DIRECTION FOR RESOURCE RECOVERY STRATEGY

The general activities and actions and timetable to complete the Resource Recovery Strategy is identified on Table 21. It is worth noting that this timeframe crosses over the existing Council (December 2014 to November 2018) and the next Council (2018 to 2022). The timetable may be adjusted to accommodate new information and/or direction.

Table 21 – Proposed Activities and Timetable to Complete Resource Recovery Strategy

Date	Event	Comments
July - December		<ul style="list-style-type: none"> Incorporate any new details that may be identified during the final stages of the Action Plan
January - March 2019	CWC Meeting	<ul style="list-style-type: none"> Present the Resource Recovery Strategy
	Council	
2 months	Provide feedback opportunities on WhyWaste Resource Recovery Strategy website	<ul style="list-style-type: none"> Advertise in the London Free Press, The Londoner and on social media
	Circulate to Community Stakeholder Groups	<ul style="list-style-type: none"> Circulate and ask for feedback from Waste Management Community Liaison, Committee (WMCLC), W12A Landfill Public Liaison Committee, Urban League and Advisory Committee on the Environment (ACE)
	Circulate to Waste Management/ Recycling Companies	<ul style="list-style-type: none"> Circulate and ask for feedback from local companies including Emterra, Green Valley Recycling, Miller Waste, Orgaworld, StormFisher, Try Recycling, Waste Connections and Waste Management
	Presentations	<ul style="list-style-type: none"> Present to WMCLC Present to ACE
1 month	Public Participation Meeting	<ul style="list-style-type: none"> CWC receives comments from the public and other stakeholders

6) SUMMARY OF KEY IMPLEMENTATION REQUIREMENTS

For the 60% Waste Diversion Action Plan to be successfully implemented, additional steps, actions and nudging/changing attitudes are required. Listed below are 15 implementation requirements that will be very helpful in moving from 45% waste diversion to the target of 60% waste diversion by the end of 2022.

The challenges, opportunities and rewards of achieving 60% waste diversion require Londoners to embrace change. At the same time, Londoners will be required to accept that new programs come with some frustration and inconvenience. However, increasing waste diversion should be considered as a long-term environmental investment opportunity in a similar light as our investments in education and health care.

These Top 15 requirements, in brief, have been developed from successful initiatives in London, a literature review of successful waste diversion programs in other communities, and successful implementation of programs in related services.

1. **Supportive elected officials and City Council.** Elected officials are key to engaging their constituents in a manner that meets their needs. Consistent information that contains easy to understand expectations for all involved is key. A common voice, whenever possible, builds confidence in decisions and direction made by Council.
2. **Sustainable program funding.** Programs must be funded to meet requirements, meet community expectations and balance other priorities in the community.
3. **The role of media.** Media play a critical role in informing the community about waste diversion initiatives and programs. It is critical that information is easily accessible and that spokespeople are available to respond to media requests for additional information. This will help the community learn about new initiatives and programs, as well as encourage them to obtain further details to help them understand how to participate.
4. **Well-developed implementation workplans.** A number of the undertakings in the 60% Waste Diversion Action Plan are significant. Workplans must address resource needs, timeframes, contractor requirements, and allow for adequate time for Londoners to adjust.
5. **Demonstrate leadership through examples.** Members of Council, City staff and community leaders must demonstrate that they are part of the change and prepared to participate in the new waste diversion programs and initiatives (“lead by example” and “practice what you preach”).
6. **Delivery of information, education and promotion on how to participate in new initiatives and programs.** There are important similarities and differences between information (e.g., how to participate), education (e.g., why should I participate) and promotion (e.g., how to increase participation). Because Londoners have been at 45% waste diversion since about 2014 and few new initiatives/programs have been added during that time, there will be an appetite for new materials. Examples of tools

and outreach programs from other communities will be key to reducing the learning curve and containing/reducing costs of production. The role and value of social media is constantly changing.

7. **Convenient, accessible and understandable services.** The more Londoners are asked to do, the more challenges can occur. It must be recognized that waste diversion and waste reduction are not priorities for many families. Services need to be considered in the context of all Londoners and be as accessible as possible.
8. **Willingness of many Londoners to embrace changes.** Londoners need to be behind these programs and embrace a culture of change.
9. **Incentives and rewards need to be considered.** Wherever possible, incentives and rewards should be considered to help with achieving the new and/or adjusted behaviours required for Londoners.
10. **Strong and enforceable by-laws also must be considered.** By-laws may be required as a backstop for certain actions (e.g., mandatory recycling, use of clear nags, etc.).
11. **Strong collaborations to deliver the new programs.** Opportunities to have shared implementation experiences and other collaborations will assist in achieving results in different communities in London.
12. **Build local capacity in the community.** Many of the initiatives will not led by the City, rather they will be led by the community. This can be achieved by ensuring that resources are available and a collaborative approach is established at the start.
13. **Flexibility and transition capabilities.** Some initiatives and programs planned today may need to be adjusted prior to implementation or after implementation. A certain mind-set is required to allow some initiatives and programs to develop on their own. This can allow for additional creativity, innovation and fun. In addition, larger programs can be designed at the outset to have transition capabilities as new technology and techniques become available.
14. **Tracking and measurement systems.** It is imperative that understandable tracking and measurement systems are established prior to implementation. Tracking and measuring progress is essential for continually improving waste diversion programs. Successful communities will track and benchmark their waste diversion performance, including participation rates, quantity and volume of materials diverted, customer satisfaction, and programs costs, revenues and other savings.
15. **Regular feedback.** Opportunities to provide feedback and information to elected officials, residents, media, businesses, service providers, etc. will ensure that progress (or lack of progress) is being shared. An annual report on waste diversion performance in an easy-to-read format that can be widely shared (in different formats) will be key.

Appendix A
Residential Waste Diversion Programs

**Table A-1 2017 City of London Residential Waste Management
Programs– Estimated Tonnes Diverted**

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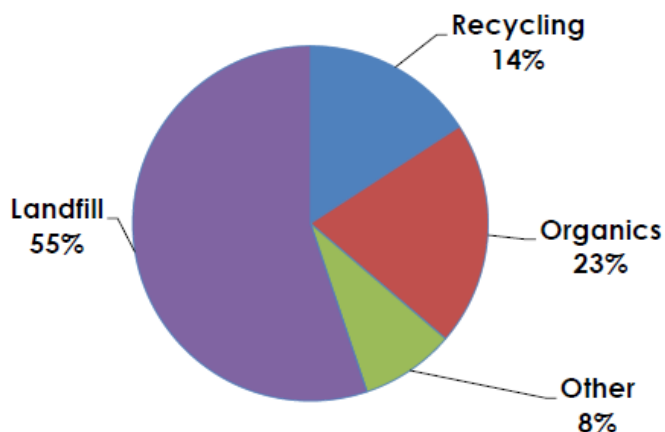
This appendix provides a description of the City's various waste diversion programs and the quantity of material diverted by each program in 2017.

This data is summarized in Table A-1 and Figure A-1.

Table A-1: 2017 CITY OF LONDON RESIDENTIAL WASTE MANAGEMENT PROGRAMS – ESTIMATED TONNES DIVERTED

PROGRAMS	Single Family Households	Multi-Residential Households	Total Tonnes
<i>Recycling</i>			
a) Curbside Recycling Program	18,670	0	18,670
b) Multi-Residential Recycling Program	0	3,220	3,220
c) City Depots (EnviroDepots, W12A)	620	260	880
d) Public Space Recycling (estimate)	30	20	50
Subtotal	19,320	3,550	22,820
<i>Organics Management</i>			
e) Home Composting Program (estimate)	5,680	0	5,680
f) Grasscycling (estimate)	3,580	0	3,580
g) Curbside Yard Waste Collection	5,250	0	5,250
h) Depot Yard Waste Collection	16,240	0	16,240
i) Fall Leaf Collection	4,760	0	4,760
j) Christmas Tree Recycling	100	0	100
Subtotal	35,610	0	35,610
<i>Other Programs</i>			
k) Waste Electronics & Electrical Equipment	200	70	270
l) Tire Recycling	2,310	570	2,880
m) Wood Waste/ Construction, Renovation & Demolition Waste	5,070	0	5,070
n) Scrap Metal	690	70	760
o) Textile/Small Household Item Reuse	1,390	350	1,740
p) Municipal Household Special Waste	430	110	540
q) Brewers Retail Container Recycling	1,750	440	2,190
Subtotal	11,840	1,610	13,450
Total Waste Diverted	66,770	5,160	71,880
Total Waste Disposed¹	65,500	24,230	89,730
Total Waste	129,900	29,400	161,610
Diversion Rate	50%	18%	45%

Notes 1. Includes process residuals from recycling and composting programs.

Figure A-1 - 2017 Waste Diversion

Blue Box Recycling Programs

Curbside Recycling – 18,670 tonnes

The City collects a wide range of recyclables from all curbside households as part of its Blue Box Recycling program. The materials collected in 2017 were newsprint & flyers; household paper; magazines, catalogues & books; paper egg cartons & boxes; cardboard boxes; glass bottles & jars; aluminum food & beverage cans; steel food & beverage cans; foil containers & foil; empty metal paint cans; empty aerosol cans; plastic bottles, jugs, plant pots/trays, large pails & tubs; milk & juice cartons; drink boxes and cardboard cans.

Materials collected were taken to the City's Manning Drive Regional Material Recovery Facility (MRF) for processing and subsequent shipping to various end markets. This facility also receives recyclables from other City programs and other municipalities. Material is weighed upon entering and leaving the MRF.

A portion of this material is allotted to each program (curbside, multi-residential, other municipalities) equal to the percentage of incoming recyclables from each source. In 2017, 20,340 tonnes of materials were collected curbside of which approximately 1,670 tonnes would become process residuals.

Multi-Residential Recycling – 3,220 tonnes

The City collects the same range of recyclables at the majority of multi-residential buildings. The property owner is responsible for purchasing and providing 360 litre carts for residents to sort their recyclables. As a result, a few multi-residential buildings do not have recycling because the property owner has not provided carts. In 2017, approximately 50,000 multi-residential units had access to on-site recycling and 3,000 units did not. Residents from buildings without on-site recycling must take their recyclables to one of four City EnviroDepots. City staff have made numerous attempts to further reduce the number of units without on-site access to recycling.

The materials collected, how they are processed and calculation of the quantity recycled is the same as the curbside Blue Box program. In 2017, 3,560 tonnes of materials were collected from multi-residential buildings of which approximately 290 tonnes would become process residuals.

Depot Recycling – 880 tonnes

As noted above, the City operates four EnviroDepots (Oxford Street, Clarke Road, Try – Clarke Road and W12A Landfill) that accept a range of materials including Blue Box recyclables. The Blue Box materials collected, how they are processed and calculation of the quantity recycled is the same as the curbside Blue Box program.

The Blue Box materials accepted is the same as the curbside Blue Box program.

In 2017, 960 tonnes of materials were collected from multi-residential buildings of which approximately 80 tonnes would become process residuals.

Public Space Recycling – 50 tonnes

The City has over 40 EnviroBins located throughout the Downtown, Old East Village, Richmond Row and Wortley Village, for use by the residents when they are out shopping or going to restaurants and/or for the residents that live above some commercial establishments. Each EnviroBin has three compartments: containers, paper and garbage.

The Blue Box materials accepted is the same as the curbside Blue Box program.

Organic Programs

Home Composting – 5,680 tonnes

The City sells composters at cost at its Oxford Street and Clarke Road EnviroDepots. In the 1990's the City also sold composters at "truck load sale events". Over the years the City has sold 55,900 composters including approximately 800 in 2017. The *Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow* recommends that municipalities assume each composter sold diverts 100 kilograms per year. This estimate is based on many factors, assumption and measured programs generally between the years 2000 and 2010. It remains a reasonable number and used by Ontario municipalities.

Grasscycling – 3,580 tonnes

The City stopped collecting grass clippings in 1995 and started promoting grasscycling. Grasscycling refers to leaving grass clippings on the lawn when mowing.

Because grass consists largely of water (80% or more), contains little lignin, and has high nitrogen content, grass clippings easily break down and return to the soil within one to two weeks, acting primarily as a fertilizer supplement and, to a much smaller degree, a mulch. Grasscycling can provide 15-20% or more of a lawn's yearly nitrogen requirements.

The amount of grass diverted in 2017 was estimated to be approximately 30 kilograms per curbside household or 3,580 tonnes in total. **Curbside Yard Waste Collection – 5,250 tonnes**

The City provides curbside collection of yard materials. This includes plant trimmings, brush and branches up to 10 cm in diameter. In 2017 yard materials were collected on a six week cycle and each home received five collections.

The collected yard materials are transported to TRY Recycling's composting facility for processing. The incoming material is weighted. On average about five percent of the incoming material becomes process residuals and 95% is either consumed during the composting process or is made into compost and sold. In 2017, 5,510 tonnes of yard materials were collected curbside of which approximately 260 tonnes would become process residuals.

Curbside Fall Leaf Collection – 4,760 tonnes

The City provides curbside collection of fall leaves beginning in mid-October. Yard materials are also collected with the fall leaves. In 2017 fall leaves were collected on a three week cycle and each home received three collections.

The collected yard materials are transported to TRY Recycling's composting facility for processing. Approximately 4,760 tonnes were collected. On average about 5% of incoming material becomes residue (or about 240 tonnes). How they are processed and the calculation of the quantity composted is the same as for yard materials.

Depot Yard Material Collection – 16,240 tonnes

Residents can drop off yard materials at the City EnviroDepots year round. The collected yard materials are transported to TRY Recycling's composting facility for processing. Approximately 13,880 tonnes were collected. How they are processed and the calculation of the quantity composted is the same as for yard materials. There was assumed to be 5% residue from processing or about 690 tonnes.

Christmas Tree Collection – 100 tonnes

In 2017, the City offered Christmas tree curbside collection during the first week in January. All four EnviroDepots were also accepting Christmas trees for composting. The trees are chipped on-site at the Depot locations and trees collected curbside were taken to TRY Recycling where they are chipped and composted.

Other Programs

Waste Electronics and Electrical Equipment Recycling – 270 tonnes

Waste Electronics and Electrical Equipment (WEEE) recycling is made up of two components. The first component is electronics collected at the EnviroDepots and shipped for recycling. In 2017 the EnviroDepots collected 210 tonnes of material electronics were shipped through the Ontario Electronic Stewardship (OES) program. The second component is appliances collected at the EnviroDepots and recycled. In 2017, 60

tonnes of appliances were collected and recycled. This does not include WEEE that is delivered by Londoners to other drop-off locations in the city.

Tire Recycling – 2,880 tonnes

The annual Municipal Datacall administered by Resource Productivity & Recovery Authority (RPRA) compiles information on materials diverted and disposed by Ontario municipalities. Most of the information used by the RPRA is provided by the local municipality but some of information comes from programs administered by provincial organizations. In the case of tires, information on the quantity of tires recycled in a community is provided by the Ontario Tire Stewardship. This organization looks after the Used Tires Program in Ontario and ensures tires are reused or recycled.

The 2017 Datacall estimate is 2,880 tonnes of tires were recycled/reused in the City of London. Included in this total is 70 tonnes of tires collected at the three City EnviroDepots as part of the Used Tire Program.

Construction, Renovation and Demolition Material Recycling – 5,070 tonnes

The City banned the collection of construction renovation and demolition waste in the 1980's. At the time the average household produced about 15 kilograms of wood waste and renovation material waste each year. At the time of the ban it was assumed about half of this material would be recycled and about half would likely continue to be landfilled as residents would hide small amounts wood waste and renovation materials in their garbage bags for collection.

Beginning in 2004, the City's EnviroDepots began to accept wood waste and renovation materials (including shingles) for recycling. The material is taken to TRY Recycling for processing where approximately 50% to 60% is made into useable products and 40% to 50% becomes residual and is landfilled. The City also accepts of wood at the W12A Landfill which is made into wood chips for on-site use.

In 2017, the EnviroDepots received 2,470 tonnes of wood waste and renovation materials. Approximately 2,225 tonnes of this material was recycled and 245 tonnes became Residual Waste and was landfilled. A further 1,975 tonnes of wood waste was recycled at the W12A Landfill.

It was assumed that approximately half of the residential renovation materials not taken to an EnviroDepots (870 tonnes) was taken to private construction, renovation and demolition waste recycling companies (TRY Recycling and Green Valley Recycling) and recycled while the other 50% (870 tonnes) was residue from recycling, hidden in the residential garbage or disposed of privately.

Scrap Metal Recycling – 760 tonnes

The City stopped the collection of scrap metal (e.g., barbeques, bicycles, etc.) and appliances in the 1990's. At the time the average person produced about 2.5 kilograms of scrap metal each year. At the time of the ban it was assumed about half of this material would be recycled and about half would likely continue to be landfilled as residents would hide small amounts of metal in their garbage bags for collection.

Beginning in 2004, the City's EnviroDepots began to accept scrap metal for recycling. The material is taken to Zubick's for processing. It is assumed 100% of the metal is recycled. In 2017, the EnviroDepots received 520 tonnes of scrap metal.

It was assumed that approximately half the residential scrap metal not taken to an EnviroDepots (240 tonnes) was taken to other scrap metal dealers and recycled while the other 50% (240 tonnes) was placed in the garbage.

Textile/Small Household Item Reuse/Recycling – 1,740 tonnes

In 2017, residents could take textiles, books and small household items to a Goodwill drop off located at the Oxford Street and Clarke Road EnviroDepots. Goodwill has estimated that they received 540 tonnes of material at these locations.

The City offers free disposal of materials to not-for-profit reuse organizations (e.g., Goodwill) to encourage and support these programs. The RPRA Datacall estimates that reuse/recycling organizations given free disposal increase their diversion efforts by 10% and this incremental increase is part of a municipalities diversion estimate.

Approximately 12,000 tonnes of materials were diverted from landfill in 2017 through reuse/recycling organizations receiving free disposal which translates into an additional 1,200 tonnes toward municipal diversion.

MHSW Recycling – 540 tonnes

The City collects all forms of Municipal Hazardous and Special Waste (MHSW) at the HSW depot at the W12A landfill including paints, solvents, pesticides, oil filters, used oil, antifreeze, batteries, florescent bulbs, compressed cylinders and oil & antifreeze containers. Some of these materials (batteries, florescent bulbs, compressed cylinders and oil & antifreeze container) are also collected at the Oxford Street and Clarke Road EnviroDepots.

The materials are shipped to various processing facilities across Ontario licensed to accept this material. The majority of the material is recycled including paint, antifreeze and oil.

The estimate of the weight of material diverted is based on a combination of actual weights for some materials and estimated weights based on the volume shipped for other materials.

Brewer's Retail /LCBO Bottle Recycling/Reuse – 2,180 tonnes

The 2017 RPRA Datacall shows 2,180 tonnes of Brewer's Retail and Liquor Control Board of Ontario (LCBO) containers being recycled/reused in the City of London.

Appendix B

Community Engagement Activities

B1 Open House 2

B2 Open House 1

B3 Community Events

B4 Other Engagement

B5 Project Website

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Appendix B1

Open House #2

November 29, 2017 Horton Street Goodwill Industries (3rd floor) 255 Horton Street (at Wellington), London 2 - 4 p.m. and 5 – 8 p.m.	November 30, 2017 Lambeth Community Centre 7112 Beattie Street, London 2 - 4 p.m. and 5 – 8 p.m.
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The Open Houses were advertised in The Londoner newspaper on November 16 and 23, 2017; on the City's calendar; on the City website; by London.ca public notices November 16 and 23, 2017; in the London's City Green publication; on the City's Facebook page on November 26, 2017; on posters at select City facilities; on the City's e-news on November 13 and 17, 2017; on the London Environmental Network and on the project website.

Letters or emails were sent between November 14 – 16 to local businesses that use the existing landfill, neighbours within 2 km of the Waste Management and Resource Recovery Area, community groups and PLC members. Individuals who signed up at Open House #1 and on the project website were sent an email on November 27, 2017. One person was sent a letter on November 27.

At these open house sessions the public learned about changes to waste management and diversion coming from the Province, potential programs/initiatives to achieve 60% diversion and key technologies for advanced diversion and resource recovery. Another focus of the open house was to inform the public and seek input on the preliminary conceptual 'Alternative Methods' for landfill expansion and the criteria to be used to comparatively evaluate the 'Alternative Methods'.

A total of 38 (19 related to waste diversion) display boards were featured at Open House #2. Boards pertaining to waste diversion and photos of the open house are included in Appendix B1.

This event was designed to provide opportunities for attendees to speak directly with the City and the EA consulting team. Attendees were asked to sign in and were encouraged to fill out a comment sheet to provide feedback and recommendations.

A total of 34 and 43 people attended Open House #2 on November 29 and 30, 2017, respectively. The overall atmosphere of the open house was professional, courteous and respectful.

Comments were received through completion of the formal feedback sheet from 34 people. In addition, one email exchange was received where the public provided feedback. Overall, meeting attendees were satisfied with the information presented and provided positive feedback on the quality of the information materials and answers provided. A summary of the feedback comments is provided in Appendix C.

Resource Recovery Strategy Boards from Open House 2



London's Short-Term Waste Diversion Goal

On October 30, 2017, Council set a short-term waste diversion goal of 60% by 2022. Please review the information presented and let us know how you think we can reach our 60% target.



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Upcoming Changes in Ontario: Extended Producer Responsibility

What is Extended Producer Responsibility?

Extended Producer Responsibility (EPR) means that the companies that produce or import products in Ontario will be fully responsible for having them recycled or reused.

Currently, municipalities pay for about half of the cost of the Blue Box program. The new legislation - The Ontario Waste Free Act - will shift full responsibility to producers (and importers).



What products will EPR apply to?

- To start: Blue Box materials, tires, electronics, and municipal hazardous & special waste. These materials will transition to EPR in the next 2 to 5 years.
- In the near future: carpets, mattresses and furniture will be considered.
- In the future: other materials (e.g., wooden furniture, etc.) will be considered.

What does this mean for London meeting its Diversion Target?

The intent of the legislation is to increase diversion across Ontario. Higher diversion targets will provide legislative backing to help us meet our goal of 60% by 2022.

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Upcoming Changes in Ontario: Food and Organic Waste Action Plan

What is the Food and Organic Waste Action Plan?

Food and organic wastes make up approximately one-third of Ontario's total waste stream. To reduce and manage this waste the Province is developing a Food and Organic Waste Action Plan. The Final Plan will recommend steps to:



- Reduce the amount of food that becomes waste in the first place
- Divert food and organic waste from landfill

What's expected in the Final Plan?

The Final Plan is scheduled to be released in early 2018 and is expected to include:

- Targets for food waste reduction
- Targets for food and organic waste diversion from landfill
- Mandatory food and organic waste programs for municipalities with a population over 50,000
- Possible ban on disposal of food and organic waste at transfer stations and disposal facilities (e.g., landfills)

What does this mean for London meeting its Diversion Target?

An organics management program (e.g., green bin, recovery of organics from mixed waste) will be part of our strategy to reach our diversion goal of 60% by 2022. Final decisions on London's organics management plan will need to wait until the Food and Organic Waste Action Plan has been finalized.

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Getting to 60% by 2022



The following boards focus on the specific strategies that will help get us to our waste diversion target of 60% by 2022. **Please complete the Feedback Booklet and tell us what you think about the different options.**



Organics Management

- Food waste reduction initiatives
- Home composting
- Community composting
- City wide organics program



Recyclables

- Carpet, mattresses and textiles
- Electronics, scrap metal and small metal appliances
- Wooden furniture
- Bulky plastics



Waste Reduction & Reuse Programs (examples)

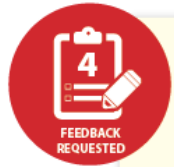
- Waste Reduction Programs: lending libraries, repair workshops
- Community outreach programs: environment days
- Policies and by-laws: landfill bans, reduced garbage limit, pay per container, use of clear bags for garbage, mandatory separation programs

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Food Waste Reduction Initiatives



Background:

On average each London household wastes about \$600 worth of food over the course of the year. This is food that could have been eaten but wasn't.

This is waste that could have been avoided. Below are moderate and significant initiatives that will focus on reducing food waste.



Tell us how much you want us to invest in this initiative?¹	Tell us how much you want us to invest in this initiative?¹	
	Moderate (investment of resources)	Significant (investment of resources)
How will resources be invested?	• Promotion and community outreach programs, and information to households.	• Same as Moderate plus provide each household with a food waste reduction tool kit to help them reduce food waste.
How much closer will it get us to the 60% goal?	0.12% 190 tonnes	1.3% 2,100 tonnes
Annual cost	\$180 K	\$1.2 M
Cost per household	\$1	\$7
Cost per tonne	\$950	\$570
Expected annual household savings	\$ 1 M	\$10 M
GHG² avoided	600 tonnes	6,100 tonnes
GHG reduction for every tonne diverted	2.9 tonnes	

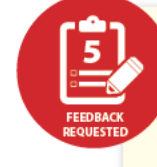
One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months.

1. Approximate range of costs and tonnes are provided based on best available data.
2. Greenhouse Gas

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Home Composting



Background:

Home composting plays an important role in waste reduction in London. The City has sold close to 56,000 units that contribute to an estimated 5,600 tonnes of food and yard waste that is managed in backyards across London.



Tell us how much you want us to invest in this initiative?¹	Tell us how much you want us to invest in this initiative?¹	
	Existing (Home Composting Program)	Significant (investment of resources)
How will resources be invested?	• Promoted seasonally, sell 'at cost' at EnviroDepots	• Moderate additional promotion and 50% subsidy of composters • Significant additional promotion and outreach and 75% subsidy of composters
How much closer will it get us to the 60% goal?	3.5% (included in 45% current diversion rate)	0.2% 300 tonnes → 0.7% 1,100 tonnes
Annual cost	\$150 K (saved in avoided landfill/pre-processing costs)	\$130 K → \$210 K
Cost per household	No additional	\$0.75 → \$1.20
Cost per tonne	No additional	\$450 → \$190
GHG² avoided		240 tonnes → 900 tonnes
GHG reduction for every tonne diverted	0.8 tonnes	

One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months.

1. Approximate range of costs and tonnes are provided based on best available data.
2. Greenhouse Gas

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Community Composting



Background:

Community composting options can range from setting up backyard composters for resident use at a multi-residential building to installing higher tech composter units for public use in parks and community spaces.



What type of program? ¹	Low Tech (Private)	Low Tech (Public)	High Tech (Public)
How will resources be invested?	Composting at apartment buildings where residents can compost kitchen waste using large backyard composters or three-compartment wooden composters.	Community locations where citizens can compost their garden or kitchen waste using large backyard composters or three-compartment wooden composters.	Community locations where citizens can compost their garden or kitchen waste using technologies such as small-scale digesters or mechanical composting units.
How much closer will it get us to the 60% goal?	0.01% 20 tonnes	0.01% 20 tonnes	0.1% 200 tonnes
Annual cost	\$2 K	\$4 K	\$80 K
Cost per household	\$0.01	\$0.02	\$0.45
Cost per tonne	\$150	\$300	\$400
GHG ² avoided	16 tonnes	16 tonnes	160 tonnes
GHG reduction for every tonne diverted	0.8 tonnes		

One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months.

1. Approximate range of costs and tonnes are provided based on best available data.
2. Greenhouse Gas

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City Wide Organics – Curbside Program



Background:

A City wide organics collection program would provide the biggest boost to our waste diversion target of 60% by 2022. It is estimated that it would increase our diversion rate in the range of 9 to 14%.



A green bin is the most common type of program in Ontario for managing household organic waste and will be considered for London. Mixed Waste Processing is another option. Organics would continue to be collected with garbage, but instead of going to landfill the collected waste would be sorted to remove organics and recyclables, and anything left over would be landfilled.

What type of program? ¹	Curbside Green Bin Program	Mixed Waste Program
How will resources be invested?	Weekly collection of kitchen organics from approximately 120,000 curbside households. Organic waste is separated by homeowners and placed out for a separate organics pickup.	Residents would continue to place organic waste in garbage. Organic waste would be separated from garbage at a mixed waste processing facility to be composted or anaerobically digested.
How much closer will it get us to the 60% goal?	9% 14,000 tonnes	14% 22,000 tonnes
Annual cost	\$3.5 M	\$7 M
Cost per household	\$20	\$40
Cost per tonne diverted	\$250	\$300
GHG ² avoided	11,000 tonnes	18,000 tonnes
GHG reduction for every tonne diverted	0.8 tonnes	

One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months.

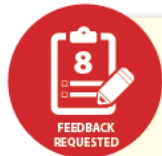
1. Approximate range of costs and tonnes are provided based on best available data.
2. Greenhouse Gas

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City Wide Organics - Multi-Residential Program



Background:

About 30% of London's households live in multi-residential (apartment/condo) buildings and generate approximately 22,000 tonnes of garbage per year. The garbage from multi-residential buildings is similar to the garbage from single family households. The main difference is a higher percentage of recyclables in the garbage and less of the garbage is compostable. Options for diversion of organic waste from the multi-residential sector are the same as for curbside households: separation of organics in the home for collection (e.g., green bin program) or collection of unsorted waste that is later sorted in a mixed waste processing facility.



What type of program?¹	Multi-residential Green Bin Program	Mixed Waste Program
How will resources be invested?	<ul style="list-style-type: none"> Weekly collection of kitchen organics from approximately 55,000 multi-residential units. Organic waste is separated by homeowners and placed out for a separate organics pickup. Collection carts would be stored in a common common area similar to how recycling is stored. 	<ul style="list-style-type: none"> Residents would continue to place organic waste in garbage. Organic waste would be separated from garbage at a mixed waste processing facility to be composted or anaerobically digested.
How much closer will it get us to the 60% goal?	1.5% 2,500 tonnes	5% 8,000 tonnes
Annual cost	\$1.3 M	\$2.4 M
Cost per household	\$7	\$14
Cost per tonne diverted	\$500	\$300
GHG² avoided	2,000 tonnes	6,400 tonnes
GHG reduction for every tonne diverted	0.8 tonnes	

One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months.

1. Approximate range of costs and tonnes are provided based on best available data.
2. Greenhouse Gas

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Other Recyclables



Background:

Mattresses, carpets and wooden furniture are currently collected as garbage in London. There is potential to recycle these materials. In fact, the Province has already identified mattresses and carpet as materials they wish to target for recycling in the future.



How will resources be invested? ¹	Moderate (Collection at an EnviroDepot)	Significant (Semi-annual collection + EnviroDepot program)	
	The data below reflect the two investment options.		
	 Carpet	 Mattresses & Box Springs	 Wooden Furniture
Impact on Diversion	0.1% 160 tonnes	0.3% to 0.6% 500 to 1,000 tonnes	0.1% 160 tonnes
Annual cost ²	\$50 K to \$140 K	\$0.5 M to \$1.1 M	\$9 K to \$90 K
Cost per household	\$0.30 to \$0.80	\$3 to \$6	\$0.05 to \$0.50
Cost per tonne	\$350 to \$850	\$900 to \$1 K	\$50 to \$500
GHG ³ avoided	400 tonnes	1,300 to 2,600 tonnes	600 tonnes
GHG reduction for every tonne diverted	2.6 tonnes	2.6 tonnes	3.8 tonnes

One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months

One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months.

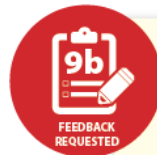
1. Approximate range of costs and tonnes are provided based on best available data.
2. Program costs may be covered in future under provincial program.
3. Greenhouse Gas

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Other Recyclables



Background:

Electrical equipment & scrap metal, textiles and bulky plastic items are currently being recycled and reused in London. However, a significant quantity of these materials continue to be landfilled. There is potential to increase diversion of these materials.



How will resources be invested?¹

Moderate
(Collection at an
EnviroDepot)

Significant
(Semi-annual collection +
EnviroDepot program)

The data below reflect the two investment options.

	Electrical Equipment, Metal	Textiles	Bulky Plastics
Impact on Diversion	0.1% to 0.2% 160 to 320 tonnes	0.2% to 0.5% 320 to 800 tonnes	0.03% to 0.06% 50 to 100 tonnes
Annual cost ²	\$20 K to \$110 K	\$0 K to \$110 K	\$20 K to \$80 K
Cost per household	\$0.10 to \$0.60	\$0 to \$0.60	\$0.01 to \$0.40
Cost per tonne	\$125 to \$350	\$0 to \$150	\$400 to \$800
GHG ³ avoided	700 to 1,400 tonnes	3,000 to 8,000 tonnes	50 to 100 tonnes
GHG reduction for every tonne diverted	4.4 tonnes	10 tonnes	1 tonne

One tonne of GHG reduction is equivalent to removing 1 car off the road for 3 months

1. Approximate range of costs and tonnes are provided based on best available data.
2. Program costs may be covered in future under provincial program.
3. Greenhouse Gas

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Waste Reduction & Reuse Initiatives



Background:

These initiatives focus on raising awareness of options to reduce waste and engage citizens to make small changes to daily life.

The impact of any one initiative may not be significant, but together small changes contribute to cultivating a culture of waste reduction, and over time could make a significant difference to how we manage resources.



As some of those listed are already underway in our community through other organizations, we could explore options to build partnerships as well as establish new sharing programs where they are needed.

More research is required to understand the potential impact on diversion and GHG reduction.

How will resources be invested?

Moderate
Investment

Significant
Investment

Program Cost for Examples

Per household
Net annual cost

Program	Net annual cost	Net annual cost
Lending libraries	\$0.25 \$45 K	\$0.50 \$90 K
Repair workshops	\$0.25 \$45 K	\$0.50 \$90 K
Promote reuse events	\$0.25 \$45 K	\$0.50 \$90 K
Waste reduction education and outreach	\$0.55 \$100 K	\$1.10 \$200 K

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Waste Reduction Policies



Background:

Many of the City's waste diversion and reduction programs are voluntary; there is no mandatory recycling by-law for example. Other programs are written into the waste collection by-law, such as the 3 container limit on garbage, and a collection ban on materials such as scrap metal, appliances, and electronics.

Expanding the power of the by-law to reduce waste can be an effective means of increasing waste diversion. Changes to the by-law can also be implemented at relatively low cost. However, implementing by-law changes may not be popular, and this needs to be considered as we go forward. Alternative approaches that provide incentives to reduce will also be explored.

More research is required to understand costs, citizen acceptance of by-law changes, potential impact on diversion, and GHG reduction.



Do you support changes to the By-law to increase waste diversion?

Indicate which of the examples below you support.

Yes	No
☐	☐

Expand & enforce material bans

Some materials are banned from collection at the curb and landfill (e.g., electronics, scrap metal, appliances, and tires). This could be expanded to include materials that can be recycled/composted now or in the future, such as: Blue Box recyclables, wooden furniture, mattresses, carpet, and organics. An expanded list of banned materials may require additional enforcement to be effective.

Clear bags for garbage

Some municipalities have introduced clear bags for garbage to facilitate enforcement of material bans. Generally, clear bag programs have an allowance for one non-clear privacy bag.

Reduced garbage container limits

Further reduction of garbage container limits may be implemented in conjunction with new diversion programs, such as a city-wide organics program. This may also be accomplished by reducing frequency of collection of garbage (from once per six business days to bi-weekly collection).

User pay

In larger communities, user pay for garbage is typically restricted to cart based programs; residents pay an annual fee based on the size of cart they select.

Performance-based incentives

Some examples include: use of incentives such as point reward systems, or a "gold box" for correct recycling, rebate in User Pay programs for selection of the small size cart.



Current Waste Diversion and Resource Recovery Research

Residential Food Waste Avoidance Pilot

- Audits show up to two-thirds of food waste is avoidable
- Testing various methods to change behaviour



Mixed Waste Processing Pilot

- 25% to 50% of material in garbage could be recovered and diverted
- Further testing/research required



Waste Composition Studies

- Determine what remains in garbage
- Four season audit





London Waste to Resources Innovation Centre



- Part of Council's Strategic Plan (2015 - 2019)
- Potential research, testing and training centre for business, institutions and municipalities
- Working with partners (e.g., ICFAR) to examine new, emerging and next-generation resource recovery and waste conversion technologies... from feedstocks to end markets
- Focus on waste diversion and resource recovery associated with:
 - Household garbage
 - Other materials targeted by the Provincial Government
 - Source separated or facility separated organics
 - Other marketable products and/or creation of energy resources
 - Other "waste materials" into resources
 - Creating higher value end products
 - Growing the local and regional economy



Possible Long Term Resource Recovery Options



Waste Conversion

Thermal or biochemical conversion of waste into synthetic gas, biofuel, biochar, etc.

Requires pre-processing of mixed waste



Energy-From-Waste (EFW)

Incineration of waste creating energy and ash

None or limited pre-processing of mixed waste



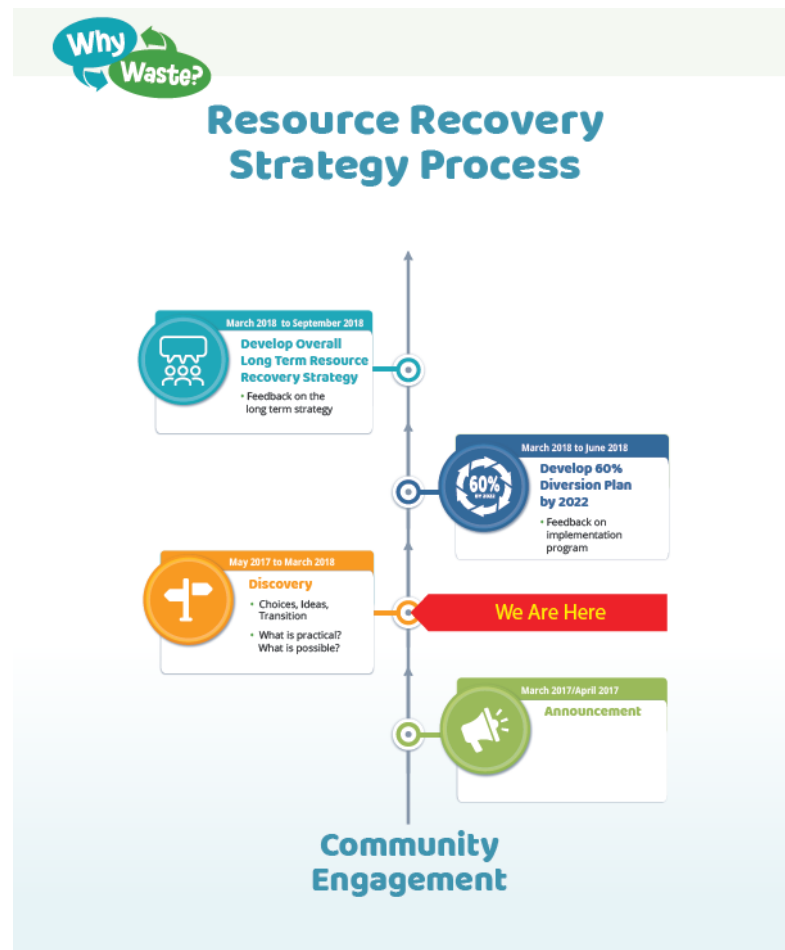
Mixed Waste Processing/ Mechanical/Biological

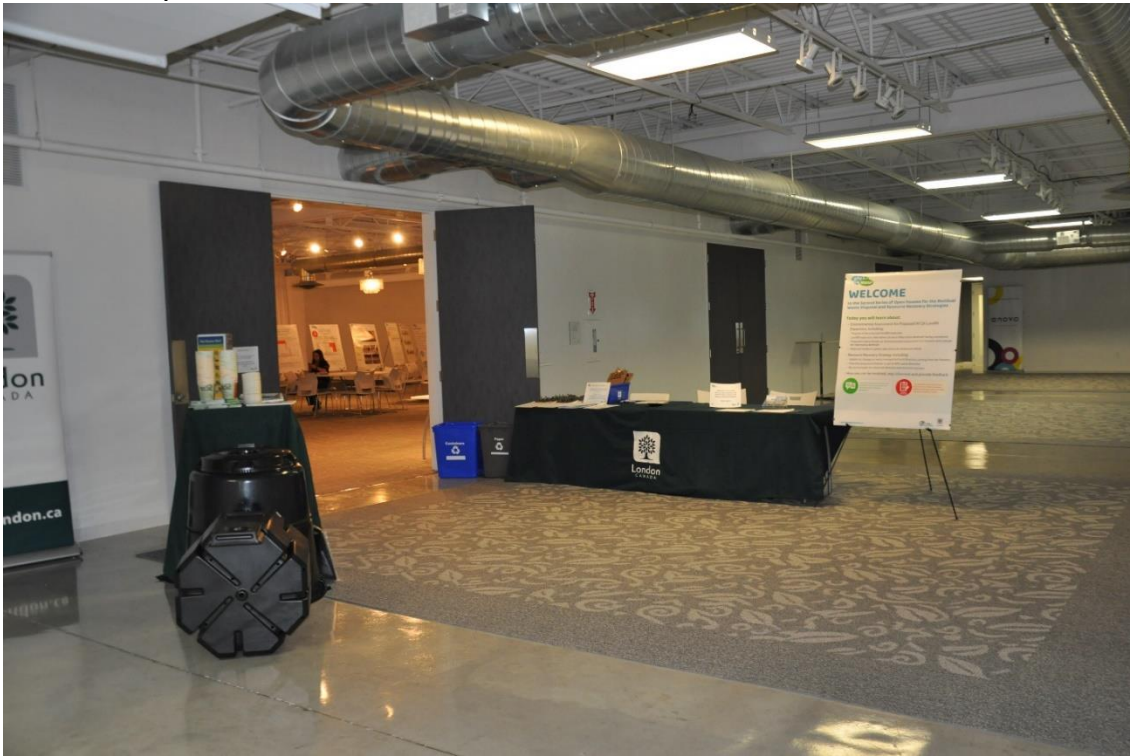
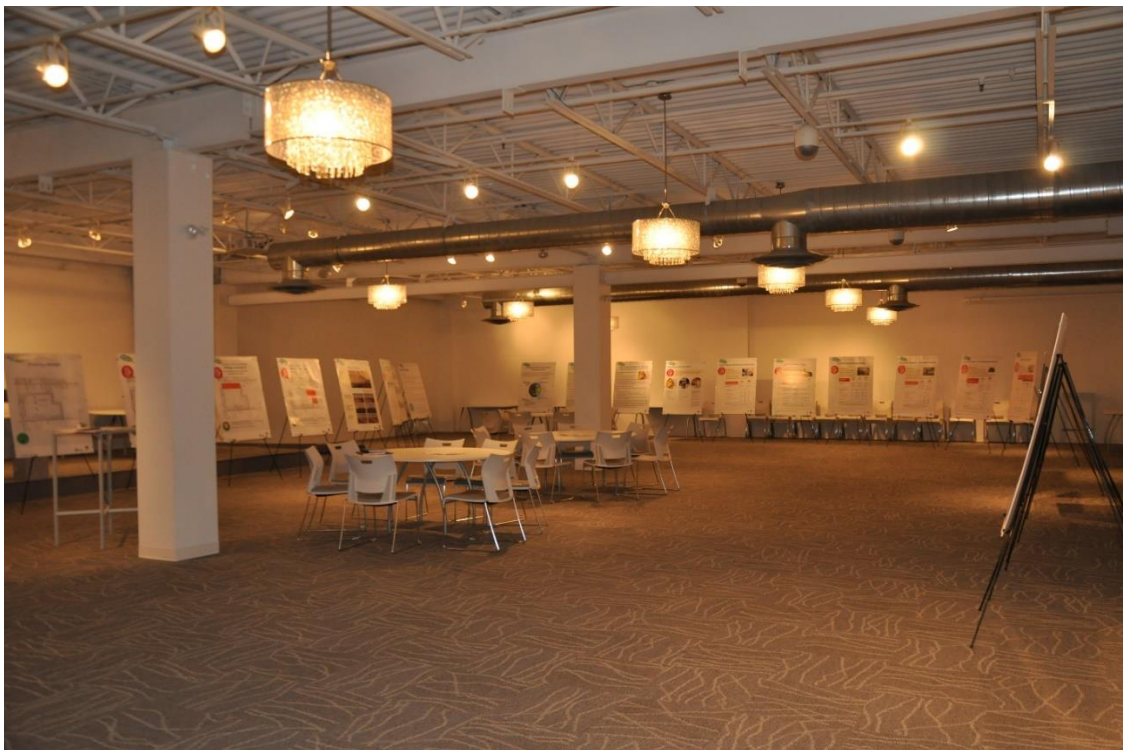
Processing of mixed waste into organic and non-organic portions with recovery of recyclable material (limited)

Organics portion could be landfilled, composted to stabilize the waste prior to landfilling or sent to an anaerobic digester to create biogas and digestate

Non-organic portion could be landfilled or converted to Solid Recovered Fuel (e.g., pellets)





Photos from Open House 2**November 29, 2017 – Horton Street Goodwill Industries**

**Photos from Open House 2
November 30, 2017 – Lambeth Community Centre**



Appendix B2

Open House #1

May 24, 2017 Horton Street Goodwill Industries (3rd floor) 255 Horton Street (at Wellington), London 2 - 4 p.m. and 5 – 8 p.m.	May 25, 2017 Lambeth Community Centre 7112 Beattie Street, London 2 - 4 p.m. and 5 – 8 p.m.
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The Open Houses were advertised in The Londoner newspaper on May 11 and 18, 2017; on the City website between May 11 and 25, 2017; in the London Free Press on May 13 and 20, 2017; on the City's Facebook page and Twitter on multiple dates; on posters at select City facilities; on the City's e-news on May 18, 2017; and on the London Environmental Network website.

Letters or emails were sent to local businesses that use the existing landfill, neighbours within 2 km of the Waste Management and Resource Recovery Area, community groups, neighbouring regional municipalities and PLC members between May 11 and May 17, 2017.

This open house provided a general overview of current City of London waste management programs as well as the EA process for the proposed expansion of the W12A Landfill site.

A total of 25 display boards were featured at Open House #1. Boards pertaining to the Resource Recovery Strategy and photos of the open house are provided in Appendix B2.

This event was designed to provide opportunities for attendees to speak directly with the City and the EA consulting team. Attendees were asked to sign in and were encouraged to fill out a comment sheet to provide feedback and recommendations.

A total of 21 and 44 people attended Open House #1 on May 24 and 25, 2017, respectively. The overall atmosphere of the open house was professional, courteous and respectful.

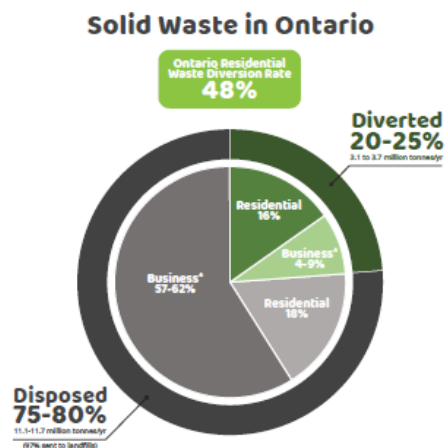
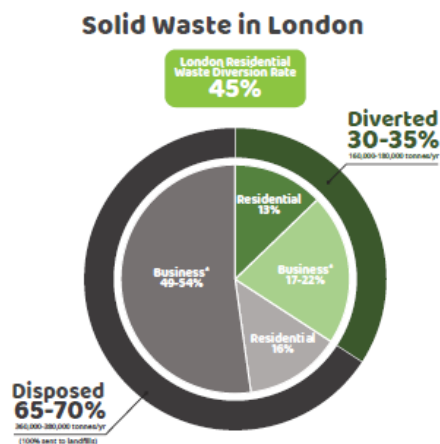
Comments were received through completion of the formal feedback sheet from five people. In addition, two email exchanges and a phone call were received where the public provided feedback. The public also provided thoughts on the City's Facebook page. Overall, meeting attendees were satisfied with the information presented and provided positive feedback on the quality of the information materials and answers provided. A summary of feedback comments is provided in Appendix C.

Resource Recovery Strategy Boards from Open House 1



Why Waste?

London and Provincial Total Waste Diversion Rates



* Business waste includes industrial, commercial and institutional (IC&I) waste as well as construction, renovation and demolition (CR&D) waste





Residential Waste Diversion and Disposal

Municipality	Management of Residential Waste (2015)	■ Diversion Program				■ Disposal		New, Emerging and Next Generation Technologies (Municipal responses as of Fall 2016)
		Blue Box Recycling	Green Bin	Leaf/Yard Materials	Other Programs	Landfill	Energy from Waste (EFW)	
City of London		✓ 16%	0%	✓ 16%	✓ 13%	✓ 55%	0%	• Will examine diversion options during the development of the new Resource Recovery Strategy.
Regional Municipality of Durham		✓ 18%	✓ 11%	✓ 11%	✓ 14%	✓ 15%	✓ 31%	• Developing a business case for mixed waste processing and anaerobic digestion of the residual waste stream prior to EPW.
Essex Windsor Solid Waste Authority		✓ 15%	0%	✓ 15%	✓ 8%	✓ 62%	0%	• No recent investigations.
City of Guelph		✓ 13%	✓ 16%	✓ 13%	✓ 19%	✓ 39%	0%	• At appropriate times in agreements and waste disposal contract cycles; explore alternatives to landfill, including energy-from-waste technologies.
Regional Municipality of Halton		✓ 21%	✓ 14%	✓ 13%	✓ 9%	✓ 43%	0%	• Study completed in 2007 looking at energy-from-waste and thermal waste conversion technologies, decided not to pursue this option.
City of Hamilton		✓ 17%	✓ 14%	✓ 7%	✓ 9%	✓ 53%	0%	• Will examine alternative disposal technologies in the next Solid Waste Master Plan review scheduled for 2017.



Residential Waste Diversion and Disposal

Municipality	Management of Residential Waste (2015)	■ Diversion Program				■ Disposal		New, Emerging and Next Generation Technologies (Municipal responses as of Fall 2016)
		Blue Box Recycling	Green Bin	Leaf/Yard Materials	Other Programs	Landfill	Energy from Waste (EFW)	
City of London		✓ 16%	0%	✓ 16%	✓ 13%	✓ 55%	0%	• Will examine diversion options during the development of the new Resource Recovery Strategy.
Regional Municipality of Niagara		✓ 19%	✓ 6%	✓ 16%	✓ 13%	✓ 46%	0%	• Plan originally recommended thermal technology with the recovery of recyclables as a preferred option. However because of changing circumstances, coupled with sufficient landfill capacity, continue to landfill residual waste. • Annual staff report updates on alternative waste management technologies.
City of Ottawa		✓ 17%	✓ 18%	✓ 2%	✓ 6%	✓ 57%	0%	• Gasification pilot project at the City's Trail Road Landfill plant. • Began operation in 2008 but only processed a fraction of its rated throughput. In 2015 the plant was decommissioned.
Regional Municipality of Peel		✓ 17%	✓ 6%	✓ 11%	✓ 10%	✓ 56%	0%	• Currently undertaking research on mixed waste processing facilities.
City of Toronto		✓ 17%	✓ 13%	✓ 12%	✓ 10%	✓ 48%	0%	• Not actively investigating at this time. • Will look at the viability of mixed waste processing in 5 years.
Regional Municipality of Waterloo		✓ 17%	✓ 5%	✓ 21%	✓ 10%	✓ 47%	0%	• Master Plan recommended investigating thermal technology (energy-from-waste, gasification, etc.) options. • Study investigating thermal technology options completed in 2016 and recommended no further action at this time.
Regional Municipality of York		✓ 19%	✓ 21%	✓ 12%	✓ 11%	✓ 25%	✓ 12%	• Currently undertaking research on the feasibility of different Source Separated Organics processing technologies.





Resource Recovery Strategy

To maximize waste reduction, reuse, recycling, composting and resource recovery in an economically viable and environmentally responsible manner

Key Project Parameters:

60% residential waste diversion by 2022



New organics management program(s) key method to reach 60% residential waste diversion



Look at the possibility of allowing neighbouring municipalities to use any new facilities developed by the City, under conditions approved by Municipal Council



Strategy needs to be able to address how future technologies can have a (transition) role in the waste management system, if appropriate





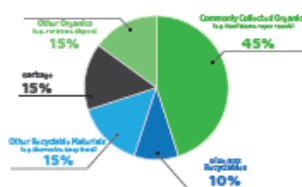
Resource Recovery Strategy Process



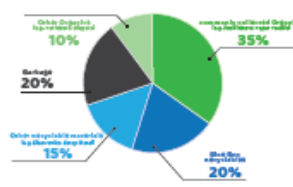
What is in the Garbage (Residual Waste)?



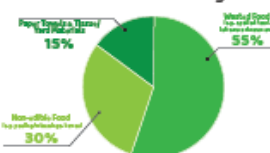
Composition of Garbage From Curbside Collection (Single-Family Homes, Townhomes, etc.)



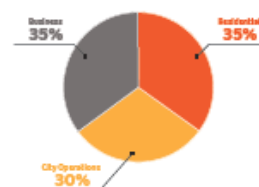
Composition of Garbage From Multi-Residential Collection (Apartments)



Composition of Commonly Collected Organics in Residential Garbage



Composition of Garbage Received at W12A Landfill





What Should We Do with Organics?



Food Waste Avoidance

Prevent the creation of food waste



Home Composting

Small scale composting at home



Community Composting

Communal composting in public places or at multi-residential buildings



Source Separated Organics

Green Bin Programs



Facility Separated Organics

Collected garbage is taken to a processing facility to remove organics



Waste Conversion

Conversion of organics (with other garbage) into synthetic gas, biofuel and/or biochar



Possible Long Term Resource Recovery Options



Waste Conversion

Thermal or biochemical conversion of waste into synthetic gas, biofuel, biochar, etc.

Requires pre-processing of mixed waste



Energy-From-Waste (EFW)

Incineration of waste creating energy and ash

None or limited pre-processing of mixed waste



Mixed Waste Processing/Mechanical/Biological

Processing of mixed waste into organic and non-organic portions with recovery of recyclable material (limited)

Organics portion could be landfilled, composted to stabilize the waste prior to landfilling or sent to an anaerobic digester to create biogas and digestate

Non-organic portion could be landfilled or converted to Solid Recovered Fuel (e.g., pellets)



**Photos from Open House 1
May 24, 2017 – Horton Street Goodwill Industries**



**Photos from Open House 1
May 25 – Lambeth Community Centre**



Appendix B3

Community Events

City staff attended public events to promote the Resource Recovery and Residual Waste Disposal Strategies. Events are listed below. Examples of the displays are also included in this Appendix. The display at these events was designed to provide opportunities for attendees to speak directly with City staff. There was no formal feedback process at the events except for the Home Show. (Home Show feedback is summarized in Appendix C.) A common inquiry at all events was the timeline of the implementation of green bins, as well as general recycling inquiries and general composting inquiries.

Community Events

Event	Date	Location
London Home Show	January 26 - 28, 2018	Western Fair District
Neighbourhood Service Days	August 28 - September 1, 2017	Crouch Neighbourhood Resource Centre, Northwest London Resource Centre, Glen Cairn Community Centre, Family Centre Argyle, Westmount Family Centre
Gathering on the Green 2	August 20, 2017	Wortley Village, The Green
Forest Festival	August 19, 2017	Harris Park
Inspiration Fest	July 23, 2017	Wortley Village, The Green
Home County Folk Festival	July 15 to July 16, 2017	Victoria Park
Sunfest	July 6 to July 9, 2017	Victoria Park
Sesquifest	June 29 to July 2, 2017	Downtown London
The Big Leak: Water Brothers	June 5, 2017	Central Library
Gathering on the Green	June 3, 2017	Wortley Village, The Green

Community Event Displays

London Home Show January 26 – 28, 2018



Gathering on the Green 2 August 20, 2017**Sesquifest June 29 – July 2, 2017**

Appendix B4

Other Engagement

Various public and City committees and groups have been advised of on-going activities and their opinions solicited as and when appropriate. The Advisory Committee on the Environment (ACE), the Agricultural Advisory Committee (AAC), the Environmental and Ecological Planning Advisory Committee (EEPAC) and W12A Landfill Public Liaison Committee (PLC) are all regular City committees and groups who have been advised of the status of this project. Details of meetings where the Resource Recovery Strategy or 60% Waste Diversion Plan have been discussed are provided below:

ACE

Date	Discussion Topic
February 7, 2018	<ul style="list-style-type: none"> 1st Report of the Waste Management Working Group received.
September 6, 2017	<ul style="list-style-type: none"> 2nd Report of the Waste Management Working Group received.
June 7, 2017	<ul style="list-style-type: none"> 1st Report of the Waste Management Working Group received. ACE gave their support for both the Residual Waste Disposal and Resource Recovery Strategies.
May 3, 2017	<ul style="list-style-type: none"> Early Stages of the Residual Waste Disposal Strategy (Including Environmental Assessment for the expansion of the W12A Landfill) and the Development of the Resource Recovery Strategy.

EEPAC

Date	Discussion Topic
January 18, 2018	<ul style="list-style-type: none"> Overview of potential organics programs as part of 60% Diversion Action Plan & Resource Recovery Strategy
June 22, 2017	<ul style="list-style-type: none"> Update on Residual Waste Disposal Strategy and Resource Recovery Strategies

W12A PLC

Date	Discussion Topic
April 19, 2018	<ul style="list-style-type: none"> Residual Waste Disposal Strategy and Resource Recovery Strategy Update #3
February 15, 2018	<ul style="list-style-type: none"> Update and discussion about the Draft Proposed Terms of Reference
December 7, 2017	<ul style="list-style-type: none"> Update on Open House #2
October 19, 2017	<ul style="list-style-type: none"> Update about the CLC

August 17, 2017	<ul style="list-style-type: none"> • Displays for community engagement, upcoming Open House in November
June 15, 2017	<ul style="list-style-type: none"> • Residual Waste Disposal Strategy and Resource Recovery Strategy Update #2 • Feedback from Open House, CLC update
April 20, 2017	<ul style="list-style-type: none"> • Residual Waste Disposal Strategy and Resource Recovery Strategy Update #1 • Reminder of Social on May 5, Open Houses May 24 & 25

The Waste Management Working Group (WMWG) is a new working group of Municipal Council consisting of five councillors and the Mayor with the purpose of monitoring and advising on activities related to the Resource Recovery Strategy and Residual Waste Disposal Strategy and EA. This is intended to provide a more effective and focused structure for members of the Civic Works Committee and Municipal Council to review, provide input and approve the necessary actions for the successful development and implementation of both Strategies. Details of meetings where the Resource Recovery Strategy or 60% Waste Diversion Plan have been discussed are provided in the table below:

Date	Discussion Topic
March 8, 2018	<ul style="list-style-type: none"> • Progress Report #5: Community Engagement Program • Background Report #3: Development of 60% Waste Diversion Action Plan
January 18, 2018	<ul style="list-style-type: none"> • Update Report #8: Programs, Projects and Provincial Activities that will Inform and/or Influence Strategies • Progress Report #4: Community Engagement Program
September 28, 2017	<ul style="list-style-type: none"> • Decision Report #4: Guiding Principles - Resource Recovery and Residual Waste Disposal Strategies • Update Report #5: Programs, Projects and Provincial Activities that will Inform and/or Influence Strategies • Update Report #4: Community Engagement Program
June 27, 2017	<ul style="list-style-type: none"> • Progress Report #1: Community Engagement Program • Update Report #3: Project Timelines <p>Update Report #2: Programs, Projects and Provincial Activities that will Inform and/or Influence Strategies</p>
January 19, 2017	<ul style="list-style-type: none"> • Decision Report #3: General Framework for the Community Engagement Program for the Resource Recovery and Residual Waste Disposal Strategies as Part of the Environmental Assessment Process • Decision Report #1: Draft Guiding Principles - Resource Recovery and Residual Waste Disposal Strategies • Update Report #1: Resource Recovery Update

A new Waste Management Community Liaison Committee (CLC) was also struck for this project consisting of representatives from waste management companies, small business, community groups and members at large. Details of meetings where the Resource Recovery Strategy or 60% Waste Diversion Plan have been discussed are provided in the table below:

Date	Discussion Topic
February 26, 2018	<ul style="list-style-type: none"> • Community Engagement Update including results of Open House 2 and Home Show • Update Resource Recovery Strategy (Between November 20, 2017 and February 23, 2018) • Next Steps – Resource Recovery Strategy
November 20, 2017	<ul style="list-style-type: none"> • Updates - Resource Recovery Strategy (Between October 16 and November 20, 2017) • Next Steps – Resource Recovery Strategy • Discussion of getting to 60% diversion
October 16, 2017	<ul style="list-style-type: none"> • Updates – Resource Recovery Strategy (Between June 5 and October 16, 2017) • Next Steps – Resource Recovery Strategy • Discussion of community involvement
September 13, 2017	<ul style="list-style-type: none"> • Group discussion on Key Project Parameters for Residual Waste Disposal Strategy including achieving 60% diversion by 2022
June 5, 2017	<ul style="list-style-type: none"> • Updates - Resource Recovery Strategy (Between March 30 and June 5, 2017) • Next Steps - Resource Recovery Strategy

Appendix B5

Project Website

The Resource Recovery Strategy webpage is published on the getinvolved.london.ca website. It was launched on March 24, 2017. There have been over 4,000 unique visitors to date with over 6,000 visits. This webpage has also been used to promote Waste Reduction Week. Visitors have the opportunity to learn about the Resource Recovery Strategy, provide feedback and subscribe to a mailing list to receive updates. Some examples of the content can be viewed below.



[Home](#) / [Resource Recovery Strategy](#)

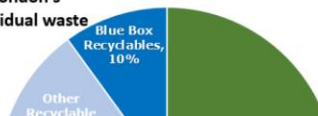
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Background

In London more than one tonne of waste is produced per person. This includes waste generated at home as well as waste generated by businesses. Much of this waste is diverted through numerous waste reduction, reuse, recycling and composting programs. The waste that remains can be considered "Residual Waste". All of the Residual Waste from households and a portion generated by businesses is disposed of at the City's W12A Landfill Site. This landfill opened in 1977 and is expected to reach capacity in 2025 based on the current amount of waste being received.

What's in London's

Household Residual waste



Upcoming Events

☐ **Thursday 12 April 2018**
Stay tuned!

Resource Recovery Strategy Timeline

- ☒ **Project Start**
March 2017
- ☒ **Establish Waste Management Community Liaison Committee**
April 2017

Home / Resource Recovery Strategy

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Waste Diversion in London and Ontario (2014)

- London's overall (residential and business) waste diversion rate is about 55% above the provincial average.
- London's residential waste diversion rate is well above the average rate (about 18% higher) compared to other Ontario municipalities without a Green Bin program.
- London's residential waste diversion rate is a little below (about 6%) the average rate for all municipalities.
- London's residential waste diversion rate is about 15% below the average rate for municipalities with Green Bin Programs.

**Waste Management in Large Ontario Municipalities**

Check out the residential waste management systems in the largest municipalities/recycling authorities in Ontario to see how they compare to London's waste management system. Information is provided on the municipalities demographics, amounts of waste diverted through various methods/programs and their long term plans for waste management. London will also be looking at other high performing municipalities such as Markham and Peterborough when developing its resource recovery strategy.

Select a municipality below to see a summary of their waste management system.

Home / Resource Recovery Strategy

Upcoming Events

Thursday 12 April 2018
Stay tuned!

Resource Recovery Strategy Timeline

- ☒ **Project Start**
March 2017
- ☒ **Establish Waste Management Community Liaison Committee**
April 2017
- ☒ **Open House # 1**
May 24 and May 25, 2017
- ☒ **Open House # 2**
November 29 and November 30, 2017
- ☒ **Community Engagement**
Spring 2017- Spring 2018
- ☐ **Circulation/Approval of 60% Diversion Action Plan**
June 2018 - July 2018
- ☐ **Circulation of Draft Strategy**
August 2018 - December 2018

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London Food Waste Survey

Did you know more than 15% of food purchased by London households becomes waste? Wow!

Take our Food Waste Survey

Complete our Food Waste Survey for a chance to win one of four \$25 gift cards to a local grocery store.

Chance to win!

What Do You Think?

See what others are saying and let us know what you think.

Virtual Open House

Virtual Open House feedback results coming soon.

Draft Guiding Principles - Feedback Results

Upcoming Events

Thursday 12 April 2018
Stay tuned!

