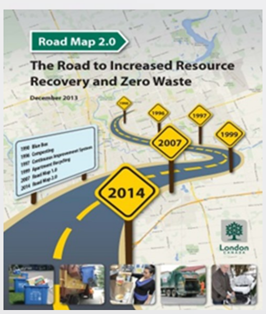
Interim Waste Diversion Plan

2014 to 2015

Including the Following Reports:

Road Map 2.0 Feedback

Road Map 2.0



London
CANADA

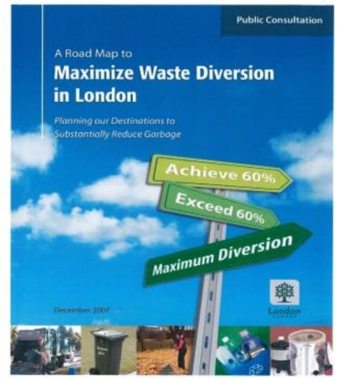
TABLE OF CONTENTS

1.0 Background and Introduction 1
2.0 Community Engagement on Road Map 2.0 2
3.0 Next Steps for Reducing Waste 4

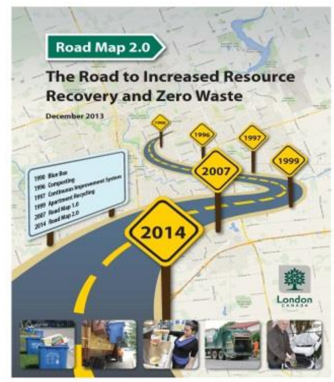
APPENDICES

Appendix A Road Map 2.0 Feedback
Appendix B Road Map 2.0 The Road to Increased Resource Recovery and Zero Waste

1.0 BACKGROUND AND INTRODUCTION



In 2007, the document, A Road Map to Maximize Waste Diversion in London, was released for public comment and input. This document looked at a wide range of program changes, initiatives and new measures to increase waste diversion over the coming years. By 2013, the City of London had implemented the majority of the recommendations from the 2007 Road Map and it was time to review our progress and map out our future direction.



Road Map 2.0: The Road to Increased Resource Recovery and Zero Waste was developed which identified options to further reduce the amount of waste we send to landfill. As a first step, Road Map 2.0 was released for public consultation. London citizens were invited to comment on the Road Map 2.0 through a number of community engagement opportunities. These opportunities and the feedback received are discussed in the section 2.0 of this report and detailed in Appendix A. Road Map 2.0 is provided in Appendix B.

The future of waste management in the Province of Ontario is at a critical juncture. It is possible that the provincial government may re-introduce proposed waste management legislation that died when the provincial election was called. This legislation would have replaced the current industry funding programs with Industry Producer Responsibly (IPR) programs for tires, electronics, household special waste and the Blue Box Program. Most costs of the Blue Box recycling system would also be shifted to the producers. It is possible that funding to the City would increase as much as $2 million to $2.5 million.

The current Waste Diversion Act, 2002 states that stewards (product manufacturers) should pay 50% of the Blue Box Program costs. In reality they pay 50% of a negotiated theoretical cost based on “best practices” and other adjustments which results in payment of less than 50% of the actual cost. The Association of Municipalities of Ontario (AMO) is concerned there is a significant and widening ‘gap’ between the negotiated costs that are funded and the actual reported municipal costs to operate the Blue Box Program. Negotiations between municipalities and the stewards for payments in 2014 stalled and resulted in the two sides going to arbitration which may have a significant impact on future payments

Until there is more certainty on the direction for waste management from the new provincial government, an Interim Waste Diversion Plan (Interim Plan) has been prepared. The Interim Plan identifies elements from Road Map 2.0 that can be initiated in the shorter term (2014 to 2015) at minimal cost.

2.0 COMMUNITY ENGAGEMENT ON ROAD MAP 2.0

The City undertook a comprehensive community engagement program for Road Map 2.0 between January and April 2014. Details of this public engagement are summarized below.

Community Engagement	Details	Quantification of Feedback
City Website	• Dedicated page on City website with information, Road Map 2.0 and the opportunity for residents to provide feedback online	• Over 250 webpage visits • 130 residents provided written feedback
Community Events and Outreach Displays	• London Home Builder's Lifestyle Home Show • London CityGreen (open 6 days/week in March and April) • Presentations to Community Groups (e.g. ACE, TREA) • Unstaffed Interactive Display at Community Centers, Libraries, Recreation Facilities (19 locations) • Distributed over 1,000 copies of the Road Map 2.0 summary reports "*How to Reduce our Waste*"	• 290 residents provided written feedback; many more residents provided verbal comments on a range of waste diversion subject matters
Social and Traditional Media	• Invited Road Map Feedback on City Facebook page and Twitter feed • Advertising Campaign: ○ Waste Diversion Ontario In-Kind ad space: London Free Press Road Map 2.0, 4 page summary report and ads in London Community News and The Londoner ○ LTC Bus Shelter ad panels, 50 locations for 4 weeks ○ Posters & signage in community centres, Beer Stores, LCBO, etc.	• 20 emails • 3 letters • 3 phone calls
Public Opinion Survey	• March 2014 public opinion survey by Nordex Research survey that included questions on the level of satisfaction with recycling and yard materials collection satisfaction	• Survey of systematic, proportional random sample of 300 residents

A summary of the feedback received for the various programs and initiatives in Road Map 2.0 is presented in Appendix A. Overall there was general public support for the Road Map 2.0 and the proposed initiatives. During the community engagement portion of the Road Map, additional with Londoners occurred that could not be quantified. The five initiatives receiving the most comments are listed below:

Initiative/Program from Road Map 2.0	Feedback Received	City Staff Response
Delay Green Bin decision until new, emerging and next generation resource recovery review is complete	• >80 responses • 10% agree • 90% do not want Green Bin delayed	No change is recommended. City should continue to delay implementation of Green Bin based on technical reasons and public opinion survey presented in Road Map 2.0. Food waste reduction and community composting pilot initiatives will be included in Interim Plan to look at reducing organics in waste stream.
Explore reduced container limits with or without a user pay system for "extra" curbside garbage	• >80 responses • 70% support for reduced container limits	Initiative will be included in Interim Plan; previously scheduled for consideration in 2016-2018 period in Road Map 2.0
Increase targeted education/ awareness programs for selected Blue Box materials	• >50 responses • 100% support	Scheduled for consideration in 2014 -2015 in Road Map 2.0; will not be part of Interim Plan; continue education/awareness at existing level but explore incentive options for increasing capture and improving quality.
North end EnviroDepot	• >40 responses • 98% support	A two-phased interim EnviroDepot solution proposed with first phase operational by September, 2014.
Add mixed polycoat & blister packaging to the Blue Box program	• >40 responses • 100% support	Initiative will be included in Interim Plan. Scheduled for consideration in 2014-2015 in Road Map 2.0

3.0 NEXT STEPS FOR REDUCING WASTE

The elements proposed in the Interim Waste Diversion Plan include those that were identified in the Road Map 2.0 as ‘underway’ and ‘for early adoption’ plus additional initiatives that have been identified after taking into consideration:

- Input from the community engagement process (see previous section)
- Cost
- Can it be implemented over the next 18 months
- Potential changes to waste management funding and legislation are unlikely to have a significant impact on the initiative

The list of initiatives identified for the Interim Plan are listed below and discussed in more detail in this report.

#	Initiative/Program	Comments
1	Two-phased expansion of existing depot at Try Recycling in the north end of the City	• Carry over from Road Map 1 • Strong public support from respondents
2	Provide two Blue Boxes (instead of one) to new homes beginning August 1, 2014	• “Early adoption” initiative from Road Map 2.0
3	Sell recycling carts to multi-residential buildings at cost beginning January 1, 2015	• “Early adoption” initiative from Road Map 2.0
4	Add vegetable oil and used motor oil to EnviroDepots	• Early adoption” initiative from Road Map 2.0
5	Add mixed polycoat (e.g., hot/cold beverage cups) and blister packaging to Blue Box program beginning October 1, 2014	• Strong public support from respondents
6	Examine reduced container limits for garbage	• Public support from respondents
7	Begin a community composting pilot project	• Public support for diversion of organics; delay of Green Bin allows time to investigate this
8	Begin food reduction awareness pilot project	• Public support for diversion of organics; delay of Green Bin allows time to investigate this
9	Examine incentive options for Blue Box recycling	• Strong public support from respondents • Potential to reduce program costs

Initiative 1: *Two-phased Expansion of North end EnviroDepot beginning September 2014*

Road Map 1.0 recommended the development of a fourth EnviroDepot in the north end of the City. Road Map 2.0 (page 37) recommended *Staff will continue to work on the development of a fourth EnviroDepot in the north*.

The north area of the city is currently serviced by the depots on Clarke Road and Oxford Street and growth in the north of the city is causing these depots to become overcrowded during busy periods. The distance from the north end is a disincentive for some residents to use these Depots. A depot is required in the north to provide an adequate level of service and encourage the proper handling of solid waste.

A longer term permanent solution has been delayed due to available land use challenges at the existing Adelaide Works Yard and the need for a comprehensive Works Yard in the north end. It may be possible to work with other divisions and departments within the City to share costs of a new multi-purpose site (e.g. works yard, other facilities, etc.). This approach is preferred but will take time to investigate.

For this reason, the establishment of a north end EnviroDepot at the Adelaide Works Yard is being recommended to delay for a minimum of two years to allow for the completion of the City Works Yard Operational and Capital Needs Assessment**.**

Try Recycling currently operates a limited drop-off depot for London residents to accept yard materials under contract to the City at 21463 Clarke Road North. The location of this site and the other three EnviroDepots are shown on Figure 1. This facility could be used as a temporary location until a permanent location is found. The Try Recycling site improves access in the north but may not be the best location for a permanent depot because it is located outside the City boundary; is further from the centre of population than is optimal; it operates different hours than the other EnviroDepots (Environmental Compliance Approval restrictions) and is not owned by the City. However, the location does represent opportunities to partner with other municipalities and could be a cost effective solution in the future.

The existing City depot at Try Recycling could be expanded to accept most of the materials accepted at the other depots including household garbage (for a fee), Blue Box recyclables, electronics, tires, batteries, compact fluorescent light bulbs, empty oil & antifreeze containers and propane tanks. As a temporary location, it will not be practical to invest in the upgrades required to accept construction & renovation materials, scrap metal and appliances (these materials will be able to go the Try Recycling facility located nearby).

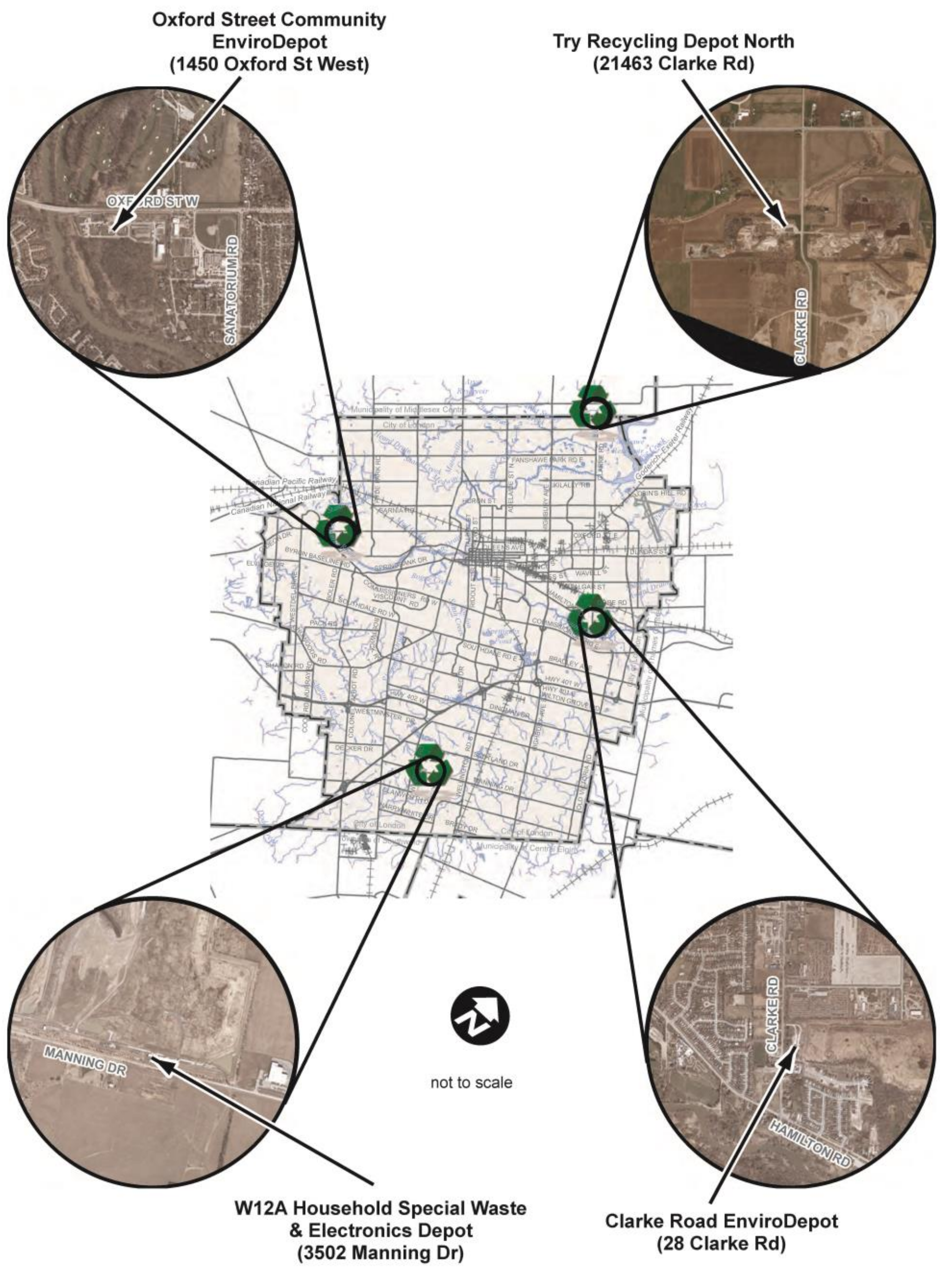
A two-phased interim EnviroDepot at Try Recycling is proposed:

Phase 1 – Expanded Area for Yard Materials: beginning September 1, 2014, an expanded area (beyond the existing City depot area) would available to accept yard materials. This would provide immediate, additional convenience for residents in the north and northeast for these materials.

Phase 2 – Expanded Area and Materials Accepted: beginning spring 2015 (tentative), the depot would accept household garbage (for a fee), Blue Box recyclables, electronics, tires, batteries, compact fluorescent light bulbs, empty oil & antifreeze containers and propane tanks.

<u>Budget Impact</u>

$1.5 million has been set aside for EnviroDepot upgrades including the establishment of a north end depot. The City will spend between $20,000 and $40,000 on selected items to expand the depot. All City funds will be spent on infrastructure that can be relocated to an existing waste management facility (e.g., other EnviroDepot, W12A Landfill) or the future permanent depot. Try Recycling will cover all other costs. The cost to operate the depot ($60,000 per year) is already included in the operating budget.



Initiative *2*: Provide two Blue Boxes (instead of one) to new homes beginning August 1, 2014

Road Map 2.0 (page 22) recommended "a*s part of recycling education and awareness, provide residents of newly constructed homes with two Blue Boxes at no cost"* as one of the initiatives for early adoption.

Historically residents of newly constructed homes are provided one new Blue Box at no cost on the understanding that new homes have not received Blue Boxes in the past. Our recycling program requires that residents sort recyclables into two streams. Providing two Blue Boxes for newly constructed homes will result in more boxes in the system and ensure that new homeowners start recycling correctly from the start. Further benefits include:

- Improved ability of residents to sort recyclables into two streams
- More room to recycle more
- Improved litter control by reducing overflowing boxes and the use of other containers (e.g. cardboard boxes, laundry baskets, etc.) and broken Blue Boxes
- Increase access to recycling for those less able to purchase Blue Boxes
- Waste Diversion Ontario (WDO) recognizes providing free or below cost recycling containers as a best practice and municipalities are financially rewarded in their grant payments

<u>Budget impact</u>
The annual cost to provide a second Blue Box to new homes is approximately $5,000 per year. This can be shifted from the community outreach budget and accommodated within the existing budget.

Initiative 3: ***Sell recycling carts to multi-residential buildings at cost beginning January 1, 2015***

Road Map 2.0 (page 22) recommended that the City "*establish a multi-residential recycling cart purchase program that sells roll-out carts at cost"* as one of the initiatives for early adoption.

The Blue Cart is the standard container across Ontario for recycling collection in multi-residential buildings. The benefits of making carts more accessible are similar to those of providing more Blue Boxes. More carts in the system will increase the capacity to recycle and provide convenience for residents. Some specific benefits include:

- Improved ability of residents to sort recyclables into two streams
- More capacity to recycle
- Improved building maintenance and litter control by reducing overflowing carts

In 2010 the City received a grant from the Continuous Improvement Fund (Waste Diversion Ontario) to increase the number of recycling carts in our program. London used the grant to subsidize the cost of carts for building owners and property managers. Approximately 2,000 carts have been added to the recycling program since 2010. The original "subsidized" cart program is coming to an end and given its success should be replaced with a permanent "at cost" cart program, noting the City usually achieves favourable pricing because of volume purchasing.

Budget impact

There is no budget impact as this initiative has a full cost recovery as carts would be sold at cost to building owners. Purchasing carts on behalf of building owners reduces costs due to economies of scale.

Initiative 4: *Add vegetable oil and used motor oil to EnviroDepots*

Road Map 2.0 (page 22) recommended that "*vegetable oil and used oil be added to the Oxford and Clarke Road EnviroDepots"* as one of the initiatives for early adoption.

As noted in Road Map 2.0, these materials have no issues with collection at W12A EnviroDepot; they have stable Ontario and North American markets and will generate revenue. There are expected to be no or minimal processing or collection issues with adding these materials at the Oxford and Clarke Road EnviroDepots.

Introduction of these materials at the EnviroDepots will not take place until 2015 because approvals are taking longer than anticipated. In the meantime, fats, oils and greases are being collected at the Oxford Street EnviroDepot from about 400 homes as part of a pilot project by Wastewater Operations.

<u>Budget impact</u>
$1.5 million has been set aside for EnviroDepot upgrades including the establishment of a permanent north end depot. The estimated cost on new infrastructure to add these materials is $16,000.

The revenue from the sale of the materials collected is projected to exceed the operating cost to collect by $4,000 to $5,000 per year.

Initiative 5: *Add mixed polycoat and blister packaging to Blue Box program beginning October 1, 2014*

The existing Blue Box program already includes most of the items that are designated as recyclable under the provinces *Blue Box Program Plan*. The two new materials that can be managed at a reasonable cost and constitute a large portion of the remaining waste stream of Blue Box designated items are mixed polycoat (e.g., hot & cold beverage cups and ice cream containers) and blister packaging (e.g., plastic packaging such as the rigid plastic around toys and tools). They are also common household waste items that citizens wish to recycle. In fact, many residents already put them in their Blue Boxes mistakenly assuming they are part of the City's program.

It is estimated that approximately 230 additional tonnes could be diverted from garbage with the addition of these items.

<u>Budget Impact</u>

The report Road Map 2.0 estimated the cost of adding mixed polycoat and blister packaging to range from $40,000 to $50,000 per year. The City's current contractor who collects and processes recyclables (Miller Waste Systems) has made a proposal to the City that includes a number of changes to the existing collection and processing contracts that will take effect immediately if the collection contract is extended to align with the processing contract. One of these changes is the collection and processing of mixed polycoat and blister packaging at no cost. If this proposal is accepted, these materials could be added to the program starting October 1, 2014.

Beverage Cups

Blister Packaging

Initiative 6: *Examine reduced container limits for garbage*

London's four container limit was implemented in January 2006. Following the container limit we saw an increase in recycling and decrease in garbage. London's four container limit is equivalent to about three containers per collection in a weekly collection schedule.

WDO has a list of best practices and a portion of municipal grant funding is linked to how many are implemented. Container limits are recognized as a best practice by WDO. WDO recommends a two-bag (or less) weekly limit. London scores very high on the WDO best practices rating, but it loses points because we have a four container limit (equivalent to 3 containers per week). Municipalities that have more restrictive container limits often have a weekly green bin program to handle wet organic waste.

A 2013 survey of 4,800 homes found that 94% of the garbage set-outs have three containers or less.

The following container limit options will be reviewed:

- 3 container limit
- 3 container limit plus $1.50 tag option for additional containers
- 2 container limit
- 2 container limit plus $1.50 tag option for additional containers
- No change

<u>Budget Impact</u>
The cost to explore reduced container limits can be accommodated with existing staff resources and within the existing operating budget.

Initiative 7: *Begin a community composting pilot project*

Community Composting is now possible because of changes to provincial legislation that makes approval of community composting easier.

Feedback from some Green Bin Pilot Project participants at the end of the project noted a wish to continue to separate Green Bin materials and a willingness to take their organics to another location to be composted. This interest is consistent with experience in some communities that are exploring the potential of community or neighbourhood composting. The practice, if successful, may be a viable alternative for some instead of Green Bin composting or home composting.

A pilot project is proposed for 2015 to assess the viability, effectiveness and cost of community composting. The project will involve the installation of multi-bin or large scale composters at a local housing co-op, a community centre or school. Funds will be required for multi-bin or large scale composters, kitchen organics containers, and signage & education materials

Budget Impact

It is estimated that a community composting pilot project will cost approximately $30,000. A portion of this cost is to hire students for a 26 week period to assist with Initiatives 7 and 8. Funds for this project will be included in the 2015 draft budget.

Initiative 8: *Begin food reduction awareness pilot project*

Approximately 80% of the organic material available to compost in the garbage is food waste thrown away by Londoners. While some of this food waste cannot be avoided (e.g., vegetable trimmings, bones, etc.), most can be and is the result of over buying; cooking too much and then throwing away the extras; not using things before they go bad; impulse buys and poor portion control.

Many people think of food waste as a benign substance that simply rots away in the landfill. Food waste is not benign and is responsible for much of the greenhouse gases and odours produced by landfills. There is a growing movement to reduce food waste at the source by promoting responsible food buying and management practices.

> ***Food Waste in the United States***
>
> *Consider these estimates of the resources dedicated to food that never gets eaten in the United States:*
> *• 25%of all freshwater used in U.S.*
> *• 4% of total U.S. oil consumption*
> *• $750 million per year in disposal fees*
> *• 33 million tons of landfill waste*

The food reduction awareness pilot project will look at providing focused education and awareness material to a local neighbourhood(s) and monitoring to see what effect this has on the reduction of food waste.

<u>Budget Impact</u>

It is estimated that a food reduction awareness pilot project will cost approximately $20,000. A portion of this cost is to hire students for a 26 week period to assist with Initiatives 7 and 8. Funds for this project will be included in the 2015 draft budget.

Initiative 9: *Examine incentive options for Blue Box recycling*

The *Sort it right!* Campaign launched in late 2012 has been the key focus for the Blue Box program through 2013 and in 2014. The goal of the campaign is to minimize the amount of recycling errors in order to reduce the operational costs of sorting this material at the curb and in the recycling facility.

In addition to leaving behind 'Sort it right!' reminders to those that have made errors, providing positive feedback to the majority that recycle correctly is also a priority. Thank you cards have been used extensively.

It is proposed to examine other incentive options to promote recycling. These incentives can generally be broken into two broad types: recognition programs (includes curbside recognition of perfect recyclers through stickers on Blue Boxes, awarding a special box such as a Gold Box, etc.) and financial reward incentives. Financial reward programs are based on providing incentives to encourage positive actions such as recycling. The positive action is then measured and the consumer or community is rewarded through redeemable points or credits donated by businesses. Examples of these types of programs include RecycleBank and ZeroFootprint GOODcoins which recently launched in London but does not include a recycling component at this time.

Staff will examine recycling incentive programs and report back with recommendations. Based on initial findings staff may implement a pilot project designed to learn more about incentive programs.

<u>Budget Impact</u>

It is estimated that a Blue Box recycling incentive pilot project will cost approximately $20,000. Funds for this project will be included in the 2015 draft budget.

APPENDIX A

Road Map 2.0
Feedback

Community Events and Outreach Displays

Location	Type	Duration
Lifestyle Home Show (Western Fair District)	Staffed Display	Jan 23 - Jan 26
Kinsmen Arena	Unstaffed Interactive Display	Feb 6 - Feb 13
North London Community Centre	Unstaffed Interactive Display	Feb 13 - 20
Carling Arena	Unstaffed Interactive Display	Feb 20 - Feb 27
South London Community Centre	Unstaffed Interactive Display	Feb 27 - March 6
Carling Heights Community Centre	Unstaffed Interactive Display	March 6 - March 13
Stoney Creek Community Centre	Unstaffed Interactive Display	March 13 - March 27
Stronach Community Centre	Unstaffed Interactive Display	April 4 - April 11
Home & Garden Show (Western Fair District)	Staffed Display	April 11 - April 13
Kiwanis Seniors' Community Centre	Unstaffed Interactive Display	April 11 - April 17
Medway Community Centre	Unstaffed Interactive Display	April 17 - April 25
CityGreen (located at Citi Plaza)	Staffed Display	March - April
Masonville Library	Unstaffed Interactive Display	April 23 - May 6
Argyle Arena	Unstaffed Interactive Display	April 25 - May 2
Beacock Library	Unstaffed Interactive Display	May 6 - April 13
Earl Nichols	Unstaffed Interactive Display	May 2 - May 16
Hamilton Road Senior Centre	Unstaffed Interactive Display	May 2 - May 16
Crouch Library	Unstaffed Interactive Display	May 13 - May 20
Westmount Library	Unstaffed Interactive Display	May 20 - May 27
Landon Library	Unstaffed Interactive Display	May 27 - June 3
East London	Unstaffed Interactive Display	June 3 - June 11
Byron Library	Unstaffed Interactive Display	June 11- June 18

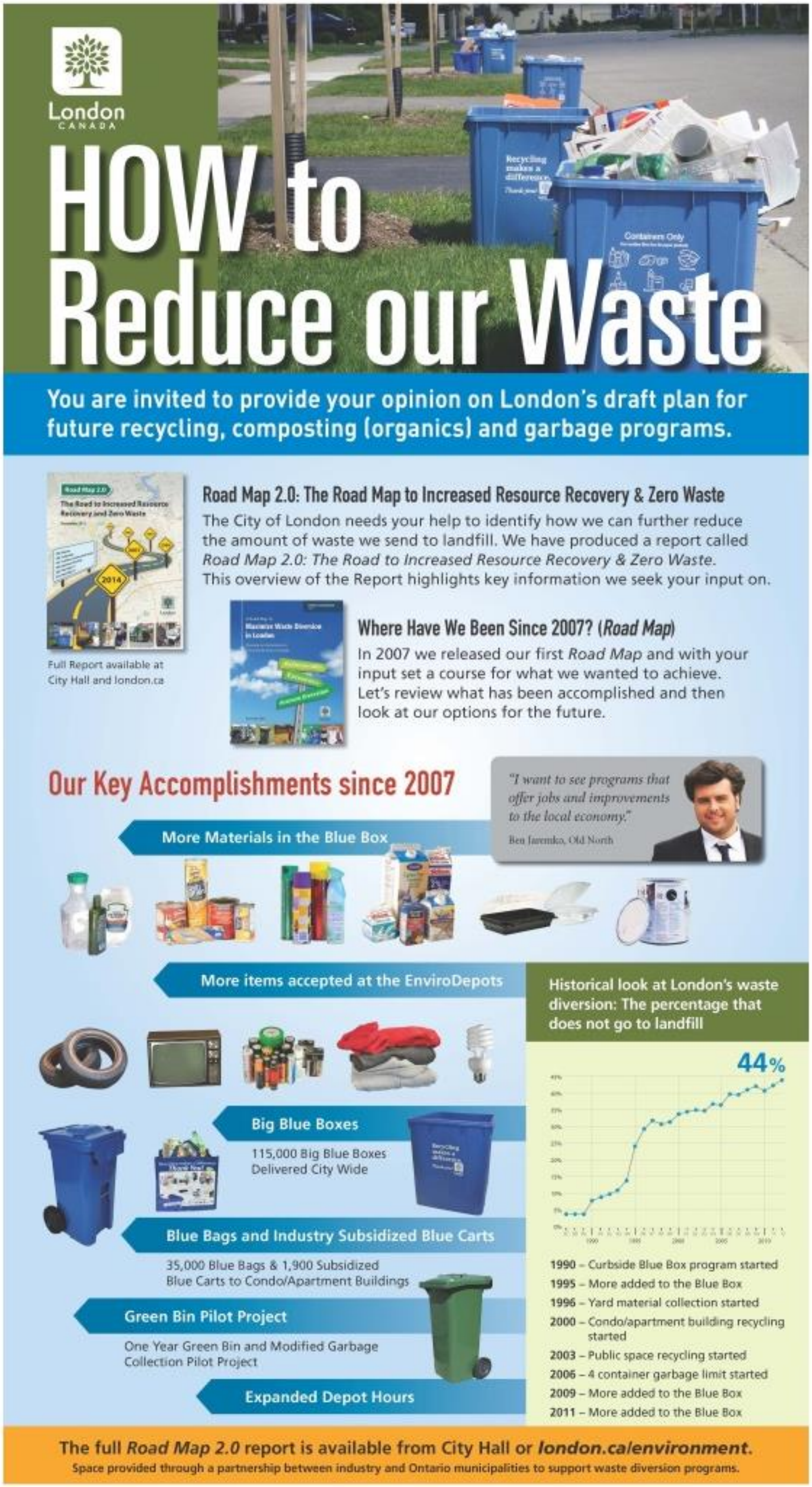
Unstaffed Interactive Display

CityGreen

Typical Bus Shelter Advertisement

Poster Displayed in Community Centres, Libraries, etc.

Four Page Flyer in London Free Press



London CANADA

HOW to Reduce our Waste

You are invited to provide your opinion on London's draft plan for future recycling, composting (organics) and garbage programs.

Full Report available at City Hall and london.ca

Road Map 2.0: The Road Map to Increased Resource Recovery & Zero Waste

The City of London needs your help to identify how we can further reduce the amount of waste we send to landfill. We have produced a report called *Road Map 2.0: The Road to Increased Resource Recovery & Zero Waste*. This overview of the Report highlights key information we seek your input on.

Where Have We Been Since 2007? (*Road Map*)

In 2007 we released our first *Road Map* and with your input set a course for what we wanted to achieve. Let's review what has been accomplished and then look at our options for the future.

Our Key Accomplishments since 2007

"I want to see programs that offer jobs and improvements to the local economy."

Ben Jaremko, Old North

More Materials in the Blue Box

More items accepted at the EnviroDepots

Big Blue Boxes

115,000 Big Blue Boxes Delivered City Wide

Blue Bags and Industry Subsidized Blue Carts

35,000 Blue Bags & 1,900 Subsidized Blue Carts to Condo/Apartment Buildings

Green Bin Pilot Project

One Year Green Bin and Modified Garbage Collection Pilot Project

Expanded Depot Hours

Historical look at London's waste diversion: The percentage that does not go to landfill

44%

- 1990 – Curbside Blue Box program started
- 1995 – More added to the Blue Box
- 1996 – Yard material collection started
- 2000 – Condo/apartment building recycling started
- 2003 – Public space recycling started
- 2006 – 4 container garbage limit started
- 2009 – More added to the Blue Box
- 2011 – More added to the Blue Box

The full *Road Map 2.0* report is available from City Hall or *london.ca/environment*.

Space provided through a partnership between industry and Ontario municipalities to support waste diversion programs.

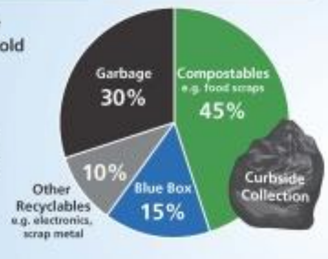
What's Left in the Garbage Bag?

Most of what we put in the garbage could be considered a resource and therefore should be diverted from the landfill. The pie charts below show just how much could be diverted – whether you put your garbage out to the curb, or down the chute into a garbage bin (2012 data). Increased diversion will have a social and financial impact, as well as environmental, so all factors will be considered.

CURBSIDE COLLECTION

For the average London household with curbside collection

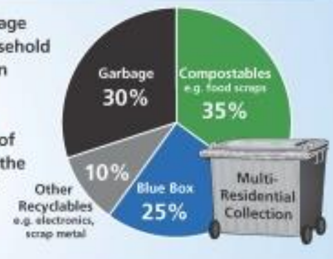
70% of materials in the garbage bag could be diverted



CONDO/APARTMENT BUILDINGS

For the average London household with bulk bin collection

70% of materials in the bin could be diverted



Reducing the Amount of Garbage Sent to Landfill. What are Some of the Choices?

"I want programs that are convenient and easy to understand."