Resource Recovery Strategy Timeline

- ☒ **Project Start**
March 2017
- ☒ **Establish Waste Management Community Liaison Committee**
April 2017
- ☒ **Open House # 1**
May 24 and May 25, 2017
- ☒ **Open House # 2**
November 29 and November 30, 2017
- ☒ **Community Engagement**
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- ☐ **Circulation/Approval of 60% Diversion Action Plan**
June 2018 - July 2018
- ☐ **Circulation of Draft Strategy**
August 2018 - December 2018

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Committee Reports - Civic Works Committee



First Report of the Waste Management Working Group

PDF (762.45 KB)

February 7, 2017 meeting of the Civic Works Committee, Item # 10a



Update and Next Steps – Resource Recovery Strategy and Residual Waste Disposal Strategy as Part of the Environmental Assessment Process

PDF (1.61 MB)

February 7, 2017 meeting of the Civic Works Committee, Item #10



Establishment of a Waste Management Working Group

PDF (41.03 KB)

December 5, 2016 meeting of the Strategic Priorities and Policy Committee, Item # 2



Individual Environmental Assessment Long Term Solid Waste Resource Recovery & Disposal Plans

PDF (256.76 KB)

October 6, 2015 meeting of the Civic Works Committee, Item # 14

Committee Reports - Waste Management Working Group



Background Document #1: Overview of Individual Environmental Assessment (EA) Process

PDF (90.67 KB)

January 19, 2017 meeting of the Waste Management Working Group, Item #3



Update Report #1: Resource Recovery Update

PDF (179.53 KB)

January 19, 2017 meeting of the Waste Management Working Group, Item #4



Decision Report #3: General Framework for the Community Engagement Program for the Resource Recovery and Residual Waste Disposal Strategies as Part of the Environmental Assessment Process

PDF (105.59 KB)

January 19, 2017 meeting of the Waste Management Working Group, Item #7

[Home](#) / [Resource Recovery Strategy](#)

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SUBSCRIBE

First Name

Last Name

Please enter your email address to join our mailing list.

Types of Information You Wish to Receive:

- ☐ Community Engagement Events (e.g. open houses)
- ☐ Online Engagement Opportunities (e.g. online survey)
- ☐ Ongoing Updates
- ☐ City Committee Meetings (when strategy is on the agenda)

Projects You Wish to Receive Information on:

- ☐ Residual Waste Disposal Strategy
- ☐ Resource Recovery Strategy
- ☐ Both

Submit

Upcoming Events



Thursday 12 April 2018

Stay tuned!

Resource Recovery Strategy Timeline



Project Start

March 2017



Establish Waste Management Community Liaison Committee

April 2017



Open House # 1

May 24 and May 25, 2017



Open House # 2

November 29 and November 30, 2017



Community Engagement

Spring 2017- Spring 2018



Circulation/Approval of 60% Diversion Action Plan

June 2018 – July 2018



Circulation of Draft Strategy

August 2018 - December 2018

Upcoming Events



Thursday 12 April 2018

Stay tuned!

Resource Recovery Strategy Timeline



Project Start

March 2017



Establish Waste Management Community Liaison Committee

April 2017



Open House # 1

May 24 and May 25, 2017



Open House # 2

November 29 and November 30, 2017



Community Engagement

Spring 2017- Spring 2018



Circulation/Approval of 60% Diversion Action Plan

June 2018 – July 2018



Circulation of Draft Strategy

August 2018 - December 2018

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Appendix C

Community Engagement Feedback

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Comments from getinvolved.london.ca April 12, 2017 to June 18, 2018**Q – What do you think? [about the Resource Recovery Strategy]**

- Work closely with grocery store and food producers to use a different waste stream for organic waste like composting . Create large composting bins for apartment buildings that won't have a smell and is easily accessible.. like composting gardens
- The ACE Subcommittee is meeting this evening to discuss the draft plan, with a particular focus on organics aspect of waste diversion.
- We do a good job now; keep on making incremental improvements. But NO GREEN BIN! Not Ever! Too expensive; small bank for a big buck!
- A composting program is essential (whether a green bin or other type of program) when the majority of waste is organic material.
- 45% of Londons waste is organic. Can those with yard space be encouraged/motivated to compost and reduce the cost of a green pickup?
- Detached homes can and should be encouraged to compost at home.
- A green bin program should be implemented for all multi unit buildings
- All food service locations should have a green bin pickup.
- Options already available for homeowners to compost but don't. Green waste like Durham can save landfill and has resale value at other end.
- Put a giant blue bin beside every garbage bin in the city; make it easier to recycle what we consume on the go than it is to throw it away.
- Lived in Brampton and used the green bin. I would like to see that in London also. More people likely to use green bin than compost at hom
- I lived in Hamilton in 2006 when they implemented a green bin. It reduced our household waste in half. London needs this!
- How can we stop repairable or good things from being thrown to the curb because it's easier? Some ideas here: <https://tinyurl.com/y9x28x8c>
- I just moved from the GTA where we've had our compost picked up weekly, for over five years. It's disappointing to see London so far behind.
- Website should show a detailed pie graph of the current recycling figure of 45%, followed by updates to see what plans are working best.
- everything that comes out of a grocery store should be Recycled, Reused or Composted and picked up at the curb by the city, in provided cans
- Agree with the other comments. Should have organic compost pick-up as part of a full composting plan and engagement strategy.
- London has a unique advantage to use existing organic waste treatment facilities where organic waste can be diverted to reach goals b4 2022.
- We have Orgaworld here in London * Where green bin waste is processed *so, why isn't the program implemented in our city too?
- I moved to London from the Niagara Region in 2015. I was shocked there was no green bin system here! Would be thrilled to see this happen.

- This is KEY: "How can we stop repairable or good things from being thrown to the curb because it's easier?"
- Encourage reuse of unwanted items:
<https://www.bristol2015.co.uk/method/resources/>
- would love to have green bin program...sister lives in Hamilton...everything goes into compost bins...great idea
- To encourage home composting, the city could consider a composter give away or sale at discounted price. Waterloo did this years ago.
- Why hasn't the City provided black bin composters for residents at a discounted price (we have 3 we use)?
- Organic waste pick up important. It takes 25 years for a head of lettuce to decompose in a landfill.
- Would love to see the green box program here in London. We do compost and recycle a lot. Most of our throw away garbage is food stuffs.
- I am concerned with ppl not using a green bin properly and increasing the amount of skunks, mice, raccoons and rats. Too many already!!!
- Shocking that London is surrounded by Municipalities that have Green Box programs and yet London doesn't. Embarrassing really.

Feedback on Second Round of Questions. Questions posed at Open House 2, online, London Home Show and to the Waste Management Community Liaison Committee. The number of responses varied by question, but ranged from 615 to 956.

What Level of Investment Are You Willing to Make?		Response	Summary Comment
Greater levels of waste diversion and resource recovery will require additional financial investments. On a household basis, how much more in municipal taxes and fees would you be prepared to pay per year?	\$0	17%	Over 80% of the respondents indicated they are prepared to pay more for waste diversion.
	\$1 - \$25	44%	
	\$26 - \$50	24%	
	\$51 - \$75	7%	
	\$76 - \$100	8%	
Potential New Programs and Initiatives (including the approximate annual cost per household)		Level of Support	Summary Comment
Food Waste Avoidance	No change: \$0	16%	Almost 85% support for some kind of program.
	Moderate Program: \$1	46%	
	Significant Program: \$7	38%	
Home Composting	No change: \$0	25%	

		Moderate Program: \$0.75	38%	75% support for all proposed options
		Significant Program: \$1.20	37%	
	Community Composting	No change: \$0	20%	80% support for all proposed options
		Low Tech, Private: \$0.01	25%	
		Low Tech, Public: \$0.15	28%	
		High Tech, Public: \$0.45	27%	
	City Wide Organics – Curbside Program	No Change: \$0	19%	Stronger support for Green Bin. Green Bin also preferred by CLC and ACE.
		Green Bin Program: \$20	62%	
		Mixed Waste Program: \$40	19%	
	City Wide Organics – Multi-Residential Program	No Change: \$0	17%	Stronger support for Green Bin
		Green Bin Program: \$7	61%	
		Mixed Waste Program: \$14	22%	
	Other Recyclables (people could choose more than 1 option)	No change: \$0	16%	About 15% do not support recycling other materials
		Carpet: \$0.30-\$0.80	30%	
		Mattresses/Box Springs: \$3-\$6	37%	
		Wood Furniture: \$0.05-\$0.50	25%	
		Electrical Equipment: \$0.10-\$0.60	34%	
		Textiles: \$0.00-\$0.60	21%	
		Bulky Plastics: \$0.01-\$0.40	29%	
	Other Waste Reduction Initiatives (people could choose more than 1 option)	Lending Libraries: \$0.25-\$0.50	34%	Between 30% and 40% are supportive of various waste reduction initiatives
		Repair Workshops: \$0.25-\$0.50	35%	
		Promote Reuse Events: \$0.25-\$0.50	41%	
		Waste Reduction Education/Outreach: \$0.55-\$1.10	32%	

Waste Reduction Policies & By-laws (people could choose more than 1 option)	Expand and enforce material bans	31%	Between 15% and 30% are supportive of various waste reduction policies and by-laws
	Clear bags for garbage	19%	
	Reduce garbage container limits	23%	
	User pay (pay per bag or container)	17%	
	Performance-based incentives	24%	

Comments from Home Show January 26 – 29, 2018

Q – Do you have any other suggestions, comments or concerns for our consideration in the development of the Resource Recovery Strategy?

- Communal compost for complexes or condos
- Bring in green bins
- Citizens young and old need to be encouraged to stop littering! This was identified in the 1960's as a problem and now it is very problematic. I take a plastic bag to collect in my area. Have brought loads back as garbage and recycle material.
- Green box program PLEASE!
- Use the organic waste plant south of London
- Need to engage corporations and property management firms in the development process to increase buy-in.
- I have generally seen a reluctance to use green bins in 50% of my neighbours in other cities. Love the ideas of options for all types of bulky recyclables.
- Mirror Guelph's program
- Collect compost by city to reduce costs
- Green bin programs already in other cities in GTA should be implemented here too.
- Education. Training. Regular feedback from community by various means.
- Food waste recycling is long overdue in London. All of the suggestions on the boards are great!
- Clean and green!
- Policies enforcement! The impact to the overall system needs to be examined. Going to performance based incentives will not be successful.
- More electric chargers
- Would love to see the food waste program here in London
- Have recycling contractors follow current recycling strategies
- Green bins for composting
- Community give away day (Guelph & Winnipeg do it). 1 day residents can put all items @ curb for neighbours to come & claim & reuse
- Use hybrid garbage trucks
- Community composting for neighbourhoods

- Reinstitute the spring clean up program where old building materials etc could be put out on a given date. Often recyclers drove by and put old doors, lawnmowers, scrap to use. Crack down on student neighbourhoods.
- Program for organic waste.
- We have a roll out cart in Nova Scotia bi-weekly pick up – compost & garbage & recycling next wk. incl. meat, bones, lobster shells, (we freeze until pickup for bears, raccoons etc.) Need a similar program in London
- Green bin & recycling collection weekly with garbage in clear bags is biweekly. Another home composter campaign to incentivize homeowners to compost. Community events with compost/soil tests with professional to advise on use at home
- I think it's a great idea. It will impact people financially, but it is slight and if there are incentive plans introduced, it will be more attractive for community involvement.
- I would like to know how businesses are contributing - What they all doing to reduce 1X plastic use. HOW DOES TIM HORTONS get away with NOT being responsible for all their cups in the garbage??!?
- Please supply blue bins to promote recycling rather than having people throwing things out. A green box program would be very beneficial.
- Compost! Take Tech – get green Bins!
- Bottle & can deposits such as used in UK. They have 90%+ recycle. Set up machines in grocery department stores use ticket to pay for necessities. Too much focus on low incentives.
- I'd like to see a youth focused summer program to repair household appliances brought in by the public (a repair depot) – too much gets trashed unnecessarily. AMO needs to pressure the food and consumer goods industries to reduce packaging
- Please don't spend too much. Educate the children in grade schools. In high schools – set up programs for kids to do resource recover for 30 community service hours.
- Start accepting Styrofoam containers. Offer free composters for backyard.
- Green bins would be great!
- Encourage businesses (with financial incentive) not to over package their goods
- This is not an economic issue it is an education issue – People need to think “garbage” when they are shopping – Have a “think garbage” campaign
- Educate public on not purchasing anything in packages that are unnecessary e.g. cookies
- Have free green bins and blue bins and one free garbage bag. Charge for extra.
- Limit ban or educate on the horrors of one use plastic.
- Garbage pick up every two weeks.
- Educating the public on environmental effects, plus means of saving residents money would/could help encouraging recycling/reducing waste
- More instructions or public ads school programs may help
- Curbside pick-up of special materials (paint, electronics etc) once/year?

- Focus on re-use & reducing plastics
- Incinerate
- Paint containers
- Need more depots available for toxic waste
- We should be able to bring our paint cans (not empty) to the recycling sites
- Green bins!
- Paint cans
- Dirty oil after an oil change
- I don't agree with charging \$1.50 per bag when we already pay for garbage services in our taxes
- Styrofoam yes
- Sod tires mulch for sale
- Green bins a must
- Green bins 4 sure!!
- Green bins
- Styrofoam! Plastic grocery bags! Kleenex/napkins!
- Styrofoam is an issue & should be recycled
- Compost bins free
- Recycle days for electronics, more compost bins
- More awareness & instructions on what to do and make it convenient
- More frequent in the summer (smell). Any improvement is good.
- User pay works best
- Educate/advertise people to sort
- Move to weekly green bin & bi-weekly recycling & garbage
- User pay is a great system. Household composting should be mandatory.
- Don't sell our landfill space to other municipalities
- Stop letting others put garbage in our landfill – London only
- Great education. I like the idea that diversion is so effective
- How about tax reduction incentive for seasonal people
- Recycle Styrofoam
- Provide rebate to homeowner for full composting home units to prevent so much garbage. Police non users of blue box programs. Green bin is a good option. More yard waste pick up days.
- All great ideas! We need to Reduce, Reuse, Recycle Much More
- Green bin
- Performance based incentives too costly to implement
- Recycle plastic grocery bags!
- For sure an implementation of by-laws – more education at the elementary school board e.g. litterless lunches. Keep at it! We have to stay strong & keep educating. We cannot be like our American neighbours.
- Green boxes soon! Rain barrels

- Same garbage day every week
- The message needs to mean something to each person, how will it affect/improve/impact my quality of life – large numbers, population statistics not as helpful for personal accountability
- Encourage more composting of organic materials
- Educate the children in school – high school. Set up programs for high school kids to get community service hours
- Would like to see London move to organic recycling ASAP
- Give me a recycle bin please. It's ironic that we used 3 pieces of paper and paper ballots to complete this game
- Waste – green
- We need to expand plastic recycling program and kitchen waste
- Educate those who are not clear about value of recycling and waste reduction. More recycle bins at parks & other public facilities.
- I have relatives who have use the green bin curbside collection result in an infestation of mice in their community. Keeping costs down will garner support
- Questions with restaurants throwing recycled waste in regular waste... why?
- Need to promote organic recycling – teaching/pub ed. Well handled – there will always be critics
- More compost incentives. Give compost bins free currently pay over \$6K in taxes. Prior to incurring increases in taxes and fees I would like the City to demonstrate enhanced efficiencies within the current infrastructure.

Comments from Facebook post December 22, 2017 requesting feedback on possible options to handle organic waste, alternative landfill design concepts and proposed studies to evaluate the alternative landfill design concepts.

- Just learn from other cities. You don't have to reinvent the wheel.
- I heard a rumour that compost bins were purchased under Fontana but plan wasn't implemented Again? Just get it done this has been an embarrassment to London for over a decade

Comments from Open House 2 (questions from Comment Book) and virtual Open House

Q - Do you have any other suggestions, comments or concerns for our consideration in the development of the Resource Recovery Strategy?

- Stop free pick up of furniture. Wooden furniture needs to be broken down at dump and put in wood bin.
- Two free garbage tags should go with the annual garbage calendar.
- This could be a showpiece for London in so many ways.
- I think individuals should get more involved with there own garbage.

- Think about the City getting out of the “garbage collection” business [long term - hard sell]. Then everyone would have to deal with their own garbage and be aware of what they generate. Only collect recyclables. Alternative collection method – private contractors or do it yourself.
- Clear bags, textile recovery, organics diversion, food waste education
- Strongly support thermal or conversion of waste incineration!
- Need to look at what other cities and countries are doing ie ban plastic bags, zero waste stores, packaging bans etc, more bulk facilitation, restaurants need to be on board too (waste going to dumpsters, have more recyclables products, ban straws and disposable napkins. The public needs to be more informed about recycling rules and composting options and how to's. I heard on the radio about Oxford County's Green Cone. I went to their website and learned about it. I looked on London's website and saw that we have them! Why didn't I know about it? Why do so many people I know, not know how to recycle properly? No one seems to care. There are tons of visuals and ideas on social media that could be utilized. We can do this!
- Allow all plastics and metals, not just packaging. Only allow containers, no bags at the curb.
- No it is not worth. Landfill is easy to fill up and cause many problems (Full, communities take advantage). I think recycling and garbage processing plants will help our environment and economy. Jobs in recycling and garbage processing plants sort all materials and put many different kinds of materials before they go to recycling plants. Lot of people throw lot of black garbage bags into the bins and containers. They never put recycling materials into the blue box or blue containers. They are lazy and uncared. Enforcement is best way to inspect them. I want to increase toward 100% near future. 60% is OK but it is not enough to take recycling materials out of garbage. Fair is best way to deal the fair sharing price.
- Be creative. This can create many jobs also. Also make land a leader in waste recovery.
- Many of the program will create jobs. Not only at the collection and sorting side, but also afterwards with the people working with the reused materials.
- More open houses regarding up to date results
- No green bins! Way too expensive for taxpayers. Just expand the landfill as required.
- Pick up on one side of the road only (not arterial roads) to limit air pollution from garbage and recycling trucks.
- I think for the amount more you're being asked to pay a substantially higher amount of garbage is being diverted making it worth while.
- [many items proposed to add to recycling program] are recycled through Goodwill etc.
- We were told that we could no longer use plastic bags for leaves to save 300K in extra charges to city. Instead you have added \$5-15 per household to buy paper (fall apart) bags for leaves and did not reduce our taxes by the equivalent 300K.

- I would select user pay (all) to work in conjunction with a reduced container limit (perhaps pay per additional bag) and clear bags, bans and incentives
- Include info as to relative cost to London households compared to other municipalities. What do I pay now? What do residents pay in comparable municipalities? Really want a green bin program with bi-weekly pick up for regular waste

Comments from Facebook post Nov 26/17 advertising Open House 2

- we need to put some of the responsibility of waste back on the manufacturers..they need to use less packaging or pay municipalities to recycle or dispose of waste.
- Composting!!!! Give us green bins!!! We are so damn behind in this city, environmentally speaking (among so many other ways we're behind the times). But I've been pushing this city for household green composting bins for nearly a decade. Make it happen!!!!
- You can't get a representative sample of opinions by requiring people to show up in person at a handful of events. Your results are going to be skewed in favour of people who are in town, work compatible hours, are not single parents, etc.
- How about spending some time trying new ways to engage with people, and understanding the bias each introduces?
- don't need it...we already have 3 blue boxes and 2 composters. People have to be sensible and do it on their own. I wonder if I don't take the green bin will they give me a reduction in my taxes?.....hahahahahah
- I'd like the green bin which would reduce garbage. I also think manufactures should reduce extra packaging that isn't necessary. No products should be in the grocery store that can't be recycled. Please give us a garbage pick up where we have the same garbage day each week, like all other cities. We pay enough taxes and we do need a weekly pick up.
- Yes please to the composter idea Also can we please have bigger blue bins? We have 2 Metro bags full of garbage each week. And we put them into a black grabage bag for pickup. With the green bin means less for us a week
- There are alot of apartment buildings in London-bet they could use some help and support to increase recycling, we need an easier method of recycling plastic film rather than taking it to stores, we need to do more recycling of fabrics and fiber that is not good enough for resale
- I remember paying "environmental disposal fee" when buying electronic items. Does anyone know where that money went?
- Hey a green bin program going. London is one of a very few that doesn't do organic waste and it's embarrassing such a progressive city is so far behind in this regard
- Need use of various bins - waste, recycling and green bins which are then self limiting due to size.
Also automated emptying into garbage truck reduces labour , health costs etc.

- I feel sorry for all the residents who live near Orgaworld. The stench around that facility is unbelievable. For that reason, I will not participate in the green program.
- And the City will ignore all these ideas....oops, it's London and BRT is going to fix all the issues don't ya know!
- I already give you \$520.00 free labour every year for recycle pay taxes for garage pick up and by things with less package do reduce problems making the stuff now put leafs etc in bags to pick up which cost me money for composts that you put in areas where people who do not have cars can't get any now you want food scraps saved put out that smell and attracts animal bugs at my expense dream on
- teach your employee is how to pick up the garbage first,,not leave it all over our lawns
- Green bin idea brought to you by the Trash Panda lobby of London.
- An online survey would be great for the people who cannot make it to a meeting!
- Incineration and put some hydro back into the grid!
- why don't you people talk to Calgary Alberta they have all this covered out there and have for year
- I loved the green bin program when I lived in St. Thomas.
- Where are the green bins?!! I have one and it sits idle here in London.
- The city back in the 90s gave composting bins to everyone who wanted one. Do that again.

Comments from Facebook post September 12, 2017 requesting feedback on the Residual Waste Disposal Strategy

- Everyone should have a fire pit in their backyard to burn all the plastic trash they have
- Green bins have been an option for years but several city councils, including the current one, have waffled on this because of cost. What does a new landfill cost? Stop waffling and make the tough decisions!
- How about supporting/ encouraging (eventually forcing?) businesses to recycle too? My understanding is that at least some businesses do not recycle, including some large office blocks downtown. These places only produce a subset of waste "types" which currently go to landfill, yet could be easily diverted to provide massive gains in terms of landfill space very quickly.
- Green bins! I have four children, two in diapers and I recycle everything I can. I compost all of my food items and our household usually only puts out 1 garbage can a week.
- Federal regulations restricting the over packaging of ALL goods, imported and domestic, from food to toys, as well as requiring that any packaging used be biodegradable.
- We need organic waste pick up. Toronto has had it for 12 years, St. Thomas too. How do we raise our children to reduce, reuse, recycle if we as a city don't???

- I moved to St. Thomas a couple years ago, and it's like a paradise here for waste! In London I recycled and still had 4 large bags every 8 to 11 days for pickup in a 2 person house hold. Here we have the green bin and I put out only 1 bag every Wednesday. London should take the lesson.
- Need green bins, too much organic waste is going landfill when it could be turned into compost. Lots of food service business could greatly benefit from this.
- Look at the Norwegian/Swedish? Model where they incinerate. Could the incinerator at Westminster Campus be resurrected, technology has come so far and maybe there is a solution to the problem that shut it down. These countries have nearly 0 trash going to the landfills. Please check it out.
- I sat on the waste advisory council in Orillia, as well I co own a business providing effective waste reduction solutions to businesses across London and beyond. If there was an opportunity to meet with st...
- Green bins for sure! I also think there should be a deposit charged on pop cans, bottles, tetra packs, etc and locations (i.e. Grocery stores) to return them for the credit. I think this would help reduce what goes to landfill. Unfortunately a lot of people don't care and won't recycle unless it hits their wallet!
- Shouldn't we try to know what's filling the dump so quickly (besides the obvious answer of 'garbage')? Once we know that, figure out a way to reduce those top items.
- Pleasantly surprised at the comments this time around. I'm used to most Londoners complaining about a bag limit. I have a family of five and we put out a chip-bag sized bag every week. Move to zero-waste and compost. I also collect things like plastic bags that aren't picked up and take them to the grocery stores (yes they take that plastic film!) glad to see so many people on the zero-waste /green bin wagon
- Encourage more recycling and let us recycle more items! Lots of items London does not recycle.
- Encourage people to donate items and not throw them away (lots of places have drop off or even pickup)...
- There is a company in Atlanta Georgia that drills holes into the ground at the landfill. By letting the air reach the waste in the ground it breaks down faster and extends the life of the landfill. Was brought up about 15 to 20 years ago, but London said no. Could this be a solution now maybe.
- "If you think your waste being burned is a good thing then you are more inclined to just chuck things away rather than recycling them."
The last few weeks there has been alot of discussions about global warming and along with that, talks and news about...
- We need to move to a zero waste society. Get rid of the one time use products. Products that we do use should be biodegradable. Green Beaver Co, bamboo toothbrushes, aka cat litter can be composted reusable produce bags, reusable sandwich bags.
- As part of the short lived pilot for green bins I can attest that our waste was cut in half when we had a green bin. Bring them back!

- Our landfill would be perfectly fine if half of it was not filled by garbage from Toronto, time for Toronto's mayor and council to start thinking about dumping their city's waste in landfills in their own city, not ours.
- We also need to look at recycling every bit of plastic out there, soft plastic, hard plastics from things such as plastic furniture, gardening pots, etc. Aim for 0% plastics, metals and food in landfill. More recycling please.
- One idea is to consume less...buy less stuff. If an item has a lot of packaging...don't buy it. Composting in your backyard is very easy if you have a small amount of yard. People need to take more responsibility for the waste they produce.
- how about stopping companies from over-packaging goods? maybe it's time to take all the extra plastic and cardboard and let the companies pay to dispose of it instead of the taxpayers?
- So work with the Canadian gov to make a garbage burning electricity producer like they have in bc kill 2 birds with 1 stone. Also create jobs.
- Buy quality products and you will spend and waste less.
Support businesses that up-cycle and recycle.
Return products that fall apart before their time. Businesses need to offer quality, long lasting products and this is the only way to get them to stop offering stuff that clutters up the landfill.
- Other city's have had green bins for years It's proven to be successful ... It's an absolute embarrassment that the city of London still doesn't offer this programSend just 1 person from London's environmental waste management board to Sweden...
- Out west there is a deposit charged when buying plastic containers such as milk, pop cans etc and are recycling depots to take them back and receive money. This would be a great incentive. Also if we implemented green boxes, it seems to work well for t...
- We were part of the green bin pilot program and it diverted 2/3 of our garbage otherwise going to the landfill.
Please bring it back.
- Enforce recycling. Require use of clear garbage bags, if there's recycling in the garbage bags then don't pick it up. I see lots of folks doing zero recycling.
- If the city doesn't recycle styrofoam or plastic bags, why aren't they banned. Also, why don't we have a composting stream? We are light years behind compared with other cities of the world , even other provinces.
- Why is London not using green bins. Our pickup of black bag garbage is every two weeks so it forces people to use green bins more. Green bin usage is up 125%!!!!!!
- Get compost bins for people and collecting bins each week. Limit 1 bag of garbage each week. I use to have a compost bin in Ancaster, only had 1/2 bag of garbage each week with a family of 4.
- Travelling in Europe I realized very quickly how wasteful Canada is when it comes to garbage and recycling. For example beer cases come in plastic containers that are

reusable. Water bottles pop bottles are recycled at a machine that takes the recyclin...

- I put out one bag a week. I recycle everything I can. I'd have even less paper recycling if they didn't put out store flyers every week. Waste of our trees. They only need to be out once a month get two of everything every week in the mail box. What a waste
- A neighbour has a doctorate in soy bean insemination with the Fed, this wit if nits simply tosses his trash in the back yard. 100% green except for the wild animal dung, all this would fit with our wacky city council!
- The dump won't get filled up from my garbage this week. Apparently my rubbish bin was "too heavy". Yes, I put 3 bags in one bin because if I leave it at the curb the animals get into it. Simple solution, take the bag off the top and chuck it in the tru...
- The link described as "Quick Feedback" begins with a question containing the following, "The Residual Waste Disposal Strategy, 'including a proposed landfill expansion'..."... For those opposed to future landfill expansion, at any point in time, there ...
- Use of bins as provided by BRA in various municipalities around us or Waste Management as in Florida.
Restricts garbage to amount per bin size (no argument as to # bags each year on council) and recycle bins easier to use and less blowing around on windy days. Thus more recycling.
Automated lift truck use and less Workers Comp claims, sick days etc. Less manpower needed.
- How about allowing Styrofoam recycling? Then I wouldn't have any garbage except pet waste (which will compost) since I compost and recycle everything else!
- We live in Orangeville ...we have the green food waste bins, blue bins and we r only allowed one open regular sized can or one clear bag of garbage (that way people can't hide recyclables in their garbage) ...the only time we have anymore waste then a
- Condos & apartment bldgs NEED TO do their part. They still just throw everything down the chute. It's convenient.
Home owners Should have/ use a compost. My sunny spot is on the front lawn so there it stands. Ugly as all hell But it works. Only garbage I really have ... cat litter
Go after apt/condo users.
- What ever you do this plan isn't working. So many dump things into our community bins. The these rude people tell us you F off it's not our business. Plus there are less scrappers on the roads these days. I use to see truck full of stuff/junk. Who would have thought trash and limits could mess things up for everyone. Unless everyone sticks to a program for trash, nothing will work.
- I live next to a "student house" in a single family neighborhood and the volume of refuse is incredible. the three containers they use hold the same as 4 green garbage bags of garbage and there is enough "blue box" garbage" for three households EVERY WEEK .The City of London is blind to any thing caused by UWO and

Fanshawe Collage and deaf to citizens concerns that these posts a lip service and seen as a joke

- Every one should be charged for having their garbage taken. It is coming because people in the country are paying already. Second composting. Have areas around the city where people can take that material. Themselves at no cost to the city. Pay as you ...
- People have had fire pits for years but now it's a money grab for our city councillors. Why can't people burn the paper and cardboard as before. The answer is the city councillors wouldn't make any money. Some people don't have the excess money to pay ...
- Buy items in compostable, recyclable or biodegradable packaging. Boycott the other stuff. Companies need to be responsible as well!
Any blue bins or green bins need to be clearly labeled with what can go in them!
And some education on waste reduction would be useful!
- There should be NO fire burns in city limits!! It's awful when you see that "just close your windows" if your neighbour is burning something. Really!! That's stupidity! Why should we be forced to close our windows and turn off our air exchangers just s...
- Until you change shopping habits nothing will change, re-use is the best way. The only reason why pop comes in plastic is the companies decided to do it, go back to glass (give the kids the fun we had trading bottles in for candy) with most people not caring about the environment or caring when suitable we will continue to have waste. A family of 6 needs only two bags trash weekly
- Green bins would be great. Also, being able to recycle styrofoam would help, lots of businesses use styrofoam containers for their take away meals. Perhaps if it can't be recycled, the use of those containers could be phased out.
- Time to start the GREEN BIN Program ... small towns ie. St. Thomas have this program ! London should be ashamed !
- I think the city should have a better Recycling program as I have found since moving to the city that my bin is often left outside because I have put Recycled material in there that the city does not take. Most of my garbage isn't garbage....i would say 80% is and can be recycled but it ends up in the trash because the city wont take it.
- What about the refuse generated from apartment buildings? After just moving into one I can tell you there's a lot of garbage! I miss composting and feel guilty putting kitchen waste in the trash.
- Tell Toronto and other places to look after their own in their community instead of polluting London.
- All the composting, recycling or incinerating in the world won't solve the problem in the long run. Everyone seems so concerned about the world we leave for our grandchildren, but we're just handing down to them a problem we're too bashful to solve ourselves
- We should be burning garbage. Sweden recycles everything possible and burns everything else. They started taking garbage from other countries because they don't have enough of their own.

- How about if we go to all the old land fills and processes the stuff in it ,look at the way London England does it
- Well we recycle, however if my son accidentally doesn't put the right thing in the container such as paper with plastic it is left at the curb with a terse little reminder to put it in the right bin. Than its in the garbage
- In St Thomas any plastic with the recycle symbol goes in the grey bins with the tins and glass
paper and cardboard go in the blue bins
compostables go in the green wheeley bins...
- Tackle it from the other end and change packaging practises ... stop production of packaging that isn't biodegradable or glass... change distribution practises... bulk style...? Want less mess to clean up - give less crap to play with. We've got the t...
- allow backyard chickens which people can grow their own chickens and wont have to have egg cartons. ..and be a city which encourages off grit (less dependent on government) and won't have so much garbage.
- Green bins for organic waste. Recycling for downtown businesses.
Penalties for residents (and students) who don't recycle or leave a house worth of furniture at the road.
- Green Bins, companies MUST recycle, construction materials/furniture/appliances should be RESTORED depots = free to public for recycling and ALL plastics reduced/recycled ALL!
- Every one wants everything easy. Pick up my garbage, pick up my recycling. We would be happy to take all of these items to a location within the city if we had too. Remember when we had the strike a few years ago???
- Quick feedback?
How can a city continue to grow and not create waste?
Another food franchise, another factory, another big box store.....????...
- Get rid of disposable diapers, and make bottled water of all shapes and sizes refillable, and include milk, soft drinks, etc. Reduce the packaging of food items.
- GREEN BINS. It's ridiculous that a city this size has yet to introduce these. Like Katie Brown said, get with the times already.
- Start developing Hemp made plastics already.
We're so screwed.
I knew it would happen. ...
- you need to incorporate compost recycling pick up like Guelph does - we compost and recycle and only put out, generally, one bag of garbage every two weeks or so.
- Why don't you have what Guelph has 3 bins that food Recycling and garbage bins are better and easier
- We had a solution. It was called the Energy From Waste plant and it was killed by uneducated NIMBYists.
- Residents who reside in a home pay a fee for garbage, and green bins!! Composting saves so much on garbage!

- yup.. keep sinking your money City Of London into BRT....that probably will not be ready by 2025....just sayin.
- How about pay per bag like most other surrounding municipalities....as a former Londoner I now pay per bag household of 4 and we put 4 bags of recycling out which is FREE....and 1 bag a week....you learn quickly to properly recycle and doesn't take any t...
- Buy quality products and you will spend and waste less.
Support businesses that up-cycle and recycle.
- Years ago, before the Brewers Retail, I took the empty liquor bottles from Robinson Hall to the recycling plant that was taking them at the time. The person there confided to me that there was no market for the glass bottles, so they were just going to...
- Bring back the green bins
- Bring back the green bins it would be a great idea for the citizens of London and the rest of London residents
- I vote green bins! Get with the times already, London!
- Green bins!! How is this not already in place?! ALSO businesses should have recycling pick up!!!!
- How about composting? The city of Pembroke composts. Why can't we? I do it anyway in my backyard
- Recycle more. I am always astounded by the number of garbage bags at the curb
- Please implement the green bin food waste system to reduce waste
- bull and barrel have to dump their wings somewhere
- We need to add the Green Bin.
- Our coop has a strick recycle program
- Thsts because you folks take Toronto's garbage
- We pay you for planning and strategy , why are you asking me. Don't waver my confidence.
- Ah hell, just pile it higher and turn it into a ski hill.
- So... where is our green bin service already?!?
- Green bins! Catch up with other cities!
- Does this include the city dumping their asphalt, concrete, etc? Or just residential garbage?
- So it's not gonna be full until 2025 but you only have the next 10 days to give feedback?
- Energy from waste...oh wait..we had one of those didn't we
- Sounds like someone needs some recycling.
- Let's get with the program..Its all about composting
- Follow edmontons lead, they are the top in the country !
- How about a green bin program?!!!! Isn't it time?
- On site composting, I do it, encourage it, and don't support more fleets of trucks.
- People have been asking for green bins for more than 10 years. It's way past time.

- Shouldn't had let Toronto use it!
- Compost where you live if possible not another fleet of trucks.
- By from bulk food stores to reduce packaging waste
- Yes green bin . Want them to do it here in Stratford too .
- Start packaging with biodegradable hemp plastics.
- More recycling, green bins picked up weekly and regular garbage every 2 weeks! It works great In Oakville. London needs to wake up!
- Send the recycling to China so they can reuse and reproduce stuff like the states do.
- Is this because Toronto has been using the same landfill for a number of years?
- Clear garbage bags made mandatory and ppl charged extra if recyclables are thrown into trash.
- Nursing homes need to compost. Retirement homes need to recycle and compost.
- Compost green bins will reduce waste
- Bring green bins to London!
- I would be happy to see London get into composting. Even in the apartment complexes.
- Might also be an idea for London not to take any more of Toronto's garbage.
- we have many option that the city is not doing so it on them,,also get garbage men to pick up properly
- I want to go zero-waste. Yes, that's a real thing. Ha
- Compost!!!!!! Works great in Markham, why wouldn't here?
- we need to re look at the way we recycle - take a page out of the European's process of recycling
- We must compost our fruit and veggie scraps!
- Green bins!!
- I agree with Green bins
- Green bins please!!!
- Green bin!!!
- Let's make a new ski hill!!
- pile it higher
- Green bins please!
- Incinerators are needed.
- Duhhh find another landfill site ...
- Green bins!
- recycle foam and plastic wrap
- Quit taking Toronto's garbage
- Green bins!
- Need a good waste program!!!!
- Did the survey. Thanks for asking!
- Green bins!
- Green program

- Composting!
- Incinerator
- Compost
- Green bins!!
- RecycleOffer composting

Comments from ES Mail or direct emails**August 30, 2017**

When resident first bought her home in the 1980s the city gave out free composters. She had not composted before that but has composted since with 3 units now and composts most yard waste in addition to kitchen scraps. Perhaps an initiative for the city to consider again....

August 25, 2017

I am fairly new to London, and concerned about the amount of household waste we produce, as I had become used to organic waste recycling elsewhere; I had gotten used to having only 1 tiny bag of trash per week. It's shocking how much organic matter we "waste" and I hope to see that change.

I have a question about the information on the city website,
<https://getinvolved.london.ca/WhyWasteResource>

This page shows a pie graph of "London's Household Residual waste", which shows recyclables at 10 % and 15 % which would be a total of 25%. Scrolling down just a bit, I read:

The Resource Recovery Strategy will identify:
areas of continuous improvement to maximize waste diversion and resource recovery including increasing the current London household waste diversion rate to 60% by 2022 from the current rate of 45%; I am wondering, where does the 45% figure come from, as we do not recycle any of the household organics currently?

Another question I have is: Are there smaller, dated targets to increase this recycling BEFORE the 2022 deadline, to ensure that smaller goals are being met on an increasing basis well before 2022 arrives?

Thank You for any information you can provide on these 2 questions.

July 29, 2017

I find it exciting that London is finally thinking about increasing the recycling. When I moved here my garbage amount doubled from what I was generating in Sudbury. The biggest amount is that you do not have a green box program. The remainder is that you do not recycle everything you can. Styrofoam is the biggest thing I noticed.

It is important that you include the cost of replacing the landfill when you start to pay for a recycling or green box program. Once you take this into account the extra cost becomes bearable.

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It is important that you include the cost of replacing the landfill when you start to pay for a recycling or green box program. Once you take this into account the extra cost becomes bearable.

July 23, 2017

So London Ontario's landfill is expected to reach capacity in 2025!
Are we the ONLY community in Ontario, or could it be all of Canada, that does not have a green bin pick up policy in place??

Out of province and even out of area visitors are shocked that this lack can still exist.
A not to be lauded fact about London the 'Forest City', to be sure.

June 10, 2017

It would be great to have an instagram account and facebook event about the green bin vote. Create a social media frenzy over people's opinion and encourage them to vote and to become aware a vote is even possible! Provide statistics and information on cost both for and against the green bin program and what the alternatives are when landfill becomes full Attend more events. The event you attended at Gathering on the green did not expose that a vote or opinion was needed on the green bin program. There was a great board about clotheslines and getting people curious about it but there was no display of a green bin or any information to suggest that was even up for debate...the sign about the landfill doesn't give enough information or attract enough attention.

Attend more events - Forest City Flea, Inspiration Fest, Folk Fest and have a ballot box for people to sign up on the spot for more information to be sent them. handing them a card and letting them walk away means they will never follow through. collect their details on the spot! Even create a mock poll where people put in a vote prior to receiving any information but include their email address so can send them more facts!

Comment from Lambeth Ratepayer's Association June 1, 2017

As we discussed, I fully endorse and support stream/separation of organic waste. From what I understand of organic waste treatment options, the City believes it can process organic waste through anaerobic means, thereby virtually eliminating odour issues. The City sees successful organic waste treatment as a key to reducing landfill volume.

Unfortunately, recent local history of waste treatment odours creates a substantial headwind of mistrust for communities to take on faith that 'this one will be different'. I hope you can make a compelling case for your scenario.

Another contentious matter is in the policy of accepting waste from other jurisdictions, who have decided it is in their best interest to export their problem to London. Wes, you make a 'for the better good' case that London has engineering, critical mass and site-environment advantages that serve this part of the province over the prospect of many small, inefficient sites dotting the landscape. Given the several large sites already in this area (Lambton, Elgin and London), how will the City of London protect the very real interests of the city and its residents, that London does not continue a trajectory to becoming 'the best little dumpsite in Ontario'? Will it be necessary to update London's logo from Forest City to Dumpsites City?

I suppose one way to thread that needle might be to re-word the Proposed Project proposal to read, "Development of a Resource Recovery Strategy to maximize waste reduction, reuse, recycling, composting and resource recovery in an environmentally responsible manner. Consideration will be given to maximizing the operating life of the W12-A site, to providing limited access to neighbouring communities in crisis under strict inflow controls and costing that will encourage responsible waste management by those communities'.

The re-worded project would then provide City of London with tools to cap total external neighbours inbound flows (at no more than current percentage levels) with a target of reduction to 60% of those flows after 2025. Delivering larger than capped volumes would be dealt with on an exponential, upward sliding pricing scale. This simple mechanism will dispel the concern (and possible temptation) by communities to 'buy their way out of their own environmental obligations at the expense of London's quality of life and reputation.

As you can see, as neighbouring communities grow (and prosper), they will find it to their benefit to make the hard decisions that London is making, to treat their waste in an environmentally responsible way, giving up their capacity to those smaller communities who do not generate a great deal of waste and who have no prospect of the needed infrastructure investment. Fair to all concerned, beneficial to all concerned...

I note, buried deep in the proposal, is incineration. Incineration is hot-button issue with a history of inadequate attention to the science of small particulate matter. Incineration units do exist which do not emit particulate of any size. My perception has been that they are expensive and of limited capacity. Maybe this has changed; if so, then I assume London intends to adopt zero emission incineration technology.

The health issues around incomplete incineration are now so well documented that I won't bother to dwell on them. I believe they are common knowledge in public health circles, energy and general industry.

I trust London's interest in the environment extends to not making its citizens, nor its neighbours, the unwilling recipients of tons of microns of heavy metals, toxins, etc. etc. This one waste management practice, if any, is fraught. In other jurisdictions it is becoming a can for litigation-worms that would make previous suits against our fair City look like 'chump-change'.

Another matter is also on my mind. Raccoons. London's raccoon population is eagerly awaiting a service that will separate organic waste from miscellaneous (inedible) trash, for them. They anticipate easier grazing, less waste-handling and with containers dedicated to organic waste, a readily accessible nightly buffet!

The City of Toronto has apparently designed a collection bin that raccoons are having considerable difficulty getting into. Please consider offering every (participating) resident of London a container of this design - not as a gift, but as a City-owned loan/resource. Like a cell phone or a mutual fund fee, early replacement redemption would be at the expense of the property owner, with a single free replacement on a seven-year cycle. In addition to the public relations & public health benefits, standardized units would improve pick-up safety and efficiency.

Comments from Open House 1 (questions from Comment Booklet) and virtual Open House on getinvolved.london.ca

Q – Should the City commit to increasing the current household waste diversion rate to 60% by 2022

- Yes. The greatest percentage of waste diversion is always a good thing for our future generations.
- Yes but how? Don't want waste in ditches.
- Yes. A “no-brainer” for the planet. We can't keep throwing stuff away (where is “away”).
- Yes. This should be a priority instead of pushed to the background. Other municipalities have successful recycling/green bin programmes outstripping London ie Guelph, PEI. Kingston has had a green bin program for years with a similar geographic make-up.
- Yes. We must be serious about recycling and reusing for a city our size.

Q – Is new organic management program(s) the key to reaching 60% diversion by 2022?

- Yes I think so because a lot of food waste, yard materials and other compost end up in landfill.
- Yes please get this program started
- Yes but only in large places of organic waste
- Yes. Critical!
- Yes. All types of recycling, composting should be considered and priced. The aim is to get as little waste for landfilling as possible.
- Yes. I think we can do better than 60%!

- Maybe. Effective education/promotion of new management programs will be needed; Source-separated organics program will improve public understanding of waste management

Q - Do you think it is acceptable to allow neighbouring municipalities to use any new waste resource recovery facilities developed by the City of London?

- Yes because neighbouring communities don't have many alternative to disposing of waste.
- Yes the more users that can participate the better ideas and ability to incorporate these into practice will happen
- No. Not in my backyard!
- Yes. Reusing resources is the goal.
- No. Green bin management and recycling facilities could be used at a price but not landfill space.
- Yes. Improve environmental responsibility for all!

Q - Do you think that Resource Recovery Strategy needs to be able to accommodate transition to new technology in the future, if appropriate?

- Yes any new technologies are a good thing in the waste industry
- Yes. Put the bright minds out there developing better killing weapons to work on saving the planet for our great-grandchildren.
- Yes. There is no use building a programme which is not cutting edge.
- Yes. Think about tech 20 years ago (1997)... you can see strategies need to adapt faster than that!
- Yes. Always allow for adaptation/evolution for long term plans such as this, especially as the city continues to grow.

Q - Do you have any suggestions, comments or concerns for consideration in the development of the Resource Recovery Strategy?

- Don't turn away some of the newer ideas before having fully explored
- Larger blue boxes. Make private homes responsible for clean up of there own spillage of garbage and blue box.
- Stop garbage at it's source by taxing garbage-intensive products and services. Make sure you have a truly 'local' information session for nearby Glanworth community.
- The administration (political and bureaucratic) must stop vacillating about ultimately recycling or repurposing as much as possible. Get with it!! Then the need for landfill expansion will drastically decline. People must be educated as well that the toss away society is dead!
- Taxes are already very high in the city, so changes to waste management/diversion should not require additional money per household as implied above (Question 4). However, individuals/households should be willing to take on additional responsibility (e.g., increased recycling, source-separated organics programs).

Extensive public education/promotion of the new programs will be needed to encourage individuals/households to take on those responsibilities.

Comments from Facebook post May 23, 2017 advertising Open House 1

- Why not start to go no waste instead building more places to throw garbage. And you would save tax payer dollar. Instead of fixing the problem, you want to find another place to put it.
- Where are our green bins? You don't need a load of meetings to take action on waste reduction.
- We need to stop manufacturers from over-packaging products. We are drowning in garbage.
- Lmao, first off, in your pic if that was at somebodys house they wouldn't take the cardboard because it's not in a blue box, maybe if your workers were all on the same page on what to take
- Can you say green bin?

Comments from Facebook post May 21, 2017 advertising Open House 1

- We are a family of 4. We generally have one bag of garbage per week and 2-3 blue boxes. A Green Box Program is the next best step, in my opinion.
- In Guelph and Toronto, we have Gray, Blue and Green bins. The grey is for regular garbage, we rarely fill the grey bin and it only goes out when it is full. Green bin goes out weekly, and our blue bin is collected every other week here in Guelph.
- It's a stupid system. In today's world not recycling as much as possible is not acceptable.
- London needs to start using the green boxes. We lived in London 21 years and moved to Hamilton a year ago. We have the green boxes and our actual garbage is next to nothing!!
- The green boxes would make a huge difference. The city "tried" to do green bins. They picked a few random neighbourhoods and dropped them off but didn't educate people as to what should go in them (we had one in my complex and the...
- We just moved to London from Burlington where our blue bins & green carts were collected weekly & the garbage every other week. We rarely had a full garbage can, even after 2 weeks, even with a little one in diapers & two cats' litter waste. London's waste collection schedule & no green cart is very wasteful.
- my family use their blue boxes for everything that is allowed, they do our best, wash out everything, sort everything out the best they can but the recycle truck keeps leaving our boxes if they miss one thing on top, it makes them upset cause of it...
- We should have a garbage system that promotes composting, recycling in glass plastic cans and paper form and as little garbage as possible... after we do all of that 1 bin or bag of garbage collection per week seems reasonable... with the population our city has we should have a better system in place like compost pick up!

- Composting would go a long way! Other municipalities practice it for a long time already and I don't understand why London is so far behind...
- We have one bag of garbage, 2 blue boxes per week, Green boxes should be next step. Guelph and other cities have been using for over 17 years
- Council after council has delayed: composing, enforcing recycling and reducing bag limits. We need political courage, not a study.
- They're almost all very smart people but they know that garbage collection is one of the radioactive issues of municipal politics and they avoid messing with it at all costs. Did you see the outcry when they reduced garbage collection a little bit this year? People were losing their minds.
- We need to do something with our garbage, besides burying it. Expand the recycling program.
- I'd like to see the city stop stalling on the implementation of the green bin.
- Simple answers. The only question here is when is this city going to invest in its environment.
- Check out the system St. Thomas has been using for years.
- Green Boxes!!!
- Give us green bins... now.
- London needs to use green bin technology
- simple, stop using stuff you can't recycle
- TEXTILE recycling!!
- London needs green carts. Super easy.
- Is there anywhere that gives out free recycling boxes ?
- Burn it!
- Introduce green bins.

Appendix D

IPSOS Survey Report

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Ipsos Public Affairs



City of London Waste Diversion

JUNE 2018

FINAL REPORT

GAME CHANGERS



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DEMOGRAPHICS

METHODOLOGY & SAMPLING





METHODOLOGY

- This report presents the findings from a survey of City of London residents about their attitudes and behaviours towards waste diversion.
- In total, n=301 London residents participated in this survey between May 31 and June 4, 2018. The precision of Ipsos online surveys is calculated via a credibility interval. In this case, the sample is considered accurate within +/- 6.4 percentage points, 19 times out of 20, had all London residents been surveyed.
- Significant differences among subgroups are identified using shaded boxes:

Significantly higher



Significantly lower



KEY FINDINGS



KEY FINDINGS (1)



Overall, residents are supportive of the City of London's efforts to increase its waste diversion from 45 percent to 60 percent, and are willing to pay for it and change their behaviour to assist in these efforts.

- There is an almost universal view (93%) among City of London residents that waste diversion is important to them, including more than half (53%) who say this is *very important*.
- When residents were informed that increasing the proportion of waste diversion will require additional financial investments, three-quarters (76%) say that they would be willing to pay more for increased waste diversion, with the highest proportion (47%) being prepared to pay between \$1 to \$25 per household per year.
- Residents were presented with different initiatives to help in waste diversion efforts.
- About six in ten (57%) prefer investing significant resources on waste diversion initiatives, while three in ten (31%) choose a moderate program, and one in ten (12%) prefer no change.
- When presented with options for a City-wide Organics Curbside Program, more than four in ten (43%) prefer a Curbside Green Bin Program, while one-third (32%) choose a Mixed Waste Program, and one-quarter (24%) prefer no change.
- When presented with options for a City-wide Organics Multi-residential Program, opinion is divided with four in ten (40%) who prefer a Multi-residential Green Bin Program and a similar number (41%) choose a Mixed Waste Program. Two in ten (19%) do not want change to the current program.

KEY FINDINGS (2)



- When residents were informed that items such as electronics, scrap metal, Christmas trees and tires are no longer picked up curbside and have to be dropped off at a depot, two-thirds (65%) indicate that they are prepared to deliver more materials to drop-off depots.
- Six in ten (60%) residents support banning additional materials from garbage pickup, such as old furniture, carpet, small appliances, mattresses, etc., if they could drop them off at a depot for recycling.

WASTE DIVERSION ATTITUDES & BEHAVIOURS

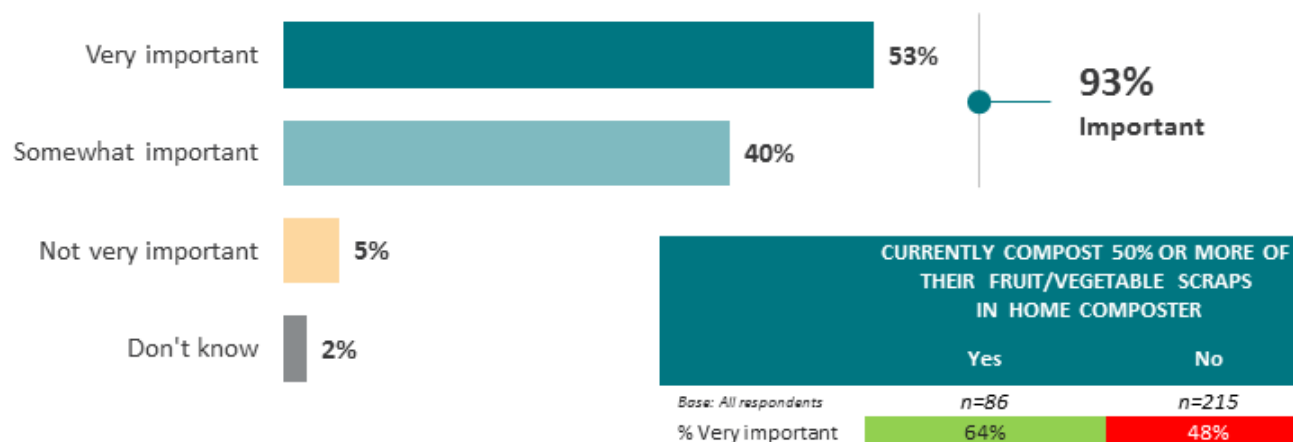




IMPORTANCE OF WASTE DIVERSION

The vast majority (93%) of London residents say that waste diversion is at least somewhat important to them, including over half (53%) who feel it is *very important*.

Those who currently compost 50 percent or more of their fruit and vegetable scraps in a home composter are more likely than those who do not to think waste diversion is *very important* (64% vs. 48%).



Q.1. Waste diversion is the process of reducing the quantity of waste landfilled and creating new materials of value. How important is waste diversion to you? Base: All Respondents (n=301)

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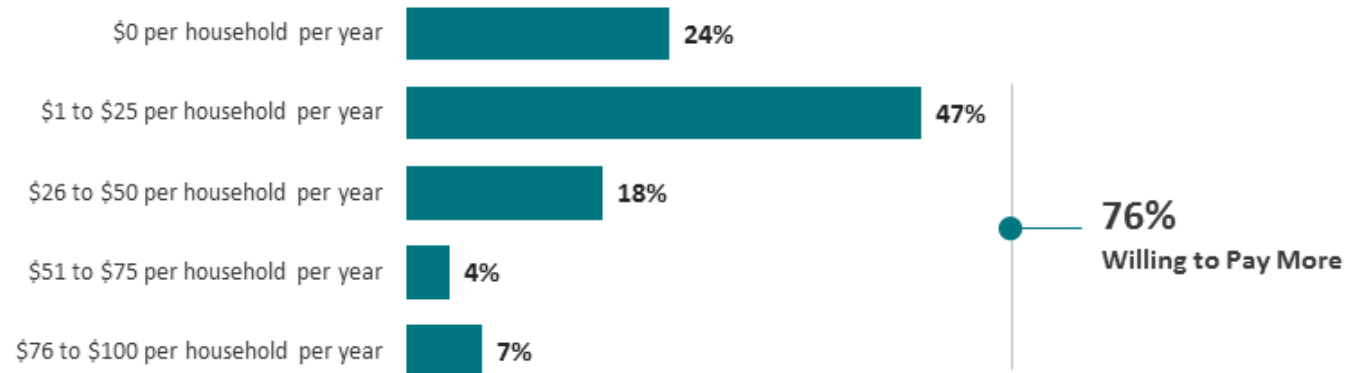


WILLINGNESS TO PAY MORE FOR INCREASED WASTE DIVERSION

Residents were informed that the City of London has set a goal of increasing its waste diversion from 45 percent to 60 percent by 2022, and that reaching this goal will require additional financial investments.

Three-quarters (76%) say that they would be willing to pay more for increased waste diversion, of which the highest proportion (47%) are prepared to pay between \$1 to \$25 per household per year.

*Currently, the residents of London divert 45% of all residential waste.
In 2017, city of London council set A goal to increase this to 60% by 2022.*



Q.2. Reaching this goal, will require additional financial investments. On a per household basis, how much more would you be prepared to pay in municipal taxes and fees per year to pay for increased waste diversion? (select one). Base: All Respondents (n=301)

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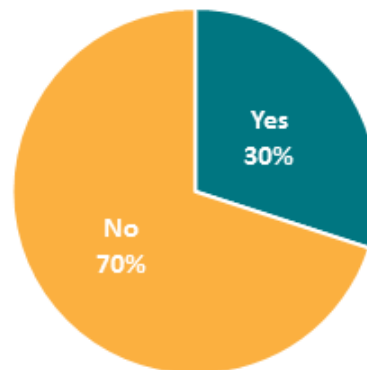


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CURRENT COMPOSTING BEHAVIOUR

Three in ten (30%) residents currently compost 50 percent or more of their fruit and vegetable scraps in a home composter.

Women are more likely than men to engage in this behaviour (37% vs. 23%).



Compost 50% or more of fruit/vegetable scraps in home composter	GENDER	
	Male	Female
Base: All respondents	n=118	n=183
% Yes	37%	23%

Q.4. Do you currently compost 50% or more of your fruit and vegetable scraps in a home composter?
 © 2018 Ipsos Base: All Respondents (n=301)

*Small base
 **Extremely small base
 Ipsos 11

WASTE DIVERSION INITIATIVES



On average, each London household wastes about \$600 worth of food each year.

This represents food waste that could have been avoided through actions such as better planning for grocery shopping and meals and use of leftovers.

In London, this food waste ends up in landfill. In municipalities with green bin programs [add clickable information icon: Includes weekly collection of organic waste from households, where this waste is separated by homeowners and placed out for separate organic waste pickup], some of the waste is composted. Both options represent a cost to municipalities to handle food waste.

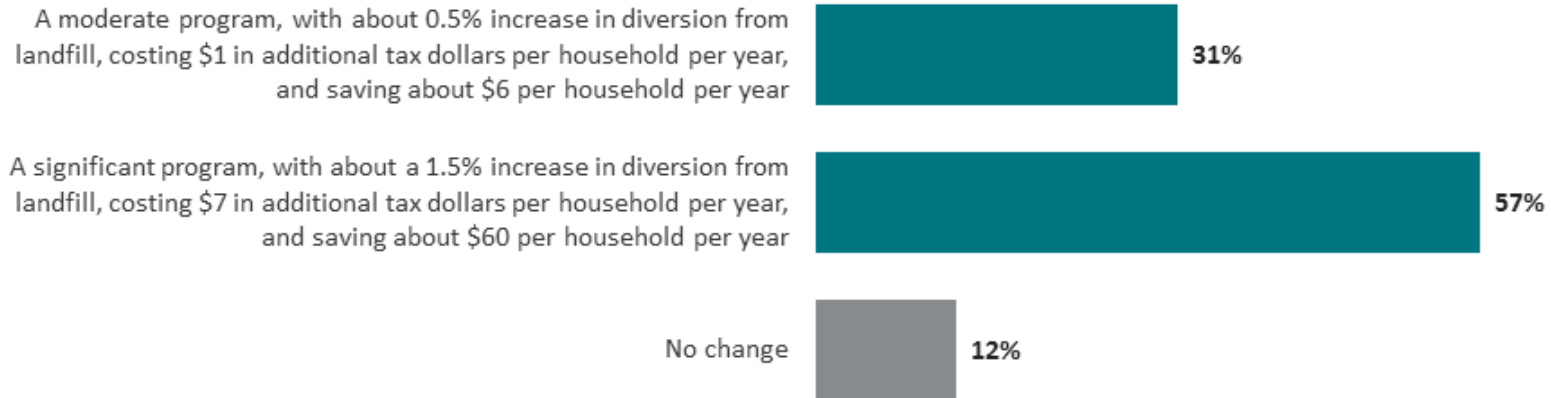
However, reducing food waste, generated by households, from ending up in landfill will save money for households and for municipalities.

The City is considering some food waste reduction initiatives.

PREFERRED INVESTMENT OPTIONS FOR CITY

Residents were presented with two options as to whether the City should invest moderate or significant resources on these waste diversion initiatives.

About six in ten (57%) prefer investing significant resources on waste diversion initiatives, while three in ten (31%) choose a moderate program, and one in ten (12%) prefer no change.



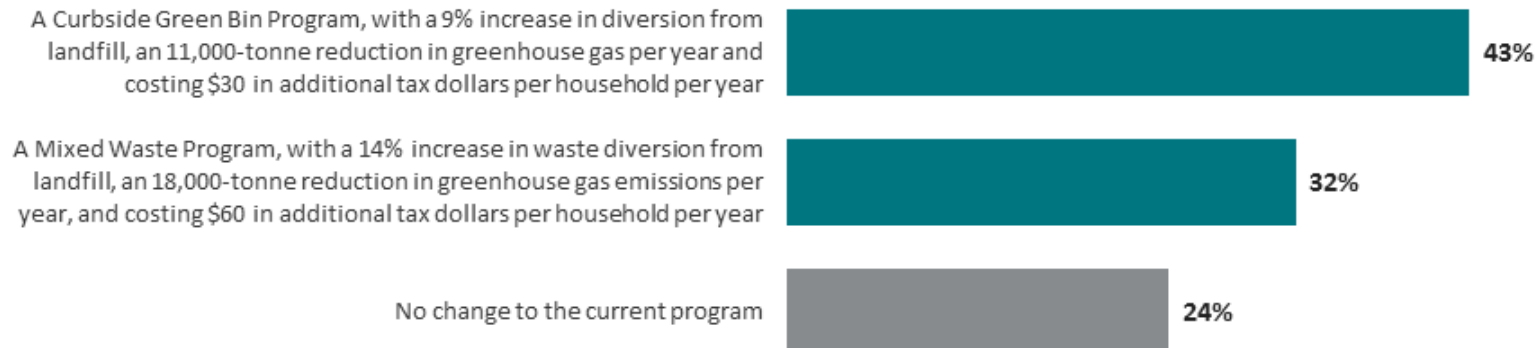
Q.3. The City could invest moderate or significant resources on these initiatives. Which do you prefer? (select one)
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PREFERRED CITY-WIDE ORGANICS CURBSIDE PROGRAM

When presented with options for a City-wide Organics Curbside Program, more than four in ten (43%) prefer a Curbside Green Bin Program, while one-third (32%) choose a Mixed Waste Program and one-quarter (24%) prefer no change.

Another initiative is a city-wide organics curbside program which would provide the biggest boost to waste diversion.



Q.5. The City is considering two options for a City-wide Organics Curbside Program. Which would you prefer?
Base: All Respondents (n=301)

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PREFERRED CITY-WIDE ORGANICS CURBSIDE PROGRAM – BY SUBGROUPS

There are no significant differences among subgroups in preference for a Mixed Waste Program. Renters and those who do not currently compost 50% or more of their fruit/vegetable scraps in a home composter are more likely to prefer a Curbside Green Bin Program. Homeowners are more likely to prefer no change to the current program.

	HOME OWNERSHIP		CURRENTLY COMPOST 50% OR MORE OF THEIR FRUIT/VEGETABLE SCRAPS IN HOME COMPSTER	
	Rent	Own	Yes	No
<i>Base: All respondents</i>	<i>n=118</i>	<i>n=183</i>	<i>n=86*</i>	<i>N=215</i>
A Curbside Green Bin Program: [includes weekly collection of organic waste from approximately 120,000 households, where it is separated by homeowners and placed out for separate organic waste pickup], with a 9% increase in diversion from landfill, an 11,000-tonne reduction in greenhouse gas per year and costing \$30 in additional tax dollars per household per year.	51%	38%	32%	48%
A Mixed Waste Program: Residents would continue to place organic waste in the garbage and it would be separated out at a mixed waste processing facility to be composted or digested., with a 14% increase in waste diversion from landfill, an 18,000-tonne reduction in greenhouse gas emissions per year, and costing \$60 in additional tax dollars per household per year.	32%	32%	38%	30%
No change to the current program	17%	30%	30%	22%

© 2018 Ipsos Q.5. The City is considering two options for a City-wide Organics Curbside Program. Which would you prefer?
Base: All Respondents (n=301)

*Small base (under n=100)

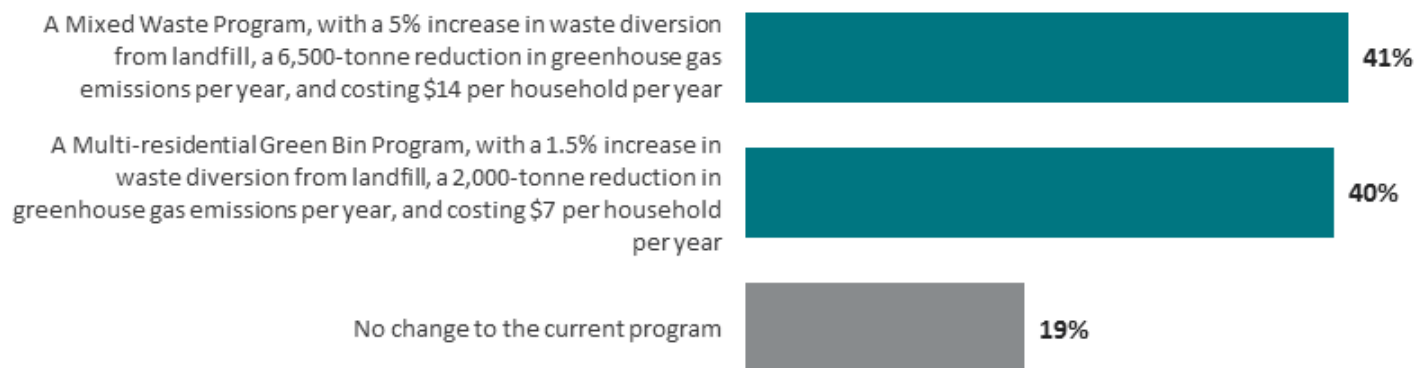


PREFERRED ORGANICS MULTI-RESIDENTIAL PROGRAM

When presented with options for a City-wide Organics Multi-residential Program, opinion is divided with four in ten (40%) who prefer a Multi-residential Green Bin Program and a similar number (41%) choose a Mixed Waste Program. Two in ten (19%) do not want change to the current program.

About 30% of London's households live in multi-residential buildings (apartment/condo) and generate approximately 22,000 tonnes of garbage per year.

Another initiative is a City-wide Organics Multi-residential Program similar to curbside.



Q.6. The City is considering two options for a City-wide Organics Multi-residential Program. Which would you prefer? (select one)
Base: All Respondents (n=301)

PREFERRED ORGANICS MULTI-RESIDENTIAL PROGRAM – BY SUBGROUPS

There are no significant differences among subgroups in preference for a Mixed Waste Program. Preference for a Multi-residential Green Bin is higher among renters, those who have lived fewer than 20 years in London, and those with household income of below \$50K. Preference for no change to the current program is higher among those age 35 to 54, homeowners, and those with household income of \$100K or above.

	AGE			HOME OWNERSHIP		TIME LIVED IN LONDON		HOUSEHOLD INCOME BEFORE TAXES		
	18-34	35-54	55+	Rent	Own	Less than 20 years	20 + years	<\$50K	\$50K- <\$100K	\$100K+
<i>Base: All respondents</i>	<i>n=48*</i>	<i>n=85*</i>	<i>n=168</i>	<i>n=118</i>	<i>n=183</i>	<i>n=101</i>	<i>n=200</i>	<i>n=145</i>	<i>n=106</i>	<i>n=50*</i>
A Mixed Waste Program , with a 5% increase in waste diversion from landfill, a 6,500-tonne reduction in greenhouse gas emissions per year, and costing \$14 per household per year	43%	36%	45%	41%	42%	39%	43%	38%	48%	38%
A Multi-residential Green Bin Program , with a 1.5% increase in waste diversion from landfill, a 2,000-tonne reduction in greenhouse gas emissions per year, and costing \$7 per household per year	49%	36%	36%	47%	34%	48%	34%	48%	33%	26%
No change to the current program	9%	28%	20%	12%	24%	14%	23%	14%	18%	36%

Q.6. The City is considering two options for a City-wide Organics Multi-residential Program. Which would you prefer? (select one)

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Base: All Respondents (n=301)

*Small base (under n=100)



DROPPING OFF MATERIALS AT RECYCLING DEPOT

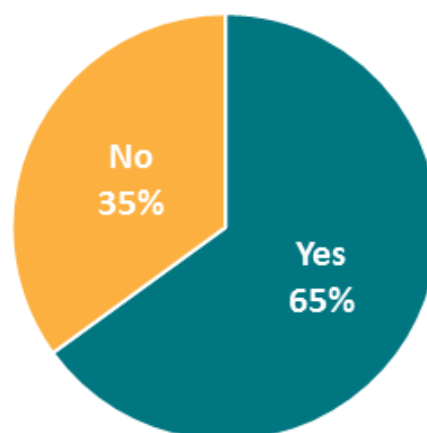


Over the last number of years, the City has started recycling programs for items such as electronics, scrap metal, Christmas trees and tires.

These items are no longer collected at the curb with garbage and should not be placed in bins at high-rise buildings. Instead, they can be dropped off at depots for recycling.

PREPARED TO DELIVER MORE MATERIALS TO DROP-OFF DEPOTS

When residents were informed that items such as electronics, scrap metal, Christmas trees and tires are no longer picked up curbside and have to be dropped off at a depot, two-thirds (65%) indicate that they are prepared to deliver more materials to drop-off depots.



Q.7. Are you prepared to deliver more materials (e.g., old furniture, carpet, small appliances, mattresses, etc.) to drop off-depots?
Base: All Respondents (n=301)

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PREPARED TO DELIVER MORE MATERIALS TO DROP-OFF DEPOTS – BY SUBGROUPS

Openness to deliver more materials to drop-off depots is higher among those aged 18 to 34 and 55+, and among those who have household incomes of between \$50K and lower than \$100K.

Prepared To Deliver More Materials	AGE			TIME LIVED IN LONDON		HOUSEHOLD INCOME BEFORE TAXES		
	18-34	35-54	55+	Less than 20 years	20 + years	<\$50K	\$50K- <\$100K	\$100K+
Base: All respondents	n=48*	n=85*	n=168	n=101	n=200	n=145	n=106	n=50*
%Yes	74%	53%	67%	74%	59%	60%	75%	59%

Q.7. Are you prepared to deliver more materials (e.g., old furniture, carpet, small appliances, mattresses, etc.) to drop off-depots?
Base: All Respondents (n=301)

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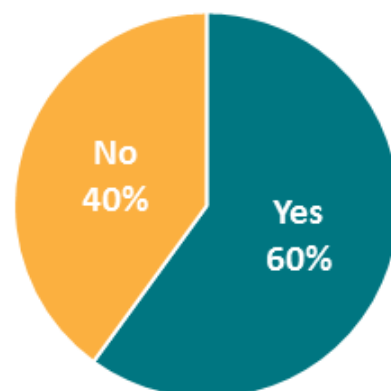
*Small base



BANNING ADDITIONAL MATERIALS FROM GARBAGE PICKUP

Six in ten (60%) residents support banning additional materials from garbage pickup, such as old furniture, carpet, small appliances, mattresses, etc., if they could drop them off at a depot for recycling.

Residents who are prepared to deliver more materials to drop-off depots are more likely to support banning additional materials from garbage pickup.



Support banning additional materials from garbage pickup	Prepared to deliver more materials to drop-off depots	
	Yes	No
Base: All respondents	n=195	n=106
% Yes	80%	22%

Q.8. Would you support banning additional materials from garbage pickup (e.g., old furniture, carpet, small appliances, mattresses, etc.) if you could drop them off at a depot for recycling? Base: All Respondents (n=301)

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DEMOGRAPHICS



DEMOGRAPHICS

LIVED IN CITY OF LONDON		RESIDENTIAL PROPERTY		RENT OR OWN	
Less than 1 year	4%	House (single family dwelling)	49%	Rent	44%
1 to less than 5 years	12%	House (multiple family dwelling)	9%	Own	56%
5 to less than 10 years	8%	Apartment	27%	GENDER	
10 to less than 20 years	17%	Condominium	12%	Men	48%
20 years or more	59%	Other (please specify)	3%	Women	52%
EDUCATION		HOUSEHOLD INCOME		AGE	
Less than high school graduation	3%	Less than \$25,000	21%	18-34	31%
Completed high school	18%	\$25,000 to less than \$50,000	30%	35-54	32%
Some/completed trade/technical school	7%	\$50,000 to less than \$75,000	19%	55+	37%
Some/completed college	30%	\$75,000 to less than \$100,000	14%		
Some/completed university	23%	\$100,000 to less than \$150,000	11%		
Graduate/professional studies	18%	\$150,000 or more	5%		

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Appendix E

Residential Waste Composition

**Table E1: Estimated 2017 Curbside and Multi-Residential Garbage
Composition**

**Table E2: Estimated 2017 Curbside Garbage and Recycling
Composition**

**Table E3: Estimated 2017 Multi-Residential Garbage and Recycling
Composition**

**Table E4: Estimated 2017 Combined Curbside and Multi-Residential
Garbage and Recycling Composition**

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This appendix provides a summary of the composition of the City's waste (including organics, compostables) and Blue Box recyclables.

Waste composition audits of garbage and Blue Box recyclables were conducted in London 2016/2017 and winter 2018 (with funding, coordination and sampling methodology provided by Stewardship Ontario (SO) and the Resource Productivity and Recovery Authority (RPRA). The waste audits consisted of four separate sets of audits conducted at specific time periods throughout the year (i.e., spring, summer, fall, winter) to address any issues of seasonality. Each audit included two samples taken over two consecutive waste collections to take into account issues of sporadic set out. The audit sample consisted of 100 curbside homes and multi-residential homes to achieve statistical significance. The same households were sampled for each of the four sets of audits.

The audit data was combined with other City data (quantities of garbage and Blue Box recyclables collected from single family homes and multi-residential, multi-residential waste and Blue Box audits from 2017, etc.) to create the following tables:

- Table E1: Estimated 2017 Curbside and Multi-Residential Garbage Composition
- Table E2: Estimated 2017 Curbside Garbage and Recycling Composition
- Table E3: Estimated 2017 Multi-Residential Garbage and Recycling Composition
- Table E4: Estimated 2017 Combined Curbside and Multi-Residential Garbage and Recycling Composition

Waste auditing has been performed and paid for every couple of years in London for more than 15 years by Stewardship Ontario. This work helps London (or other) staff:

- understand the changing composition of the waste stream;
- determine what materials are being captured by London and at what percentages;
- determine what materials should be focused on for waste diversion and recovery;
- determine the calorific value of the waste stream for the purpose of recovering energy through solid recovered fuel, creation of syngas, etc.;
- compare with other communities in Ontario and other areas of Canada; and
- provide data for researchers and academics to pursue additional analysis.

Table E1: Estimated 2017 Curbside and Multi-Residential Garbage Composition

Material Category	Curbside			Multi-Residential			Total
	Per Household kg/yr	Total tonne/yr	%	Per Household kg/yr	Total tonne/yr	%	Total tonne/yr
1. Paper							
Newsprint	2	227	0.4	10	541	2.4	768
Magazines & Catalogues	1	130	0.2	3	148	0.7	278
Directories/Telephone Books	0.1	9	0.0	0.1	3	0.0	12
Other Printed Paper – Recyclable	4	525	0.9	5	300	1.3	825
Other Printed Materials – Non-Recyclable	4	507	0.8	4	227	1.0	734
Total Paper	11	1,397	2.3	22	1,219	5.4	2,616
2. Paper Packaging							
Gable Top Containers	1	76	0.1	1	69	0.3	145
Aseptic Containers	1	70	0.1	0.4	23	0.1	93
Spiral Wound Containers	0.3	35	0.1	0.3	16	0.1	52
Corrugated Cardboard	4	454	0.7	11	615	2.7	1,069
Boxboard/Cores (Tubes)	9	1,112	1.8	12	647	2.9	1,758
Polycoat Cups/Ice Cream Containers	2	232	0.4	2	104	0.5	336
Other Bleached Long Polycoat Fibre	3	370	0.6	2	101	0.4	471
Other Paper Laminate Categories – Non-Recyclable	1	103	0.2	1	29	0.1	132
Total Paper Packaging	20	2,452	4.0	29	1,604	7.1	4,055
3. Plastics							
#1 PET	4	440	0.7	6	348	1.5	789
#2 HDPE	1	147	0.2	2	108	0.5	255
#3 - #7 Mixed Plastics	4	472	0.8	4	224	1.0	697
#6 PS - Expanded Polystyrene	3	340	0.6	2	99	0.4	439
Large HDPE & PP Pails & Lids	0.2	21	0.0	0.4	23	0.1	45
LDPE/HDPE Film	17	2,124	3.5	15	858	3.8	2,982
Plastic Laminates – Mostly Non-Recyclable	9	1,082	1.8	6	330	1.5	1,412
Other Rigid Plastic Packaging– Mostly Non-Recyclable	3	401	0.7	2	138	0.6	539
Other Plastic-Non-Packaging/ Durable – Non-Recyclable	8	985	1.6	5	298	1.3	1,283
Total Plastics	49	6,014	9.8	44	2,426	10.8	8,440

Table E1: Estimated 2017 Curbside and Multi-Residential Garbage Composition (Continued)

Material Category	Curbside			Multi-Residential			Total
	Per Household kg/yr	Total tonne/yr	%	Per Household kg/yr	Total tonne/yr	%	Total tonne/yr
4. Metals							
Aluminum – Food/Beverage Containers	1	138	0.2	2	104	0.5	243
Aluminum - Foil & Trays	2	192	0.3	1	80	0.4	272
Steel – Food & Beverage Containers	2	190	0.3	2	132	0.6	322
Steel/Aluminum – Aerosol Containers (Non-MHSW)	0.4	56	0.1	1	28	0.1	84
Other Aluminum– Non-Blue Box	0.1	13	0.0	0.1	3	0.0	16
Other Steel – Non-Blue Box	3	432	0.7	4	211	0.9	643
Total Metals	8	1,022	1.7	10	559	2.5	1,581
5. Glass							
Clear Glass	3	408	0.7	4	248	1.1	656
Coloured Glass	1	86	0.1	1	65	0.3	151
Other Glass – Non-Blue Box	5	575	0.9	2	131	0.6	706
Total Glass	9	1,069	1.7	8	444	2.0	1,513
6. Municipal Hazardous and Special Waste							
Paint & Stain Containers	0.1	8	0.0	0.1	7	0.0	14
Batteries	0.2	31	0.0	0.2	9	0.0	40
Other MHSW	0.5	60	0.1	0.1	4	0.0	63
Total MHSW	1	98	0.2	0	19	0.1	118
7. Organic Materials							
Avoidable Food Waste	118	14,586	23.8	84	4,700	20.9	19,286
Unavoidable Food Waste	60	7,437	12.1	48	2,693	12.0	10,129
Yard Waste	13	1,619	2.6	8	458	2.0	2,077
Tissue/Towelling – Non-Recyclable	26	3,202	5.2	22	1,243	5.5	4,445
Diapers & Sanitary Products	38	4,665	7.6	21	1,142	5.1	5,808
Pet Waste	51	6,282	10.3	40	2,200	9.8	8,482
Total Organic Materials	305	37,791	61.7	224	12,435	55.2	50,226
8. Other Materials							
Textiles	15	1,826	3.0	16	877	3.9	2,703
C,R&D	25	3,122	5.1	28	1,531	6.8	4,653
Electronics	3	395	0.6	3	177	0.8	571
Other Non-Recyclable Materials	30	3,724	6.1	22	1,229	5.5	4,952
Bulky Items	19	2,300	3.8	0.0	0.0	0.0	2,300
Total Other Materials	92	11,367	18.6	69	3,814	16.9	15,881*
Grand Total	495	61,210	100	405	22,520	100	83,730*

*Page revised August 1, 2018

Table E2: Estimated 2017 Curbside Garbage and Recycling Composition

Material Category	Materials Accepted in London's Blue Box Program	Estimated Curbside Composition						
		City				Per Household		
		Blue Box Material Recycled	Material in Garbage	Total	Capture Rate of Blue Box Materials	Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	%	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
1. Paper								
Newsprint	X	4,656	227	4,883	95	38	2	39
Magazines & Catalogues	X	1,044	130	1,175	89	8	1	9
Directories/ Telephone Books	X	80	9	89	90	1	0.1	1
Other Printed Paper – Recyclable	X	680	525	1,205	56	5	4	10
Other Printed Materials –Non-Recyclable		584	507	1,091	54	5	4	9
Total Paper		7,045	1,397	8,442	83	57	11	68
Targeted BB Paper		6,460	891	7,351	88	52	7	59
2. Paper Packaging								
Gable Top Containers	X	286	76	362	79	2	1	3
Aseptic Containers	X	94	70	163	57	1	1	1
Spiral Wound Containers	X	39	35	74	52	0	0	1
Corrugated Cardboard	X	4,191	454	4,645	90	34	4	38
Boxboard/Cores (Tubes)	X	2,429	1,112	3,541	69	20	9	29
Polycoat Cups/Ice Cream Containers	X	134	232	366	37	1	2	3
Other Bleached Long Polycoat Fibre		63	370	433	15	1	3	3
Other Paper Laminate Categories – Non-Recyclable		32	103	135	24	0	1	1
Total Paper Packaging		7,267	2,452	9,719	75	59	20	79
Targeted BB Paper Packaging		7,172	1,979	9,151	78	58	16	74

Table E2: Estimated 2017 Curbside Garbage and Recycling Composition (Continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Curbside Composition						
		City				Per Household		
		Blue Box Material Recycled	Material in Garbage	Total	Capture Rate of Blue Box Materials	Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	%	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
3. Plastics								
#1 PET	X	1,443	440	1,883	77	12	4	15
#2 HDPE	X	473	147	620	76	4	1	5
#3 - #7 Mixed Plastics	X	398	472	870	46	3	4	7
#6 PS – Expanded Polystyrene		14	340	354	4	0.1	3	3
Large HDPE & PP Pails & Lids	X	46	21	67	68	0.4	0.2	0.5
LDPE/HDPE Film		80	2,124	2,204	4	1	17	18
Plastic Laminates – Mostly Non-Recyclable		27	1,082	1,109	2	0.2	9	9
Other Rigid Plastic Packaging – Mostly Non-Recyclable		157	401	559	28	1	3	5
Other Plastics - Non-Packaging/Durable – Non-Recyclable		193	985	1,178	16	2	8	10
Total Plastics		2,831	6,014	8,844	32	23	49	71
Targeted BB Plastics		2,360	1,081	3,441	69	19	9	28
4. Metals								
Aluminum – Food/Beverage Containers	X	389	138	527	74	3	1	4
Aluminum - Foil & Trays	X	26	192	219	12	0.2	2	2
Steel - Food & Beverage Containers	X	557	190	747	75	5	2	6
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	43	56	98	43	0.3	0.4	1
Other Aluminum – Non-Blue Box		2	13	15	12	0.0	0.1	0.1
Other Steel – Non-Blue Box		129	432	561	23	1	3	5
Total Metals		1,146	1,022	2,168	53	9	8	18
Targeted BB Metals		1,016	576	1,592	64	8	5	13

Table E2: Estimated 2017 Curbside Garbage and Recycling Composition (Continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Curbside Composition						
		City				Per Household		
		Blue Box Material Recycled	Material in Garbage	Total	Capture Rate of Blue Box Materials	Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	%	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
5. Glass								
Clear Glass	X	1,794	408	2,202	81	14	3	18
Coloured Glass	X	653	86	739	88	5	1	6
Other Glass – Non-Blue Box		82	575	658	13	1	5	5
Total Glass		2,530	1,069	3,599	70	20	9	29
Targeted BB Glass		2,447	494	2,941	83	20	4	24
6. Municipal Hazardous and Special Waste								
Paint & Stain Containers	X	12	8	20	60	0.1	0.1	0.2
Batteries		0.1	31	31	0	0.0	0.2	0.2
Other MHSW		0.0	60	60	0	0.0	0.5	0.5
Total MHSW		12	98	110	11	0.1	1	1
Targeted BB MHSW		12	8	20	60	0.1	0.1	0.2
7. Organic Materials								
Avoidable Food Waste		104	14,586	14,689	1	1	118	119
Unavoidable Food Waste		5	7,437	7,442	0	0.0	60	60
Yard Waste		0.0	1,619	1,619	0	0.0	13	13
Tissue/Towelling – Non-Recyclable		0.0	3,202	3,202	0	0.0	26	26
Diapers & Sanitary Products		0.0	4,665	4,665	0	0.0	38	38
Pet Waste		0.0	6,282	6,282	0	0.0	51	51
Total Organic Materials		109	37,791	37,900	0	1	305	306
8. Other Materials								
Textiles		0.0	1,826	1,826	0	0.0	15	15
C,R&D		0.0	3,122	3,122	0	0.0	25	25
Electronics		0.0	395	395	0	0.0	3	3
Other Non-Recyclable Materials		337	3,724	4,060	8	3	30	33
Bulky Items		0.0	2,300	2,300	0	0.0	19	19
Total Other Materials		337	11,367	11,704	3	3	92	95
Grand Total - Targeted BB		19,467	5,029	24,495	79	157	41	198
Grand Total		21,275	61,210	82,485	26	172	495	666

Table E3: Estimated 2017 Multi-Residential Garbage and Recycling Composition

Material Category	Materials Accepted in London's Blue Box Program	Estimated Multi-Residential Composition (Excludes Bulky Items)								
		City						Per Household		
		Blue Box Material Recycled	Garbage			Total Garbage and Recycling	Capture Rate of Blue Box Materials Units with Recycling	Recycling Units		
			Units with Recycling (51,440)	Units without Recycling (4,180)	Total			Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	tonne/yr	tonne/yr	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
1. Paper										
Newsprint	X	935	430	111	541	1,476	69%	18	8	27
Magazines & Catalogues	X	184	123	25	148	331	60%	4	2	6
Directories/ Telephone Books	X	5	2	1	3	8	66%	0.1	0.0	0.1
Other Printed Paper-Recyclable	X	157	266	34	300	457	37%	3	5	8
Other Printed Materials - Non-Recyclable		140	200	28	227	367	41%	3	4	7
Total Paper		1,420	1,021	198	1,219	2,639	54%	28	20	47
Targeted BB Paper		1,280	821	171	992	2,272	56%	23	16	39
2. Paper Packaging										
Gable Top Containers	X	64	59	10	69	133	52%	1	1	2
Aseptic Containers	X	12	20	3	23	35	38%	0.2	0.4	1
Spiral Wound Containers	X	11	14	2	16	28	44%	0.2	0.3	0.5
Corrugated Cardboard	X	378	541	75	615	993	41%	7	11	18
Boxboard/Cores (Tubes)	X	440	565	82	647	1,087	44%	9	11	20
Polycoat Cups/Ice Cream Containers	X	16	95	9	104	119	14%	0.3	2	2
Other Bleached Long Polycoat Fibre		6	93	8	101	107	6%	0.1	2	2
Other Paper Laminate Categories - Non-Recyclable		2	27	2	29	31	6%	0.0	1	1
Total Paper Packaging		929	1,413	190	1,604	2,533	37%	18	27	46
Targeted BB Paper Packaging		921	1,294	180	1,474	2,395	42%	18	25	43

Table E3: Estimated 2017 Multi-Residential Garbage and Recycling Composition (Continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Multi-Residential Composition (Excludes Bulky Items)								
		City						Per Household		
		Blue Box Material Recycled	Garbage			Total Garbage and Recycling	Capture Rate of Blue Box Materials Units with Recycling	Recycling Units		
			Units with Recycling (51,440)	Units without Recycling (4,180)	Total			Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	tonne/yr	tonne/yr	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
3. Plastics										
#1 PET	X	307	299	49	348	655	51%	6	6	12
#2 HDPE	X	92	93	15	108	200	50%	2	2	4
#3 - #7 Mixed Plastics	X	77	202	23	224	302	28%	2	4	5
#6 PS - Expanded Polystyrene		5	91	8	99	104	5%	0.1	2	2
Large HDPE & PP Pails & Lids	X	2	21	2	23	26	10%	0.0	0.4	0.5
LDPE/HDPE Film		43	790	68	858	900	5%	1	15	16
Plastic Laminates – Mostly Non-Recyclable		12	304	26	330	342	4%	0	6	6
Other Rigid Plastic Packaging – Mostly Non-Recyclable		30	125	13	138	168	19%	1	2	3
Other Plastic- Non-Packaging/Durable -Non-Recyclable		40	272	25	298	338	13%	1	5	6
Total Plastics		608	2,198	228	2,426	3,034	22%	12	43	55
Targeted BB Plastics		479	615	89	704	1,182	44%	9	12	21
4. Metals										
Aluminum – Food/Beverage Containers	X	62	92	13	104	167	40%	1	2	3
Aluminum – Foil & Trays	X	7	74	7	80	87	9%	0.1	1	2
Steel - Food & Beverage Containers	X	125	113	19	132	257	53%	2	2	5
Steel/Aluminum – Aerosol Containers (Non-MHSW)	X	8	26	3	28	37	25%	0.2	0.5	1
Other Aluminum – Non-Blue Box		1	3	0	3	4	22%	0.0	0.1	0.1
Other Steel – Non-Blue Box		10	195	17	211	221	5%	0	4	4
Total Metals		213	501	58	559	772	30%	4	10	14
Targeted BB Metals		203	304	41	345	547	40%	4	6	10

Table E3: Estimated 2017 Multi-Residential Garbage and Recycling Composition (Continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Multi-Residential Composition (Excludes Bulky Items)								
		City						Per Household		
		Blue Box Material Recycled	Garbage			Total Garbage and Recycling	Capture Rate of Blue Box Materials Units with Recycling	Recycling Units		
			Units with Recycling (51,440)	Units without Recycling (4,180)	Total			Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	tonne/yr	tonne/yr	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
5. Glass										
Clear Glass	X	234	213	35	248	482	52%	4	4	8
Coloured Glass	X	53	57	9	65	118	48%	1	1	2
Other Glass – Non-Blue Box		61	117	14	131	192	34%	1	2	3
Total Glass		348	386	58	444	792	47%	7	8	14
Targeted BB Glass		287	270	43	313	600	52%	6	5	11
6. Municipal Hazardous and Special Waste										
Paint & Stain Containers	X	1	6	1	7	7	12%	0.0	0.1	0.1
Batteries		0.1	9	1	9	9	1%	0.0	0.2	0.2
Other MHSW		0.0	3	0	4	4	0%	0.0	0.1	0.1
Total MHSW		1	18	2	19	20	5%	0.0	0.3	0.4
Targeted BB MHSW		1	6	1	7	7	12%	0.0	0.1	0.1
7. Organic Materials										
Avoidable Food Waste		10	4,346	354	4,700	4,709	0%	0.2	84	85
Unavoidable Food Waste		1	2,490	202	2,693	2,694	0%	0.0	48	48
Yard Waste		0.0	423	34	458	458	0%	0.0	8	8
Tissue/Towelling – Non-Recyclable		0.0	1,149	93	1,243	1,243	0%	0.0	22	22
Diapers & Sanitary Products		0.0	1,057	86	1,142	1,142	0%	0.0	21	21
Pet Waste		0.0	2,035	165	2,200	2,200	0%	0.0	40	40
Total Organic Materials		11	11,500	935	12,435	12,446	0%	0	224	224
8. Other Materials										
Textiles		0.0	811	66	877	877	0%	0.0	16	16
C,R&D		0.0	1,416	115	1,531	1,531	0%	0.0	28	28
Electronics		0.0	163	13	177	177	0%	0.0	3	3
Other Non-Recyclable Materials		81	1,130	98	1,229	1,310	7%	2	22	24
Bulky Items		0.0	0.0	0.0	0.0	0.0	0%	0.0	0.0	0.0
Total Other Materials		81	3,521	293	3,814	3,895	2%	2	68	70
Grand Total - Targeted BB		3,170	3,309	525	3,834	7,004	49%	62	64	126
Grand Total		3,613	20,558	1,962	22,520	26,132	15%	70	400	470

Table E4: Estimated 2017 Combined Curbside and Multi-Residential Garbage and Recycling Composition

Material Category	Materials Accepted in London's Blue Box Program	Estimated Overall Composition						
		City				Per Household		
		Blue Box Material Recycled	Material in Garbage	Total	Capture Rate of Blue Box Materials	Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	%	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
1. Paper								
Newsprint	X	5,591	768	6,359	88	31	4	35
Magazines & Catalogues	X	1,228	278	1,506	82	7	2	8
Directories/ Telephone Books	X	85	12	97	88	0.5	0.1	1
Other Printed Paper – Recyclable	X	837	825	1,662	50	5	5	9
Other Printed Materials – Non-Recyclable		724	734	1,458	50	4	4	8
Total Paper		8,465	2,616	11,081	76	47	15	62
Targeted BB Paper		7,741	1,882	9,623	80	43	10	54
2. Paper Packaging								
Gable Top Containers	X	350	145	495	71	2	1	3
Aseptic Containers	X	106	93	199	53	1	1	1
Spiral Wound Containers	X	50	52	102	49	0.3	0.3	1
Corrugated Cardboard	X	4,569	1,069	5,638	81	25	6	31
Boxboard/Cores (Tubes)	X	2,869	1,758	4,627	62	16	10	26
Polycoat Cups/Ice Cream Containers	X	149	336	485	31	1	2	3
Other Bleached Long Polycoat Fibre		69	471	540	13	0.4	3	3
Other Paper Laminate Categories – Non-Recyclable		34	132	166	20	0.2	1	1
Total Paper Packaging		8,196	4,055	12,251	67	46	23	68
Targeted BB Paper Packaging		8,093	3,453	11,546	70	45	19	64

Table E4: Estimated 2017 Combined Curbside and Multi-Residential Garbage and Recycling Composition (Continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Overall Composition						
		City				Per Household		
		Blue Box Material Recycled tonne/yr	Material in Garbage tonne/yr	Total tonne/yr	Capture Rate of Blue Box Materials %	Blue Box Material Recycled kg/hhld/yr	Material in Garbage kg/hhld/yr	Total kg/hhld/yr
3. Plastics								
#1 PET	X	1,750	789	2,538	69	10	4	14
#2 HDPE	X	565	255	820	69	3	1	5
#3 - #7 Mixed Plastics	X	476	697	1,172	41	3	4	7
#6 PS - Expanded Polystyrene		20	439	459	4	0	2	3
Large HDPE & PP Pails & Lids	X	48	45	93	52	0	0	1
LDPE/HDPE Film		122	2,982	3,104	4	1	17	17
Plastic Laminates – Mostly Non-Recyclable		39	1,412	1,451	3	0.2	8	8
Other Rigid Plastic Packaging – Mostly Non-Recyclable		187	539	726	26	1	3	4
Other Plastic – Non-Packaging/Durable-Non-Recyclable		232	1,283	1,515	15	1	7	8
Total Plastics		3,439	8,440	11,879	29	19	47	66
Targeted BB Plastics		2,838	1,785	4,623	61	16	10	26
4. Metals								
Aluminum - Food/Beverage Containers	X	451	243	694	65	3	1	4
Aluminum - Foil & Trays	X	34	272	306	11	0.2	2	2
Steel – Food & Beverage Containers	X	682	322	1,004	68	4	2	6
Steel/Aluminum – Aerosol Containers (Non-MHSW)	X	51	84	135	38	0.3	0.5	1
Other Aluminum – Non-Blue Box		3	16	19	13	0.0	0.1	0
Other Steel – Non-Blue Box		139	643	782	18	1	4	4
Total Metals		1,359	1,581	2,940	46	8	9	16
Targeted BB Metals		1,218	921	2,139	57	7	5	12
5. Glass								
Clear Glass	X	2,028	656	2,684	76	11	4	15
Coloured Glass	X	706	151	857	82	4	1	5
Other Glass – Non-Blue Box		144	706	850	17	1	4	5
Total Glass		2,878	1,513	4,390	66	16	8	24
Targeted BB Glass		2,734	806	3,541	77	15	4	20

Table E4: Estimated 2017 Combined Curbside and Multi-Residential Garbage and Recycling Composition (Continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Overall Composition						
		City				Per Household		
		Blue Box Material Recycled	Material in Garbage	Total	Capture Rate of Blue Box Materials	Blue Box Material Recycled	Material in Garbage	Total
		tonne/yr	tonne/yr	tonne/yr	%	kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
6. Municipal Hazardous and Special Waste								
Paint & Stain Containers	X	13	14	27	47%	0.1	0.1	0.2
Batteries		0.2	40	40	0%	0.0	0.2	0.2
Other MHSW		0.0	63	63	0%	0.0	0.4	0.4
Total MHSW		13	118	130	10%	0.1	1	1
Targeted BB MHSW		13	14	27	47%	0.1	0.1	0.2
7. Organic Materials								
Avoidable Food Waste		113	19,286	19,399	1%	1	108	108
Unavoidable Food Waste		7	10,129	10,136	0%	0	56	56
Yard Waste		0.0	2,077	2,077	0%	0	12	12
Tissue/Towelling – Non-Recyclable		0.0	4,445	4,445	0%	0	25	25
Diapers & Sanitary Products		0.0	5,808	5,808	0%	0	32	32
Pet Waste		0.0	8,482	8,482	0%	0	47	47
Total Organic Materials		120	50,226	50,346	0%	1	280	281
8. Other Materials								
Textiles		0.0	2,703	2,703	0%	0.0	15	15
C,R&D		0.0	4,653	4,653	0%	0.0	26	26
Electronics		0.0	571	571	0%	0.0	3	3
Other Non-Recyclable Materials		418	4,952	5,370	8%	2	28	30
Bulky Items		0.0	2,300	2,300	0%	0.0	13	13
Total Other Materials		418	15,181	15,599	3%	2	85	87
Grand Total - Targeted BB		22,637	8,862	31,499	72%	126	49	176
Grand Total		24,887	83,730	108,617	23%	139	467	605

Appendix F

Overview of Key Environmental, Social, Financial and Technical Considerations for Various Waste Diversion Programs/Initiatives

Food Waste Avoidance

Home (Backyard) Composting

Community Composting

Curbside Organics Collection

Multi-Residential Organics Collection

Carpet

Electrical Equipment/Small Metal

Mattresses

Bulky Plastics

Textiles

Wooden Furniture

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Source of GHG reduction estimates

GHG reductions estimates have been estimated using the Environment Canada's GHG Calculator for Waste Management model and the U.S Environmental Protection Agency's Waste Reduction Model (WARM, version 14 released March 2016).

Environment Canada created the GHG Calculator for Waste Management in 2005 to help municipalities and other users estimate lifecycle GHG emission reductions from different waste management practices, including recycling, composting, anaerobic digestion, combustion, and landfilling. This model is based on the EPA WARM lifecycle emissions estimating tool, which has been in use and updated since 1993.

Various models exist worldwide and may produce different results. For the purpose of the 60% Waste Diversion Action Plan, both models were used for the potential waste diversion programs and initiatives. The EPA WARM was used to estimate GHG reductions for carpet, electrical equipment/ small metal, mattresses, bulky plastics and wooden furniture. The Environment Canada model was used to estimate GHG reductions for food waste avoidance, home composting, community composting, curbside organics collection and multi-residential organics collection. Textiles GHG reductions were estimated using the reduction factor provided in the scientific journal article *Environmental Sustainability through Textile Recycling* published in the Journal of Textile Science & Engineering Environmental Sustainability (Chavan, J Textile Sci Eng 2014, S2 <https://www.omicsonline.org/open-access/environmental-sustainability-through-textile-recycling-2165-8064.S2-007.pdf>).

Program estimates

The information in this appendix is consistent with the information provided to the public for feedback. Please note that some of the program estimates in the main body are for pilot or reduced programs and therefore will be different than the estimates in this appendix for a fully implemented program.

Consideration			Food Waste Avoidance	
			Moderate Outreach Program	Significant Outreach Program
Environmental	Change in Diversion	Annual Tonnes Diverted	200 to 600	800 to 2,100
		Contribution to 60% Target	0.1% to 0.4%	0.5% to 1.3%
	GHG Benefits	Reduction per Tonne Diverted	2.9 tonnes	
		Annual Reduction (tonnes)	580 to 1,750 (145 to 440 cars removed from the road ^a)	2,300 to 6,100 (580 to 1,500 cars removed from the road ^a)
Social	Public Support		Strong support for some kind of program	
	Resident Benefits/ Issues		• Potential homeowner savings of \$900,000 to \$2,700,000	• Potential homeowner savings of \$4,000,000 to \$10,000,000
Financial	Cost ^b	Collection	\$0	\$0
		Processing	\$0	\$0
		Other	\$150,000 to \$200,000	\$1,100,000 to \$1,200,000
		Total	\$150,000 to \$200,000	\$1,100,000 to \$1,200,000
	Cost per Household		\$0.9 to \$1.1	\$6.5 to \$7.0
	Market/Revenue		Not applicable	Not applicable
Technical	Collection Issues		Not applicable	Not applicable
	Processing Issues		Not applicable	Not applicable
	Other		• Pilot project completed, lower cost program more effective in reducing avoidable food waste in garbage • Effectiveness on large scale unknown	
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				

Consideration			Home Composting	
			Moderate Outreach Program, 50% Subsidy	Significant Outreach Program, 75% Subsidy
Environmental	Change in Diversion	Annual Tonnes Diverted	320 to 640	800 to 1,200
		Contribution to 60% Target	0.2% to 0.4%	0.5% to 0.7%
	GHG Benefits	Reduction per Tonne Diverted	0.8 tonnes	
		Annual Reduction (tonnes)	260 to 500 (65 to 125 cars removed from the road ^a)	640 to 960 (160 to 240 cars removed from the road ^a)
Social	Public Support		General support for some subsidy program	
	Resident Benefits/ Issues		<ul style="list-style-type: none">• Compost for use by homeowner• Homeowner must purchase composter unit	<ul style="list-style-type: none">• Compost for use by homeowner• Homeowner must purchase composter unit
Financial	Cost ^b	Collection	\$0	\$0
		Processing	\$0	\$0
		Other	\$80,000 to \$170,000	\$220,000 to \$250,000
		Total	\$80,000 to \$170,000	\$220,000 to \$250,000
	Cost per Household		\$0.44 to \$0.94	\$1.2 to \$1.4
	Market/Revenue		No revenue	No revenue
Technical	Collection Issues		Not Applicable	Not Applicable
	Processing Issues		Not Applicable	Not Applicable
	Other		Not Applicable	Not Applicable
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				

Consideration			Community Composting		
			Low Tech Program Public	Low Tech Program Private	High Tech Program Public
Environmental	Change in Diversion	Annual Tonnes Diverted	10 to 19	10 to 19	80 to 240
		Contribution to 60% Target	0.01%	0.01%	0.05% to 0.14%
	GHG Benefits	Reduction per Tonne Diverted	0.8 tonnes		
		Annual Reduction (tonnes)	8 to 15 tonnes (2 to 4 cars removed from the road ^a)	8 to 15 tonnes (2 to 4 cars removed from the road ^a)	64 to 200 tonnes (16 to 50 cars removed from the road ^a)
Social	Public Support		General support for community composting program		
	Resident Benefits/ Issues		<ul style="list-style-type: none">• Simple design and access• Public access may cause quality issues	<ul style="list-style-type: none">• Simple design and access	<ul style="list-style-type: none">• More knowledge required• Public access may cause quality issues
Financial	Cost ^b	Collection	\$0	\$0	\$0
		Processing	\$0	\$0	\$0
		Other	\$1,500 to \$3,000	\$5,000 to \$10,000	\$52,000 to \$78,000
		Total	\$1,500 to \$3,000	\$5,000 to \$10,000	\$52,000 to \$78,000
	Cost per Household		\$0.01 to \$0.02	\$0.03 to \$0.06	\$0.30 to \$0.45
	Market/Revenue		No revenue	No revenue	No revenue
Technical	Collection Issues		Not Applicable	Not Applicable	Not Applicable
	Processing Issues		Not Applicable	Not Applicable	Not Applicable
	Other		<ul style="list-style-type: none">• City responsible for maintenance	<ul style="list-style-type: none">• Private maintenance	<ul style="list-style-type: none">• City responsible for maintenance
Notes					
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.					
(b) Based on industry estimates, literature review and data from other municipalities.					

Consideration			Curbside Organics Collection	
			Curbside Green Bin Program	Mixed Waste Program
Environmental	Change in Diversion	Annual Tonnes Diverted	13,000 to 20,000	18,000 to 35,000
		Contribution to 60% Target	8% to 12%	11% to 22%
	GHG Benefits	Reduction per Tonne Diverted	0.8 tonnes	
		Annual Reduction (tonnes)	10,400 to 16,000 (2,600 to 4,000 cars removed from the road ^a)	14,400 to 28,000 (3600 to 5,800 cars removed from the road ^a)
Social	Public Support		Strong Support	General Interest
	Resident Benefits/ Issues		• Homeowner has to source separate organics	• Convenient • Homeowner does not have to source separate
Financial	Cost ^b	Collection	\$2,500,000 to \$3,000,000	\$0
		Processing	\$1,400,000 to \$2,500,000	\$9,000,000 to \$14,000,000
		One Time Capital Cost	\$12,000,000 over 10 years	\$0
		Total	\$3,900,000 to \$5,500,000	\$9,000,000 to \$14,000,000
	Cost per Household		\$20 to \$30	\$50 to \$80
	Market/Revenue		Potential to produce compost or renewable natural gas	
Technical	Collection Issues		New collection vehicles required	Incorporated with current pick up schedule
	Processing Issues		None	Compost/digestate product may have difficulty meeting Ontario standards
	Other		Odour concerns with facility locations	
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				

Consideration			Multi-Residential Organics Collection	
			Multi-Residential Green Cart Program	Mixed Waste Program
Environmental	Change in Diversion	Annual Tonnes Diverted	2,000 to 2,500	6,000 to 10,000
		Contribution to 60% Target	1.2% to 1.4%	4.0% to 6.0%
	GHG Benefits	Reduction per Tonne Diverted	0.8 tonnes	
		Annual Reduction (tonnes)	1,600 to 2,000 (400 to 500 cars removed from the road ^a)	4,800 to 8,000 (1,200 to 2,000 cars removed from the road ^a)
Social	Public Support		Strong Support	Strong Support
	Resident Benefits/ Issues		• Odour from large scale collection	• Not Applicable
Financial	Cost ^b	Collection	\$1,100,000 to \$1,400,000	\$0
		Processing	\$220,000 to \$275,000	\$3,000,000 to \$5,000,000
		Other	\$0	\$0
		Total	\$1,300,000 to \$1,675,000	\$3,000,000 to \$5,000,000
	Cost per Household		\$7.2 to \$9.3	\$20 to \$30
	Market/Revenue		Potential to produce compost or renewable natural gas	
Technical	Collection Issues		New collection vehicles required	Incorporated with current pick up schedule
	Processing Issues		None	Compost/digestate product may have difficulty meeting Ontario standards
	Other		Odour concerns with facility locations	
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				

Consideration			Carpet	
			Collection at EnviroDepots (on a cost recovery basis)	Curbside and EnviroDepot Collection (no user fee)
Environmental	Change in Diversion	Annual Tonnes Diverted	200 to 300	600 to 800
		Contribution to 60% Target	0.12% to 0.18%	0.35% to 0.45%
	GHG Benefits	Reduction per Tonne Diverted	2.6 tonnes	
		Annual Reduction (tonnes)	520 to 780 (130 to 195 cars removed from the road ^a)	1,550 to 2,100 (390 to 520 cars removed from the road ^a)
Social	Public Support		Strong Support	Strong Support
	Resident Benefits/ Issues		• Inconvenience of transporting to EnviroDepot	• Convenience of curb side pick up
Financial	Cost ^b	Collection	\$8,000 to \$15,000	\$96,000 to \$112,000
		Processing	\$60,000 to \$93,000	\$180,000 to \$248,100
		Other	\$0	\$0
		Total	\$68,000 to \$108,000	\$276,000 to \$360,000
	Cost per Household		\$0.38 to \$0.60	\$1.5 to \$2.0
	Market/Revenue		Outside processor at cost to City	Outside processor at cost to City
Technical	Collection Issues		Not applicable	Not applicable
	Processing Issues		Currently only one option in province	
	Other		Not applicable	Not applicable
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				

Consideration			Electrical Equipment/Small Metal
			Collection at the Curb
Environmental	Change in Diversion	Annual Tonnes Diverted	250 to 400
		Contribution to 60% Target	0.15% to 0.25%
	GHG Benefits	Reduction per Tonne Diverted	4.4 tonnes
		Annual Reduction (tonnes)	1,100 to 1,760 (275 to 440 cars removed from the road ^a)
Social	Public Support		Strong Support
	Resident Benefits/ Issues		Convenience of curbside pick up
Financial	Cost ^b	Collection	\$70,000 to \$80,000
		Processing	\$0
		Other	\$0
		Total	\$70,000 to \$80,000*
	Cost per Household		\$0.40 to \$0.44
	Market/Revenue		\$40,000 to \$60,000
Technical	Collection Issues		Incorporated with current pickup schedule
	Processing Issues		Private processor
	Other		Strong markets, commodity prices fluctuate
Notes			
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.			
(b) Based on industry estimates, literature review and data from other municipalities.			

Consideration			Mattresses	
			Collection at EnviroDepots (on a cost recovery basis)	Curbside and EnviroDepot Collection (banned for curbside collection)
Environmental	Change in Diversion	Annual Tonnes Diverted	200 to 300	600 to 800
		Annual Units Diverted	10,000 to 15,000	30,000 to 40,000
		Contribution to 60% Target	0.12% to 0.18%	0.35% to 0.50%
	GHG Benefits	Reduction per Tonne Diverted	2.6 tonnes	
		Annual Reduction (tonnes)	520 to 780 (130 to 195 cars removed from the road ^a)	1,550 to 2,100 (390 to 520 cars removed from the road ^a)
Social	Public Support		Strong Support	Strong Support
	Resident Benefits/ Issues		• Inconvenience of transporting to Envirodepot	• Convenience of curbside pick up
Financial	Cost ^b	Collection	\$40,000 to \$60,000	\$192,000 to \$232,000
		Processing	\$160,000 to \$240,000	\$480,000 to \$640,000
		Other	\$0	\$0
		Total	\$200,000 to \$300,000	\$600,000 to \$870,000
	Cost per Household		\$1.1 to \$1.7	\$3.7 to \$4.8
	Market/Revenue		No revenue	No revenue
Technical	Collection Issues		Not applicable	Incorporated with current pickup schedule
	Processing Issues		Private processor	Private processor
	Other		Not applicable	Not applicable
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				

Consideration			Bulky Plastics
			Collection at EnviroDepots
Environmental	Change in Diversion	Annual Tonnes Diverted	50 to 100
		Contribution to 60% Target	0.03% to 0.06%
	GHG Benefits	Reduction per Tonne Diverted	1.0 tonnes
		Annual Reduction (tonnes)	50 to 100 (15 to 25 cars removed from the road ^a)
Social	Public Support		Strong Support
	Resident Benefits/ Issues		• Inconvenience of transporting to EnviroDepot
Financial	Cost ^b	Collection	\$8,000 to \$16,000
		Processing	\$50,000 to \$100,000 ^c
		Other	\$0
		Total	\$8,000 to \$16,000
	Cost per Household		\$0.05 to \$0.09
	Market/Revenue		\$50,000 to \$100,000 ^c
Technical	Collection Issues		Not applicable
	Processing Issues		Private processor
	Other		Not applicable
Notes			
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.			
(b) Based on industry estimates, literature review and data from other municipalities.			
(c) Cost of processing material will be covered by the revenue from market			

Consideration			Textiles	
			Enhanced Awareness and Drop-off Program	Enhanced Awareness, Drop-off and Curbside Collection Program
Environmental	Change in Diversion	Annual Tonnes Diverted	245 to 380	640 to 760
		Contribution to 60% Target	0.15% to 0.23%	0.38% to 0.45%
	GHG Benefits	Reduction per Tonne Diverted	14 tonnes	
		Annual Reduction (tonnes)	3,400 to 5,300 (850 to 1325 cars removed from the road ^a)	9,000 to 10,600 (2,250 to 2,650 cars removed from the road ^a)
Social	Public Support		Moderate Support	Moderate Support
	Resident Benefits/ Issues		• Inconvenience of transporting to drop-offs	• Convenience of curbside pick up
Financial	Cost ^b	Collection ^c	\$0	\$72,000 to \$86,000
		Processing	\$0	\$0
		Other	\$15,000 to \$40,000	\$20,000 to \$40,000
		Total	\$15,000 to \$40,000	\$92,000 to \$126,000
	Cost per Household		\$0.08 to \$0.23	\$0.41 to \$0.49
	Market/Revenue		No revenue	No revenue
Technical	Collection Issues		Not applicable	Incorporated with current pickup schedule
	Processing Issues		Private processor	Private processor
	Other		Not applicable	Not applicable
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				
(c) Costs covered by vendor				

Consideration			Wooden Furniture	
			Collection at EnviroDepots	Curbside and EnviroDepot Collection
Environmental	Change in Diversion	Annual Tonnes Diverted	100 to 150	100 to 150
		Contribution to 60% Target	0.06% to 0.09%*	0.06% to 0.09%
	GHG Benefits	Reduction per Tonne Diverted	3.8 tonnes	
		Annual Reduction (tonnes)	380 to 570 (95 to 145 cars removed from the road ^a)	380 to 570 (95 to 145 cars removed from the road ^a)
Social	Public Support		Moderate Support	Moderate Support
	Resident Benefits/Issues		• Inconvenience of transporting to EnviroDepot	• Convenience of curbside pickup
Financial	Cost ^b	Collection	\$0	\$60,000 to \$70,000
		Processing	\$9,000 to \$12,000	\$10,000 to \$12,000
		Other	\$0	\$0
		Total	\$9,000 to \$12,000	\$70,000 to \$82,000
	Cost per Household		\$0.05 to \$0.07	\$0.40 to \$0.50
	Market/Revenue		No revenue	No revenue
Technical	Collection Issues		Not applicable	Incorporated with current pick-up schedule
	Processing Issues		Private processor	Private processor
	Other		Not applicable	Not applicable
Notes				
(a) The diversion of these materials has avoided the Greenhouse Gas (GHG) emissions equivalent to removing the identified number of vehicles per year.				
(b) Based on industry estimates, literature review and data from other municipalities.				

Appendix G

Summary of Ontario Green Bin Programs

Table G1: Ontario Green Bin Programs - Operational Details

Table G2: Ontario Green Bin Programs

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This appendix provides a summary of Ontario municipal Green Bin programs (Tables G-1 and G-2). The summary provides operational details categorized by:

- municipalities allowing plastic bags, sanitary products and pet waste
- municipalities not allowing plastic bags, sanitary products or pet waste
- municipalities allowing pet waste but not plastic bags or sanitary products

The Ontario municipalities surveyed had the following common collection challenges:

- Source separated organics (SSO) freezes in collection bin
- Wildlife overturning bins and creating mess
- Leachate leaks from collection vehicle
- Loose organics in bin not emptying
- Broken bins in winter
- Overweight bins
- Placement of unacceptable materials in bin (plastic, glass)

Data was collected from Resource Productivity & Recovery Authority (RPRA) and other municipalities and compiled by 2cg Consulting and City of London staff.

Table G-1: Ontario Green Bin Programs – Operational Information

Municipality	Quantity of Households		Eligibility of Multi-Family Households for Green Bin Collection ¹	Collection Container Size (litres)	Allowable liner (plastic, certified compostable plastic, paper)	Collection Details		
	Single Family	Multi-Family	(All, Some, None)			SSO Collection Frequency	Garbage Collection Frequency	Leaf/Yard Top Up
Municipalities allowing plastic bags, sanitary products and pet waste								
Toronto	461,089	649,194	All	97	-plastic -paper -compostable plastic	Weekly	Bi-Weekly	No
York Region	315,025	51,290	Some, lower tier municipalities provide collection services (e.g., Markham) and others do not	46	-paper & compostable plastic (preferred) -plastic (accepted)	Weekly	Bi-Weekly	No

Municipality	Quantity of Households		Eligibility of Multi-Family Households for Green Bin Collection ¹	Collection Container Size (litres)	Allowable liner (plastic, certified compostable plastic, paper)	Collection Details		
	Single Family	Multi-Family	(All, Some, None)			SSO Collection Frequency	Garbage Collection Frequency	Leaf/Yard Top Up
Municipalities NOT allowing plastic bags, sanitary products and pet waste								
Barrie	42,436	11,200	None ²	46	-paper -compostable plastic	Weekly	Bi-weekly	No
Durham	200,192	24,298	None	46	-paper -compostable plastic	Weekly	Bi-Weekly	No
Hamilton	173,349	50,445	All	-46 downtown -120	-paper -compostable plastic	Weekly	Weekly	No
Halton Region	165,787	39,674	All	-46 -360 some townhomes	-paper -compostable plastic	Weekly	Bi-Weekly	No
Kingston	45,062	8,456	All	-46 Downtown -80 residential	-paper -compostable plastic	Weekly	Weekly	Yes
Ottawa	285,541	117,376	None	-80 single family - 240 multi-family	-paper	Weekly	Bi-weekly	Yes
Ottawa Valley	16,743	1,647	None	120	-paper	Weekly	Bi-weekly	Yes
Peel Region	338,362	98,656	None	100	-paper -compostable plastic	Weekly	Bi-weekly	Yes
Simcoe County	123,730	5,852	None ³	46	-paper -compostable plastic	Weekly	Weekly	No

Municipality	Quantity of Households		Eligibility of Multi-Family Households for Green Bin Collection ¹	Collection Container Size (litres)	Allowable liner (plastic, certified compostable plastic, paper)	Collection Details		
	Single Family	Multi-Family	(All, Some, None)			SSO Collection Frequency	Garbage Collection Frequency	Leaf/Yard Top Up
City of St. Thomas	13,427	3,576	None	240	-paper -compostable plastic	Bi-Weekly	Weekly	Yes
Municipalities NOT allowing plastic bags or sanitary products and accept pet waste								
Waterloo	150,201	59,039	Some, multi-family households with 6 units or less	46	-paper -compostable plastic	Weekly	Bi-Weekly	No
Guelph	29,901	26,026	All	80	-paper -compostable plastic	Weekly	Bi-weekly	Yes
Niagara Region	165,301	31,527	Some, multi-family households with 6 units or less	-46 residential -80 small business	-paper -compostable plastic	Weekly	Weekly	Yes

Notes:

1. Some municipalities only provide curbside green bin collection service, therefore multi-family households are ineligible to participate.
2. Household quantities from 2016, multi-family green bin collection service implemented January 2017, therefore multi-family households ineligible to receive green bin collection service.
3. Multi-family households may be eligible for curbside green bin collection, eligibility determined by municipality on an application process.

Table G-2: Ontario Green Bin Programs – Collection and Processing Information

Municipality	Quantity of Households Eligible for Service			SSO Collection 2016 Quantity		Processing Facility
	Single Family	Multi-Family ¹	Total	Tonnes	Kilograms per household	
Municipalities allowing plastic bags, sanitary products and pet waste						
Toronto	461,089	649,194	1,110,283	132,560	119	-majority at Disco Road Organics Processing Facility -small portion processed by contractors
York Region	315,025	25,645 ²	340,670	97,044	285	-Orgaworld (London) -LaFleche Environmental (Moose Creek)
Municipalities NOT allowing plastic bags, sanitary products and pet waste						
Barrie	42,436	0 ³	52,436	4,123	97	-All Treat Farms (Walker Environmental Group)
Durham	200,192	0	224,490	27,612	138	-Durham Region (Miller Compost)
Hamilton	173,349	50,445	223,794	30,025	134	-Hamilton Central Composting Facility
Halton Region	165,787	39,674	205,461	27,682	135	-Hamilton Central Composting Facility
Kingston	45,062	8,456	53,518	3,959	74	-Norterra (Kingston)
Ottawa	285,541	117,376	402,943	70,918	176	-Orgaworld (Ottawa)
Ottawa Valley	16,743	0	16,743	3,878	232	-Ottawa Valley Waste Recovery Centre (Pembroke)
Peel Region	338,362	0	338,362	59,726	177	-Peel Region (Brampton, Caledon)

Municipality	Quantity of Households Eligible for Service			SSO Collection 2016 Quantity		Processing Facility
	Single Family	Multi-Family ¹	Total	Tonnes	Kilograms per household	
Simcoe County	123,730	0	123,730	10,798	87	-Hamilton Central Composting Facility
City of St. Thomas	13,427	0	13,427	4,046	301	-Orgaworld (London)
Municipalities NOT allowing plastic bags or sanitary products and accept pet waste						
Waterloo	150,201	2,952 ⁴	153,153	10,364	68	-Guelph Organic Waste Processing Facility
Guelph	29,901	26,026	55,927	9,744	174	-Guelph Organic Waste Processing Facility
Niagara Region	165,301	1,576 ⁴	166,877	11,508	69	-Walker Environmental Group (Niagara)

Notes:

1. For calculation purposes, municipalities that do not provide multi-family households green bin collection service are assumed zero. Participation may be minimal and would not significantly contribute to the kilograms per household quantity.
2. The region provides some green bin collection service to lower tier municipalities. This quantity of multi-family households that receive green bin collection service is estimated at 50% of eligible multi-family households.
3. Multi-family green bin collection service implemented January 2017, kilograms per household calculation does not include multi-family units as the tonnage is from 2016 prior to program implementation.
4. Multi-family units with 2-6 units are eligible for green bin collection service. For calculation purposes 5% of the total multi-family units is assumed.

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Appendix H

Mixed Waste Processing Pilot Project Results

Waste Composition of Mixed Waste Streams (2cg Consulting, 2017)

High Diversion MRF Results (Canada Fibers, 2017)

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REPORT

Waste Composition of Mixed Waste Streams

City of London

September 2017



159 Ridout Street South, London, Ont. N6C 3X7
Paul van der Werf Tel: 519-645-7733
Email: 2cg@sympatico.ca

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Appendix 1- Material Categories and Description

Appendix 2- Audit “Fines” Category Visual Analysis

1.0 Introduction

2cg Inc. (2cg) was retained by the City of London (City) to undertake a waste composition analysis of municipal solid waste (MSW) loads delivered by the City of London to Canada Fibers Ltd. Dongara mixed waste processing facility. Inbound loads of MSW (curbside single family or curbside single family/multi-residential) were processed and divided into a number of fractions through mechanical means. 2cg undertook a composition analysis of the three waste fractions: “lights”; “medium-heavies”; and “heavies” (i.e. low to high density). Fieldwork took place on 31 August and 1 September 2017.

2.0 Methodology

Canada Fibers staff collected the waste stream samples according to the waste fractions and a crew of two 2cg staff were used to collect and sort the sub-samples.

2.1 Sample Collection

Large samples of the three waste fractions from the two waste generation sources were collected directly off the line and delivered to a sorting area by Canada Fibers staff in an approximately 1-3 cubic metre bin. 2cg extracted 10-25 kg sub-samples from all three streams (increasing sample size as wastes became heavier). A total of five curbside sub-samples of “lights”; three curbside & multi-residential sub-samples of “lights”; five curbside sub-samples of “medium-heavies”; four curbside & multi-residential sub-samples of “medium heavies”; four curbside sub-samples of “heavies”; and four curbside & multi-residential sub-samples of “heavies” were extracted and sorted.

2.2 Sample Sorting

The typical sorting set up is shown in Photos 1 and 2. Each sub-sample was sorted into 18 categories (Table 2.1) and the data was entered into an Excel spreadsheet for analysis.



Photo 1. Scale set up

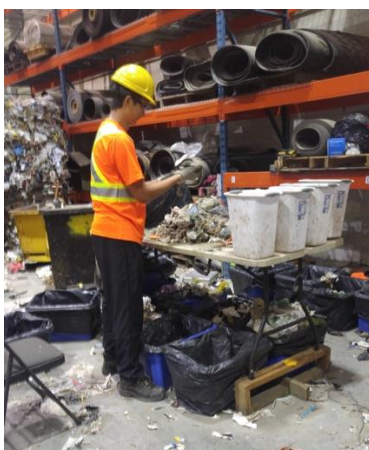


Photo 2. Waste sorting set up

Table 2.1 Sorting Categories

Category
Recyclable Fiber
Non-Recyclable Fiber
Recyclable Plastic
Non-Recyclable Plastic
Recyclable Metals
Non-Recyclable Metals
Glass
Organics
Sanitary & Pet Waste
C&D
Ceramics
Tires & Rubber
Textiles
MHSW
WEEE
Bulky Items
Other
Fines

3.0 Results and Discussion

3.1 Curbside “Lights” Fraction

Five sub-samples of curbside “lights” fraction weighing a total of 45.12 kg were sorted (Photo 3). The overall results of the curbside “lights” fraction can be found in Table 3.1 in Appendix 1.

Figure 3.1 depicts the overall composition of the “lights”. It consisted largely of recyclable plastic, non-recyclable plastic, fines and organics.

The recyclable plastic was primarily grocery bags and recyclable film plastic. The non-recyclable plastic was primarily laminated plastic packaging and rigid plastic packaging. The fines were primarily small pieces of mostly paper and plastic (see Appendix 2 for definition). The organics were primarily soiled tissue and yard waste.

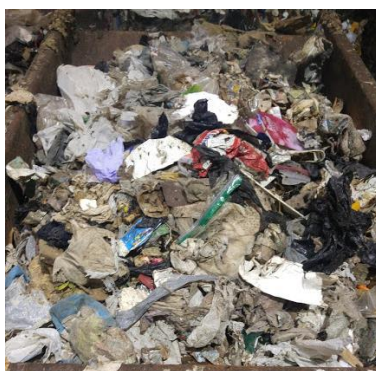
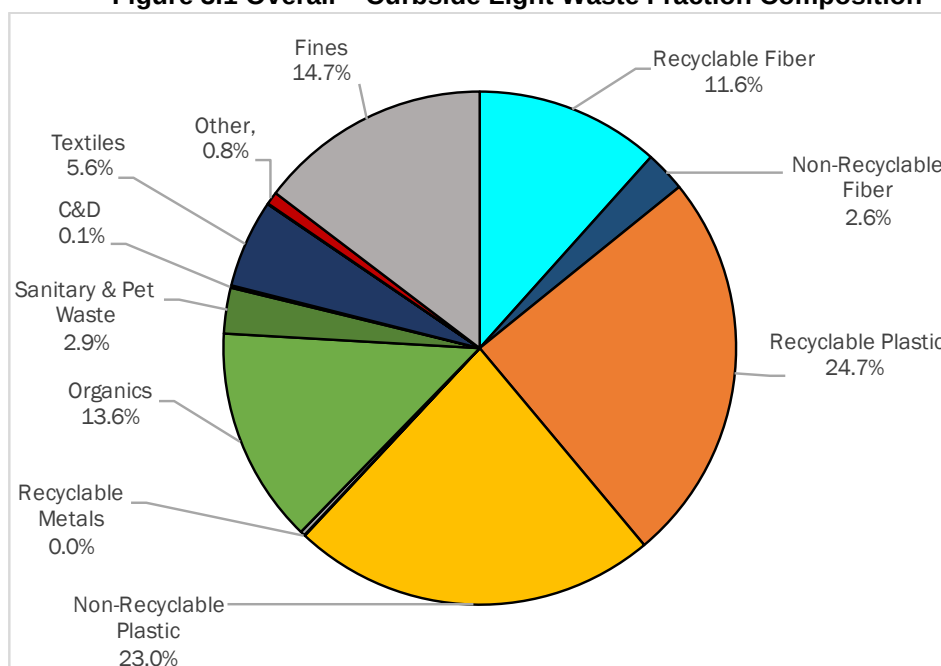


Photo 3. “Lights” curbside sample bin

Figure 3.1 Overall – Curbside Light Waste Fraction Composition



3.2 Curbside & Multi-Residential “Lights” Fraction

Three sub-samples of curbside & multi-residential “lights” fraction weighing a total of 30.62 kg was sorted (Photo 3). The overall results of the curbside & multi-residential “lights” fraction can be found in Table 3.2 in Appendix 1.

Figure 3.2 depicts the overall composition of the “lights”. It consisted largely of recyclable plastic, non-recyclable plastic and recyclable fiber.