Stacey Nicholls, Carling Heights

1 Blue Box Recycling

Here are some options for increasing how much we recycle:

- **Accept more materials** in the Blue Box:
  - coffee cups and ice cream containers
  - plastic 'blister packaging' (the hard-to-remove) clear plastic on toys and tools
  - batteries and metal pots & pans
- Provide **more recycling containers**.
- **More opportunities** to recycle away from home, such as in public spaces and businesses.

2 Organics Management

- **Home Composting**
  Home composting has played an important role in waste reduction in London. It is estimated that 500 to 2,000 more tonnes of food scraps could be diverted from landfill.
- **Community Composting**
  Community composting is now possible due to recent changes to provincial legislation.
- **Christmas Trees**
  Provide curbside collection for composting.
- **Green Bin Program**
  A decision about a Green Bin program has been delayed until a more comprehensive review of other options has been completed.

3 EnviroDepots

The EnviroDepots are popular destinations which provide a convenient 'one stop drop-off' for many materials. Options for increasing their effectiveness include:

- **Open a North-end Depot**
  - to complement our depots in the East, West and South ends
- **Accept more materials** for recycling:
  - paint
  - Styrofoam™
  - carpets and mattresses

4 Encouraging & Engaging Londoners

There are a number of 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.

Options include:

- decreasing the garbage bag limit
- more awareness and feedback to residents
- user pay system for extra bags
- reducing the frequency of garbage collection
- incentive programs to increase recycling
- mandatory recycling by-law

The full *Road Map 2.0* report is available from City Hall or *london.ca/environment*.

What Technologies Should We Look at to Help Reduce Waste?

There are various technologies that could assist in optimizing materials recovery and creating renewable energy while moving from the City's current diversion rate of approximately 44% towards the Provincial goal of 60% and beyond.

Approximate Costs for Alternative Technologies and Conventional Technologies

Alternative (Resource Recovery) Technologies (a)	Estimated Processing Cost per Tonne (b)
Anaerobic Digestion generally for separated organic matter	$70 to $120
Energy-from-Waste (advanced combustion and energy recovery)	$100 to $150
Advanced Thermal Treatment (produces charcoal, coke or gas) Examples include gasification, plasma gasification, pyrolysis	$80 to $155
Mechanical Biological Treatment (MBT) Examples include a combination of mechanical material sorting followed by composting, anaerobic digestion or bio-drying	$90 to $150
Conventional Technologies	**Estimated Processing Cost per Tonne (b)**
Aerobic Composting Examples include covered windrows, channel, in-vessel, silos, rotary drums	$80 to $120
Landfilling (c)	$30 to $45

(a) Some technologies require a separated stream of materials; others handle mixed waste.
(b) Estimated technology cost ranges include annual operating costs and annualized capital costs. Revenue streams from product sales are not included.
(c) Generally all new, emerging and next generation technologies have some reliance on landfilling. This does not include potential advancements to landfill technology.

"I am concerned about the cost and how it will be paid for. Our taxes are already high enough."

Bob Lyons, Byron West

Understanding Financial Considerations

Approximately 65% of total waste management costs are paid by property taxes and 35% comes from recycling revenues, service fees and stewardship funding from industry. In 2013, it cost Londoners $5 million ($30 per household) to serve 170,000 households with our existing waste diversion programs. Below we consider what programs will increase our diversion rate and at what costs.

Diversion rate and level of program changes that are required	40 - 45% **Minor Changes** Recycling improvements	45 - 50% **More Changes** Recycling & composting improvements	50 - 60% **Major Changes** New technology for organics	60 - 80% **Significant Changes** New technology for remaining waste
Diversion Rate: percent of waste diverted from landfill Green = diverted Yellow = landfilled				
Estimated cost range to achieve diversion rate	$60,000 to $120,000	$800,000 to $1,000,000	$3,800,000 to $5,000,000	$6,000,000 to $10,000,000
Additional cost at the household level	$0.35 - $0.70	$5 - $6	$23 - $29	$35 - $60
Total waste diversion cost per household	$30 - $31	$35 - $36	$53 - $59	$65 - $90

What is Your Opinion on the Recycling and Garbage Collection Schedule? Do you want more pick-ups?

Options	How it would work?	Number of Collections per year	Additional Annual Cost	Additional Cost per Household Served
Current Schedule	No change – Collection once every 6 business days	42	$0	$0
Seasonal Change	Collection on the same day. Garbage is weekly in summer, bi-weekly in winter. Recycling is weekly.	39 - garbage 52 - recycling	$700,000 to $1,000,000	$7
5 Days	Collection once every 5 business days. The collection day moves forward after a statutory holiday.	50	$700,000 to $900,000	$7
Same Day	Same day collection every week	52	$1,100,000 to $1,300,000	$10

We need to hear from you! See the next page for how to have your say.

See the next page for how to have your say.

Recycling and Resource Recovery Help Reduce Energy Use and Reduce Greenhouse Gas Emissions

Most of us know that recycling, composting and reducing the amount of waste we send to landfill is better for the environment. What you might not know is that making cans and newspapers from raw materials like minerals and trees takes far more energy than recycling old cans and newspapers. Plus, a lot of these smelters and paper mills are far away in Northern Ontario or Quebec, while recycling plants are closer to home. Less energy = fewer greenhouse gases. It also means that less land needs to be mined or forests felled for raw materials.

When food scraps and other compostable organic matter are sent to landfills, they produce methane (a potent greenhouse gas) as these materials decompose. By composting or reducing organic matter sent to landfill through alternative resource recovery technologies (see previous page) we can reduce greenhouse gas emissions. In fact, we are also able to make biofuels and other products from some of these technologies!

How to Reduce our Waste

We Need to Hear from You!

- london.ca/environment
- es@london.ca
- @CityofLdnOnt or #ReduceLdnWaste
- facebook.com/LondonCanada
- Solid Waste 519-661-2500 ext 8413

"My main concern is the environment. What are we leaving for the next generation?"

Grace Corby, Fairmont

Community Energy Action Plan

Give us your feedback on ANOTHER important community engagement project

Recycling and resource recovery is just one way we can reduce energy use in London. London's draft Community Energy Action Plan outlines what we can all work on over the next 5 years. Tell us what you think of our draft plan – and what actions you have taken or plan to take to reduce your energy use.

Find out more at **london.ca/environment**.

London
CANADA

The full *Road Map 2.0* report is available from City Hall or *london.ca/environment*.

Summary of Comments from Community Engagement

Year	Proposed Programs/Initiatives	General Support		Suggested Alternatives/ Comments
		Yes	No	
2013	• North end EnviroDepot	49	1	
	• Delay Green Bin	9	78	
Early 2014 Adoption	• Two Blue Boxes for new homes	28	3	• Different colours for paper and container boxes
	• Multi-residential recycling cart purchase program	30	0	
	• Vegetable oil and used motor oil collection to the EnviroDepots	26	1	• Vegetable oil drop off for commercial, not residential • Exemption period at curb
Further Investigation in the Short Term (2014 to 2015)	• Add mixed polycoat & blister packaging to the Blue Box program	49	0	
	• Sell Blue Boxes at EnviroDepots at cost	29	0	
	• Front end bin cardboard collection at multi-residential buildings	27	0	
	• Start downtown cardboard collection	24	0	• Full Blue Box recycling recommended by five
	• Increase public space recycling	36	0	
	• Facilitate purchase of recycling services by BIAs/commercial areas	29	0	
	• Targeted education/awareness programs for selected Blue Box materials	54	0	
	• Increase education and awareness funding (as budgets permit)	10	3	• Blue Box program should be standardized across Ontario
	• Explore source reduction of food waste	3	0	

Summary of Comments from Community Engagement

<table>
<tr><th rowspan="2">Year</th><th rowspan="2">Proposed Programs/Initiatives</th><th colspan="2">General Support</th><th rowspan="2">Suggested Alternatives/ Comments</th></tr>
<tr><th>Yes</th><th>No</th></tr>
<tr><td></td><td>• Examine the role of community composting</td><td>13</td><td>1</td><td></td></tr>
<tr><td rowspan="6">Further investigation in the Mid-term (2016 to 2019)</td><td>• Add single use batteries and metal cookware to the Blue Box program</td><td>28</td><td>0</td><td></td></tr>
<tr><td>• Provide replacement Blue Boxes to residents</td><td>28</td><td>3</td><td>• Only provide to those that request</td></tr>
<tr><td>• Add paint, expanded foam polystyrene, carpets and mattresses to EnviroDepots</td><td>39</td><td>1</td><td>• Ban the use of expanded foam polystyrene
• Exemption period at curb</td></tr>
<tr><td>• Increase home composting</td><td>25</td><td>5</td><td>• Too difficult in winter
• Not possible in apartments</td></tr>
<tr><td>• Explore a reduced bag limit with user pay system for extra garbage</td><td>59</td><td>23</td><td>• User pay for bulky items
• User pay after Green Bin implemented
• Limit bulky item collection to four times a year</td></tr>
<tr><td>• Begin semi-annual curbside collection of electronics, scrap metal and batteries</td><td>1</td><td>0</td><td>• Retailers already take-back</td></tr>
<tr><td rowspan="4">Delayed – Future Consideration</td><td>• Add film plastic, expanded foam polystyrene and textiles to the Blue Box</td><td>25</td><td>0</td><td>• Add light bulbs</td></tr>
<tr><td>• Add film plastic to the EnviroDepots</td><td>29</td><td>1</td><td>• Can be taken back to grocery stores</td></tr>
<tr><td>• Examine full User Pay for garbage</td><td>5</td><td>0</td><td></td></tr>
<tr><td>• Mandatory Recycling Bylaw (with and without clear bags for garbage)</td><td>26</td><td>11</td><td></td></tr>
</table>

Summary of Comments from Community Engagement

Year	Proposed Programs/Initiatives	General Support		Suggested Alternatives/ Comments
		Yes	No	
Financial Considerations	• 40-45% Diversion = $60,000 to $120,000 ($0.35 - $0.70 per hhld)	3	0	
	• 45-50% Diversion = $800,000 to $1,000,000 ($5 - $6 per household)	8	0	
	• 50-60% Diversion = $3,800,000 to $5,000,000 ($23-$29 per household)	6	0	
	• 60-80% Diversion = $6,000,000 to 10,000,000 ($35 -$60 per household)	23	0	
Other Potential Initiatives	• Recycling Containers at community mail boxes for paper	7	0	
	• Reducing over-circulation of flyers and newspapers	9	0	
	• Take Back programs	4	0	
	• Furniture re-use/exchange programs	5	0	
	• School programs	4	0	
	• Community workshops	1	0	
	• Incentives for living green	3	0	
	• Newsletters to residents/neighbourhood groups	4	0	
	• Support resident groups and ambassador and volunteer programs	1	0	
	• Waste reward programs for top performing residents (i.e. gold box)	5	0	
	• Encouraging smarter consumer practices	2	0	
	• All of the Above	22	0	

APPENDIX B

ROAD MAP 2.0
The Road to Increased Resource Recovery and Zero Waste

Road Map 2.0

The Road to Increased Resource Recovery and Zero Waste

December 2013

1990 Blue Box
1996 Composting
1997 Continuous Improvement System
1999 Apartment Recycling
2007 Road Map 1.0
2014 Road Map 2.0

London
CANADA

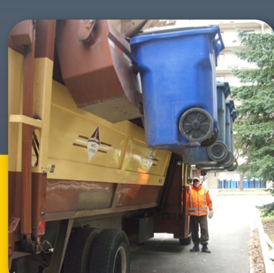




Table of Contents

1) INTRODUCTION 1
1.1 WE WANT YOUR INPUT – HERE'S HOW YOU CAN GET INVOLVED 1
1.2 CONTINUOUS IMPROVEMENT STRATEGY – DELIVERED SINCE 1997 2
1.3 GUIDING PRINCIPLES SINCE 2007 3
2) ROADMAP 1.0 5
2.1 WHAT HAS BEEN ACCOMPLISHED SINCE 2007? 5
2.2 Roadmap 1.0 – HAS IT MADE A DIFFERENCE? 5
3) PLANNING THE NEXT TRIP 10
3.1 INTRODUCTION 10
3.2 WASTE COMPOSITION NOW AND IN THE FUTURE 10
3.3 CURRENT AND FUTURE ROLE OF THE CITY OF LONDON 11
3.4 ROLE OF OTHER PUBLIC AND PRIVATE ORGANIZATIONS 14
3.5 NEW AND EMERGING TECHNOLOGIES 17
4) WHAT'S NEXT…ROADMAP 2.0 – What are the Choices? 19
4.1 INTRODUCTION 19
4.2 BLUE BOX RECYCLING PROGRAM 20
4.3 ORGANICS MANAGEMENT 30
4.4 ENVIRODEPOT (MULTI-MATERIAL) PROGRAMS 35
4.5 ENCOURAGING AND ENGAGING LONDONERS 38
4.6 OTHER POTENTIAL INITIATIVES 41
5) HOW FAST/FAR DO WE DRIVE? 42

List of Figures

Figure 1 - Historical Diversion Rates 1987-2012 4
Figure 2 - Garbage Generation from 2007 to 2012 5
Figure 3 - Volume of Recyclables Captured 7
Figure 4 – Annual EnviroDepot Visitors 8

List of Tables

Table 1 - Measures Undertaken from Roadmap 1.0 6
Table 2 – Capture Rates of Recyclable 7
Table 3 – Approximate Costs and Cost Ranges for Alternative Resource Recovery Technologies 18
Table 4 – Key Recyclable Materials to Target 27
Table 5 - Residential Curbside Garbage Composition 30
Table 6 – Ongoing Green Bin Costs 31
Table 7 - Breakdown of Food Waste 34
Table 8 - Implementation Schedule 43

List of Appendices

Appendix A .... Historical Waste Diversion Data
Appendix B .... Waste Compostion Data
Appendix C .... Potential Materials to be Added to the Blue Box Program
Appendix D .... Green Bin Information
Appendix E .... Home Composting Information
Appendix F .... Potential Materials to be Added to the EnviroDepots

1) INTRODUCTION

1.1 WE WANT YOUR INPUT – HERE'S HOW YOU CAN GET INVOLVED

What can we do? How do we do it? We need to hear from Londoners what their priorities are and how quickly do they want to move with respect to increased recovery and zero waste initiatives. The proposed four-month public engagement period with Londoners includes:

- Information through traditional media, including a summary of the report in the London Free Press
- Social media outreach
- Outreach at community events (e.g., London Home Builder's Association Home Show)
- Feedback opportunities through a variety of means including the City's website

Step 1: Read this Road Map... You are already well on your way by reading this document which provides information on many options being considered by the City to increase waste diversion and resource recovery. Thank you for your interest and for your time.

More information about London's existing programs can be found at london.ca. Looking at other municipal websites is also a good way to learn about programs and service options in other municipalities. To compare how London is doing relative to other Ontario municipalities you can go to the Waste Diversion Organization (WDO) website at wdo.ca where they compile information on materials being recycled and composted by municipalities. Stewardship Ontario's website stewardshipontario.ca has information specific to Ontario Blue Box programs as well as reports on new programs, demonstration projects and waste audits submitted by municipalities, including London.

Step 2: Understand the Options and Tell Us Your Preferences…Once you understand the options for London, the next step is to tell us what you prefer and why. This document will provide the information you need to make informed decisions about the cost of new programs, how much more material can be recycled or composted, as well as the environmental benefits.

Some of the information to help you evaluate the options will come from your own willingness and the willingness of your friends and neighbours to participate and support both current and new programs. Consider for example, if you are willing to support a reduction in the garbage container limit? Or, if you would be willing to spend more time separating recyclables if the City was to add new materials to the program? It is important to consider the impact of these new programs on your daily routine and ask if it is feasible for you to participate.

Step 3: Provide Feedback…We need to hear back from Londoners, especially if you have reviewed this document and considered the options. Opportunities to provide feedback can be found at london.ca/roadmap or by calling 519-661-2500 ext. 5419.

1.2 Continuous Improvement Strategy – Delivered Since 1997

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. 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 fifteen years ago, the City of London has steadily increased its performance to the current level of 44% waste diversion while having one of the lowest total waste management costs in Ontario for urban centres (based on statistics compiled by the Ontario Municipal Benchmarking Initiative – OMBI).

The nature of continuous improvement is to improve using logical, incremental and measurable steps. It applies to all elements of the waste management system, from administrators and designers, to service providers and system users. Continuous improvement is constantly adapting, by obtaining and using information, and by evaluating changes to make sure that they are effective. It requires:

a) The ability to pull people and resources together from different levels and areas of the Corporation of the City of London; other levels of government; citizens and community groups; employees and employers; waste management service providers; academia; and industry specialists to freely discuss the information and issues involved, come up with ideas, evaluate them, choose some, and carry them out.

b) Key information about our programs, projects and policies, from a variety of sources. This is used to evaluate our outcomes (what has been achieved) and our processes (how we go about doing it).

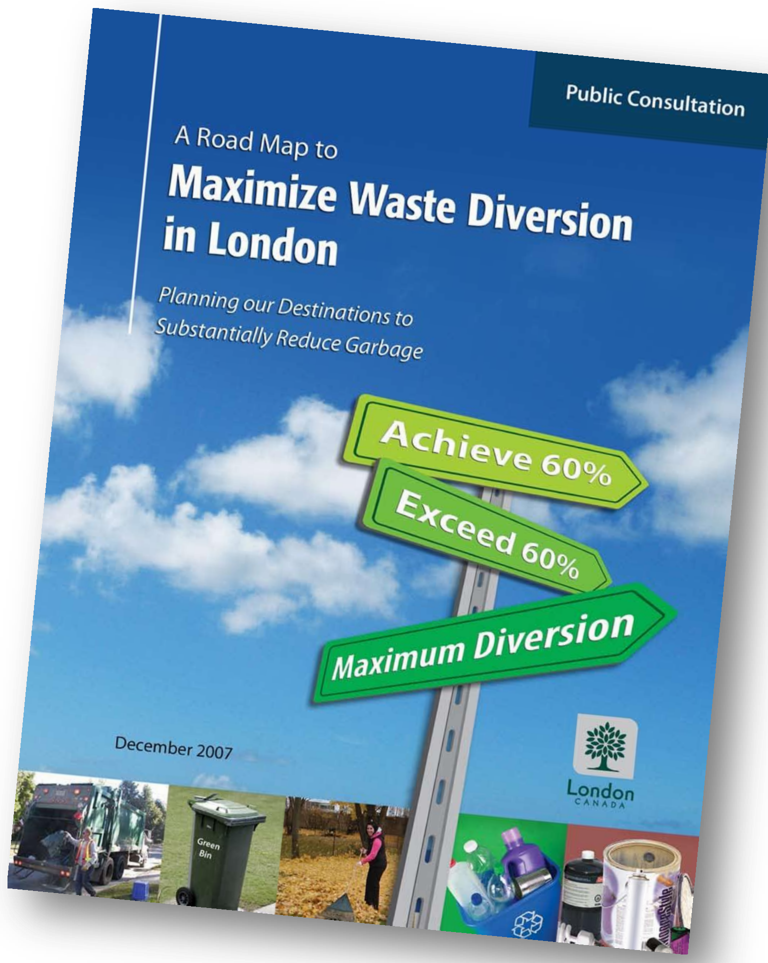
c) Systematic and transparent ways to measure the outcomes of our changes and progress.

d) A real desire to improve, even if it means adjusting or changing relationships and doing some things you do not completely agree with.

The current report – *Road Map 2.0 – The Road to Increased Resource Recovery and Zero Waste* – continues from the earlier report - *A Road Map to Maximize Waste Diversion* (2007) - which guided the path to bring us to where we are today. In the next sections we will reflect on our progress since the first Road Map report as we engage on setting a route for the future.

1.3 Guiding Principles Since 2007

When A Road Map to Waste Diversion in London was released in 2007 London had reached a significant milestone on the waste diversion road. A 40% waste diversion rate was achieved in 2006 and sustained through 2007. We had come a long way since 1987 when only 4% of residential waste was diverted from landfill. What made the difference? At the provincial level waste diversion became a priority. Ontario's Waste Reduction Action Plan, announced in February 1991, set a goal to divert 50% of waste by 2000 using 1987 as the base year. In London, the introduction of the Blue Box Program in 1990 allowed us to make significant inroads. Moreover it has been the commitment of Londoners to continuously increase the amount of waste that is recycled through the expansion of this program and composted through newer City initiatives.

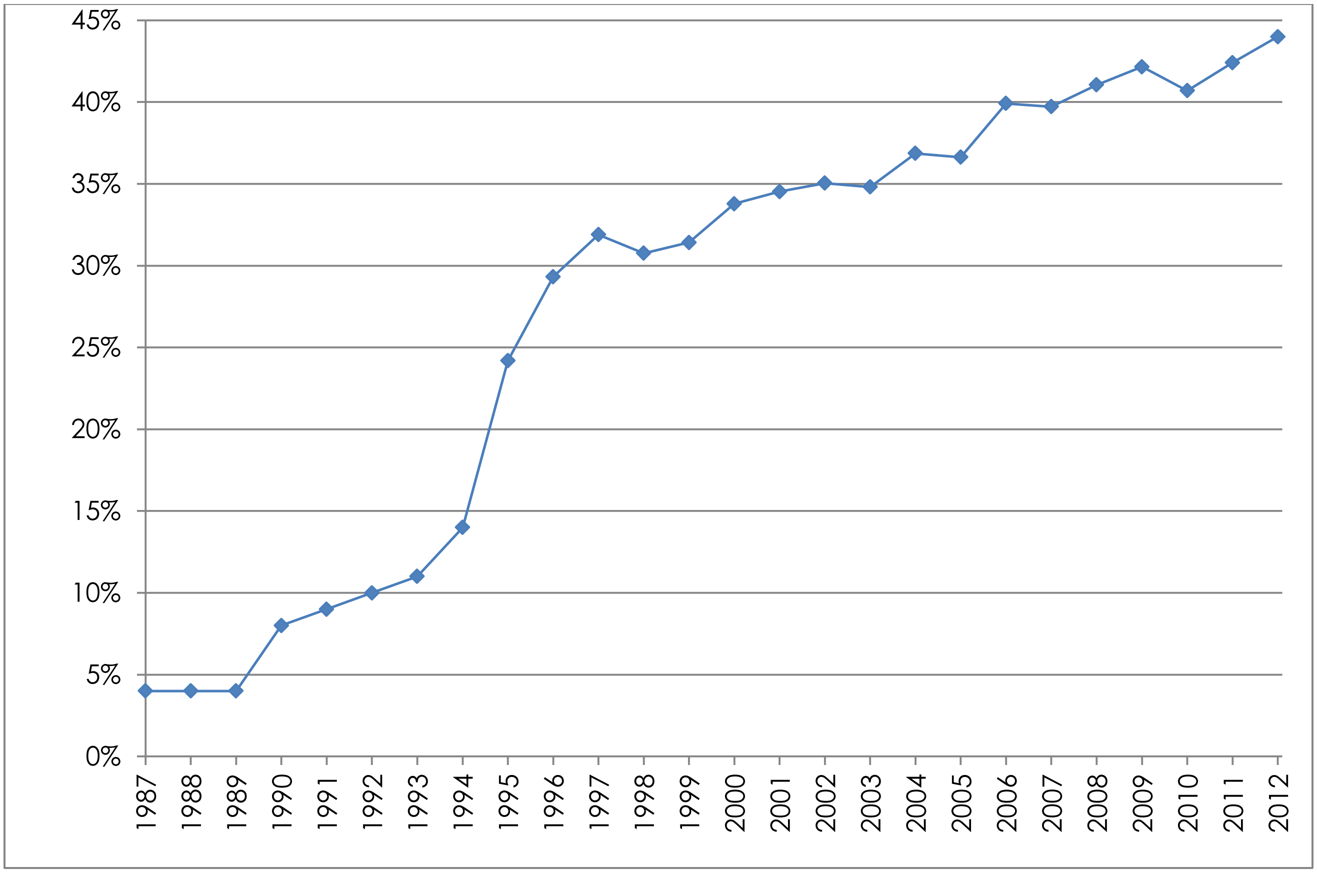


In 2007, the document *A Road Map to Maximize Waste Diversion in London* was released for public comment and input. This document set the direction for waste management decisions in the coming years. A number of guiding principles were established as a result of this document and the subsequent Business Plan was approved by Council. These guiding principles included:

- Continuous improvement to maximize waste diversion
- Reduce or maintain current costs of City programs
- Support local job creation efforts
- Minimize the negative impact to Londoners
- Align with Provincial direction and the revised Waste Diversion Act

Today, waste diversion programs contribute to the overall diversion rate of 44%, as shown in Figure 1 on the following page. As we go forward towards 60% diversion and beyond, we need to identify the most cost effective programs to divert additional materials that are currently placed in the garbage.

Figure 1 - Historical Diversion Rates 1987-2012



Key Program Changes

1990	-	Curbside Blue Box pickup introduced City wide
1994	-	Appliances banned from garbage collection
1995	-	Added new items to Blue Box
	-	Grass clippings banned from garbage collection
1996	-	Curbside pickup of yard materials
2000	-	Multi-Residential Building Recycling Program started
2002	-	Electronics Recycling introduced at EnviroDepots
2003	-	Public Space Recycling started
2005	-	Renovation Material accepted for recycling at the EnviroDepots
2006	-	4 Container Limit for Garbage introduced for curbside collection
2007	-	Container limit fully implemented and enforced
2009	-	Added more items to Blue Box Program
2011	-	Further expansion of Blue Box Program

2) ROADMAP 1.0

2.1 What Has Been Accomplished Since 2007?

In 2007 the document *A Road Map to Maximize Waste Diversion in London* was released for public comment and input. This document looked at a wide range of program changes, initiatives and new measures to increase waste diversion.

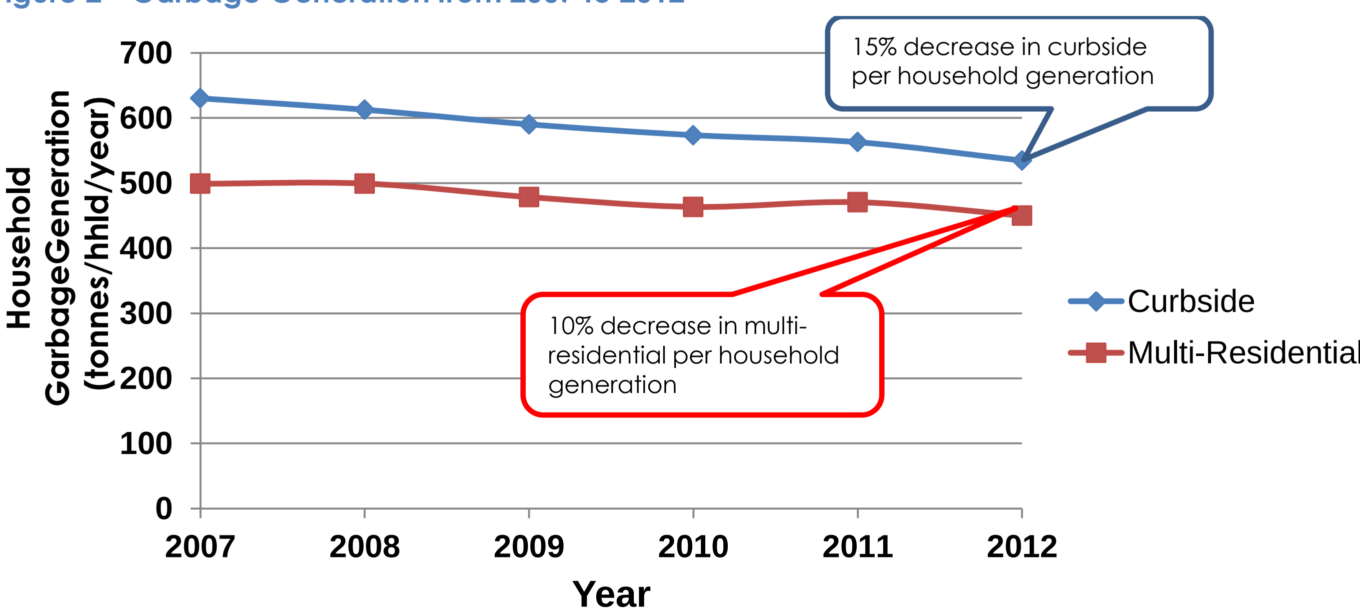
Following extensive consultation the *Interim Business Plan for the Green Bin Program and Zero Waste Initiatives* was developed and approved by Council. The Interim Business Plan required Council approval of each proposed individual program change, initiative or new measure before they could be implemented. The key components of the interim business plan are listed in Table 1 (next page) along with the program changes, initiatives and new measures implemented to date.

2.2 Roadmap 1.0 – Has It Made A Difference?

Yes…the programs and initiatives implemented have increased overall waste diversion from 40% in 2007 to 44% in 2012 (see details in Appendix A) as well as resulted in many other system improvements. Four examples are presented below.

a) Decrease in Garbage Generation

Figure 2 - Garbage Generation from 2007 to 2012



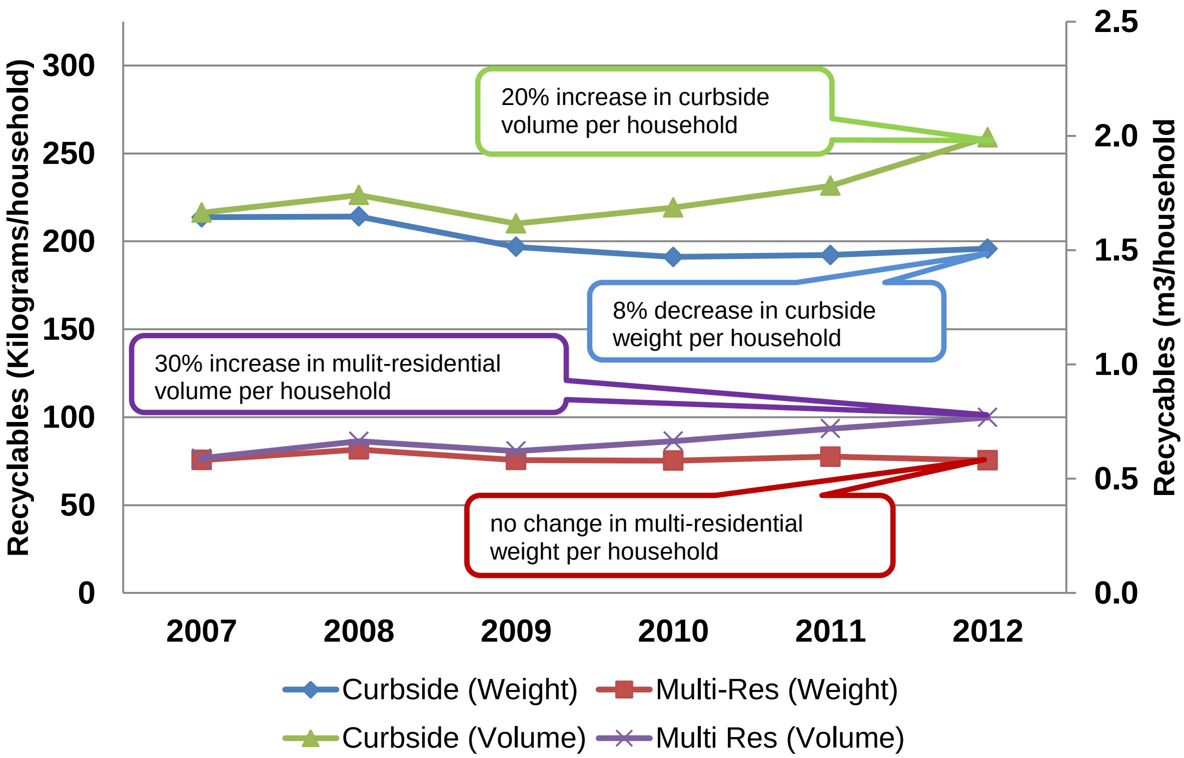
The amount of garbage generated per household has continuously dropped for curbside and multi-residential homes over the last five years. The main reason for this drop is the many initiatives implemented to divert waste. However, other factors besides the new waste diversion initiatives have also contributed to this decrease. These factors include changing waste composition (see discussion on next page), demographics (smaller households, aging population) and a downturn in the Canadian and local economy.