The recyclable plastic was primarily grocery bags and recyclable film plastic. The non-recyclable plastic was primarily durable plastic product and rigid plastic packaging. The recyclable fiber was primarily mixed office paper and cardboard.



Photo 3. Curbside & Multi-Residential “Lights” organic waste

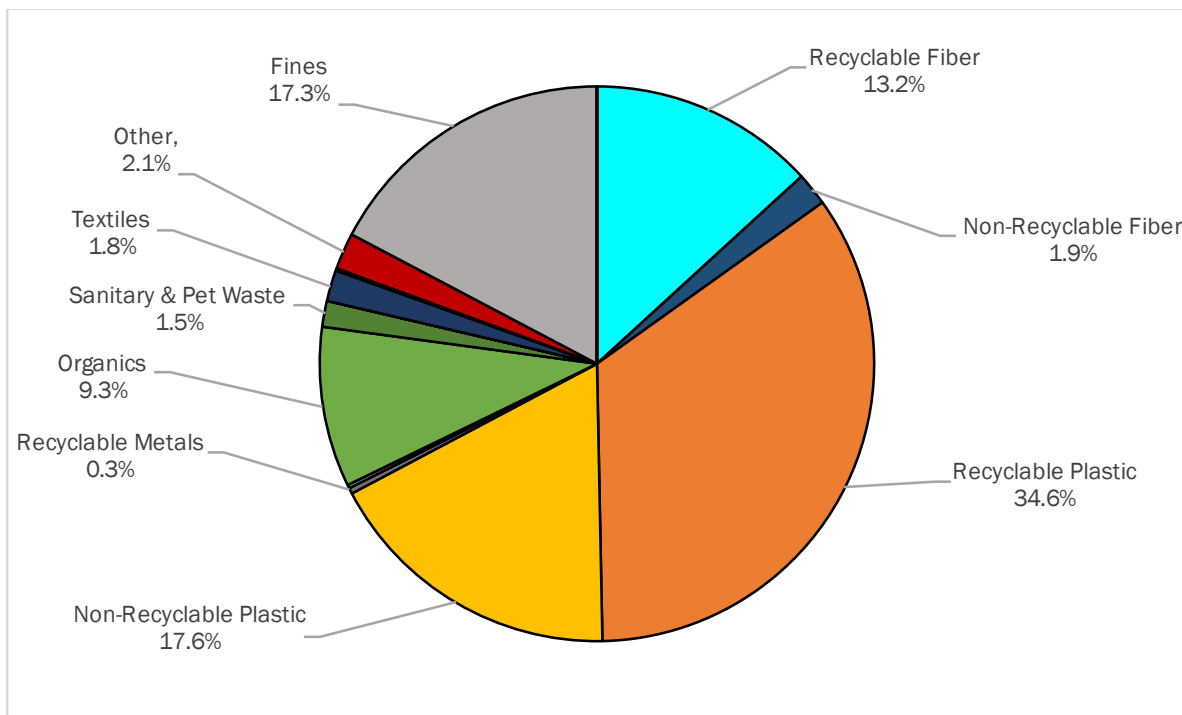


Figure 3.2 Overall Curbside & Multi-Residential Light Waste Fraction Composition

3.3 Curbside “Medium-Heavies” Fraction

Five curbside sub-samples of “medium-heavies” weighing a total of 73.16 kg were sorted (Photo 4). The overall results of the curbside “medium-heavies” fraction can be found in Table 3.3 in Appendix 1.

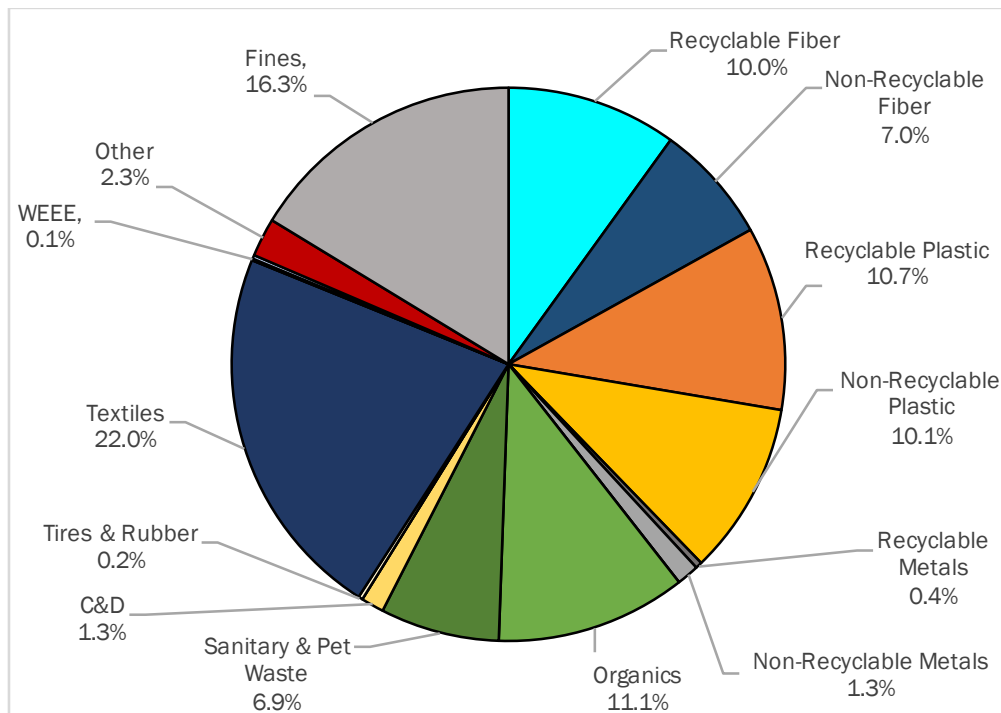
Figure 3.3 depicts the overall composition of the “medium-heavies”. It consisted largely of textiles, fines and organic waste.

The textiles were primarily clothing items. The fines consisted of unidentifiable materials due to the process of shredding waste (Appendix 2). The organic waste was primarily tissues and food waste.



Photo 4. “Medium-Heavies” Organic Waste

Figure 3.3 Overall Curbside Medium-Heavies Waste Fraction Composition



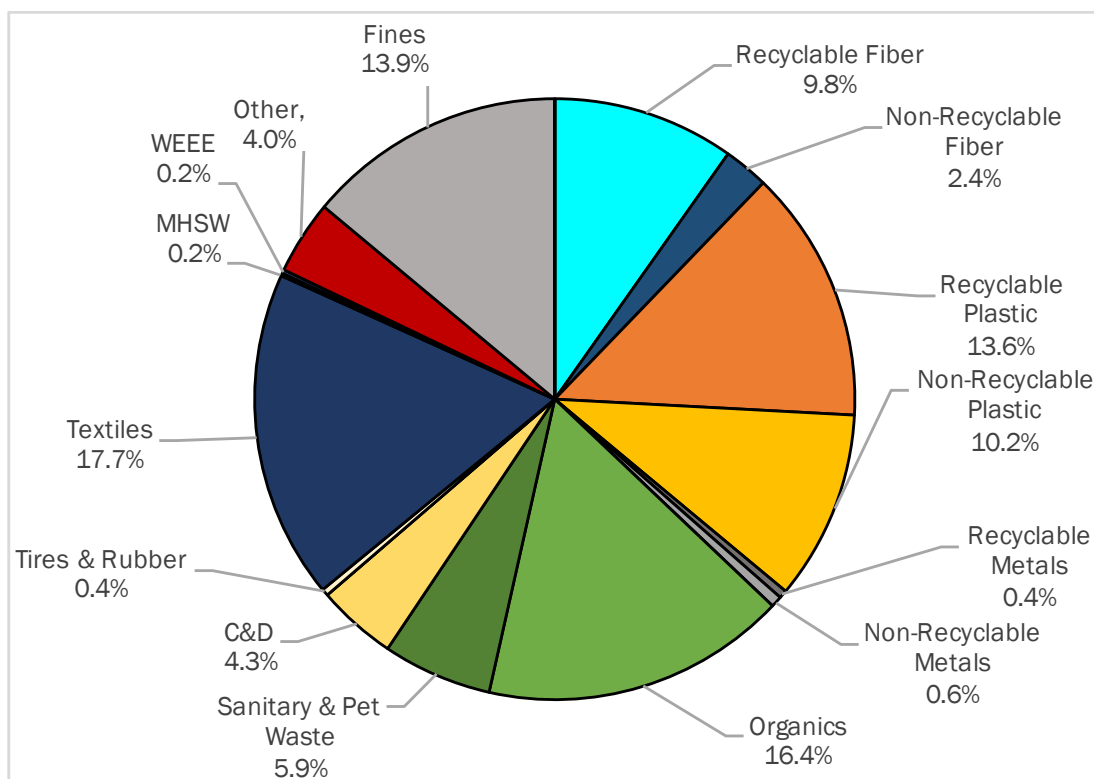
3.4 Curbside & Multi-Residential “Medium-Heavies” Fraction

Four curbside & multi-residential sub-samples of “medium-heavies” weighing a total of 64.14 kg were sorted. The overall results of the “medium-heavies” fraction can be found in Table 3.4 in Appendix 1.

Figure 3.4 depicts the overall composition of the curbside & multi-residential “medium-heavies”. It consisted largely of textiles, organics, fines and recyclable plastic.

The textiles were primarily clothing items. The organic waste was primarily tissue toweling and food waste. The fines consisted of unidentifiable materials due to the process of shredding waste (see Appendix 2 for definition). The recyclable plastic was primarily rigid plastic packaging and film packaging.

Figure 3.4 Overall Curbside & Multi-Residential Medium-Heavies Waste Fraction Composition



3.5 Curbside “Heavies” Fraction

Four curbside sub-samples of curbside “heavies” fraction weighing a total of 69.26 kg were sorted (Photo 5). The overall results of the curbside “heavies” fraction can be found in Table 3.5 in Appendix 1.

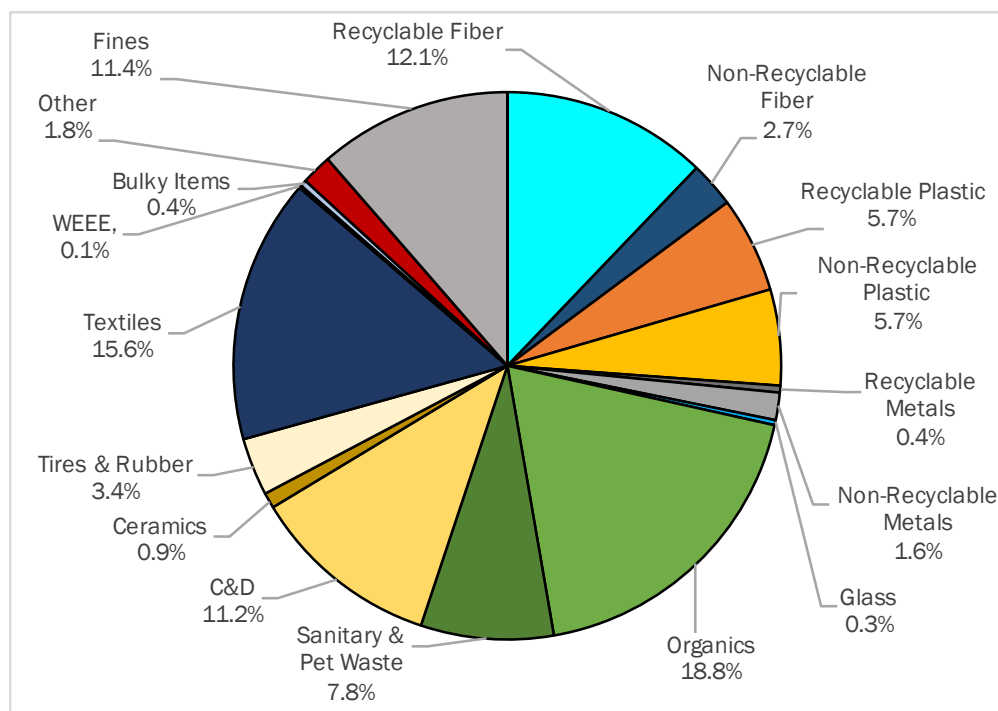
Figure 3.5 depicts the overall composition of the “heavies”. It consisted largely of organics, recyclable fiber, fines and C&D waste.

The organics consisted largely of tissue and unavoidable food waste (i.e. corn husks). The recyclable fiber consisted largely of cardboard and boxboard. The fines consisted of unidentifiable materials due to the process of shredding waste (Appendix 2). The C&D consisted largely of chunks of wood and brick.



Photo 5. Curbside “Heavies” Sample

Figure 3.5 Overall Curbside Heavy Waste Fraction Composition



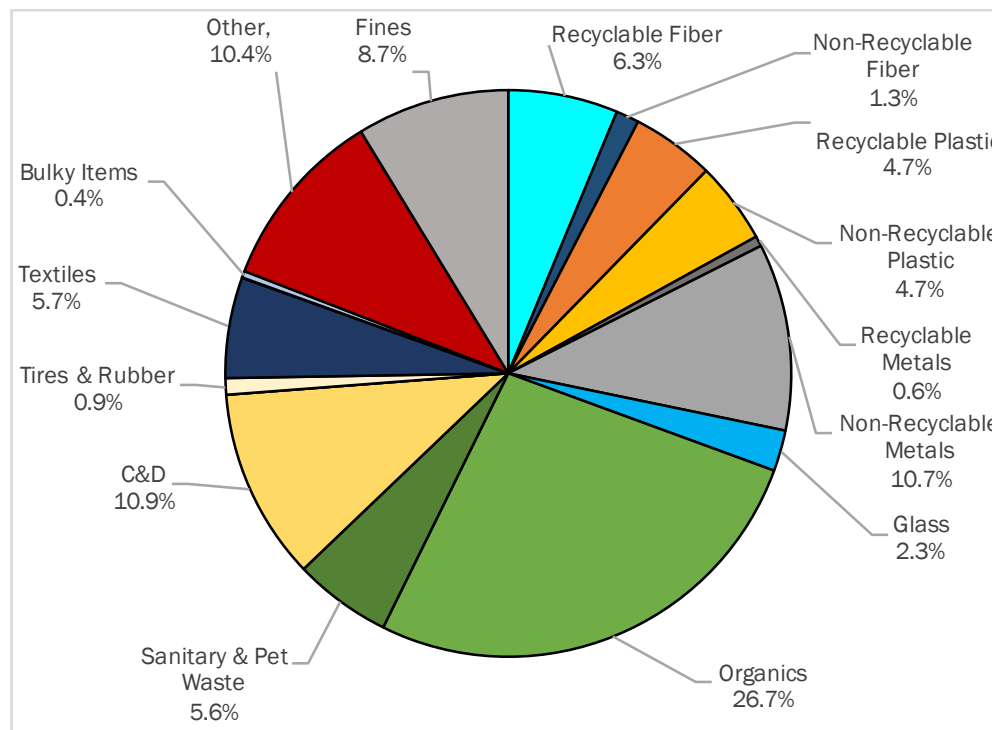
3.6 Curbside & Multi-Residential “Heavies” Fraction

Four curbside & multi-residential sub-samples of the “heavies” fraction weighing a total of 85.92 kg were sorted. The overall results of the curbside & multi-residential “heavies” fraction can be found in Table 3.6 in Appendix 1.

Figure 3.6 depicts the overall composition of the “heavies”. It consisted of organics, C&D, non-recyclable metals and other waste.

The organics largely consisted of avoidable food waste. The C&D consisted largely of chunks of cement and tile. The non-recyclable metal consisted largely of other metal and other aluminum. The other waste consisted largely of various toys (e.g. baseballs, tennis balls) and bathtub mats.

Figure 3.6 Overall Curbside & Multi-Residential Heavy Waste Fraction Composition



3.7 Curbside Overall Data Analysis

Tables 3.1, 3.3 and 3.5 show that there is considerable variability (i.e., see min and max) with the three waste fractions in curbside samples.

Figure 3.7 shows the proportion of recyclable materials compared for the three waste fractions. It shows that recyclable waste varied per waste stream during this audit. Recyclable Fiber was found to be most prominent in “heavies”, followed by “medium-heavies” and “lights”. This is likely due to the soiled nature of the recyclable fiber. Recyclable Plastic was found to be most prominent in “lights”, followed by “medium-heavies” and “heavies”. This is likely due to the light weight of carry out bags (the most prominent recyclable plastic). Recyclable Metals were found to be most prominent in the “heavies” and “medium-heavies” waste fraction, which was primarily aluminum and steel cans.

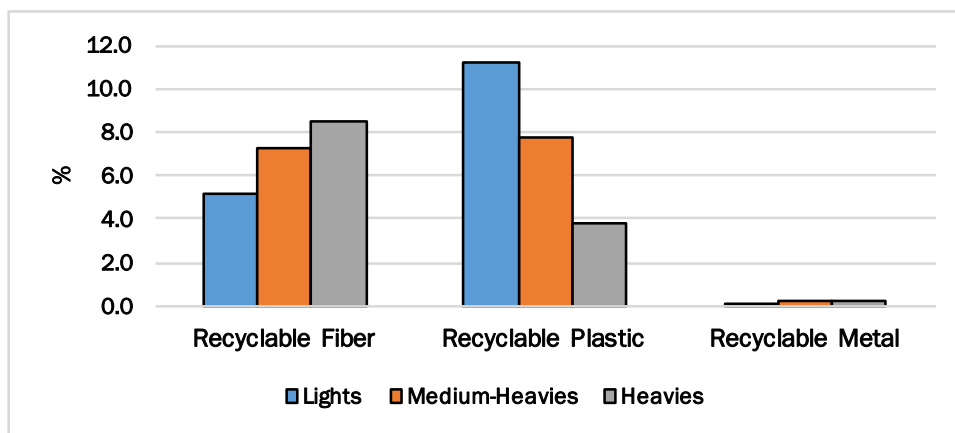
Figure 3.7 Comparison of Recyclable Material in Waste Fractions

Figure 3.8 shows the proportion of non-recyclable materials compared for the three curbside waste fractions. It shows that non-recyclable fiber was primarily found in “medium-heavies”. Non-recyclable plastic is most prominent in “lights” and “medium-heavies”. Non-recyclable metals are most prominent in “heavies” and “medium-heavies”. Non-recyclable glass was most prominent in “heavies”. This is likely due to the round and heavy nature of the glass food containers and other glass products.

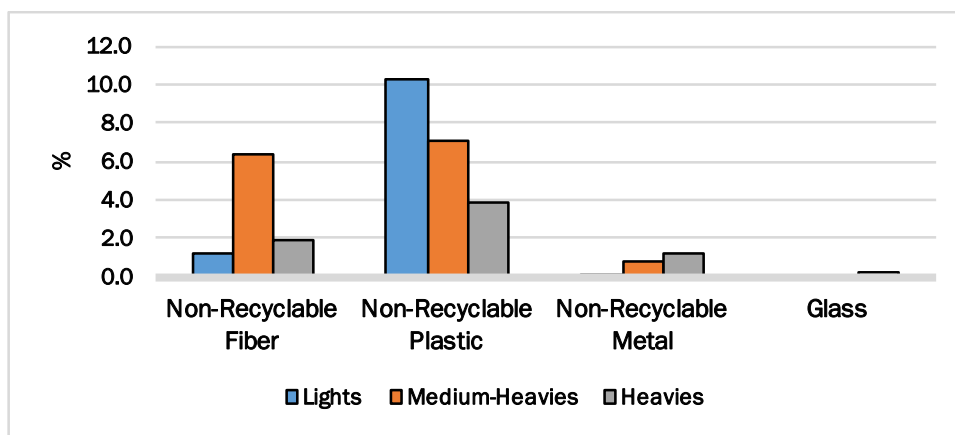
Figure 3.8 Comparison of Non-Recyclable Material in Waste Fractions

Figure 3.9 shows the proportion of residual materials compared for the three waste fractions. It shows that there is a considerable amount of textiles, which are most prominent in “medium-heavies” fraction.

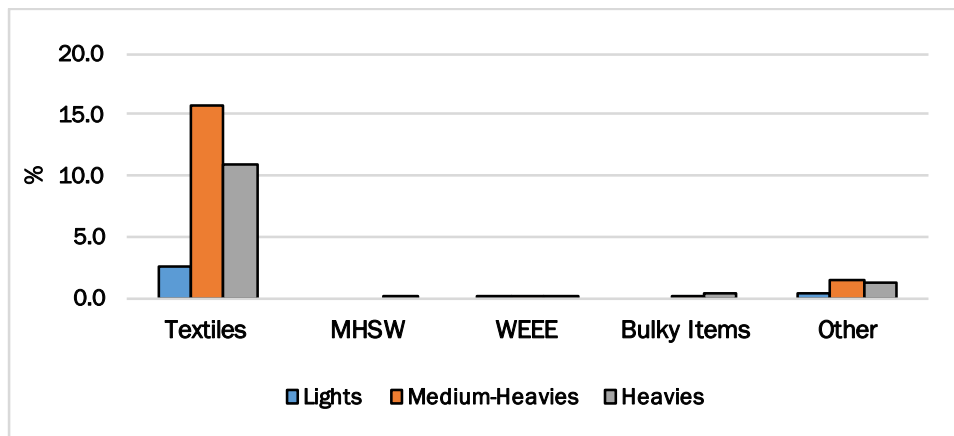
Figure 3.9 Comparison of Residual Material in Waste Fractions

Figure 3.10 shows the proportion of organic materials compared for the three waste fractions. It shows that organic waste is more prominent in “heavies”. This is largely due to the roll-off (round organics enter the “heavies” roll-off bin). Sanitary & pet waste was found to be equally prominent in “medium-heavies” and “heavies”. This is largely due to the heavy nature of sanitary and pet waste.

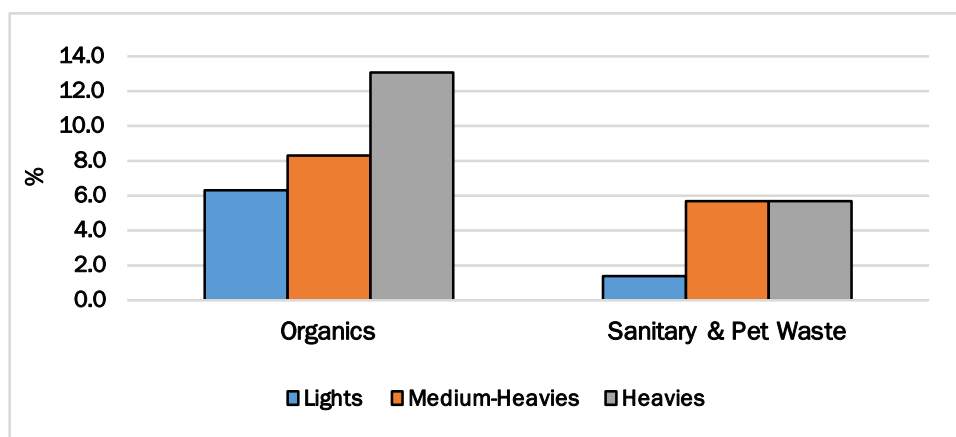
Figure 3.10 Comparison of Organic Material in Waste Fractions

Figure 3.11 shows the proportion of construction materials compared for the three waste fractions. It shows that the majority of construction materials were found in the “heavies”, followed by “medium-heavies”. There was no ceramic or tires & rubber in “lights”.

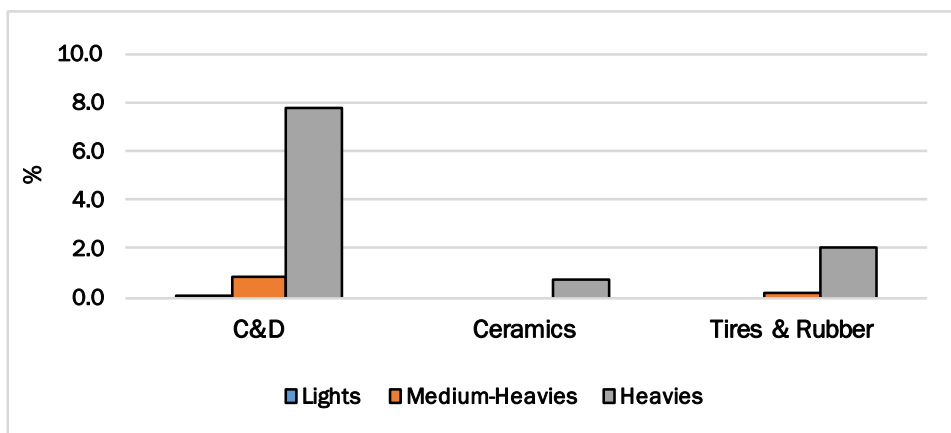
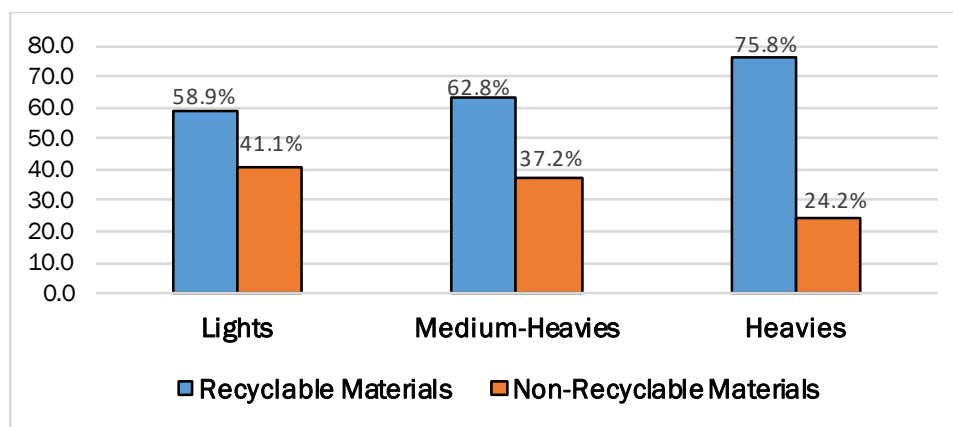
Figure 3.11 Comparison of Construction Material in Waste Fractions

Figure 3.12 shows the overall proportion of recyclable and non-recyclable materials compared for the three waste fractions. It shows that as wastes became heavier, there was an increase in recyclable material and a decrease in non-recyclable materials, with all fractions representing over 55% divertible materials.

Figure 3.12 Overall Comparison of Recyclable Vs. Non-Recyclable Materials in Waste Fractions

3.4 Curbside & Multi-Residential Overall Data Analysis

Tables 3.2, 3.4 and 3.6 show that there is considerable variability (i.e., see min and max) with the three waste fractions in curbside & multi-residential samples.

Figure 3.13 shows the proportion of recyclable materials compared for the three waste fractions. It shows that recyclable waste varied per waste stream during this audit depending on the waste fraction. Recyclable fiber and recyclable plastic was most prominent in “medium-heavies”. The recyclable metal was most prominent in “heavies”.

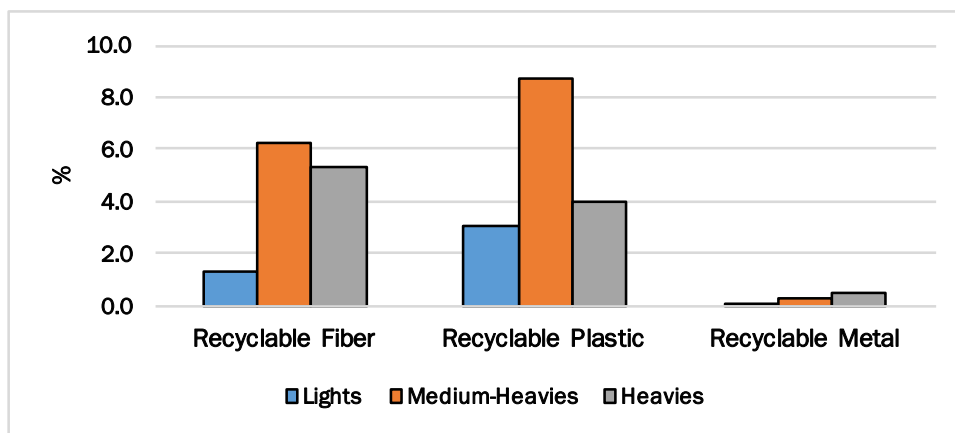
Figure 3.13 Comparison of Recyclable Material in Waste Fractions

Figure 3.14 shows the proportion of non-recyclable materials compared for the three waste fractions. It shows that non-recyclable fiber and non-recyclable plastic were most prominent for “medium-heavies”, followed by “heavies”. Non-recyclable metal and glass waste proportions were most prominent for “heavies”, with no glass or metal found in the “lights” fraction.

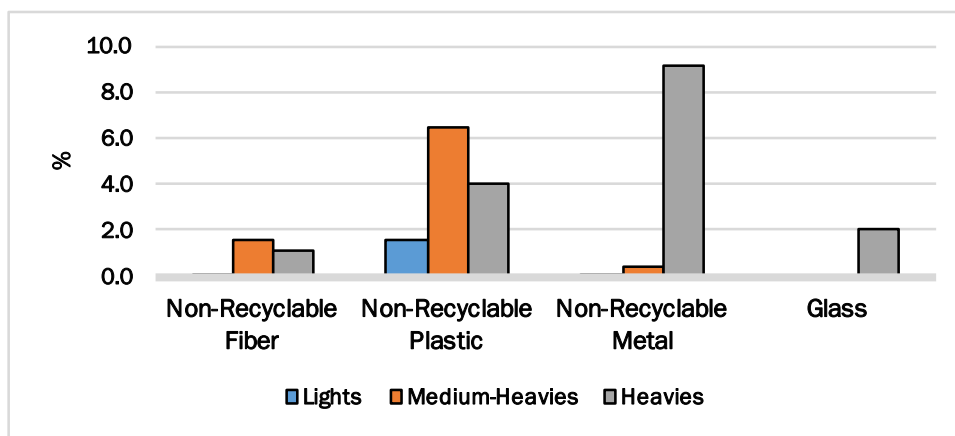
Figure 3.14 Comparison of Non-Recyclable Material in Waste Fractions

Figure 3.15 shows the proportion of residual materials compared for the three waste fractions. It shows that there is a considerable amount of textiles, which are most prominent in “medium-heavies” fraction. The amount of Other residuals increases with waste fraction.

Figure 3.15 Comparison of Residual Material in Waste Fractions

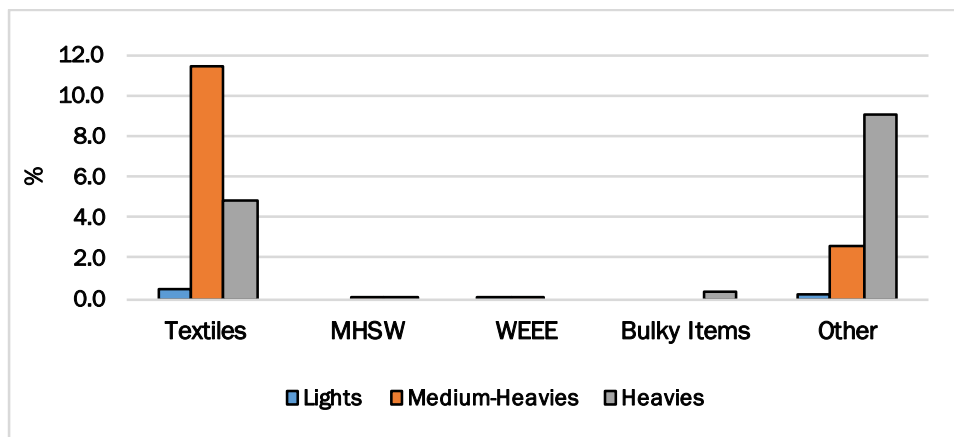


Figure 3.16 shows the proportion of organic materials compared for the two waste fractions. It shows that organic waste and sanitary & pet waste proportions increased as wastes became heavier.

Figure 3.16 Comparison of Organic Material in Waste Fractions

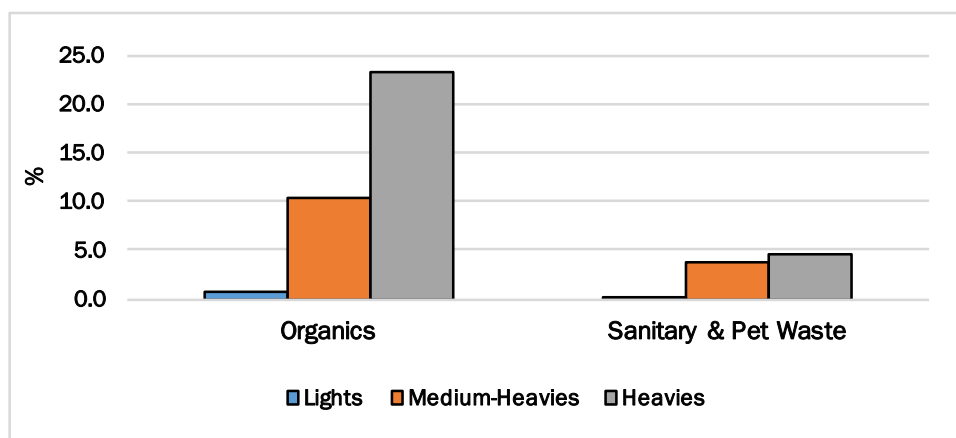


Figure 3.17 shows the proportion of construction materials compared for the two waste fractions. It shows that C&D and tires & rubber are most prominent in the “medium-heavies” waste stream. No ceramic was found in curbside & multi-residential waste.

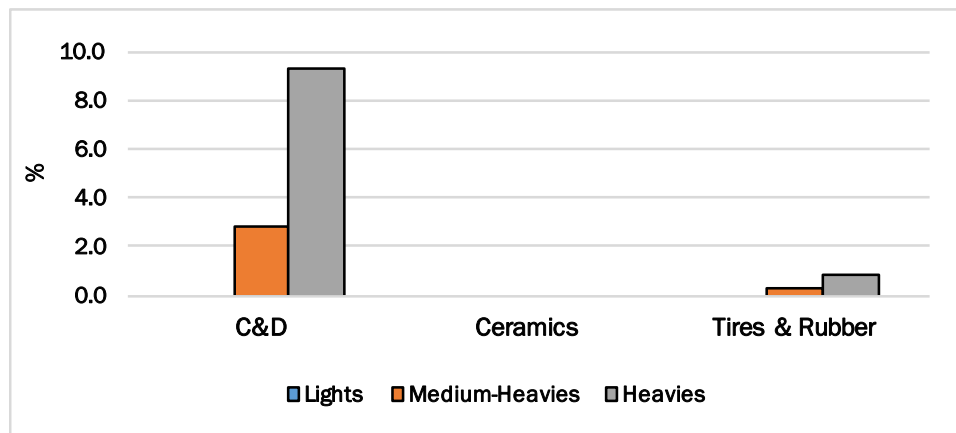
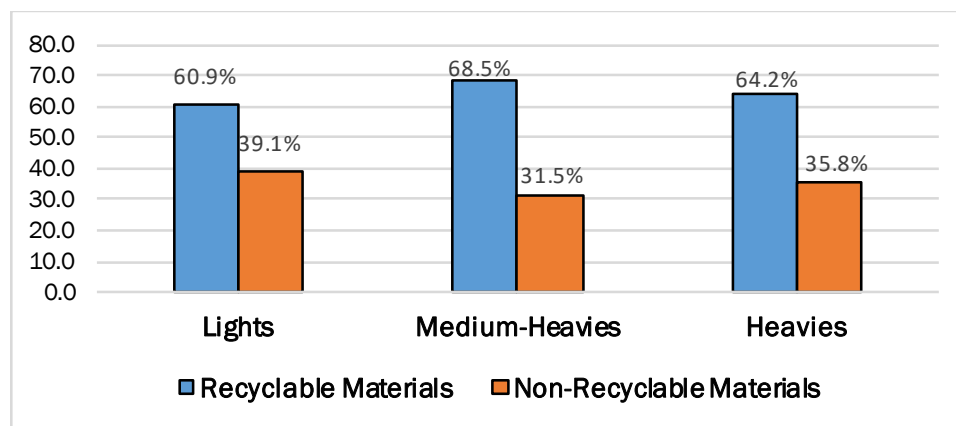
Figure 3.17 Comparison of Construction Material in Waste Fractions

Figure 3.18 shows the overall proportion of recyclable and non-recyclable materials compared for the two waste fractions. It shows that the highest amount of recyclable materials occurred in the medium-heavies fraction. However, all fractions had more than 60% of potentially recyclable materials.

Figure 3.18 Overall Comparison of Recyclable Vs. Non-Recyclable Materials in Waste Fractions

4.0 Summary

2cg staff collected and sorted 24 samples weighing a total of 368.22 kg from three waste fractions:

- All three waste fraction samples were collected directly off the line using an approximate 1-3 cubic metre bin by Canada Fibers staff, with sub-samples extracted by 2cg staff;
- The curbside “lights” sub-samples were primarily composed of: recyclable plastic (24.7%), non-recyclable plastic (23.0%) and organics (13.6%);
- The curbside & multi-residential “lights” sub-samples were primarily composed of: recyclable plastic (34.6%), non-recyclable plastic (17.6%), and fines (17.3%);
- The curbside “medium-heavies” sub-samples were primarily composed of: textiles (22.0%), fines (16.3%), and recyclable plastic (10.7%);
- The curbside & multi-residential “medium-heavies” sub-samples were primarily composed of: textiles (17.7%), organics (16.4%) and recyclable plastic (13.6%);
- The curbside “heavies” sub-samples were primarily composed of: organics (18.8%), textiles (15.6%) and recyclable fiber (12.1%);
- The curbside & multi-residential “heavies” sub-samples were primarily composed of: organics (26.7%), C&D (10.9%), other waste (10.4%) and non-recyclable metals (10.7%);
- The curbside “lights” fraction contained approximately 59% divertible material, the “medium- heavies” contained approximately 63% divertible material, and the “heavies” fraction contained approximately 76% divertible material.
- The curbside & multi-residential “lights” contained approximately 61% divertible material, the “medium- heavies” contained approximately 69% divertible material, and the “heavies” fraction contained approximately 64% divertible material

Appendix 1

Table 3.1- Curbside Light Fraction Sample Sort Results

"Lights" Fractions Sorting	Sample Number											
	%											
Category	1	2	3	4	5	6	7	8	9	Average	Min	Max
Recyclable Fiber	14.3	6.7	14.6	12.7	9.8					11.6	6.7	14.6
Non-Recyclable Fiber	1.5	1.9	1.2	2.6	5.6					2.6	1.2	5.6
Recyclable Plastic	18.4	22.4	28.5	27.9	26.5					24.7	18.4	28.5
Non-Recyclable Plastic	39.5	17.8	16.3	20.0	21.6					23.0	16.3	39.5
Recyclable Metals	0.0	0.0	0.2	0.0	0.0					0.0	0.0	0.2
Non-Recyclable Metals	0.2	0.4	0.0	0.2	0.6					0.3	0.0	0.6
Glass	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0
Organics	9.4	24.5	10.0	14.7	9.4					13.6	9.4	24.5
Sanitary & Pet Waste	1.9	3.3	2.4	5.3	1.4					2.9	1.4	5.3
C&D	0.0	0.0	0.7	0.0	0.0					0.1	0.0	0.7
Ceramics	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0
Tires & Rubber	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0
Textiles	6.1	8.4	0.2	1.1	12.0					5.6	0.2	12.0
MHSW	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0
WEEE	0.0	0.0	0.0	0.2	0.0					0.0	0.0	0.2
Bulky Items	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0
Other	0.2	2.1	1.5	0.2	0.0					0.8	0.0	2.1
Fines	8.5	12.6	24.1	15.1	13.0					14.7	8.5	24.1
TOTAL	100.0	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	25.0	0.0	100.0

Table 3.2- Curbside & Multi-Residential "Lights" Sample Sort Results

"Lights" Fractions Sorting	Sample Number											
	%											
Category	1	2	3	4	5	6	7	8	9	Average	Min	Max
Recyclable Fiber	14.2	14.5	10.9							13.2	10.9	14.5
Non-Recyclable Fiber	1.0	3.0	1.7							1.9	1.0	3.0
Recyclable Plastic	31.8	38.7	33.1							34.6	31.8	38.7
Non-Recyclable Plastic	16.1	19.4	17.2							17.6	16.1	19.4
Recyclable Metals	0.6	0.0	0.4							0.3	0.0	0.6
Non-Recyclable Metals	0.4	0.2	0.0							0.2	0.0	0.4
Glass	0.0	0.0	0.0							0.0	0.0	0.0
Organics	8.8	8.6	10.7							9.3	8.6	10.7
Sanitary & Pet Waste	1.5	0.4	2.7							1.5	0.4	2.7
C&D	0.0	0.0	0.0							0.0	0.0	0.0
Ceramics	0.0	0.0	0.0							0.0	0.0	0.0
Tires & Rubber	0.0	0.0	0.0							0.0	0.0	0.0
Textiles	5.2	0.0	0.2							1.8	0.0	5.2
MHSW	0.0	0.0	0.0							0.0	0.0	0.0
WEEE	0.2	0.0	0.2							0.1	0.0	0.2
Bulky Items	0.0	0.0	0.0							0.0	0.0	0.0
Other	2.7	0.6	3.1							2.1	0.6	3.1
Fines	17.4	14.7	19.8							17.3	14.7	19.8
TOTAL	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	100.0

Table 3.3- Curbside “Medium-Heavies” Sample Sort Results

"Medium-Heavies" Fractions Sorting	%											
Category	1	2	3	4	5	6	7	8	9	Average	Min	Max
Recyclable Fiber	7.7	10.9	8.0	13.2						10.0	7.7	13.2
Non-Recyclable Fiber	21.9	2.1	1.7	2.1						7.0	1.7	21.9
Recyclable Plastic	5.7	18.3	8.9	10.0						10.7	5.7	18.3
Non-Recyclable Plastic	6.7	9.9	16.7	7.0						10.1	6.7	16.7
Recyclable Metals	0.4	0.7	0.0	0.4						0.4	0.0	0.7
Non-Recyclable Metals	1.6	1.0	1.4	1.1						1.3	1.0	1.6
Glass	0.0	0.0	0.0	0.0						0.0	0.0	0.0
Organics	12.9	10.6	10.8	10.2						11.1	10.2	12.9
Sanitary & Pet Waste	7.5	7.1	4.9	8.3						6.9	4.9	8.3
C&D	1.3	1.7	0.6	1.9						1.3	0.6	1.9
Ceramics	0.0	0.0	0.0	0.0						0.0	0.0	0.0
Tires & Rubber	0.0	0.0	0.8	0.1						0.2	0.0	0.8
Textiles	14.6	26.7	26.3	20.6						22.0	14.6	26.7
MHSW	0.0	0.0	0.0	0.0						0.0	0.0	0.0
WEEE	0.4	0.0	0.0	0.0						0.1	0.0	0.4
Bulky Items	0.0	0.0	0.0	0.9						0.2	0.0	0.9
Other	2.8	0.4	2.5	3.3						2.3	0.4	3.3
Fines	16.5	10.5	17.3	20.9						16.3	10.5	20.9
TOTAL	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	100.0

Table 3.4- Curbside & Multi-Residential “Medium-Heavies” Sample Sort Results

"Medium-Heavies" Fractions Sorting	Sample Number											
	%											
Category	1	2	3	4	5	6	7	8	9	Average	Min	Max
Recyclable Fiber	8.9	11.3	10.2	8.8						9.8	8.8	11.3
Non-Recyclable Fiber	1.2	2.3	2.1	4.0						2.4	1.2	4.0
Recyclable Plastic	11.8	13.0	16.2	13.5						13.6	11.8	16.2
Non-Recyclable Plastic	8.9	9.7	14.1	8.1						10.2	8.1	14.1
Recyclable Metals	0.1	0.7	0.4	0.5						0.4	0.1	0.7
Non-Recyclable Metals	0.1	0.0	1.3	1.0						0.6	0.0	1.3
Glass	0.0	0.0	0.0	0.0						0.0	0.0	0.0
Organics	17.5	10.8	22.9	14.5						16.4	10.8	22.9
Sanitary & Pet Waste	5.6	5.7	7.4	4.9						5.9	4.9	7.4
C&D	2.8	5.3	2.3	6.7						4.3	2.3	6.7
Ceramics	0.0	0.0	0.0	0.0						0.0	0.0	0.0
Tires & Rubber	1.1	0.0	0.4	0.0						0.4	0.0	1.1
Textiles	25.5	10.1	15.4	19.7						17.7	10.1	25.5
MHSW	0.0	0.4	0.1	0.1						0.2	0.0	0.4
WEEE	0.5	0.0	0.1	0.1						0.2	0.0	0.5
Bulky Items	0.0	0.0	0.0	0.0						0.0	0.0	0.0
Other	1.9	6.7	0.5	6.7						4.0	0.5	6.7
Fines	14.0	23.9	6.6	11.3						13.9	6.6	23.9
TOTAL	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	100.0

Table 3.5- Curbside “Heavies” Sample Sort Results

"Heavies" Fractions Sorting	Sample Number										
	%										
Category	1	2	3	4	5	6	7	8	Average	Min	Max
Recyclable Fiber	11.9	14.6	14.3	7.7					12.1	7.7	14.6
Non-Recyclable Fiber	3.7	1.8	0.5	4.7					2.7	0.5	4.7
Recyclable Plastic	4.0	4.7	6.8	7.1					5.7	4.0	7.1
Non-Recyclable Plastic	6.0	3.5	6.6	6.6					5.7	3.5	6.6
Recyclable Metals	0.3	0.0	0.2	1.1					0.4	0.0	1.1
Non-Recyclable Metals	0.1	3.6	2.7	0.0					1.6	0.0	3.6
Glass	0.4	0.1	0.0	0.7					0.3	0.0	0.7
Organics	19.1	18.0	15.9	22.1					18.8	15.9	22.1
Sanitary & Pet Waste	7.9	12.1	11.4	0.0					7.8	0.0	12.1
C&D	9.3	13.2	12.0	10.4					11.2	9.3	13.2
Ceramics	2.3	0.9	0.5	0.0					0.9	0.0	2.3
Tires & Rubber	0.4	1.7	0.0	11.5					3.4	0.0	11.5
Textiles	17.6	13.4	19.3	12.1					15.6	12.1	19.3
MHSW	0.0	0.0	0.1	0.0					0.0	0.0	0.1
WEEE	0.5	0.0	0.0	0.0					0.1	0.0	0.5
Bulky Items	0.0	0.0	1.5	0.0					0.4	0.0	1.5
Other	2.5	1.2	0.6	2.9					1.8	0.6	2.9
Fines	13.9	11.1	7.5	13.0					11.4	7.5	13.9
TOTAL	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	20.0	0.0	100.0

Table 3.6- Curbside & Multi-Residential “Heavies” Sample Sort Results

"Heavies" Fractions Sorting	Sample Number											
	%											
Category	1	2	3	4	5	6	7	8	9	Average	Min	Max
Recyclable Fiber	0.0	0.0	11.4	13.7						6.3	0.0	13.7
Non-Recyclable Fiber	0.0	0.0	3.0	2.2						1.3	0.0	3.0
Recyclable Plastic	0.0	1.8	8.8	8.5						4.7	0.0	8.8
Non-Recyclable Plastic	2.4	4.3	5.3	6.6						4.7	2.4	6.6
Recyclable Metals	0.0	0.0	1.6	0.7						0.6	0.0	1.6
Non-Recyclable Metals	29.1	8.8	3.2	1.6						10.7	1.6	29.1
Glass	4.2	4.2	0.0	1.0						2.3	0.0	4.2
Organics	20.6	47.7	15.7	22.9						26.7	15.7	47.7
Sanitary & Pet Waste	0.0	0.0	13.7	8.6						5.6	0.0	13.7
C&D	21.4	5.8	9.7	6.9						10.9	5.8	21.4
Ceramics	0.0	0.0	0.0	0.0						0.0	0.0	0.0
Tires & Rubber	0.7	3.1	0.0	0.0						0.9	0.0	3.1
Textiles	0.0	0.0	13.1	9.9						5.7	0.0	13.1
MHSW	0.0	0.0	0.1	0.0						0.0	0.0	0.1
WEEE	0.0	0.0	0.0	0.0						0.0	0.0	0.0
Bulky Items	0.0	0.9	0.0	0.6						0.4	0.0	0.9
Other	17.7	19.4	2.5	2.0						10.4	2.0	19.4
Fines	4.0	4.1	11.9	14.9						8.7	4.0	14.9
TOTAL	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	100.0

Appendix 2

“Audit Fines” Category Visual Analysis

For the purpose of this particular waste audit, the sorting category of “audit fines” is used to describe material that is typically less than 1.0cm in size and impossible to sort into other waste categories because they are wet and/or soiled. Typically, the most prominent source of “audit fines” in all waste fractions are miniscule pieces of plastic, metal, textile and fiber that is combined and saturated with shredded organic waste and pet & sanitary waste to the point of being indistinguishable from one another. The photo below demonstrates the saturated nature, size and composition of typical fines found in all waste streams. The condition of this material does not vary as waste fractions get heavier.



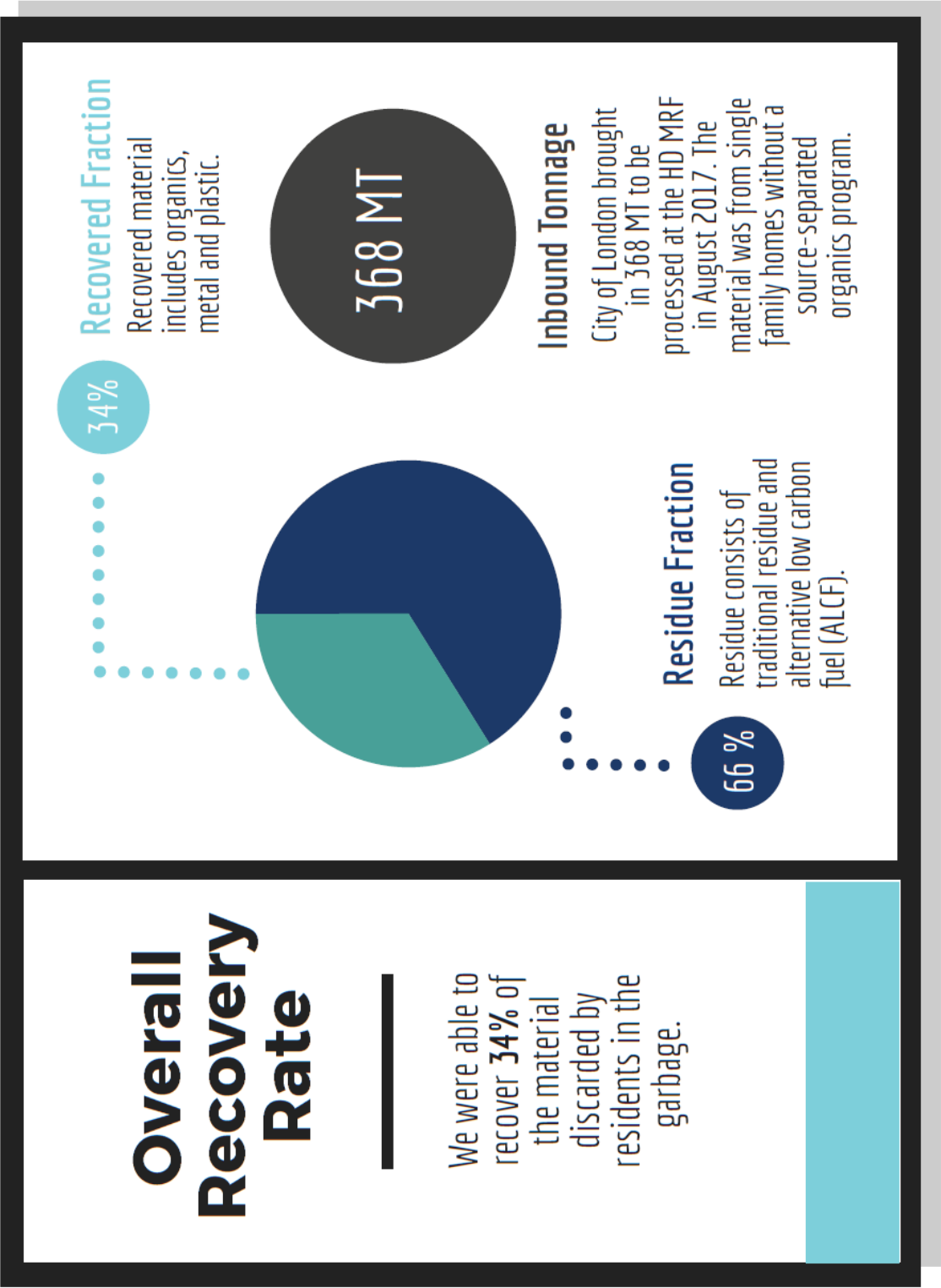
Photo 7. “Fines” Category

HIGH DIVERSION MRF PILOT RESULTS

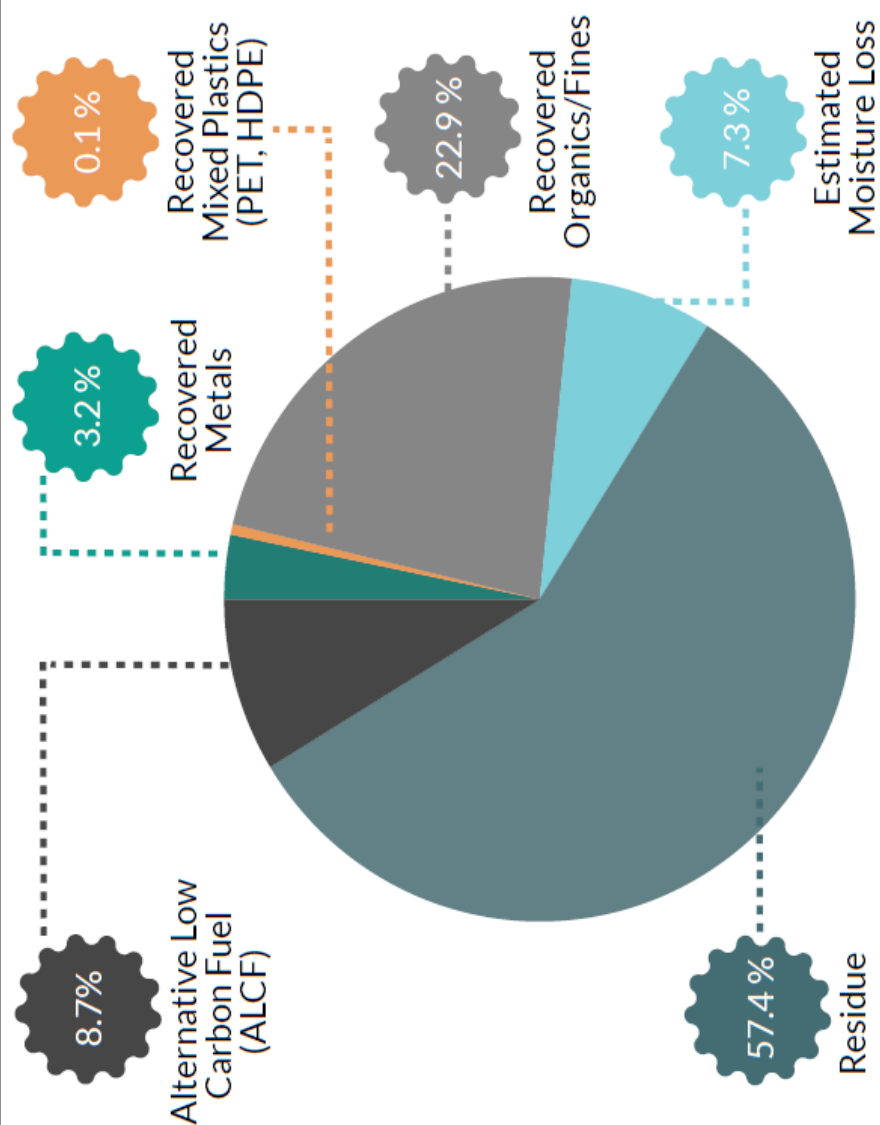
August 2017

Preliminary results from pilot to assess viability of recovering resources from City of London's mixed solid waste stream.





BREAKOUT OF RECOVERED & RESIDUE FRACTIONS



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April 5, 2018

Volume I

Draft Proposed Terms of Reference

**Environmental Assessment of the Proposed W12A Landfill
Expansion, City of London**



Executive Summary

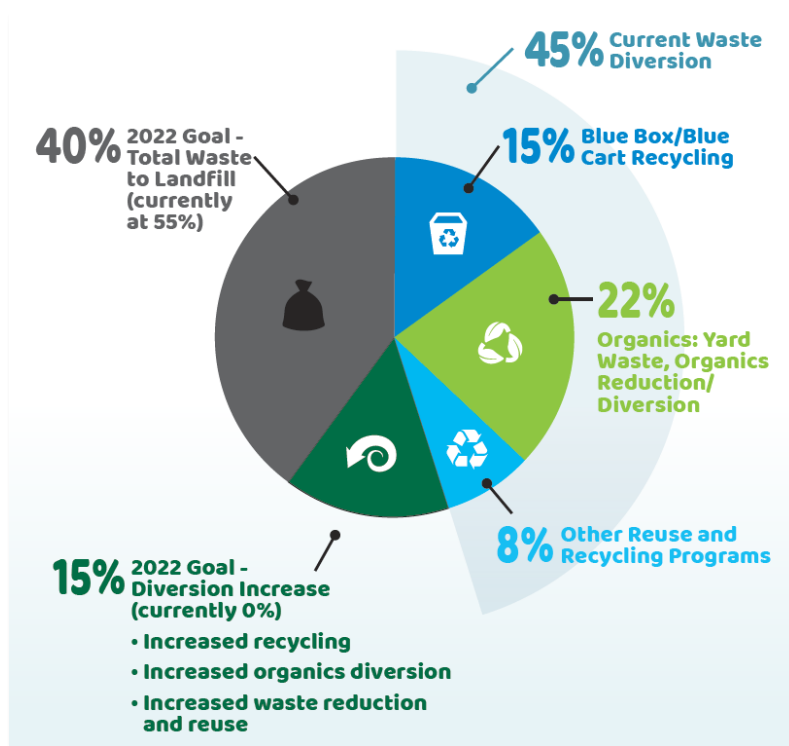
Phase 1: Preparation of a Terms of Reference:

An Individual Environmental Assessment (EA) for expansion of the W12A Landfill site is being undertaken by the City of London and requires approval under the provincial *Environmental Assessment Act*. The first phase in the EA process is preparation of a Terms of Reference (ToR). Work on the ToR started in March, 2017. The ToR becomes the framework for carrying out the EA.

This is an Executive Summary of the content of the draft proposed ToR, which has been prepared by the City and will be circulated to government review agencies, Indigenous communities, a number of City committees and the public for comment. The comments received will be considered by the City of London in making revisions and preparing the proposed ToR, which will then be submitted to the Minister of Environment and Climate Change (Minister) for a decision. Once approved by the Minister, the ToR provides the framework or work plan that must be subsequently completed to prepare the EA, and the basis for review and approval.

The City of London has implemented many waste diversion programs over the years and has achieved 45% diversion of its residential waste stream (Figure 1). This diversion rate is comparable to other medium to large size municipalities in Ontario with the exception of communities with Green Bin programs. The City has commenced the development of its long-term Resource Recovery Strategy. The first component of the strategy is to complete a 60% Diversion Action Plan to determine how best to increase residential waste diversion to 60% by 2022.

Figure 1 - Residential Waste Diversion



In parallel, and recognizing that despite measures to maximize diversion there will still be waste requiring disposal, expansion of the W12A Landfill site is the approach the City is taking for the long term Residual Waste Disposal Strategy for materials that cannot be diverted.

The W12A Landfill Site

The W12A landfill site is located in the south portion of the City of London, within the western part of the block of land bounded by Manning Drive, Scotland Drive, White Oak Road and Wellington Road South (Figure 2). The site is currently licensed by the Province of Ontario to dispose of waste within a 107 hectare disposal area, which is located within a 142 hectare property. There is an approved site capacity of 12,500,000 cubic metres for waste (about 10,000,000 tonnes), cover soil and final cover. The site is allowed to accept solid non-hazardous waste from a specified area, consisting of the City of London, the Municipality of Thames Centre, the Lake Huron and Elgin Area water treatment plants and Try Recycling Facilities located adjacent to the City's northern boundary. The site can also accept Municipal Hazardous or Special Waste from the City of London, the County of Elgin and the County of Middlesex for transfer off-site for recycling or disposal.

Figure 2 - W12A Landfill Location



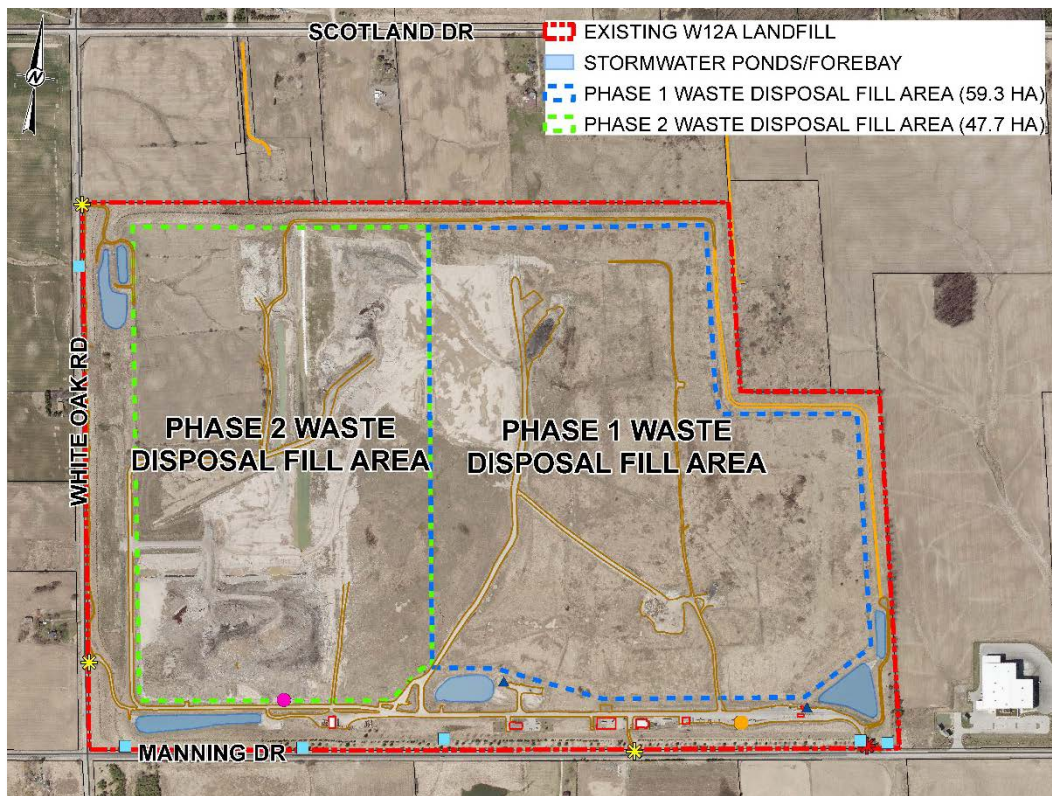
The landfill property is located within the Waste Management Resource Recovery Area, which is a large area of City-owned land identified within the City's Official Plan for future waste management facilities. A City-owned Material Recycling Facility (MRF) is located within these lands just east of the landfill site.

The landfill property is located within the Waste Management Resource Recovery Area, which is a large area of City-owned land identified within the City's Official Plan for future waste management facilities. A City-owned Material Recycling Facility (MRF) is located within these lands just east of the landfill site.

The W12A Landfill Site has been in operation since 1977. The majority of the wastes that it receives are from London residences and some businesses. The remainder of the businesses within the city export their waste for disposal to facilities outside the City. At current disposal rates, the W12A Landfill is expected to reach its approved capacity at the beginning of 2025.

The landfill is divided into two phases (Figure 3). Phase 1 occupies the eastern portion of the disposal area and was filled to capacity in the first 25 years of operation. Phase 2 occupies the remaining western portion and has been constructed with a number of engineering design and operational upgrades (i.e., modern landfill design), and is the active area being used for the residual waste materials generated and requiring disposal. There are engineered collection systems for the leachate (the contaminated liquid produced by precipitation contacting the waste) produced at the site.

Figure 3 - W12A Landfill



For Phase 1 there is a leachate collection system around the perimeter of the disposal area, while for Phase 2 there is a full underdrain collection system below the entire base area. The collected leachate is sent off-site through a piping system for treatment at the Greenway Wastewater Treatment Plant. There is an active landfill gas collection system installed within the completed areas that have received final cover. The collected gas is flared. This gas management system reduces greenhouse gas and odour emissions from the landfill site. There is also a stormwater management system to control the quality and quantity of runoff discharged from the site.

The landfill property and surrounding area is underlain by an extensive deposit of low permeability clayey glacial till soil that provides a natural barrier to control migration of leachate into the groundwater. There are two permeable aquifer zones within the till deposit that are used for water supply from private wells by residences, agricultural and other business purposes in this rural area of the City.

Based on the results from ongoing groundwater and residential well monitoring programs, there is no evidence of leachate effects on the aquifer zones and the W12A Landfill is operating in accordance with the province's requirements in terms of effects on groundwater quality at the property boundary. The W12A Landfill is not having an effect on off-site water well quality.

The ongoing surface water quality monitoring program indicates that the surface water discharged via the stormwater management system meets provincial requirements. The landfill gas monitoring program indicates that landfill gas is not migrating off-site through the subsurface.

Rationale for Expanding the W12A Landfill Site

Since 1969, the City has undertaken a number of waste management planning studies to be able to provide secure, long-term waste management infrastructure for the city. The continued operation of the W12A Landfill site has been a component of the City's long-term plan to provide waste management services since 1977. In 1991 a provincially-appointed arbitrator addressed the City's request to annex additional lands in the Township of Westminster. The arbitrator reported that the W12A Landfill was the most desirable location for a landfill site and that the adjacent lands were likely suitable for an additional landfill site. In the City's 'Vision 96' strategic planning process, it was concluded that the W12A Landfill was a key component of the City's long-term waste management infrastructure.

From 1995 to 1999 the City of London and County of Middlesex were involved in a cooperative long term waste management planning exercise referred to as the London/Middlesex Waste Management plan. This project was 50% funded by the Province. Outcomes of the planning exercise included the approval of the City's long term strategy known as the Waste Management Continuous Improvement System and expansion of the City's Household Special Waste depot to serve the County of Middlesex.

The City commenced the W12A Landfill Area Plan study process in 2005 to study the evolution of the W12A Landfill facility within an overall integrated waste management centre with a planning horizon of 40 years. The study compared seven alternatives that included closing the W12A Landfill and either establishing a new landfill within London or exporting the waste for disposal outside its boundaries, and expanding the W12A Landfill. This study, which included public consultation events, concluded in 2008 and identified the preferred approach as expansion of the W12A Landfill within an integrated resource recovery centre. This was followed by establishment and designation of the Waste Management Resource Recovery Area in the City's Official Plan, and additional public consultation to develop a Community Enhancement and Mitigative Measures Program to involve the community in the site operations and to benefit the community in the area of the landfill site.

As part of developing this ToR, a confirmatory screening assessment of the seven alternatives evaluated in the previous study was completed and the results presented to the public, various committees and City Council. This assessment confirmed that expansion of the W12A Landfill site remains the preferred approach for the City's Residual Waste Disposal Strategy.

It is proposed that additional assessment of long-term waste disposal alternatives (known as 'Alternatives To' the undertaking) will not be part of the EA.

Previous waste management studies and work completed as part of the TOR process concluded that expansion of the W12A Landfill is the most appropriate disposal option. Consequently, the City is proposing not to look at other disposal alternatives as part of the EA.

Description of the Project

Based on previous community engagement activities and ongoing input received, Guiding Principles were developed by the City and approved by City Council to direct the development of the Residual Waste Disposal Strategy. Among these guiding principles, the most support was received for making waste reduction the highest priority, being socially responsible and ensuring that the solution is financially sustainable. In addition, there was support for London managing its waste within its own boundaries.

The W12A Landfill site expansion project will be defined by:

- A 25 year planning period beyond 2025, i.e., until 2050.
- The service area will be expanded to neighbouring municipalities to create a regional service area: The City of London and the Counties of Huron, Perth, Elgin and Lambton and Middlesex will be included in the regional service area. The City of London Council will have the authority to decide which, if any, of these other municipalities will be allowed to use the W12A Landfill for disposal of their wastes, and under what conditions.
- Reduction in the maximum allowable annual tonnage that can be accepted at the landfill from 650,000 tonnes to 500,000 tonnes.
- Achieving 60% residential waste diversion by 2022.

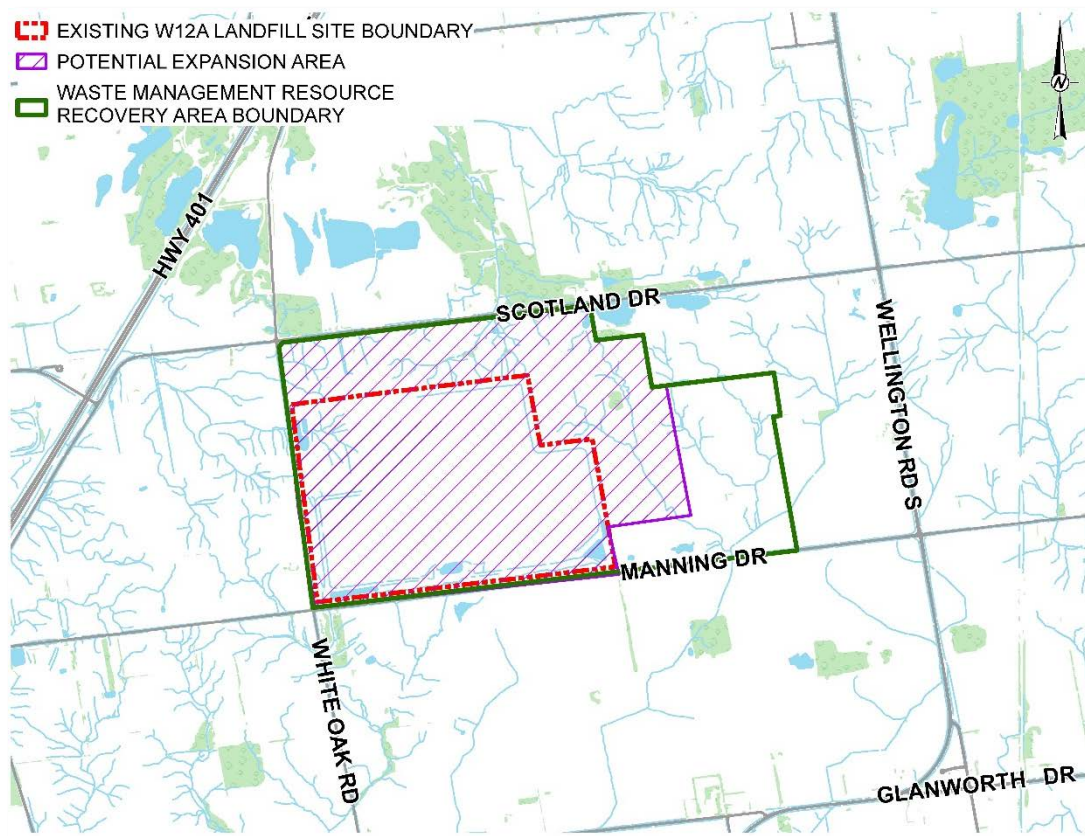
At current disposal rates, the site is expected to reach its approved capacity at the beginning of 2025. An additional 14,700,000 cubic metres of airspace at the W12A Landfill site, which will about double the current approved capacity, will be required to satisfy disposal requirements for residual waste for the next 25 year period.

To satisfy these disposal requirements, expansion of the W12A Landfill should allow for an additional landfill capacity of 14,700,000 cubic metres.

The different ways in which this additional airspace can be achieved on the W12A Landfill site are known as 'Alternative Methods.' The alternative methods of expanding the W12A Landfill site will be developed and described during the EA and will consist of a vertical expansion above the existing waste disposal area and/or a horizontal expansion to the north and/or to the east within a portion of the Waste Management Resource Recovery Area (Figure 4).

The area proposed for horizontal expansion extends beyond the current landfill site about 300 metres northward to Scotland Drive, and eastward about 420 metres. These expansion alternatives will consist of variations in and combinations of landfill height, landfill area and configuration. It is expected that there will be three or four different landfill expansion alternatives developed at a conceptual level, their potential effects on the environment assessed, and the alternatives then compared to identify the overall preferred expansion alternative.

Figure 4 – Potential Expansion Area

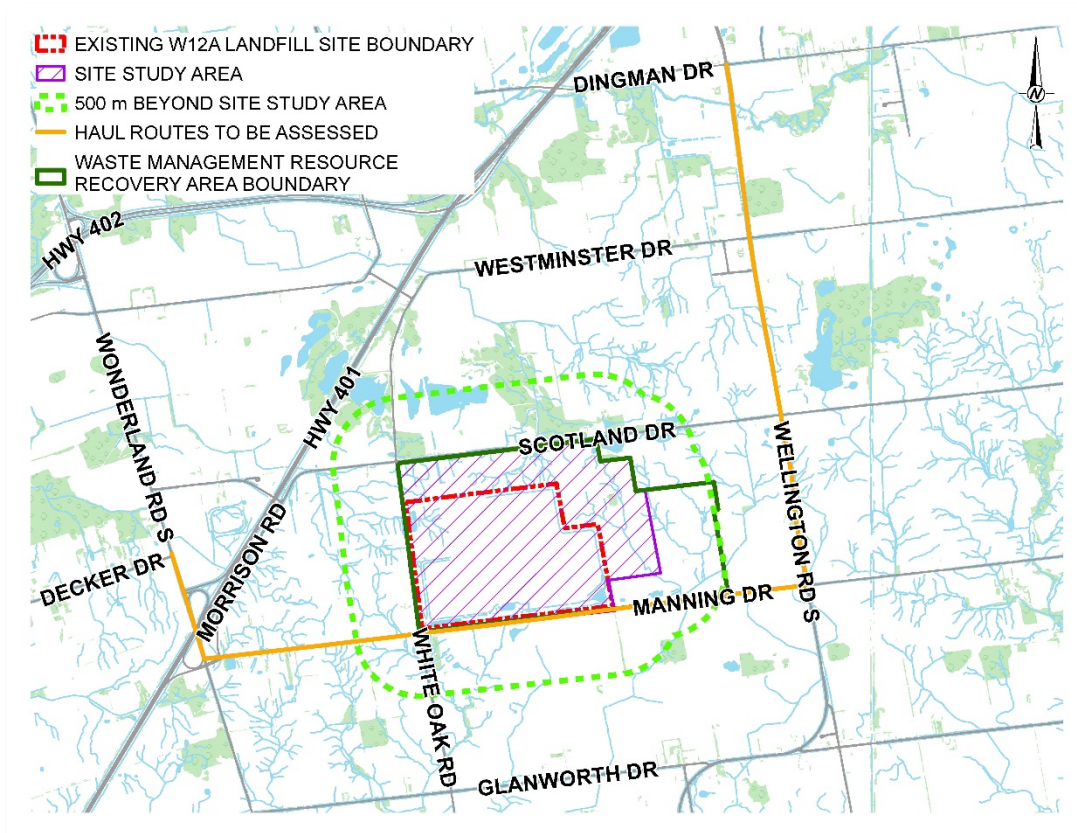


Phase 2: Environmental Assessment

The EA work will be undertaken in a series of nine steps:

- Step 1** – Identify the ‘Alternative Methods’ of landfill expansion (and incorporate conceptual design mitigation measures)
- Step 2** – Characterize the existing environmental conditions
- Step 3** – Qualitative evaluation of ‘Alternative Methods’
- Step 4** – Compare the ‘Alternative Methods’ for landfill expansion and identify the preferred alternative
- Step 5** – Determine the net effects of the preferred alternative
- Step 6** – Describe the preferred ‘Alternative Method’ for landfill expansion;
- Step 7** – Consideration of climate change
- Step 8** – Cumulative Impact Assessment
- Step 9** – Preparation of the EA Study Report

Figure 5 – Proposed Study Areas



Consultation (community engagement) with the public, Indigenous communities, Government review team members, City of London Advisory Committees, and other stakeholders will be ongoing throughout the EA process.

The EA study area is the area within which activities associated with the proposed project will occur and where potential environmental effects will be studied. Three preliminary generic study areas (Figure 5) for the assessment, which may be refined and will be confirmed during the EA, have been identified as follows:

Site Study Area – The existing W12A Landfill Site, located at 3502 Manning Drive and adjacent lands where landfill expansion may occur.

Site-vicinity Study Area – The lands in the area immediately adjacent to the Site Study Area that have the potential to be directly affected by the landfill expansion and activities with the Site Study Area. The extent of the Site-vicinity Study Area will be determined for each of the environmental components. For most environmental components, a Site-vicinity Study Area of 500 metres from the Site Study Area is appropriate.

Wider Study Area – An area that takes on the broader community generally beyond the immediate site vicinity and for specific environmental components may include the entire Municipality.

The components and sub-components of the environment that will be evaluated during the EA such that the potential effects of the proposed landfill expansion alternatives are determined and compared using a set of comparative evaluation criteria, are:

Environmental Components:

- Atmosphere (air and noise)
- Geology and Hydrogeology (groundwater quality)
- Surface Water (quality and quantity)
- Biology (aquatic and terrestrial)

Socio-Economic Components:

- Land Use
- Agriculture
- Archaeology and Cultural Heritage
- Socio-economic
- Visual Impacts

Technical Components:

- Design & Operations
- Transportation

The ToR provides technical work plans for each of these components and sub-components that will be undertaken during the EA study.

Consultation (Community Engagement)

The ToR describes the Community Engagement Program prepared and undertaken by the City for the development of this ToR, as well as the program proposed for the subsequent EA process.

Engagement and consultation with the public and other stakeholders is a key component of the EA process. It enables stakeholders to participate in the planning process and enhance the quality of the project. The key instruments in the Community Engagement Program that were used to engage the public and the other stakeholders and elicit feedback during the ToR preparation are summarized in Table 1). Input received from this program was considered by the City in preparing the draft ToR.

A list of potentially affected Indigenous communities was developed in consultation with the MOECC during the development of this ToR. A program to engage and consult with the eight identified Indigenous communities was carried out considering their specific needs and specific issues. The Indigenous communities were consulted on how they would like to be involved in the EA process. City staff were available to meet with interested Indigenous communities and discuss the proposed project at any time during the development of the ToR.

**Table 1 - Key Community Engagement Activities
Between March 2017 and January 2018**

Community Engagement Activity	Comments
Open Houses	<ul style="list-style-type: none">• Two sets of open houses (one in May, one in November 2017)• Each set had an afternoon and evening sessions at two locations plus a follow-up virtual open house on the project website
W12A Landfill Public Liaison Committee	<ul style="list-style-type: none">• Existing committee• Provided updates at six meetings
City of London Advisory Committees	<ul style="list-style-type: none">• Advisory Committee on the Environment, Agricultural Advisory Committee and Environmental and Ecological Planning Advisory Committee• Attended and presented at two meetings for each advisory committee
Community Liaison Committee	<ul style="list-style-type: none">• New committee with members representing various stakeholder groups• Four meetings
Community Events	<ul style="list-style-type: none">• Booth at 10 community events (e.g., Sunfest, Lifestyle Home Show, etc.)

Community Engagement Activity	Comments
Project Website	<ul style="list-style-type: none">• Getinvolved.London.ca/WhyWasteDisposal• Over 1,300 unique visitors
Letter/email correspondence	<ul style="list-style-type: none">• Contacted 275 nearby property owners and residents, 28 landfill customers, 15 stakeholder groups and over 30 government agencies on three occasions (Notice of Commencement and both sets of open houses)
Newspaper and social media advertisements	<ul style="list-style-type: none">• Numerous ads at various point in the process

To assist in the comparative evaluation of the expansion alternatives during the EA, the public was asked at open house #2 to rank the environmental components that they considered more important, important and less important. Based on the input received, groundwater quality, aquatic ecosystems and terrestrial ecosystems were the environmental components identified as most important, while cultural heritage landscapes, cultural heritage resources and archaeology were ranked less important.

Following approval of this ToR and during preparation of the EA, a consultation program will be continued to engage the public, businesses, the Government review team, Indigenous communities, as well the various groups and committees during the EA process. Input will be obtained through a number of engagement activities, which will be generally similar to the activities completed during preparation of the ToR.

The Draft EA will be circulated for a seven week public comment period prior to finalization and submission to the MOECC for approval. In addition, consultation specific to individual Indigenous communities will also be carried out.

Other Regulatory Approvals

In addition to EA approval, the W12A Landfill expansion will also require approvals under the *Environmental Protection Act*, the *Ontario Water Resources Act* and the *Planning Act*, and perhaps from the Upper Thames and Kettle Creek Conservation Authorities in terms of a permit to undertake specific works associated with the expansion. These approvals processes are expected be undertaken after EA approval is in place.

Overview of the EA Schedule

The following schedule is anticipated:

Circulation of Draft ToR for public and agency review	April/May 2018
Submission of Proposed ToR for Minister's Approval	August 2018
Approval of ToR	Late 2018/Early 2019
EA Studies and EA Submission for Minister's Approval	2019 and 2020
Approval of EA	Mid-2021
Other Approvals	2021-2022

It is anticipated that all approvals will be in place to allow final design of the preferred landfill expansion and any required construction prior to the W12A Landfill reaching its currently approved capacity, which is predicted at the beginning of 2025.

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Volume II – Supporting Documents

Supporting Document #1 - W12A Landfill Area Plan

Supporting Document #2 - Residual Waste Projections and Landfill Capacity Assessment

Volume III – Record of Consultation

Appendix A

Community Engagement Plan

Appendix B

Government Review Team

Appendix C

Aboriginal Consultation

Appendix D

ToR Launch Material

Appendix E

Open House #1

Appendix F

Open House #2

Appendix G

Other Engagement

Appendix H

Draft ToR Review

Appendix I

Media Articles

ACRONYMS

Acronym	Definition
AAC	Agricultural Advisory Committee
AADT	Average Annual Daily Traffic
ACE	Advisory Committee on the Environment
AG	Agricultural
BMP	Best Management Practices
C of A	Certificate of Approval
CLC	Community Liaison Committee
CLI	Canada Land Inventory
CO _{2e}	Carbon Dioxide Equivalents
COTTFN	Chippewas of the Thames First Nation
CR&D	Construction, Renovation and Demolition Waste
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EAA	<i>Environmental Assessment Act (Ontario)</i>
ECA	Environmental Compliance Approval
EDR	Emergency Detour Route
EEPAC	Environmental and Ecological Planning Advisory Committee
EES	Environmental & Engineering Services
EFW	Energy from Waste
EPA	<i>Environmental Protection Act (Ontario)</i>
ER	Environmental Review
ESA	Environmentally Significant Area
EX	Resource Extraction
FAQ	Frequently Asked Questions
GAP	Generally Accepted Principles
GHG	Greenhouse Gases
GIS	Geographic Information System
GRT	Government Review Team
H	Horizontal
HIA	Heritage Impact Assessment
HSW	Household Special Waste
IC&I	Industrial, Commercial and Institutional Waste
KCCA	Kettle Creek Conservation Authority
LF	Landfill
LFG	Landfill Gas
LIO	Land Information Ontario
LOS	Level of Service
LWRIC	London Waste to Resources Innovation Centre
MDI	Mineral Deposit Inventory
MHSW	Municipal Hazardous or Special Waste

Acronym	Definition
MNDM	Ministry of Northern Development and Mines
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MRF	Materials Recovery Facility
MTCS	Ministry of Tourism Culture and Sport
MTO	Ministry of Transportation Ontario
MU4	Muriel soils (MU4)
NOC	Notice of Commencement
OMB	Ontario Municipal Board
OS	Open Space
O. Reg.	Ontario Regulation
OWRA	Ontario Water Resources Act
PLC	Public Liaison Committee
PORs	Points of Reception
RGP	Resident Geologist Program
SAR	Species at Risk
SOCC	Species of Conservation Concern
SWH	Significant Wildlife Habitat
SWM	Stormwater management
SWMS	Stormwater management system
ToR	Terms of Reference
V	Vertical
WMWG	Waste Management Working Group
WRM	Waste Management and Resource
UTRCA	Upper Thames River Conservation Authority

UNITS OF MEASURE

Acronym	Definition of Units
cm	centimetre
ha	hectare
km	kilometre
m	metre
masl	metres above sea level
mm	millimetre
m ³	cubic metre

GLOSSARY OF TERMS

Term	Definition
'Alternative Methods'	Alternative methods of carrying out the proposed undertaking are different ways of doing the same activity associated with an undertaking. Alternative methods could include consideration of one or more of the following: alternative technologies; alternative methods of applying specific technologies; alternative sites for a proposed undertaking; alternative design methods; and, alternative methods of operating any facilities associated with a proposed undertaking.
'Alternatives To'	Alternatives to the proposed undertaking are functionally different ways of approaching and dealing with a problem or opportunity.
Ambient Air	Open air not enclosed in a structure, machine, chimney or stack.
Aquifer	A layer of permeable soil, i.e., sand and/or gravel, or bedrock through which groundwater flows and can yield enough water to supply wells for use.
Berm	At a landfill site, a narrow mound or ridge comprised of soil (for example, a screening berm used to block the view of the landfill activities from off-site)
Borehole	A hole drilled into the ground to obtain information on the soil, bedrock and groundwater conditions and characteristics. A borehole can be completed as a groundwater monitoring well.
Buffer Area	The part of the landfill site not used for waste disposal, usually between the perimeter of the disposal area and the landfill property boundary.
Certificate of Approval (Waste)	An approval issued by the Ministry of the Environment for the establishment and operation of a waste management site/facility. Now referred to as an Environmental Compliance Approval.

Term	Definition
City of London	The City of London (the proponent); used when referencing the political or corporate administrative body.
CR&D Waste	Waste generated by the Construction, Renovation and Demolition sector of the economy.
Criteria	A description of each environmental component to be considered in the environmental assessment, consisting of the rationale for including the component and the indicator(s) to be used in the assessment.
Waste Management Community Liaison Committee	A group established specifically for this project with the objective of ensuring the diverse interests of multiple stakeholders are equally and adequately represented throughout the EA process.
Cumulative Effects	The net effects of the proposed undertaking combined with the predicted effects of other existing and identified certain and probable projects in the area of the proposed undertaking, where the effects would overlap.
Disposal Area	The area within the landfill property approved for the disposal of residual waste; also referred to as the waste footprint.
Environment	As defined by the <i>Environmental Assessment Act</i> , environment means: <ul style="list-style-type: none"> • Air, land or water, • Plant and animal life, including human life, • The social, economic and cultural conditions that influence the life of humans or a community, • Any building, structure, machine or other device or thing made by humans, • Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or • Any part or combination of the foregoing and the interrelationships between any two or more of them (ecosystem approach).
Environmental Assessment	An environmental assessment, commonly known as an individual EA, is a study that is completed by the proponent to assess the potential environmental effects (positive or negative) of an individual project.
Environmental Compliance Approval	An approval issued by the Ministry of the Environment and Climate Change for the establishment and operation of a waste management site/facility.
Environmental Components	Environmental components are different aspects of the physical, biological and human environments.

Term	Definition
Greenfield Site	A parcel of land that has not been previously developed for urban use, i.e., rural or agricultural land or green space.
Groundwater	Water below the ground surface contained in the pore spaces in soil or in openings within the bedrock.
Haul Route	Public roadways used by vehicles transporting waste to a landfill site.
Hazardous Waste	Waste generated from any source that is defined as hazardous by the regulations of Ontario.
Indicators	Specific characteristics of the environmental components that can be measured, qualified, quantified or determined in some way.
IC& I Waste	Waste generated by the Industrial, Commercial & Institutional sector of the economy.
Landfill	An approved site used for the long-term disposal of residual waste.
Landfill Capacity	The volume approved for disposal of residual wastes and cover materials, described in cubic metres. Also referred to as the approved airspace.
Landfill Expansion	An increase in the approved landfill capacity.
Landfill Gas	Gases generated from the anaerobic decomposition of organic waste materials; mainly consisting of methane and carbon dioxide and traces of other gases
Landfill Gas Collection System	The system used to collect the gases generated by decomposition of the waste in the landfill, typically consisting of a network of gas wells and/or horizontal piping attached to vacuum to extract the gas and convey it to a location where the gas can be combusted in a gas flare or processed for subsequent use.
Leachate	The liquid produced when water (typically rainwater or snowmelt) passes through a landfill and contains contaminants as a result of coming in contact with the waste.
Leachate Collection System	The system used to collect leachate generated by a landfill, usually consisting of a network of piping and drainage stone beneath or around the perimeter of the disposal area.
Mitigation Measures	Design features and/or operational approaches used to control the potential effects of the landfill on the environment.
Monitoring Well	An installation at a selected depth in a borehole in which the groundwater level can be measured and groundwater samples obtained for chemical analysis to determine its quality. At a landfill, this information is typically monitored at some frequency over time and is referred to as a groundwater monitoring program.

Term	Definition
Non-hazardous Solid Waste	Waste generated from any source that is defined as non-hazardous and solid by the regulations of Ontario.
Ontario Regulation 232/98	The regulation that governs the design, operation, closure and post-closure of new or expanding waste disposal sites in the province of Ontario.
Proponent	A person, corporation, government agency or other legal entity who: a) Proposes to carry out an undertaking, or b) Is the owner or person having charge, management or control of an undertaking. For this undertaking (project), the proponent is the City of London.
Reasonable Use Guideline (or Concept)	The Ministry of Environment and Climate Change guideline used to determine the acceptable level of impact from landfill leachate on off-site groundwater quality, and used to assess compliance of landfill sites in terms of effects on groundwater resources.
Receptor	A specific location where the effect(s) from a waste management facility may be received. Also referred to as Points of Reception (PORs).
Residential Waste	Waste generated by residences (ranging from single to multi-residential units).
Residual Waste	The waste material that cannot be diverted through recycling or other processes and requires disposal.
Service Area	The geographic area from which generated waste can be received at a recycling or disposal site, in accordance with the approval for the recycling or disposal site.
(the) Site	(the) W12A Landfill.
Site Life	The period of time during which the W12A Landfill can continue to accept wastes.
Stormwater Management System	An engineered system to manage/control the quantity and/or quality of stormwater runoff from the site, typically consisting of ditches and ponds that discharge to the natural environment.
Surface Water	Water on top of or flowing across the ground surface, i.e., lakes, rivers, ditches.

Term	Definition
Terms of Reference	A document prepared by the proponent and submitted to the Ministry of the Environment and Climate Change for approval. The Terms of Reference (ToR) document sets out the framework for the planning and decision-making process to be followed by the proponent during the preparation of an EA. In other words, it is the City of London's (the proponent's) work plan for what is going to be studied. If approved, the EA must be prepared according to this ToR. The ToR also provides the framework for evaluating the EA.
(the) Undertaking	The activities associated with the EA for the proposed expansion of the W12A Landfill, as described in this ToR. Also referred to as the 'project'.
Waste Generation Rate	The quantity of waste generated by an individual(s) on a daily or annual basis, typically described in tonnes (or kilograms) per person per year.

1.0 Introduction

This is the Terms of Reference (ToR) document (i.e., the work plan or framework for work) for the proposed expansion of the W12A Landfill (the site) by the City of London (the proponent). This section provides an introduction to the project; including the proponent, the purpose of the project, the project location and a general description of the site.

1.1 Identification of the Proponent

The City of London (the City) is the proponent for the proposed project. The City is located in southern Ontario and has a total area of approximately 421 square kilometres (km²) with a 2016 population of 383,822. The contacts for this project are as follows:

Jay Stanford, M.A., M.P.A.

Director - Environment, Fleet and Solid Waste

Phone: (519) 661-2489 ext. 5411

Fax: (519) 661-2354

E-mail: jstanfor@london.ca

Wesley Abbott, P. Eng.

Project Manager, Solid Waste Management

Phone: (519) 661-2489 ext. 1812

Fax: (519) 661-2354

E-mail: wabbott@london.ca

Mailing Address for the above staff is:

Corporation of the City of London

Solid Waste Management Division, 8th Floor

300 Dufferin Avenue, P.O. Box 5035

London, ON N6A 4L9

1.2 Purpose of the Undertaking

In the City more than one tonne of waste is produced per person each year. This includes both waste generated in residences as well as waste generated by businesses and institutions. Waste is diverted from disposal through numerous waste reduction, reuse, recycling, composting and recovery initiatives that have been implemented by the City and by private and institutional sectors; however, there is still a quantity of waste produced that is not diverted and requires disposal. Waste that cannot be reduced, reused, recycled or composted is considered residual waste.

The residual waste created in London from residences and some businesses is currently disposed of at the City's W12A Landfill. Some of the City's business waste is taken to landfills located outside the City for disposal. At the current disposal rates, this landfill is expected to reach its currently approved capacity at the beginning of 2025.

To plan for the future, the City has commenced the development of two long-term waste management strategies: the Resource Recovery Strategy, and the Residual Waste Disposal Strategy. The Resource Recovery Strategy will include a plan to maximize waste reduction, reuse, recycling, resource recovery, energy recovery and/or waste conversion in an economically viable and environmentally responsible manner. The current residential diversion rate is 45% with the latest comprehensive assessment of existing diversion programs and proposed diversion program enhancements provided in *The Road to Increased*

Resource Recovery and Zero Waste (Road Map 2.0). The only significant diversion component that remains undecided and unimplemented is residential organics management program. The Resource Recovery Strategy is scheduled to be completed in early 2019. An interim step includes the completion of the 60% Diversion Action Plan in 2018 and will include development of programs and an implementation schedule for specific activities to increase the City's diversion rate to 60% for residential waste.

The Residual Waste Disposal Strategy will involve the development of a long-term plan to manage residual waste, which will require obtaining additional residual disposal capacity. Several ways of satisfying this need were assessed (referred to as 'Alternatives To' the undertaking). The assessment of these 'Alternatives To' is described in Section 4 of this document. The preferred 'Alternative To' included the expansion of the W12A Landfill.

The expansion of the W12A Landfill requires an Environmental Assessment (EA) and approval from the Minister of the Environment and Climate Change for Ontario, pursuant to the Ontario *Environmental Assessment Act* (EAA). The purpose of the EA is to obtain approval for expansion of the W12A Landfill.

One of the City of London's responsibilities as an Ontario municipality is to provide residual waste disposal service to its ratepayers. If the W12A Landfill is allowed to reach its currently approved capacity and other possible means of providing disposal service are not pursued by the City, then they will not be able to fulfill this obligation. Because the W12A Landfill is expected to reach its approved capacity early in 2025, the City of London is commencing this EA process at this point in time to allow adequate time for completion of both the required approvals and the implementation of the landfill expansion to be available to receive waste prior to the current remaining disposal capacity being consumed.

This ToR is being submitted to the Ministry of the Environment and Climate Change (MOECC) for approval to carry out an individual EA under the EAA. Through completion of this EA, the City will be able to achieve its primary objective of providing the long-term preferred solution for residual waste disposal for the City.

The City of London will consider the stated purpose of this EA during the EA process and will refine the purpose if required. The final purpose statement will be provided in the EA study report.

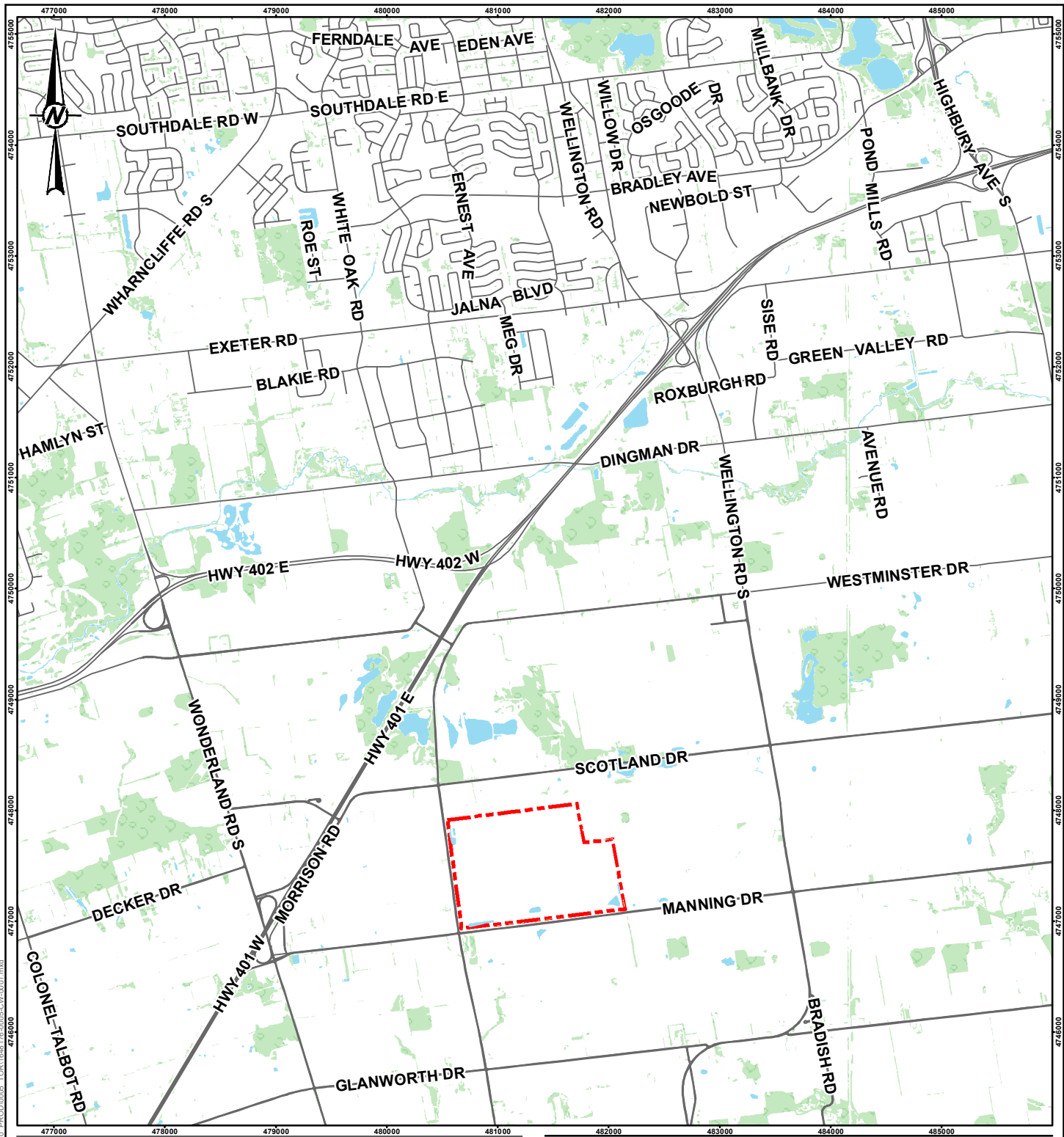
1.3 W12A Landfill Site Description

The W12A Landfill is located at 3502 Manning Drive in the south end of the City of London, Ontario, as shown in Figure 1.3-1. The site is currently approved to accept waste as follows:

- Solid non-hazardous waste, generated from only the following areas:
 - The geographic boundaries of **the City of London**;
 - The geographic boundaries of **the Municipality of Thames Centre**;
 - **Lake Huron Water Treatment Plant** located at 71155 Bluewater Highway, Municipality of South Huron;
 - **Elgin Area Water Treatment Plant** located at 43665 Dexter Line, Municipality of Central Elgin; and
 - **TRY Recycling Plants** located at 21462 and 21463 Clarke Road, Municipality of Middlesex Centre.
- Municipal Hazardous or Special Waste (MHSW) from residents and small quantity generators (businesses with limited amounts of MHSW) from the following areas:
 - The geographic boundaries of **the City of London**;
 - The geographic boundaries of **the County of Middlesex**; and
 - The geographic boundaries of **the County of Elgin**.

Solid, non-hazardous waste is disposed at the site while the MHSW is accepted for transfer to appropriate recycling/processing facilities.

The City owns a number of properties adjacent to and near the W12A Landfill as depicted in Figure 1.3.2. This figure also shows the boundary of the Waste Management Resource Recovery Area, which is an area identified in the City's Official Plan for future waste management facilities and activities including landfilling.

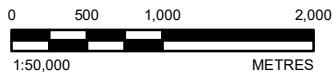


LEGEND



EXISTING W12A LANDFILL SITE BOUNDARY

DRAFT



REFERENCE(S)

- SERVICE LAYER CREDITS:
- PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9 VERTICAL DATUM: CGVD28

CLIENT

CORPORATION OF THE CITY OF LONDON

PROJECT

TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE

KEY PLAN

CONSULTANT



YYYY-MM-DD 2018-01-04

DESIGNED ---

PREPARED JEM

REVIEWED ---

APPROVED ---

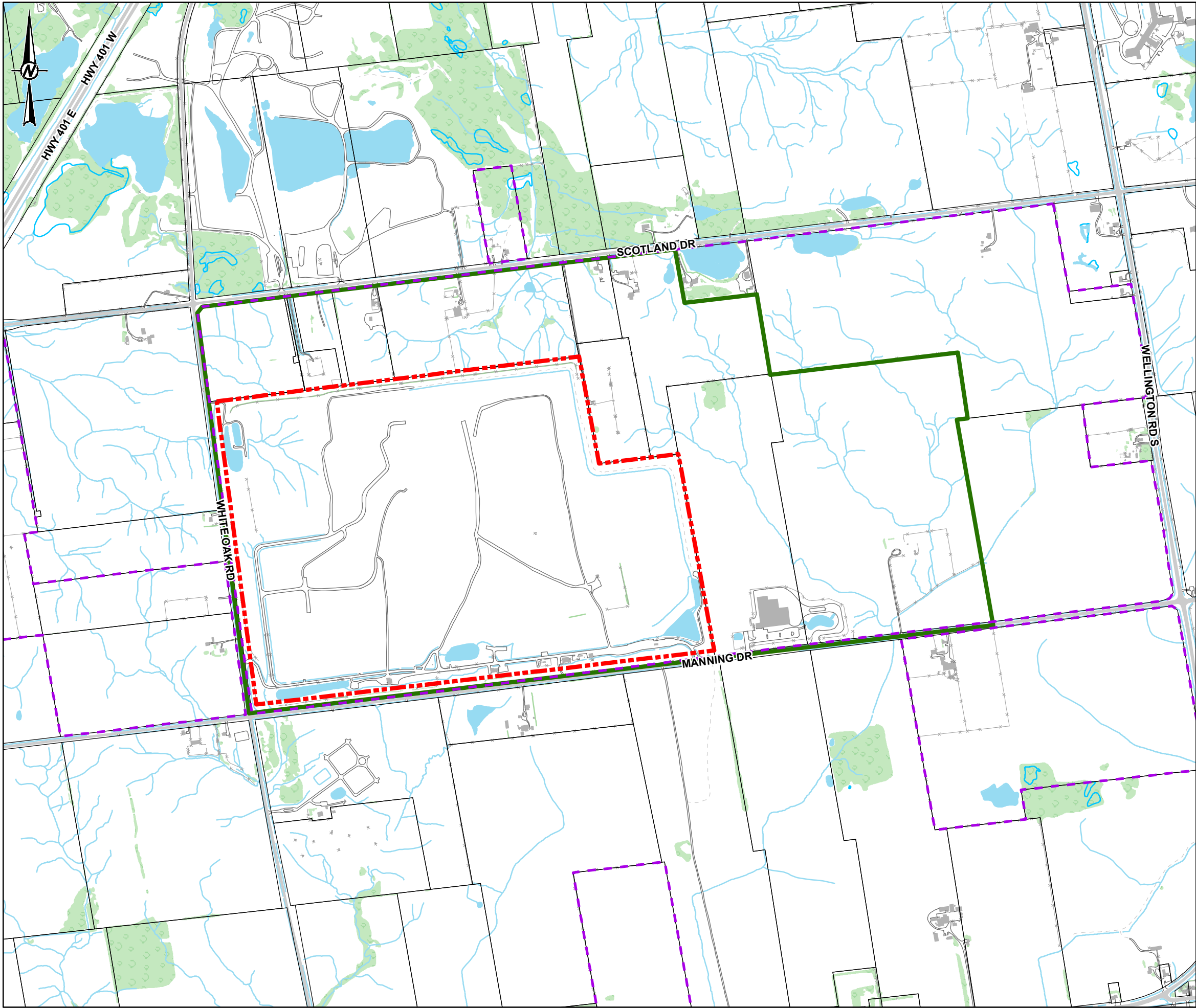
PROJECT NO.
1648176

CONTROL
0005

REV.
A

FIGURE
1.3-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM 25mm



LEGEND

- WATERCOURSE
- DRIVEWAY
- FENCELINE
- TRAIL
- BUILDING FOOTPRINT
- WOODED AREA
- WATERBODY
- CITY OWNED PROPERTY
- WASTE MANAGEMENT RESOURCE RECOVERY AREA BOUNDARY
- EXISTING W12A LANDFILL SITE BOUNDARY

REFERENCE(S)
1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 17 VERTICAL DATUM: CGVD28

DRAFT



CLIENT CORPORATION OF THE CITY OF LONDON		
PROJECT TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION		
TITLE SITE PLAN		
	CONSULTANT	YYYY-MM-DD 2018-01-04
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	---
	APPROVED	---
PROJECT NO. 1648176	CONTROL 0005	REV. A
		FIGURE 1.3-2

1.3.1 Site Development History

In 1969, the City commissioned James F. MacLaren Limited to develop a long-term solid waste disposal plan. The results of the study are contained in the report entitled *Report on Solid Waste Disposal for the City of London* (October 1970). The report recommended that the City proceed with the necessary approvals, detailed design and land acquisition for the development of a new landfill (referred to as W12) to be located on part of Lots 18, 19 and 20 of Concession 5 in the former Township of Westminster.

During site investigations, it was determined that the geological setting of W12 was not suitable for a landfill because a spillway containing granular soils traversed the surficial silty clay soils that are generally predominant in the area. It was also determined that the area south of W12 had thick surficial deposits of silty clay. As a result, the location of the proposed landfill was changed to the area referred to as W12A located on part of Lots 18, 19 and 20 of Concession 6 in the former Township of Westminster.

In April 1973, the City filed an application for a Certificate of Approval (C of A), (now referred to as an Environmental Compliance Approval (ECA)), for a Waste Disposal Site to the MOE for the W12A Landfill. Subsequently, the Environmental Hearing Board held a public hearing in the former Township of Westminster from July 30, 1973 to August 3, 1973 to review the application for the W12A Landfill. The Environmental Hearing approved the application.

On November 13, 1973, the MOE issued a Provisional C of A (#A042102) for the W12A Landfill. The C of A did not permit the disposal of waste until final design plans and specifications were submitted and approved by the MOE.

In 1974, the Ontario Municipal Board (OMB) held a public hearing to address planning issues related to the establishment of a new landfill. As a result of the hearing, the OMB issued an order in January 1975 authorizing the City to acquire the necessary lands to create the W12A Landfill and spend the necessary funds to construct the new landfill. The OMB also directed the former Township of Westminster to amend its zoning by-law and any other necessary by-laws to permit landfilling in the lands referred to as the W12A Landfill.

In 1976, the final design plans and specifications for the W12A Landfill were submitted to the MOE. The original site design consisted of 14 cells covering 107 hectares (ha), five stormwater management ponds, the use of berms and trees to provide screening, a perimeter leachate collection system and a surface water and groundwater monitoring program. On August 16, 1976 the MOE re-issued C of A #A042102 for the W12A Landfill to permit the disposal of waste in accordance with the submitted plans.

Since 1976, the C of A or ECA has been re-issued or amended sixteen times to permit changes in the operation of the landfill. These changes have included refinement of the environmental monitoring programs, requirement for an annual report, approval of a household special waste (HSW) facility, various design changes and infrastructure upgrades and an expansion of the service area from which waste can be received.

Waste was first disposed of in the landfill during the summer of 1977. At this time, the landfill accepted non-hazardous waste generated from within the boundaries of London.

In 1999, the City received approval to establish a HSW depot at the landfill to accept MHSW from residents and small quantity generators from within the geographic boundaries of London and the County of Middlesex for transfer to appropriate recycling/processing facilities.

In 2015, an Environmental Screening was completed as per *Ontario Regulation (O. Reg.) 101/07* (under the EAA) to expand the service area of the site to include the following locations and types of waste:

- Lake Huron Water Treatment Plant (water treatment plant residuals);
- Elgin Area Water Treatment Plant (water treatment plant residuals);
- TRY Recycling's Clarke Road facility (construction, renovation and demolition (CR&D) recycling process residuals and residential garbage);
- Thames Centre (municipal non-hazardous waste); and
- Elgin County (MHSW).

An Environmental Screening Report was submitted to the MOECC and an amendment to the ECA for the landfill was obtained on May 16, 2016. The expanded service area did not change the approved fill rate (amount of waste the landfill can receive in a year) or the types of waste that can be accepted.

1.3.2 Landfill Site and Landfill Components

The W12A Landfill site has a 107 ha fill area and is located on a 142 ha property.

As described in Section 1.3.1, waste disposal at the W12A Landfill commenced in 1977. Over the first 25 years of operation, approximately 5 million tonnes of waste were deposited at the W12A Landfill in the first six cells that comprise Phase 1. These Phase 1 cells cover 59.3 ha and occupy the eastern portion of the landfill footprint (see Figure 1.3-3). The Phase 1 cells are labelled Cells 1, 2, 3, 4, 5 East and 5 West on Figure 1.3-3. Landfilling in Phase 1 is complete.

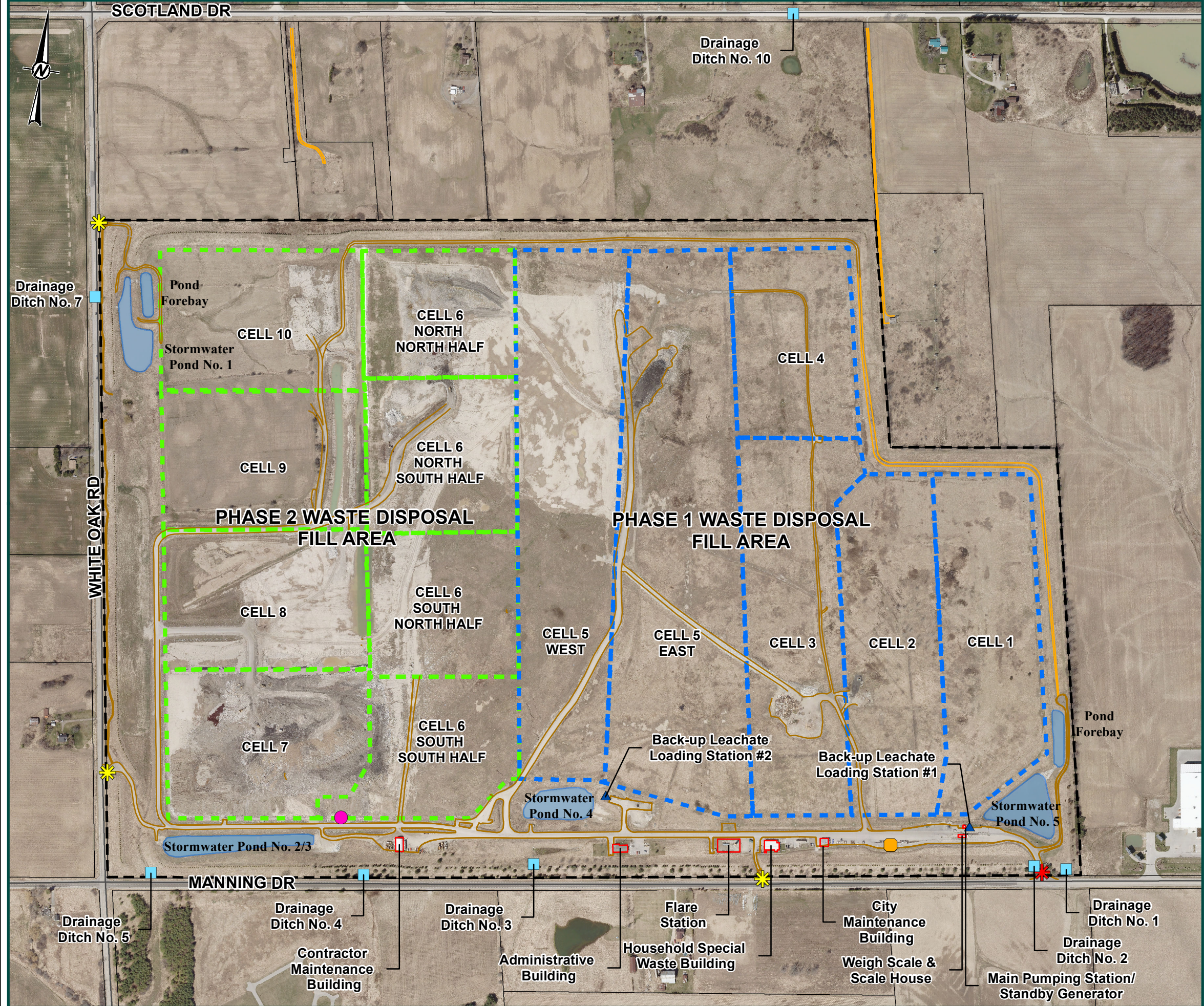
The remainder of the landfill covers 47.7 ha and has been designed to accommodate approximately another 5.5 million tonnes. The area is referred to as Phase 2 as shown on Figure 1.3-3. Phase 2 is divided into eight cells labelled on Figure 1.3-3 as Cells 6 South South Half, South North Half, North South Half and North North Half, and Cells 7 through 10. Cell 7 has been filled and landfilling is currently ongoing in Cell 8; construction of Cell 9 is scheduled for 2018. Phase 2 of the landfill includes a full underdrain leachate collection system that was approved in 2002. Several other engineering upgrades were also approved in 2002 including a landfill gas (LFG) collection system and stormwater management pond upgrades.

The current waste disposal ECA for the site (#A042102) permits annual disposal of 650,000 tonnes of waste, noting that over the past 10 years the site typically receives between 200,000 and 280,000 tonnes of waste per year. The site is operated Monday through Friday from 8 a.m. to 4 p.m. and Saturday from 8 a.m. to 3 p.m.

The total approved airspace of the W12A Landfill (i.e., to hold garbage, daily cover and final cover) for the current site is 12,500,000 cubic metres (m³). As of January 2018, the remaining approved airspace in Phase 2 is approximately 2.5 million m³.

The landfill consists of the following major components (shown in Figure 1.3-3):

- **Fourteen landfill cells** divided into two waste disposal fill areas known as Phase 1 and Phase 2.
- **Four stormwater management ponds** that provide flow control (to prevent flooding) and quality control (sediment removal) of drainage from the landfill received by a series of ditches located along the perimeter of the landfill as well as along the access road.
- A **perimeter leachate collection system** for Phase 1 of the landfill and an **underdrain leachate collection system** for Phase 2 of the landfill. Collected leachate is directed through more than 10 kilometres (km) of piping to the on-site leachate pumping station, which sends the leachate off-site via a leachate forcemain connected to the municipal sanitary sewer system for treatment at the Greenway Wastewater Treatment Plant.



LEGEND

- LANDFILL SITE ENTRANCE
- LANDFILL SITE SECONDARY ENTRANCE
- PUBLIC DROP OFF AREA
- MH 701 PUMPING STATION/STANDBY GENERATOR
- LEACHATE STORAGE
- DRAINAGE DITCH
- LANDFILL ACCESS ROADS
- MONITORING ACCESS ROADS
- PHASE 1 WASTE DISPOSAL FILL AREA (59.3 HA)
- PHASE 2 WASTE DISPOSAL FILL AREA (47.7 HA)

PROPERTY INFORMATION

- EXISTING W12A LANDFILL
- STORMWATER PONDS/FOREBAY
- BUILDINGS

REFERENCE(S)

1. DATA PROVIDED BY THE CITY OF LONDON
2. CITY OF LONDON AERIAL PHOTOGRAPHY, APRIL 2016
3. SITE FEATURES PREPARED BY CALLON DIETZ INC. LTD., OCTOBER 19, 2016.
4. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 17 VERTICAL DATUM: CGVD28

DRAFT



CLIENT CORPORATION OF THE CITY OF LONDON			
PROJECT TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION			
TITLE EXISTING LANDFILL SITE DEVELOPMENT PLAN			
	CONSULTANT	YYYY-MM-DD	2018-01-04
	DESIGNED	---	---
	PREPARED	JEM	---
	REVIEWED	---	---
	APPROVED	---	---
PROJECT NO. 1648176	CONTROL 0005	REV. A	FIGURE 1.3-3

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- A **LFG collection system and flare** consisting of 46 active LFG extraction wells and more than 5 km of piping that collect the LFG and carry it to the flare for combustion. This system reduces greenhouse gas (GHG) and odour emissions from the landfill.
- **HSW Depot** that accepts hazardous and special wastes from residents and small businesses for off-site recycling/disposal.
- **Public Drop-off Depot** that accepts household garbage, appliances, Blue Box recyclables (e.g., paper products, plastics, aluminum and steel containers, glass bottles and jars), yard waste, oversized cardboard, electronics, scrap metal, tires and wood for recycling.

1.3.3 Current Landfill Performance

The W12A Landfill has had groundwater, surface water, leachate, water well and LFG monitoring programs since it opened in 1977. The following outlines the results from these monitoring programs for 2017.

Groundwater Monitoring

There are two aquifers below the W12A Landfill - the Upper Aquifer and the White Oak Aquifer. The groundwater monitoring program includes sampling 25 monitoring wells both downgradient and upgradient of the landfill in the Upper Aquifer and the White Oak Aquifer for a wide range of parameters. The test results from 2017 indicate no impacts on the Upper Aquifer or White Oak Aquifer from the W12A Landfill.

Chloride has been identified as the “critical” contaminant (i.e., the parameter that engineering controls and monitoring programs are based on) because it is the only parameter expected to be detected in the downgradient monitoring wells at elevated levels based on the contaminant transport modelling. For this reason, the trigger mechanism for implementation of contingency measures to prevent off-site groundwater impacts is based on chloride concentration levels. There has been no increase in downgradient chloride concentrations as a result of operation of the landfill.

Surface Water Monitoring

Surface water is monitored at six surface water sampling stations (located within the ditches surrounding the landfill). There are four critical contaminants with respect to surface water: un-ionized ammonia, biological oxygen demand, chloride and sulphate. In 2017, there were no exceedances of the trigger concentrations for the critical contaminants.

The City also undertakes sampling directly from the stormwater management ponds that receive runoff from areas that have been landfilled (Ponds 2/3, 4 and 5). In 2017, none of the samples collected from the stormwater management ponds exceeded trigger concentrations for the critical contaminants.

Water Well Monitoring

The two aquifers below the landfill (the Upper Aquifer and the White Oak Aquifer) are both used as sources of drinking water in the surrounding area. Sampling for the purpose of monitoring the off-site water wells is conducted at 3 water wells in the Upper Aquifer and 11 water wells in the White Oak Aquifer (all wells are down-gradient or cross-gradient from the landfill). Indicator parameters are tested annually. Heavy metals are analyzed on a 3-year cycle with the most recent testing occurring in 2017.

The results from 2017 indicated all wells had indicator parameter concentrations below the Reasonable Use Criteria (MOE, 1994). All wells continue to have high iron levels, which have been encountered in private water wells since monitoring began in 1977. Recent iron levels are similar to historical levels. The monitoring results show that the W12A Landfill is not affecting off-site water wells.

LFG Monitoring

The LFG monitoring program consists of:

- continuous air quality monitoring for methane, oxygen and hydrogen sulphate in all on-site buildings;
- periodic “bartests” to determine the methane gas concentrations in the surficial soils in the area adjacent to the fill area;
- periodic testing of LFG to determine its composition; and
- five monitoring events of two LFG monitoring wells installed in the buffer area of the landfill. These monitoring wells were installed at the property boundary opposite the two closest off-site buildings to the waste footprint.

Monitoring of the buildings has never encountered elevated levels of methane or hydrogen sulphate or low levels of oxygen. No bartests were performed in 2017. Historically, the bartests have found that detectable levels of methane do not migrate beyond 10 m from the waste footprint in the areas tested.

No testing of the LFG composition was completed in 2016. Historical testing of the LFG quality has found the LFG to be typical of other landfills with methane ranging from 55% to 60% and carbon dioxide between 40% and 45%, with trace amounts of a few non-methane organic compounds.

Testing of the LFG monitoring wells in 2017 found methane levels were always less than 250 parts per million in both monitoring wells for all sampling events, indicating that LFG is not migrating off-site through the subsurface.

In summary, the landfill monitoring programs indicate that the landfill is performing acceptably and in accordance with provincial requirements in terms of potential effects of leachate on groundwater and surface water, as well as in terms of LFG migration in the subsurface.

Leachate Collection

The amount of leachate that is captured has generally increased over the years as the size of the waste footprint has increased. Approximately 175,000 m³ of leachate was captured and pumped for off-site treatment in 2017.

Leachate generation is estimated to be approximately 170,000 m³ per year when the entire landfill footprint has been developed and capped as per the *Hydraulic Evaluation of Landfill Performance (HELP) Modeling* (London, November 2002).

LFG Collection

The amount of LFG that is captured has generally increased over the years as new LFG wells are installed as the waste footprint increases. In 2017, an average of 2,400 m³ per hour of LFG was captured and flared. This is estimated to be approximately 50% of the gas produced by the landfill.

2.0 The EA Process

This section describes the EA process that applies to the project.

2.1 Ontario EAA

The EAA is a provincial statute that sets out a planning and decision-making process to evaluate the potential environmental effects of a proposed undertaking or project (MOECC, 2010). *O. Reg. 101/07* for Waste Management Projects, which was made under the EAA, states (in part) that some waste management projects, regardless of whether the proponent is public or private, are designated under the EAA. Various projects are then exempted. According to Section 4 of *O. Reg. 101/07*, the increased landfill capacity proposed in this ToR is subject to an EA because more than 100,000 m³ will be added to the total waste disposal volume for the W12A Landfill. Also, according to *O. Reg. 101/07*, the project is not exempt and is not subject to fulfilling the requirements of the environmental screening process. Accordingly, the City's project is subject to an individual EA process.

An EA under the EAA is a planning study that assesses environmental effects and advantages and disadvantages of a proposed project. The environment is considered in broad terms that include the natural, social, cultural and economic aspects of the environment. In an individual EA, the first step in the process is to develop a ToR for the EA studies (this document is the ToR). Two series of public open houses were hosted by the City as part of the consultation process for the development of the ToR. This draft proposed ToR is being submitted to the MOECC, the Government Review Team (GRT) and the public for review. The final proposed ToR will be submitted to the Minister who will decide whether to approve, approve with conditions, or not approve this ToR. If approved, the ToR becomes the framework for preparation and review of the EA. An overview of the entire approval process was presented to the public as part of Open Houses #1 and #2 and is available in Volume III Appendices E and F.

2.2 Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* is a federal statute that requires federal agencies to conduct an EA for designated projects and activities and projects on federal lands. The expansion of a landfill is not a designated project and the proposed undertaking does not involve any federal lands as further explained in Table 8.1-1; therefore, no federal EA is required.

2.3 Organization of the ToR

This submission of documents to the MOECC consists of three volumes: Volume I - Terms of Reference; Volume II – Supporting Documents for the development of this ToR; and Volume III- Consultation Record.

Volume I is organized into the following sections and appendices:

- Section 1.0 provides an introduction to this ToR, identifies the proponent, presents the purpose of the undertaking and describes the existing site;
- Section 2.0 describes the EA process, presents the purpose and organization of this ToR, includes the submission statement (i.e., how this ToR is being submitted for approval), provides justification for focusing the EA, and discusses flexibility in this ToR;
- Section 3.0 provides the rationale and description of the undertaking;
- Section 4.0 presents an assessment of the ‘Alternatives To’ the undertaking;
- Section 5.0 provides a description of and the rationale for the ‘Alternative Methods’ of carrying out the undertaking;
- Section 6.0 provides an overview of the existing environmental conditions;
- Section 7.0 provides an overview of the proposed methods for conducting the EA, including the comparative evaluation of alternatives, as well as the definition of study areas;
- Section 8.0 presents the consultation plan (i.e., community engagement program) for developing this ToR and preparing the EA;
- Section 9.0 provides an overview of other regulatory approvals required for the undertaking to proceed;
- Section 10.0 presents the proposed schedule for preparing the EA;
- Section 11.0 provides statements of commitments and monitoring strategies by the City of London to be completed during the EA; and
- Section 12.0 lists the documents referenced in this ToR.

Volume II contains supporting documents that are referred to within this ToR.

Volume III presents the record of the consultation process for the development of this ToR. This includes a summary of events, stakeholder feedback received, and how stakeholder feedback was incorporated into the development of this ToR or a rationale for why it was not considered appropriate for inclusion.

2.4 ToR Submission Statement

The ToR statement indicates how the EA will be prepared. This ToR was prepared in considering the *Code of Practice – Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (ToR Code of Practice; MOECC, 2014a).

This ToR is submitted to the MOECC for approval in accordance with *O. Reg. 101/07*, and specifically pursuant to subsection 6(2)(c) of the EAA, which allows the proponent to “...set out in detail the requirements for the preparation of the environmental assessment” (Ontario, 2010). Subsections 6(2)(c) and 6.1(3) of the EAA enable proponents to ‘focus’ the EA and ‘Alternatives To’ to address their specific needs and circumstances.

The City commits to preparing and submitting an EA to the MOECC for review and approval in accordance with the approved ToR as required by subsection 6.1(1) of the EAA, and in accordance with the requirements of subsection 6.1(2) of the EAA.

The subsections that will be addressed by the EA are listed in Table 2.4-1. The exceptions are subsection 6.1(2)(b)(iii) and 6.1(2)(d), which describes and provides the rationale for the ‘Alternatives To’ the undertaking and advantages and disadvantages of the ‘Alternatives To’. The ‘Alternatives To’ requirement is addressed by this ToR (Section 4.0).

Table 2.4-1: Requirements for the EA

Subsection of EAA (Ontario, 2010)	EA Requirements
6.1(2)(a)	A description of the purpose of the undertaking.
6.1(2)(b)(i)	A description of and statement of the rationale for the undertaking.
6.1(2)(b)(ii)	A description of and statement of the rationale for the ‘Alternative Methods’ of carrying out the undertaking.
6.1(2)(b)(iii)	A description of and a statement of the rationale for the ‘Alternative To’ the undertaking.
6.1(2)(c)(i)	A description of the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly by the undertaking.
6.1(2)(c)(ii)	A description of the effects that will be caused or that might reasonably be expected to be caused to the environment.
6.1(2)(c)(iii)	The actions or mitigation measures that are necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment.

Subsection of EAA (Ontario, 2010)	EA Requirements
6.1(2)(d)	An evaluation of the advantages and disadvantages to the environment of the undertaking, the 'Alternative Methods' of carrying out the undertaking and the 'Alternatives To' the undertaking.
6.1(2)(e)	A description of any consultation about the undertaking by the City and the results of the consultation.

In accordance with the *ToR Code of Practice* (MOECC, 2014a), the City has chosen to consider 'Alternatives To' the undertaking at the ToR stage and conduct a confirmatory screening during the ToR development process. The confirmatory screening identified the proposed project (i.e., expansion of the W12A Landfill) as the preferred 'Alternative To'. Accordingly, the City is proposing no further consideration of the 'Alternatives To' in the EA. The screening assessment of the 'Alternatives To' is presented in Section 4.0 of this ToR.

2.5 Justification for Submitting a Focused EA

The City intends to proceed under subsections 6(2)(c) and 6.1(3) of the EAA, which allows the proponent to focus the EA. Specifically, the City intends to exclude the 'Alternatives To' assessment during the EA studies because:

- The City has previously considered both landfilling and non-landfilling options for waste management available to the City in the context of a reasonably long-term planning horizon; and,
- The assessment of the 'Alternatives To', including an assessment of the do nothing scenario, has been further reassessed during the preparation of this ToR and is presented in Section 4.0 of this ToR.