Table 1 - Measures Undertaken from Roadmap 1.0

	Interim Business Plan Component	*Measures Undertaken*
✓	***New Materials Added to the Blue Box Program***	• milk and juice cartons • drinking boxes • steel paint cans and aerosol cans • #3, #6 and #7 plastic bottles, tubs and jugs • thermoform PET plastic (e.g. clamshell containers) • cardboard cans
✓	***New Materials Added to the EnviroDepots***	• tires, appliances • used clothing and small household items • batteries • fluorescent tubes and bulbs • empty oil containers • vegetable oil (HSW Depot only)
✓	**Convenience and Capacity Added to Blue Box Program**	• delivered 115,000 large capacity Blue Boxes • delivered 35,000 reusable Blue Bags • added 8,000 apartment units to the program (an increase of 25%) • added 1,900 Blue Carts to existing buildings (an increase of 65%) • expanded public space recycling
✓	**Convenience and Capacity Added to the EnviroDepots**	• expansion of Oxford EnviroDepot • expansion of Clarke Road Depot (underway) • proposed EnviroDepot in north end of the City (planning stages) • HSW open 5 days/week, up from 1 day/week • allow small businesses to use HSW Depot
✓	**Enhanced Education and Awareness Programs**	• Many initiatives over the last 5 years including: o *Sort it Right* campaign o *Plastic Containers Are In* campaign o London Clean & Green expanded
✓	**Green Bin Pilot completed**	• 760 homes participated in pilot project • four season (yearlong) study • seasonal collection schedule studied (weekly Blue Box and Green Bin, weekly garbage in summer and bi-weekly garbage in winter)
✓	**Provincial Engagement**	• Staff are actively involved in provincial processes and organizations to help set direction. Staff currently or in the past have been on the Board of Directors and/or committees for: o Association of Municipalities of Ontario (AMO) and the AMO Waste Management Task Force (current) o Regional Public Works Commissioners of Ontario (RPWCO) and the RPWCO Solid Waste subcommittee (current) o Ontario Waste Management Association (OWMA) (current) o Municipal Waste Association (MWA) (from 2007 to 2013) • Staff are involved with other organizations (e.g., Recycling Council of Ontario) receiving updates and comments via general membership

Increase in the Volume and Percentage of Recyclables Captured

Figure 3 - Volume of Recyclables Captured



The volume of recyclables captured per household has increased significantly over the last five years while the weight of recyclables has decreased. This is because of changes to the composition of waste over the last five years. Examples of these changes include:

- An increase in light weight and multi material packaging (e.g. more packaging of fruits and vegetables in "clamshell" plastic containers)
- Plastic containers replacing glass, aluminum and steel
- An increase in plastic stand-up pouches for food products replacing plastic containers
- Consumers reading more newspapers and magazines online

This means much more effort is required to recycle a tonne of recyclables than in the past because there are many more items that must be collected and processed.

<u>*Percentage of Recyclables Captured*</u>

Waste composition studies conducted by Stewardship Ontario in 2007 and 2012 show the percentage of recyclables has increased (see Table 2).

Table 2 – Capture Rates of Recyclable

Material	*Capture Rate of Blue Box Materials*		*2012 vs 2007 Capture*
	2007	*2012*	
Paper	80%	85%	+ 5%
Paper Packaging	55%	56%	+ 1%
Plastics	28%	31%	+ 3%
Metals	50%	56%	+ 6%
Glass	75%	75%	No change

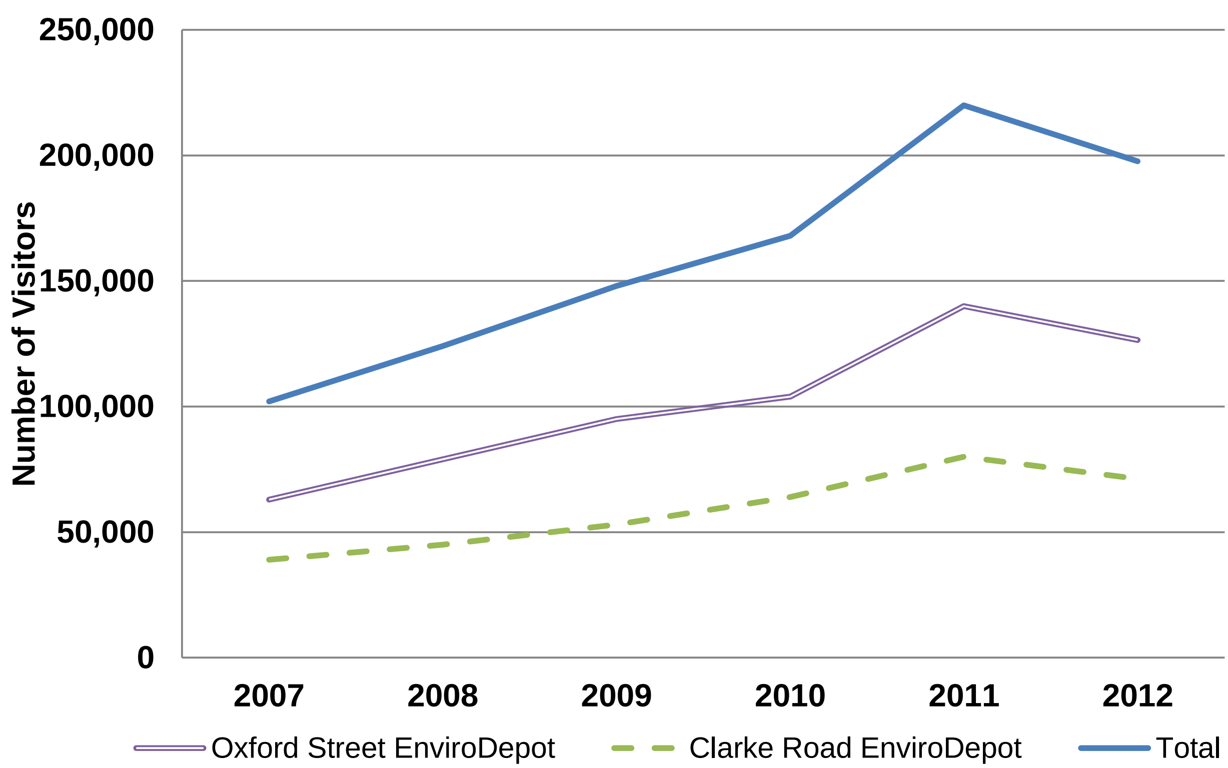
b) More Residents Accessing City Programs

Many more residents are accessing City waste diversion programs. For example, the number of residents using the EnviroDepots since 2007 has doubled. (Figure 4)

The list of materials added at the EnviroDepots, since 2007 are:

- tires, appliances
- used clothing and small household items
- batteries
- fluorescent tubes and bulbs
- empty oil containers
- vegetable oil (HSW Depot only)

Figure 4 – Annual EnviroDepot Visitors



c) More Access to Waste Diversion Programs through other Organizations

Thanks to provincial Extended Producer Responsibility (EPR) programs, residents now have access to recycling programs for tires, electronics and household special waste (e.g. paint, batteries, etc.) at retail locations throughout the city. In addition to 'take-back' type programs (e.g. paint, light bulbs, etc.) recycling is more common in businesses and retail locations, and drop-off for return of plastic bags at many retailers has now become common place. Other diversion initiatives in the London community include:

- Retail take-back programs offered by retailers for a range of items including electronics, batteries, compact florescence light bulbs, paint, plastic bags, printer cartridges, tires and appliances
- Specialized diversion programs offered by businesses that target materials designated by Waste Diversion Ontario, that generate revenue for the businesses through industry steward fees paid by manufacturers (e.g., electronics, batteries)
- Resource recovery of materials banned from garbage collection and disposal, such as construction and renovation materials (e.g. scrap metal, wood)
- Deposit programs: Beer Store and LCBO
- Growth of drop-off locations and pickup for used goods (e.g. Goodwill, Thrift Stores, Canadian Diabetes)

Do you want more information?

Additional details on the City's *A Road Map to Maximize Waste Diversion in London (2007),* the *Interim Business Plan* or technical information on the City's waste diversion programs can be found at london.ca

3) PLANNING THE NEXT TRIP

3.1 INTRODUCTION

Before deciding on what changes to the current waste management system are appropriate, consideration must be given to:

- What waste is composed of now and in the future
- The current and future role of the City of London
- The role of other public and private organizations
- New, emerging and next generation technologies

3.2 WASTE COMPOSITION NOW AND IN THE FUTURE

The waste stream is constantly changing due to industry introducing new packaging or modifying existing packaging, changing consumer habits and new products in the marketplace. Some of the changes that have occurred over the last five years were previously listed.

These trends coupled with the waste diversion programs implemented under the *Road Map to Maximize Waste Diversion* means what is being collected for recycling and for disposal is different today than in 2007 and will be different in the future.

Details of current and projected waste quantities are presented in Appendix B. What is currently in the garbage is shown on the next page and discussed below.

Single Family Households

Single families make up about 70% of London's households and generate approximately 60,000 tonnes of the residential garbage each year that is landfilled. A large percentage of this waste could be composted or recycled.

A breakdown of what is in the typical garbage bag is illustrated on the page 12. About 10% of single family household garbage is material that should have been placed in the Blue Box. A further 10% of the garbage, including renovation materials and electronics, could have been taken to a Community EnviroDepot and recycled. It may be possible to capture more of these materials with enhanced education programs.

An expanded Blue Box program that accepted additional items such as mixed polycoat (e.g. coffee cups, ice cream containers), metal cookware, batteries, blister packaging (e.g. *rigid plastic around toys, hardware*), film plastic (e.g. plastic bags) and foam polystyrene "EPS" (e.g. meat trays) could reduce garbage a further 5%.

About 45% of landfill garbage is compostable (i.e. organics such as food scraps and non-recyclable paper such as paper towel, paper napkins). Expanding our current organics program of grass, leaves and yard waste to include one or more programs focused on the expanded list of organics by reducing the amount created, composting separated materials and/or recovering the energy content would significantly increase diversion, source reduction, and provide other environmental benefits.

Multi-Residential Households

About 30% of London's households live in multi-residential (apartment/condo) buildings and generate approximately 22,000 tonnes of garbage per year. A breakdown of the garbage collected from multi-residential buildings is presented on page 13.

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 (22% versus 10% for single family) but less of the garbage is compostable (36% versus 45% for single family).

3.3 CURRENT AND FUTURE ROLE OF THE CITY OF LONDON

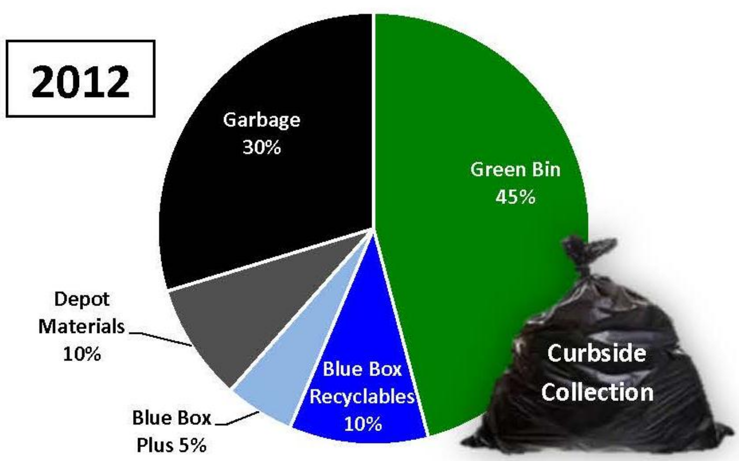
The City of London is the main service provider for the delivery of solid waste collection, processing and disposal services for the residential waste stream in London. The responsibility for management of some residential waste materials is shared with industry as required under the Waste Diversion Act (WDA). The WDA has established a framework for partial funding of designated material groups, which includes Blue Box program materials, electronics, household hazardous waste, and tires. The City also provides some waste management services to the Institutional, Commercial & Industrial (IC&I) sector. In addition to providing services, the City plays a role through input in provincial processes that will have an impact on how we deliver and pay for our programs and services.

The role of the City in the future will be determined in part by a new Ontario Waste Reduction Act and Waste Diversion Strategy. The direction of the new WRA if approved is for industry to play a larger role in waste management. This could result in more funding for City programs or industry delivered services, or a blending of both options. City staff will continue to follow the process of the proposed revised WDA at the provincial legislature.

What's in the Garbage Bag?

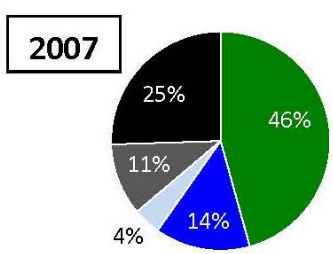
Most of what we put in the garbage could be diverted from the landfill through existing and new programs that are discussed in this document. The composition diagrams below and on the next page show just how much – whether you put your garbage out to the curb, or down the chute into a garbage bin.

Curbside Collection



For the average London household with curbside collection **70%** of materials in the garbage bag could be diverted.

Compared to 2007, this is a **5%** improvement to the composition found in the garbage bag.



Legend

Blue Box:
Items from the existing program that are put in the garbage instead of being recycled.

Blue Box Plus:
Items that are harder to collect and process and have less stable end markets - expanded Polystyrene ™ (light weight foam packaging), plastic bags & plastic wrap, polycoat materials such as beverage cups, ice cream tubs.

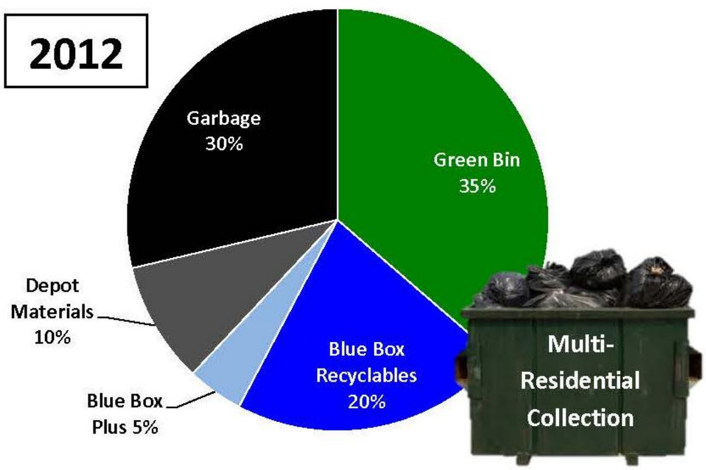
Depot Materials:
Items that could be dropped off at a depot and recycled – textiles, scrap metal, electronics, household renovation materials.

Green Bin:
Compostable materials - kitchen scraps and non-recyclable paper (soiled paper, tissue, paper towel).

Garbage:

What's in the Garbage Bin?

Multi-Residential Collection

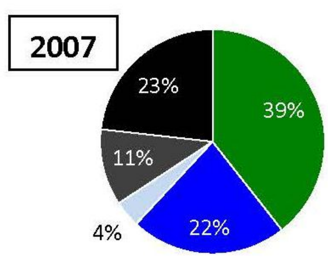


For the average London household with bulk bin collection

70% of materials in the bin could be diverted.

Compared to 2007, this is a

7% improvement to the composition found in the bulk bin.



Legend

Blue Box:
Items from the existing program that are put in the garbage instead of being recycled.

Blue Box Plus:
Items that are harder to collect and process and have less stable end markets - expanded Polystyrene ™ (light weight foam packaging), plastic bags & plastic wrap, polycoat materials such as beverage cups, ice cream tubs.

Depot Materials:
Items that could be dropped off at a depot and recycled – textiles, scrap metal, electronics, household renovation materials.

Green Bin:
Compostable materials - kitchen scraps and non-recyclable paper (soiled paper, tissue, paper towel).

Garbage:

3.4 Role of Other Public and Private Organizations

There are many other organizations that have a role in diverting residential waste generated in the city. The role of these organizations and the potential for partnership opportunities with the City must be taken into consideration when looking at new initiatives.

Community Organizations

There are numerous community organizations that share the City's interest in waste reduction and diversion. These include organizations such as Goodwill, Thames Region Ecological Association (TREA), Waste Free World, Habitat for Humanity Restore and Youth Opportunities Unlimited (YOU) Recycling Services. Working with these groups helps keep the City in touch with resident concerns and provides us an opportunity to promote our programs through a wider community network. The City will continue to explore opportunities to build relationships and partnership initiatives.

Local Business

London businesses represent a large source of waste and resource materials. Their level of engagement in responsible waste management practices will have an impact on some City programs and facilities, such as our landfill lifespan and potential throughput of materials received at waste diversion facilities (e.g. EnviroDepots, Materials Recovery Facility, Household Special Waste Depot).

Through their internal policies and actions, businesses can play an important role in the London community to encourage and support a culture of waste minimization and waste diversion. Londoners are increasingly conscientious about how much waste they are creating as they go about their daily routines, at work, at school, as they shop, dine out, etc. As consumers of products and services Londoners want to have options to minimize their waste. The proposed Waste Reduction Act, which is before the Ontario Government for approval, will have a significant impact on requiring businesses to increase waste diversion activities. There is a potential for the City to play a role to assist with this positive transition.

Waste Management Service Providers

London has many private sector companies that specialize in waste management and waste diversion services. These companies provide services to different levels of government, directly to local businesses and often provide services without charge (or minimal charge) to charity and not-for-profit groups. These companies also represent the opportunity for innovation and creativity with respect to higher levels of waste diversion and resource recovery. Most importantly, these companies contribute to the local economy in the form of job creation and purchase of local goods and services.

Provincial Government

The Ontario Ministry of the Environment (MOE) is responsible for all legislation pertaining to waste management within the Province. Key legislation includes the 3Rs Regulations (under the *Environmental Protection Act*) and the *Waste Diversion Act (WDA)*.

Ontario's 3Rs Regulations were passed in 1994 and outline specific minimum waste management requirements for municipalities, industry and institutions. In 2002, under the *Waste Diversion Act*, Waste Diversion Ontario (WDO) was created to support the development, implementation and operation of waste diversion programs for materials including Blue Box Recyclables, Used Tires, Used Oil, Household Special Waste (HSW) and Waste Electronic and Electrical Equipment (WEEE). WDO also develops industry stewardship models for handling the materials and/or funding of the programs. The City of London is actively involved with WDO programs (i.e., policy reviews, program evaluations).

In early 2013, Bill 91 was introduced into the provincial Legislature. Bill 91 proposes to replace the existing *Waste Diversion Act, 2002* with the proposed *Waste Reduction Act, 2013* (WRA). The Province is also proposing a new Waste Reduction Strategy (WRS). If passed by the Legislature, the WRA and accompanying WRS will result in significant changes to how recyclables, organics and residential waste (garbage) are to be managed in Ontario. These changes and proposed direction have the potential to impact all aspects of London's residential waste management system (generally under the implementation responsibility of Municipal Council) and strongly influence how Industrial, Commercial & Institutional (IC&I) waste is managed by businesses and private waste management companies.

The proposed WRA and WRS for Ontario have a strong vision to divert more waste resources from landfill to the benefit of the Ontario economy and environment. The WRS is an outcomes based strategy that will promote Individual Producer Responsibility (IPR) and internalize the costs of recycling in the price of products. The WRS highlights why a transformation is needed and provides some specific facts and figures.

Recognizing challenges and opportunities from other municipalities is key to designing a sustainable waste management system for London. The MOE continues to be an important technical resource and is the regulatory authority on most waste management matters in the Province. City staff will continue to consult with them on appropriate matters.

Industry

Industry can play an important role in waste diversion by designing products and packaging with waste minimization in mind. If identified as a priority, industry's innovative nature can have a significant positive impact on waste reduction. For example, plastic beverage bottles have seen a light-weighting trend and the quantity of plastic required has been steadily reduced.

Federal Government

At the Federal level, Environment Canada is moving forward with two key approaches to promote waste reduction and diversion (sometimes referred to as waste minimization):

1. Extended Producer Responsibility (EPR): means that the responsibility of a consumer product at the end of its lifecycle (i.e., when it is being disposed) is shifted to the producer of the product, away from municipalities, and

2. Packaging Stewardship: recognizes the need for product packaging to be designed to have a minimum impact on the environment.

In October 2009, Canadian Council of Ministers of the Environment (CCME) approved the *Canada-Wide Action Plan for Extended Producer Responsibility* and a *Canada-wide Strategy for Sustainable Packaging*,

As noted on their website, the broad mandate of the CCME is to protect Canada's environment, 'by focusing on issues that are national in scope and that require collective attention by a number of governments' (provincial, federal, territorial).

The CCME Waste Management Task Group reviews and develops positions on government policy and advancements in the area of waste management in Canada. In addition to EPR and Packaging, other areas of work for the Task Group include: Compost, Electrical Waste, Hazardous Waste and Biosolids.

EPR at the Federal level is very logical as it builds on economies of scale plus the fact that products and packages flow regularly from one Province to the next. Harmonization of regulation will benefit consumers, taxpayers and businesses. City staff will continue to follow the progress with the CCME and Environment Canada.

3.5 NEW AND EMERGING TECHNOLOGIES

Staff continue to review developments with aerobic composting, anaerobic digestion, mechanical biological treatment (MBT) processes, advanced thermal treatment (ATT) and other technologies (including new, next generation and emerging technologies) that could assist in optimizing materials recovery and creating renewable energy while moving from the City's current diversion rate of approximately 44% towards the Provincial goal of 60%.

Some of these new, next generation and emerging technologies are currently being investigated or used in other Ontario municipalities and are shown below.

Gasification Pilot Project (Plasco)
Ottawa

Anaerobic Digestion Facilities
Toronto

Refused Derived Fuel (Dongara)
York Region

Gasification Pilot Project (Elementa)
Sault St. Marie

Durham York Energy Centre (Covanta)
Durham Region (Artist's Rending)

A report on alternative technologies and the role they might play in the future in London's waste management system is underway with a planned completion in early 2014.

Capital and operating cost estimates for new, emerging and next generation technologies are not widely available in North America and even less information is specifically available in Canada. Table 3 contains data derived from a number of sources. As noted, further details are being compiled for these types of technologies. Also shown in Table 3 is the cost for managing Green Bin materials (aerobic composting) and expansion of the W12A landfill (landfilling) for comparison purposes.

Table 3 – Approximate Costs and Cost Ranges for Alternative Resource Recovery Technologies

Technology	Approximate Cost			Comments
	Capital ***($ per annual tonne capacity)[a]***	***Operating*** **($/tonne)**	**Combined Operating & Capital ($/tonne)**	
New Emerging and Next Generation Technologies				
Anaerobic Digestion[b]	$600 to $800	$50 to $80	-	Capital and/or operating costs may vary +/- 50% depending on specific vendor and technology
Energy-from-Waste[b]	$700 to $900	$60 to $90	-	
Gasification[b]	$800 to $1,000	$60 to $90	-	
Refused Derived Fuel[c]	-	-	$90 to $100	
Conventional Technologies				
Aerobic Composting[d]	-	-	$90 to $100	
Landfilling[e]	-	-	$35 to $40	

Notes

a) For London, assume a facility that processes between 75,000 and 150,000 tonnes; therefore capital cost could range between $60 million to $120 million; of which London could produce feedstock for 25% to 50% of the capacity.
b) Cost information adapted from *Waste Resource Strategy Update* (Stantec, 2013) and other similar engineering consultant studies
c) Cost estimate based on Dongara facility in Region of York
d) Cost estimate based on various municipal contracts in Ontario.
e) Preliminary estimated overall cost for expansion of the City of London W12A landfill.

4) WHAT'S NEXT…ROADMAP 2.0 – What are the Choices?

4.1 INTRODUCTION

The nature of continuous improvement is to improve using logical, incremental and measurable steps. Generally there are three areas of accountably where improvement and balance is sought: environmental, economic and social. Blended together, these three areas often referred to as the "triple bottom" line and are the foundation of sustainable waste management.

These concepts were used to review all aspects of the City's current waste management system and provide a road map for potential changes over the next several years. Potential changes are outlined in the next sections of the report. Most of the changes identified in this report are small incremental improvements to the system. Large scale changes to the current waste management system will be examined following completion of a detailed review of new, emerging and next generation technologies that is currently underway and is discussed in Section 3.4. In addition, it is key to have the policy direction for the Province of Ontario that may or may be set under the proposed Waste Reduction Act and Waste Reduction Strategy. The potential changes have been grouped into one of five categories as follows:

a) Initiatives Previously Approved
These are initiatives that were previously part of the first Road Map and are in the process of being implemented.

b) Early Adoption (2014)
These are initiatives that can move forward immediately because they are relatively low cost and are expected to have public support.

c) Initiatives to Consider in the Short Term (2014 – 2015)
These are initiatives that are considered the most logical to implement in the short term based on the following guiding principles:

- Continuous improvement to maximize waste diversion
- Reduce or maintain current costs of City programs
- Support local job creation efforts
- Minimize negative impact to Londoners and the environment
- Align with the proposed Waste Reduction Act and Waste Reduction Strategy

These are the same guiding principles as those established in 2007 with only minor modifications, taking into account changes at the provincial level and Council directive to contain costs.

d) *Initiatives to Consider in the Mid-Term (2016 – 2019)*

Initiatives that are more costly, and/or less public support and/or have more difficult approvals.

e) *Initiatives Not to be Considered at this Time*

Initiatives that are not consider reasonable at this time because of high cost relative to the potential benefit. This may change in the future as technology or other factors change.

4.2 Blue Box Recycling Program

a) *Adding New Materials*

City Staff Choices

Short Term: 2014 to 2015

- *Investigate adding mixed polycoat (includes hot/cold beverage cups & ice cream containers) and blister packaging (i.e. consumer plastic packaging such as rigid plastic around toys, hardware, etc.)*

Mid-Term: 2016 to 2019

- *Investigate metal cookware and single use batteries*

Not at this time

- Film plastic (e.g. plastic bags), expanded foam polystyrene (EPS) and textiles

Rationale

The existing Blue Box program already includes all "low hanging fruit". These are materials that can be managed at a reasonable cost or materials that constitute a large portion of the waste stream.

Existing Blue Box Program

✓ Accepts 14 materials
✓ Shipped over 26,000 tonnes to markets (mostly in Ontario and Canada)
✓ Generated $3.8 million in revenue in 2012

A review of other municipalities in Ontario found nine "more difficult" to recycle materials that are being recycled by at least one municipality. Financial, environmental and social considerations as well as technical issues of adding these materials to the City's recycling program are presented in Appendix C and summarized below.

Materials That May be Added in the Short Term

Further investigation in the short term is recommended for mixed polycoat (e.g., coffee cups) and *blister packaging (rigid plastic around toys, hardware, etc.)*.

Each of these materials is currently being recycled by one or more municipalities in Ontario but research is required to confirm strength of end markets and processing costs for addition to the City's program in 2014.

Mixed Polycoat

Blister Packaging

<u>Materials That May be Added in the Mid-Term</u>

Further investigation in the mid-term is recommended for batteries and metal cookware.

Each of these materials is currently being recycled by one or more municipalities in Ontario but research is required to:

- Further examine alternative collection methods for single use batteries (e.g. collection with Blue Box or separate collection with electronics)
- Confirm processing costs and changes to the City's Material Recovery Facility to accommodate metal cookware in the future

Single Use Batteries

Metal Cookware

<u>Materials not to be Added at this Time</u>

Film Plastic

Expanded Foam

Textiles

Film plastic (e.g. plastic bags), expanded foam polystyrene (EPS) and textiles are not recommended for inclusion in the recycling program at this time because:

- potential to contaminate other recyclables and/or damage processing equipment
- processing costs are significantly greater than revenue
- residents can already take film plastic (e.g. grocery bags) to many retail outlets for recycling and textiles to drop-off locations throughout the City for reuse
- EPS does not have stable North American markets and its capture rate is very low (< 20%) at Material Recovery Facilities

Consideration will be given to collecting film and EPS at the EnviroDepots as part of a pilot project. Textiles are already collected at the EnviroDepots.

b) *Increase Capacity*

City Staff Choices

<u>Early Adoption: 2014</u>

- *As part of recycling education and awareness, provide residents of newly constructed homes with two Blue Boxes at no cost*
- *Establish a multi-residential recycling cart purchase program that sells roll-out carts at cost*

<u>Mid-Term: 2014 to 2015</u>

- *Sell Blue Boxes at cost from the City's EnviroDepots*
- *Provide front-end collection of cardboard at larger multi-residential buildings*

<u>Mid-Term: 2016 to 2019</u>

- *Provide free replacement Blue Boxes for broken ones*

Rationale

<u>Providing Blue Boxes to Residents</u>

Providing two Blue Boxes for newly constructed homes and selling boxes at cost will result in more boxes in the system which will increase the capacity to recycle and provide convenience for residents. Further benefits include:

Existing Program

- ✓ One Blue Box is provided to each newly constructed home
- ✓ Residents are asked to use at least two Blue Boxes to separate their recyclables into two streams.

- Improved ability of residents to sort recyclables into two streams
- More room to recycle more
- Improved litter control by reducing overflowing boxes and the use of other containers (e.g. cardboard boxes, laundry baskets, etc.) and broken Blue Boxes
- Increase access to recycling for those less able to purchase Blue Boxes
- Waste Diversion Ontario recognizes providing free or below cost recycling containers as a best practice and municipalities are financially rewarded in their grant payments
- Minimal cost to implement; there is no added cost for selling Blue Boxes at cost and it would cost approximately $5,000 per year to provide a second Blue Box to new homes

Further investigation should be given to providing replacement Blue Boxes for boxes that are broken. It is estimated that such a program could cost approximately $60,000 per year after WDO funding but given the benefits noted previously, this expenditure may be warranted.

<u>Providing Blue Carts</u>

The Blue Cart is the standard container for recycling collection in multi-residential buildings. The benefits of making carts more accessible are similar to those of providing more Blue Boxes. More carts in the system will increase the capacity to recycle and provide convenience for residents. Some specific benefits include:

Multi-Residential Recycling

- ✓ There are 51,600 multi-residential units in London
- ✓ They represent 31% of all London households

- Improved ability of residents to sort recyclables into two streams
- More capacity to recycle
- Improved building maintenance and litter control by reducing overflowing carts
- A lower priced recycling cart is an incentive for building owners/property managers to increase their recycling efforts and reduce their garbage

In 2010 the City received a grant from the Continuous Improvement Fund (Waste Diversion Ontario) to increase the number of recycling carts in our program. The goal of the grant program was to increase the number of carts to the best practices recommendation of 50 litres capacity per multi-residential unit (i.e. 1 cart per 7 units) which is about the equivalent of a small blue box.

London used the grant to subsidize the cost of carts for building owners and property managers. We continue to make subsidized carts available, and work towards the best practices recommended number of carts.

The following provides an overview of number of carts:

- Since 2009, prior to the grant program, we have increased the ratio of carts from 25 litres to 38 litres per unit (our goal is 50 litres per unit).
- There are 5,350 recycling carts in the program (compared to 3,400 in 2009), a 57% increase during this period.

The original "subsidized" cart program is drawing to an end and given its success should be replace with a permanent "at cost" cart program.

Front End Cardboard Collection at Multi-Residential Buildings

The use of front end collected bulk bins, instead of recycling carts, is a more effective way to store and collect cardboard from many multi-residential buildings. A pilot project in London found buildings with front-end cardboard collection captured twice as much cardboard compared to buildings using only carts. Multi-residential buildings and complexes generate large quantities of cardboard that is a challenge to manage and collect using 360 litre (95 gallon) recycling carts. Bulk bins are typically 3,050 to 4,600 litres (4 to 6 cubic yards) or equivalent to 9 to 13 recycling carts.

Cardboard Pilot Collection

- ✓ 40 buildings
- ✓ Cardboard capture doubled compared to buildings using carts for cardboard
- ✓ Positive feedback from building managers and collectors

In addition to providing more volume capacity, they are better suited to manage the size of cardboard. Large cardboard pieces do not fit inside recycling carts and instead are placed loose resulting in site maintenance problems and collection inefficiencies. Often oversize and overflow cardboard is found in the garbage bulk bins when carts are used resulting in a loss of recyclables.

In 2010 the City received a grant from the Continuous Improvement Fund (Waste Diversion Ontario) to increase our recycling capacity in the multi-residential buildings up to 50 litres of recycling storage space per household unit. This included a grant to purchase 100 front-end bins (shown above) as well as recycling carts (discussed on previous page).

This service should be provided where it is economically viable (e.g. several buildings close together).

c) *Other Blue Box Initiatives*

City Staff Choices

<u>Short Term: 2014 to 2015</u>

- *Options for increasing public space recycling be explored*
- *A comprehensive pilot cardboard collection project be undertaken in the downtown area for small businesses to determine cost and effectiveness of a permanent program (to add to the details that have been previously compiled)*
- *The City facilitate purchase of contracted recycling collection to Business Improvement Areas (BIAs) and business/industry parks*

Rationale

<u>Increase Public Space Recycling</u>

When London residents have the opportunity to recycle away from home it reinforces the correct information about what and how to recycle and that recycling is a priority for the City of London. In addition to increasing the opportunities to recycle, public space recycling is important for the positive effect it has on at-home recycling. When public space recycling is not available it can send a message with negative consequences for our City-wide Blue Box program. Additionally, public space recycling contributes to our overall waste diversion efforts.