The *ToR Code of Practice* (MOECC, 2014a) outlines considerations for focusing a ToR. It allows a proponent to proceed under subsections 6(2)(c) and 6.1(3) if the proponent is further along in the defined planning process and additional detail is known regarding the proposed project.

A study known as the *W12A Landfill Area Plan* (IBI Group, 2008) commenced in 2005 to study the evolution of the W12A Landfill facility towards an integrated waste management centre, including both the landfill site itself and the land areas adjoining the landfill site. Seven landfill evolution alternatives ('Alternatives To') were developed by the study team and from public input and then evaluated as part of this W12A Landfill Area Plan study. The City proposes to use the conclusion of the *W12A Landfill Area Plan* as the basis to prepare the ToR and focus the 'Alternatives To' within the EA. A copy of the W12A Landfill Area Plan report is provided as Supporting Document #1 to this ToR. A summary of the W12A Landfill Area Plan is provided in Section 4.1 of this ToR.

The development of this 2008 plan was an open, transparent and participatory process. A total of four open houses were held throughout its development to inform the public, provide an opportunity for input and exchange and to solicit feedback. An additional four public meetings and numerous individual meetings took place during the development of the Community Enhancement and Mitigative Measures Program. This program was developed in conjunction with the selection of the preferred alternative (establish an Integrated Resource Recovery Centre that includes the expansion of the W12A Landfill) to reduce and address the potential negative effects of the W12A Landfill on neighbouring properties.

As described in the *ToR Code of Practice*, it is allowable for a proponent to proceed under subsections 6(2)(c) and 6.1(3) of the EAA if the proponent is further along in the defined planning process and additional details are known regarding their proposal. As such, the City intends to exclude the 'Alternatives To' assessment during the EA studies because a comparative assessment of 'Alternatives To' was previously conducted that identified the expansion of the W12A Landfill as the preferred 'Alternative To' and a confirmatory screening assessment of alternatives was completed in this ToR (see Section 4.0 of this ToR). The focusing of the EA in this manner is consistent with the purpose of the EAA (Ontario, 2010), which is defined as:

"The betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management in Ontario of the environment."

The W12A Landfill will continue to be operated in accordance with best management practices (BMP), and will ensure the protection of human health and the environment.

The studies to be carried out for the purposes of the EA are discussed in more detail in Section 7.0.

2.6 Flexibility of the ToR to Accommodate New Circumstances

The ToR Code of Practice (MOECC, 2014a) and subsection 6.1(1) of the EAA states that the EA must be prepared in accordance with the approved ToR; however, circumstances may arise that could necessitate minor revisions to this ToR. Accordingly, the ToR Code of Practice (MOECC, 2014a) states that it is important to incorporate flexibility into the ToR to accommodate new circumstances.

Assuming that the Minister of the Environment and Climate Change approves this ToR, some minor adjustments might be required during the preparation of the EA. Flexibility in this ToR would include minor variations such as a change in EA methodology, consultation methods or environmental characterization study methodologies. In addition, circumstances may arise during the EA that do not allow commitments made during the ToR to be fulfilled; if this were to occur, the commitment may be subject to further refinement and adjustments during the EA.

For example, the work plans in this ToR are described at a general level of detail. During the EA, and in consultation with the MOECC and other GRT members, the work plans may be modified or described in greater detail. Another example would be where it was advisable to change study area boundaries should new information become available. EA studies may show effects that are greater or less than anticipated and might require adjustments to the work plans. New or additional data sources might also become known and it would be beneficial to incorporate these into the EA studies.

As another example, modifications to the proposed public consultation program might include the incorporation of additional workshops or meetings in response to a high level of public interest or concern, or the change in format of consultation events to better suit the public's needs. Such modifications would be considered minor changes to this ToR.

Any proposed minor modifications to this ToR would be documented and discussed in advance with the MOECC and would not require an amendment to the ToR. The modifications described above and other similar modifications would be considered minor changes that could be included within the overall scope of this ToR without seeking approval for a formal amendment to the ToR.

3.0 Rationale and Description of the Undertaking

This section describes the City's proposed undertaking and the rationale for the undertaking, including the analysis to estimate the City's disposal requirements.

3.1 Overview of the Rationale

In October 2015 Municipal Council directed City of London staff to proceed with the development of a long-term Resource Recovery Strategy and a Residual Waste Disposal Strategy for the City of London. At that time it was anticipated that the existing W12A Landfill would reach capacity at the beginning of 2025.

The Resource Recovery Strategy involves the development of a plan to maximize waste reduction, reuse, recycling, resource recovery, energy recovery and/or waste conversion in an economically viable and environmentally responsible manner. Resource recovery strategies (i.e., often known as waste diversion strategies) are developed and approved at the local government level and do not require provincial government approval. However, these strategies do serve as input into provincial government decision-making as related to approval of the Residual Waste Disposal Strategy component.

The Residual Waste Disposal Strategy involves the development of a long-term plan to manage residual waste (waste after resource recovery) and involves completion of an Individual EA as prescribed by the MOECC. The Individual EA requires approval by the Minister of Environment and Climate Change and by Cabinet.

It is proposed the Residual Waste Disposal Strategy will:

- Consider expanding the W12A Landfill as outlined in further detail in Section 4.0;
- Find solutions that will manage residual waste until 2050 (25 years beyond the current approved capacity of the W12A Landfill);
- Look at the possibility of allowing neighbouring municipalities to use any new/expanded waste disposal facilities developed by the City, approved by the Province and under conditions approved by Municipal Council;
- Place limits on the amount of residual waste that will be accepted at any new/expanded waste disposal facilities; and
- Be based on a commitment by the City to increase the current London residential (household) waste diversion rate to 60% by 2022 from the current rate of 45%.

3.2 Guiding Principles

Guiding principles have been developed by the City and approved by City Council to direct the development of the Residual Waste Disposal Strategy.

Over the last ten years, there have been numerous community engagement activities with respect to solid waste management in London including:

- 2006 to 2009 – W12A Landfill Area Plan and W12A Landfill Site Community Enhancement and Mitigative Measures Program
- 2007 – *A Road Map to Maximize Waste Diversion in London*
- 2013 – *Road Map 2.0: The Road to Increased Resource Recovery and Zero Waste (and the Interim Waste Diversion Plan 2014 – 2015)*
- 2014 – Public Feedback on Different Garbage and Recycling Collection Frequency Schedules
- 2015 to 2016 – Streamlined EA (Environmental Screening) for Waste Disposal regarding service area expansion
- 2016 – Garbage Container Limits

It is based on these previous community engagement activities and ongoing input received from Municipal Council, a number of Council Advisory Committees, community and business groups, and the W12A Landfill Public Liaison Committee (PLC), that eleven guiding principles (Table 3.2-1) were identified that reflect community values, concerns and priorities at this point in time.

Community and stakeholder input on the guiding principles was completed as part of the community engagement processes for the two strategies. Various community engagement tools (e.g., traditional media, social media, getinvolved.london.ca website, the City's website, open houses, etc.) were used and the final guiding principles were approved in October 2017. All guiding principles received general support from the public with the following ones receiving the most support:

- Make waste reduction the first priority
- Be socially responsible
- Ensure financial sustainability

Table 3.2-1: Guiding Principles

Guiding Principles
<i>Be Socially Responsible</i> – Develop socially acceptable and fair solutions that minimize social impacts, encourage participating and maximize social benefits for residents and businesses and take into account input from residents and businesses.
<i>Ensure Financial Sustainability</i> – Develop financially sustainable solutions that are easy and affordable to maintain by current and future generations and also help to stimulate economic growth within the community.
<i>Ensure Responsibility for Waste Management</i> – Waste management is a fundamental service provided by municipal governments. London should manage residential waste and resources generated within its boundaries. London should ensure that local businesses have access to competitive resource recovery and residual waste disposal options.
<i>Ensure Impacts of Residual Waste Disposal are Minimized</i> – Waste disposal facilities must meet, and if possible, exceed all applicable regulatory standards. London will make all reasonable efforts to reduce and address negative effects of any future residual waste disposal facility through proper design and operation of the facility, as well as providing appropriate mitigation measures to the surrounding community.
<i>Implement more Resource Recovery Solutions</i> – Residual waste needs to be minimized and any waste that is generated needs to be treated as a resource, when practical. Resource recovery includes reuse, recycling, composting, anaerobic digestion and waste conversion to create energy and energy products. Resource recovery will balance environmental, social and financial needs along the road to a waste-free Ontario in the future.
<i>Make the Future System Transparent</i> – Future decisions on the implementation of the Resource Recovery Strategy and Residual Waste Disposal Strategy will continue to be open, accessible, based on best practices and facts, and follow the Corporation of the City of London by-laws, policies and practices to find solutions.
<i>Make Waste Reduction the First Priority</i> – The City's first goal is to reduce the amount of material being generated by residents and businesses that requires management (e.g., encourage food waste avoidance, composting at home, local policies to encourage waste reduction, supporting producer responsibility and other provincial and federal programs).
<i>Prioritize the Community's Health and Environment</i> – The health of London's residents and the environment is a priority in decision-making to minimize negative impacts and to maximize the benefits.
<i>Support Development of Business (contractual) Partnerships</i> – Working together with the private sector will ensure that roles, responsibilities and skills are assigned appropriately such that municipal resources are maximized and the best opportunities for London and potential partners are created.

Guiding Principles
<i>Support Development of Community Partnerships</i> – Working together with local community groups and organizations will help London reach its waste diversion goals and maximize resource recovery more effectively and efficiently.
<i>Work to Mitigate Climate Change Impacts</i> – To reduce the impact on climate change London will identify, assess and implement solutions that reduce GHG emissions associated with its waste management system.

3.3 Problem and Opportunity Assessment

This section discusses the need for additional residual waste management capacity and the W12A Landfill expansion, including a general overview of the current status of waste disposal capacity in Ontario and within the area surrounding London, a description of the City's proposed regional service area, waste management facilities, residual waste generation (after diversion), and disposal requirements.

3.3.1 Current City of London Strategy

The City of London's Waste Management System is based on a Continuous Improvement Strategy (management philosophy) and Sustainable Waste Management. This strategy, which was approved by Municipal Council in 1997, has been the foundation for going forward. It uses an active framework that recognizes integrated waste management as an important environmental service in the community. An overview of the City's current waste management systems, strategy and future requirements is summarized in the following sections.

3.3.2 Existing Diversion Programs

Currently, the City is achieving a residential diversion rate of approximately 45% as a result of a number of programs, which are summarized in Table 3.3-1.

Table 3.3-1: Summary of Existing Waste Diversion Programs

Program	Comments
Curbside, multi-residential, depot and public space Blue Box recycling	The City collects a wide range of recyclables from all curbside households as part of its Blue Box Recycling program. The materials collected in 2017 were newsprint & flyers; household paper; magazines, catalogues & books; paper egg cartons & boxes; cardboard boxes; glass bottles & jars; aluminum food & beverage cans; steel food & beverage cans; foil containers & foil; empty metal paint cans; empty aerosol cans; plastic bottles, jugs, plant pots/trays, large pails & tubs; milk & juice cartons; drink boxes and cardboard cans.
Home Composting	The City sells composters at cost at its four EnviroDepots. In the 1990s the City also sold composters at “truck load sale events”. Over the years the City has sold over 55,000 composters. <i>The Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow</i> (Corporations Supporting Recycling, 2003) recommends that municipalities assume each composter sold diverts 100 kilograms per year.
Grasscycling	The City stopped collecting grass clippings curbside in 1995 and started promoting grasscycling. Grasscycling refers to leaving grass clippings (i.e., mulching) on the lawn when mowing.
Leaf, yard and Christmas tree material curbside and depot collection	Collected materials are composted at contractor’s compost facility (TRY Recycling).
Electronics	Used electronics can be dropped off for recycling at 12 locations within the City including the City’s four EnviroDepots.
Tires	Used tires can be dropped off for recycling at over 100 locations within the City including the City’s four EnviroDepots.
CR&D material recycling	The City stopped collecting CR&D material in 1995. Material can be taken to the City’s four EnviroDepots or at private CR&D recycling facilities.
Scrap metal and appliance recycling	The City stopped collecting scrap metal and appliances in 1995. Scrap metal and appliances can be taken to the City’s four EnviroDepots or a scrap metal yard for recycling.

Table 3.3-1: Summary of Existing Waste Diversion Programs

Program	Comments
Textile/small household item reuse/recycling	There are numerous locations throughout London to take textiles and small household items for reuse/recycling including the City's Oxford Street EnviroDepot.
MHSW	<p>The City collects all forms of MHSW at the HSW Depot at the W12A Landfill including paints, solvents, pesticides, oil filters, used oil, antifreeze, batteries, florescent bulbs and tubes, compressed cylinders and empty oil & antifreeze containers. Some of these materials (batteries, florescent bulbs, compressed cylinders and empty oil & antifreeze containers) are also collected at the Oxford Street and Clarke Road EnviroDepots.</p> <p>The materials are shipped to various processing facilities across Ontario licensed to accept this material. The majority of the material is recycled including paint, antifreeze and oil.</p>

3.3.3 Resource Recovery Strategy

As previously discussed, to plan for the future the City has started development of a long term Resource Recovery Strategy. The Resource Recovery Strategy involves the development of a plan to maximize waste reduction, reuse, recycling and resource recovery in an economically viable and environmentally responsible manner.

The Resource Recovery Strategy is scheduled to be completed in 2019. The Resource Recovery Strategy will look at opportunities for advanced resource recovery and increased waste diversion through new, emerging and next generation technologies and where these technologies may play a role in London and area.

An interim step includes the completion of the 60% Diversion Action Plan and will include development of programs and an implementation schedule for specific activities to increase the City's residential diversion rate to 60% by 2022.

Based on current analysis and feedback, the initiatives and programs to achieve 60% diversion are summarized in Table 3.3-2.

Table 3.3-2: Potential 60% Diversion Plan

Component	Diversion Rate	Comment
Existing Diversion	45%	<ul style="list-style-type: none"> See Programs in Table 3.3-1
Food Waste Avoidance and more home/community composting	0.5% to 1.5%	<ul style="list-style-type: none"> Driven by education and awareness
Organics Management Program	8% to 10%	<ul style="list-style-type: none"> Still investigating multi-residential and mixed waste processing options Minimum diversion of 8% to 10% diversion is based on a curbside source separation program using experience from other Ontario municipalities.
Other Programs	4% to 5%	<ul style="list-style-type: none"> Reduction, more recycling, etc.
Total Diversion Rate	60%	

An update on the progress, recommendations and actions arising from the Resource Recovery Strategy will be provided in the EA report.

3.3.4 City of London Support for Provincial Waste Management Goals

While the province recognizes that additional waste disposal is needed to meet demands over the next several years, the goal of the *Waste-Free Ontario Act* and subsequent *Strategy for a Waste-Free Ontario* is to shift from waste disposal to waste diversion and make waste management a carbon neutral industry (i.e., reducing greenhouse gas generation from the waste sector). The City supports these goals and is taking proactive steps toward these goals including:

- The City has committed to increasing its residential waste diversion rate from 45% to 60% by 2022.
- The City is developing a long-term Resource Recovery Strategy to increase diversion beyond 60% after 2022.
- The City plays a leadership role on Food Waste Avoidance both within London and provincially. The City is active in a number of provincial committees that have formed in the past few years to collaborate on this issue. Within London, a number of pilot projects have been initiated to gain a better understanding of the food waste, including the magnitude of the problem and potential approaches to bringing about positive change.

- The Resource Recovery and other associated programs that have been and will be implemented by the City will enable a reduction in the maximum allowable annual tonnage that can be accepted at the W12A Landfill from 650,000 tonnes to 500,000 tonnes (as described in Section 3.4).
- The City has asked municipalities within the proposed regional service area (refer to Section 3.3.7) if they were interested in developing a regional resource recovery strategy. All municipalities expressed an interest in working together (subject to costs) to reduce the need for landfilling.
- The City continues to pursue projects, relationships and partnerships for the purposes of innovation, creativity, best practices and excellence in solid waste management under a banner known as the London Waste to Resources Innovation Centre (LWRIC). The City has working relationships with a number of waste management organizations through LWRIC including Bio-Tech Far Inc. (pyrolysis technology), a business group previously known as Hawthorne Green Key Group (pyrolysis technology), RediCan (gasification technology), TRY Recycling (CR&D waste recycling), Western University (Institute of Chemicals and Fuels from Alternative Resources) and the Canadian Plastics Industry Association.
- The City is a member of a Mixed Waste Processing Working Group comprised of several Ontario municipalities including the City of Toronto, Region of York, Region of Waterloo, Region of Niagara, County of Oxford, and County of Simcoe. This Working Group shares updates, research results, Committee/ Council reports, site visit experience and related operational experiences related to mixed waste processing.
- The City has begun work on development of a 0.5 MegaWatt power plant at the W12A Landfill to convert LFG to green power.
- The City is exploring opportunities to convert LFG not used by the power plant to renewable natural gas.

3.3.5 Disposal Facilities

The City of London is served by one landfill, the W12A Landfill, located in the southern part of the City (refer to Figure 1.3-1). The total approved airspace for the current site is 12,500,000 m³ and it is estimated that it will reach its approved capacity in early 2025.

3.3.6 Residual Waste Projections – Existing Service Area

The City has completed a detailed assessment of projected residual solid waste generation between 2025 and 2050 taking into consideration Residual Waste Strategy requirements outlined in Section 3.1. This document, titled *Residual Waste Projections and Landfill Capacity Assessment*, is provided as Supporting Document #2 to this ToR and provides this information by developing residual waste quantity projections for the planning period that take into account:

- Population growth;
- Existing and proposed provincial waste diversion targets;
- *Waste-Free Ontario Act*;
- Provincial Strategy for a Waste-Free Ontario Building a Circular Economy (2017c);
- Availability of waste disposal facilities in neighbouring municipalities;
- Waste audit data; and,
- Changing waste technologies.

The key assumptions used in determining the quantity of residual waste to be managed at the expanded W12A Landfill from the existing service area over the 25 year planning period are summarized as follows, the details of which are provided in Supporting Document #2:

- The current residential waste diversion rate in the City of London will increase from its current level of 45% to 60% by 2022.
- The City of London population is projected to grow at a rate of approximately 0.8 to 1% annually, increasing from 394,000 (includes an allowance for post-secondary students) in 2016 to 520,200 in 2050. All residential residual waste generated in the City of London will be disposed at the W12A Landfill.
- The Industrial, Commercial and Institutional (IC&I) diversion rate achieved in the City of London will be 25% by 2025 and 50% by 2050. All IC&I residual waste from London will come to the W12A Landfill by 2025.
- The CR&D diversion rate achieved in the City of London will be 50%. All CR&D residual waste from London will come to the W12A Landfill by 2025.
- The W12A Landfill will continue to dispose of quantities of sewage sludge ash, biosolids, street sweepings, water treatment plant process residuals and contaminated soil.

Based on the above assumptions, the existing service area will generate 9.2 million tonnes of residual waste between 2025 and 2050.

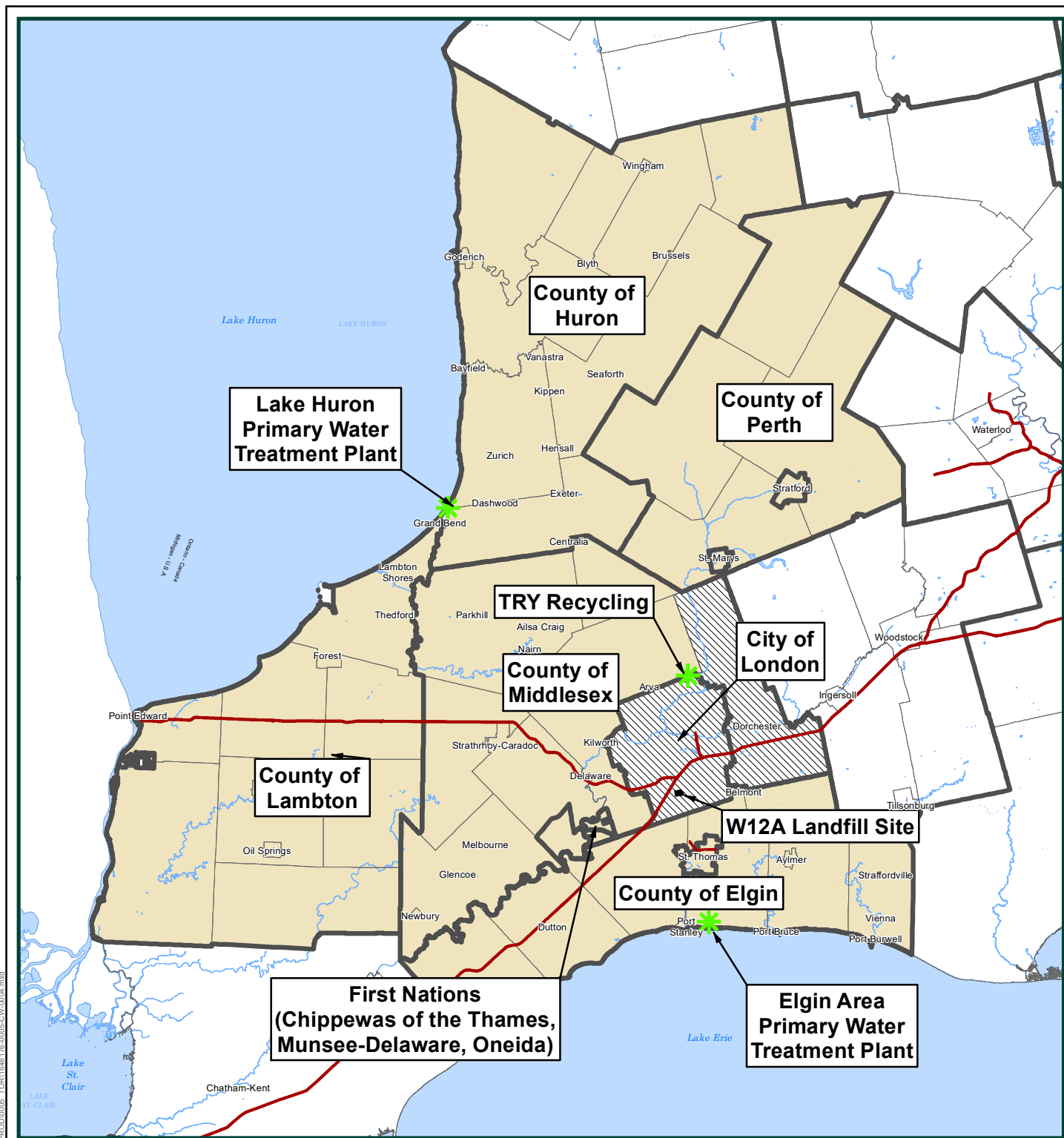
3.3.7 Proposed Regional Service Area

The City is proposing to establish a regional service area. The benefits of a regional service area include: consistency with the *Strategy for a Waste-Free Ontario* (discussed below), addressing a portion of the provincial shortfall in disposal capacity, providing a public disposal option for nearby organizations and municipalities, ensuring that competitive waste disposal pricing is available for municipalities and providing a financial benefit to the City.

The City approached nearby lower and upper tier municipalities to determine their interest in being included in the service area of the W12A Landfill. Based on their responses, a regional service area consisting of the City of London plus Elgin County, Middlesex County, Huron County, Lambton County, Perth County and local First Nation Communities is proposed. The population of Elgin, Middlesex, Huron, Lambton and Perth Counties (including separated cities) as well as local First Nations communities is approximately 420,000. The proposed service area is shown on Figure 3.3-1.

The proposed expansion of the service area for the W12A Landfill aligns with the Ontario government's policy goals under the *Strategy for a Waste-Free Ontario* by:

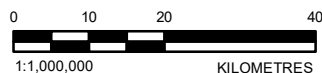
- **Minimizing the need for the development of landfills** – There are over twenty operating landfills in the proposed W12A Landfill regional service area. The majority of these are small landfills. Providing a local, cost effective, well maintained and environmentally sound disposal alternative will encourage municipalities with small landfills not to expand their landfills after they reach capacity. This will reduce the number of landfills in the service area in the long term. It is also noted that municipalities wishing to use the W12A Landfill will be encouraged to achieve similar diversion objectives as the City of London.
- **Ensuring existing landfills are well maintained** – As noted above, the majority of the over twenty landfills in the proposed service area are smaller landfills. Only four landfills, including the W12A Landfill, have landfill gas collection and flaring systems. Most of the landfills do not have engineered controls for leachate management and some do not have regular groundwater or surface water monitoring programs. The W12A Landfill has a landfill gas collection and flaring system, is located in a favourable hydrogeological setting (e.g., thick deposit of clayey till soils), has a leachate collection system and has landfill gas, surface water and groundwater monitoring programs. In general, waste coming to the W12A Landfill from other locations within the service area will come to a landfill that is well maintained and offers a high level of environmental protection.
- **Reducing GHG Emissions** – As noted above, only four landfills in the proposed service area have landfill gas and collection systems. Having more waste go the W12A Landfill, which has a landfill gas collection and flaring system, will reduce GHG emissions.



LEGEND

-  CURRENT SERVICE POINT
-  CURRENT SERVICE AREA
-  PROPOSED SERVICE AREA

DRAFT



NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9 VERTICAL DATUM: CGVD28

CLIENT

CORPORATION OF THE CITY OF LONDON

PROJECT

TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE

PROPOSED SERVICE AREA

CONSULTANT



YYYY-MM-DD 2018-01-04

DESIGNED ---

PREPARED JEM

REVIEWED ---

APPROVED ---

PROJECT NO.
1648176

CONTROL
0005

REV.
A

FIGURE
3.3-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM 25mm

Expanding the service area has the potential to reduce GHG emissions by approximately 80,000 tonnes of carbon dioxide equivalents (CO_{2e}) over the 25 year planning period based on the following:

- The average tonne of garbage produces approximately 0.46 tonnes CO_{2e}. (EPA WARM Model), which is released to the atmosphere at landfills that do not have gas collection and flaring systems;
- It is estimated that the W12A Landfill has a landfill gas capture rate of over 60% (more than 0.28 tonnes CO_{2e} of GHG per tonne of garbage buried);
- The GHG emissions to transport a tonne of waste to the W12A Landfill from within the proposed service area is less than 0.01 tonnes CO_{2e};
- The net GHG reduction for waste that comes to the W12A Landfill instead of a landfill without a landfill gas collection flaring system is 0.27 tonnes CO_{2e} per tonne of garbage (0.28 CO_{2e} - 0.01 tonnes CO_{2e}); and,
- It is estimated that approximately 300,000 tonnes of waste could come to the W12A Landfill from landfills without gas collection systems from within the proposed service area over the next 25 years.

3.3.8 Residual Waste Projections – Proposed Regional Service Area

Residual waste generation projections for the proposed regional service area are provided in the aforementioned Supporting Document #2 Residual Waste Projections and Landfill Capacity Assessment (Appendix G) and summarized below.

Four waste diversion scenarios were considered for the proposed regional service area ranging from no increase in waste diversion to meeting the interim waste diversion goals in *Strategy for a Waste-Free Ontario*. The waste diversion rates for the four scenarios are presented in Table 3.3-3.

Table 3.3-3: Waste Diversion Scenarios

Scenario	2018	2020	2030	2050
Scenario 1 - No increase in waste diversion rates	25%	25%	25%	25%
Scenario 2 - Increase in diversion rates half way towards interim MOECC diversion goals	25%	28%	38%	53%
Scenario 3 - Increase in diversion rates 75% of the way towards interim MOECC diversion goals	25%	29%	44%	66%
Scenario 4 - Achieve 100% of interim MOECC diversion goals	25%	30%	50%	80%

For each waste diversion scenario it was assumed:

- There is no increase in population or per capita waste generation rate in the future.
- Green Lane Landfill owned by the City of Toronto will continue to accept waste from local municipalities until it closes.
- Municipalities would continue to use their existing landfill (24 operating landfills within the proposed regional service area) until it closes.
- The City contacted each of the municipalities within the proposed regional service area to determine their interest in using a regional waste disposal facility. Only municipalities that expressed an interest in using the W12A Landfill were included in residual waste calculations.
- No export of waste outside of the proposed service area (see discussion in Section 3.3.9)

The results of the four scenarios are presented in Table 3.3-4 and show residual waste quantities ranging from 1.0 million to 2.4 million tonnes over the 25 year planning period.

Table 3.3-4: Summary of Residual Waste for Various Waste Diversion Scenarios

Scenario	Residual Waste (millions)	Diversion Rate in 2050	Percentage of MOECC goal ^a
<i>Scenario 1</i> - No increase in waste diversion rates	2.4	25%	30%
<i>Scenario 2</i> - Increase in diversion rates half way towards interim MOECC diversion goals	1.7	53%	66%
<i>Scenario 3</i> - Increase in diversion rates 75% of the way towards interim MOECC diversion goals	1.4	66%	80%
<i>Scenario 4</i> - Achieve 100% of interim MOECC diversion goals	1.0	80%	100%

Notes a) Calculated by dividing the diversion rate in 2050 by the interim MOECC diversion goal for 2050 (80%).

There are many unknowns associated with implementation of these interim waste diversion goals that will require major changes to how business is done in Ontario including moving to a Circular Economy. It is also noted that previous waste diversion goals adopted by the Province have not been achieved by the desired date. For example, the 25% waste diversion goal which was to have been attained by 1989 but did not happen until more than two decades later.

Considering the above, it is proposed that the residual waste quantities from the proposed regional service area will be estimated by assuming diversion rates for Scenario 3 (achieve 80% of the interim waste diversion goals in Strategy for a Waste-Free Ontario), resulting in 1.4 million tonnes of residual waste.

3.3.9 Waste Export from Proposed Regional Service Area

As noted in the *Strategy for a Waste-Free Ontario* (page 25) - “while Ontario strives for a waste-free future, there will still be a need for landfill space as we work towards this goal”. Currently Ontario has a lack of landfill capacity to meet its needs and there are limited options for municipalities within the proposed service area to manage their residual waste should their current disposal location not be available.

- **Ontario has a Landfill Capacity Deficit** - Ontario has a net deficit of landfill capacity for residual waste with over 3 million tonnes of solid non-hazardous waste from Ontario being exported to the U.S. annually. Waste projections suggest this deficit will continue for the foreseeable future.
- **Disposal Options outside of the Proposed Service Area** - As small landfills in the proposed regional service area close, the municipalities will need a place to take their residual waste. There are only three landfills in the Province outside of the proposed regional service area that are approved to accept their waste.

All these landfills are located some distance away (Eastern Ontario Waste Handling Facility (Lafleche landfill) in eastern Ontario, Niagara Waste Systems in Niagara Region and the Essex-Windsor Landfill in Essex County). Their distant location increases the cost and GHG emissions of managing waste from the area. In addition, the Niagara Waste Systems landfill already receives its maximum annual waste allowed and cannot take on new customers; Lafleche landfill receives close to its maximum annual waste allowed (within 10%) and has limited ability to take on new customers; and the Essex-Windsor landfill can only accept waste from a portion of the proposed service area (Lambton County and Elgin County).

Considering the above, it is assumed that waste from the proposed regional service area will not be exported.

3.3.10 Converting Landfill Tonnes to Landfill Volume

The volume of landfill airspace required to accommodate waste is typically calculated by multiplying the number of tonnes of waste to be disposed by the landfill utilization rate. The landfill utilization rate is the amount of space (m^3) needed to manage an average tonne of waste, including daily soil cover material.

The W12A Landfill has received 8,240,000 tonnes since it opened and has used 9,640,000 m^3 of space (excluding final cover) for a historical landfill utilization rate of 0.8 tonnes/ m^3 . This is equivalent to approximately 85% of the landfill volume being consumed by waste (assuming an average compacted waste density of 1 tonne/ m^3) and 15% of the landfill volume being consumed by cover material (approximately 5 to 1 waste to soil cover ratio).

There is a range of average waste density and waste to cover ratios used in converting tonnage to volume for the purpose of estimating the required airspace for new or expanding landfills. For expanding landfills, where data is available, it is considered appropriate to use information available from the existing site, with an inherent assumption that in future the nature of the materials to be disposed and the method of placement and compaction will not change significantly from current operations. For example, average compacted densities can range from 0.80 to 1.1 tonnes/m³, and a 4 to 1 waste to cover ratio is often assumed, with corresponding utilization rates of about 0.64 to 0.9 tonnes/m³. New landfills are often designed with a utilization rate of 0.64 tonnes/m³ based on 80% of the landfill volume being consumed by waste (with an average waste density of 0.8 tonnes/m³) and 20% of the landfill volume being consumed by cover material (approximately 4 to 1 waste to soil cover ratio).

The relatively higher utilization rate achieved by the W12A Landfill is directly attributable to the significant quantity of ash, contaminated soils and other denser materials that the landfill has received in the past. It is anticipated that the utilization rate will be lower in the future because the proportion of “denser” materials will decrease (e.g., less ash in the future as the historical ash quantities included Energy from Waste (EFW) ash, less contaminated soil in the future because of the contaminated soil processing facility opened by GFL in Dorchester in 2013, and more residential and IC&I waste because of the proposed expanded service area).

For the 25 year planning period, a landfill utilization rate of 0.72 tonnes/m³ (which is the midway point between 0.64 tonnes/m³ and 0.80 tonnes/m³) is proposed.

3.4 Need for the Proposed Undertaking

Based on the assessment in Section 3.3, the residual solid waste generated and required to be managed at the W12A Landfill is approximately 9.2 million tonnes from the existing service area and approximately 1.4 million tonnes from the proposed regional service area for a total of 10.6 million tonnes of residual solid waste between 2025 and 2050.

For this amount of projected residual waste to be received at the site there can be a reduction in the maximum allowable annual tonnage that can be accepted at the landfill from 650,000 tonnes to 500,000 tonnes.

For the 25 year planning period, based on a landfill utilization rate of 0.72 tonnes/m³, an expansion of the W12A Landfill should consider the need for an additional disposal volume of 14,700,000 m³.

3.5 Description of the Proposed Undertaking

The proposed undertaking is the expansion of the W12A Landfill within the current site boundaries and onto an identified area of adjacent land within the Waste Management Resource Recovery Area (as described in Section 1.3) that is owned by the City.

The proposed undertaking, which will be assessed and refined in the EA process, consists of a sequence of construction and operational components, generally described as follows:

- Filling of the expanded landfill to approved capacity post-EA; and,
- Progressive placement of final cover as disposal in areas of the W12A Landfill is sequentially completed.

The site infrastructure, other site activities and currently operating diversion facilities are anticipated to continue to operate through 2050. To achieve 60% residential diversion by 2022, it is anticipated that new diversion operations or facilities will be required and will be implemented as per the developing Resource Recovery Strategy and as outlined in Section 3.3.3.

In summary, the proposed undertaking consists of a sequence of construction activities and landfilling operations that are typical of operations at the existing W12A Landfill.

4.0 Assessment of ‘Alternatives To’ to the Project

Section 3.0 provided the rationale for and general description of the undertaking, which is to provide for the disposal of post-diversion residual wastes generated in London and from a number of surrounding municipalities over a 25 year planning period. The City assessed different ways of satisfying this need; in EA terminology, these different ways are referred to as ‘Alternatives To’ the project. The *ToR Code of Practice* (MOECC, 2014a) defines ‘Alternatives To’ as “functionally different ways of approaching and dealing with a problem or opportunity”, and states that consideration should be given to a reasonable range of alternatives. The *ToR Code of Practice* (MOECC, 2014a) also allows proponents to conduct an initial screening of alternatives before or at the ToR phase to determine the range of ‘Alternatives To’ be examined in the subsequent EA phase. This is the approach used by the City for this ToR.

The assessment of ‘Alternatives To’ was conducted in this assessment in two steps. The first step, as described in Section 4.1, was to describe previous studies completed by the City that led to the identification of the expansion of the W12A Landfill site and development of an integrated resource recovery centre as the preferred ‘Alternative To’. The second step was to confirm the previous conclusion using a screening assessment of ‘Alternatives To’ as described in the *ToR Code of Practice* (MOECC, 2014a), considering the current status of long-term waste disposal alternatives available to the City and surrounding municipalities in the region; this is provided in Section 4.2.

4.1 Assessment of ‘Alternatives To’ Prior to this EA

The City took into account the results of previous waste management planning studies that considered alternative approaches to disposal of residual wastes, as well as previous regulatory and City Council decisions in this regard. These led to the identification of the expansion of the W12A Landfill site and continued operation of this facility as the preferred alternative to provide long-term additional disposal capacity. A summary of these previous studies and decisions is provided below, including reference to public processes and consultation, to demonstrate the considerable amount of work that has already been completed in this regard and an understanding of the reasoning and background context for this EA.

In 1991, the Province appointed an Arbitrator to address a request by the City to annex additional lands, which included the Township of Westminster. The Arbitrator’s report references specifically the W12A Landfill as being the most desirable location for such a facility, and describes the adjacent lands as “probably suitable for an additional landfill site”. The lands on which the W12A Landfill are located became part of the City of London in 1993 as part of the *London-Middlesex Act* 1992. The development of a new Official Plan for the annexed lands was undertaken through a public strategic planning process known as ‘Vision 96’, which included an assessment of future land uses including the significance of the W12A Landfill to provide the waste disposal component of the City’s waste management infrastructure.

From 1995 to 1999 the City of London and County of Middlesex were involved in a cooperative long term waste management planning exercise referred to as the London/Middlesex Waste Management plan. This project was 50% funded by the Province. Outcomes of the planning exercise included the approval of the City's long term strategy known as the Waste Management Continuous Improvement System and expansion of the City's Household Special Waste depot to serve the County of Middlesex.

A study known as the *W12A Landfill Area Plan* (IBI Group, 2008) commenced in 2005 to study the evolution of the W12A Landfill facility towards an integrated waste management centre, including both the landfill site itself and the land areas adjoining the landfill site within a core study area bounded by White Oak Road and Wellington Road South on the west and east, respectively, and by Scotland Drive and Manning Drive on the north and south, respectively, covering a total area of 397 ha. The study also considered the potential effects on a buffer area consisting of all lands within 1,500 m around the core area. A planning time horizon of 40 years was considered. A copy of the main study report is provided with this ToR as Supporting Document #1 (See Volume II). An overview of the study and its outcome is provided below.

Seven landfill evolution alternatives ('Alternatives To') were developed by the study team and from public input and then evaluated as part of this W12A Landfill Area Plan study. These seven alternatives represent the range of reasonable alternatives that were available to the City. The alternatives evaluated were as follows:

- 1) Continued use of the existing landfill until its approved capacity is reached in about 2020 to 2025, and then locate a new Greenfield landfill within the municipal boundaries of the City of London;
- 2) Expand the W12A Landfill - addition of land area to increase the life of the W12A Landfill to the 40-year time horizon;
- 3) Develop an Integrated Resource Recovery Centre - support on-site recovery of materials and EFW materials brought to the site to achieve the provincial 60% diversion target and thereby extend the landfill life beyond the 40-year time horizon, by means of an expansion of the W12A Landfill;
- 4) Develop an Industrial Eco-park - capitalize on the use of both garbage and recyclables as raw materials to manufacture new products on-site, to add value to the outputs from the site operations and complete the recycling process. This would require an expansion of the W12A Landfill and add lands for resource recovery and the industrial eco-park;
- 5) Close the landfill in August 2006 - premature closure of the W12A Landfill requiring the City to export their waste temporarily, then consider a new Greenfield site within the municipal boundaries of the City of London for the next 40 years;

- 6) Export waste - continue to use the W12A Landfill until its currently approved capacity is reached in 2020 to 2025, and then establish a waste transfer station to export waste for disposal outside of the City; and,
- 7) Accelerate waste diversion to maximize landfill site life - change the City's waste management system to achieve 60% diversion by 2010 by the addition of lands and facilities to provide a full range of waste management activities including landfill, landfill expansion and resource recovery facilities including mechanical, biological and thermal waste processing. This would involve a large investment in waste and diversion activities and extend the use of the W12A Landfill beyond the 40-year time horizon by means of an expansion of the W12A Landfill.

The basic objectives to be achieved by the W12A Land Area Plan, as reflected by the seven alternatives described above, was to evolve the W12A Landfill and adjoining land area for long-term waste management for the City of London, and by doing so continue to provide waste management services (both diversion and residuals disposal) for the City's residents and businesses. In EAs it is common to consider a Do-Nothing alternative as a basis for comparison of alternatives. However, for the City of London, the Do-Nothing alternative would be to allow the W12A Landfill to reach its approved capacity and not pursue any other solution for waste management for the City. One of the City's basic requirements as a municipality is to provide municipal services and infrastructure for its ratepayers. As such, the true Do-Nothing alternative was not, and is not an alternative that could even be considered by the City, so it was not considered as a separate alternative in the previous *W12A Landfill Area Plan* study. However, in keeping, with the Code of Practice, the Do-Nothing alternative as described above was added and considered in the confirmatory screening assessment of the same alternatives assessed in the W12A Land Area Plan, which is provided in Section 4.2.

Option 7) from the W12A Landfill Area Plan included accelerated waste diversion to maximize landfill site life by facilities including, but not limited to, resource recovery facilities such as mechanical, biological and thermal waste processing. Through the *W12A Landfill Area Plan* study, these options were evaluated and identified as not preferred for the City of London based on prohibitively high costs and in some cases the continued need for a substantial landfill expansion with the technology. The City of London has continued to review mechanical, biological and thermal waste processing options outside of this EA. More recently, it would appear that these options do not align with the Strategy for a Waste-Free Ontario and the thermal waste processing option is not in alignment with the Province's energy needs. As such, because an alternative utilizing such technologies still does not provide a viable solution for the City of London, this alternative was not revisited in the confirmatory screening assessment provided in Section 4.2.

Technical background studies that evaluated agricultural and archaeological potential, as well as existing natural heritage; hydrology; hydrogeology; land use; built natural heritage; and transportation in the core and surrounding areas were completed as part of the *W12A Land Area Plan* study. The alternatives were evaluated and compared qualitatively using four

categories (natural environment, social/cultural, technical/economic and regulatory/administrative) with a number of sub-criteria used within each category. Each of the criteria were weighted equally and there was no ranking of relative importance in the criteria within in each category or between categories. The rating system used a numeric measure on a one to five scale, and five qualitative measures, as follows:

Rating	Numeric Measure	Qualitative Measure
Strong Positive	5	Indicator shows a significant positive effect for this criterion
Positive	4	Indicator shows some positive effect for this criterion
Neutral	3	Indicator shows no positive or negative effect for this criterion
Negative	2	Indicator shows some negative effect for this criterion
Strong Negative	1	Indicator shows a significant negative effect for this criterion

The comparative evaluation of the seven landfill evolution alternatives also considered sound solid waste management practices, the *City of London Official Plan*, the *Provincial Policy Statement 2005* (which was the version in effect at the time this work was done, and which has not changed significantly in the current 2014 version in terms of waste management as it relates to the W12A Land Area Plan study) and sound land use planning principles. In addition, the City developed a set of Guiding Principles for their solid waste management planning.

The development of the *W12A Landfill Area Plan* was an open, transparent and participatory process. A total of four open houses were held throughout its development between 2005 and 2008 to inform the public, provide an opportunity for input and exchange and to solicit feedback from both the public stakeholders and government agencies.

The evaluation was based on both an assigned numeric measure and a qualitative measure for each alternative. The evaluation considered two perspectives: 1) the City's obligation to and desire to provide sound municipal planning and waste management programs, which included providing landfill disposal within its municipal boundaries; and 2) impact of a specific alternative on the study area.

The results of the comparative analysis of alternatives was as follows:

W12A Landfill Evolution Alternative	Numeric Rating	Qualitative Rating
Continued Use	2.32	Negative
Expand W12A Landfill	3.10	Neutral
Develop an Integrated Resource Recovery Centre	3.71	Positive
Develop an Industrial Eco-Park	3.70	Positive
Close the W12A Landfill in August 2006	2.01	Negative
Export waste	2.64	Neutral/Negative
Accelerate waste diversion to maximize W12A landfill site life	3.67	Positive/Neutral

The evaluation of alternatives in 2006 identified alternatives 3 and 4 as having an overall positive qualitative rating, alternative 7 as having an overall positive/neutral qualitative rating, and alternatives 3, 4 and 7 as scoring closely when a numeric rating approach was applied. Through additional public consultation and consideration by the City, the overall preferred alternative identified and approved by City Council was:

Develop an Integrated Resource Recovery Centre that includes the expansion of the W12A Landfill for a 40-year time horizon and the development of facilities to promote the diversion/recovery of materials and energy on the adjoining land within the core area. The conclusions of the Plan recognized the need for approvals under the EAA and EPA to expand the W12A Landfill site.

As a result of the *W12A Landfill Area Plan*, a Special Policy Area to be used for both the expanded landfill and the integrated resource recovery centre covering some 288 ha of land was identified and subsequently incorporated into the City's updated Official Plan. This recognized the Special Policy Area as the preferred location within the City for these long-term waste management activities. The land comprising the Special Policy Area is shown on Figure 1.3-2. A Materials Recovery Facility (MRF) was planned, and subsequently implemented, on these lands just east of the landfill site.

An additional four public meetings and numerous individual meetings took place during the development of the Community Enhancement and Mitigative Measures Program associated with the W12A Landfill site and establishment of the Special Policy Area. This Program was developed to reduce and address the potential negative effects of the W12A Landfill and its planned expansion on neighbouring properties and includes the following components: a property value protection and acquisition plan; a community enhancement fund for initiatives within the broader community; and the establishment of a PLC involved in ongoing review and exchange of information related to the operations and performance of the landfill site.

4.2 Confirmation Screening Assessment of 'Alternatives To'

The seven alternatives considered previously in the *W12A Landfill Area Plan* study that concluded in 2008 are still considered to cover the reasonable range of alternatives currently available to the City at the time of preparation of this ToR. The second step in this current assessment was to confirm the conclusion of the previous study by completing a further screening assessment of the same seven alternatives examined in the previous study using the screening questions provided in the *ToR Code of Practice* (MOECC, 2014a).

The description of the seven alternatives remains as described in Section 4.1, noting that the time horizon for this EA is 25 years beyond when the current approved capacity of the W12A Landfill is reached, or a planning period from 2025 to 2050. This planning period is quite similar to the 40 year planning horizon beyond 2005 considered in the previous *W12A Landfill Area Plan*. The assessment of 'Alternatives To' was confirmed and documented during the preparation of this ToR, and was presented to the public, the PLC, the Waste Management Community Liaison Committee (CLC), the Waste Management Working Group (WMWG), Civic Works Committee and City Council.

The CLC and the WMWG are further explained in Sections 8.1 and 8.1.4 of this ToR.

As previously described in the *W12A Landfill Area Plan* study, and as it relates to long-term disposal of residual waste, alternatives 1 and 5 involve closure of the W12A Landfill and establishing a new Greenfield landfill site within the City; alternatives 2, 3, 4 and 7 involve various levels of waste diversion and an expansion of the W12A Landfill; and alternative 6 involves exporting waste for disposal outside the City. Because this EA process only considers alternatives related to long-term waste disposal, in the screening assessment the 7 alternatives were combined into three groups (as described above) based on their common approach to waste disposal.

As discussed in Section 4.1, in EAs it is common to consider a Do-Nothing alternative as a basis for comparison of alternatives. For the City of London, the Do-Nothing alternative would be to allow the W12A Landfill to reach its approved capacity and not pursue any other solution for waste management for the City. One of the City's basic requirements as a municipality is to provide municipal services and infrastructure for its ratepayers. As such, the true Do-Nothing alternative was not, and is not an alternative that could even be considered by the City, so it was not considered as a separate alternative in the previous *W12A Landfill Area Plan* study. However, in keeping with the Code of Practice, the Do-Nothing alternative as described above was added and considered in the confirmatory screening assessment as shown in Table 4.2-1.

The confirmatory screening assessment consisted of answering the series of screening questions/criteria provided in the *ToR Code of Practice* (MOECC, 2014a), as shown in Table 4.2-1. For each of the questions, a single answer (yes, maybe, no) was reached; the rationale by which the answer was reached for each group of alternatives is provided in Table 4.2-1.

Table 4.2-1: Confirmatory Screening Assessment of ‘Alternatives To’ the Undertaking

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
1- Does the alternative provide a viable solution to the need? (as defined in Section 3.4 of the ToR)	Yes. Continuing to use W12A Landfill until it reaches its current approved capacity or closing W12A Landfill and short-term exporting of waste and then locating a new Greenfield site within the City would provide long-term waste management.	Yes. Expansion of the W12A Landfill site would provide the City with long-term waste management.	Yes. Noting that this alternative is not consistent with the City’s guiding principles to provide a waste management solution within the City, and is dependent on the availability of facilities owned by others to provide waste disposal for the planning period.	No. Allowing the W12A Landfill to be filled to its approved capacity and not having pursued an alternative solution to dispose of residual waste would not provide the City with long-term waste management.
2- Does the alternative use proven technologies?	Yes. Landfilling, whether at W12A Landfill or at other disposal site or at a new Greenfield site location uses proven technologies.	Yes. Landfilling, at W12A Landfill uses proven technologies, which are used in current operations.	Yes. Landfilling at other disposal sites uses proven technologies.	Yes. Landfilling, at W12A Landfill uses proven technologies, which are used in current operations.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
3- Is the alternative technically feasible?	No. Preliminary constraints mapping suggests that there is not a large enough parcel of suitable land within the City boundaries for a new Greenfield landfill.	Yes. All aspects are technically feasible.	Yes. All aspects are technically feasible.	Yes. Continuing to operate the W12A Landfill is technically feasible
4- Is the alternative consistent with provincial government priority objectives (i.e., waste diversion, energy efficiency, source water protection, GHG reduction)?	Yes. The alternative would be designed to satisfy these objectives.	Yes. The alternative would be designed to satisfy these objectives.	No. The increased truck travel distance to export the City's waste in the long-term would increase greenhouse gas production.	No. A municipality not providing residual waste disposal services is not consistent with provincial objectives to responsibly manage wastes, nor with its responsibility as an Ontario municipality to provide waste disposal services.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
5- Is the alternative consistent with the applicable Official Plans?	No. A new Greenfield landfill would require approvals under the Planning Act and Official Plan/Zoning amendments.	Yes.	Yes.	Yes.
6- Will the alternative protect sensitive environmental features?	Yes. Both the existing landfill and approval of a new Greenfield landfill at a site yet to be determined would require these features to be protected during operations and post-closure.	Yes. Approval of an expansion of the W12A Landfill would require these features to be protected during operations and post-closure.	Yes. It is assumed that the approval of the sites where the City waste would be exported for disposal would require these features to be protected during operations and post-closure.	Maybe. Allowing the W12A Landfill to reach capacity and close would protect these features, but not having an alternative available for disposal of residual wastes could result in environmental damage as a result of illegal uncontrolled disposal.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
7- Is the alternative practical, financially realistic and economically viable?	No. Preliminary constraints mapping suggests that there is not a large enough parcel of suitable land within the City boundaries. The siting of a new landfill is expected to be technically and socially challenging, and the approvals, construction and operation of a new landfill would be very costly to the City compared to other alternatives involving expansion of W12A Landfill. Also, for Alternative 1 it may not be possible to have a new site available when the current landfill capacity is reached.	Yes. The expansion of the W12A Landfill would be less costly than other alternatives and could be achieved prior to utilizing the current site capacity.	No. The export of waste to other facilities for disposal represents a significant increase of costs to the City compared to alternatives involving the continued use of W12A Landfill.	No. Allowing the W12A Landfill to be filled to capacity without having an alternative to provide residual waste disposal is not a realistic alternative for the City of London.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
8- Is the alternative within the ability of the proponent to implement?	Yes.	Yes.	Yes.	No. The City of London cannot abdicate its responsibility to provide waste management services to its ratepayers.
9- Can the alternative be implemented within the municipal boundaries of the City of London?	No. Preliminary constraints mapping suggests that there is not a large enough parcel of suitable land within the City boundaries. In addition, the siting of a new landfill within the City of London is expected to be technically and socially challenging.	Yes.	No. Waste would be exported to licensed disposal facilities outside the City.	Yes.
10- Can the alternative be implemented within the City's time frame for additional disposal capacity?	Maybe. It may not be possible to have a new site available when the current landfill capacity is reached.	Yes.	Yes.	No. This alternative would not provide additional disposal capacity.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
11- Is the alternative appropriate for the City?	Yes.	Yes.	No. This alternative is not consistent with the City's guiding principles or Official Plan to provide a waste management solution within the City.	No. Allowing the W12A Landfill to be filled to its approved capacity and not having pursued an alternative solution to dispose of residual waste generated in the City of London is not an appropriate alternative for the City.
12- Is the alternative able to meet the purpose of the EAA?	Yes.	Yes.	Yes.	Not applicable. This alternative would not require approval under the EAA, since there would be no undertaking.

Notes:

1. No shading indicates a 'Yes' answer to the screening question.
2. Orange shading indicates a 'Maybe' answer to the screening question.
3. Red shading indicates a 'No' answer to the screening question.

4.3 Discussion

The City has undertaken a number of waste planning studies since 1969 with the objective of providing secure, long-term waste management infrastructure for the City. Through these studies, as well as other regulatory processes that involved consultation with the public, the W12A Landfill site was established, its location within the city was recognized as suitable from a planning perspective, and expansion of the landfill beyond its currently licensed capacity was identified. In the most recent study, the *W12A Landfill Area Plan* that was completed in 2008, application of a combination of environmental, technical, and socio-economic factors as well as solid waste planning and land use planning factors identified expansion of the W12A Landfill within the context of a resource recovery centre on adjoining lands as the preferred long-term waste management solution. It is noted that based on ongoing monitoring programs, the W12A Landfill is performing acceptably as expected and in accordance with its ECA; this supports the pursuit of its expansion in accordance with provincial requirements. The City has also advanced their waste diversion practices and is developing new plans to reach 60% residential diversion by 2022 (prior to the W12A Landfill reaching its approved capacity).

The Do-Nothing alternative (allow the W12A Landfill to reach its approved capacity and not pursue any other solution for waste management for the City) an alternative that could be neither considered by the City nor provide a long-term waste management solution, is confirmed as such through the screening assessment. The answer to screening questions 1, 4, 7, 8, 10 and 11 were 'no', including the key question "Does the alternative provide a viable solution to the need?"

From the above confirmatory screening assessment of the three groups that are comprised of the same seven 'Alternatives To' considered in the *W12A Landfill Area Plan* study, the answer to screening questions 1, 2, 6, 8 and 12 is 'yes' and so these questions do not differentiate among the groups. Each of the three groups would satisfy these criteria.

The remaining screening questions differentiate among the groups as follows:

- Group 1 (establish new Greenfield landfill site within the City – Alternatives 1 and 5) does not or may not satisfy screening questions 3, 7, 9 and 10, and there is therefore uncertainty in proceeding with this approach to long-term waste disposal. The uncertainties are because a preliminary constraint mapping exercise suggests that there is not a large enough parcel of land suitable for a new landfill within the City limits; siting of a new landfill is expected to be technically and socially challenging; and the costs of a new landfill would be very costly compared to Group 2 that involves expansion of the W12A Landfill. This group does not satisfy screening question 5 since if a new Greenfield landfill site is located, there would be approvals under the *Planning Act* and Official Plan/Zoning amendments required.

- Group 3 (export waste outside the City – Alternative 6) does not satisfy screening questions 4, 7, 9 and 11. Exporting of waste is inconsistent with the City's guiding principles and Official Plan to provide waste management solutions within the City; would represent a significant increased cost to the City compared to Group 2 that involves expansion of the W12A Landfill; and the increased truck travel distance from the City to whatever site the waste is exported would increase GHG emissions.
- Group 2 (expand the W12A Landfill – Alternatives 2, 3, 4 and 7) satisfies all screening questions.

Of the four alternatives that comprise Group 2, the City has already implemented much of the Alternative 3 approach by construction of a MRF adjacent to the landfill, and re-zoned a large area of land adjacent to the landfill (the Special Policy Area) to permit resource recovery and other waste management functions.

Based on both the conclusions of the previous waste management studies and this confirmatory screening assessment of alternatives available to the City, the expansion of the W12A Landfill is confirmed as the overall preferred 'Alternative To' to meet the City's long-term residual waste disposal needs. It is proposed that this EA be focused on the development and comparative assessment of 'Alternative Methods' of implementing this preferred 'Alternatives To'.

5.0 Description and Rationale for ‘Alternative Methods’

In EA terminology, ‘Alternative Methods’ are the different ways that the project can be implemented.

The *ToR Code of Practice* (MOECC, 2014a) states that a range of alternatives should be considered, which address the need and are within the proponent’s ability to implement. The alternatives should be determined by the significance of potential environmental effects of the project and the circumstances specific to the proposal, such as the proponent’s situation, timing and financing.

At the ToR stage, the City has chosen to identify the categories or types of ‘Alternative Methods’.

The individual alternatives will be identified, refined and confirmed during the EA. Since the City has already conducted a screening of ‘Alternatives To’ and identified expansion of the W12A Landfill as the preferred alternative for residual waste management, only ‘Alternative Methods’ associated with this alternative are presented in this ToR.

‘Alternative Methods’ are the different ways that the expansion of the W12A Landfill could be implemented. The City will determine ‘Alternative Methods’ of achieving the purpose of the undertaking, which is to expand the W12A Landfill to gain an additional 25 years of disposal capacity involving 14,700,00 m³ of additional airspace, thereby allowing the site to operate through the year 2050.

During the initial stage of the EA, three or four different landfill expansion alternatives, within the existing W12A Landfill property and a portion of the adjacent Special Policy Area, will be identified and described at a sufficient level of detail (i.e., conceptual designs) so that potential effects of the expanded landfill on each environmental component can be assessed and compared. The expansion alternatives will consist of variations in and combinations of landfill height, landfill area, and configuration.

It is noted that alternatives are limited to vertical expansion and/or lateral expansion to the north and/or east within the Special Policy Area. The development of the alternative expansion configurations (height and slope angles) will include consideration of the geotechnical aspects (i.e., stability and settlement). The characteristics of the existing and proposed site design and engineering system requirements, including conceptual design mitigation measures (i.e., mitigation measures at the conceptual design stage), can affect the environment and site activities such as operational and maintenance requirements. These potential effects will be assessed in the EA.

Preliminary design concepts for the ‘Alternative Methods’ were presented to the public as part of the development of this ToR, as discussed in Section 8.1.3, to illustrate possible ways that 14,700,000 m³ of airspace could be configured as an expansion to the W12A Landfill site.

There are a number of factors that will govern the configuration and number of different 'Alternative Methods' of landfill expansion. The lateral expansion of the W12A Landfill, both on-site and beyond the existing W12A Landfill property boundary, is limited by the following (refer to Figures 1.3-2 and 1.3-3):

- The currently approved landfill has a low height above ground (approximately 9 metres (m)), a large footprint (107 ha), and a top configuration with its peak near the north side of the landfill and a flat (1%) top slope from north to south. It is expected that this large, low, flat topped landfill will create challenges for developing practical expansion geometries in accordance with *O. Reg. 232/98* requirements for the target airspace of 14,700,000 m³.
- The potential area for horizontal expansion extends beyond the current landfill property as follows: northward approximately 300 m to Scotland Drive and eastward approximately 420 m. Although there is additional City-owned land further to the east within the Special Policy Area, it will be left available for other waste management uses.
- The geometrical factors need to comply with the requirements of *O. Reg. 232/98*, i.e., landfill sideslopes of 4 horizontal (H):1 vertical (V) or flatter, landfill top slopes not flatter than 20H:1V, below grade sideslopes not steeper than 3H:1V.
- Preliminary geotechnical assessment indicates that the underlying soils do not present a practical design constraint to the height of landfill sideslopes in terms of stability or in terms of subgrade settlement.
- Based on hydrogeological assessment of potential leachate impacts on groundwater quality, it is not anticipated that a geomembrane liner will be required beneath the possible horizontal expansion limits to demonstrate and achieve compliance with the *MOECC Reasonable Use Guideline* (MOE, 1994).
- In view of the above, horizontal expansion areas will continue to utilize the natural low permeability clay till deposit as a natural liner, above which will be constructed a leachate collection piping system with a continuous drainage blanket as set out in *O. Reg. 232/98* (similar to the approach in the current Phase 2 area).
- *O. Reg. 232/98* recommends a buffer width of at least 100 m between the disposal area and the property boundary, and with justification can be reduced to a minimum buffer width of 30 m.
- Visibility of the landfill from off-site vantage points is also an important consideration in developing expansion concepts, since it will be part of the comparative evaluation of expansion alternatives in the EA.
- A perimeter leachate collection system is present around the north and east sides of the Phase 1 area. It will be necessary to ensure that the function of this system, i.e., collection and conveyance of leachate that seeps along the base of the Phase 1 landfill area to the perimeter, continues when the site is expanded.

6.0 Description of Existing Environmental Conditions

The EAA defines the environment in a broad, general sense. The environmental component includes: air quality, noise, geology, hydrogeology and surface water, aquatic and terrestrial ecology. The social component includes: socio-economic, land use and cultural.

The technical component includes: financial and built aspects of the environment.

This section presents an overview of existing environmental conditions on and in the area of the W12A Landfill. As described in the *MOECC Code of Practice* (MOECC, 2014a), the City of London will present a more detailed description of the environmental conditions in the EA Report.

The methods and data sources that will be used to characterize the existing conditions during the EA are described in Table 7.6-1. The following is an overview of existing conditions.

6.1 Atmosphere

The atmosphere component comprises air quality, odour, GHG, and noise. Within the site-vicinity, the atmospheric environment is typical of southwestern Ontario with transportation and agricultural activities contributing to baseline air quality/odour and noise levels. Due to the proximity to Highway 401, Highway 401 activities are expected to be the dominant source of the existing atmospheric environment for air quality, GHG and noise. The ambient conditions also include current landfill operations, which is an existing source of air, odour, GHG, and noise emissions.

In the general area, other sources of odour emissions include farming operations, waste management facilities (e.g., Orgaworld Canada composting facility, StormFisher Environmental anaerobic digester) and industrial operations.

Ambient air quality data is available from an air monitoring station located in London, but there is minimal documentation of existing noise levels.

In terms of odour, landfills can emit two types of odours: garbage odour and LFG odour. Garbage odour is generated by recently disposed waste, and LFG odour is generated during the anaerobic decomposition of organic material in the waste.

6.2 Geology and Hydrogeology

In terms of geological setting, the landfill is located on part of the Westminster moraine, which consists of low permeability till soils identified as the Port Stanley Till. Immediately north of the landfill site, gravel and gravelly sand were formed from the older Catfish Creek drift (located under the Port Stanley Till), or were deposited underneath the Port Stanley Till by subglacial streams.

Major hydrostratigraphic units are divided into aquitards and aquifers. An aquitard consists of low permeability soils that inhibit groundwater flow. An aquifer consists of permeable soils that can transmit large enough quantities of water such that when water wells are installed they produce usable quantities of water.

In terms of the hydrogeological setting, the site is underlain by an aquitard, consisting of low permeability Port Stanley Till, referred to as the Surficial Aquitard. The thickness of the Surficial Aquitard varies from as much as 20 m in the northwest corner of the existing W12A Landfill site, to 15 m or greater below much of the existing landfill, and to about 8 m at the southeast corner of the site along Manning Drive. Groundwater moves downward at an estimated velocity of 1 to 2 centimetres (cm) per year in the Surficial Aquitard.

The next major hydrogeological feature in the region is an aquifer found beneath the Port Stanley Till, consisting of stratified sand and gravel soils, most likely part of the Catfish Creek Drift. These soil deposits comprise the White Oak Aquifer. The aquifer has an irregular vertical distribution with a maximum thickness of approximately 45 m just north of the landfill along Scotland Drive. Groundwater flow in the White Oak Aquifer is in a general north to south/southeast direction.

Some local aquifers consisting of sand and gravel soil layers within the low permeability till soils were probably formed by subglacial processes at the time that the till soils were deposited. One such local aquifer is present underneath the landfill (referred to as the Upper Aquifer) and separates the Port Stanley Till into the Surficial Aquitard and a Lower Aquitard, both of which are above the White Oak Aquifer. The Upper Aquifer is indicated not to be present north of Scotland Drive, but extends south of Manning Drive; groundwater flow in the Upper Aquifer is towards the southeast. These aquifers are not regionally extensive and generally thinner than the White Oak Aquifer.

Limestone bedrock is found approximately 80 to 90 m below the landfill and slopes downwards from north-northeast.

6.3 Surface Water

W12A Landfill is situated on the boundary between two subwatershed areas, Dingman Creek and Dodd Creek. Dingman Creek is a tributary of the Thames River (Lake St. Clair Basin) watershed and Dodd Creek is part of the Kettle Creek (Lake Erie Basin) watershed.

The majority of the landfill property falls within the Dodd Creek watershed and a small northerly portion of the landfill falls within the Dingman Creek watershed. Figures 1.3-3 and 6.3-1 shows an overview of the existing environmental conditions. Three surface water features crossing Manning Drive convey runoff from the W12A Landfill property to downstream receiving water systems within the Dodd Creek watershed and one additional surface water feature crossing White Oak Road conveys runoff from the site to a tributary of Dingman Creek. All four tributaries are documented as being seasonally dry, intermittent watercourses with a majority of flow generated as a result of direct runoff during precipitation events.

The on-site drainage network is divided into four general areas with a system of berms, slopes and perimeter drainage ditches directing runoff generated within the W12A Landfill property envelope to four separate stormwater management ponds. Stormwater management ponds 2/3, 4 and 5 are located along the south side of the site and service approximately 130 ha of drainage area within the site. Stormwater management pond 1 is located at the northwest corner of the site and services approximately 15 ha of drainage area that falls

within the Dingman Creek watershed area. All stormwater management ponds have been designed to provide stormwater quality and quantity control of surface water runoff leaving the W12A Landfill property, as per the requirements outlined by MOECC and design criteria published in relevant Subwatershed Studies. The ponds have been designed, or have been retrofitted, to function as standard extended detention wet ponds with over-control of frequent rainfall events to protect downstream features from ongoing erosion and degradation. Three ponds (1, 2/3 and 5) also incorporate sediment forebay areas to aide in settling of suspended solids and improve ease of regularly scheduled maintenance.

Surface water quality is regularly monitored as part of an existing leachate collection system and stormwater management discharge monitoring program. Sampling from all stormwater management ponds is undertaken three times per year after significant rainfall events. Water quality monitoring samples are regularly compared to baseline samples, MOECC water quality targets and the specific Provincial Water Quality Objectives included in the Dingman and Dodd Creek Subwatershed Reports or Conservation Authority Subwatershed report cards.

6.3.1 Biology

The biology component of this study is comprised of terrestrial, wetland and aquatic ecosystems.

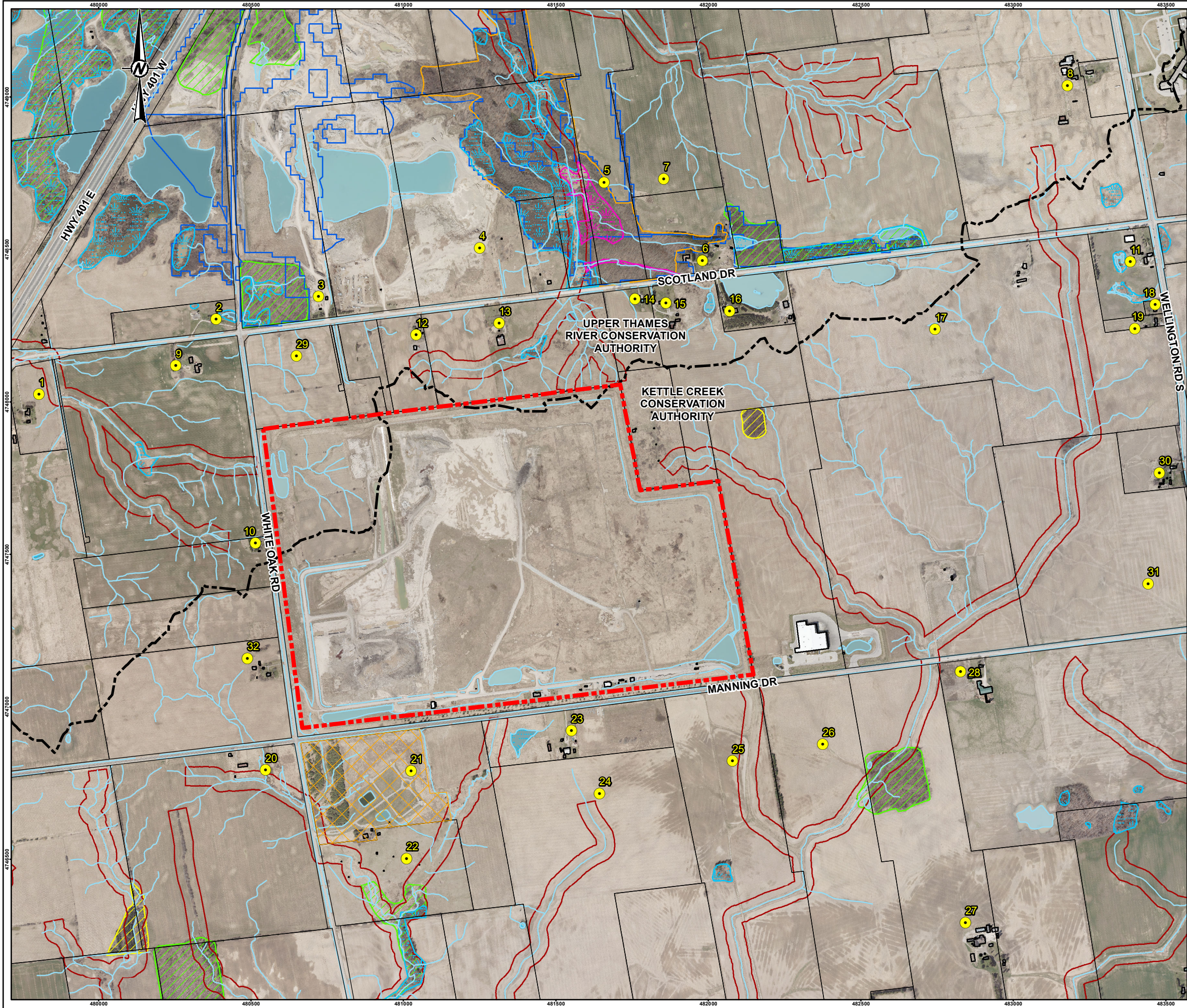
Natural vegetation in the Middlesex region consists primarily of deciduous forest communities (Middlesex County, 2014) including Dry-fresh Deciduous Forest, Fresh-moist Sugar Maple Deciduous Forest and Fresh-moist Poplar-sassafras Deciduous Forest (North-South Environmental Inc., 2009).

Clay to silt textured soils are the predominant type in the Dingman Creek Subwatershed (Delcan, 2005) and areas of imperfect to poor drainage may contribute to the presence of wetlands in the general area. Several man-made or managed drains are also present. Unevaluated woodlands, unevaluated wetlands and a potential Environmentally Significant Area (ESA) are located in the area of the landfill, as well as some successional meadows and thickets.

Previous investigations identified several vegetation community types within the area, including cultural, forest, marsh, open aquatic and swamp communities.

The primary terrestrial features found within the area of the W12A Landfill as shown on Map 5 of the London Plan and Figure 6.3-1 of this ToR include:

- A potential ESA on the north side of Scotland Drive (vegetation patch #10121)
- Significant Woodlands north of Scotland Drive (vegetation patches #10120 and #10122)
- Significant woodland south of Manning Drive (vegetation patch #11068)
- Unevaluated wetlands north of Scotland Drive
- Locally Significant Wetland north of Scotland Drive (Silver Swamp)



LEGEND

- POTENTIAL HERITAGE PROPERTY
- WATERCOURSE
- CONSERVATION AUTHORITY BOUNDARY (WATERSHED DIVIDE)
- PROPERTY FABRIC
- BUILDING FOOTPRINT
- WATERBODY
- LOCALLY SIGNIFICANT WETLAND
- UNEVALUATED WETLAND
- POTENTIAL ENVIRONMENTALLY SIGNIFICANT AREA
- UNEVALUATED VALLEY LAND
- UNEVALUATED VEGETATION PATCH
- SIGNIFICANT GROUND WATER RECHARGE AREA
- SIGNIFICANT WOODLAND
- CEMETERY
- EXISTING W12A LANDFILL SITE BOUNDARY

REFERENCE(S)
1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 17 VERTICAL DATUM: CGVD28

DRAFT



CLIENT CORPORATION OF THE CITY OF LONDON			
PROJECT TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION			
TITLE OVERVIEW OF EXISTING ENVIRONMENTAL CONDITIONS			
CONSULTANT		YYYY-MM-DD	2018-01-04
		DESIGNED	---
		PREPARED	JEM
		REVIEWED	---
		APPROVED	---
PROJECT NO. 1648176	CONTROL 0005	REV. 0	FIGURE 6.3-1

The primary aquatic features identified in the area include the Shore Drain, Sterling Drain, Bannister Johnson Drain and C.B. Smith Drain. Most of these watercourses have been altered (e.g., channelized) to facilitate drainage for surrounding land use.

Fish habitat has been identified as either Type 2 (generally important but not critical) or Type 3 (marginal/severely degraded). Fish species previously observed were ranked globally as G5 and provincially as S5 (in each case meaning very common and abundant). The benthic macroinvertebrate community is considered of poor quality and is indicative of shallow, eutrophic aquatic habitat.

Previous studies have identified several species of mammals, birds, amphibians and reptiles in the region. The background review has identified known records of several plant, bird, snake, and mammal Species at Risk (SAR) and Species of Conservation Concern (SOCC), and potential Significant Wildlife Habitat (SWH) including features supporting bat maternity colonies, amphibian breeding, and habitat for SOCC. In order to determine the presence/absence of any significant species or features within the study area site-specific field investigations need to be completed.

6.4 Land Use

The area around the W12A Landfill has historically been used for agriculture and the majority of properties remain in active agriculture. The landfill is located approximately 3 km south of the City's Urban Growth Boundary along Highway 401 and within close proximity to the Highway 401 and Highway 402 split. The Westcliff Pit, operated by AAROC Aggregates, and the Gough Pit operated by Brekelmens Holdings are located directly to the north of the site.

The W12A Landfill is designated "Agricultural" in the City of London Official Plan (1989). The area surrounding the Landfill is designated "Agricultural" with some areas identified as "Environmental Review".

A new Official Plan, called *The London Plan*, was approved by the Ministry of Municipal Affairs with modifications on December 28, 2016. *The London Plan* is under appeal and is therefore not in full force and effect. *The London Plan* will be reviewed to assess the City's future direction with regards to land use to the year 2035 as part of the land use assessment. *The London Plan* proposes to designate the W12A Landfill and approximately 150 ha to the north and east of the landfill as "Waste Management Resource Recovery Area". Land surrounding the "Waste Management Resource Recovery Area" will be designated "Farmland", "Green Space" and "Environmental Review".

The W12A Landfill is zoned “Waste Management and Resource (WRM) Zone 1”. This permits the waste management facility which currently operates on the site. Neighbouring properties (within 1 km) are zoned as follows:

- Agricultural (AG) 2 Zone, which permits a variety of agricultural uses including livestock facilities, forestry uses, farm market, greenhouse farm, nursery, conservation lands, aquaculture, manure storage facility, mushroom farm, compost facility, among others;
- Environmental Review (ER) Zone, which permits conservation lands and works, passive recreational uses, managed woodlot, and agricultural uses;
- Open Space (OS) 3, which permits cemeteries;
- Resource Extraction (EX) Zone, which permits resource extraction operations, farms, wayside pits and forestry uses; and
- Waste Management and Resource (WRM) Zone 1, which permits various waste management uses in addition to landfilling including operation of a MRF.

6.5 Agriculture

As per historical soils mapping of Middlesex County (Hagarty and Kingston, 1992), the soils on and around the W12A Landfill site are identified as Muriel soils (MU4), which contain silty clay loam, silty clay, and occasionally clay loam glacial till deposited by glaciation from the Lake Erie basin. The MU4 soils have moderately well to imperfect soil drainage.

A rectangular area of land on the landfill property is identified as “dump” and labelled as “soils that have not been mapped” (NM) due to the fact that the soils have been disturbed, modified or permanently withdrawn from agricultural use. Adjacent to the area identified as NM is an area identified as Eroded Channel, which continues south of the site to a Valley Complex. Eroded Channel is described as being narrow, shallow channels cut by small streams or creeks.

6.6 Archaeology

The City of London has an archaeological master plan that covers the area on and around the landfill site. Completed in 1996, it indicates that a significant portion of this area has archaeological potential. The City’s master plan is currently undergoing a review to be updated as a new Archaeological Management Plan, but a final updated version is not yet publicly available.

Previous archaeological work completed within the area includes a Stage 1 assessment conducted in 2005 for the *W12A Landfill Area Plan* study (Archaeologix Inc. 2006). It compiled available information about the known and potential cultural resources within the area and provided specific direction for the protection, management and/or recovery of these resources. Other archaeological assessments were completed in the vicinity over the last five years, including a Stage 1-3 assessment of the Highway 401 and Wonderland Road

Interchange in 2015 (New Directions Archaeology Ltd. 2015), a Stage 1-2 assessment of 43 ha at 3242 Manning Drive in 2015 (Golder, 2016b), and a Stage 1-2 assessment of 20.33 ha at 3137 Scotland Drive in 2016 (Golder, 2016a). These assessments resulted in the identification of numerous isolated finds and nine registered archaeological sites, which includes four pre-contact Indigenous sites and five historical Euro-Canadian sites. The registered archaeological sites are located greater than 500 m from the boundary of the W12A Landfill site and the adjacent area proposed for possible expansion.

6.7 Cultural Heritage

The cultural heritage existing conditions review identified the following cultural heritage resources within the W12A Landfill site and adjacent areas, which are listed in Table 6.8-1, shown on Figure 6.3-1 and summarized below:

- Six (6) properties inventoried on the Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels Geographic Information System (GIS) layer;
- Twenty (20) properties adjacent to properties inventoried on the Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer;
- Seven (7) properties with structures that are more than 40 years of age, and may require evaluation for cultural heritage value or interest; and
- Seven (7) properties that contain structures with unknown cultural heritage value or interest.

Each identified resource and associated recommendation for further action is summarized in Table 6.8-1.

Table 6.8-1: Heritage Properties within the W12A Landfill site and adjacent areas

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
1	4166 Scotland Drive	<ul style="list-style-type: none"> • Adjacent to 5435 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
2	5435 White Oak Road	<ul style="list-style-type: none"> • Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
3	3900 Scotland Drive	<ul style="list-style-type: none"> • Adjacent to 5435 White Oak Road and 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
4	3696 Scotland Drive	<ul style="list-style-type: none"> Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
5	3583 Westminster Drive	<ul style="list-style-type: none"> Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
6	3502 Scotland Drive	<ul style="list-style-type: none"> Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house with unknown date of construction.
7	3513 Westminster Drive	<ul style="list-style-type: none"> Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house and barn with unknown date of construction.
8	5371 Wellington Road South	<ul style="list-style-type: none"> Property includes house and barn that may have been constructed more than 40 years ago.
9	4067 Scotland Drive	<ul style="list-style-type: none"> Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
10	5725 White Oak Road	<ul style="list-style-type: none"> Adjacent to 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house with unknown date of construction.
29	Assessment Roll # 080020170000000	<ul style="list-style-type: none"> Adjacent to 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
12	3801 Scotland Drive	<ul style="list-style-type: none"> Property includes house with unknown date of construction.

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
13	3713 Scotland Drive	<ul style="list-style-type: none"> • Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house that may have been constructed more than 40 years ago.
14	3561 Scotland Drive	<ul style="list-style-type: none"> • Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house that may have been constructed more than 40 years ago.
15	3465 Scotland Drive	<ul style="list-style-type: none"> • Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes barn that may have been constructed more than 40 years ago.
16	3405 Scotland Drive	<ul style="list-style-type: none"> • Property includes house and barn with unknown date of construction.
17	3137 Scotland Drive	<ul style="list-style-type: none"> • Adjacent to 5751 Wellington Road South, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
11	5529 Wellington Road South	<ul style="list-style-type: none"> • Property includes house that may have been constructed more than 40 years ago. • Appears at the same location as 3137 Scotland Drive
18	5595 Wellington Road South	<ul style="list-style-type: none"> • Property includes house with unknown date of construction.
19	5615 Wellington Road South	<ul style="list-style-type: none"> • Property no longer includes a house.
	3502 Manning Drive	<ul style="list-style-type: none"> • Adjacent to 4067 Scotland Drive, 6100 White Oak Road, and 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer. • This is the landfill.

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
31	Assessment Roll # 080020139000000	<ul style="list-style-type: none"> • Adjacent to 5751 Wellington Road South, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
30	5751 Wellington Road South	<ul style="list-style-type: none"> • Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
20	4069 Manning Drive / 4025 Manning Drive	<ul style="list-style-type: none"> • Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property possibly includes a barn that may have been constructed more than 40 years ago.
21	6100 White Oak Road	<ul style="list-style-type: none"> • Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
22	6150 White Oak Road	<ul style="list-style-type: none"> • Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
23	3691 Manning Drive	<ul style="list-style-type: none"> • Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
24	Assessment Roll # 080020121000000	<ul style="list-style-type: none"> • Adjacent to 6100 White Oak Road and 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
25	Assessment Roll # 080020075000000	<ul style="list-style-type: none"> • Adjacent to 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
26	Assessment Roll # 080020076000000	<ul style="list-style-type: none"> • Adjacent to 3424 Glanworth Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
27	6601 Wellington Road South / 6603 Wellington Road South	<ul style="list-style-type: none"> • Adjacent to 3424 Glanworth Drive and 3402 Glanworth Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house and barn with unknown date of construction.
28	3243 Manning Drive	<ul style="list-style-type: none"> • Property includes house that may have been constructed more than 40 years ago.
32	5861 White Oak Road	<ul style="list-style-type: none"> • Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer.

6.8 Socio-economic

The socio-economic component considers the impact of the landfill expansion on the local economy in terms of employment and municipal finances as well as the effects on residents and communities. The current site is located in a largely rural setting with a small number of residential properties (many of these properties to the north and east are owned by the City of London) and farms located within the adjacent areas. The closest communities are the hamlet of Glanworth located approximately 1.9 km southeast of the site and Shaver Subdivision located approximately 2.0 km to the northeast.

There are no schools, hospitals or religious buildings within the site-vicinity study area. The Islamic Cemetery of London is located to the south of the site.

In terms of business operations, the most notable feature is the Westcliff Pit, operated by AAROC Aggregates, and the Gough Pit operated by Brekelmens Holdings located on the north side of Scotland Drive, just north of the landfill.

The City of London's W12A Landfill received approximately 280,000 tonnes of waste in 2017 and collects waste generated within the City of London, the Municipality of Thames Centre, Lake Huron and Elgin Area Water Treatment Plants and the TRY Recycling Construction and Demolition Recycling Facility located just north of the City. There is also a Household Special Waste (HSW) facility and a public drop off depot for household garbage, appliances, Blue Box recyclables, yard waste, cardboard, electronics, scrap metal, tires and wood. The HSW Depot accepts MHSW waste from the City of London, the County of Middlesex and Oneida Nation of the Thames First Nations.

The landfill currently employs 14 full time and 2.6 full time equivalent seasonal staff working for the City directly and about 4 to 5 full time equivalent staff working for the contractor at the landfill. In 2017, a total of 34 odour complaints were made by local residents; this is higher than in recent years (19 in 2014, 21 in 2015 and 17 in 2016). The landfill's operating costs in 2017 were approximately \$3.5 million and revenues were approximately \$3.4 million.

6.9 Visual

In comparison to many other large municipal landfills the W12A Landfill is a relatively flat (covers a larger area and is not as high). Nevertheless, the existing W12A Landfill is an anomaly rising approximately 9 to 12 m above an otherwise generally flat landscape. The landfill can be seen from a distance up to 5 km from the south and east, 3 km from the west and 1 km from the north. Close views of the site are mainly seen by local residents and truck drivers on the landfill haul routes. Most people who see the site do so from a distance (at least 1 km) from main traffic routes (e.g., Highway 401 and Wellington Road South).

Depending on the location from which W12A Landfill is visible, features in the immediate landscape such as landscaping and buildings can take visual precedence over the landfill, drawing the viewer's attention away and thereby reducing the visual impact of the landfill. Factors such as seasonal changes to foliage and the type of agricultural crops present can affect visibility.

6.10 Transportation

The Transportation component comprises traffic effects expected along the haul route in the vicinity of the W12A Landfill site. The current designated haul route consists of two options: Manning Drive via Wonderland Road to the west and Manning Drive via Wellington Road South to the east. Until the opening of the Highway 401 and Wonderland Road interchange in late-2015, the Wellington Road South option was the sole haul route. Available existing traffic data reflects a condition prior to the addition of the new interchange. The estimated Average Annual Daily Traffic (AADT) volumes are approximately 500 vehicles per day on Manning Drive, 6,400 vehicles per day on Wonderland Road, and 12,000 vehicles per day on Wellington Road South (north of Manning Drive) within the vicinity of the site. Manning Drive serves as the Emergency Detour Route (EDR) for Highway 401, along which the access to the landfill is also located.

The types of typical road users include regular automobile vehicles, heavy landfill-related vehicles, heavy material recovery (recycling) vehicles, and slow moving / farm vehicles. Based on past studies (2009), it was assessed that under 2016 conditions the roadway network, and the intersections of Manning Drive at Wellington Road South (signalized) and at the W12A Landfill site accesses were expected to operate at acceptable levels of service (LOS).

6.11 Design and Operations

The Design and Operations component comprises the design and operation of the landfill and the site. The design of the W12A Landfill and the operations at the site are approved under ECA No. 042102. The W12A Landfill has been operational since 1977 and currently accepts solid non-hazardous waste generated within the City of London, the Municipality of Thames Centre, Lake Huron and Elgin Area Water Treatment Plants and the TRY Recycling Construction and Demolition Recycling Facility located just north of the City. In addition to the landfill, facilities at the site are inbound and outbound weigh scales, a scalehouse, a small vehicle drop off area, maintenance buildings, an administration building, a HSW facility and a LFG blower and flare compound. The following material is diverted from the landfill: MHSW, appliances, Blue Box recyclables, yard waste, cardboard, electronics, scrap metal, tires and wood.

The landfill is approved to accept 650,000 tonnes of waste per year, but over the past 10 years typically received between 200,000 and 280,000 tonnes of waste per year.

The W12A Landfill has been designed in two phases on a 107 ha footprint to accommodate 12,500,000 m³ of airspace for waste, daily cover and interim cover. The landfill has buffers beyond the limit of the waste footprint area of 92 m to the south and west and 46 m to the north and east. Phase 1 of the landfill occupies the eastern portion of the footprint and was filled between 1977 and 2002. Phase 1 has six cells that were excavated to an average depth of 3 m below grade. The landfill design approach considered the low-permeability nature of the natural clay till soils below the landfill that hinder the potential downward migration of landfill leachate. The native clay till deposit provides a natural liner.

There are two approaches to leachate collection. Leachate within Phase 1 is collected by a perimeter leachate collection system consisting of 200 millimetre (mm) diameter perforated pipe placed in gravel around the perimeter of the waste footprint. There is a leachate mound within the Phase 1 landfill area. Phase 2 of the landfill has eight cells, of which six have been constructed. Phase 2 was designed with a full underdrain leachate collection system consisting of 200 mm diameter perforated pipes spaced 90 m apart within a clear stone blanket and covered with a geotextile filter and 0.2 m thick protective sand layer. The base of Phase 2 is graded to convey leachate into the perforated pipes and with an overall fall from north to south to a low point at an elevation of 270 m above sea level (masl). The collected leachate from both phases is stored in holding tanks before it is pumped via a pumping station located near the scalehouse through a forcemain along Manning Drive to the Dingman Creek Pumping Station and eventually to the Greenway Wastewater Treatment Plant for treatment.

LFG is collected via buried pipes connecting LFG extraction wells and an extraction blower. The collected gas is sent to an enclosed LFG flare for combustion.

The overall final designed shape of the landfill is generally rectangular. The design of the side slopes ranges from 4H:1V to 6H:1V and the top is sloped at approximately 1% from the south to a peak elevation of the final cover of 293 masl near the north end of the landfill. The final cover design consists of 0.85 m of compacted clay soil and 0.15 m of topsoil. The average height of the landfill above ground surface is about 9 m. In summary, the currently approved W12A Landfill can be described as having a large footprint area and a low height above grade.

7.0 EA Methodology

This section presents the proposed methodology for the completion of the EA and the associated technical studies.

7.1 EA Approach

It is proposed that the EA work will be undertaken in a series of seven steps (further details are provided in Section 7.6) as follows:

- Step 1 – Identify the ‘Alternative Methods’ of landfill expansion (and incorporate conceptual design mitigation measures);
- Step 2 – Characterize the existing environmental conditions;
- Step 3 – Qualitative evaluation of ‘Alternative Methods’;
- Step 4 – Compare the ‘Alternative Methods’ for landfill expansion and identify the preferred alternative;
- Step 5 – Refine the mitigation measures and determine the net effects of the preferred alternative;
- Step 6 – Describe the preferred ‘Alternative Method’ for landfill expansion;
- Step 7 – Consideration of climate change;
- Step 8 – Cumulative impact assessment; and
- Step 9 – Preparation of the EA Study Report.

Consultation with the public, Indigenous Communities, GRT members, City of London Advisory Committees, and other stakeholders will be ongoing throughout the EA process.

7.2 Study Areas

The proposed methodology that will be used to conduct the EA is provided in the following sections. The EA, which will be carried out in accordance with the approved ToR, will involve the identification of the preferred ‘Alternative Method’ for the project and the assessment of the effects of the project.

The study area is the area within which activities associated with the proposed project will occur and where potential environmental effects will be studied. Three preliminary generic study areas for the assessment have been identified as follows:

- **Site Study Area** – The existing W12A Landfill Site and adjacent area of land within which landfill expansion may occur.
- **Site-vicinity Study Area** – The lands in the area immediately adjacent to the Site Study Area that have the potential to be directly or indirectly affected by the landfill expansion and activities within the Site Study Area. As described below, the extent of the Site-vicinity Study Area will be determined for each of the environmental components described in Section 7.3.
- **Wider Study Area** – lands generally beyond the Site-vicinity Study Area, which could extend to include the area of the City of London.

The rationale for the definition of these preliminary generic study areas is as follows:

- **Site Study Area** – The area of land within which ‘Alternative Methods’ of landfill expansion may occur has been defined, and will be limited to the existing W12A Landfill property and a specific portion of the adjacent Special Policy Area to the immediate north and east.
- **Site-vicinity Study Area** – The MOECC Guideline D-4 Land Use on or Near Dumps describes that the most significant potential impacts typically occur within 500 m of the perimeter of the waste disposal area on a landfill site. For this reason, this Guideline distance is often used by Ontario municipalities in their Official Plans to establish a holding zone around landfills; development within these zones requires proponents to demonstrate that their proposed development will not be adversely affected by the landfill site and its operations. For most environmental components, a Site-vicinity Study Area of 500 m from the Site Study Area limits is appropriate. For specific environmental components, the appropriate Site-vicinity Study Area is greater than 500 m from the existing or potential expanded disposal area. It should also be recognized that the W12A Landfill has been in operation for over 40 years, and monitoring and operational data demonstrates compliance with the requirements of its ECA and the limited extent for potential adverse environmental impacts to occur off-Site.
- **Wider Study Area** – An area that takes in the broader community generally beyond the immediate site-vicinity and for specific environmental components may include the entire municipality.

The preliminary extent of the study area proposed for each of the environmental components to be studied during the EA, together with a rationale, is provided in Table 7.2-1 below.

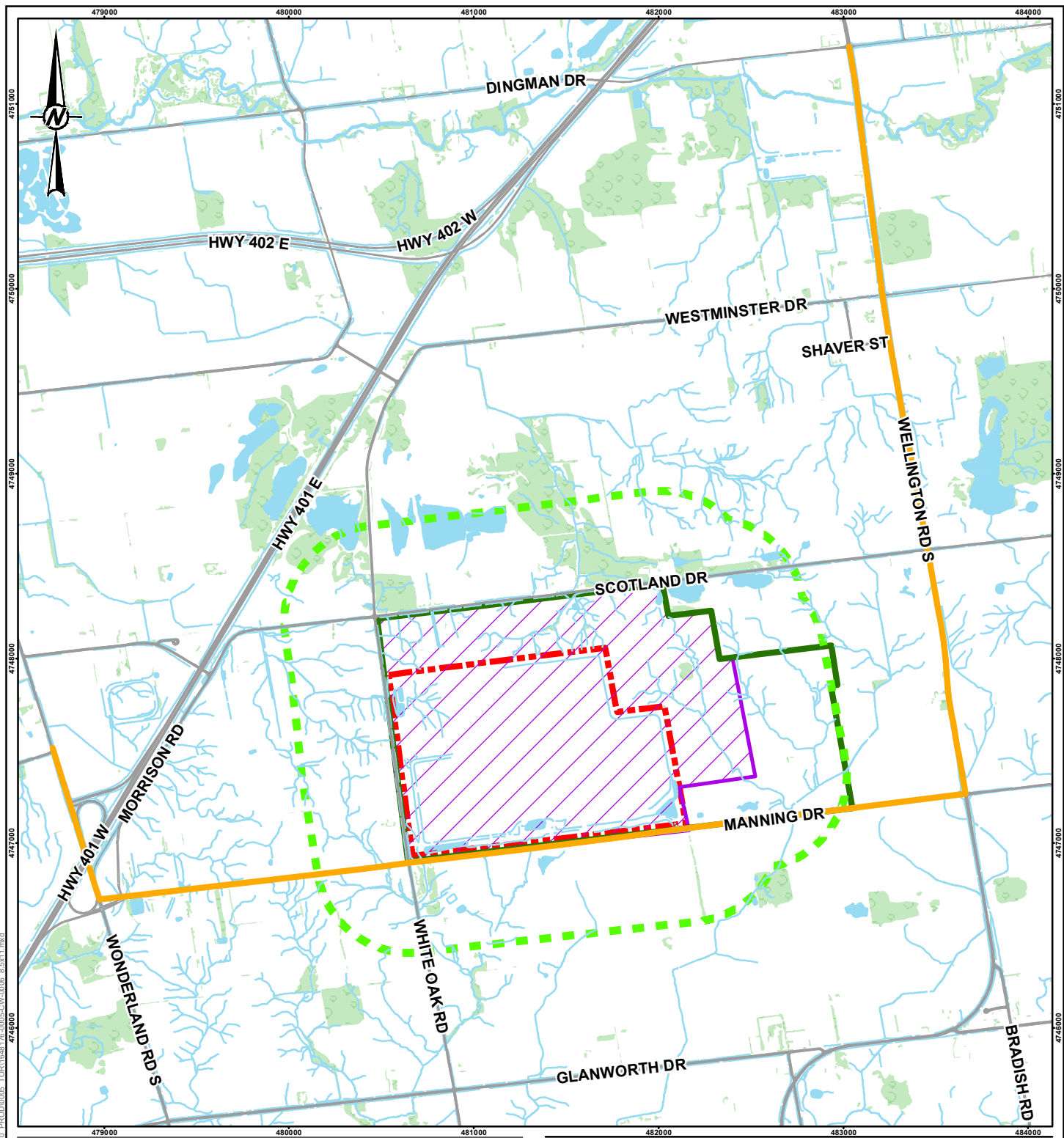
Table 7.2-1: Proposed Preliminary Study Areas

Environmental Component	Preliminary Area(s) to be Studied	Rationale
Atmosphere	Site and Site-vicinity	Air and noise emissions are required to meet provincial requirements at the landfill site boundary or closest sensitive receptors (which are within 500 m of the landfill).
	Site and Site-vicinity	Odour emissions may travel further than 500 m but any effects are expected to be within 1.5 km of the Site Study Area.
	Site-vicinity	To assess haul route noise. See discussion under Transportation for a description on the Site-vicinity Study Area for the haul routes.
Geology and Hydrogeology	Site	Potential effects on groundwater quality have to comply with the MOECC Reasonable Use Guideline at the landfill site boundary.
Surface Water	Site and Site-vicinity	Necessary to include the drainage boundaries of the subwatersheds within which the site is located.
Biology	Site and Site-vicinity	Potential effects on biological resources are expected to be limited to 500 m from the Site Study Area.
Land Use	Site and Site-vicinity	Since there are provincial requirements that govern the potential emissions or discharges from the landfill site, potential effects on land use are expected to be limited to 500 m from the Site Study Area.
Agriculture	Site and Site-vicinity	Since there are provincial requirements that govern the potential emissions or discharges from the landfill site, potential effects on agriculture are expected to be limited to 500 m from the Site Study Area.
Archaeology	Site	Potential disturbance of archaeological resources will be limited to areas associated with the landfill expansion.
Culture	Site and Site-vicinity	In accordance with MTCS requirements for cultural studies, the area of study will extend to approximately 1.5 km from the Site Study Area as shown on Figure 6.3-1.

Environmental Component	Preliminary Area(s) to be Studied	Rationale
Socio-economic	Site, Site-vicinity and Wider	To consider the potential effects of the landfill expansion within 500 m of the Site Study Area and on the broader community.
Visual	Site-vicinity	Off-site vantage points from where the landfill expansion may be visible from as far as 5 kilometres.
Transportation	Site-vicinity	To consist of the haul routes associated with the landfill, specifically Manning Drive between Wellington Road South and Highway 401 and Wellington Road South between Dingman Drive and Manning Drive. Also Wonderland Road South between Decker Drive and Manning Drive (as suggested by public feedback received during Open House #2). As shown on Figure 7.2-1.
Design and Operations	Site	This component relates only to activities associated with the landfill expansion itself

The Site Study Area and the area extending 500 m beyond the Site Study Area are illustrated on Figure 7.2-1. The Wider Study Area is not depicted on this figure.

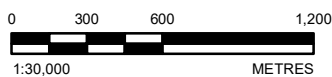
These preliminary study areas are subject to refinement and will be confirmed during the EA.



LEGEND

-  EXISTING W12A LANDFILL SITE BOUNDARY
-  SITE STUDY AREA
-  500 m BEYOND SITE STUDY AREA
-  HAUL ROUTES TO BE ASSESSED
-  WASTE MANAGEMENT RESOURCE RECOVERY AREA BOUNDARY

DRAFT



REFERENCE(S)

1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
TERMS OF REFERENCE FOR THE ENVIRONMENTAL
ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE
STUDY AREAS

CONSULTANT



YYYY-MM-DD 2018-04-04

DESIGNED ---

PREPARED JEM

REVIEWED ---

APPROVED ---

PROJECT NO.
1648176

CONTROL
0005

REV.
A

FIGURE
7.2-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

7.3 Environmental Components

As noted in Section 6.0, the environment is defined as those environmental components that may be affected by the project.

The environmental components and sub-components that will be evaluated during the EA are presented in Table 7.3-1.

The environmental components, including socio-economic and technical components, for this EA cover the broad definition of the environment and are:

- atmosphere;
- geology and hydrogeology;
- surface water;
- biology;
- land use;
- agriculture;
- archaeology;
- culture;
- socio-economic;
- visual;
- transportation; and
- design and operations.

Table 7.3-1 outlines each environmental component, including a statement rationalizing why each was included in the EA and the indicators that will be used for determination of potential impacts in the assessment. The data sources that will be used for assessing each of these environmental components are provided in Table 7.6-1. These components and indicators were proposed by the City's EA study team during the development of the ToR and presented to the public at Open House #2 for comment. The feedback received from the public is provided in Table 8.1-4 of this ToR.

These criteria and indicators are preliminary and subject to refinement, and will be confirmed during the EA .

Table 7.3-1: Proposed Environmental Components, Rationale and Indicators for the EA

Component	Sub-component	Rationale	Indicator(s)
Environmental Components			
Atmosphere	Air quality (including dust, odour, GHG)	Landfill expansion and associated operations can produce gases containing contaminants that degrade air quality if they are emitted to the atmosphere. Construction activities associated with landfill expansion and continued landfill operation can lead to levels of particulates (dust) in the air. Landfill operation can also result in odour effects.	<ul style="list-style-type: none"> • Expected concentrations of air quality indicator compounds (selected regulated air contaminants to represent this type of project) at the property boundary. • Expected site-related odour at sensitive receptors. • Expected GHG emissions.
	Noise	Landfill expansion and associated operations will generate noise that will be emitted into the atmosphere and could affect off-site points of reception (PORs).	<ul style="list-style-type: none"> • Noise Levels at off-site PORs, or vacant lots that accommodate the future construction of PORs.
Geology and Hydrogeology	Groundwater quality	Contaminants associated with the landfill expansion and associated operations could enter the groundwater and impact off-site groundwater or surface water.	<ul style="list-style-type: none"> • Expected effect on groundwater quality at the property boundary.

Component	Sub-component	Rationale	Indicator(s)
Surface Water	Surface water quality	Contaminants associated with the landfill expansion and associated operations could seep or runoff into surface water and adversely affect water quality and aquatic life.	<ul style="list-style-type: none"> • Expected effect on surface water quality in the stormwater management system (SWMS) and within the site-vicinity.
	Surface water quantity	Operations associated with the landfill expansion could alter runoff and peak flows.	<ul style="list-style-type: none"> • Expected change in peak flows (within the on-site SWMS and at the property boundary). • Expected degree of off-site effects on surface water within the site-vicinity.
Biology	Aquatic ecosystems	Landfill expansion could remove or disturb the functioning of natural aquatic habitats and species, including rare, threatened or endangered species.	<ul style="list-style-type: none"> • Expected change in surface water quality on-site and within the site-vicinity. • Expected impact on aquatic habitat and biota, including rare, threatened or endangered species within on-site and within the site-vicinity.
	Terrestrial ecosystems	Landfill expansion could remove or disturb the functioning of natural terrestrial habitats and vegetation, including rare, threatened or endangered species.	<ul style="list-style-type: none"> • Expected impact on terrestrial vegetation communities, wildlife habitat, and wildlife, including rare, threatened or endangered species on-site and within the site-vicinity.

Component	Sub-component	Rationale	Indicator(s)
Socio-Economic Components			
Land Use	Current and planned future land uses	Waste disposal facilities could potentially affect the use and enjoyment of sensitive uses in the vicinity of the Site.	<ul style="list-style-type: none"> • Expected impact on sensitive land uses (i.e., dwellings, churches, and parks within the site-vicinity).
Agriculture	Agriculture	The agricultural land base or agricultural operations may be impacted by the landfill expansion and associated operations.	<ul style="list-style-type: none"> • Expected effect on agricultural land base and agricultural operations within the site and site-vicinity.
Archaeology	Archaeology	A horizontal landfill expansion has the potential to affect archaeological resources.	<ul style="list-style-type: none"> • Expected archaeological resources potentially affected on-site.
Culture	Cultural Heritage Landscapes	Identified cultural heritage landscapes can be altered by the landfill expansion. Depending on the nature of identified cultural heritage landscapes, there could be an impact by the ongoing operation of the landfill.	<ul style="list-style-type: none"> • Expected impact on identified cultural heritage landscapes on-site and within the site-vicinity.
	Cultural Heritage Resources (including built heritage)	Heritage attributes of identified cultural heritage resources could be impacted by the landfill expansion and associated operations.	<ul style="list-style-type: none"> • Expected impact on the heritage attributes of identified cultural heritage resources on-site and within the site-vicinity.

Component	Sub-component	Rationale	Indicator(s)
Socio-economic	Local Economic	The continued operation of the landfill can influence employment and business in the wider regional area.	<ul style="list-style-type: none"> • Expected effect on local employment. • Expected effects on local businesses and commercial activity. • Expected effects on municipal finances.
	Residents and Community	Waste disposal facilities can potentially affect the use and enjoyment of their properties by residents in the vicinity of the site.	<ul style="list-style-type: none"> • Displacement of residents. • Expected interference with use and enjoyment of residential properties (nuisance effects).
Visual	Visual	The landfill expansion can affect the local community by changes in the visual appearance of the site.	<ul style="list-style-type: none"> • Expected changes in landscape views from off-site.
Technical Component			
Design and Operations	Engineered Containment	Sites that require less engineering to provide protection of off-site groundwater or air quality are typically preferred from a public and regulatory perspective.	<ul style="list-style-type: none"> • Expected degree of engineered containment and/or controls required.
	Financial	Different methods of landfill expansion can have different costs based on the type and amount of engineering required.	<ul style="list-style-type: none"> • Estimated costs associated with implementation of expansion alternatives.
Transportation	Traffic	The operations at the landfill can impact the traffic in the surrounding area through changes in truck traffic to/from the landfill.	<ul style="list-style-type: none"> • Expected effect on traffic along the haul routes in the vicinity of the site.

The nearest airports to the W12A Landfill are the St. Thomas Municipal Airport and the Greater London International Airport. The St. Thomas Airport is located approximately 15 km to the southeast of the landfill, while the Greater London Airport is located approximately 17 km to the northeast of the landfill. In view of these separation distances and given that the landfill already exists; that the proposed project will only extend the use of the site (while maintaining a similar rate of fill); and that there are no known concerns from airport operators, an assessment of the potential effects of the landfill expansion in terms of aviation is not proposed.

If circumstances arise during the EA studies that require modifications to the criteria and/or indicators presented in the ToR, the reason for the modifications would be explained in the EA study report. If additional aspects of the environment that require evaluation are identified during the EA studies, additional criteria and indicators will be developed during the EA, as appropriate and included in the EA consultation process.

7.4 Time Frame

As noted previously, the W12A Landfill is expected to reach capacity early in 2025. Assuming that the necessary approvals will be in place by that time and that the expected life of the expanded landfill is approximately 25 years, then the following time frames are proposed for the assessment:

- operations (2025 to 2050); and
- post-closure (beyond 2050).

Landfilling operation activities will occur throughout the expanded life of the W12A Landfill (i.e., about 25 more years from 2025 to 2050). Leachate collection and treatment, LFG system operation, and site performance monitoring and maintenance activities, will also be ongoing throughout this time frame. During the post-closure period (i.e., beyond 2050), the only activities anticipated are leachate collection and management, LFG system operations, and site performance monitoring and maintenance.

7.5 EA Scope of Work

As noted previously, the City is proposing to undertake the EA in seven steps as described in the following sections.

7.5.1 Step 1 – Identify ‘Alternative Methods’ of Landfill Expansion

As noted previously, the ‘Alternative Methods’ are the different ways the project can be implemented.

The City will determine ‘Alternative Methods’ of achieving the purpose of the undertaking, which is to expand the W12A Landfill to gain an additional 25 years of disposal capacity, thereby allowing the site to operate through the year 2050. During the initial stage of the EA, a reasonable range of expansion alternatives will be identified and described at a sufficient level

of detail (i.e., conceptual designs) so that potential effects of the expanded landfill on each environmental component can be assessed and compared.

Following identification of a reasonable number of alternatives for expansion, the EA project team will conduct a preliminary assessment of potential effects of each alternative for the proposed project. Those works and activities that could potentially adversely affect the environment will be identified. Potential mitigation measures to avoid or reduce the impact will be identified. These proposed mitigation measures (referred to as conceptual mitigation measures) will be incorporated into the conceptual design of the alternatives. These measures could, for example, include appropriate modifications to the existing leachate collection system and/or new mitigation measures. The description and illustration of the conceptual design alternatives will be provided as a section in the EA and will serve as the common basis for predicting the environmental effects of the 'Alternative Methods'.

LFG management requirements for the current and expanded landfill, which has a total airspace in excess of 1,500,000 m³, are mandated by *O. Reg. 232/98* and *O. Reg. 216/08* (i.e., use of an active gas collection system) and will be conceptually designed as such for the W12A Landfill expansion alternatives.

It should also be noted that landfills are included in the list of facilities to which *O. Reg. 419/05* (air pollution and local air quality) applies. As part of the EA, the City will ensure the requirements of this regulation are addressed in the assessment of potential effects.

7.5.2 Step 2 – Characterize Existing Environmental Conditions

An initial overview of existing environmental conditions is provided in Section 6.0. The existing environment that could potentially be affected by the project will be further described for each of the environmental components. The work plans and methodologies that will be used to characterize existing conditions for each component are presented in Table 7.6-1.

7.5.3 Step 3 – Qualitative Evaluation of 'Alternative Methods'

The EA project team will qualitatively predict the effects for each 'Alternative Method' (i.e., including conceptual design mitigation measures) on the environment. The assessment will be done for each component based on the conceptual designs for each alternative, including mitigation (determined in step 1) and the existing environmental conditions (determined in Step 2).

If the assessment indicates that any additional mitigation measures are required to achieve site compliance with provincial standards, they will be developed and the assessment repeated to incorporate these measures. The EA project team will update and revise the conceptual designs to include any additional mitigation measures. The final conceptual designs will be included in the EA.

In this step, each 'Alternative Method' of the W12A Landfill expansion will be examined to determine if it would ultimately be approvable under the EPA. This screening step is included to eliminate any alternative that would not likely be approvable. Should an alternative be found to not be approvable due to unacceptable net effects (i.e., no further

refinement of mitigation is possible) or technical reasons, then the alternative would be eliminated from further consideration. At this point, the EA project team may also consider additional 'Alternatives To' the project that may have been identified by the public or other parties during the EA process.

7.5.4 Step 4 – Compare the 'Alternative Methods' of Landfill Expansion and Identify the Preferred Alternative

When the alternatives have been finalized, a comparative evaluation of 'Alternative Methods' will be conducted to identify the preferred alternative. The alternatives will be compared using the environmental sub-components and indicators presented in Table 7.3-1. Preliminary feedback on the relative importance of the assessment indicators was received from the City of London Advisory Committees and through public open houses during preparation of this ToR, and further input will be obtained during the initial stages of the EA. This comparative analysis will be undertaken by the EA project team.

As part of this comparison, the advantages and disadvantages of each alternative method will be described.

The outcome of this ranking exercise will then be used in the comparative evaluation to identify the overall preferred expansion alternative.

7.5.5 Step 5 – Refine the Mitigation Measures and Determine the Net Effects of the Preferred Alternative

The prediction of future environmental effects associated with the preferred 'Alternative Method' (assuming that conceptual design mitigation measures are in place) will be provided by each discipline lead as described in Table 7.6-1. Assessment of potential effects will be done using appropriate objectives, standards, policies and regulations. The remaining effects or net effects, if any, will be documented.

Also, a qualitative comparison will be made between the predicted effects of the preferred alternative and the Do-Nothing alternative as defined in Section 4.2 considering the indicators for the environmental components.

7.5.6 Step 6 – Describe the Preferred 'Alternative Method'

The outcome of this step will be the description of the preferred landfill expansion alternative.

In addition, the quantity of leachate generation from the preferred landfill expansion alternative will be predicted, the quality of the leachate associated with the expansion and requiring treatment will be assessed, and a high level assessment of the capability of the existing forcemain to continue to convey the collected leachate to the municipal sewer system and the Greenway Wastewater Treatment Plant to continue to treat the leachate will be carried out and the results provided in the EA study report (Step 9).

7.5.7 Step 7 – Consideration of Climate Change

The 2017 Guide- Consideration of Climate Change in EA in Ontario describes two basic aspects to be considered: 1) Project Effects on Climate Change, and 2) Climate Change Effects on the Project. For this EA, climate change will be assessed as follows:

Project Effects on Climate Change: for the preferred landfill expansion alternative, a quantitative assessment of GHG generation potential associated with the landfill expansion (waste decomposition within the landfill, stationary combustion sources, i.e., flare and building heating, and on-site traffic and mobile equipment) and the GHG reductions resulting from design mitigation measures (active gas extraction system) will be prepared.

Climate Change Effects on the Project: The manner in which climate change has the greatest potential to affect this project is in terms of changes (increases) in precipitation events and associated effects on the performance of the site's SWMS. It is proposed to conceptually design the SWMS for each of the landfill expansion alternatives in compliance with *O. Reg. 232/98*, which requires their SWMSs to be designed for the 100 year storm event. For the preferred landfill expansion alternative, it is then proposed to conduct a sensitivity analysis to assess the performance of the SWMS under the 250-year storm event for the preferred alternative. Depending on the findings of the analysis, the preferred landfill expansion alternative's SWM design may then be modified accordingly. Alternatively, if the SWMS design can be easily adapted in future and/or the potential effects of climate change can be acceptably mitigated, then the design may be left as per the *O. Reg. 232/98* requirements.

Consideration will also be given to the potential effects of climate change on other infrastructure associated with the site, as well as ways that the project could reduce GHG emissions or remove GHG from the atmosphere.

The total estimated GHG emissions associated with the expanded landfill will be compared to the Ontario-wide emissions of GHG.

7.5.8 Step 8 – Cumulative Impact Assessment

The net effects of the proposed project, as determined by the analysis conducted in Step 5, will be combined with the predicted effects of other existing and identified certain and probable projects in the area of the site, where the effects would overlap. The evaluation would consider potential effects on the various components to determine if there are any unacceptable predicted cumulative impacts, as measured against applicable regulatory standards. The study area for the cumulative impact assessment of the project will be determined based on the potential for the W12A Landfill expansion effects to interact with those of other projects, as determined by the impact assessment studies for the proposed project.

7.5.9 Step 9 – Preparation of EA Study Report

A Draft Study EA report will be prepared, consisting of the main EA study report, technical supporting documents as appropriate, and a Consultation Record. The EA study report will include a description of the EA planning process; a summary of consultation efforts; the characterization of existing conditions; a description of each Alternative Method of landfill expansion; the qualitative evaluation of Alternative Methods; the identification and description of the preferred Alternative Method; a summary of the methods and results of the technical studies to assess the impacts from the preferred alternative compared to the applicable regulations, standards and guidelines; consideration of climate change; cumulative impact assessment; and the identification of any proposed mitigation measures, monitoring requirements and commitments to be fulfilled by the City. The EA study report will contain an Executive Summary, a list of references consulted, and appropriate maps illustrating various aspects of the overall undertaking and aspects of the technical component studies.

7.6 Work Plans for the EA

This section presents the proposed approach and work plans for the EA. The proposed work plans present the scope of work required to complete the EA, including the general scope of technical studies for each of the environmental components, and how the effects prediction/assessment will be carried out. The EA methodology is described in the preceding Section 7.5 of this ToR.

The EA work plans may be updated and revised throughout the EA process based on continuing discussions with GRT members.

Table 7.6-1 describes the proposed work plans by environmental sub-component for the description of existing conditions, comparison of 'Alternative Methods' and the prediction/assessment of potential effects.

Table 7.6-1: Work Plans

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	Atmosphere					
	Air quality (dust, odour and GHG)	<ul style="list-style-type: none"> Expected concentrations of air quality indicator compounds (selected regulated air contaminants to represent this type of project) at the property boundary. Expected site-related odour at sensitive receptors. Expected GHG emissions. 	<ul style="list-style-type: none"> Compile and interpret existing Environment Canada or MOECC's air quality monitoring data and meteorological data. Review available air quality data from Ontario locations outside of London in a similar setting with a landfill, and if considered more representative than local data, consider incorporating it as existing air quality for this assessment Review aerial photographic mapping. Review zoning maps. 	<ul style="list-style-type: none"> Identify the differences in potential air and odour concentrations from emission sources based on their distance and direction to nearest receptors, the property boundary, and site characteristics such as height of the landfill that will influence dispersion. Identify difference in the alternatives that will impact GHG generation such as the landfill configuration that may impact LFG collection efficiency. Rank each alternative based on the differences. 	<ul style="list-style-type: none"> Select air indicator compounds appropriate for the landfill expansion. Complete air and odour emission estimates based on published emission factors and available literature, as well as a site-specific LFG generation model for input into the dispersion model. Execute an air quality dispersion model for the currently approved landfill and for an expanded landfill. Predict worst-case air quality and odour effects for off-site receptors based on an expanded landfill operations scenario. Calculate GHG emissions based on the expanded landfill. 	<ul style="list-style-type: none"> Environment Canada or MOECC's regional air quality data, hourly meteorological data and climate normals. Published emission factors (including odour). Site-specific LFG generation model. Preferred 'Alternative Method' landfill phasing plan. Odour complaints history. Existing site-specific studies. Applicable provincial regulations, standards and guidelines.
	Noise	<ul style="list-style-type: none"> Noise Levels at off-site PORs, or vacant lots that accommodate the construction of PORs. 	<ul style="list-style-type: none"> Review aerial imagery. Review zoning / land use mapping. Review previously prepared noise studies. Undertake field program to quantify existing noise levels. 	<ul style="list-style-type: none"> Identify existing and potential PORs in the vicinity of the landfill. Identify potential differences in expected noise levels off-site based on the distance and potential line-of-site exposure of the PORs to the landfilling equipment/activities. Review the direct interaction of the proposed alternative method footprints and existing/potential PORs. Rank each 'Alternative Method' based on the differences. 	<ul style="list-style-type: none"> Noise emission estimates based on available project-specific information, manufacturer's noise data, and consultant's database of similar noise sources. Establish applicable noise limits in accordance with accepted MOECC practices. Develop a project/site-specific three-dimensional noise prediction model in accordance with MOECC and internationally accepted standards. Using the site-specific noise model described above, model the predictable worst-case noise levels from the preferred landfill expansion at identified off-site PORs, and compare them to MOECC noise guidelines. If required, identify mitigation that can be implemented into the design of the preferred alternative to allow the landfill expansion to achieve compliance with applicable noise limits. 	<ul style="list-style-type: none"> Landfill equipment list and expected utilization. Preferred 'Alternative Method' landfill phasing plan. Existing site-specific noise studies. Existing noise studies for facilities in the vicinity (if available). Manufacturer's noise data. Consultant's database of similar noise studies. Ministry of Transportation Ontario (MTO) traffic count data or newer data collected as part of this EA.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	Biology					
	Aquatic ecosystems	<ul style="list-style-type: none">Expected change in surface water quality on-site and within the site-vicinity.Expected impact on aquatic habitat and biota, including rare, threatened or endangered species within on-site and within the site-vicinity.	<ul style="list-style-type: none">Habitat assessment of the four (4) watercourses within the site-vicinity study area, to consist of:<ul style="list-style-type: none">Channel Type.Channel morphology.Flow characteristics.Substrates, in-stream cover.Specialized habitat.Bank and riparian community characteristics.Valley form characteristics.Benthic (macro) Invertebrate Surveys.	<ul style="list-style-type: none">Identify differences in potential impacts to watercourses.<ul style="list-style-type: none">Temperature.Sedimentation.Fish habitat.Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">Identify areas of disturbance including:<ul style="list-style-type: none">Direct habitat loss/disturbance.Indirect habitat disturbance.Impacts to aquatic SAR habitat and species.Evaluation of short term vs. long-term impacts.Identify appropriate mitigation measures.	<ul style="list-style-type: none">W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study (Earth Tech, 2005).Middlesex Natural Heritage Systems Study (Middlesex County, 2014).The London Plan (2016)City of London Inventory and Evaluation of Woodlands (North-South Environmental Inc. (2009).Dingman Creek Subwatershed Study (Aquafor Beech et.al., 1995) and Dingman Creek Subwatershed Study Update (Delcan, 2005).Dingman Creek Watershed Report Card (2012).Dodd Creek Subwatershed Strategy (Wilcox Betsy, 2005).Department of Fisheries and Oceans (DFO) Drain Classification and Fish Habitat Data from the Upper Thames River Conservation Authority (UTRCA) and Kettle Creek Conservation Authority (KCCA).Land Information Ontario (LIO).Ministry of Natural Resources and Forestry (MNRF) SAR List.Natural Heritage Information Centre.DFO.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	Terrestrial ecosystems	<ul style="list-style-type: none"> Expected impact on terrestrial vegetation communities, wildlife habitat, and wildlife, including rare, threatened or endangered species on-site and within the site-vicinity. 	<ul style="list-style-type: none"> Herpetofauna Surveys: <ul style="list-style-type: none"> Vernal Pool Surveys. Auditory Amphibian Surveys. Visual Amphibian/Salamander Surveys. Bat Habitat Suitability Assessment. Preliminary review of site and site-vicinity identified five (5) features requiring assessment. Snake Cover Board and Area Searches. Breeding Bird Surveys. Ecological Land Classification Confirmation and Floral Inventory. Wetland Community Boundary Delineation. Lepidoptera and Odonata Surveys. SWH Surveys. 	<ul style="list-style-type: none"> Identify difference in the alternatives that will impact terrestrial features (removal of habitat, harm or harassment of species, sedimentation, dust, spills and contamination). <ul style="list-style-type: none"> Woodlands. SWH. SAR and their habitat. Unevaluated Wetlands. Potential ESA north of Scotland Drive. Locally Significant Wetland (Silver Swamp). Rank each 'Alternative Method' based on the differences. 	<ul style="list-style-type: none"> Identify potential impacts to SAR, SWH, ESA, wetland and woodlands including: <ul style="list-style-type: none"> Direct habitat loss/disturbance. Indirect habitat disturbance. Impacts to terrestrial SAR habitat and species. Evaluation of short term vs long-term impacts. Vegetation removal. Potential impacts to species. Implementation of mitigation measures including: <ul style="list-style-type: none"> Appropriate setbacks as required. Obtain permits as required under applicable acts such as the Endangered Species Act. Siting, installation and monitoring of appropriate erosion and sediment control measures. Follow construction activity timing windows that minimize impacts to species and habitat. 	<ul style="list-style-type: none"> <i>W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study</i> (Earth Tech, 2005). <i>Middlesex Natural Heritage Systems Study</i> (Middlesex County, 2014). <i>The London Plan</i> (2016). <i>City of London Inventory and Evaluation of Woodlands</i> (North-South Environmental Inc. (2009). <i>Dingman Creek Subwatershed Study</i> (Aquafor Beech et. al., 1995) and <i>Dingman Creek Subwatershed Study Update</i> (Delcan, 2005). <i>Dingman Creek Watershed Report Card</i> (2012). <i>Dodd Creek Subwatershed Strategy</i> (Wilcox Betsy, 2005). <i>DFO Drain Classification and Fish Habitat Data</i> from the UTRCA and KCCA. (LIO). <i>MNRF Ontario SAR List</i>. <i>Natural Heritage Ontario Reptile and Amphibian Atlas</i>. <i>Ontario Breeding Bird Atlas</i>. <i>Ontario Butterfly Atlas</i>.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	Geology and Hydrogeology					
	Groundwater quality	<ul style="list-style-type: none">Expected effect on groundwater quality at the property boundary.	<ul style="list-style-type: none">Extensive field investigations and hydrogeological assessments have been completed for the existing landfill site.The hydrogeological conceptual site model has been verified and major hydrostratigraphic units defined in three dimensions.Additional field investigations will focus on identified data gaps such as the northern terminus of the Upper Aquifer.Extensive hydraulic conductivity testing has been completed for the major hydrostratigraphic units; additional testing will be focused on any identified differences between results of the additional field work and the conceptual model.	<ul style="list-style-type: none">Identify the differences between the alternatives that will affect the potential impact on groundwater quality such as waste footprint configuration, direction of groundwater flow, landfill cover type.Estimate how the differences will affect the groundwater quality.Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">Prepare a predictive model of landfill performance (contaminant transport model) as per <i>O. Reg. 232/98</i>.Predict worst case concentrations in the groundwater of the Upper Aquifer at the property boundary for key leachate indicator parameters with consideration of reasonable mitigation measures.Prepare a groundwater monitoring program.Prepare conceptual trigger mechanism and contingency plan approaches.Predict the contaminating lifespan.	<ul style="list-style-type: none">Published regional sources and data on regional geological and hydrogeological conditions such as the Middlesex-Elgin Groundwater Study, Source Protection Assessment Reports.Review MNRF petroleum well records.Provincial Quaternary and Bedrock Mapping.Ontario Water Well Records.Landfill Annual Monitoring Reports.Previous site characterization reports.Borehole Logs.Adjacent property assessment reports.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	Surface Water					
	Surface water quality	<ul style="list-style-type: none"> Expected effect on surface water quality in the SWMS and within the site-vicinity. 	<ul style="list-style-type: none"> Compile and interpret existing annual monitoring reports and supplemental (if required) surface water quality monitoring program data. Update surface water quality stormwater pond design criteria based on published changes to the Dingman and Dodd Creek Subwatershed Study requirements. 	<ul style="list-style-type: none"> Identify the differences that may impact changes in surface water quality such as expansion area and potential impacts on the existing SWMS. Assess any limitations to expand or build new SWM ponds based on landfill expansion designs. Rank each 'Alternative Method' based on the differences. 	<ul style="list-style-type: none"> Evaluation of SWM facility expansion/modification or required construction of new on-site facilities and the facilities' ability to mitigate potential changes to water quality. Modeling of proposed SWMS and comparison with MOECC and Subwatershed specific design criteria. 	<ul style="list-style-type: none"> Topographic maps. Air photos. <i>Stormwater Management Master Plan</i> (Earth Tech, 2002). <i>Surface Water Background Study</i> (Dillon, 2005). Annual water quality Monitoring Reports. Design and Operations Reports. Surface water drainage mapping. Agricultural farm drain mapping. Watershed/subwatershed reports. Local climate data. Published water quantity and flow information from the MOECC, Environment Canada and local Conservation Authorities. Site reconnaissance. Flow observations during sampling program.
	Surface water quantity	<ul style="list-style-type: none"> Expected change in peak flows (within the on-site SWMS and at the property boundary). Expected degree of off-site effects on surface water quantity within the site-vicinity. 	<ul style="list-style-type: none"> Field review of stormwater management and drainage outlet locations. Update existing conditions assessment of hydraulic capacity, flooding and stream bank erosion. Review current and historic site photos and aerial imagery. Update surface water quantity control design criteria based on published changes to the Dingman and Dodd Creek Subwatershed Study requirements. 	<ul style="list-style-type: none"> Identify the differences that may impact changes in surface water quantity such as expansion area, proposed side slopes of the landfill, proposed landfill cover alternatives, potential changes to watershed divides, and potential impacts on the existing SWMS. Rank each 'Alternative Method' based on the differences. 	<ul style="list-style-type: none"> Predict and assess future surface water peak flows and quantity conditions associated with the preferred landfill expansion alternative for a range of storm events (e.g., 2, 5, 10, 25 and 100 year) as required by <i>O. Reg. 232/98</i>, as well as consideration of climate change effects. Evaluate the need for SWM infrastructure to meet <i>O. Reg. 232/98</i>, and prepare EA level design for SWMS. Modeling of proposed SWMS and comparison with MOECC and Subwatershed specific design criteria. 	