EnviroBin Locations

- ✓ Argyle B/A
- ✓ Downtown
- ✓ Richmond Row
- ✓ Wortley Village
- ✓ Old East Village

The public space recycling program has been in place for approximately ten years. There are about 40 collection containers in four areas as noted in the box above. Public space recycling should be expanded because of its benefits. Options for expansion include:

a) Increase the number of recycling containers in the existing five locations where we currently collect
b) Increase the number of Business Improvement Areas where public space recycling is available.
c) Investigate options for increasing recycling in other public space areas

Downtown Cardboard Collection

Provincial legislation requires that the City provide Blue Box recycling to residential properties, but is not required to provide recycling to commercial properties. As a result the City has traditionally not provided recycling collection in commercial areas. However, in the most recent collection contract a change was introduced to extend curbside recycling collection to businesses located on residential collection routes. This has been well received by businesses, increasing our recycling quantities and reducing what we send to landfill. Collection of cardboard in the core areas offers a number of similar advantages, including:

Downtown Cardboard Collection

- ✓ Over 100 business place cardboard to the curb
- ✓ Will collect upwards of 200 tonnes annually

- Cardboard that is set out for collection is already being collected by the City garbage crews. The recommended change would have the cardboard recycled rather than being picked up with garbage and landfilled.
- Downtown cardboard is another source of recyclables that can be processed in London's Material Recovery Facility. As noted in previous reports, our processing costs decrease as we increase the facility throughput.
- Increased service delivery to business and residents in the downtown area.
- Can be collected at a minimal cost (can be co-collected with garbage with one truck)

A comprehensive pilot project to collect downtown cardboard is proposed to determine costs and effectiveness of a permanent program and add to the experience from initial collection trials.

Facilitate Recycling Services in BIAs and Business/Industry Parks

Some Business Improvement Areas and Business/Industry Parks are not serviced with recycling collection. Individual businesses may have arrangements, but many of the businesses are not recycling. An option would be for neighbouring businesses to work together to find a common recycling service provider (e.g. would likely produce economies of scale to help reduce program costs to participants). This would be of benefit to both the businesses and the service providers. There is a potential role for the City to facilitate the purchase of recycling collection service, especially in those areas where the City is providing garbage

collection to the businesses. More recycling would reduce the recyclables we are collecting with the garbage, and there is potential to increase the quantity of recyclables that are sent to the City's Material Recovery Facility.

d) Blue Box Education and Awareness Programs

City Staff Choices

Short Term: 2014 to 2015

- *Targeted promotion to increase the capture of boxboard, mixed household paper, plastics and aluminum foil/trays and proper sorting of recyclables*
- *Increase education and awareness funding (as budgets permit) and/or in-kind services to the recommended "Blue Box" best practice of $1 per household to implement new incentive programs (e.g., reward programs such as the Gold Box) and/or other encouragement/engagement programs*

Rationale

Target Key Materials

Existing programs are the easiest place to find more materials to divert from landfill. Programs such as Blue Box recycling are already deep-rooted in our community. Residents understand the program and the program infrastructure is in place.

Waste audits conducted in 2012 show there are 11,000 tonnes of recyclable materials still being disposed of in the garbage. The incremental cost to capture more of these recyclables through the existing collection program is small compared to the cost to provide new programs.

The best way to increase the capture rate of missed recyclables is with enhanced communication and education and different methods of reaching the target audiences. This should focus on the key materials that have a combination of a low capture rate and significant quantity still in the garbage.

Table 4 – Key Recyclable Materials to Target

Material	*Existing Capture Rate*	*Quantity in Garbage (tonnes)*
Boxboard	60%	1,900
Household Paper	40%	1,700
Plastic Containers	60%	1,600
Aluminum Foil/Trays	10%	200

Recommended materials to focus on are boxboard (e.g. cereal boxes, mixed household paper, plastics and aluminum foil and trays) as shown in Table 4.

Education and Awareness Funding

Existing Education/Awareness Program

- ✓ Annual $70,000 budget for recycling
- ✓ Annual $30,000 budget for other waste diversion programs
- ✓ Newspaper ads provided without charge, as an in-kind industry stewardship obligation to pay for Blue Box program costs

WDO best practices report recommends that a municipality spend approximately $1 per household on promotion and education for recycling in addition to the free newspaper ads provided by industry. London's current budget is approximately $80,000. At $1 per household the budget would be approximately $170,000. Given current budget constraints it is not practical to increase to this level in the short term, and alternative strategies will need to be identified. Staff will look at opportunities to increase exposure and awareness of our programs taking advantage of low and no cost media options. The additional funding can go towards promotion programs such as incentive programs.

Waste Diversion Awareness

More and more each year staff is challenged to develop innovative and cost effective methods of communicating our program information and key messages to the London community. The traditional media outlets, such as newspaper, radio and television ads, which previously represented our main means of communicating, are now only one part of the much wider range of methods being used to inform and educate the public about our programs. The new media offer great opportunities to connect with more people. To help us meet these challenges and benefit from the wide range of medium for getting our messages out to Londoners, an annual Promotion & Education (P&E) Plan is created to provide direction, key messages and budget allocations for the year.

Regional Partnerships

In 2012 London signed partnership agreements with six local municipalities for processing of Blue Box recyclables at the Manning Drive Regional Material Recovery Facility (MRF). At that time the partner municipalities (Aylmer, Bayham, Central Elgin, Dutton-Dunwich, Malahide, Thames Centre), changed their programs to collect the same as in London's program. This harmonization of Blue Box programs across the seven municipalities has offered considerable shared benefits. For residents the immediate benefit is common information about their recycling program across all partner municipalities. As residents travel across the communities (for work, school, entertainment, etc.) they will access this common information about their recycling program from the various local media (TV, radio, news and community papers) and in social interactions (e.g., from friends and family living in adjacent communities). For municipalities there is savings of P&E budgets and staff time as all are able to share in design templates and work cooperatively on media buy and production costs.

Funding Opportunities

London looks for opportunities to leverage additional funding through partnerships, collaboration and municipal grants program. Aside from the obvious advantage of more funds to promote waste diversion programs, these opportunities have the added advantage of bringing more expertise and guidance to the table. Since Road Map 1.0 (2007) was released, London has received external funding for several P&E initiatives, including:

- Multi-residential recycling promotion
- Curbside, two stream recycling promotion
- Increasing capture of Blue Box plastics
- Funding to update waste composition data
- Public space recycling awareness
- Electronic waste recycling awareness

2014 Priorities

The *Sort it right!* Campaign was launched in late 2012 and has been the key focus for the Blue Box program through 2013 and will continue in 2014. The goal of the campaign is to minimize the amount of recycling errors (non-recyclables and recyclables placed in the wrong Blue Box) received at the MRF to less than 3% by the end of 2014. Providing positive feedback to the majority of London residents that take the time to recycle correctly is also a priority. Thank you cards are currently being used. Other options include curbside recognition of perfect recyclers through stickers on Blue Boxes, or awarding a special box, such as a gold box. The gold box program in Hamilton provides a gold recycling box to residents who have been found to be sorting their recyclables properly.

Initiatives that are used to encourage or engage those residents that are underperforming are discussed in Section 4.4. A balance approach between reward programs and encouragement/engagement programs is preferred.

Building regional MRF partnerships was a key focus for 2013 and will continue through 2014 as we explore ways to promote common messages and share resources. Community partnerships have been fostered in new areas including working with youth groups, a local theatre company and community organizations.

4.3 ORGANICS MANAGEMENT

a) Green Bin

City Staff Choices

Initiatives Previously Approved

- *Delay Green Bin decision until new, emerging and next generation resource recovery review complete in 2014 (in progress).*

Rationale

One of the key components of the *Interim Business Plan for the Green Bin Program and Zero Waste Initiatives* was the potential implementation of a City wide Green Bin program.

Pilot Project

In order to refine costing, diversion estimates and determine logistical issues, a one year Green Bin and Modified Garbage Collection Schedule Pilot Project began in mid-October 2011 with approximately 760 homes in the Glen Cairn area. Details of the pilot project can be found in Appendix D.

Residential Garbage Composition

Waste audits suggest there is approximately 45% or 26,000 tonnes of compostable material in the curbside garbage that is collected (See Table 5).

Table 5 - Residential Curbside Garbage Composition

Material	***Quantity***		***Comments***
	(tonnes)	***%***	
Food Waste	*22,000*	*38*	
Yard Waste	*1,000*	*2*	
Compostable Paper	*3,000*	*5*	*e.g. Tissue, towels, etc.*
Subtotal Compostables	26,000	45	Total curbside organics available
Other Curbside Materials	32,000	55	Excludes bulky items
Total Curbside Garbage	58,000	100	
Total Residential Waste	154,000		Includes curbside & multi-residential garbage and recyclables, yard materials and on-site management (e.g. backyard composting)

Estimated Program Diversion and Costs of City Wide Program

The increased waste diversion and costs of implementing a City wide Green Bin program are presented below. The diversion rate and costs were developed based on providing weekly Green Bin, Garbage and Blue Box collection. Lower costs and higher diversion rates can be achieved by behaviour change initiatives such as bi-weekly garbage collection, reduced garbage container limits, user pay system, etc.

Diversion Impact

- as shown in Table 5, recent waste audits (2012) indicate there are approximately 26,000 tonnes of compostable waste in the curbside residential waste stream and this represents 45% of the curbside waste stream (excluding bulky items)
- a curbside Green Bin program would divert approximately 12,000 to 14,500 tonnes (45% to 55 % of the compostable waste) and increase overall waste diversion by 8% to 9%; the curbside diversion rate will increase from about 50% to about 60 to 65%
- it is noted the estimated amount of material diverted and the potential increase in the diversion rate is lower than in the report Road Map to Maximize Waste Diversion in London. This is because the per household food waste generation is down 10% since 2007 (overall household generation is down 15%) and the estimated capture rate of organics from townhomes has been lowered

Costs

- One time capital costs of approximately $9 million which consists of carts for 117,000 homes ($6 million), modifications to existing garbage trucks ($1.5 million) and the purchase of six new trucks ($1.5 million)
- On-going operating costs of approximately $2.9 million annually for Green Bin which consists of $1.3 million in Green Bin processing costs and $1.6 to provide weekly Green Bin collection.
- Additional on-going operating costs of approximately $1.2 million annually for weekly same day Blue Box and garbage collection

Table 6 – Ongoing Green Bin Costs

Operating Costs	***Cost per Household Served***
Green Bin - Collection	$14
Green Bin – Processing	$11
Weekly Garbage/Recycling	$10
Total Cost	$35

Benefits and Problems

There are many benefits to a Green Bin program in addition to the increase in waste diversion as well as some potential problems. These are detailed in Appendix D. Benefits of the program include reduction of greenhouse gases, increased employment; creation of a valuable product and increasing the likelihood of expanding the City's landfill. Potential problems include low participation rate by residents and processing issues. Appendix D also provides a summary of Green Bin programs in Ontario

<u>Conclusion</u>

The Green Bin program has many benefits and is a proven way to divert waste but comes with significant capital and operating costs and only a 50% to 65% participation rate. As noted in Section 3, staff continue to review developments with respect to aerobic composting, anaerobic digestion, mechanical biological treatment (MBT) processes, advanced thermal treatment (ATT) and other technologies (including new, next generation and emerging technologies) that could assist in optimizing materials recovery and moving from the City's current diversion rate of approximately 44% towards the Provincial goal of 60%. It is recommended that any decision on the Green Bin program be delayed until this review is completed.

b) Home Composting

City Staff Choices

<u>Mid-Term: 2016 to 2019</u>
- *Additional investigation be undertaken into increasing home composting.*

Rationale

<u>Home Composting</u>

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 two EnviroDepots. The units are sold for $30 and approximately 250 units per year are sold. Home composting is promoted on the City's website and through information flyers.

Two pilot projects were undertaken 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 and the details are provided in Appendix E. 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 local community school and a higher price for the composters ($20 per composter).

Initial estimates suggest that an additional 500 to 2,000 tonnes per year of food scraps could be diverted (up to 1.5% 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 $80,000 to $100,000.

It is recommended that additional investigation into the preferred approach(es) to increase home composting be undertaken.

c) Community Composting

City Staff Choices

<u>Short Term: 2014 to 2015</u>

- Additional investigation be undertaken into potential opportunities for community composting.

Rationale

Community Composting is now possible because of changes to provincial legislation that makes approval of community compost areas less onerous.

Of particular interest, City staff heard from some Green Bin Pilot Project participants that they wished to continue to separate Green Bin materials at the end of the Green Bin pilot program and were prepared to drive their organics to another location to be composted. For those that wish to continue to separate Green Bin materials, a special area was established at the Clarke Road EnviroDepot.

This interest is consistent with experience in some communities that are exploring the potential of "community or neighbourhood composting".

d) Curbside Collection of Christmas Trees

City Staff Choices

Mid-Term: 2016 to 2019

- *Additional investigation be undertaken into providing curbside collection of Christmas trees.*

Rationale

Residents currently have the option of taking Christmas trees to a depot or having them collected with garbage. It is estimated that approximately 100 tonnes of trees are diverted to the depots and about 400 tonnes are disposed of at the landfill. Consideration could be given to providing curbside collection of Christmas Trees at an estimated cost of $30,000 to 40,000 per year.

e) Food Waste Reduction

Short Term: 2014 to 2015

- *Additional investigation be undertaken into the potential of promoting source reduction of food waste.*

Rationale

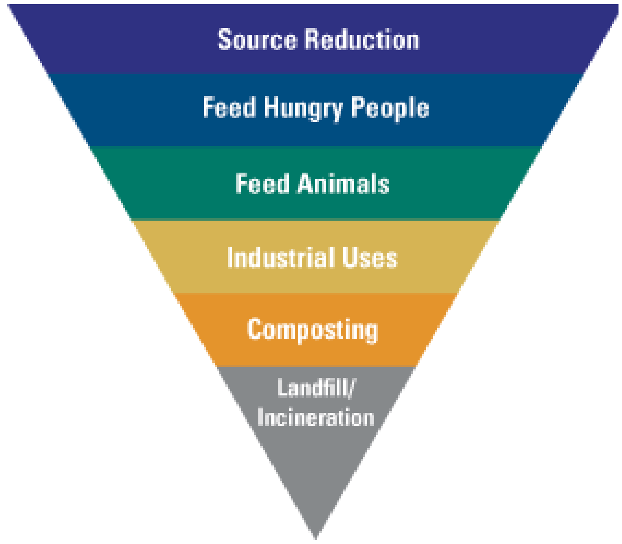
Approximately 80% of the organic material available to compost in the garbage is food waste thrown away by Londoners (see Table 5). A breakdown of this food waste based on the 2012/13 waste audits are presented in Table 7.

While some of this food waste cannot be avoided (e.g. vegetable trimmings, bones, etc.), most of it can be and is the result of over buying, cooking too much and then throwing away the extras, not using things before they go bad, impulse buys and poor portion control.

Table 7 - Breakdown of Food Waste

Food Category	%	kg/wk
Fresh Vegetables, Salads, Fresh Fruit, Beans	53%	1.82
Meat and Fish	10%	0.34
Dairy and Eggs	5%	0.17
Cereals, Grains, Pasta, Bakery	13%	0.46
All other Food Waste	19%	0.63
Total	100%	3.41

Many people think of food waste as a benign substance and simply rots away in the landfill anyway. Food waste is not benign and is responsible for much of the greenhouse gases and odours produced by landfills. There is a growing movement to reduce food waste at the source by promoting responsible food buying and management practices.



The United States Environmental Protection Agency has developed a food waste recovery hierarchy to illustrate how productive use can be made of excess food. The hierarchy emphasizes practices that provide the greatest ecological, economic, and social benefits, with disposal as the last option. Source reduction is at the top of the hierarchy with composting near the bottom.

4.4 EnviroDepot (Multi-material) Programs

a) Adding New Materials

The existing EnviroDepots are popular destinations which provide a convenient "one stop drop" location for residents to dispose of a variety of materials.

A review of other municipalities in Ontario found eight materials that could potentially also be managed at the depots. Financial, environmental and social considerations as well as technical issues of adding these materials to the Depots is presented in Appendix F and summarized below.

Existing EnviroDepot Program

✓ 3 locations
✓ 200,000 customers in 2012
✓ Accepts:

- Blue Box materials
- leaf & yard materials
- electronics
- used clothing & small household items
- scrap metal
- appliances
- renovation materials
- tires
- batteries
- fluorescent tubes & bulbs
- propane tanks
- empty oil & antifreeze containers

City Staff Choices

Early Adoption: 2014

- That vegetable oil and used oil be added to the Oxford and Clarke Road EnviroDepots in 2014

Mid-Term: 2016 to 2019

- *Additional investigation into adding paint, expanded foam polystyrene, carpets and mattresses be undertaken in the future.*

Not at this time

- Film plastic (e.g. plastic bags) is not recommended for inclusion in the EnviroDepot program at this time.

Rationale

Adding vegetable oil and used oil to the EnviroDepots in 2014 will allow time to get the necessary approvals and make the required modifications to the EnviroDepots. These materials are recommended to be added in the short term:

Vegetable Oil

Used Motor Oil

- No issues with collection of used vegetable oil & used motor oil at W12A EnviroDepot
- They have stable Ontario and North American markets and will generate revenue
- There are no processing or collection issues with adding these materials at the Oxford and Clarke Road EnviroDepots

<u>Materials to be considered in the Mid-Term</u>

Paint

EPS

Mattresses

Carpets

Residents in London can currently take used paint to three retail outlets and the City's HSW depot. This is down from five retail outlets and the City's HSW depot a year earlier. The City's HSW depot is the only location that provides service to small businesses (e.g. paint contractors). Given this, there may be a need for more locations in the future. Under the current MHSW funding program the cost to collect paint at the EnviroDepots would be the responsibility of the City while the cost to remove/process would be covered by the stewards (industry). How funding would work if the proposed WRA is passed is unknown.

Several Ontario municipalities have depot programs for EPS. Preliminary research suggests that a program consisting of EPS collection at the EnviroDepots and processing at the City's Material Recovery Facility would cost between $25,000 and 40,000 per year. Approximately 50% of these costs would be funded under the existing program. How EPS would be managed and how the funding of EPS would change if the WRA is passed is unknown.

Mattresses and carpets are currently being recycled by a couple of municipalities in Ontario. In these municipalities residents are responsible for taking the mattresses and carpets to a depot and must pay a fee. In London, mattresses and carpets are currently collected at the curb with garbage at no cost to the residents. Currently there is no industry funding for mattresses and carpets but this may change if the proposed WRA is passed. In summary, staff choice on the addition of paint, EPS, mattresses and carpets is to delay this until 2016 to 2019 so that the potential impact of the WRA on these materials and their funding is better understood.

Materials Not to be Added at this time

Film plastic (e.g. plastic bags) is not recommended for inclusion in the EnviroDepot program at this time because:

- Residents can already conveniently recycle film plastic (e.g. grocery bags) at many retail outlets
- Collection and processing costs are significantly greater than revenue
- There may be opportunities to work with local retailers to expand the types of film plastic they take (e.g. include bread bags, overwrap, etc.)

b) Increase Capacity

City Staff Choices

Initiatives Previously Approved

- *Staff will continue to work on the development of a fourth EnviroDepot in the north.*

Rationale

The north area of the City is currently serviced by the depots on Clarke Road and Oxford Street and growth in the north of the City is causing these depots to become overcrowded during busy periods. The distance in the north end is a disincentive for residents to make use of the Depot services. A depot is required closer to these residents to provide an adequate level of service and encourage the proper handling of solid waste.

Council has previously approved capital funds for a new depot in the north end, but its development has been delayed because of difficulties in securing a suitable location to construct the facility.

4.5 ENCOURAGING AND ENGAGING LONDONERS

City Staff Choices

Mid-Term: 2016 to 2019

Additional investigation be undertaken in into:

- *Reducing the bag limit in conjunction with a user pay system for "extra" curbside garbage*
- *Banning of Christmas trees from curbside garbage collection.*

Not at This Time

- *Full user Pay*
- *Mandatory Recycling Bylaw (with and without clear bags for garbage)*

Rationale

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. every other week garbage collection). 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 consumer behaviour (e.g. banning plastic bags in London). Some residents may see these programs as inconvenient or "going too far".

Below are some common behaviour change 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 will encourage participation in the various waste diversion programs as well as reducing garbage generation.

The City of London currently has a 4 Container Limit 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 2.3 to 3.5 containers per week or an average of 3.2 containers per week over the entire year. Many Ontario municipalities have a one or two container limit per week.

Consideration to reducing the bag limit in conjunction with a user pay system for "extra" curbside garbage is recommended because:

- The quantity of curbside garbage per household has been reduced by 17% since the introduction of the 4 Container Limit in 2007
- Many municipalities have a 1 or 2 container limit
- Allowing residents to pay for "extra" garbage will provide convenience to residents who currently drive extra garbage to the EnviroDepots

Under the current six day cycle, consideration should be given to reducing the container limit to three containers per week with residents having the option of purchasing tags for additional containers.

Staff is currently examining various potential collection schedules, including a return to weekly garbage collection. If the City implements weekly garbage collection, consideration should be given to reducing the container limit to 2 bags per week with residents having the option of purchasing tags for additional containers.

Collection Frequency

Reducing garbage collection frequency to every other week can result in an even greater desire to participate in waste diversion programs and reduce garbage generation. Municipalities with every other week garbage collection typically have weekly Green Bin collection which allows residents to get rid of materials that are likely to smell if stored for two weeks. Without a Green Bin program, it is possible to reduce collection to every other week in the winter when cooler weather can help control odours but not the summer. This type of collection schedule is called "seasonal collection" (weekly collection in the summer and bi-weekly collection in the winter).

Consideration should be given to a seasonal collection schedule as part of the City's review of potential collection schedules.

Mandatory Recycling By-Law

The vast majority of Londoners participate in various diversion programs although there are those that refuse to participate in these voluntary programs. The City could explore developing a mandatory by-law for the diversion of materials for which there are programs. Enforcement of the by-law would require additional staff. Some municipalities have residents use clear bags so that recyclables could be easily spotted in the garbage. This is more common in the Maritimes but the City of Markham recently became the first large municipality in Ontario to require the use of clear bags.

Consideration to a mandatory recycling by-law and/or the use of clear bags should not be considered until other behavior change initiatives have been implemented.

Municipal Council Policies and By-laws (e.g. bans, restrictions)

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.

Residents currently have the option of taking Christmas trees to a depot or having them collected with garbage. Consideration could be given to banning them from garbage collection and requiring residents to take them to a depot or providing curbside collection of Christmas Trees.

Mattresses and carpets could be banned from curbside collection in the future if recycling opportunities are provided for these materials at the EnviroDepots.

Full 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. This the case in Toronto where residents pay an annual fee ranging from $224 to $430 per year per household depending on the size of cart they select. A full user pay system is not recommended for London at this time.

4.6 OTHER POTENTIAL INITIATIVES

City Staff Choices

Mid-Term: 2016 to 2019

- *Additional investigation be undertaken in into providing semi-annual curbside collection of batteries, electronics and scrap metal.*

Rationale

Curbside Collection of Batteries, Electronics & Scrap Metal

A small (1,000 home) pilot completed by the City suggests that it may be possible to provide annual or semi-annual curbside collection of batteries, electronics and scrap metal at no or little cost because the revenue generated may cover collection costs.

Electronics/Battery Collection Pilot Project

- ✓ 1,000 homes
- ✓ Collected 4 tonnes of electronics
- ✓ Collected 30 kilograms of batteries

There is also the possibility that non-sanctioned scavengers may take the more valuable materials before the City sanctioned contractor can collect them, leaving only materials that will cost money to be handled. A pilot covering a larger number of homes should be considered before deciding if such a program is practical.

Other Initiatives

A list of waste diversion initiatives that may warrant some consideration in the future is presented below. Each of these initiatives is currently in place in at least one municipality in Ontario:

- Recycling containers at community mail boxes for paper
- Program to reduce over-circulation of flyers and newspaper (non-solicited mail)
- More take back programs with local retailers
- Furniture re-use/exchange program
- Involvement with school programs
- Community waste diversion workshops
- Incentive program with local businesses for living green
- Newsletters to residents/neighbourhood groups
- Supporting active resident groups and ambassador/volunteer programs
- Waste free lunch challenges
- Waste reward programs for top performing residents
- Encouraging smarter consumer practices

5) HOW FAST/FAR DO WE DRIVE?

Information on a number of potential programs and initiatives were presented in the previous sections. These potential programs and initiatives are summarized in Table 7 below. Table 7 also includes a tentative timetable for implementation.

We now need to hear from Londoners what are their priorities and how quickly do they want to move. A four month public engagement period with Londoners is proposed and would include:

- Information to residents through traditional media including a summary of the report in the London Free Press
- Social media outreach
- Outreach at community events (e.g., London Home Builder's Association Home Show)
- Feedback opportunities through a variety of means including the City's website

Feedback from residents will help shape the direction of new programs and initiatives to be implemented. It should also be noted:

- Prior to the implementation of any these programs/initiatives, detailed information on the program/initiative will be brought to Council for final approval.
- It will take time to develop the new programs after decisions have been made as to which programs and initiatives should be implemented. Time is required to obtain provincial approvals, have new equipment supplied, make approved program changes, ensure people are aware of upcoming changes, ensure appropriate budgets are approved, etc.
- Some programs, such as providing two Blue Boxes to newly constructed homes could start almost immediately while others will take one to two years or longer to fully implement.
- The timetable for some programs, like mattress recycling, will be dependent on the outcome of the Waste Reduction Act and follow-up regulations.
- Expenditures on waste diversion programs must also be considered in the context of other environmental expenditures and other budgetary needs across the Corporation of the City of London.

Table 8 - Implementation Schedule

Year	Program/Initiative
2013	• North end EnviroDepot (in progress) • Delay Green Bin decision until new, emerging and next generation resource recovery review complete in 2014 (in progress)
Early 2014 Adoption	• As part of recycling education and awareness, provide residents of newly constructed homes with two Blue Boxes at no cost • Establish a multi-residential recycling cart purchase program that sells roll-out carts at cost • Add vegetable oil and used motor oil to EnviroDepots
Further Investigation 2014 to 2015	• Add mixed polycoat (includes hot/cold beverage cups & ice cream containers) & blister packaging (includes rigid plastic packaging around toys, hardware, etc.) to the Blue Box program • Sell Blue Boxes at the EnviroDepots at cost • Front end bin cardboard collection at multi-residential buildings • Start downtown cardboard collection • Increase public space recycling • Facilitate purchase of recycling services for BIAs/commercial areas • Targeted education & awareness programs for selected Blue Box materials • Increase education and awareness funding (as budgets permit) and/or in-kind services to implement new incentive programs (e.g., reward programs such as the Gold Box) and/or other encouragement/engagement programs • Explore source reduction of food waste • Examine the role of community composting
Further investigation 2016 to 2019	• Add single use batteries and metal cookware to the Blue Box program • Provide replacement Blue Boxes to residents • Add paint, expanded foam polystyrene, carpets and mattresses to EnviroDepots • Increasing home composting • Begin curbside collection of Christmas trees • Ban curbside garbage collection of Christmas trees • Explore a reduced bag limit with user pay system for extra garbage • Begin semi-annual curbside collection of electronics, scrap metal and batteries
Delayed – Future Consideration	• Add film plastic, expanded foam polystyrene and textiles to the Blue Box • Add film plastic to the EnviroDepots • Examine full User Pay for garbage • Mandatory Recycling Bylaw (with and without clear bags for garbage)

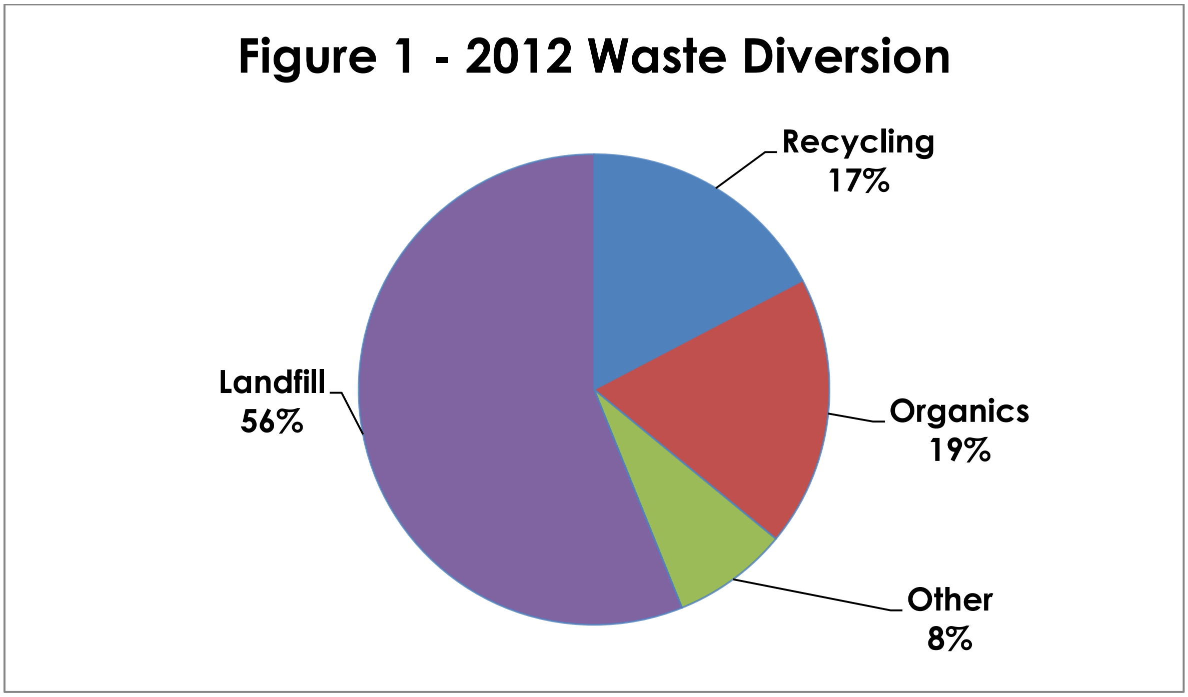
This page left intentionally blank.

Appendix A
Existing Waste Diversion Program Data

A description of the City's various waste diversion programs and the quantity of material diverted by each program in 2012 is provided below. These data are summarized in Table A-1 and Figure A-1.

Table A-1: 2012 CITY OF LONDON RESIDENTIAL WASTE MANAGEMENT PROGRAMS – ESTIMATED TONNES DIVERTED

PROGRAMS	Single Family Households	Multi-Residential Households	Total Tonnes
Recycling			
a) Curbside Recycling Program	22,960	0	22,960
b) Multi-Residential Recycling Program	0	3,290	3,290
c) City Depots (EnviroDepots, W12A)	260	110	370
d) Public Space Recycling (est.)	30	20	50
Subtotal	23,250	3,420	26,680
Organics Management			
e) Home Composting Program (estimate)	5,460	0	5,460
f) Grasscycling (estimate)	3,950	0	3,950
g) Curbside Yard Material Collection	4,540	0	4,540
h) Depot Yard Material Collection	9,920	0	9,920
i) Fall Leaf Collection	4,680	0	4,680
j) Christmas Tree Recycling	100	20	120
Subtotal	28,650	20	28,670
Other Programs			
k) Waste Electronics & Electrical Equipment	1,030	270	1,300
l) Tire Recycling	2,200	550	2,750
m) Wood Waste/ Construction & Demolition Waste	4,540	0	4,540
n) Scrap Metal	650	70	720
o) Textile/Small Household Item Reuse	320	80	400
p) Municipal Household Special Waste	330	80	410
q) Brewers Retail Container Recycling	1,710	430	2,140
Subtotal	10,780	1,480	12,260
Total Waste Diverted	**62,680**	**4,920**	**67,600**
Total Waste Delivered Directly to Landfill	**60,310**	**22,900**	***83,210***
Residual Waste Delivered to Landfill	**2,680**	**180**	***2,860***
Total Waste Disposed	**62,990**	**23,080**	***86,070***
Total Waste	**125,670**	**28,000**	***153,670***
Diversion Rate	**50%**	**18%**	**44%**



Blue Box Recycling Programs

Curbside Recycling – 22,960 tonnes

The City collects a wide range of recyclables from all curbside households. The materials collected in 2012 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& tubs; milk & juice cartons; drink boxes & cardboard cans. Plastic plant pots/trays and large plastic pails were added to the program in 2013.

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 form other City programs and other municipalities. Material is weighed upon entering and leaving the MRF.

Approximately 99% of incoming recyclable materials (or 96% of the total incoming material) was shipped to end markets in 2012. 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.

Multi-Residential Recycling – 3,290 tonnes

The City collects recyclables from multi-residential buildings at no cost.

The property owner is responsible for purchasing and providing 95 gallon carts for residents to place their recyclables in. As a result, a few multi-residential buildings do not have recycling because the property owner has not provided carts. In 2012, 47,870 multi-residential units had access to on-site recycling and 3,830 units did not. Residents from buildings without on-site recycling must take their recyclables to one of three City EnviroDepots. City staff have made numerous attempts to further reduce the number of units without on-site access to recycling. Enforcement for this service lies with the Ministry of the Environment.

The materials collected, how they are processed and calculation of the quantity recycled is the same as the curbside Blue Box program.

Depot Recycling – 370 tonnes

As noted above, the City operates three EnviroDepots (Oxford Street, 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.

Public Space Recycling – 50 tonnes

The City has 42 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– 5,460 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 54,600 composters including 240 in 2012. 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.