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	Agriculture					
	Agriculture	<ul style="list-style-type: none">Expected effect on agricultural land base and agricultural operations within the site and site-vicinity.	<ul style="list-style-type: none">A field survey of the study areas to document types of farms, farm improvements, cropping patterns, buildings, etc.Review aerial photographic mapping.Compile parcel fabric mapping from City.Review Official Plans and Zoning By-law.Review Canada Land Inventory (CLI) mapping.Review Soils of Middlesex County mapping.Interviews with municipal staff and if necessary, property owners.	<ul style="list-style-type: none">The potential effect of the proposed project alternatives on the existing and potential agricultural use of on-Site and off-site lands will be assessed.Differences between alternatives will be identified, for example, proximity to livestock, use of prime agricultural areas, etc.Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">Based on the proposed landfill operational practices and/or results of predictive assessments of potential nuisance effects as carried out by other components; the technical and operational considerations component; and groundwater and surface water considerations, the potential effects of the preferred method on existing and proposed off-site agricultural use will be assessed.	<ul style="list-style-type: none">Preferred 'Alternative Method' landfill phasing plan.Existing site-specific studies.Applicable provincial regulations, standards and guidelines.<i>Provincial Policy Statement</i> (2014).<i>City of London Official Plan</i> (1989) and <i>The London Plan</i> (2016).City of London Zoning By-law.<i>Provincial Policy Statement</i> (2014).Aerial photographic and topographic mapping.Available soils mapping (Soils of Middlesex County mapping, CLI), municipal drain mapping, and available ownership information based on municipal assessment information and including farm tax credit information.Field reconnaissance.Statistics Canada agriculture profiles.Interviews with farmers, if necessary.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	Archaeology					
	Archaeology	<ul style="list-style-type: none">Expected archaeological resources potentially affected on-site.	<ul style="list-style-type: none">Review and update existing background research including archaeological, historical, and environmental literature.Review updated list of registered archaeological sites within 1 km of the site.Complete Stage 2 Property Assessment (pedestrian and shovel test pit surveys) to identify archaeological sites that may be present within the site.Clean, catalogue, and analyze recovered cultural material to determine cultural heritage value or interest of identified archaeological sites.	<ul style="list-style-type: none">Identify archaeological sites that are anticipated to be impacted by expansion alternatives.Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">Archaeological sites that will be impacted by the preferred expansion alternative may require Stage 3 assessment to determine spatial extent, complete a full evaluation of significance, and determine the need for strategies to mitigate impacts and provide future conservation (Stage 4 mitigation).	<ul style="list-style-type: none"><i>Stage 1 Archaeological and Built Heritage Assessment, W12A Landfill Area Study</i> (2006).Other existing site-specific archaeological assessment reports.Ontario Archaeological Sites Database.<i>Ministry of Tourism, Culture, and Sport (MTCS) Standards and Guidelines for Consultant Archaeologists</i>.<i>City of London's Archaeological Master Plan</i>.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	Culture					
	Cultural Heritage Landscapes	<ul style="list-style-type: none"> Expected impact on identified cultural heritage landscapes within the site-vicinity. 	<ul style="list-style-type: none"> Background research of archival, published & unpublished sources, municipal heritage policies, and historic maps and aerial imagery. Consultation with municipal heritage planner. Field investigations to document and evaluate existing conditions. 	<ul style="list-style-type: none"> Identify the risk of potential direct or indirect impacts using guidance and types identified in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>. Rank each 'Alternative Method' based on differences. 	<ul style="list-style-type: none"> Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present. Methods to predict potential effects following guidance provided in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>. Methods to consist of identifying key vistas and views, sources of direct and indirect impact resulting from construction and operation, and preferred options and conservation measures to reduce or avoid impact to protected heritage properties or known or newly identified properties of cultural heritage value or interest. 	<ul style="list-style-type: none"> Description of proposed expansion alternatives (including construction operations to determine sources of impacts). Preferred landfill design. Existing site-specific studies. Applicable provincial plans, acts, regulations, standards and guidelines, and policies. Applicable municipal official plans, heritage policies, and guidance.
	Cultural Heritage Resources (including built heritage)	<ul style="list-style-type: none"> Expected impact on the heritage attributes of identified cultural heritage resources within the site-vicinity. 	<ul style="list-style-type: none"> Background research of archival, published & unpublished sources, municipal heritage policies, and historic maps and aerial imagery. Consultation with municipal heritage planner. Field investigations to document and evaluate existing conditions. 	<ul style="list-style-type: none"> Identify the risk of potential direct or indirect impacts using guidance and types identified in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>. Rank each 'Alternative Method' based on differences. 	<ul style="list-style-type: none"> Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present. Methods to predict potential effects will follow guidance provided in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>. Methods will include identifying key vistas and views, sources of direct and indirect impact resulting from construction and operation, and preferred options and conservation measures to reduce or avoid impact to protected heritage properties or known or newly identified properties of cultural heritage value or interest. 	<ul style="list-style-type: none"> Description of proposed expansion alternatives (including construction operations) to determine sources of potential impacts. Preferred landfill design. Existing site-specific studies. Applicable provincial plans, acts, regulations, standards and guidelines, and policies. Applicable municipal official plans, heritage policies, and guidance.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	Land Use					
	Current and planned future land uses	<ul style="list-style-type: none">Expected impact on sensitive land uses (i.e., dwellings, churches, and parks within the site-vicinity).	<ul style="list-style-type: none">A field survey of the study area to document existing land uses including the number, type and proximity of sensitive land uses.Review aerial photographic mapping.Compile parcel fabric mapping from City.Review Official Plan and Zoning By-law.Review Provincial Guidelines (e.g., Land Use Compatibility, Guideline D-1, Land Use On or Near Landfills and Dumps, Guideline D-4).Review Provincial Policy Statement, 2014.Interviews with municipal staff to confirm development activity planned in the site-vicinity and identify potential planning issues.	<ul style="list-style-type: none">Identify differences in the use and enjoyment of sensitive uses in the site-vicinity.Differences between alternatives will be identified, for example, proximity to sensitive land uses.Rank each 'Alternative Method' based on differences.	<ul style="list-style-type: none">Based on the proposed operational practices and/or results of predictive assessments of potential nuisance effects as carried out by other components and the technical and operational considerations component, the potential compatibility of the preferred method with existing and proposed surrounding land use will be assessed.	<ul style="list-style-type: none">Preferred 'Alternative Method' landfill design and phasing plan.Existing site-specific studies.Applicable provincial regulations, standards and guidelines.<i>Provincial Policy Statement</i> (2014).<i>City of London Official Plan</i> (1989).City of London Zoning By-law.<i>Land Use Compatibility, Guideline D-1.</i><i>Land Use On or Near Landfills and Dumps, Guideline D-4.</i>Aerial photographic and topographic mapping.Field reconnaissance.Discussion with City planning department.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	Socio-economic					
	Local Economy	<ul style="list-style-type: none"> Expected effect on local employment. Expected effects on local businesses and commercial activity. Expected effects on municipal finances. 	<ul style="list-style-type: none"> Review of current and projected employment numbers (during both construction and operation phases). Review of municipal revenues and projected change from site expansion. Review of land use designations and City of London Official Plan. Interviews with municipal staff to understand potential costs and impacts to services from expanded site (e.g., public works, emergency management systems, transportation). Review of local business database. 	<ul style="list-style-type: none"> Identify total increase in employment hours/full time equivalent positions during both construction and operational phases by alternative design. Identify loss of potential land use for commercial purposes or residential purposes as a result of landfill expansion and associated employment and rental income, respectively. Rank each 'Alternative Method' based on the differences. 	<ul style="list-style-type: none"> Re-evaluate property taxes or rent paid to the municipality based on larger property parcel and any potential change in land use designation. Qualitative assessment of impacts on local businesses from changes at the site, (e.g., loss of patronage, operational impacts.) Impacts on employment as determined by change in employment numbers and resultant economic impact at the local level. Calculate amount of increased revenue to the City minus any potential increased costs to determine net economic effect. 	<ul style="list-style-type: none"> City of London Official Plan. City of London Financial Returns. Land use designation database.
	Residents and Community	<ul style="list-style-type: none"> Displacement of residents. Expected interference with use and enjoyment of residential properties (nuisance effects). 	<ul style="list-style-type: none"> Review aerial photography to identify closest residential properties. Windshield survey of study area to identify residences and businesses (including farms) as well as any other community facilities in the site-vicinity. 	<ul style="list-style-type: none"> Establish closest residential receptors to each alternative design. Review of findings from other disciplines – noise, odour, visual, air quality to ascertain any potential nuisance effects on residential receptors. Rank each 'Alternative Method' based on the differences. 	<ul style="list-style-type: none"> Evaluate level of nuisance effects once mitigation measures and BMPs have been implemented to determine change from baseline (current) conditions. Evaluate if the preferred alternative could cause displacement of residents from City-owned property. 	<ul style="list-style-type: none"> Site related complaints. Discipline findings – noise, air quality, land use, cultural, visual, agriculture. Existing site related BMPs.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	Visual	• Expected changes in landscape views from off-site.	<ul style="list-style-type: none">• Using Google Earth mapping software, GeoGratis data of the site and surrounding area, and AutoCAD plans of the currently approved final contours, create a 3D model of the study area, including topography, roads, vegetation, buildings, etc.• Prepare high-level description of the site and study area using this 3D model and aerial photos as reference.• Photograph existing conditions from selected off-site vantage points.	<ul style="list-style-type: none">• Prepare 3D models of each proposed landfill expansion 'Alternative Method' and render them with appropriate surface material / vegetation cover (turf, meadow, trees, etc.).• Merge the expansion models with the existing site conditions model.• Merge the site photos with the 3D model to illustrate the impact of each expansion alternative on each of the selected vantage points within the study area.• Apply conceptual level mitigation measures to each alternative.• Identify the degree of visual impact of each 'Alternative Method'.• Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">• Use 3D model to identify critical viewsheds that can be mitigated.• Develop a mitigation evaluation matrix to prioritize evaluation criteria (e.g., cost, effectiveness, immediacy, practicality, appearance, long-term maintenance).• Refine conceptual level mitigation measures using 3D models and viewshed analysis.• Assess each mitigation measure using the matrix developed.• Identify and document the potential net effects of the preferred 'Alternative Method' on views from the selected vantage points.	<ul style="list-style-type: none">• Google Earth / GeoGratis.• City of London aerial photos.• ACAD drawings of existing landfill and proposed expansion alternatives.• Site photos.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Technical	Design and Operations					
	Engineered Containment	<ul style="list-style-type: none">Expected degree of engineered containment and/or controls required.	<ul style="list-style-type: none">Develop three to four alternative design configurations (footprint, height, slopes).Calculate landfill footprint areas, excavation volumes, elevations, and airspace for each alternative.	<ul style="list-style-type: none">Identify potential impacts of alternatives on the operation of the landfill, considering leachate generation, potential for leachate mounding, slope stability, construction methods, LFG generation and excess soil management.Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">Prepare landfill phasing plan.Prepare overall materials balance (excavation, cover and fill requirements).Establish a geotechnical model for the site and complete a geotechnical assessment of preferred alternative (the expected settlement performance and stability of the landfill configuration).Assess the effects that short and long-term settlements may have on the operations of the new cells.Prepare estimate of LFG generation.Develop an estimate of the quantity of leachate generated from the expansion.Prepare conceptual design of LFG management system and leachate collection system.	<ul style="list-style-type: none">Annual environmental monitoring reports.Results of Hydrologic Evaluation of Landfill Performance model.Currently approved design and operations report.Existing site-specific studies (on-site subsurface investigations, geotechnical reports).Topographic mapping, soils mapping, available water well records.O. Reg. 232/98.Commercial software specifically developed to assess slope stability.
	Financial	<ul style="list-style-type: none">Costs associated with implementation of expansion alternatives.	Estimated cost for alternative designs.	<ul style="list-style-type: none">Identify potential cost implications of alternatives.Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">Develop an estimate of probable cost for construction and operation for the preferred alternative.	<ul style="list-style-type: none">Existing cost information from the City.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Technical	Transportation					
	Traffic	<ul style="list-style-type: none">Expected effect on traffic along the Haul Route.	<ul style="list-style-type: none">Obtain available recent traffic data (2016/2017) for selected intersections and corridors within the haul route study area.Collect Turning Movement Count (TMC) data for Manning Drive at White Oak Road, Wonderland Road, Wellington Road South, and primary site access locations, including vehicle classifications for regular automobiles, heavy goods vehicles, and slow moving / farm vehicles.Collect AADT volumes on Wonderland Road, Manning Drive, and Wellington Drive.Obtain signal timing data for Manning Drive at Wellington Road South and Wellington Road South at Dingman Drive.Site visit to confirm geometric conditions and observe operating conditions in context.	<ul style="list-style-type: none">Assessing existing traffic conditions based on Haul Route and other common users.Identify the differences in traffic operations (both strategic and operational) by evaluating the alternatives for landfill expansion.Rank each 'Alternative Method' based on the differences.	<ul style="list-style-type: none">Assess existing hourly and daily carrying capacity of the Haul Route study area roads.Assess existing intersection LOS and other performance metrics for the haul route study area intersections to confirm overall intersection and critical movement performance (capacity and delay).Assess future traffic operation and safety requirements of defined study area (adjacent roadway and haul route) conditions.Assess potential intersection geometric requirements for mitigation. Undertake warrants to confirm auxiliary lane and/or intersection control requirements, as necessary.Assess sensitivity/impacts of partial haul route closure or activation of Highway 401 emergency detour route (up to 2 alternatives).	<ul style="list-style-type: none">TMC, AADT, and signal timing data.Additional tonnage and resulting number of trucks to site due to expansion.Collision history statistics.Existing site-specific and related studies, consultant observations, and available City planning and engineering documents.

Notes: * Any 'Alternative Method' identified as preferred that is determined to have predicted effect(s) in excess of provincial thresholds, regulations or guidelines will be assessed to determine if the unacceptable effect(s) can be mitigated. If the effect(s) cannot be mitigated to below the provincial thresholds, regulations or guidelines, that 'Alternative Method' will be abandoned as the preferred 'Alternative Method' and the next most favourable 'Alternative Method' will be identified as preferred and evaluated

8.0 Consultation

The Consultation Record for the development of this ToR is provided in Volume III of the ToR documentation. This section of the ToR presents an overview of the results of consultation and engagement carried out during the development of this ToR, in consideration of the *MOECC's Code of Practice: Consultation in Ontario's Environmental Assessment Process* (Consultation Code of Practice; MOECC, 2014b). The City has developed a Consultation Plan (referred to by the City as a Community Engagement Program) for the development of this ToR as well as the subsequent EA process. A copy of this Consultation Plan/Community Engagement Program is provided in Volume III Appendix A. A summary of the proposed Plan for conducting the EA is presented in Section 8.2.

A summary of the consultation and engagement activities conducted during the development of the ToR is provided in Section 8.1. For ease of reference, the engagement activities are presented sequentially from the beginning of this ToR process. The first and second open houses were held during the development of this ToR. The third and fourth open houses are proposed to be held during the EA.

8.1 Record of Consultation Activities during the ToR

Engagement of and consultation with the public and other stakeholders is a key component of the EA process. It enables stakeholders to participate in the planning process and enhance the quality of the project. The key vehicles in the Community Engagement Program that were used to engage the public and the other stakeholders and elicit feedback were open houses, the establishment of the Waste Management CLC, the existing W12A Landfill PLC, letter/email correspondence, the City's Residual Waste Disposal Strategy website (the EA Website) and newspaper and social media advertisements.

It is noted that the Waste Management CLC is a new liaison committee whose purpose is to ensure that the diverse interests of multiple stakeholders are equally and adequately represented through diversification in membership throughout the EA process by encouraging the participation of key individuals representing specific stakeholder groups.

The objectives of the Community Engagement Program for preparation of this ToR were to:

- engage stakeholders from the beginning of the process through the use of a variety of consultation events and activities including open houses, letters/emails, and the project website, and establishment of the Waste Management CLC;
- to ensure that there are adequate opportunities for stakeholders to learn about the project and to provide input, feedback and comments concerning the project and EA process, and that these comments are considered by the EA project team;
- engage local elected officials to ensure that they are provided with regular and timely information concerning this ToR development process;

- engage stakeholders as early as possible in the development of this ToR for the EA and to facilitate their involvement in the process in ways that meet their needs;
- ensure the engagement process is open, transparent and inclusive;
- document all issues and concerns identified by the public, agencies and other stakeholders and to demonstrate how these concerns and issues have been incorporated into the final ToR (this document); and
- fulfill the EA process public consultation requirements.

Additional information regarding the Waste Management CLC is provided in the Community Engagement Program in Volume III Appendices A and G.

Details of the engagement related to the development of this ToR is documented within the Volume III Consultation Record. The tables in the following sections summarize the primary engagement activities that have occurred throughout the development of this ToR.

8.1.1 Notice of Commencement

The EA process was initiated by publishing a Notice of Commencement (NOC) in The Londoner newspaper on March 30, 2017 and April 6, 2017 (Volume III Appendix D1), as required under the EAA. The NOC provided a brief overview of the proposed undertaking, the location of the undertaking, the EA process, a description of how interested stakeholders can become involved in the project and participate in the CLC, information about the proponent, and how to contact the EA Project Team with comments and questions. The invitation to join the Waste Management CLC was printed in The Londoner separate from the NOC on April 13, 2017.

The NOC was also posted on the project website on April 6, 2017 and can be found at: <https://getinvolved.london.ca/WhyWasteDisposal> (Volume III Appendix D1). Further details of material on the website are also included in Volume III Appendix D2.

During development of the NOC, Frequently Asked Questions (FAQ) were also developed and used with various mailouts as and when appropriate and posted on the project website. A copy of these FAQs, identified as FAQ #1, are provided in Volume III Appendix D1.

Additionally, introduction letters accompanied by the NOC and in some instances the FAQs were emailed or mailed to the following stakeholders between March 29, 2017 and April 3, 2017 (see Volume III Appendices C2 and D3):

- 31 GRT members (see Volume III Appendix B for the initial list and subsequent GRT lists as the ToR has evolved); and
- 9 Indigenous Communities and the Southern First Nations Secretariat.

The NOC and FAQ were also mailed to over 200 properties located within a 2 km radius of the Waste Management and Resource Recovery Area, 32 businesses that use the W12A Landfill, 5 community groups, 49 neighbouring regional municipalities and the PLC members between March 28 and 30, 2017 (see Volume III Appendices D3 and D4). The area selected for the mail out was based on the W12A Landfill Community Enhancement and Mitigative Measures Program (which was developed in conjunction with the local community) that generally provides for mitigative measures to properties located within 1.5 km or less of the W12A Landfill site. The notification zone for the EA was extended an additional 500 m to include the nearby hamlets of Glanworth and Shaver subdivision.

Table 8.1-1 summarizes the GRT responses received following the NOC. Copies of the correspondence are provided in Volume III Appendix D5.

Table 8.1-1: Stakeholder Responses

Stakeholder	Stakeholder Comment	City of London's Response	Status and where addressed in ToR
Anjala Puvarananathan, Canadian Environmental Assessment Agency	<p>The <i>Canadian Environmental Assessment Act</i>, 2012 focuses federal environmental reviews on projects that have the potential to cause significant adverse environmental effects in areas of federal jurisdiction and applies to physical activities described in the <i>Regulations Designating Physical Activities</i>. Based on the information provided, your project does not appear to be described in the Regulations. Kindly review the Regulations to confirm applicability to the proposed project.</p> <p>If you believe the project is not subject to a federal environmental assessment, and do not submit a project description, we kindly request that you remove the Canadian Environmental Assessment Agency from your distribution list.</p>	No response required. The City self-assessed and does not believe this project is described in the Regulations. The Canadian Environmental Assessment Agency was removed from the project contact list.	Updated GRT list available in Volume III Appendix B.
Transport Canada, EA Program	Transport Canada does not require receipt of all individual or Class EA related notifications. Request that project proponents self-assess the need to consult with Transport Canada.	No response required. Transport Canada was removed from the project contact list as the Project will not interact with federal property nor will it require approval or authorization under any Acts administered by Transport Canada.	Updated GRT list available in Volume III Appendix B.
Stephanie Rocca, Ministry of Northern Development and Mines (MNMD)	<p>With respect to the geology and mineral potential, the Resident Geologist Program of the Ontario Geologist Survey has completed the following regarding the proposed Landfill Expansion project area:</p> <ol style="list-style-type: none">1. the Ministry's Mineral Deposit Inventory for mineral occurrences: There are no known mineral occurrences on or within 1 km of the proposed project area.2. the project area is underlain by Paleozoic rock consisting of Dundee formation limestone. Drift thickness mapping shown in ARIP 78, Aggregate Resources Inventory of the County of Middlesex and the City of London indicates thick drift (greater than 15 m) covers the project area.3. the Ministry's Assessment File Report Inventory database to determine whether past mineral exploration activity has been reported for the proposed area: there are no assessment files for this area.4. the GIS-based "Metallic Mineral Potential Estimation Tool" to get an estimation of the mineral potential of the proposed project area: low metallic mineral potential is estimated for the area (19).5. groundwater Study 5, Karst of Southern Ontario and Manitoulin Island for identified karst hazard: there are inferred karst features in the project area. 'Inferred karst' areas represent areas where direct observations could not be made but where rock type is predominantly carbonate and may be susceptible to karst processes.6. reviewed the NOC of ToR for the Proposed Landfill Expansion in the City of London to assess the potential environmental considerations identified. <p>However, given that there are no conflicts identified with the proposed project and geology or mineral resource potential, MNMD has no concerns.</p>	No response required. The MNMD was removed from the project contact list.	Updated GRT list available in Volume III Appendix B.

Stakeholder	Stakeholder Comment	City of London's Response	Status and where addressed in ToR
Joseph Muller, MTCS	<p>The MTCS's interest in this EA project relates to its mandate of conserving Ontario's cultural heritage, which includes:</p> <ul style="list-style-type: none">• Archaeological resources, including land-based and marine;• Built heritage resources, including bridges and monuments; and,• Cultural heritage landscapes. <p>Under the EA process, the proponent is required to determine a project's potential impact on cultural heritage resources. While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Indigenous Communities may have knowledge that can contribute to the identification of cultural heritage resources, and it is suggest that any engagement with Indigenous Communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources.</p> <p>Screen the project with the MTCS <i>Criteria for Evaluating Archaeological Potential</i> to determine if an archaeological assessment is needed. If this EA project area exhibits archaeological potential, then an archaeological assessment should be undertaken by an archaeologist licenced under the <i>Ontario Heritage Act</i>, for submittal of the report directly to the MTCS for review.</p> <p>The MTCS <i>Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes</i> should be completed to help determine whether this EA project may impact cultural heritage resources. If potential or known heritage resources exist, MTCS recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts. Send the HIA to the MTCS for review, and make it available to local organizations or individuals who have expressed interest in review.</p> <p>All technical heritage studies and their recommendations are to be addressed and incorporated into EA projects. Advise the MTCS whether any technical heritage studies will be completed for your EA project, and provide them to the MTCS before issuing a Notice of Completion. If the screening identifies no known or potential cultural heritage resources, or no impacts to these resources, include the completed checklists and supporting documentation in the EA report or file.</p>	Noted. When the ToR is approved, MTCS will be advised of the studies to be completed.	No change to the draft ToR.
Joe Gordon, KCCA	KCCA is interested in engaging in further discussions and providing input for this project throughout the EA process.	No response required, KCCA remains on the GRT list.	No change to the draft ToR.
Dale B. Arndt St. Thomas Municipal Airport	The St. Thomas planning department confirmed the proposed expansion of the landfill is 15,727 m from the St. Thomas airport. The proposed landfill expansion is just outside the 15 km limit.	No response required, the St. Thomas Municipal Airport remains on the GRT list.	No change to the draft ToR.

Stakeholder	Stakeholder Comment	City of London's Response	Status and where addressed in ToR
Steve Faulkner, London International Airport	As we discussed, the London Airport has no objection to the expansion of the existing landfill site located at 3502 Manning Drive. I appreciate you including us in your consultations.	No response required, the London International Airport remains on the GRT list.	No change to the draft ToR.
Jodie Lucente MTO	While MTO has reviewed materials available on the website, we wish to request any/all reports and plans, trucking routes and detour plans, etc. available to date regarding the proposed W12A Landfill Expansion.	No response required at this time as there are no reports or plans on, trucking routes and detour plans, etc.. The MTO remains on the GRT list.	No change to the ToR.
Laura Warner Ministry of Natural Resources and Forestry	<p>Please note that a screening of natural heritage (including SAR) or other resource values for the project has not yet been completed. Please also note that it is the City's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals.</p> <p>Please refer to the attached <i>SAR Reference Guides</i> for a list of threatened and endangered species that may occur in your area to further inform an initial background information review for your project. Also attached is Aylmer District's <i>SAR Reference Material Memo</i> intended to introduce and explain the reference guide that is attached.</p> <p>Please refer to Aylmer District's <i>SAR Screening Process Technical Bulletin</i> (attached) for information about the process for seeking Endangered Species Act 2007 advice, including the information required and where to submit a request.</p> <p>There may be petroleum wells within the proposed project area. Please consult the Ontario Oil, Gas and Salt Resources Library website (www.ogsrlibrary.com) for the best known data on any wells recorded by MNRF. Please reference the 'Definitions and Terminology Guide' listed in the publications on the Library website in order to better understand the well information available. Any oil and gas wells in your project area are regulated by the Oil, Gas and Salt Resource Act, and the supporting regulations and operating standards. If any unanticipated wells are encountered during development of the project, or if the proponent has questions regarding petroleum operations, the proponent should contact the Petroleum Operations Section at 519-873-4634.</p> <p>Some Municipal projects may be subject to the provisions of the Public Lands Act or Lakes and Rivers Improvement Act. Please review the information on MNRF's web pages provided below regarding when an approval is required or not. Please note that many of the authorizations issued under the Lakes and Rivers Improvement Act are administered by the local Conservation Authority.</p> <p>After reviewing the information provided, if you have not identified any of MNRF's interests stated above, there is no need to circulate any subsequent notices to our office.</p>	<p>No response required. The SAR Reference Guides are already included to be reviewed in the EA in Section 7.6.</p> <p>The City is in agreement with the reviewer's request to review this in the EA.</p> <p>The City has reviewed the relevant material and the Public Lands Act and Lakes and Rivers Improvement Act do not apply to this proposed EA.</p>	<p>No change to the ToR.</p> <p>A review of petroleum wells within the site study area has been included in the groundwater work plan in Section 7.6 of the draft ToR.</p> <p>No change to the draft ToR.</p>

8.1.2 Open House #1

The first open house series occurred as follows:

May 24, 2017

Horton Street Goodwill Industries (3rd floor)
255 Horton Street (at Wellington), London
2 - 4 p.m. and 5 – 8 p.m.

May 25, 2017

Lambeth Community Centre
7112 Beattie Street, London
2 - 4 p.m. and 5 – 8 p.m.

The open houses were advertised in the The Londoner newspaper on May 11 and 18, 2017; on the City website between May 11 and 25, 2017; in the London Free Press on May 13 and 20, 2017; on the City's Facebook page and Twitter on multiple dates; on posters at select City facilities; on the City's e-news on May 18, 2017; and on the London Environmental Network website. All material is provided in Volume III Appendix E1.

Letters or emails were sent to the GRT, Indigenous Communities, local businesses that use the existing landfill, neighbours within 2 km of the Waste Management and Resource Recovery Area, community groups, neighbouring regional municipalities and PLC members between May 11 and May 17, 2017 and examples of this correspondence is provided in Volume III Appendices C3 and E2.

This open house provided a general overview of current City of London waste management programs, the EA process, the W12A Landfill site features, assessment of the proposed 'Alternatives To', a description of the preferred 'Alternative To', and how stakeholders can be involved in the EA process.

The purpose of the open house was to inform the public of the project and seek input on the EA Process, the proposed community engagement program, the assessment of 'Alternatives To' residual waste disposal, the preferred "Alternative To", and next steps for the project. A total of 25 display boards (20 related to the EA) were featured at Open House #1. Copies of the information available at the open house, the feedback sheets, FAQs #2, blank sign in sheets, the project website content and photos of the open house are provided in Volume III Appendix E3.

This event was designed to provide opportunities for attendees to speak directly with the City and the EA consulting team. Attendees were asked to sign in and were encouraged to fill out a comment sheet to provide feedback and recommendations.

Key representatives from the City and their EA consultants in attendance at Open House #1 included:

- Jay Stanford, Director – Environmental Programs, Fleet and Solid Waste, City of London;
- Wesley Abbott, Project Manager – Solid Waste Management, City of London;
- Mike Losee, Division Manager – Solid Waste Management, City of London;
- John Whitworth, Manager – Solid Waste Facilities, City of London;
- Anne Boyd – Manager – Waste Diversion Programs;
- Andre Joseph, Manager – Solid Waste Management;
- Jane Kittmer – Solid Waste Planning Coordinator;
- Jessica Favalaro – Solid Waste Planning Coordinator;
- Trish Edmond, EA Project Manager, Golder Associates Ltd.;
- Paul Smolkin, EA Project Director, Golder Associates Ltd; and
- Paul van der Werf, Waste Planning and Diversion Specialist, 2cg Inc.

A total of 21 and 44 people attended Open House #1 on May 24 and 25, 2017, respectively. The overall atmosphere of the open house was professional, courteous and respectful.

MTCS requested a copy of the open house material after the event (Volume III Appendix E4). Comments were received through completion of the formal feedback sheet from five people. In addition, two email exchanges and a phone call were received where the public provided feedback. The public also provided thoughts on the City's facebook page. Overall, meeting attendees were satisfied with the information presented and provided positive feedback on the quality of the information materials and answers provided. A summary of the formal feedback comments is provided in Table 8.1-2 and a copy of the completed comment sheets, emails, phone record and facebook posts are included in Volume III Appendix E5.

Table 8.1-2: Summary of Comments on Comment Sheets from Open House #1

Comment Received	City of London Response	Status and where addressed in ToR
<p>1. General comments regarding the project:</p> <ul style="list-style-type: none"> • The landfill expansion is needed to keep London waste in London instead of trucking waste out to other municipalities. • The open house was very informative and detailed. • Blue box is too small. • Concerned about the management of runoff and leachate that flows onto neighbouring property through the Shore Municipal Drain. How will it be engineered? Can the existing stormwater management ponds handle a 1 in 100 year storm? • Believe the expansion is necessary and the land is ready and developed but diversion must be increased. 	Noted.	Stormwater management requirements for the expansion will be evaluated during the EA. [ToR Table 7.6-1 under Surface Water]
<p>1. Do you understand the need for the proposed W12A Landfill expansion? 4 of 5 said yes</p> <ul style="list-style-type: none"> • Need to landfill local and regional wastes at a central location that is properly managed and operated. • Burn the waste. • Needed for years to come and process must be initiated now. 	Noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).	No further action required. [Described in ToR Section 4.1]

Comment Received	City of London Response	Status and where addressed in ToR
<p>2. Is a solution that will manage Residual Waste (garbage) until 2050 (25 years beyond the current approved capacity of the W12A Landfill) appropriate?</p> <p>4 of 5 said yes</p> <ul style="list-style-type: none"> • Too expensive to transport waste outside of London. • Burn it if done correctly. • If it stays a local landfill. • Must be coupled with further recycling. 	<p>Noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).</p>	<p>No further action required. [Described in ToR Section 4.1]</p>
<p>3. Do you think it is acceptable to allow neighbouring municipalities to use any new waste disposal facilities developed by the City of London?</p> <p>2 of 5 said yes</p> <ul style="list-style-type: none"> • Not too many. • There will be increased truck traffic. What is the effect on nearby community of Glanworth? Will make it undesirable to live there due to nuisance effects. Roads will deteriorate and who will pay? • Defeats the purpose of a landfill expansion for the community. 	<p>Other neighbouring municipalities could only use the expanded landfill under conditions approved by Municipal Council.</p>	<p>Potential for increase in traffic and nuisance effects will be considered in the EA. [ToR Section 3.3.2, Table 7.6-1]</p>
<p>4. Should there be limits on the amount of Residual Waste that will be accepted at any new waste disposal facility?</p> <p>3 of 5 said yes</p> <ul style="list-style-type: none"> • It goes somewhere and don't want to encourage illegal dumping. • Recycling should be optimized so little garbage is left to be landfilled. 	<p>Noted.</p>	<p>No further action required. [ToR Section 3.3.2]</p>

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Comment Received	City of London Response	Status and where addressed in ToR
<p>5. Should the City commit to increasing the current household waste diversion rate to 60% by 2022 from the current rate of 45%?</p> <p>5 of 5 said yes</p> <ul style="list-style-type: none"> • But how? • Make this a priority. 	Noted.	No further action required. [ToR Section 3.3.3]
<p>6. Do you have any suggestions, comments or concerns for consideration regarding the proposed expansion of the W12A Landfill?</p> <ul style="list-style-type: none"> • A landfill is always going to be needed and we would pay more for trucking out of town. • Have more than just a landfill by adding in appropriate complementary businesses. • Look into burning; lesser of two evils. • Make producers (particularly packaging producers) be financially responsible to promote better/less packaging. • The landfill expansion must be coupled with a requirement that diversion be increased, including multi residential buildings. Education will be a key component. 	Noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).	No further action required. [Described in ToR Section 4.1]
<p>7. Do you have any suggestions, comments or concerns for consideration in the development of the draft Terms of Reference?</p> <ul style="list-style-type: none"> • Focus on reducing waste not increasing land area to bury it. 	Noted. See the City's progress on the Resource Recovery Strategy.	No further action required. [ToR Section 3.3.3]
<p>8. Do you understand how the Environmental Assessment process works?</p> <p>4 of 5 said yes</p>	Noted.	No further action required.

8.1.3 Open House #2

The second open house series occurred as follows:

November 29, 2017

Horton Street Goodwill Industries (3rd floor)
255 Horton Street (at Wellington), London
2 - 4 p.m. and 5 – 8 p.m.

November 30, 2017

Lambeth Community Centre
7112 Beattie Street, London
2 - 4 p.m. and 5 – 8 p.m.

The Open Houses were advertised in the The Londoner newspaper on November 16 and 23, 2017; on the City's calendar; on the City website; by London.ca public notices November 16 and 23, 2017; in the London's City Green publication; on the City's Facebook page on November 26, 2017; on posters at select City facilities; on the City's e-news on November 13 and 17, 2017; on the London Environmental Network and on the project website. All material is provided in Volume III Appendix F1.

Letters or emails were sent between November 14 – 16 to the GRT, Indigenous Communities, local businesses that use the existing landfill, neighbours within 2 km of the Waste Management and Resource Recovery Area, community groups and PLC members. Individuals who signed up at Open House #1 were sent an email on November 27, 2017. One person was sent a letter on November 27.

At these open house sessions the public learned about the proposed content of the Draft ToR (overall work plan for the project) including existing site conditions, preliminary landfill expansion concepts (known as 'Alternative Methods'), the proposed methodology and technical studies for evaluating and comparing the 'Alternative Methods', and how to be involved in the EA process.

A main focus of the open house was to inform the public and seek input on the preliminary conceptual 'Alternative Methods' for landfill expansion and the criteria to be used to comparatively evaluate the 'Alternative Methods'. A total of 38 (19 related to EA) display boards were featured at Open House #2. Copies of the information available at the open house, the feedback sheets, FAQs #3, blank sign in sheets, the project website content and photos of the open house are included in Volume III Appendix F3.

This event was designed to provide opportunities for attendees to speak directly with the City and the EA consulting team. Attendees were asked to sign in and were encouraged to fill out a comment sheet to provide feedback and recommendations.

Key representatives from the City and their EA consultants in attendance at Open House #2 included:

- Jay Stanford, Director – Environmental Programs, Fleet and Solid Waste, City of London;
- Wesley Abbott, Project Manager – Solid Waste Management, City of London;
- Mike Losee, Division Manager – Solid Waste Management, City of London;
- Jane Kittmer – Solid Waste Planning Coordinator;
- Jessica Favalaro – Solid Waste Planning Coordinator
- Trish Edmond, EA Project Manager, Golder Associates Ltd.;
- Paul Smolkin, EA Project Director, Golder Associates Ltd; and
- Paul van der Werf, Waste Planning and Diversion Specialist, 2cg Inc.

A total of 34 and 43 people attended Open House #2 on November 29 and 30, 2017, respectively. The overall atmosphere of the open house was professional, courteous and respectful.

MTCS requested a copy of the Open House material after the event (Volume III Appendix F4). Comments were received through completion of the formal feedback sheet from 34 people. In addition, one email exchange was received where the public provided feedback. Overall, meeting attendees were satisfied with the information presented and provided positive feedback on the quality of the information materials and answers provided. A summary of the formal feedback comments is provided in Table 8.1-3 and Table 8.1-4 and copies of the completed comment sheet portions related to the ToR and email are provided in Volume III Appendix F5. The formal feedback sheet asked if participants understood the preliminary alternative Design Concepts presented at the open house and all respondents to the question (31) said yes.

Table 8.1-3: Summary of Comments on Comment Sheets from Open House #2

Comment Received	City of London Response	Status and where addressed in ToR
Stop collecting wood furniture as garbage, provide free garbage tags with calendar	Comment noted. No response required.	Will be considered during development of Resource Recovery Strategy.
Suggest asking for maximum capacity	Comment noted. No response required.	No further action required.
Prefer Design Concept 3, individuals should get more involved with their own garbage	Comment noted. No response required.	No further action required.
Inquiring about berms or screening with increased height, reduction methods for odour control, impact on neighbouring cemetery property, would like to see cross sections of all design concepts, show human scale, visual impact across the street	Comments noted. No response required.	Mitigation measures for visual and odour will be considered in the EA as and where required [ToR Table 7.6-1]. It is anticipated that cross-sections will be prepared through the 'Alternative Methods' that are developed during the EA phase for comparative evaluation. [ToR Section 5.0].
Prefer Design Concept 3 1C, plant a 5:1 ratio for every tree removed, allow other municipalities to use landfill as long as they follow the standards, recommended resource recovery strategies include clear bags, textile recovery, organic diversion and food waste education	Comments noted. No response required.	No further action required. [ToR Section 3.3.2].

Comment Received	City of London Response	Status and where addressed in ToR
Green bins recommended with incentives and enforcement before building a mixed waste processing plant, strongly support thermal conversion of waste incineration	Comments noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).	Will be considered during development of Resource Recovery Strategy. [Thermal technologies discussed in ToR Section 4.1].
Prefer landfill to expand vertically (go up) than horizontally (go sideways) in the future, encourage community to get involved with their waste, alternative collection methods-private contractors or homeowners	Comments noted. No response required.	No further action required. [ToR Section 5.0].
Learn from other cities and countries for RRS (ban plastic bags, zero waste stores, packaging bans, more bulk facilities), restaurant food wastes go to homeless, more recyclable products, ban straws, disposable napkins etc. Public should be more informed about recycling rules and composting options	Comments noted. No response required.	Will be considered during development of Resource Recovery Strategy.
Concerned about the impact of high winds on landfill, impact on wildlife habitat	Comments noted. No response required.	Potential impacts to air quality and biology will be studied during the EA. [ToR Table 7.6-1].

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Comment Received	City of London Response	Status and where addressed in ToR
Inquiring about the application of gas purifying when more LFG generated, allow ALL plastics and metals to be recovered, only allow containers and no bags at curb	Comments noted. No response required.	No further action required. [Regarding possible use of LFG, ToR Section 3.3.4].
Landfilling is strongly not recommended, prefer recycling and garbage processing factories to save environment and create jobs, enforcement is suggested	Comments noted. No response required.	No further action required.
Inquiring about the pros & cons of each concept, more open house events, good location and times	Comments noted. No response required.	No further action required. [ToR Section 7.5.4].
Inquiring about the pros & cons of each concept, requesting more information at future open houses to be presented about Resource Recovery Strategy	Comments noted. No response required.	The conceptual 'Alternative Methods' will be refined during the EA [ToR Section 7.5.4]; the Resource Recovery Strategy will be finalized and more information will be provided in subsequent Open Houses.
Encouraging creativity when implementing the Resource Recovery Strategy to create jobs become a leader in waste recovery	Comments noted. No response required.	Will be considered during development of Resource Recovery Strategy.
Prefer user pay to work in conjunction with a reduced container limit, clear bags, and incentives to encourage waste reduction	Comments noted. No response required.	Will be considered during development of Resource Recovery Strategy.

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Comment Received	City of London Response	Status and where addressed in ToR
Include cost information on waste diversion programs from other municipalities	Comments noted. Cost information from other municipalities will be included in Resource Recovery Strategy.	No further action required.
Prefer Design Concept 3, prefer to not expand service area, prefer green bins program with bi-weekly pickup for regular waste	Comments noted. No response required.	No further action required.
Prefer Design Concept 1, traffic study should include Wonderland Rd from Wharncliffe Rd S. The use of landfill from other municipalities should be strictly limited	Comments noted. No response required.	Haul Route study area as defined at Open House #2 did not include Wonderland Road. Haul Route study area for the EA modified as a result of this comment and verbal comments received at the open house. [ToR Section 7.2].
Add a tree line around perimeter to capture windblowns, reduce wind speed over landfill, added a complaint that there was no tax reduction from using plastic bags to paper bags for leaves	Comments noted. No response required.	Potential nuisance effects will be studied during the EA. [ToR Table 7.6-1].
Inquiring about the coverage of farm loss revenue from land expansion in Design Concepts 1B and 1C	Comments noted. No response required.	Potential agricultural and socio-economic impacts will be

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Comment Received	City of London Response	Status and where addressed in ToR
		evaluated during the EA. [ToR Table 7.6-1].
Too many garbage trucks on Wonderland Rd S - need more lanes and upgrades to road, requesting municipal water	Comments noted. No response required.	Haul route study area as defined at Open House #2 did not include Wonderland Road. Haul route study area for the EA modified as a result of this comment and verbal comments received at the open house. [ToR Section 7.2].
Prefer Design Concept 1C, suggest waste collection on one side of the road only to reduce air pollution	Comments noted. No response required.	No further action required.
Concern about the increased odour level as landfill height raised, inquiring if sludge from Greenway Wastewater Treatment Plant is still taken to landfill	Comments noted. No response required.	Potential air quality impacts will be evaluated during the EA. [ToR Table 7.6-1].
Prefer Design Concept 1, but leave 2 & 3 for distant future	Comments noted. No response required.	No further action required.
No green bins as it is too expensive for taxpayers, expand landfill as required	Comments noted. No response required.	No further action required.
Not in favour of expanding the landfill so high – concerned about odour carrying farther. Opposed to expanding service area	Comments noted. No response required.	Potential air quality impacts will be evaluated during the EA. [ToR Table 7.6-1].

Table 8.1-4 summarizes the ranking of individual environmental components based on the submission of comment sheets and engagement during Open House #2 (see Volume III Appendix F5). A simple ranking of the environmental components based on the feedback received was completed where three points were awarded for each person who ranked an environmental component “more important”, two points for each person who ranked an environmental component “important” and one point for each person who ranked an environmental component “less important”.

Table 8.1-4: Ranking of Environmental Components

Environmental Component	Environmental Sub-component	More Important	Important	Less Important	Ranking Order
Atmosphere	Air quality (including dust, odour and GHG)	23	9	0	3
	Noise	5	16	11	15
Geology and Hydrogeology	Groundwater quality	29	3	0	1
Surface Water	Surface water quality	22	10	0	5
	Surface water quantity	15	12	5	7
Biology	Aquatic ecosystems	24	8	0	2
	Terrestrial ecosystems	23	9	0	3
Land Use	Current and planned future land uses	11	17	3	9
Agriculture	Agriculture	10	20	2	10
Archaeology	Archaeology	5	12	15	16
Culture	Cultural heritage landscapes	2	12	18	18
	Cultural heritage resources (including built heritage)	3	14	15	17
Socio-economic	Local economic	11	17	2	8
	Residents and community	18	13	1	6
Visual	Visual	9	10	13	14
Transportation	Traffic	8	15	9	13
Design and Operations	Technical considerations	13	12	7	11
	Financial considerations	12	11	9	12

Based on the input received, groundwater quality, aquatic ecosystems and terrestrial ecosystems were the environmental components identified as most important, while cultural heritage landscapes, cultural heritage resources and archaeology were ranked least important.

8.1.4 Other Engagement

During this ToR various public and City committees and groups have been advised of on-going activities and their opinions solicited as and when appropriate. As already mentioned in Section 8.1, a new Waste Management CLC was struck for this project. The invitation to join this committee, distribution list, terms of reference, and meeting agendas and summaries are provided in Volume III Appendix G4.

The City Advisory Committee on the Environment (ACE), the Agricultural Advisory Committee (AAC), the Environmental and Ecological Planning Advisory Committee (EEPAC) and W12A Landfill PLC are all regular City committees and groups who have been advised of the status of this project. Details of meetings where the ToR has been discussed are provided in Volume III Appendices G1, G2, G3 and G5 for the ACE, AAC, EEPAC and PLC, respectively.

The WMWG is a new working group of Municipal Council consisting of six councillors and the Mayor with the purpose of monitoring and advising on activities related to the Resource Recovery Strategy and Residual Waste Disposal Strategy and EA. This is intended to provide a more effective and focused structure for members of the Civic Works Committee and Municipal Council to review, provide input and approve the necessary actions for the successful development and implementation of both Strategies. The WMWG list of reports, meeting agendas and meeting minutes are provided in Volume III Appendix G6.

Note that additional details on these groups and committees is provided in the City's Community Engagement Program document in Volume III Appendix A.

During this ToR the City also provided information, advertised and consulted during community events such as Gathering on the Green, Sesquifest, Sunfest, Our City e-news letter, etc. Copies of the various information and feedback are provided in Volume III Appendix G7.

8.1.5 Other Comments

Outside the engagement events, some comments have been received by City throughout the development of the ToR. These comments were received either through the project website commenting feature or by direct email to the project team and summarized in Table 8.1-5.

Table 8.1-5: Other Comments

Commenter	Date Received	Comment Received	City of London Response	Status	Location in ToR
Comments from getinvolved.london.ca What do you think?	March 30, 2017 to September 22, 2017	<p>13 individuals provided written comments.</p> <ul style="list-style-type: none"> • Support organics program 54% • More focus on public space waste diversion 18% • Improve waste collection 62% • Support waste reduction by manufacturers 15% • Pro alternative waste reduction 23% • More focus on multi-res and business recycling 15% 	Comments noted. No response required.	No further action required.	Volume III Appendix D6
Comments from getinvolved.london.ca Comments on Draft Guiding Principles	March 30, 2017 to September 22, 2017	<p>6 individuals provided written comments.</p> <ul style="list-style-type: none"> • Support green bin 17% • Focus on Resource Recovery 33% • More focus on multi-res recycling 17% • Support waste reduction by manufacturers 17% • Unrelated 83% 	Comments noted. No response required.	No further action required.	Volume III Appendix D6

Draft Proposed Terms of Reference for the Environmental Assessment of the
Proposed W12A Landfill Expansion, City of London

Commenter	Date Received	Comment Received	City of London Response	Status	Location in ToR
Comments from getinvolved.london.ca What do you think?	September 22, 2017 to January 18, 2018	8 individuals provided written comments. <ul style="list-style-type: none"> • Support organics program 50% • Improve waste collection 38% • Lower container limit 25% • Improve recycling program 50% • Pro alternative waste reduction 13% • Against green bin 13% 	Comments noted. No response required.	No further action required.	N/A
Facebook comments	From November 26, 2017 post	21 individual comments received <ul style="list-style-type: none"> • Support green bin 33% • Improve waste collection 24% • Against green bin 14% • Comments about Open House 9% • Support alternative waste disposal 9% • Waste diversion is producer's responsibility 9% 	Comments noted. No response required.	No further action required.	Volume III Appendix F5
Comments from getinvolved.london.ca Virtual Open House	December 14, 2017 to January 15, 2018	2 individuals provided comments <ul style="list-style-type: none"> • Support landfill closure, build new landfill in the north end of city • Support alternate technology (landfill reclamation) 	Comments noted. No response required.	No further action required.	N/A

Draft Proposed Terms of Reference for the Environmental Assessment of the
Proposed W12A Landfill Expansion, City of London

Commenter	Date Received	Comment Received	City of London Response	Status	Location in ToR
Facebook comments	From December 22, 2017 post	6 individual comments received <ul style="list-style-type: none"> • Support organics diversion 17% • Unrelated 83% 	Comments noted. No response required.	No further action required.	Volume III Appendix F5
Aerobic Landfill Technologies Inc.	January 14, 2018	Aerobic Landfill Technologies Inc. is a company that specializes in aerobic degradation of waste to reclaim landfill space and mitigate the long term risks of waste management activities. Our process could be used to reclaim the old landfill site safely and in an environmentally friendly manner to be reused as new landfill space without any need for landfill expansion. Our technology and technologies like it can also be used at the new site to create a mixed waste processing and reuse system that negates the need for any long term storage and therefore no actual landfill to be replaced at the site.	The City discussed with Aerobic Landfill Technologies Inc. this opportunity. This technology has not yet been used in Ontario and further research is required before this technology can be considered "proven".	No further action required.	Volume III Appendix F5

8.1.6 Draft Proposed Terms of Reference

An initial draft of the Proposed ToR was shared with the MOECC for a high level review in January 2018. Comments and questions were provided by the Environmental Assessment and Permissions Branch (EA, noise and wastewater) and the Southwest Region (planner/EA coordinator, air quality, groundwater and surface water). These comments and questions are provided in disposition tables in Volume III Appendix H1 along with responses from the City and how the comments were included in the updated draft Proposed ToR. In general, the comments received focused on meeting the requirements of the Code of Practice for preparing ToR (MOECC, 2014a), better outlining the project need particularly as it relates to provincial waste policies and better describing the study area and studies to be completed in the EA. A conference call occurred with the EA Branch and the City on March 22, 2018 to review specific comments. The summary of this call is provided in Volume III Appendix H1.

8.1.7 Consultation with Indigenous Communities during the ToR Phase

A list of potentially affected Indigenous Communities was developed in consultation with the MOECC during the development of this ToR (see Volume III Appendix C1). A program to engage and consult with Indigenous Communities was carried out considering their specific needs and specific issues. The Indigenous Communities were consulted on how they would like to be involved in the EA process.

The following Indigenous Communities and groups were contacted as part of the distribution of the NOC:

- Aamjiwnaang First Nation;
- Bkejwanong Territory (Walpole Island);
- Caldwell First Nation;
- Chippewas of the Thames First Nation (COTTEN);
- Oneida Nation of Thames;
- Delaware Nation (Moravian of the Thames);
- Munsee-Delaware Nation; and
- Southern First Nations Secretariat.

Communication tools available to Indigenous Communities include meetings or presentations for individual Indigenous Communities, smaller discussion groups with interested persons/groups by phone and/or in-person on specific topics, site tours, copies of information and email correspondence.

Each of the communities identified were sent a NOC, notices of open houses, and invitations to participate in the EA and discussions about potential benefits and effects of the project on Indigenous Community interests (see Volume III Appendices C2, C3 and C5). City staff were available to meet with interested Indigenous Communities and discuss the proposed project at any time during the development of the ToR.

To date, only the COTTEN have requested additional information and/or meetings with the City.

8.1.7.1 Chippewas of the Thames First Nation

On September 7, 2017 the City of London met with the COTTEN to discuss the Residual Waste Disposal Strategy and EA and the Resource Recovery Strategy. The current status of each strategy was discussed and the next steps provided. The information discussed is provided in a summary in Volume III Appendix C4.

On February 11, 2018 the City of London met with the COTTEN a second time to provide more up to date details on the Residual Waste Disposal Strategy and EA and the Resource Recovery Strategy. Areas of particular interest to the COTTEN included protection of groundwater, migration of methane gas, the archaeology study and planting of native vegetation and areas that will be disturbed. There were five follow up actions as a result of this meeting as follows:

1. The City (Environmental & Engineering Services - EES) is to provide a link to the annual report for the W12A Landfill (<http://www.london.ca/residents/Garbage-Recycling/Garbage/Pages/W12A-Landfill-Site.aspx>).
2. The City (EES) will follow-up with Golder Associates about using COTTEN staff to assist with field work required for the archaeology study. The field work is likely to take place in fall 2018.
3. The City (EES) will organize a tour of various City facilities including the MRF, W12A Landfill and possibly some other City locations such as Greenway Wastewater Treatment Plant, etc. for COTTEN staff and members of the Antler River Guardians of the Four Directions. The tour is expected to take place in July 2018.
4. The City (EES) should investigate using native trees and grasses when doing plantings at the landfill. Rochelle Smith can be provide further guidance on this matter including project examples if more details are necessary.
5. The City (EES) will make sure that staff in Community and Economic Innovation (Government and External Relations) are aware of the training and awareness opportunities provided by COTTEN for Treaties and Culture.

8.2 Proposed Consultation Plan for EA

Following approval of this ToR and during preparation of the EA, a consultation program will be continued to engage the public, businesses, the GRT, Indigenous Communities, as well as the various groups and committees interested during the EA process. Input will be obtained through a number of engagement activities, as proposed below. In addition to the engagement activities described below, consultation specific to individual Indigenous Communities will also be carried out. These additional activities are described in Section 8.3. The results of the engagement program conducted by the City during preparation of the EA will be presented in the EA Report.

The proposed consultation activities for the EA studies are as follows:

- **Open House #3** will present the approved ToR, describe the EA process, inform the public about each of the 'Alternative Methods' for landfill expansion being considered, the criteria for the comparative evaluation of those landfill expansion alternatives and the results of the comparison, and invite participation and comment regarding the 'Alternative Methods' and comparison;
- **Open House #4** will present the proposed EA and inform the public about the identification of the preferred alternative for landfill expansion, as well as inform them of the results of the existing conditions studies and the predicted effects of the preferred alternative, and the commitments London is making to mitigate any adverse effects;
- **Project Website** to inform the public on the EA process, public engagement activities and to solicit comments from the public;
- **Letters and emails** to the GRT members, Indigenous Communities and interested parties to provide information and invite feedback;
- **Group and Committee meetings** to discuss the EA project and provide feedback as applicable; and
- **Circulation of Draft EA** for public comment prior to finalization and submission to the MOECC. There will be a seven week review period provided for the draft EA.

There are a number of key decision-making milestone points when consultation will occur during preparation of the EA. The main milestone is reviewing the developed 'Alternative Methods', the evaluation criteria and indicators to be applied to 'Alternative Methods' and reviewing the recommended 'Alternative Method' identified through the comparative evaluation process at Open House #3. In addition the presentation of the proposed EA at Open House #4 is another key decision-making milestone.

During the EA there may be issues raised or disputes during preparation of the EA that may be difficult to resolve. The City will attempt to resolve all issues or disputes to reach a resolution that is amenable, recognizing that interests of multiple stakeholders and/or regulations may sometimes dictate a resolution that may not be desirable to all parties. In the event that a mutually agreeable resolution is not achieved, the matter will be referred to the MOECC for guidance.

8.3 Proposed Indigenous Community Engagement Program for EA

It is recognized that Indigenous Communities have specific interests and rights with regard to consultation on projects that might potentially affect them. The consultation with Indigenous Communities will provide insight into the potential effects on Indigenous Communities, including the potential effects on use of lands for traditional purposes. It is also recognized that Indigenous Communities may have specific and differing needs with regard to how they would like to be consulted. To address these interests, the City will continue to inform Indigenous Communities about the proposed project and invite their participation in the EA process.

The City will continue to meet with interested Indigenous Communities and discuss the proposed project at any time during the EA study process.

9.0 Other Regulatory Approvals

In addition to EA approval, the W12A Landfill expansion will require approval under the EPA and the *Ontario Water Resources Act* (OWRA). The City proposes to seek EA approval prior to proceeding with the EPA approval process. The following sections provide an overview of the approvals that may be required in addition to the EA approval process. The approvals required will be dependent on the preferred 'Alternative Method' of expansion and will be described in the EA Report. It is noted that the following list of other regulatory approvals may be refined as the EA study progresses, and the final description of other regulatory approvals will be described in the EA study report.

9.1 Environmental Protection Act

The EPA, Section 27 stipulates that “...no person shall use, operate, establish, alter, enlarge or extend a waste management system or a waste disposal site except under and in accordance with an environmental compliance approval [ECA].” The application for the waste ECA under Part 5 of the EPA must be supported by a detailed report that complies with *O. Reg. 232/98* Landfilling Sites and describes the proposed design and operations of the W12A Landfill site.

Additionally, the site will require an air and noise ECA as per Part 9 of the EPA.

9.2 Ontario Water Resources Act

The OWRA, Section 53 states “...no person shall use, operate, establish, alter, extend or replace new or existing sewage works except under and in accordance with an environmental compliance approval.”. Sewage works in this context refer to collecting, transmitting, treating and/or disposing of stormwater. An ECA amendment from the MOECC for 'sewage works' is expected to be required for stormwater works associated with the expanded landfill. The application must be supported by a document assessing potential impacts to the environment and relevant environmental standards that must be met.

9.3 Planning Act

Ontario *Planning Act* applications are separate from the EA, but may share impact assessment studies and other common elements. An Official Plan amendment is not anticipated, at this time, to be required. A Zoning By-law amendment will be required for an expansion that extends beyond the current landfill site property limits.

9.4 Conservation Authority Approvals

Conservation Authorities are responsible for issuing permits for any construction in, or alteration of, watercourses under *O. Reg. 163/06*.

The site is located within the jurisdiction of both the UTRCA and the KCCA. If required for the purposes of implementing the preferred alternative, Conservation Authority approval will be obtained.

9.5 Federal Approvals

At this time, it is not expected that any federal approvals will be required as described in Table 8.1-1.

10.0 EA Schedule

A draft proposed ToR was made available to the MOECC, Indigenous Communities, GRT, stakeholder committees and the public in late April 2018. A series of open houses about the proposed ToR were conducted on November 29 and 30, 2017.

The submission of this ToR to the Minister occurred in XXXX after comments received on the draft proposed ToR were incorporated.

EA timelines are dependent on the Minister's decision about this ToR and the EA cannot proceed without an approved ToR. A decision about the approval of this ToR is anticipated in late 2018/early 2019. The EA is expected to be completed and the application documents submitted in mid-2020.

It is assumed that the EA application documents in final form will be reviewed by the GRT members, Indigenous Communities, stakeholder committees and the public. It is proposed that any supplementary evaluations, responses and/or clarifications required by this review process will be documented by addendum to the EA or other appropriate method.

As previously mentioned, the proposed project will also require approvals for the W12A Landfill expansion under the EPA and the OWRA. Monitoring requirements for the proposed project will be developed as part of EPA or OWRA approvals processes. The City is proposing to submit applications for EPA/OWRA approval and supporting documents following receipt of EA approval.

11.0 Commitments and Monitoring Strategy

The EA Report will include a comprehensive list of commitments made by the City of London during the development of this ToR.

11.1 Commitments

A list of commitments made during the development of this ToR and during consultation is contained in Table 11.1-1.

Table 11.1-1: List of Commitments

ID	Commitment
1	The City has committed to a target of 60% residential waste diversion by 2022.
2	When requested, the City of London will meet with individuals or groups at their convenience to assist them with understanding the project information and providing input, for example, if they are unable to participate in planned public consultation events or require more information.

The EA Report will also include a comprehensive list of commitments made by the City during the preparation of the EA studies and during consultation throughout the EA process. These commitments include, but are not limited to, the following:

- All commitments relating to impact management measures (such as mitigation measures);
- Additional works and studies to be carried out;
- Monitoring;
- Public consultation;
- Contingency planning; and
- Documentation and correspondence.

11.2 Compliance and Effects Monitoring

Mitigation measures are designed to avoid or reduce potential adverse effects from the undertaking.

The City of London commits to developing a monitoring framework during the preparation of the EA. The monitoring framework will consider all phases of the proposed undertaking. The monitoring will include:

- Compliance monitoring; and
- Effects monitoring.

A description of the proposed effects monitoring programs for the expanded landfill will be prepared. It is anticipated that the detailed effects monitoring requirements for the project will ultimately be determined through the conditions of EPA/OWRA approval. Compliance monitoring is an assessment of whether an undertaking has been constructed, implemented and/or operated in accordance with the commitments made during the preparation of the EA and the conditions of the EAA. Compliance monitoring and contingency measures will be designed to detect and immediately respond to potential problems and unanticipated effects. Effects monitoring will involve activities designed to determine and verify the anticipated effects of the undertaking.

12.0 References

- Aquafor Beech Limited, Beak Consultants Limited, Development Engineering Limited, Geomatics International Inc., The Lura Group, Henricks and Associates and Upper Thames River Conservation Authority. (1995). Dingman Creek Subwatershed Study Phases II to V. A report prepared for the City of London.
- Archaeologix Inc. (2006). Archaeological and Built Heritage Assessment (Stage 1) W12A Landfill Area Study, City of London.
- The City of London. (2016). The London Plan. <https://www.thelondonplan.ca/digital-copy>.
- The City of London. (2013). The Road to Increased Resource Recovery and Zero Waste (Road Map 2.0)
- The City of London. (1989). City of London Official Plan.
- Corporations Supporting Recycling (CSR). (2003). The Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow.
- Delcan. (2005). Dingman Creek Subwatershed Study Update. Prepared by Delcan Corporation with contributions from Stantec Consulting Limited and Cummings Cockburn Limited. Available at: <https://www.london.ca/city-hall/master-plans-reports/reports/Documents/Dingman-Creek-Subwatershed-Study-Update%20Volume%201%20Main%20Report.pdf>.
- Dillon Consulting. (2005). City of London W12A Landfill Area Plan Study Surface Water Background Study.
- Dillon Consulting. (2012). Hydraulic Evaluation of Landfill Performance (HELP) Modeling for the City of London.
- Earth Tech Canada Inc. (2005). W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study.
- Earth Tech Canada Inc. (2002). Stormwater Management Master Plan W12A Landfill Area Plan Study City of London.
- Golder Associates Ltd. (2016a). Stage 2 Archaeological Assessment, 3137 Scotland Drive, Part of Lot 16, Concession 6, Former Geographic Township of Westminster, now City of London, Middlesex County, Ontario. Revised report on file with the Ministry of Tourism, Culture, and Sport. Toronto, Ontario.
- Golder Associates Ltd. (2016b). Stage 1-2 Archaeological Assessment, 3243 Manning Drive, Part of Lots 16 and 17, Concession 7, Former Geographic Township of Westminster, now City of London, Middlesex County, Ontario. Revised report on file with the Ministry of Tourism, Culture, and Sport. Toronto, Ontario.

- Government of Canada. (2012). *Canadian Environmental Assessment Act*. S.C. 2012, c. 19, s. 52.
- Government of Ontario (Ontario). (2017a). *Environmental Protection Act*, R.S.O. 1990, Chapter E.19. Last amended November 2017.
- Government of Ontario (Ontario). (2017b). *Ontario Water Resources Act*, R.S.O. 1990, Chapter O.40. Last amended December 2017.
- Government of Ontario (Ontario). (2017c). Strategy for a Waste-Free Ontario: Building the Circular Economy.
- Government of Ontario (Ontario). (2016). *Waste-Free Ontario Act*, R.S.O. 2016, Chapter O.12.
- Government of Ontario (Ontario). (2010). *Environmental Assessment Act*, R.S.O. 1990, Chapter E.18. Last amended October 2010.
- Government of Ontario (Ontario). (2007). *Ontario Regulation 101/07: Waste Management Projects. Environmental Assessment Act*.
- Government of Ontario (Ontario). (2005). *Ontario Regulation 419/05: Air Pollution – Local Air Quality. Environmental Protection Act*.
- Government of Ontario (Ontario). (2008). *Ontario Regulation 216/08: Landfilling Sites. Environmental Protection Act*.
- Government of Ontario (Ontario). (1998). *Ontario Regulation 232/98. Landfilling Sites*. Last Updated: October 2011. *Environmental Protection Act*.
- Hagerty, T.P. and Kingston, M.S. (1992). Resources Management Branch, Ontario Ministry of Agriculture and Food, Guelph. The Soils of Middlesex County (Volume 1 & 2) - Report No. 56 of the Ontario Centre for Soil Resource Evaluation.
- IBI Group. (2008). W12A Landfill Area Plan (for the City of London).
- MacLaren Limited. (1970). Report on Solid Waste Disposal for the City of London.
- Middlesex County. (2014). Middlesex Natural Heritage Systems Study: A study to identify natural heritage systems in Middlesex County. Project management by Upper Thames River Conservation Authority in cooperation with Middlesex County Conservation Authorities. Available at: <http://thamesriver.on.ca/watershed-health/natural-heritage-studies/middlesex-natural-heritage-systems-study-2014/>.
- Ministry of the Environment (MOE). (1994). Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities. Guideline B-7 (formerly Policy 15-08):

MOE Program Development Branch: Ontario Ministry of the Environment and Energy, April 1994, 8 p.

Ministry of the Environment and Climate Change (MOECC). (2017). Considering climate change in the environmental assessment process. October 2017.

Ministry of the Environment and Climate Change (MOECC). (2014a). Ontario MOECC Code of Practice for Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario. January 2014.

Ministry of the Environment and Climate Change (MOECC). (2014b) Consultation in Ontario's Environmental Assessment Process. 2014.ew Directions Archaeology Ltd. (2015). Stage 1 Archeological Assessment of Wonderland Road, City of London, Project # P018-465-2013.

North-South Environmental Inc. (2009). Inventory and Evaluation of Woodlands: City of London. Available at: <https://www.london.ca/business/Resources/Guideline-Documents/Documents/reference-docs/Inventory-Evaluation-of-Woodlands-August-2009.pdf>.

UTRCA. (2012). Dingman Creek Watershed Report Card. Available at: http://thamesriver.on.ca/wp-content/uploads/WatershedReportCards/RC_Dingman.pdf.

Wilcox, Betsy. (2005). Dodd Creek Community Based Watershed Strategy.

United States Environmental Protection Agency (EPA). (2016). Waste Reduction Model (WARM). Version 14.