Grasscycling – 5,460 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.

It is estimated that not collecting grass diverts on average approximately 45 kilograms of grass per curbside household.

Curbside Yard Material Collection – 4,540 tonnes

The City provides curbside collection of yard materials. This includes plant trimmings, brush and branches up to 10 cm in diameter. In 2012 yard materials were collected on a six week cycle and each home received four 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 2012 4,540 tonnes of yard materials were collected curbside of which approximately 200 tonnes would become process residuals.

Curbside Fall Leaf Collection – 4,680 tonnes

The City provides curbside collection of fall leaves beginning in mid-October. Yard materials are also collected with the fall leaves. In 2012 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. On average about 5% of incoming material becomes residue. How they are processed and the calculation of the quantity composted is the same as for yard materials.

Depot Yard Material Collection – 9,920 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. How they are processed and the calculation of the quantity composted is the same as for yard materials.

Depot Christmas Tree Collection – 120 tones

The City operates depots at six locations to collect Christmas trees for the 1st week of January each year. The trees are chipped on-site at the Depot locations and taken to TRY Recycling where they are chipped and composted and to W12A Landfill where they are chipped and used for daily cover.

Other Programs

Waste Electronics and Electrical Equipment Recycling – 1,130 tonnes

Waste Electronics and Electrical Equipment (WEEE) recycling is made up of three components. The first component is electronics collected at the EnviroDepots and shipped for recycling. In 2012 the EnviroDepots collected 560 tonnes of material electronics were shipped through the Ontario Electronic Stewardship (OES) program.

The second component is appliances collected at the EnviroDepots and recycled. 2012, 100 tonnes of appliances were collected and recycled.

The third component was the amount of appliances taken to local scrap metal dealers because they are no longer collected at the curb. It was estimated there were an additional 640 tonnes of material diverted because of the ban on appliances.

Tire Recycling – 2,300 tonnes

The annual Municipal Datacall administered by Waste Diversion Ontario (WDO) compiles information on materials diverted and disposed by Ontario municipalities. Most of the information used by the WDO 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 2012 WDO Datacall shows 2,300 tonnes of tires being recycled/reused in the City of London. Included in this total is called 120 tonnes of tires collected at the three City EnviroDepots as part of the Used Tire Program.

Wood, Renovation Material & Construction/Demolition Material Recycling – 4,540 tonnes

The City banned the collection of wood waste, renovation materials and construction/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 were approximately 80% is made into useable products and 20% becomes residual and is landfilled.

In 2012, the EnviroDepots received 4,240 tonnes of wood waste and renovation materials. Approximately 3,390 tonnes of this material was recycled and 850 tonnes became residual waste and was landfilled.

It was assumed that approximately ½ the residential renovation materials not taken to an EnviroDepots (1,150 tonnes) was taken to a private construction and demolition waste recycling companies (TRY Recycling and Green Valley Recycling) and recycled while other 50% (1,150 tonnes) was placed in the garbage or disposed of privately.

Scrap Metal Recycling – 720 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 percent of the metal is recycled. In 2012, the EnviroDepots received 500 tonnes of scrap metal.

It was assumed that approximately half the residential renovation materials not taken to an EnviroDepots (220 tonnes) was taken to other scrap metal dealers and recycled while other 50% (220 tonnes) was placed in the garbage.

Textile/Small Household Item Reuse/Recycling– 400 tonnes

In 2012, 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 400 tonnes of material at these locations.

MHSW Recycling– 410 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– 1,710 tonnes

The 2012 WDO Datacall shows 1,710 tonnes of Brewer's Retail and Liquor Control Board of Ontario (LCBO) containers being recycled/reused in the City of London. This information is provided to the WDO from Brewer's Retail.

This page is intentionally left blank.

Appendix B
Garbage and Blue Box Composition Data

Existing Composition – Garbage (including compostables) and Blue Box Recyclables

Composition audits of garbage and Blue Box recyclables were conducted in London in 2012/2013 (with funding, coordination and sampling methodology provided by Stewardship Ontario). The audit consisted of four separate sets of audits conducted at specified intervals throughout the year (i.e. spring, summer, fall, winter) to address any issues of seasonality. Each audit included two samples taken over two consecutive collections to address issues of sporadic set out. The audit sample consisted of 100 curbside homes to achieve statistical significance. The same homes were used 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 2007, etc.) to create the following tables:

- Table B1 – Summary of 2012 Garbage Composition
- Table B2 – Estimated 2012 Curbside Garbage and Recycling Composition
- Table B3 – Estimated 2012 Multi-Residential Garbage and Recycling Composition
- Table B4 – Estimated 2012 Garbage and Recycling Composition

Future Composition - Waste (Garbage and Blue Box Materials Combined)

Estimates of waste quantities (garbage and blue box materials combined) were calculated for 2012, 2016 and 2025 and are shown in tables:

- Table B5 – Estimated 2012 Curbside and Multi-Residential Waste Composition
- Table B6 – Estimated 2016 Curbside and Multi-Residential Waste Composition
- Table B7 – Estimated 2025 Curbside and Multi-Residential Waste Composition

These estimates were made taking the 2012 waste composition and adjusting it based on:

- estimates of future curbside (single family dwellings) and multi-residential units from *Employment, Population, Housing and Non-Residential Construction Projects, City of London, Ontario, 2011 Update* (AltusGroup, 2012)
- expected changes to the generation rate of specific materials using information on projected changes to the generation rates from *Volume 1: Executive Summary A Study of the Optimization of the Blue Box Material Processing System in Ontario Final Report* (Waste Diversion Organization, 2012) (Table B8)

The changes to material generation rates in Table B7 are due to industry introducing new packaging or modifying existing packaging, changing consumer habits and new products being introduced. Examples of recent changes include:

- More fruits and vegetables in “clamshell” packaging
- An increase in light weight and multi material packaging
- Plastic containers replacing glass, aluminum and steel
- An increase in plastic stand-up pouches for food products
- Consumers reading more newspapers and magazines online which reduces the amount of paper for recycling
- An increase in cardboard as more people shop online

Future Composition – Garbage and Blue Box Materials

Projections of the amount of material that would be diverted by the Blue Box program in the future were estimated for three scenarios:

- Table B9 – Estimated 2016 Garbage and Blue Box Composition – Base Case
- Table B10 – Estimated 2025 Garbage and Blue Box Composition – Base Case
- Table B11 – Estimated 2025 Garbage and Blue Box Composition – High Increase in Capture Rate

The composition in Table B9 is based on the implementation of the recommendations in this report. The composition in Table B10 assumes the increased capture rates continues in line with trends from previous years, but there are no substantially new or different initiatives to increase recovery. It is assumed that markets for some materials will strengthen based on current efforts. The composition in Table B11 assumes recovery rates are substantial and will require aggressive promotion, education and incentive programs (e.g., rewards programs for recycling).

The capture rates used to generate Tables B9 to B11 are presented in Table B12.

Table B1: Summary of 2012 Garbage Composition

Material Category	2012					
	Curbside (Single Family Dwellings)		Multi-Residential		Total	
	Total tonne/yr	% Blue Box Capture[a]	Total tonne/yr	% Blue Box Capture[a]	Total tonne/yr	% Blue Box Capture
Blue Box Recyclables						
Paper	3,853	83%	3,510	42%	7,363	74%
Plastic	997	67%	657	30%	1,654	58%
Metal	652	66%	460	26%	1,112	57%
Glass	509	81%	436	35%	945	71%
Total Blue Box Recyclables	6,011	80%	5,063	39%	11,074	71%
Other Potential Blue Box Materials						
Beverage Cups/Ice Cream Containers	352		121		473	
Expanded Polystyrene	256		83		339	
Plastic Bags/Film	2,388		773		3,161	
Total Other Potential Blue Box	2,996		977		3,973	
Other						
Municial Hazardous & Special Waste	254		46		300	
Food Waste	22,065		6,919		28,983	
Yard Waste	1,193		312		1,504	
Textiles	1,842		818		2,660	
Construction & Demolition	1,899		843		2,742	
Carpeting	958		426		1,384	
Electronics	648		288		935	
Other Non-recyclable Materials	19,784		7,209		26,993	
Total Other	48,643		16,860		65,503	
Grand Total	57,650		22,900		80,550	

Notes

(a) Percentage of material that is not in the garbage (placed in Blue Box).

Table B2: Estimated 2012 Curbside Garbage and Recycling Composition

Material Category	Materials Accepted in London's Blue Box Program	Estimated Curbside Composition (Excludes Bulky Items)						
		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
1. PAPER								
Newsprint	X	7,228	359	7,587	95%	62	3	65
Magazines and Catalogues	X	2,492	172	2,664	94%	21	1	23
Directories / Telephone Books	X	138	30	167	82%	1	0.3	1.4
Mixed Fine Paper	X	1,187	1,189	2,376	50%	10	10	20
Books	X	438	145	583	75%	4	1	5
Other Printed Materials - Non-Recyclable		133	324	457	29%	1	3	4
Total Paper		**11,614**	**2,220**	**13,834**	**84%**	**99**	**19**	**118**
Targeted BB Paper		**11,481**	**1,895**	**13,377**	**86%**	**98**	**16**	**114**
2. PAPER PACKAGING								
Gable Top Containers	X	248	83	331	75%	2	0.7	3
Aseptic Containers	X	83	67	150	55%	0.7	0.6	1.3
Spiral Wound Containers	X	53	68	121	44%	0.5	0.6	1.0
Corrugated Cardboard	X	3,821	616	4,437	86%	33	5	38
Boxboard / Cores (Tubes)	X	2,655	1,125	3,780	70%	23	10	32
Polycoat Cups/Ice Cream Containers		52	299	351	15%	0.4	3	3
Other Bleached Long Polycoat Fibre		3	53	57	6%	0.0	0.5	0.5
Other Paper Laminate Categories - Non-Recyclable		25	318	343	7%	0.2	3	3
Tissue/Toweling - Non-Recyclable		13	3,205	3,218	0%	0.1	27	27
Total Paper Packaging		**6,954**	**5,833**	**12,787**	**54%**	**59**	**50**	**109**
Targeted BB Paper Packaging		**6,860**	**1,958**	**8,818**	**78%**	**58**	**17**	**75**
3. PLASTICS								
#1 PET	X	1,269	397	1,666	76%	11	3	14
#2 HDPE	X	460	159	620	74%	4	1	5
#3 - #7 Mixed Plastics	X	306	408	714	43%	3	3	6
#6 PS - Expanded Polystyrene		19	256	275	7%	0.2	2	2
Large HDPE & PP Pails & Lids	X	11	33	44	25%	0.1	0.3	0.4
LDPE/HDPE Film		141	2,388	2,529	6%	1	20	22
Plastic Laminates - Mostly Non-Recyclable		31	946	977	3%	0.3	8	8
Other Rigid Plastic Packaging - Mostly Non-Recyclable		171	575	746	23%	1	5	6
Other Plastics - Non-Packaging/Durable - Non-Recyclable		149	942	1,091	14%	1	8	9
Total Plastics		**2,558**	**6,104**	**8,662**	**30%**	**22**	**52**	**74**
Targeted BB Plastics		**2,046**	**997**	**3,043**	**67%**	**17**	**8**	**26**

Table B2: Estimated 2012 Curbside Garbage and Recycling Composition (continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Curbside Composition (Excludes Bulky Items)						
		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
4. METALS								
Aluminum- Food/Beverage Containers	X	430	112	542	79%	4	1	5
Aluminum - Foil and Trays	X	26	165	191	14%	0.2	1.4	1.6
Steel - Food and Beverage Containers	X	760	222	981	77%	6	2	8
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	26	109	134	19%	0.2	0.9	1.1
Other Aluminum - Non-Blue Box		0.0	11	11	0%	0.0	0.1	0.1
Other Steel - Non-Blue Box		37	457	493	7%	0.3	4	4
Total Metals		**1,278**	**1,075**	**2,353**	**54%**	**11**	**9**	**20**
Targeted BB Metals		**1,242**	**608**	**1,849**	**67%**	**11**	**5**	**16**
5. GLASS								
Clear Glass	X	1,591	469	2,060	77%	14	4	18
Coloured Glass	X	518	40	557	93%	4	0.3	5
Other Glass - Non-Blue Box		128	335	463	28%	1	3	4
Total Glass		**2,236**	**844**	**3,080**	**73%**	**19**	**7**	**26**
Targeted BB Glass		**2,109**	**509**	**2,618**	**81%**	**18**	**4**	**22**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE								
Paint & Stain Containers	X	10	44	55	19%	0.1	0.4	0.5
Lubricating Oil Containers		5	7	11	40%	0.0	0.1	0.1
Batteries		2	106	108	2%	0.0	0.9	0.9
Other MHSW		30	101	131	23%	0.3	0.9	1.1
Total MHSW		**47**	**258**	**305**	**15%**	**0.4**	**2**	**3**
Targeted BB MHSW		**10**	**44**	**55**	**19%**	**0.1**	**0.4**	**0.5**
7. OTHER MATERIALS								
Food Waste		0.0	22,065	22,065	0%	0.0	188	188
Yard Waste		0.0	1,193	1,193	0%	0.0	10	10
Diapers & Sanitary Products		0.0	3,492	3,492	0%	0.0	30	30
Textiles		0.0	1,842	1,842	0%	0.0	16	16
C&D		0.0	1,899	1,899	0%	0.0	16	16
Carpeting		0.0	958	958	0%	0.0	8	8
Electronics		0.0	648	648	0%	0.0	6	6
Other HSW		0.0	40	40	0%	0.0	0.3	0.3
Other Non-Recyclable Materials		313	9,180	9,493	3%	3	78	81
Total Other Materials		**313**	**41,316**	**41,629**	**1%**	**2.7**	**352**	**355**
Total Targeted BB		**23,749**	**6,011**	**29,760**	**80%**	**202**	**51**	**254**
Grand Total		**25,000**	**57,650**	**82,650**	**30%**	**213**	**491**	**705**

Table B3: Estimated 2012 Multi-Residential Garbage and Recycling Composition

Material Category	Materials Accepted in London's Program	Estimated Multi Residential Composition (excludes bulky items) – City: Blue Box Material Recycled tonne/yr	City: Material in Garbage recycling units tonne/yr	City: Material in Garbage non-recycling units tonne/yr	City: Total tonne/yr	City: Capture Rate of Blue Box Materials	Per Household: Blue Box Material Recycled recycling units kg/hhld/yr	Per Household: Material in Garbage recycling units kg/hhld/yr	Per Household: Total kg/hhld/yr
1. PAPER									
Newsprint	X	1,189	807	134	2,130	56%	25	17	42
Magazines and Catalogues	X	410	291	47	748	55%	9	6	15
Directories / Telephone Books	X	23	22	3	47	48%	0.5	0.5	1
Mixed Fine Paper	X	195	437	43	675	29%	4	9	13
Books	X	72	82	10	165	44%	1.5	1.7	3.2
Other Printed Materials - Non-Recyclable		22	100	8	131	17%	0.5	2	3
Total Paper		**1,910**	**1,739**	**246**	**3,895**	**49%**	**40**	**37**	**77**
Targeted BB Paper		**1,888**	**1,639**	**238**	**3,765**	**50%**	**40**	**35**	**74**
2. PAPER PACKAGING									
Gable Top Containers	X	39	89	9	137	29%	0.8	2	3
Aseptic Containers	X	8	28	2	39	21%	0.2	0.6	0.8
Spiral Wound Containers	X	6	29	2	38	17%	0.1	0.6	0.7
Corrugated Cardboard	X	300	557	58	915	33%	6	12	18
Boxboard / Cores (Tubes)	X	313	785	74	1,172	27%	7	17	23
Polycoat Cups/Ice Cream Containers		6	97	7	110	6%	0.1	2	2
Other Bleached Long Polycoat Fibre		0.4	16	1	18	2%	0.0	0.3	0.4
Other Paper Laminate Categories - Non-Recyclable		3	98	7	108	3%	0.1	2	2
Tissue/Toweling - Non-Recyclable		2	944	64	1,009	0%	0.0	20	20
Total Paper Packaging		**678**	**2,642**	**224**	**3,543**	**19%**	**14**	**56**	**70**
Targeted BB Paper Packaging		**667**	**1,488**	**145**	**2,300**	**29%**	**14**	**31**	**45**
3. PLASTICS									
#1 PET	X	177	306	32	515	34%	4	6	10
#2 HDPE	X	64	115	12	192	33%	1	2	4
#3 - #7 Mixed Plastics	X	43	165	14	222	19%	1	3	4
#6 PS - Expanded Polystyrene		3	78	5	86	3%	0.1	2	2
Large HDPE & PP Pails & Lids	X	2	11	1	14	11%	0.0	0.2	0.3
LDPE/HDPE Film		20	723	50	792	2%	0.4	15	16
Plastic Laminates - Mostly Non-Recyclable		4	283	19	306	1%	0.1	6	6
Other Rigid Plastic Packaging - Mostly Non-Recyclable		24	195	15	233	10%	0.5	4	5
Other Plastics - Non-Packaging/Durable - Non-Recyclable		21	299	22	341	6%	0.4	6	7
Total Plastics		**356**	**2,174**	**170**	**2,701**	**13%**	**7**	**46**	**53**
Targeted BB Plastics		**285**	**598**	**59**	**942**	**30%**	**6**	**13**	**19**

Table B3: Estimated 2012 Multi-Residential Garbage and Recycling Composition (continued)

Material Category	Materials Accepted in London's Program	Estimated Multi Residential Composition (excludes bulky items)							
		City					Per Household		
		Blue Box Material Recycled tonne/yr	Material in Garbage recycling units tonne/yr	Material in Garbage non-recycling units tonne/yr	Total tonne/yr	Capture Rate of Blue Box Materials	Blue Box Material Recycled recycling units kg/hhld/yr	Material in Garbage recycling units kg/hhld/yr	Total kg/hhld/yr
4. METALS									
Aluminum- Food/Beverage Containers	X	56	114	11	182	31%	1	2	4
Aluminum - Foil and Trays	X	3	57	4	65	5%	0.1	1.2	1.3
Steel - Food and Beverage Containers	X	100	209	21	329	30%	2	4	6
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	3	39	3	46	7%	0.1	0.8	0.9
Other Aluminum - Non-Blue Box		0.0	3.3	0.2	3.6	0%	0.0	0.1	0.1
Other Steel - Non-Blue Box		4	117	8	129	3%	0.1	2	3
Total Metals		**167**	**539**	**48**	**754**	**22%**	**4**	**11**	**15**
Targeted BB Metals		**163**	**419**	**39**	**621**	**26%**	**3**	**9**	**12**
5. GLASS									
Clear Glass	X	188	338	35	561	34%	4	7	11
Coloured Glass	X	43	57	7	106	40%	1	1	2
Other Glass - Non-Blue Box		29	197	15	241	12%	0.6	4	5
Total Glass		**260**	**591**	**57**	**908**	**29%**	**5**	**12**	**18**
Targeted BB Glass		**231**	**394**	**42**	**668**	**35%**	**5**	**8**	**13**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE									
Paint & Stain Containers	X	0.2	1	0.1	1	17%	0.0	0.0	0.0
Lubricating Oil Containers		0.5	0.8	0.1	1	37%	0.0	0.0	0.0
Batteries		0.2	13	1	14	1%	0.0	0.3	0.3
Other MHSW		4	12	1	17	21%	0.1	0.3	0.3
Total MHSW		**5**	**27**	**2**	**34**	**13%**	**0.1**	**1**	**0.7**
Targeted BB MHSW		**0.2**	**1**	**0.1**	**1**	**17%**	**0.0**	**0.0**	**0.0**
7. OTHER MATERIALS									
Food Waste		0.0	6,482	437	6,919	0%	0.0	136	136
Yard Waste		0.0	292	20	312	0%	0.0	6	6
Diapers & Sanitary Products		0.0	684	46	730	0%	0.0	14	14
Textiles		0.0	767	52	818	0%	0.0	16	16
C&D		0.0	790	53	843	0%	0.0	17	17
Carpeting		0.0	399	27	426	0%	0.0	8	8
Electronics		0.0	270	18	288	0%	0.0	6	6
Other HSW		0.0	17	1	18	0%	0.0	0.3	0.3
Other Non-Recyclable Materials		125	3,820	266	4,211	3%	3	80	83
Total Other Materials		**125**	**13,520**	**919**	**14,565**	**1%**	**0.0**	**198**	**198**
Total Targeted BB		**3,234**	**4,539**	**524**	**8,297**	**39%**	**68**	**96**	**164**
Grand Total		**3,500**	**21,234**	**1,666**	**26,400**	**13%**	**71**	**361**	**432**

Table B4: Estimated 2012 Garbage and Recycling Composition

Material Category	Materials Accepted in London's Program	Estimated Overall Composition (Excludes Bulky Items)						
		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
1. PAPER								
Newsprint	X	8,416	1,301	9,717	87%	50	8	58
Magazines and Catalogues	X	2,902	510	3,412	85%	17	3	20
Directories / Telephone Books	X	160	54	214	75%	1	0.3	1.3
Mixed Fine Paper	X	1,382	1,669	3,051	45%	8	10	18
Books	X	510	238	748	68%	3	1	4
Other Printed Materials - Non-Recyclable		155	433	588	26%	0.9	3	3
Total Paper		**13,525**	**4,205**	**17,729**	**76%**	**81**	**25**	**106**
Targeted BB Paper		**13,370**	**3,772**	**17,141**	**78%**	**80**	**22**	**102**
2. PAPER PACKAGING								
Gable Top Containers	X	287	180	467	61%	2	1	3
Aseptic Containers	X	90	97	187	48%	0.5	0.6	1.1
Spiral Wound Containers	X	59	99	159	37%	0.4	0.6	0.9
Corrugated Cardboard	X	4,122	1,231	5,352	77%	25	7	32
Boxboard / Cores (Tubes)	X	2,968	1,983	4,952	60%	18	12	29
Polycoat Cups/Ice Cream Containers		58	402	461	13%	0.3	2.4	3
Other Bleached Long Polycoat Fibre		4	71	74	5%	0.0	0.4	0.4
Other Paper Laminate Categories - Non-Recyclable		28	423	451	6%	0.2	3	3
Tissue/Toweling - Non-Recyclable		14	4,212	4,226	0%	0.1	25	25
Total Paper Packaging		**7,631**	**8,698**	**16,330**	**47%**	**45**	**52**	**97**
Targeted BB Paper Packaging		**7,526**	**3,591**	**11,117**	**68%**	**45**	**21**	**66**
3. PLASTICS								
#1 PET	X	1,446	735	2,181	66%	9	4	13
#2 HDPE	X	524	287	811	65%	3	2	5
#3 - #7 Mixed Plastics	X	348	588	936	37%	2	3	6
#6 PS - Expanded Polystyrene		22	339	361	6%	0.1	2	2
Large HDPE & PP Pails & Lids	X	12	45	57	22%	0.1	0.3	0
LDPE/HDPE Film		161	3,161	3,321	5%	1	19	20
Plastic Laminates - Mostly Non-Recyclable		35	1,248	1,283	3%	0.2	7	8
Other Rigid Plastic Packaging - Mostly Non-Recyclable		195	784	980	20%	1	5	6
Other Plastics - Non-Packaging/Durable - Non-Recyclable		169	1,262	1,432	12%	1	8	9
Total Plastics		**2,914**	**8,449**	**11,363**	**26%**	**17**	**50**	**68**
Targeted BB Plastics		**2,331**	**1,654**	**3,985**	**58%**	**14**	**10**	**24**

Table B4: Estimated 2012 Garbage and Recycling Composition (continued)

Material Category	Materials Accepted in London's Program	Estimated Overall Composition (Excludes Bulky Items)						
		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
4. METALS								
Aluminum- Food/Beverage Containers	X	486	238	724	67%	3	1	4
Aluminum - Foil and Trays	X	30	226	256	12%	0.2	1.3	1.5
Steel - Food and Beverage Containers	X	859	451	1,311	66%	5	3	8
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	29	151	180	16%	0.2	0.9	1
Other Aluminum - Non-Blue Box		0.0	14	14	0%	0.0	0.1	0.1
Other Steel - Non-Blue Box		40	582	622	6%	0.2	3	4
Total Metals		**1,445**	**1,662**	**3,107**	**47%**	**9**	**10**	**18**
Targeted BB Metals		**1,404**	**1,066**	**2,470**	**57%**	**8**	**6**	**15**
5. GLASS								
Clear Glass	X	1,779	842	2,621	68%	11	5	16
Coloured Glass	X	561	103	664	84%	3	1	4
Other Glass - Non-Blue Box		156	547	703	22%	0.9	3	4
Total Glass		**2,496**	**1,492**	**3,988**	**63%**	**15**	**9**	**24**
Targeted BB Glass		**2,340**	**945**	**3,285**	**71%**	**14**	**6**	**20**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE								
Paint & Stain Containers	X	11	46	56	19%	0.1	0.3	0.3
Lubricating Oil Containers		5	8	13	40%	0.0	0.0	0.1
Batteries		2	120	122	2%	0.0	0.7	0.3
Other MHSW		33	114	148	23%	0.2	1	1
Total MHSW		**51**	**288**	**339**	**15%**	**0.3**	**2**	**2**
Targeted BB MHSW		**11**	**46**	**56**	**19%**	**0.1**	**0.3**	**0.3**
7. OTHER MATERIALS								
Food Waste		0.0	28,983	28,983	0%	0.0	173	173
Yard Waste		0.0	1,504	1,504	0%	0.0	9	9
Diapers & Sanitary Products		0.0	4,222	4,222	0%	0.0	25	25
Textiles		0.0	2,660	2,660	0%	0.0	16	16
C&D		0.0	2,742	2,742	0%	0.0	16	16
Carpeting		0.0	1,384	1,384	0%	0.0	8	8
Electronics		0.0	935	935	0%	0.0	6	6
Other HSW		0.0	58	58	0%	0.0	0.3	0.3
Other Non-Recyclable Materials		439	13,266	13,705	3%	3	79	82
Total Other Materials		**439**	**55,756**	**56,195**	**1%**	**0.0**	**247**	**247**
Total Targeted BB		**26,982**	**11,074**	**38,056**	**71%**	**161**	**66**	**227**
Grand Total		**28,500**	**80,550**	**109,050**	**26%**	**167**	**395**	**561**

Table B5: Estimated 2012 Curbside and Multi-Residential Waste Composition

Material Category	Materials Accepted in London's Program	Estimated Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
1. PAPER							
Newsprint	X	7,587	2,130	9,717	65	42	58
Magazines and Catalogues	X	2,664	748	3,412	23	15	20
Directories / Telephone Books	X	167	47	214	1.4	0.9	1.2
Mixed Fine Paper	X	2,376	675	3,051	20	13	18
Books	X	583	165	748	5	3	4
Other Printed Materials[a]		457	131	588	4	3	3
Total Paper		**13,834**	**3,895**	**17,729**	**118**	**77**	**105**
Targeted BB Paper		**13,377**	**3,765**	**17,141**	**114**	**74**	**102**
2. PAPER PACKAGING							
Gable Top Containers	X	331	137	467	3	3	3
Aseptic Containers	X	150	39	188	1.3	0.8	1.0
Spiral Wound Containers	X	121	38	159	1.0	0.7	0.9
Corrugated Cardboard	X	4,437	915	5,352	38	18	32
Boxboard / Cores (Tubes)	X	3,780	1,172	4,952	32	23	29
Polycoat Cups/Ice Cream Containers		351	110	461	3	2	3
Other Bleached Long Polycoat Fibre		57	18	74	0.5	0.4	0.8
Other Paper Laminate Categories[a]		343	108	451	3	2	3
Tissue/Toweling - Non-Recyclable		3,218	1,009	4,226	27	20	25
Total Paper Packaging		**12,787**	**3,543**	**16,330**	**109**	**70**	**97**
Targeted BB Paper Packaging		**8,818**	**2,300**	**11,118**	**75**	**45**	**66**
3. PLASTICS							
#1 PET	X	1,666	515	2,181	14	10	13
#2 HDPE	X	620	192	811	5	4	5
#3 - #7 Mixed Plastics	X	714	222	936	6	4	6
#6 PS - Expanded Polystyrene		275	86	361	2	2	2
Large HDPE & PP Pails & Lids	X	44	14	57	0.4	0.3	0.3
LDPE/HDPE Film		2,529	792	3,321	22	16	20
Plastic Laminates[a]		977	306	1,283	8	6	8
Other Rigid Plastic Packaging[a]		746	233	980	6	5	6
Other Plastics - Non-Packaging/Durable[a]		1,091	341	1,432	9	7	9
Total Plastics		**8,662**	**2,701**	**11,363**	**74**	**53**	**68**
Targeted BB Plastics		**3,043**	**942**	**3,985**	**26**	**19**	**24**

Notes

(a) Mostly non-recyclable material.

Table B5: Estimated 2012 Curbside and Multi-Residential Waste Composition (continued)

Material Category	Materials Accepted in London's Program	Estimated Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
4. METALS							
Aluminum- Food/Beverage Containers	X	542	182	724	5	4	4
Aluminum - Foil and Trays	X	191	65	256	2	1	2
Steel - Food and Beverage Containers	X	981	329	1,311	8	6	8
Steel/Aluminum - Aerosol Containers	X	134	46	180	1	1	1
Other Aluminum - Non-Blue Box		10.5	3.6	14	0.1	0.1	0.1
Other Steel - Non-Blue Box		493	129	622	4	3	4
Total Metals		**2,353**	**754**	**3,107**	**20**	**15**	**18**
Targeted BB Metals		**1,849**	**621**	**2,470**	**16**	**12**	**15**
5. GLASS							
Clear Glass	X	2,060	561	2,621	18	11	16
Coloured Glass	X	557	106	664	5	2	4
Other Glass - Non-Blue Box		463	241	703	4	5	4
Total Glass		**3,080**	**908**	**3,988**	**26**	**18**	**24**
Targeted BB Glass		**2,618**	**668**	**3,285**	**22**	**13**	**20**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE							
Paint & Stain Containers	X	55	1	56	0.5	0.03	0.2
Lubricating Oil Containers		11	1	13	0.1	0.0	0.1
Batteries		108	14	122	1	0.3	1
Other MHSW		131	17	148	1	0	1
Total MHSW		**305**	**34**	**339**	**3**	**1**	**2**
Targeted BB MHSW		**55**	**1**	**56**	**0.5**	**0.0**	**0.2**
7. OTHER MATERIALS							
Food Waste		22,065	6,919	28,983	188	136	173
Yard Waste		1,193	312	1,504	10	6	9
Diapers & Sanitary Products		3,492	730	4,222	30	14	25
Textiles		1,842	818	2,660	16	16	16
C&D		1,899	843	2,742	16	17	16
Carpeting		958	426	1,384	8	8	8
Electronics		648	288	935	6	6	6
Other HSW		40	18	58	0.3	0.3	0.3
Other Non-Recyclable Materials		9,493	4,211	13,704	81	83	82
Total Other Materials		**31,449**	**10,048**	**56,194**	**268**	**198**	**247**
Total Targeted BB		**29,760**	**8,297**	**38,056**	**254**	**164**	**226**
Grand Total		**72,470**	**21,883**	**109,050**	**618**	**432**	**562**

Table B6: Estimated 2016 Curbside and Multi-Residential Waste Composition

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
1. PAPER							
Newsprint	X	6,959	2,152	9,111	57	37	51
Magazines and Catalogues	X	2,572	796	3,368	21	14	19
Directories / Telephone Books	X	135	42	176	1	1	1
Mixed Fine Paper	X	2,562	801	3,363	21	14	19
Books	X	610	190	799	5	3	4
Other Printed Materials - Non-Recyclable		478	150	629	4	3	3
Total Paper		**13,316**	**4,130**	**17,446**	**109**	**71**	**97**
Targeted BB Paper		**12,837**	**3,980**	**16,817**	**105**	**68**	**94**
2. PAPER PACKAGING							
Gable Top Containers	X	389	177	565	3	3	3
Aseptic Containers	X	176	50	226	1	1	1
Spiral Wound Containers	X	136	47	183	1	1	1
Corrugated Cardboard	X	5,141	1,167	6,309	42	20	35
Boxboard / Cores (Tubes)	X	3,954	1,350	5,304	32	23	29
Polycoat Cups/Ice Cream Containers		395	136	532	3	2	3
Other Bleached Long Polycoat Fibre		64	22	86	0.5	0.4	0.5
Other Paper Laminate Categories - Non-Recyclable		387	133	520	3	2	3
Tissue/Toweling - Non-Recyclable		3,366	1,162	4,528	27	20	25
Total Paper Packaging		**14,007**	**4,244**	**18,251**	**114**	**73**	**102**
Targeted BB Paper Packaging		**9,796**	**2,790**	**12,586**	**80**	**48**	**70**
3. PLASTICS							
#1 PET	X	1,904	648	2,551	16	11	14
#2 HDPE	X	628	214	842	5	4	5
#3 - #7 Mixed Plastics	X	804	275	1,079	7	5	6
#6 PS - Expanded Polystyrene		244	84	328	2	1	2
Large HDPE & PP Pails & Lids	X	46	16	61	0.4	0.3	0.3
LDPE/HDPE Film		2,564	884	3,449	21	15	19
Plastic Laminates - Mostly Non-Recyclable		1,117	385	1,502	9	7	8
Other Rigid Plastic Packaging - Mostly Non-Recyclable		925	318	1,243	8	5	7
Other Plastics - Non-Packaging/Durable - Non-Recyclable		1,141	393	1,534	9	7	9
Total Plastics		**9,371**	**3,217**	**12,589**	**76**	**55**	**70**
Targeted BB Plastics		**3,381**	**1,153**	**4,534**	**28**	**20**	**25**

Table B6: Estimated 2016 Curbside and Multi-Residential Waste Composition (continued)

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
4. METALS							
Aluminum- Food/Beverage Containers	X	550	203	752	4	3	4
Aluminum - Foil and Trays	X	194	72	266	2	1	1
Steel - Food and Beverage Containers	X	963	356	1,319	8	6	7
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	141	52	193	1	1	1
Other Aluminum - Non-Blue Box		11.0	4.1	15	0.1	0.1	0.1
Other Steel - Non-Blue Box		516	148	664	4	3	4
Total Metals		**2,375**	**836**	**3,211**	**19**	**14**	**18**
Targeted BB Metals		**1,848**	**684**	**2,531**	**15**	**12**	**14**
5. GLASS							
Clear Glass	X	1,956	587	2,543	16	10	14
Coloured Glass	X	529	111	641	4	2	4
Other Glass - Non-Blue Box		484	277	761	4	5	4
Total Glass		**2,969**	**975**	**3,944**	**24**	**17**	**22**
Targeted BB Glass		**2,485**	**698**	**3,183**	**20**	**12**	**18**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE							
Paint & Stain Containers	X	57	2	59	0.5	0.03	0.3
Lubricating Oil Containers		12	2	14	0.1	0.0	0.1
Batteries		113	16	129	1	0.3	1
Other MHSW		137	20	156	1	0	1
Total MHSW		**319**	**39**	**358**	**3**	**1**	**2**
Targeted BB MHSW		**57**	**2**	**59**	**0.5**	**0.0**	**0.3**
7. OTHER MATERIALS							
Food Waste		23,080.5	7,969	31,050	188	136	173
Yard Waste		1,248	359	1,607	10	6	9
Diapers & Sanitary Products		3,653	841	4,493	30	14	25
Textiles		1,927	943	2,870	16	16	16
C&D		1,986	972	2,958	16	17	16
Carpeting		1,003	490	1,493	8	8	8
Electronics		678	331	1,009	6	6	6
Other HSW		42	20	62	0.3	0.3	0.3
Other Non-Recyclable Materials		9,930	4,851	14,781	81	83	82
Total Other Materials		**32,896.6**	**11,574**	**44,470**	**268**	**198**	**247**
Total Targeted BB		**30,405**	**9,306**	**39,711**	**248**	**159**	**221**
Grand Total		**75,254**	**25,015**	**100,270**	**613**	**428**	**558**

Table B7: Estimated 2025 Curbside and Multi-Residential Waste Composition

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
1. PAPER							
Newsprint	X	5,293	1,626	6,919	39	25	35
Magazines and Catalogues	X	2,323	714	3,037	17	11	15
Directories / Telephone Books	X	49	15	64	0.4	0.2	0.3
Mixed Fine Paper	X	3,039	944	3,983	22	15	20
Books	X	678	209	887	5	3	4
Other Printed Materials - Non-Recyclable		532	166	698	4	3	3
Total Paper		**11,914**	**3,674**	**15,588**	**87**	**57**	**78**
Targeted BB Paper		**11,382**	**3,508**	**14,890**	**83**	**54**	**75**
2. PAPER PACKAGING							
Gable Top Containers	X	538	243	782	4	4	4
Aseptic Containers	X	244	69	312	2	1	2
Spiral Wound Containers	X	176	60	236	1	1	1
Corrugated Cardboard	X	6,966	1,571	8,537	51	24	43
Boxboard / Cores (Tubes)	X	4,395	1,491	5,886	32	23	29
Polycoat Cups/Ice Cream Containers		510	175	685	4	3	3
Other Bleached Long Polycoat Fibre		82	28	111	1	0.4	1
Other Paper Laminate Categories - Non-Recyclable		499	171	670	4	3	3
Tissue/Toweling - Non-Recyclable		3,741	1,283	5,025	27	20	25
Total Paper Packaging		**17,152**	**5,091**	**22,243**	**126**	**79**	**112**
Targeted BB Paper Packaging		**12,319**	**3,434**	**15,753**	**90**	**53**	**79**
3. PLASTICS							
#1 PET	X	2,519	852	3,370	18	13	17
#2 HDPE	X	648	219	868	5	3	4
#3 - #7 Mixed Plastics	X	1,036	353	1,389	8	5	7
#6 PS - Expanded Polystyrene		160	55	215	1	1	1
Large HDPE & PP Pails & Lids	X	51	17	68	0.4	0.3	0.3
LDPE/HDPE Film		2,647	907	3,554	19	14	18
Plastic Laminates - Mostly Non-Recyclable		1,477	506	1,984	11	8	10
Other Rigid Plastic Packaging - Mostly Non-Recyclable		1,389	474	1,863	10	7	9
Other Plastics - Non-Packaging/Durable - Non-Recyclable		1,268	434	1,702	9	7	9
Total Plastics		**11,195**	**3,817**	**15,012**	**82**	**59**	**75**
Targeted BB Plastics		**4,254**	**1,441**	**5,695**	**31**	**22**	**29**

Table B7: Estimated 2025 Curbside and Multi-Residential Waste Composition (continued)

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
4. METALS							
Aluminum - Food/Beverage Containers	X	567	208	775	4	3	4
Aluminum - Foil and Trays	X	200	74	274	1	1	1
Steel - Food and Beverage Containers	X	913	335	1,248	7	5	6
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	156	58	214	1	1	1
Other Aluminum - Non-Blue Box		12.2	4.5	17	0.1	0.1	0.1
Other Steel - Non-Blue Box		574	164	738	4	3	4
Total Metals		**2,423**	**844**	**3,266**	**18**	**13**	**16**
Targeted BB Metals		**1,837**	**675**	**2,512**	**13**	**10**	**13**
5. GLASS							
Clear Glass	X	1,677	500	2,177	12	8	11
Coloured Glass	X	454	95	549	3	1	3
Other Glass - Non-Blue Box		538	306	844	4	5	4
Total Glass		**2,669**	**901**	**3,569**	**20**	**14**	**18**
Targeted BB Glass		**2,131**	**595**	**2,725**	**16**	**9**	**14**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE							
Paint & Stain Containers	X	64	2	65	0	0.0	0.3
Lubricating Oil Containers		13	2	15	0.1	0.0	0.1
Batteries		126	18	144	1	0.3	1
Other MHSW		152	22	174	1	0	1
Total MHSW		**355**	**43**	**398**	**3**	**1**	**2**
Targeted BB MHSW		**64**	**2**	**65**	**0**	**0.0**	**0.3**
7. OTHER MATERIALS							
Food Waste		25,658	8,802	34,459	188	136	173
Yard Waste		1,387	397	1,783	10	6	9
Diapers & Sanitary Products		4,060	929	4,989	30	14	25
Textiles		2,142	1,041	3,183	16	16	16
C&D		2,208	1,073	3,281	16	17	16
Carpeting		1,115	542	1,656	8	8	8
Electronics		753	366	1,119	6	6	6
Other HSW		46	23	69	0.3	0.3	0.3
Other Non-Recyclable Materials		11,038	5,358	16,396	81	83	82
Total Other Materials		**36,570**	**12,783**	**49,352**	**268**	**198**	**247**
Total Targeted BB		**31,986**	**9,655**	**41,640**	**234**	**150**	**209**
Grand Total		**82,276**	**27,153**	**109,429**	**603**	**421**	**548**

Table B8: Assumed Change 2016 to Per Household Generation

Material	**Assumed Change 2016 to Per Household Generation**[a]	**Assumed Change 2025 to Per Household Generation**[b]
Newspaper	-12%	-40%
Telephone Books	-23%	-75%
Old Magazines	-8%	-25%
Other Printed Paper	3%	10%
OCC	11%	35%
Gable Top	12%	40%
Paper Laminates	8%	25%
Aseptic	12%	40%
OBB	0%	0%
PET	9%	30%
HDPE	-3%	-10%
PS	-15%	-50%
Film	-3%	-10%
Plastic Laminates	9%	30%
Other Plastics	18%	60%
Aluminum Food & Beverage Cans	-3%	-10%
Foil and Other Aluminum	-3%	-10%
Steel Cans	-6%	-20%
Aerosol	0%	0%
Paint Cans	-9%	-30%
Food & Beverage Glass Clear	-9%	-30%
Food & Beverage Glass Coloured	-9%	-30%

Notes

(a) Assumed to be 30% of the estimated change for the year 2025.

(b) From *Executive Summary a Study of the Optimization of the Blue Box Material Processing System in Ontario Final Report (Waste Diversion Organization, 2012)*

Table B9: Estimated 2016 Garbage and Blue Box Composition – Base Case

Material Category	Materials Accepted in London's Program	Estimated 2016 Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
1. PAPER					
Newsprint	X	8,502	1,215	9,717	88%
Magazines and Catalogues	X	2,986	427	3,412	88%
Directories / Telephone Books	X	188	27	214	88%
Mixed Fine Paper	X	1,373	1,678	3,051	45%
Books	X	570	178	748	76%
Other Printed Materials - Non-Recyclable		0.0	588	588	0%
Total Paper		**13,618**	**4,111**	**17,729**	**77%**
Targeted BB Paper		**13,618**	**3,523**	**17,141**	**79%**
2. PAPER PACKAGING					
Gable Top Containers	X	304	164	467	65%
Aseptic Containers	X	101	87	188	54%
Spiral Wound Containers	X	69	89	159	44%
Corrugated Cardboard	X	4,282	1,070	5,352	80%
Boxboard / Cores (Tubes)	X	3,219	1,733	4,952	65%
Polycoat Cups/Ice Cream Containers	X	202	259	461	44%
Other Bleached Long Polycoat Fibre	X	0.0	74	74	0%
Other Paper Laminate Categories - Non-Recyclable		0.0	451	451	0%
Tissue/Toweling - Non-Recyclable		0.0	4,226	4,226	0%
Total Paper Packaging		**8,176**	**8,154**	**16,330**	**50%**
Targeted BB Paper Packaging		**7,975**	**3,143**	**11,118**	**72%**
3. PLASTICS					
#1 PET	X	1,527	654	2,181	70%
#2 HDPE	X	568	243	811	70%
#3 - #7 Mixed Plastics	X	374	562	936	40%
#6 PS - Expanded Polystyrene	X	0.0	361	361	0%
Large HDPE & PP Pails & Lids	X	20	37	57	35%
LDPE/HDPE Film		141	3,180	3,321	4%
Plastic Laminates - Mostly Non-Recyclable		0.0	1,283	1,283	0%
Other Rigid Plastic Packaging - Mostly Non-Recyclable		0.0	980	980	0%
Other Plastics - Non-Packaging/Durable - Non-Recyclable		0.0	1,432	1,432	0%
Total Plastics		**2,630**	**8,733**	**11,363**	**23%**
Targeted BB Plastics		**2,489**	**1,496**	**3,985**	**62%**

Table B9: Estimated 2016 Garbage and Blue Box Composition – Base Case (continued)

Material Category	Materials Accepted in London's Program	Estimated 2016 Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
4. METALS					
Aluminum- Food/Beverage Containers	X	507	217	724	70%
Aluminum - Foil and Trays	X	27	229	256	11%
Steel - Food and Beverage Containers	X	917	393	1,311	70%
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	63	117	180	35%
Other Aluminum - Non-Blue Box		0.0	14	14	0%
Other Steel - Non-Blue Box		218	404	622	35%
Total Metals		**1,732**	**1,375**	**3,107**	**56%**
Targeted BB Metals		**1,514**	**957**	**2,470**	**61%**
5. GLASS					
Clear Glass	X	1,835	786	2,621	70%
Coloured Glass	X	523	141	664	79%
Other Glass - Non-Blue Box		0.0	703	703	0%
Total Glass		**2,358**	**1,631**	**3,988**	**59%**
Targeted BB Glass		**2,358**	**927**	**3,285**	**72%**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE					
Paint & Stain Containers	X	15	41	56	28%
Lubricating Oil Containers	X	6	7	13	48%
Batteries		0.0	122	122	0%
Other MHSW		0.0	148	148	0%
Total MHSW		**22**	**317**	**339**	**6%**
Targeted BB MHSW		**15**	**41**	**56**	**28%**
7. OTHER MATERIALS					
Food Waste		0.0	28,983	28,983	0%
Yard Waste		0.0	1,504	1,504	0%
Diapers & Sanitary Products		0.0	4,222	4,222	0%
Textiles		0.0	2,660	2,660	0%
C&D		0.0	2,742	2,742	0%
Carpeting		0.0	1,384	1,384	0%
Electronics		0.0	935	935	0%
Other HSW		0.0	58	58	0%
Other Non-Recyclable Materials		0.0	13,704	13,704	0%
Total Other Materials		**0.0**	**41,497**	**41,497**	**0%**
Total Targeted BB		**27,969**	**10,088**	**38,056**	**73%**
Grand Total		**28,535**	**65,818**	**94,353**	**30%**

Table B10: Estimated 2025 Garbage and Blue Box Composition – Base Case

Material Category	Materials Accepted in London's Program	Estimated 2025 - Natural Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
1. PAPER					
Newsprint	X	6,227	692	6,919	90%
Magazines and Catalogues	X	2,733	304	3,037	90%
Directories / Telephone Books	X	57	6	64	90%
Mixed Fine Paper	X	1,992	1,992	3,983	50%
Books	X	710	177	887	80%
Other Printed Materials - Non-Recyclable		0.0	698	698	0%
Total Paper		**11,719**	**3,869**	**15,588**	**75%**
Targeted BB Paper		**11,719**	**3,171**	**14,890**	**79%**
2. PAPER PACKAGING					
Gable Top Containers	X	547	235	782	70%
Aseptic Containers	X	187	125	312	60%
Spiral Wound Containers	X	118	118	236	50%
Corrugated Cardboard	X	7,256	1,281	8,537	85%
Boxboard / Cores (Tubes)	X	3,826	2,060	5,886	65%
Polycoat Cups/Ice Cream Containers	X	342	342	685	50%
Other Bleached Long Polycoat Fibre	X	0.0	111	111	0%
Other Paper Laminate Categories - Non-Recyclable		0.0	670	670	0%
Tissue/Toweling - Non-Recyclable		0.0	5,025	5,025	0%
Total Paper Packaging		**12,277**	**9,966**	**22,243**	**55%**
Targeted BB Paper Packaging		**11,935**	**3,818**	**15,753**	**76%**
3. PLASTICS					
#1 PET	X	2,359	1,011	3,370	70%
#2 HDPE	X	607	260	868	70%
#3 - #7 Mixed Plastics	X	625	764	1,389	45%
#6 PS - Expanded Polystyrene	X	0	215	215	0%
Large HDPE & PP Pails & Lids	X	27	41	68	40%
LDPE/HDPE Film		178	3,376	3,554	5%
Plastic Laminates - Mostly Non-Recyclable		0.0	1,984	1,984	0%
Other Rigid Plastic Packaging - Mostly Non-Recyclable		0.0	1,863	1,863	0%
Other Plastics - Non-Packaging/Durable - Non-Recyclable		0.0	1,702	1,702	0%
Total Plastics		**3,796**	**11,216**	**15,012**	**25%**
Targeted BB Plastics		**3,619**	**2,076**	**5,695**	**64%**

Table B10: Estimated 2025 Garbage and Blue Box Composition – Base Case (continued)

Material Category	Materials Accepted in London's Program	Estimated 2025 - Natural Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
4. METALS					
Aluminum- Food/Beverage Containers	X	543	233	775	70%
Aluminum - Foil and Trays	X	41	233	274	15%
Steel - Food and Beverage Containers	X	874	374	1,248	70%
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	86	129	214	40%
Other Aluminum - Non-Blue Box		0.0	17	17	0%
Other Steel - Non-Blue Box		295	443	738	40%
Total Metals		**1,838**	**1,428**	**3,266**	**56%**
Targeted BB Metals		**1,543**	**969**	**2,512**	**61%**
5. GLASS					
Clear Glass	X	1,741	435	2,177	80%
Coloured Glass	X	439	110	549	80%
Other Glass - Non-Blue Box		0.0	844	844	0%
Total Glass		**2,180**	**1,389**	**3,569**	**61%**
Targeted BB Glass		**2,180**	**545**	**2,725**	**80%**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE					
Paint & Stain Containers	X	20	46	65	30%
Lubricating Oil Containers	X	8	8	15	50%
Batteries		0.0	144	144	0%
Other MHSW		0.0	174	174	0%
Total MHSW		**27**	**371**	**398**	**7%**
Targeted BB MHSW		**20**	**46**	**65**	**30%**
7. OTHER MATERIALS					
Food Waste		0.0	34,459	34,459	0%
Yard Waste		0.0	1,783	1,783	0%
Diapers & Sanitary Products		0.0	4,989	4,989	0%
Textiles		0.0	3,183	3,183	0%
C&D		0.0	3,281	3,281	0%
Carpeting		0.0	1,656	1,656	0%
Electronics		0.0	1,119	1,119	0%
Other HSW		0.0	69	69	0%
Other Non-Recyclable Materials		0.0	16,396	16,396	0%
Total Other Materials		**0.0**	**49,352**	**49,352**	**0%**
Total Targeted BB		**31,016**	**10,625**	**41,640**	**74%**
Grand Total		**31,838**	**77,591**	**109,429**	

Table B11: Estimated 2025 Garbage and Blue Box Composition – High Increase in Capture Rate

Material Category	Materials Accepted in London's Program	Estimated 2025 - High Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
1. PAPER					
Newsprint	X	6,227	692	6,919	90%
Magazines and Catalogues	X	2,733	304	3,037	90%
Directories / Telephone Books	X	57	6	64	90%
Mixed Fine Paper	X	2,390	1,593	3,983	60%
Books	X	799	89	887	90%
Other Printed Materials - Non-Recyclable		0.0	698	698	0%
Total Paper		**12,206**	**3,382**	**15,588**	**78%**
Targeted BB Paper		**12,206**	**2,684**	**14,890**	**82%**
2. PAPER PACKAGING					
Gable Top Containers	X	586	195	782	75%
Aseptic Containers	X	234	78	312	75%
Spiral Wound Containers	X	165	71	236	70%
Corrugated Cardboard	X	7,683	854	8,537	90%
Boxboard / Cores (Tubes)	X	4,120	1,766	5,886	70%
Polycoat Cups/Ice Cream Containers	X	411	274	685	60%
Other Bleached Long Polycoat Fibre	X	55	55	111	50%
Other Paper Laminate Categories - Non-Recyclable		0.0	670	670	0%
Tissue/Toweling - Non-Recyclable		0.0	5,025	5,025	0%
Total Paper Packaging		**13,255**	**8,988**	**22,243**	**60%**
Targeted BB Paper Packaging		**12,789**	**2,964**	**15,753**	**81%**
3. PLASTICS					
#1 PET	X	2,528	843	3,370	75%
#2 HDPE	X	651	217	868	75%
#3 - #7 Mixed Plastics	X	694	694	1,389	50%
#6 PS - Expanded Polystyrene	X	0.0	215	215	0%
Large HDPE & PP Pails & Lids	X	34	34	68	50%
LDPE/HDPE Film		178	3,376	3,554	5%
Plastic Laminates - Mostly Non-Recyclable		0.0	1,984	1,984	0%
Other Rigid Plastic Packaging - Mostly Non-Recyclable		0.0	1,863	1,863	0%
Other Plastics - Non-Packaging/Durable - Non-Recyclable		0.0	1,702	1,702	0%
Total Plastics		**4,084**	**10,928**	**15,012**	**27%**
Targeted BB Plastics		**3,907**	**1,788**	**5,695**	**69%**

Table B11: Estimated 2025 Garbage and Blue Box Composition – High Increase in Capture Rate (continued)

Material Category	Materials Accepted in London's Program	Estimated 2025 - High Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
4. METALS					
Aluminum- Food/Beverage Containers	X	582	194	775	75%
Aluminum - Foil and Trays	X	82	192	274	30%
Steel - Food and Beverage Containers	X	936	312	1,248	75%
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	107	107	214	50%
Other Aluminum - Non-Blue Box		0.0	17	17	0%
Other Steel - Non-Blue Box		369	369	738	50%
Total Metals		**2,076**	**1,191**	**3,266**	**64%**
Targeted BB Metals		**1,707**	**805**	**2,512**	**68%**
5. GLASS					
Clear Glass	X	1,850	326	2,177	85%
Coloured Glass	X	466	82	549	85%
Other Glass - Non-Blue Box		0.0	844	844	0%
Total Glass		**2,316**	**1,253**	**3,569**	**65%**
Targeted BB Glass		**2,316**	**409**	**2,725**	**85%**
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE					
Paint & Stain Containers	X	33	33	65	50%
Lubricating Oil Containers	X	8	8	15	50%
Batteries		0.0	144	144	0%
Other MHSW		0.0	174	174	0%
Total MHSW		**40**	**358**	**398**	**10%**
Targeted BB MHSW		**33**	**33**	**65**	**50%**
7. OTHER MATERIALS					
Food Waste		0.0	34,459	34,459	0%
Yard Waste		0.0	1,783	1,783	0%
Diapers & Sanitary Products		0.0	4,989	4,989	0%
Textiles		0.0	3,183	3,183	0%
C&D		0.0	3,281	3,281	0%
Carpeting		0.0	1,656	1,656	0%
Electronics		0.0	1,119	1,119	0%
Other HSW		0.0	69	69	0%
Other Non-Recyclable Materials		0.0	16,396	16,396	0%
Total Other Materials		**0.0**	**49,352**	**49,352**	**0%**
Total Targeted BB		**32,958**	**8,682**	**41,640**	**79%**
Grand Total		**33,978**	**75,451**	**109,429**	**31%**

Table B12: Capture Rates

Materials	Estimated 2012 Capture Rates for London			Estimated Capture Rates for Ontario from *A study of the Optiza of Blue Box Material Processing System in Ontario* (June, 2012)			Projected Short Term Change London's Capture Rate (2016)			Projected Long Term Change to Overall London's Capture Rate	
	Curbside	Multi-Residential	Overall	2010	Natural Growth 2025	High Growth 2025	Curbside	Multi-Residential	Overall	Natural Growth 2025	HIgh Growth 2025
1. PAPER											
Newsprint	95%	56%	87%	97%	98%	98%	95%	65%	88%	90%	90%
Magazines and Catalogues	94%	55%	85%	97%	98%	98%	95%	65%	88%	90%	90%
Directories / Telephone books	82%	48%	75%	97%	98%	98%	95%	65%	88%	90%	90%
Mixed Fine Paper	50%	29%	45%	56%	60%	75%	50%	30%	45%	50%	60%
Books	75%	44%	68%	-	-	-	85%	50%	76%	80%	90%
Other Printed Materials -Non recyclable	29%	17%	26%	-	-	-					
Total Paper	84%	49%	76%								
Targeted BB Paper	86%	50%	78%								
2. PAPER PACKAGING											
Gable Top Containers	75%	29%	61%	34%	50%	75%	76%	32%	65%	70%	75%
Aseptic Containers	55%	21%	48%	12%	30%	75%	60%	35%	54%	60%	75%
Spiral wound containers	44%	17%	37%	1%	5%	30%	50%	25%	44%	50%	70%
Corrugated Cardboard	86%	33%	77%	87%	88%	95%	90%	50%	80%	85%	90%
Boxboard / cores (tubes)	70%	27%	60%	55%	60%	80%	75%	35%	65%	65%	70%
Polycoat cups/Ice Cream Containers	15%	6%	13%	1%	5%	30%	50%	25%	44%	50%	60%
Other bleached long polycoat fibre	6%	2%	5%	1%	5%	30%	0%	0%	0%	0%	50%
Other paper laminate categories - Non recyclable	7%	3%	6%	-	-	-					
Tissue/Toweling - Non recyclable	0%	0%	0%	-	-	-					
Total Paper Packaging	54%	19%	47%								
Targeted BB Paper Packaging	78%	29%	68%								
3. PLASTICS											
#1 PET	76%	34%	66%	61%	65%	75%	80%	40%	70%	70%	75%
#2 HDPE	74%	33%	65%	57%	60%	75%	80%	40%	70%	70%	75%
#3 - #7 Mixed Plastics	43%	19%	37%	19%	40%	60%	45%	25%	40%	45%	50%
#6 PS - Expanded polystyrene	7%	3%	6%	4%	10%	50%	0%	0%	0%	0%	0%
Large HDPE & PP Pails & Lids	25%	11%	22%	-	-	-	40%	20%	35%	40%	50%
LDPE/HDPE Film	6%	2%	5%	6%	15%	40%	5%	2%	4%	5%	5%
Plastic Laminates - mostly non recyclables	3%	1%	3%	1%	1%	10%	0%	0%	0%		
Other Rigid Plastic Packaging - mostly non recyclable	23%	10%	20%	-	-	-			0%		
Other Plastics - non-packaging/durable - Non recyclable	14%	6%	12%	-	-	-					
Total Plastics	30%	13%	26%								
Targeted BB Plastics	67%	30%	58%								

Table B12: Capture Rates (continued)

Materials	Estimated 2012 Capture Rates for London			Estimated Capture Rates for Ontario from *A study of the Optiza of Blue Box Material Processing System in Ontario* (June, 2012)			Projected Short Term Change London's Capture Rate (2016)			Projected Long Term Change to Overall London's Capture Rate	
	Curbside	Multi-Residential	Overall	2010	Natural Growth 2025	High Growth 2025	Curbside	Multi-Residential	Overall	Natural Growth 2025	HIgh Growth 2025
4. METALS											
Aluminum- food/Beverage Containers	79%	31%	67%	50%	55%	75%	80%	40%	70%	70%	75%
Aluminum - foil and trays	14%	5%	12%	9%	20%	50%	12%	6%	11%	15%	30%
Steel - food and beverage containers	77%	30%	66%	61%	65%	75%	80%	40%	70%	70%	75%
Steel/aluminum - aerosol containers (non-MHSW)	19%	7%	16%	28%	30%	50%	40%	20%	35%	40%	50%
Other Aluminum - non-Blue Box	0%	0%	0%	-	-	-					
Other steel - Non-Blue Box	7%	3%	6%	-	-	-	40%	20%	35%	40%	50%
Total Metals	54%	22%	47%								
Targeted BB Metals	67%	26%	57%								
5. GLASS											
Clear Glass	77%	34%	68%	89%	90%	95%	80%	40%	70%	80%	85%
Coloured Glass	93%	40%	84%	71%	72%	80%	90%	45%	79%	80%	85%
Other Glass - non-Blue Box	28%	12%	22%	-	-	-					
Total Glass	73%	29%	63%								
Targeted BB Glass	81%	35%	71%								
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE											
Paint & Stain containers	19%	17%	19%	-	-	-	30%	20%	28%	30%	50%
Lubricating Oil Containers	40%	37%	40%	-	-	-	50%	40%	48%	50%	50%
Batteries	2%	1%	2%	-	-	-					
Other MHSW	23%	21%	23%	-	-	-					
Total MHSW	15%	13%	15%								
Targeted BB MHSW	19%	17%	19%								
7. OTHER MATERIALS											
Food Waste	0%	0%	0%	-	-	-					
Yard Waste	0%	0%	0%	-	-	-					
Diapers & Sanitary Products	0%	0%	0%	-	-	-					
Textiles	0%	0%	0%	-	-	-					
C&D	0%	0%	0%	-	-	-					
Carpeting	0%	0%	0%	-	-	-					
Electronics	0%	0%	0%	-	-	-					
Other HSW	0%	0%	0%	-	-	-					
Other non-recyclable materials	3%	3%	3%	-	-	-					
Total Other Materials	1%	1%	1%								
Total Targeted BB	80%	39%	71%								
Grand Total	30%	13%	26%								

Appendix C
Potential Materials to be Added to the Blue Box Program

Introduction

The City of London accepts 14 categories of recyclable materials in its Blue Box program: 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, tubs & trays; milk & juice cartons; drink boxes and cardboard cans.

The existing Blue Box program includes all "low hanging fruit", materials that can be managed at a reasonable cost or constitute a large portion of the waste stream. A review of other municipalities in Ontario found six "more difficult" to recycle materials that are being recycled by at least one municipality. These materials are:

1. Mixed Polycoat (e.g., coffee cups, cold beverage cups, ice cream containers)
2. Batteries (limited to single use batteries)
3. Metal Cookware (e.g., pots, pans)
4. Blister Packaging (e.g., rigid plastic around toys, hardware)
5. Film plastic (e.g., plastic bags)
6. Expanded Polystyrene (e.g., meat trays, foam cups, packaging materials)

The financial, environmental and social considerations as well as technical issues of adding these materials to the City's Blue Box recycling program are presented in Tables C-1 and C-2.

In summary, the following materials require further investigation before a final recommendation can be made with respect to adding them to the Blue Box Program: mixed polycoat (e.g., coffee cups, cold beverage cups, ice cream containers); batteries (limited to single use batteries); metal cookware (e.g., pots, pans); and blister packaging (e.g., rigid plastic around toys, hardware).

The following materials are not recommended to be added to the Blue Box Program: film plastic (e.g., plastic bags) and expanded polystyrene (e.g., meat trays, foam cups, packaging materials).

Table C-1: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials that Need Further Investigation

Consideration		Material Recommended for Further Investigation	
		Mixed Polycoat (e.g., coffee cups, ice cream containers)	**Blister Packaging (e.g., rigid packaging around toys)**
Environmental	*Estimated Annual Tonnes Diverted*	*190*	*40*
	Estimated Annual Units Diverted (a)	*15,000,000*	*1,000,000*
	Annual GHG Savings Equivalent to (b)	*400 tonnes 100 cars removed from the road*	*80 tonnes 24 cars removed from the road*
	Annual Energy Savings Equivalent to (c)	*3,300 GJ 100 homes supplied with electricity*	*2,400 GJ 70 homes supplied with electricity*
Social	*Public Support*	• *Strong* • *10% to 20% of material already being placed in Blue Box*	• *Average* • *5% of material already being placed in Blue Box*
	Resident Issues	• *May be confusion where to place (paper products or containers)* • *Light weight materials may increase street litter on windy days*	• *Removes some confusion of which plastics are recyclable* • *Light weight materials may increase street litter on windy days*
Financial	*Additional Collection Cost (d)*	*$0*	*$5,000*
	Estimated Processing Cost (d)	*$30,000 to $40,000*	*$3,000*
	Market/Revenue	• *Limited markets but growing* • *$60 to $120/tonne ($7,000 to $15,000/yr)*	• *Limited markets but growing* • *$30 to $50/tonne ($1,000 to $2,000/yr)* • *Some municipalities staring to collect*
Technical	*Collection Issues*	• *None*	• *None*
	Processing Issues	• *Regional MRF capable of processing* • *Possible contamination issues from lids being left on or food placed inside container*	• *Regional MRF capable of processing* • *Possible contamination issues if resident does not remove paper inside plastic packaging*

Notes

(a) *Based on average size of units.*

(b) *Estimated Greenhouse Gas (GHG)* savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model.*

(c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model.*

(d) Estimates provided by current contractor (Miller Waste Systems).

Table C-1 continued on next page

Table C-1: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials that Need Further Investigation

<table>
<tr><th colspan="2" rowspan="2">Consideration</th><th colspan="2">Material Recommended for Further Investigation</th></tr>
<tr><th>Batteries
(e.g., single use batteries)</th><th>Metal Cookware
(e.g., pots, pans)</th></tr>
<tr><td rowspan="4">Environmental</td><td>Estimated Annual Tonnes Diverted</td><td>35</td><td>80</td></tr>
<tr><td>Estimated Annual Units Diverted (a)</td><td>1,500,000</td><td>50,000</td></tr>
<tr><td>Annual GHG Savings Equivalent to (b)</td><td>Not available</td><td>140 tonnes
30 cars removed from the road</td></tr>
<tr><td>Annual Energy Savings Equivalent to (c)</td><td>Not available</td><td>1,700 GJ
50 homes supplied with electricity</td></tr>
<tr><td rowspan="2">Social</td><td>Public Support</td><td>• Strong</td><td>• Average</td></tr>
<tr><td>Resident Issues</td><td>• Communication plan required to reach residents about how to use program (program only for single use batteries and collection only twice per year)</td><td>• Residents may place other metal items (non-cookware) in Blue Box in error</td></tr>
<tr><td rowspan="3">Financial</td><td>Additional Collection Cost (d)</td><td>$15,000</td><td>$10,000</td></tr>
<tr><td>Estimated Processing Cost (d)</td><td>$0</td><td>$30,000 to $40,000</td></tr>
<tr><td>Market/Revenue</td><td>• Ontario
• Stable
• $300 to $700/tonne ($10,000 to $25,000/yr)</td><td>• Ontario
• Stable
• $200 to $350/tonne ($8,000 to $15,000/yr)</td></tr>
<tr><td rowspan="2">Technical</td><td>Collection Issues</td><td>• Residents may set out batteries on non-collection weeks by mistake</td><td>• None</td></tr>
<tr><td>Processing Issues</td><td>• No processing issues
• Regional MRF capable of processing</td><td>• No processing issues
• Modifications required to MRF to handle larger metal pieces ($60,000)</td></tr>
</table>

Notes

(a) Based on average size of units.

(b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.

(c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.

(d) Estimates provided by current contractor (Miller Waste Systems).

Table C-2: Overview of Key Environmental, Social, Financial Considerations &Technical Issues of Materials not Recommended to be Added to the Blue Box Recycling Program

Consideration		Material not Recommended to be Added: Film Plastic (e.g., grocery bags)	Material not Recommended to be Added: Expanded Foam Polystyrene (e.g., meat trays)
Environmental	Estimated Annual Tonnes Diverted	400	60
Environmental	Estimated Annual Units Diverted (a)	50,000,000	7,500,000
Environmental	Annual GHG Savings Equivalent to (b)	400 tonnes 100 cars removed from the road	60 tonnes 15 cars removed from the road
Environmental	Annual Energy Savings Equivalent to (c)	18,000 GJ 500 homes supplied with electricity	2,600 GJ 80 homes supplied with electricity
Social	Public Support	• Strong	• Strong
Social	Resident Issues	• Light weight materials may increase street litter on windy days • Residents can already recycle plastic bags at many retail outlets	• Light weight materials may increase street litter on windy days • Some packaging is too large to collect
Financial	Additional Collection Cost (d)	$200,000 to $225,000	$125,000 to $150,000
Financial	Estimated Processing Cost (d)	$400,000 to $450,000	$150,000 to $200,000
Financial	Market/Revenue	• North American • Stable • Revenue significantly less than processing cost • 0 to $30/tonne ($0 - $15,000/yr)	• Limited Markets • Unstable • Revenue significantly less than processing cost • $300 to $700/tonne ($10,000 - $25,000/yr)
Technical	Collection Issues	• None	• None
Technical	Processing Issues	• Regional MRF capable of processing • May cause cross-contamination • May increase equipment maintenance requirements	• Regional MRF capable of processing • May cause cross-contamination and increase equipment maintenance • Low capture (majority breaks up goes to residue); only 180 tonnes recycled from 3.0 million homes with program in 2012

Notes

(a) Based on average size of units.

(b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.

(c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.

(d) Estimates provided by current contractor (Miller Waste Systems).

Appendix D
Green Bin Information

D.1 Green Bin Pilot Project

Background

Details of the Green Bin Pilot Project are provided in Table D-1 (next page) and summarized below.

Residents were given the option of participating in the Green Bin program and offered a choice of three different size bins to use to hold their household organics (e.g., food scraps). Residents were also provided a kitchen catcher and educational material.

The Pilot Project was also used to test a "seasonal" garbage collection schedule. The seasonal garbage collection schedule consisted of weekly, same day, garbage collection during the summer (April to September) and bi-weekly, same day, collection during the winter (October to March). Testing the seasonal collection schedule helped to determine public acceptance of the program, and the cost savings/increases resulting from this type of collection schedule.

Pilot Project - Resident Demographics

The data presented here is a summary of demographic information on the Green Bin Pilot Area. The source of this data is Environics Analytics which is available to staff under an existing contract with Environics Analytics. The data are compiled from Statistics Canada's census data and from other private and public surveys.

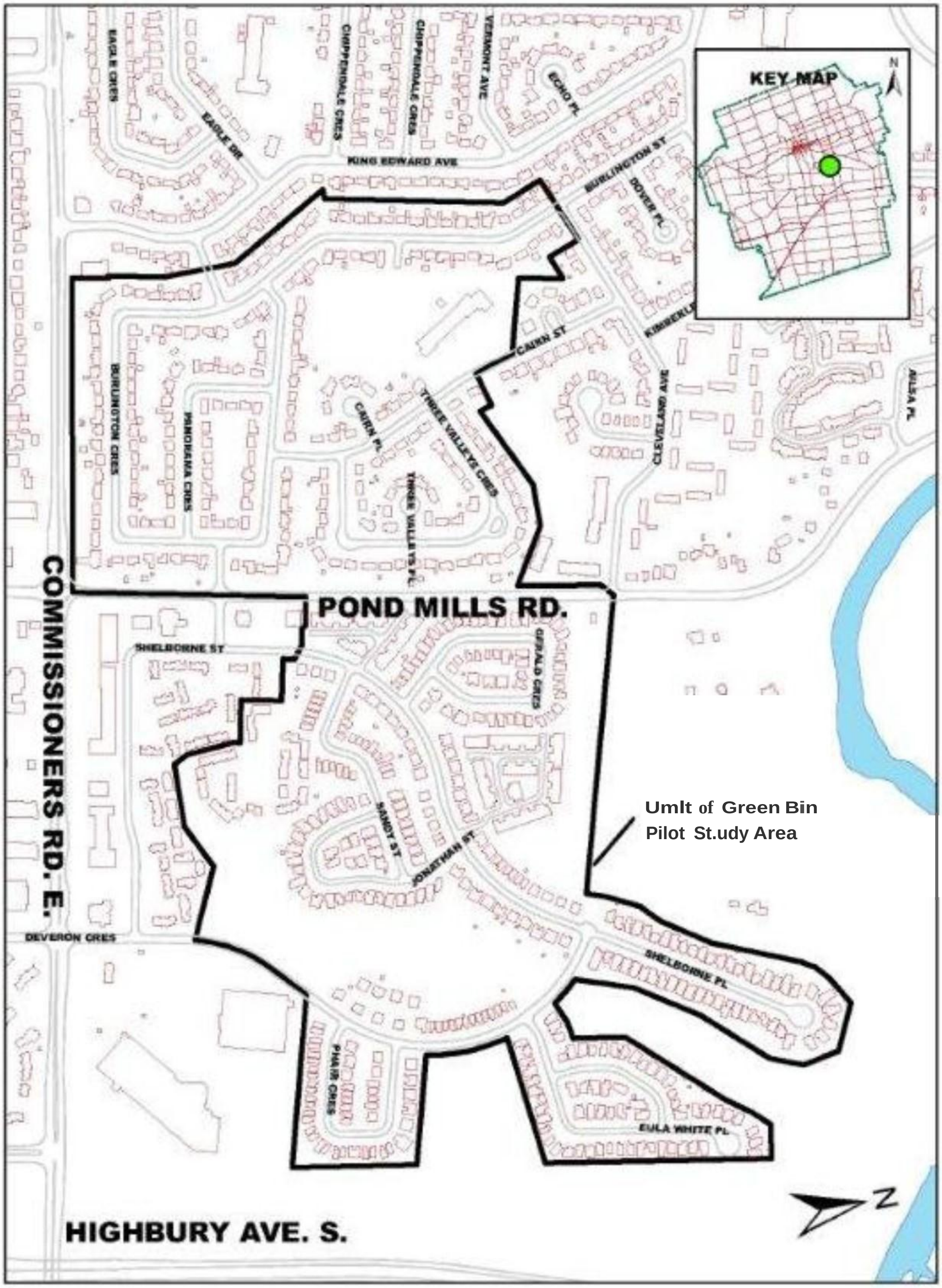
The Green Bin Pilot Area includes 763 households (population of approximately 2,010). The Area accounts for approximately 0.6 % of London curbside households and approximately 0.6% of London's curbside population.

In general, the area has many similar demographic characteristics as other parts of London. It should be noted however, that London is comprised of many neighbourhoods which have their own unique demographic characteristics, which when blended together produce a 'mathematical average.' In addition to representing many attributes of a typical London neighbourhood, the Green Bin neighbourhood was selected in part because it provided a range of housing types which would allow us to experience all collection issues that may occur (hills, large and small yards, homes with and without garages, row housing, etc.).

Table D-1 : Overview of Green Bin Pilot/Modified Collection Schedule Project

Component	*Comment*
Collection Area	Location – Ponds Mills (see Figure D-1) Number of Homes - 762
Collection Frequency	Recycling – Weekly (52 pickups per year) Green Bin – Weekly (52 pickups per year) Garbage - Summer (April to September), Weekly (26 pickups per year) - Winter (October to March), Weekly (13 pickups per year)
Cart Selection	Residents could choose from a 45 litre, 80 litre or 120 litre cart based on their needs and room to store the cart. Approximately half of the residents requested a specific cart size as follows: • 45 litre – 150 (40%) • 80 litre – 186 (50%) • 120 litre – 41 (10%)
Kitchen Catcher Selection	Residents could choose from three types of kitchen catcher based on their needs. Approximately half the residents requested a specific kitchen catcher as follows: • Orbis (standard) – 115 (30%) • Sure-Close (air holes) – 217 (60%) • Busch (small) – 45 (10%)
Liners	Paper liners or certified compostable liners are allowed. Plastic bags are not allowed as liners.
Materials Collected	Materials collected include: • Food waste • Paper products that cannot go in the Blue Box (e.g. paper towels and napkins, other soiled paper) • Animal bedding • Can be topped up with yard materials
Materials Not Collected	Materials not collected include but are not limited to: • Diapers and sanitary products • Kitty litter and pet waste
Educational Material	All residents were provided with educational materials at the start of the pilot project including: • Booklet detailing the project • Fridge magnet showing the materials accepted in the Green Bin Pilot Project • Waste Reduction & Conservation Calendar for the pilot area

Figure D-1 : Green Bin Pilot Project Area



Demographically, when compared with average values for London, the demographics below are highlighted as they represent the largest variance from the average for London. Other demographic information is not included as it was the same as the average for London.

- There are fewer households with a single occupant (19% compared to 30%) and more households with 4 or more persons (27% compared to 21%).
- There are more households headed by younger people. The difference is greatest in two age groupings - those 35 to 44 years of age (21% compared to 17%) and in the 65 and older age group (14% compared to 22%).
- 44% have post-secondary qualifications, compared to 54% for London and 13% have a university degree compared to 23% for London.
- The average household income for the area is $69,500, which is 16% below the London average of $82,600.
- There is a higher percent of visible minorities (22% compared to 18%).

Pilot Project – Participation, Green Bin Quantities and Total Waste Diversion

Participation

- 92% of households in the Green Bin Pilot Project area agreed to participate.
- 100% of the households were required to participate in the bi-weekly garbage pickup portion of the project
- actual Green Bin participation rate averaged between 50 to 55% in single family homes (with some periods of the year showing slightly higher rates) and 10 to 20% in townhome complexes
- participation rates in London were typical of most other full scale Green Bin programs in Ontario. Higher participation rates are typically associated with programs with operational adjustments (e.g., garbage pickup every two weeks) and/or advanced education and awareness programs.

Green Bin Quantities

- on average 1.7 tonnes to 1.9 tonnes of Green Bin materials were collected each week
- the amount of Green Bin materials diverted from all single family households in the Green Bin area, on average, was about 2.4 to 2.7 kg per week (130 to 140 kg/yr) and about 0.7 to 1.0 kg per week (35 to 50 kg/yr) from townhomes. This suggests that a participating household would be diverting about 240 to 280 kg/yr

- the amount diverted per household is within the range collected in other programs in Ontario that limit yard waste and do not allow use of plastic bags. Municipalities that encourage the placement of grass clippings and yard waste into the curbside carts have higher diversion rates for Green Bin. In addition, the few communities that permit the use of plastic bags and a broader range of materials into the Green Bin appear to have higher diversion rates.
- the contamination rate of the Green Bin materials from the pilot area was measured twice and is about 3%. This is significantly "cleaner" than Green Bin programs that allow plastic bags
- incoming Green Bin materials met feedstock (chemical/physical) characteristics required to make top quality compost (e.g., unrestricted use in Ontario.)

Total Waste Diversion

- total waste diversion for the pilot project was estimated at 60% to 65% when all quantities of Green Bin materials, recyclable materials and estimates for other services (e.g., yard materials collection, electronics recycling, etc.) are included
- the diversion rate of 60% to 65% can be compared with the overall 50% diversion rate experienced across London for single family homes.

Pilot Project – Survey Results

Residents were formally surveyed by Nordex Research (October, 2012) about their views on the Green Bin Pilot Project. The full survey results can be found at the end of Appendix D. Below are some results of the survey:

- the program was supported by 73% of respondents and opposed or criticized by 21% respondents (6% did not offer answer or were ambivalent); It is important to note that this survey question (result) came before the survey question associated with Green Bin program costs
- 80% placed materials in the Green Bins daily
- 12% reported cleaning the Green Bins was a problem
- 70% found the size of the containers (Green Bin/kitchen catcher) was just right
- 39% reported they would pay extra for the program, 23% said maybe, 35% said they would not, and 3% were unsure

Pilot Project – Other Resident Feedback

Staff received many informal comments (calls, emails) during the Pilot Project which are summarized below:

- resident feedback (non-solicited) included both positive and negative comments regarding the Green Bin:
    - Positive comments: same day collection, Green Bin reduces waste, and able to compost materials not acceptable for backyard composters (e.g. meats)
    - Negative comments: not interested because of age, managing wet waste without plastic bags was problematic – the YUK factor; no room to store bin
- there were few negative complaints expressed directly to staff about bi-weekly garbage collection in the winter. It is interesting to note that not one household, including those that did not participate in the Green Bin Pilot Project, demanded the normal collection service during winter months.

Pilot Project - Operational Learnings

Operational learnings from the pilot project are summarized below:

- at the start of the Pilot Project, 40% of residents selected the smaller Green Bins that can be emptied by hand; 60% of residents selected the larger Green Bins carts which require a cart tipper on the truck. Very few households changed their Green Bin for a different size during the Pilot Project
- collection time for the sanitation operators increased by 40% for garbage and Green Bin compared to garbage only
- most residents did not use liners

D.3 Estimated Quantity of Compostable Material

Appendix B contains estimated waste composition data based on audits conducted in London in 2012/2013. These data were used to estimate the quantity of compostable waste material in garbage that is collected curbside. It is estimated there is approximately 26,000 tonnes of compostable material in curbside garbage (See Table D-2, next page)

Table D-2 Residential Curbside Waste Composition – Focus on Compostables

Material	***Quantity***		***Comments***
	(tonnes)	***%***	
Food Waste	*22,000*	*37*	
Yard Waste	*1,000*	*3*	
Compostable Paper	*3,000*	*5*	*e.g. Tissue, towels, etc.*
Subtotal Compostables	26,000	45	Total curbside organics available
Other Curbside Materials	32,000	55	Excludes bulky items
Total Curbside Garbage	58,000	100	
Total Residential Waste	154,000		Includes curbside & multi-residential garbage and recyclables, yard materials and on-site management (e.g. backyard composting)

D.4 Program Benefits and Opportunities

The environmental, social and financial benefits of a city-wide Green Bin program can be estimated based on experience from other Ontario and North American jurisdictions coupled with experience from the Green Bin Pilot Project. These are summarized below.

<u>Environmental Benefits</u>

1. *Reduced Greenhouse Gases*

Diverting organic waste has the benefit of reducing greenhouse gas production and associated climate change impacts. It is estimated that greenhouse gases could be reduced by 10,000 tonnes per year or the amount equivalent to removing 2,500 cars from the road.

2. *Closer to Provincial Goal of 60% Waste Diversion*

Implementing the Green Bin program and other waste diversion initiatives will be necessary for London to reach the provincial 60% waste diversion target. It is estimated that the Green Bin program will increase our diversion rate by 8% to 9%.

Reaching the provincial goal of 60% will be an important consideration in the MOE approval of expanding London's landfill and it is anticipated that approval would not be granted unless programs to reach 60% waste diversion are implemented.

3. *Additional Landfill Capacity*

It is estimated that if a Green Bin program was implemented it would divert 12,000 to 14,500 tonnes each year. This would extend the life of the W12A Landfill by approximately 8 months. This delays the need for a new landfill and taking additional farmland out of production.

4. *Reduced Landfill Impacts*

Reducing the amount of waste to the landfill would reduce nuisance impacts from the W12A landfill such as reduced truck traffic, litter, noise and odours.

5. *Better Use of Material*

Materials collected from the Green Bin Program would be turned into useful products instead of being landfilled. If the material were composted, it would result in the production of approximately 350,000 bags of compost with a market value of between $700,000 and $1.1 million. Other technologies (e.g. anaerobic digestion) allows for the production of energy and a compost like product from the collected materials.

<u>Social benefits</u>

6. *Jobs*

A Green Bin program would create jobs locally and outside London, compared to landfilling. It is estimated that the Green Bin program would result in a net increase of 10 to 20 jobs as compared to landfilling organics.

7. *Consistent with other Municipalities*

London and Windsor are the only remaining larger Ontario municipalities that have not approved or already implemented a Green Bin program. It must be recognized that neither of these jurisdictions have faced a waste disposal crisis due to well planned integrated waste management systems in place.

Financial Benefits

8. *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 is estimated to be approximately $35 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 that 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 $180,000 to $290,000 per year. The majority of these savings would be in capital costs which would reduce the annual contribution from general taxes required for the Sanitary Landfill Reserve Fund.

9. *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 Ministry of the Environment would be unlikely unless the City has programs in place to reach the provincial goal of 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 $6,000,000 to $10,000,000 per year.

D.5 Potential Issues and Challenges

1. *Low Participation Rate*

Green Bin programs typically have low participation rates (about 50 to 60%) compared to the Blue Box programs (90%). This has resulted in some municipalities (e.g., Ottawa, Waterloo) not collecting the quantity of material they were expecting from households after they started Green Bin programs.

2. *Processing Facility Problems*

Some processing facilities accepting Green Bin material in Ontario and other parts of Canada have experienced processing issues such as odours. The problems can reflect badly on the Green Bin program.

3. *Yuk Factor*

Participants in the pilot project area were asked why they were satisfied or dissatisfied. Many who reported they were dissatisfied said it was because of odours/maggots/flies associated with keeping the food waste for a week.

4. Lack of Provincial or Industry Funding to Offset Program Costs

Unlike the Blue Box program there is no provincial or industry funding to offset program costs.

The Blue Box program receives funding equal to approximately 50% of net program costs. No such program exists for organics nor is one expected in the future. The proposed MOE Waste Reduction Strategy highlights that Green Bin Programs are going to be addressed in year 4 or beyond of the strategy but provides no indication if funding is part of a future strategy.

5. Cost of Green Bin Program

A Green Bin program will cost approximately $2.9 million per year. Organics will need to be collected weekly so a further $1.2 million will be required to provide matching weekly garbage and recycling collection. These additional costs will be borne by all taxpayers (single family, multi-residential, commercial, industrial, agricultural, etc.) and not just the homes receiving the service.

Some homes receiving the Green Bin service may be opposed as they already home compost and will not want to pay for a program they do not need.

D.6 Summary of Green Bin Programs in Ontario

<u>Status of Green Bin Programs in Ontario</u>

Most Green Bin programs in Ontario are similar to London's pilot project in that they:

- do not allow pet waste, diapers or sanitary products
- do not allow Green Bin materials to be placed in plastic bags

2011 Ontario Green Bin Programs

(2012 data from Waste Diversion Ontario is not available until late 2013)

- 20 plus programs in Ontario
- Service provided to 3.5 million homes or 70% of Ontario households
- 400,000 tonnes diverted in 2011

- provide weekly collection

The most common issues/concerns with the programs in other municipalities are:

- Liquids leaking from collection vehicle
- Green Bin material freezes in bin
- Strong odours from Green Bin materials
- Broken Green Bins in winter
- Trouble accessing Green Bins because of parked cars
- Pests (maggots, flies)
- Operational problems (e.g., odours) with processors

Details of all Green Bin programs in the Ontario are provided in Tables D-3 and D-4.

D-3: Ontario Green Bin Programs – Operational Detail

Municipality/ # Households Eligible for Service	Container Size (litres)	Allowable liners	Collection Details			Collection Issues
			SSO	Garbage	Leaf/Yard Top Up	
Municipalities allowing plastic bags, sanitary products and pet waste						
Toronto 529,000	46 litre	Plastic	Weekly	Bi-Weekly	No	• Leachate leaks from collection vehicle
York Region 287, 000	46 litre	Paper or certified compostable mandatory; currently no enforcement (no leave behind policy)	Weekly	Bi-Weekly	No	• Leachate leaks from collection vehicle • SSO freezes in bin • Loose organics in bin not emptying • Broken bins in winter
Municipalities not allowing plastic bags or sanitary products						
Barrie 45,200	46 litre	Paper or certified compostable	Weekly	Weekly	No	• Leachate leaks from collection vehicle • SSO freezes in bin
Durham 189,000	46 litre	Paper or certified compostable	Weekly	Bi-Weekly	No	• Leachate leaks from collection vehicle • SSO freezes in bin • Overweight bins
Guelph 37,000*	80 litre	Paper or certified compostable	Weekly	Bi-Weekly	Yes	• None

Table D-3 continued on next page

D-3: Ontario Green Bin Programs – Operational Detail (continued)

Municipality/ # Households Eligible for Service	Container Size (litres)	Allowable liners	Collection Details			Collection Issues
			SSO	Garbage	Leaf/Yard Top Up	
Hamilton 152,000	46 litre downtown 120 litre	Paper or certified compostable	Weekly	Weekly	Yes	• Leachate leaks from collection vehicle • SSO freezes in bin • Strong odours from SSO • Broken bins in winter • Parked cars • Pests (maggots, flies)
Halton Region 146,000	46 litre & 360 litre for some townhouses	Paper or certified compostable	Weekly	Bi-Weekly	No	• Leachate leaks from collection vehicle • SSO freezes in bin • Broken bins in winter
Kingston 43,000	46 litre downtown residential 80 litre	Paper bags	Weekly	Weekly	Yes	• SSO freezes in bin
Niagara Region 166,000	46 litre (single and multifamily) 80 litre (small business)	Paper or certified compostable	Weekly	Weekly	Yes	• Leachate leaks from collection vehicle • SSO freezes in bin • Broken bins in winter
Ottawa 263,000	80 litre some 47 litre	Paper	Weekly Summer Bi-Weekly Winter	Weekly	Yes	• SSO freezes in bin • Broken bins in winter
Ottawa Valley 16,000	120 litre	Paper	Weekly	Bi-Weekly	Yes	None
Peel Region 323,000	46 litre	Paper or certified compostable	Weekly	Weekly Bi-Weekly pilot	Yes	• Leachate leaks from collection vehicle
Simcoe County 126,000	46 litre	Paper or certified compostable	Weekly	Weekly	No	• Leachate leaks from collection vehicle
City of St. Thomas 16,000	240 litre	Paper or certified compostable	Bi-Weekly	Weekly	Yes	• Overweight bins
Waterloo 134,000	46 litre	Paper	Weekly	Weekly	No	• Leachate leaks from collection vehicle • SSO freezes in bin

D-4: Ontario Green Bin Programs – Collection and Processing Details

Municipality/ # Households Eligible for Service	SSO Quantity Collected (2011) (tonnes)	SSO Collected per Household (2011) (kg/household)	Participation Rate % (at least 2 setouts/month)	Processing Facility (Location)
Municipalities allowing plastic bags, sanitary products and pet waste				
Toronto 529,000	118,000	229	89%	Orgaworld (London) LaFleche (Moose Creek) All Treat Farms (Arthur)
York Region 287, 000	92,000 (only 59,000 sent for processing as processors experienced challenges resulting in a portion of SSO not being processed).	205 (processed) 320 (generated)	Region wide-85%	Orgaworld (London) LaFleche (Moose Creek)
Municipalities not allowing plastic bags or sanitary products				
Barrie 45,200	2,697	60	Average - 34% Established areas -47% New areas – 27%	All Treat Farms (Arthur)
Durham 189,000	26,866	142	65-70%	Durham Region (Miller Compost)
Guelph 37,000*	10,700	288	100% City of Guelph has a bylaw making it mandatory to separate waste into 3 streams	City of Guelph
Hamilton 152,000	34,957	230	75%	City of Hamilton
Halton Region 146,000	25,933	178	70%	City of Hamilton
Kingston 43,000	3,590	84	2011-53.6% 2012-56.1% Sept 2012 reduced garbage bag limit by one participation 64.3%	Norterra (Kingston)

Table D-4 continued on next page

D-4: Ontario Green Bin Programs – Collection and Processing Details (continued)

Municipality/ # Households Eligible for Service	SSO Quantity Collected (2011) (tonnes)	SSO Collected per Household (2011) (kg/household)	Participation Rate % (at least 2 setouts/month)	Processing Facility (Location)
Niagara Region 166,000	11,219 (food waste only) 31,545 (food and yard)	68 (food waste only) 190 (food and yard)	2010-2011-41.7%	Walker Brothers (Thorold)
Ottawa 263,000	55,063	209	2010-40%	Orgaworld (Ottawa)
Ottawa Valley 16,000	4,161	267	Participation less than 2x per month due to large bin size	Ottawa Valley Waste Recovery Centre (Pembroke)
Peel Region 323,000	32,390	100	2012-37.2%	Peel Region (Brampton, Caledon)
Simcoe County 126,000	10,968	87	2011 Winter-65% Spring-61% Summer-56% Fall-59%	City of Hamilton
City of St. Thomas 16,000	3,239	202	Not available	Orgaworld (London)
Waterloo 134,000	9,521	71	Not available	City of Guelph

Nordex Research Report

Introduction

Nordex Research was commissioned in October 2012 by the Environmental Programs & Solid Waste division of the City of the London to carry out two surveys: 1) a survey of participants in a pilot program of green bin (compost collection) services in the Glen Cairn area of the City (southeast London), and 2) a survey of non-participating, default respondents who had rejected participating in the green bin program. The second group would be surveyed on a new seasonally-adjusted schedule of regular garbage collection highlighting weekly summertime, same day, collections and wintertime, same day, 2-week collections also in Glen Cairn. The pilot program lasted from October 2011 to early November 2012 (Nov. 6th). Nordex surveyed respondents in the last week of the program on October 29, 30 and November 1.

The purpose of the surveys was to tap into the experience, behaviour and preferences of respondents on both services. Since the client felt comfortable about base-level knowledge on the behaviour of program participants, there was some attempt to move to the next step in these surveys i.e. to canvass explanations for such behaviour. And so, there was an experimental quality to some questions in these surveys that is normally not pursued i.e. we asked questions about causal behaviour. For the most part, when these questions were reined in and we asked for concrete, easily knowable linkages by respondents we achieved the expected moderately good results from our efforts.

Methodology & Sampling

The client's targeted population in Glen Cairn area numbered 763 households. Of this group, 442 households – according to the client's data -- agreed to participate in the green bin pilot project (57.9%) and 321 became default participants in the seasonal garbage scheduling program (42.1%).

Up to **338 green bin participants** offered the client telephone contact information or it was obtained by Nordex through resort to a community directory. It turned out that Nordex was able to secure 35 additional telephone numbers beyond the client's initial telephone list. Upon completing the green bins survey, it also turned out that 40 telephone numbers were non-operational for various reasons. This left us with an actual sample frame of 298 households. We **interviewed 163 individuals** for the green bins survey and thus achieved a response rate of 54.6%.[1]

On the scheduling survey, **229 default participants** offered telephone numbers for contact purposes, but 30 of these numbers were invalid for several reasons, thus granting us a sample frame of 199. We **interviewed 80 individuals**, thus granting us a 40.2% response rate.[2]

Methodologically, the client's sample frame and targeted survey population indicated that a "selected" sample of respondents was available to Nordex for both surveys. Random sampling was not called for, nor available to us. With selected samples, sampling errors cannot be calculated. Only random sampling produces sampling errors. On the other hand, the proposed selected sample frames produced data sets that represented 55% of available green bin participants, and 40% of available, default seasonal scheduling program participants. These figures made both surveys highly representative of their target populations.

Demographic Profiles

In typical fashion for surveys of municipal services, baby boomers (ages: 45-64) dominated our surveys. In both surveys, 44% of respondents were baby boomers, 27-29% were Gen X'ers and Generation Y (26-44), and 24-26% were seniors (>65). Women also dominated both surveys, 59-65%, as did retirees, 28-31%, working occupations, 26-35%, and professionals & managers, 22-28%. Almost all green bin respondents were homeowners, and 88% of scheduling respondents were homeowners. The dominant household size for both surveys is 2-4 persons (76-81%). *Almost a majority of green bin respondents come from middle income ($45-*

[1] In our RFP proposal, we suggested to the client that an aggregate target sample size of 200 and a response rate of 60% might be possible for the green bins survey, assuming lots of things went right. We actually obtained 157 initial round completions and 8 additional completions from 35 extra telephone numbers retrieved by Nordex. On our aggregate target sample size of 200, we reached 82% of our target.

[2] In our RFP reply we suggested an aggregate sample size of 100 in this survey and a 38% response rate. As noted we received a 40% response rate. We were able to obtain only one additional number from our supplemental search, which ended up being an out of service number. As a result we did not reach our initial target of N=87 + 13 supplemental completions = N=100, but we did reach N=80 and thus 80% of our target.

85k/yr.) households (49%), and the leading plurality of scheduling respondents come from lower income (<$45k/yr.) households (40%).

Green Bins Survey

General Satisfaction/Dissatisfaction with the Green Bin Program

As a general introductory observation, respondents appeared to endorse the green bin pilot program enthusiastically, granting it just less than a 10:1 positive rating. Fully two-thirds of respondents said they were "very satisfied;" up to 9 per cent were dissatisfied. See Table 1.

Table 1. In general, how satisfied or dissatisfied are you with the green bin program i.e. the regular activity of depositing food scraps and other material into the green bins for City of London collection and composting? (N=163)

very satisfied	67.5%	N=110	Ratio: <10:1
somewhat satisfied	22.7	37	
not so satisfied	3.7	6	
not satisfied at all	5.5	9	
don't know/refuse	0.6	1	

It should be noted that this question produced "top of mind" results; respondents were not yet focused on the details of the survey and so they produced an "instant answer" on satisfaction or dissatisfaction – not an unusual outcome given that this query was positioned at the beginning of the interview schedule.

Reasons for Satisfaction or Dissatisfaction with the Green Bin Pilot Program

We then asked the follow-up and open-ended question: "why do you say that?". For this open-ended query, we produced a series of coded responses based on the array of unfiltered raw responses offered to us by respondents. See Table 2. The dominant response supporting those satisfied with the pilot program was the reduction of regular garbage loads (37% of the sample as a whole or 49% of those able to offer an answer). Informally, respondents many times reported they had 50-75% less regular garbage to put out at the curb under program conditions. Respondents also indicated that green bins and the separation exercise was an “easy” exercise (15% or 20% of those offering an answer); the bins were “easy to use.” That something was being done “for the environment” also appealed to some respondents (10% of the whole or 13% of those answering), and so were the “weekly” and “regular” pick-ups of greens bins (8% or 11% or those answering) – at least in the warm months during the program period.

For those answering in Table 2, almost 21% of responses (34 of 159 responses) were exclusively negative on green bins.[3] Those dissatisfied were most inclined to identify fatigue in coping with and the handling of green bins (7%), particularly on sorting materials and cleaning the green bins. Related to this was dissatisfaction with the stench/odours of rotting food and the sight of maggots (5%). A few others found the whole program a big expense for not much benefit, or simply a waste of time for all concerned (3%). Fewer still cited wildlife intrusions (2%). And even fewer found the green bin containers to be too large or too small.

Table 2. Why do you say that? (satisfaction or dissatisfaction (N=163) Ratio: >3:1 on responses (122:37)
7:2, respondents (119:34)[4]

Satisfied		r	*Dissatisfied*		r
1) (significantly) less garbage	36.8%	60	1) tired of sorting/cleaning/too much work	7.4%	12
2) easy to use	14.7	24	2) rotten food/odours/maggots	4.9	8
3) good for the environment	9.8	16	3) program too expensive/waste of effort	3.1	5
4) weekly/regular pick-ups	8.0	13	4) wildlife intrusions	2.4	4
5) secure from wildlife	1.2	2	5) improper containers/too large/too small	1.2	2
6) helps recycling	0.6	1	6) insects/flies	0.6	1
7) other	3.7	6	7) other	3.1	5
8) don’t know	4.9	8	8) don’t know	0.6	1
9) n/a	20.3	33	9) n/a	76.7	125

When we counted the actual number of concrete positives in Table 2 compared to actual concrete negatives, the program was clearly supported by 119 respondents (73% of respondents), and opposed or criticized

[3] See footnote # 5.
[4] See footnote # 6.

by 34 respondents (21%). Thus, this second-round ratio on satisfaction versus dissatisfaction came in at a 7:2 instead of 10:1.[5] This meant the program still has popular support among respondents, but not overwhelming support as the 10:1 ratio would indicate. And while a 7:2 support is quite good for public policy purposes, demonstrating normally sufficient public legitimacy from a public opinion point of view, it ought to be modestly concerning that 21% of respondents who offered a concrete opinion about the pilot program were not happy with it.

Integrating the Results from Table 1 and Table 2

The client has raised the issue of why respondents who seem so satisfied in Table 1 effectively "changed their minds" in Table 2 to reveal that they were less satisfied. The answer is a comparatively large number were not actually "satisfied" in the first place when we scratched the surface or they did not know why they were satisfied, particularly in the "very satisfied" category. And so, while we acknowledge the results of Table 1 the facts are this was a top of mind introductory inquiry positioned as the very first question of the survey and lot of respondents apparently casually responded with "satisfaction" responses that they did not really mean. While we do not intend probe social psychological rationales for this kind of unreliability in first-question responses, we can report that the phenomenon is not entirely atypical in survey research, although in this case the scope of the phenomenon is certainly broader.

Let us now get down to facts and figures. Ten respondents who said they were "very satisfied" in Table 1 could not offer concrete positive reasons for their choices in Table 2 (e.g see the "other" category in Table 2 and those said "don't know.) This meant that 9% of those who said they were "very satisfied" with the green bin could not come up with a good reason for their high satisfaction. This is an unusual result in survey research since respondents typically know very well why they are "very satisfied."

[5] These ratios were calculated by comparing the concrete positive responses to concrete negative responses. We removed from the calculation the "don't knows" and obviously the "not applicable." And so the ratios came in at just over 3:1 on the responses (r=122 vs. r-37) and 7:2 from respondents (N=119 vs N=34), which meant green bins, even when stripped of faux positives and those going negative out of the Table 1 "somewhat satisfied" column still offered the program emergent popular acceptance. As a stand-alone program, without considering questions on the direction and level of financing, green bins remained on the cusp of solid public legitimacy. Later, when we introduced the financing questions, things changed.

In addition, 19 respondents who said they were "somewhat satisfied" Table 1 also could not come up with positive reasons in Table 2; indeed quite the contrary, all 19 respondents actually offered exclusive negatives -- as we describe above. This is the classic "good, but ..." response we often observe in survey research. Respondents say they are "somewhat" satisfied, and what they really mean is the program or service is "ok, but I want to tell you what's wrong with it." And so, on the second round of questioning in response to the "why do say that?" open-ended question the negatives entered the picture in greater numbers. Again, 19 respondents out of 37 respondents who said "somewhat satisfied" in Table 1 offered exclusive negatives in Table 2.[6]

Frequency of Use: Kitchen Container

Up to 80% of respondents indicated they used their kitchen containers designed for the green bin program on a daily basis. Up to 11% used these containers less frequently. See Table 3.

Table 3. How often do you use your kitchen (green bin) container for food scraps, if you do? (N=163)

daily	79.7%
every couple of days	7.4
weekly	3.1
less than weekly	6.1
don't know or refuse	2.5
don't use	1.2

[6] Three respondents who said "somewhat satisfied" in Table 1 and who offered negative responses in Table 2 also offered positives in Table 2. We classify these respondents as "ambivalent" and remove them from the list of exclusively positive or negative respondents. Thus we see a reduction on the numbers from total positive and negative responses to total positive and negative respondents and corresponding adjustments on the ratios in Table 2. Two who said green bins were "good for the environment" also said they were "tired of sorting/cleaning greens" [or the whole process was] "too much work," and one respondent said his/her green bin was "secure from wildlife" but the program was "too expensive or a waste of effort."

Retail (Wholesale) Purchase of Compostable Bags

A solid majority of respondents purchased compostable bags for their kitchen containers in the retail or wholesale market -- after they received sample bags from the City. A large minority said they did not. See Table 4.

Table 4. Have you purchased any compostable bags for your kitchen (green bin) container? (N=163)

yes	55.8%
no	43.6
no green bin	0.6

Cleaning and Maintenance of Kitchen Containers

Up to 12% of respondents indicated that they had a problem with cleaning and maintaining their kitchen containers regularly or occasionally; 85% did not have a problem. See Table 5.

Table 5. Is regular cleaning and maintenance of the kitchen (green bin) container a problem for you? (N=163)

yes	7.9%
no	84.7
sometimes	4.3
don't know/refuse	2.5
no green bin	0.6

Size of Curbside Green Bins

Since respondents chose the size of green bins they wanted at the beginning of the program, it stands to reason that most would be satisfied with the size they received. On the other hand, almost one-quarter said their green bin was too big, and 7 respondents said it was too small. See Table 6.

Table 6. In terms of the size of the curbside/outside green bin you received, do you find it to be: too big, just the right size, or too small? (N=163)

too big	24.0%
just right	70.5
too small	4.3
no opinion	0.0
can't say/refuse	1.2

Green Bins for Yard Materials or Food Scraps?

The purpose of the question in Table 7 was to explore how many respondents used their green bins for yard materials "exclusively." It turned out exclusive use of green bins for yard materials was reported by only one respondent. Just over one-third of respondents placed yard materials in their green bins "sometimes." Otherwise, close to two thirds of respondents used the greens bins exclusively for food scraps, which was the primary purpose of the program.

Table 7. Some people use the curbside/outside green bin exclusively for yard materials e.g. grass clippings, leaves and yard materials? Do you do the same thing or do you use it exclusively for food scraps? (N=163)

yard materials, exclusively	0.6%
yard materials, sometimes	35.6
exclusively food scraps	62.6
don't know/refuse	1.2

Cleaning the Curbside Green Bins

Up to 18% of respondents cited regular or occasional problems with cleaning and maintaining the green bins; otherwise there were no problems. See Table 8.

Table 8. Is regular cleaning and maintenance of the curbside/outside green bin a problem for you? (N=163)

yes	12.3%
no	81.0
sometimes	5.5
dk/refuse	1.2

Frequency of Curbside Collections & Obstacles

More than four-fifths of respondents took their green bins to the curb on a weekly basis. However, in spite of weekly pick-ups, close to one-fifth set out their greens bins less frequently. See Table 9. No respondents indicated that they faced any difficulty taking their green bins to the curb. See Table 10. And so we are left the question: why were one-fifth of respondents resorting to less than weekly pick-ups?

Table 9. Do you take your curbside/outside green bin out for City collections on a weekly basis, or less often? (N=163)

weekly	81.6%
every 2 weeks	11.7
every 3 weeks	3.7
monthly or less often	2.4
don't know/refuse	0.6

Table 10. (If less than weekly in Q 9) Do you experience any difficulty taking your outside green bin to the curb for collections?

no	17.8
n/a	82.2

Difficulty on Curbside Collections Last Winter?

Up to 99% of respondents said they had no problem taking their green bins to the curb last winter. It was, as we recall, a light winter. One respondent indicates there was a "snow" problem. See Table 11.

Table 11. Last winter – even though it was a light winter -- did you experience any difficulties taking the outside green bin to the curb? (N=163)

no	98.8%
yes	0.6
no green bin	0.6
(If yes) What problem?	"snow"

Pay Extra for Green Bins?

By a split 11:10 ratio on the "yes:no" response, respondents were ambivalent about paying extra money for a green bin service. When folding in their "maybe" responses in with the "no's" on the negative side, their opposition comes in at a 3:2 negative ratio. When folding in the "maybe" responses with the "yes" responses, there is a near 2:1 positive ratio for paying extra.

Thus, there was at best modest support in favour of paying extra for green bins and at worst, negative 3:2 opposition. On a straight yes:no response, opinion was split. See Table 12.

Table 12. Is there sufficient extra value in a new green bin program to pay extra money for this service? (N=163)

yes	38.6%	yes:no	11:10 positive
no	35.0	yes: no+maybe	3:2 negative
maybe	23.3	yes+maybe:no	< 2:1
don't know/refuse	3.1		

How Much Extra for Green Bins?

We asked respondents who thought green bins were definitely or possibly worth extra payment in Table 12 to select a price range that would be attractive to them. Two-thirds (64%) of those answering "yes" or "maybe" in Table 12 said they would be willing to pay less than $50.00 annually; more than one-third (37%) said less than $40.00 annually; 20% would pay more than $50.00 annually, and 8% more than $60.00 annually. See Table 13.

Even those saying "yes" in Table 12 tended to be somewhat parsimonious when it came to choosing a payment level; out 63 respondents in this category, 21 said <$40, 18 said $40-50, 8 said $50-60 and 6 could not form an impression.

On those saying “maybe” in Table 12, they were also quite frugal: of the 38 “maybe” respondents, 10 said <$40, 5 said “nothing,” 9 said $40-50, and 10 could not offer a selection.

Table 13. (If “yes” or “maybe” in Table 12) How much would you be willing to pay on an annual basis for a permanent green bin program, if you are willing?

	N=163	N=100
nothing/not willing	3.7%	6%
<$40.00	19.0	31
$40-50	16.6	27
$50-60	7.4	12
$60-70	1.8	3
>$70.00	3.1	5
don’t know/refuse	9.8	16
n/a	38.6	

What Service Cuts to Receive Green Bins?

With the question in Table 14, we experienced the ill-effects of calling for causal linkages.[7] Whereas we asked in Table 12 whether there was “sufficient extra value” in the green bins program, would respondents pay

[7] Causal interrogatives are not often pursued in telephone surveys because respondents are not typically capable of answering such questions. It is simply too much to ask them to perform spontaneous “if ... then” calculations, on the spot, in the immediacy of 5-6 minute telephone conversation, particularly when they do not have any time for preparation or are not psychologically prepared to be tested on a question that requires some reflection and perhaps calculations. “If ... then” questions, in effect, ask respondents to link mental objects between two points in time and then explain their “cause and effect.” Often the links between objects being considered are too distant or too abstract for ordinary respondents to formulate an answer. They are also often not prepared because do not have the cognitive capability to answer. Again, causal questions in the main ask too much of an ordinary respondent. Further, when respondents are asked to respond to or estimate the “why?” of their own motivations, such queries typically fail. Why? Ordinary individuals are not in a position to judge their own motivations. Subjective estimations of motivation rarely can successfully replace the act of posing objectively-crafted “what” questions on “determinants” of behaviour. From these determinants, often disaggregated, we can make more useful estimates of actual collective motivation or even comparatively-rendered group motivation. However, while questions about subjective motivation rarely work in (telephone) survey research, they can be useful for guidance purposes when looking for qualitative, exploratory research results, and thus they are sometimes used in focus group research. In summary, As Thaler and Sunstein have pointed out in their popular book, Nudge, on this matter of using causal questions, it is knowing the difference between two kinds of thinking that ought to act as our guide: 1) intuitive and automatic thinking and 2) reflective and rational thinking. Automatic responses about known interests and preferences form the typical cognitive architecture for telephone survey research respondents. See also Daniel Kahneman, Thinking, Fast and Slow, 2011.

extra, in the question inside Table 14 we asked as an alternative to paying extra money for green bins, would respondents “give up other city services?”

We received two reactions to this question; neither of them very useful. First, there was a low response to the question in specific terms: did they favour or oppose such an alternative? Instead of answering directly, respondents effectively gave us non-responses and dumped their answers into the highly ambivalent and circumspect “it depends” response category. See below. In fact, two-thirds of those who answered the question dumped their answers into this residual category; they simply dodged the question. As a result, as statisticians say, we got mush, perhaps valid mush, but mush nonetheless. The results of this question are not useful for analytical purposes.

Table 14. (If Table 12 “yes”) As an alternative to paying extra money for green bin collections, to what extent do you favour or oppose giving up other city service(s) in order to have a green bin program permanently? (N=163)

very much favour	1.8%
somewhat favour	3.1
somewhat oppose	3.1
very much oppose	4.9
depends on the service elimination	25.1
don’t know/refuse	0.6
n/a	61.4
(What service elimination, if any?	1) no children’s services
	2) police force
	3) libraries
	4) 3-week garbage pick up with green bin
	5) sidewalk plowing in winter

Backyard Composting?

About one-quarter of respondents said they engaged in backyard composting. See Table 15.

Table 15. Do you currently engage in backyard composting at your home? (N=163)

yes	25.8%
no	74.2

Influence of Green Bins on Backyard Composting

Here we have another causal question, in this case, asking for respondents' subjective responses on how green bins changed behaviour in relation to backyard composting. For the 25% (N=42) who said they pursued backyard composting, just under 60% of this group (N=24) said the green bin program did not change their behaviour. See Table 16. For this to be true, it meant none of these respondents ever previously, for example, placed food scraps in their backyard compost bin or compost pile. However, this conclusion contradicts the evidence we have in Table 10 of the scheduling survey.

Table 16. (If yes above in Table 15) How has the green bin program changed the way you do backyard composting, if it has? (N=163)

some change	10.5%
no change	14.7
dk/refuse	0.6
n/a	74.2

Suggested Changes Occurring:

1) use my own composter
2) now can get rid of bones in green bin
3) stopped using backyard composting (3)
4) yard waste goes to my composter
5) proteins now go in green bin; before in garbage
6) more goes in the green bin
7) no food scraps in compost (2)
8) less garbage
9) use backyard composter less (2)

10) grass in compost; food in green bins

11) less composting in winter (2)

12) compost in summer; green bin in winter

Future Options for Regular Garbage Pick Up

In keeping with Londoners' typical preferences for low-priced, low-taxed public services, respondents in this survey favoured inexpensive garbage services. Indeed, a clear majority (51.5%) were happy to accept the new seasonally-adjusted, weekly summertime and biweekly wintertime garbage collection service if it "did not cost the taxpayer any additional money." Similarly, close to 3 in 10 (28.8%) would accept returning to the more established 8-day cycle, representing the base current expenditure for regular garbage services. And, when asked about the more expensive all-year-round, weekly, same day service that would be more expensive, less than one in ten (8.6%) favoured this option. Up to 11% could not decide which option was most appealing. See Table 17.

Table 17. Finally, the City will shortly be considering three scheduling options for regular garbage pick up. Which option do you prefer? (N=163)

- First, weekly summertime and every two week wintertime service that doesn't cost the taxpayers any additional money.
- Second, an all-year round weekly, same day service that is more expensive than the seasonally adjusted one.
- Third, staying with the more established 8-day pick up cycle, which also doesn't cost anything extra?

seasonally adjust pick up	51.5%
weekly pick up	8.6
previous 8-day pick up	28.8
can't decide	11.1

Demographics for Green Bins

We profiled the key demographics in our introductory remarks. The tables below offer more detail on this information.

Age		Gender		Family Income		Occupation	
18-25	3.1%	male	35.0%	<$45k/yr	24.5%	prof'l/mgr	21.5%
26-44	28.8	female	65.0	$45-85k/yr	49.1	sales	5.5
45-65	44.2			>$85k/yr	24.5	service	11.6
66-80	20.8			don't know	1.9	office	8.6
>80	3.1					constr'n/trades	3.7+
						factory	2.5
						technical	3.1
						student	1.8
						homemaker	7.4
						retired	28.2*
						unemployed	2.5
						disabled	1.2
						other	1.8
						dk/refuse	0.6

Residence owner 97.5% renter 2.5

Household Size one= 11.0% two=38.7 3-4=42.3 >4=8.0

*Thirty per cent of retirees are baby boomers

+Thirty-five per cent of respondents are in non-prof'l, non-mgt working occ's

Cross-tabulations on General Satisfaction

We decided to cross-tabulate data from Table 1, the satisfaction/dissatisfaction question with all other questions. This exercise produced the following statistically significant results. Those who were "very satisfied" with the green bins program were inclined to:

- be daily users of kitchen containers;
- not distinguish on the size of curbside green bin between "too large" and "just right";
- be weekly and every 2-week distributors to the curb;
- make no distinction on the extra value of green bins in order to pay extra money;

- favour the low-end $40-50 and <$40 annual payments categories for a new green bin program;
- say “it depends” on the matter of cutting services to obtain a green bin program, and
- be baby boomers primarily, but also Gen X’rs and early seniors, 66-80.

Summary Analysis

There were four critical questions posed in this survey, the results of which centrally aided our knowledge about the potential for a green bin program in London. See Tables 1, 2, 12 and 13.

Table 1 results indicated that there was a 10:1 approval ratio on general satisfaction with the green bins pilot program. This was an early and tentative demonstration of very high support.

When we asked about the specifics of satisfaction and dissatisfaction in Table 2, the approval for the program based on specific answers on both sides dropped to slightly over a 7:2 ratio; a demonstration of popular support, but not overwhelming support, as suggested by the 10:1 ratio.

Table 12 then raised the issue of “sufficient extra value” for a greens bin program in order “to pay extra money for the service,” and on this score “yes:no” responses dropped to a split 11:10 ratio. When the “maybe” responses were combined with “yes” responses the ratio rose to just less than 2:1. When “maybe” responses are combined with “no” responses the ratio declines to a 3:2 negative. And so, we experience some modest ambiguity.

Finally, we asked the “rubber meets the road” question in Table 13. For those saying “yes” or “maybe” in Table 12, we asked what dollar amount respondents would be willing to pay extra for green bins on an annual basis. The choices ranged from nothing and less than $40/yr. to more than $70/yr.. Up to two-thirds of those answering “yes” or “maybe” said they would pay less than $50/yr.; 37% said <$40/yr[8]; 27% said $40-50/yr.. The remainder i.e. 15% would be willing to pay $50-70/yr., and 5% would be willing to pay more $70/yr..

[8] When respondents said “<$40/yr.” they meant it; <$40 meant something negligible; closer to “zero dollars” than $40.00.

Even for those saying “yes” in Table 12, they tended to be somewhat parsimonious when it came to choosing a payment level. Out of 63 respondents in this category, 21 said <$40, 18 said $40-50, 8 said $50-60, and 6 could not offer an answer. For those who said “maybe” in Table 12, they were also quite frugal. Of the 38 “maybe” respondents, 10 said <$40, 5 said “nothing”, 9 said $40-50 and 10 could not offer a choice.

In summary, respondents were happy to offer good intentions up-front, saying yes to a “free” service – actually paid for by other taxpayers – but then became very frugal on the business of personally and directly paying for the service.

Garbage Scheduling Survey

Satisfaction/Dissatisfaction with Seasonally-Adjusted Regular Garbage Collections

In general, respondents were quite satisfied with the seasonally-adjusted garbage pick up schedule they experienced from October 2011 to November 2012. By a 4:1 ratio, they offered their stamp of approval; indeed, a solid majority were “very satisfied,” while just under 19% said they were dissatisfied. See Table 1.

Table 1. Your area of the city is a test case for determining the acceptability of weekly, summertime, same day garbage pick up and every two week, wintertime, same day pick up. In general, how satisfied or dissatisfied are you with this seasonally adjusted garbage pick-up schedule? (N=80)

very satisfied	55.0%	Ratio: 4:1 positive
somewhat sat.	25.0	
not so satisfied	12.5	
not sat. at all	6.25	
don’t know	1.25	

However, again, it must be noted that this response is “top of mind;” it does not offer anything other than a quick and unreflective introductory response.

Reasons for Satisfaction/Dissatisfaction on Seasonally-Adjusted Garbage Collection

As in the green bins survey, we asked the follow-up, open-ended question: “why do you say that?” in Table 2 on the matter of satisfaction and dissatisfaction. We again coded the raw responses coming from respondents.

Upon entering the positive and negative categories in Table 2, we compared the number of concrete positive descriptors to the number of concrete negative descriptors. Respondent support dropped from a 4:1 approval in Table 1 to slightly less than a 3:2 approval (N=32:22) in Table 2.

Moreover, each of the single factors indicating positive support or negative criticism registered at low orders of magnitude, most being in the single digits. There was also a high “don’t know” factor on the positive side of “reasons for satisfaction.” And an additional 29% of responses were categorized as “unspecified positives,” or their answers had to be placed in the “other” category given their vagueness or irrelevance. So, close to three-quarters of respondents on the positive side of this query gave us non-responses, no discernible or unclear responses. The rest said “same day service, weekly service and the seasonal cycle” was just fine.

In the negative column appearing in Table 2, 17 respondents could offer a clear expression of their dissatisfaction, and no respondent said “don’t know.” The whole group of those offering negatives was 28% of the sample. See Table 2.

Table 2. Why do you say that? (N=80) Ratio: <3:2 of responses

Positive		r	Negative		r
1) same day service	8.75%	7	1) want weekly year round service	7.5%	4
2) liked weekly, summer service	5.0	4	2) 2/wk cycle too long in winter	7.5	6

3) 1/wk & 2/wk cycles fine	5.0	4
4) unspecified positive	8.75	7
5) other	12.5	10
6) don't know	33.75	27
7) n/a	26.25	21

3) odours/stench	2.5	2
4) City keeps changing schedule	2.5	2
5) winter wildlife intrusions	2.5	2
6) space problems in 2/wk cycle	1.25	1
7) unspecified negative	1.25	1
8) other	5.0	4
9) n/a	70.0	58

From our detailed review of the data, the top of mind responses recorded in Table 1 began to soften in Table 2, and so the 4:1 rating suffered some debilitation. For example, for those who said they were "very satisfied" (N=44) in Table 1, 18 of these respondents in Table 2 could not offer other than a non-response (e.g. "don't know") on why they were "very satisfied." Thus, 41% of the so-called "very satisfied" found themselves bereft of reasons for their satisfaction. Similarly, 8 respondents out the 20 who said they were "somewhat satisfied" in Table 1offered a negative response in Table 2. And 2 of these respondents indicated they were overall ambivalent as they offered a positive descriptor along with their negative descriptor in Table 2. Thus, 30% (N=6) of the so-called "somewhat satisfied" revealed themselves to be exclusively dissatisfied when we probed further in Table 2.

Experience with the 2-Wk Cycle: Length of Time on Pick Ups Last Winter

A clear majority of respondents found the 2-week cycle on garbage pick ups last winter to be "just right." On the other hand, a large minority found the 2-week cycle to be "too long" (41%). The positive ratio on "just right" or "too long" is about 4:3. See Table 3.

Table 3. How did you find the two week cycle for garbage pick up last winter? Would you say the two-week wintertime cycle was: (N=80)

too long	41.25%
just right	56.25
too short	1.25

don't know/refuse	1.25

Problems with Odours?

Three-quarters of respondents declared "no problem" on the issue of odours in relation to 2-week collections last winter.[9] Up to 7% said there were "major problems"; 11% said there were "moderate problems," and 9% said there were "small problems." See Table 4.

Table 4. Do you recall if you had problems with odours coming from your garbage during the two-week cycle last winter? Were these odours a major problem, a modest problem, a small problem, or no problem at all? (N=80)

major problem	7.5
modest problem	11.25
small problem	8.75
no problem	72.5

Sources of Odours

As expected, the primary source of odours came from food scraps. See Table 5. But as noted, close to three-quarters of respondents said they faced no odour problem last winter, a data result that is likely contaminated by historical memory error.[10] See Table 5.

Table 5. (If Q 4 1-3 above) During the 2-week cycle in the winter months, on the problem of odours, what was usually the source(s) of that problem? (N=80)

diapers	3.75%
food scraps	18.75
kitter litter	0.0

[9] While we have no direct, empirical evidence to challenge the quiescence of respondents on this matter, the client needs to be reminded that historical memories are somewhat to very unreliable.

[10] It is always a challenge in telephone survey research to capture anything approaching reliable data when respondents are asked to recall some obscure condition or apprehension of an event months after it has occurred. Historical memories are never going to be sufficiently reliable, and they appear not to be reliable in this case.

dog waste	0.0
can’t say	3.75
no odour problem	1.25
n/a	72.5

Importance of Weekly, Same Day Blue Box Pick Ups

A solid majority of respondents considered the more frequent weekly pick up of blue boxes to be “very important.” Indeed, they offered just less than a 4:1 salience ratio on this more frequent service. About one-fifth of respondents did not think weekly pick ups were important. See Table 6.

Table 6. Your blue box (recycling) pick up is now once a week on Thursdays. How important to you is this more frequent pick up service? (N=80)

very important	55.0%	Ratio: < 4:1
somewhat important	23.75	
not so important	12.5	
not important at all	8.75	

Frequency Change for Recycling Influence by Week Pick Ups

Twenty-five per cent of respondents said they recycled more with the weekly blue box service; 75% said their use of the blue box(es) did not change.[11] See Table 7.

Table 7. Do you find that you recycle more, less, or just same amount of materials into the blue box when it is picked up on the more frequent weekly schedule? (N=80)

[11] Here we have another causal question. In this case, the client wanted to know if the frequency of recycling involving blue boxes changed because of the weekly schedule. Typically respondents are not fully capable of objectively observing their own “change” behaviour. Better to have asked them about their current behaviour at two or more points in time i.e. before and after some event or turning point. The problem arises because any attempt to ask them to make observations for which vested personal interests may be in play cannot be successful. In this case, it is not entirely clear why more materials would be “blue-boxed” just because the service is on a 7-day cycle versus an 8-day cycle, which the rest of the city experienced. Presumably, the rationale for more recycling would be the motivation and action on distributing more recyclables from the regular garbage to the blue box. But again, why would significant numbers of dedicated or disciplined blue-boxers deliberately place recyclables in the regular garbage – unless they regularly ran out of space in the blue box, and maybe that was so. However, if this is reason, would this apply to a full 25% of respondents as indicated in Table 7 -- unless some version of Hawthorne Effect is in operation. Nordex is sceptical of the 25% figure in Table 7.

more	25.0%
less	0.0
just the same	75.0

Paying Extra for Weekly Garbage & Blue Box, Same Day Pick Up?

Respondents were essentially split (5:4) in the negative against paying more for weekly, same day, regular garbage pick ups. They were also somewhat more negative, by a 2:1 ratio, against paying more for weekly, same day, blue box service.

Our results in Table 8 on paying more for weekly, same day garbage collection are reflected almost precisely in the results of a similar question in Table 12, favouring more expensive weekly, same day garbage service. We draw equivalence between the "very much favour" results in Table 8 and the "weekly pick up" results in Table 12.

Returning to the aggregate data in Table 8, we also note that opinion is polarized on paying more for weekly, same day service; respondents are inclined to be strongly in favour or strongly opposed to extra payments.

Table 8. To what extent do you favour or oppose paying an extra $10.00, annually, for weekly, same day, regular garbage pick up, and another $10.00 extra for weekly, same day blue box pick up? (N=80)

	Very much favour	Somewhat fav	Somewhat Oppose	Very much opp.	DK	Ratio
garbage pick up	32.5%	11.25	25.0	31.25	0.0	>5:4 neg
blue boxes	23.75%	8.75	33.75	33.75	0.0	>2:1 neg

Backyard Composting?

Up to 30% of respondents said they engaged in backyard composting at their homes. See Table 9.

It is curious to note that in percentage terms more respondents in the non-green bin, default group, i.e. those refusing to participate in the green bin pilot program, said they composted in their backyards, compared to green bin participants. Presumably, some backyard composters prefer the do-it-yourself approach over the more organized, perhaps institutional, city service.

Table 9. Do you currently engage in backyard composting at your home? (N=80)

yes	30.0%
no	70.0

Protein in the Compost Pile

Nine respondents said they placed meat and bones in their backyard compost pile. See Table 10.

Table 10. (If yes above in Q 9) Do you discard meat and bones in the compost pile? (N=80)

yes	7.5%
no	17.5
sometimes	3.75
don’t know/refuse	1.25
n/a	70.00

Composting in Winter?

Seventeen respondents said they pursued backyard composting in winter. See Table 11.

Table 11. (If yes in Q 9) Do you compost in the winter?

yes	21.25%
no	1.25
don’t know/refuse	7.5
n/a	70.0

Future Options for Regular Garbage Pick Up

Surprisingly, more default/scheduling respondents (34%) who also have lower incomes are more likely to favour the more expensive weekly, same day, garbage service compared to their green bin counterparts. See Table 12. Having noted this, the leading plurality of respondents in this question (44%) favoured the less expensive seasonally-adjusted garbage collection service. The more established 8-day service was favoured by just over 20%. Only one respondent could not decide which service s/he favoured.

Table 12. The City will shortly be considering three options for garbage pick up. Which option do you prefer?

- First, weekly summertime and every two week, wintertime service that doesn't cost the taxpayers any additional money.
- Second, an all-year round weekly, same day service that is more expensive than the seasonally adjusted one.
- Third, staying with the more established 8-day pick up cycle, which also doesn't cost anything extra?

seasonally adjust pick up	43.75%
weekly pick up	33.75
previous 8-day pick up	21.25
can't decide	1.25

Why Not Green Bins?

Since our question in this section concerns: "why not green bins?", we must acknowledge that more than 20% of "default" scheduling respondents in this survey claimed they occasionally engaged in green bin activities during the pilot program. Presumably, this means that the weight we place on the other factors should be leveraged up. When we do so, we gain some interesting insight into the kind of opposition presented against the green bin program. See Table 13.

As expected, about one-quarter (24.2%) of objectors were extant backyard composters. Up to 17% of those who did not use green bins said they were distracted by busy lifestyles (17%). And while, “not having kitchen scraps” seems like an implausible excuse for 16% of respondents; on the other hand, large numbers of people in the City dine out at restaurants on a near-daily basis. Not wishing to separate out “unpleasant garbage” is offered by 8% of respondents. (We estimate that the real number is higher.) And a residual group of defiant objectors turned thumbs down on saving the environment and coincidentally submitting to the green bins program (19%).

Table 13. Can you tell us why you did not use the City’s green bin service for composting over the course of the last year?

	Actual	Weighted
already compost in the backyard	18.75%	24.2%
do not produce kitchen scraps	12.5	16.1
too busy	13.75	17.7
separating garbage is too unpleasant	6.25	8.1
not interested in composting, no real environmental benefit	15.0	19.4
other	8.75	11.3
did use green bins occasionally	22.5	
can’t say	2.5	3.2

Demographics

Default respondents in the scheduling survey were more likely to have lower incomes than respondents in the green bins survey, but they were less likely to be employed in non-professional, non-management working occupations. And, there were more professionals & managers in the scheduling survey. There were fewer women in this survey and yet women dominated both surveys. This survey also had more renters than the green bins survey, and so some of these folks would have been ineligible for the green bins survey.

Age		Gender		Family Income		Occupation	
18-25	1.25%	male	41.25%	<$45k/yr	40.0%	prof'l/mgr	27.5%
26-44	27.5	female	58.75	$45-85k/yr	36.25	sales	3.75
45-65	43.75			>$85k/yr	21.25	service	8.75
66-80	20.0			don't know	2.5	office	1.25
>80	6.25					constr'n/trades	7.5
refuse	1.25					factory	3.75
Residence	owner	87.5%	renter	12.5		technical	1.25
						student	0.0
Household Size	one= 13.75%	two=38.75	3-4=37.5	>4=7.5	dk=2.5	homemaker	11.25
						retired	31.25
						unemployed	1.25
						disabled	1.25
						dk/refuse	1.25

Salient Demographic Cross-tabulations

Gen X'rs/Gen Y (26-45) and baby boomers (45-65) were notably inclined to think weekly blue box collections as "important." However, baby boomers were statistically significant in opposing extra annual fees for blue boxes.

Professionals, managers and retirees were more inclined than the sample as whole to think garbage odours were not a problem last winter during the 2-week garbage collection cycle. They were similarly more inclined than the sample as whole to think weekly blue box pick ups as "important." However, retirees were statistically inclined to be "very much opposed" to paying extra for blue box service on an annual basis.

Summary Analysis

Consistent with the green bins summary analysis, there were also four critical questions posed in the scheduling survey. See Tables 1, 2, 8a and 12 featuring evaluation results on the seasonally-adjusted regular garbage schedule.

Again, we started with a general satisfaction question, the results of which were somewhat more modest coming in at a 4:1 approval ratio on the seasonally-adjusted garbage schedule (Table 1). Next, we acknowledge the results in Table 2, which offered concrete aspects of satisfaction and dissatisfaction. And, at this juncture in our developmental research we observed a reduction in support down to a 3:2, which cannot be regarded as "passable" support. Table 8a is next, on favouring or opposing a payment of an extra $10/yr. for weekly, same day, garbage collection, and respondents settled in at just over a 5:4 negative ratio. So at this point the seasonal garbage schedule program is "under water," at least on the matter of paying extra for weekly, same day service. Finally, Table 12 indicated that respondents in the aggregate would not accommodate "additional tax or user fee increase" options. They favoured, by a 2:1 margin, the seasonally-adjusted service (44%) or the more established 8-day service -- with statutory holiday interruptions (22%) -- versus the more expensive weekly, same day service (34%). (It is notable, nonetheless, that our less affluent default respondents – those mainly occupying the lower middle class -- were more 4 times more bullish about spending money on the weekly, same day, garbage service than green bin respondents, who mainly occupy the more affluent middle class.)

This page intentionally left blank.

Appendix E
Home Composting Pilots

Table E-1 – Home Composting Pilot Project

Location	**Northridge (south of Fanshawe, east of Adelaide)**	**Old South (east of Wellington)**
Households	1,200	700
Timing	Summer 2010	Fall 2011 (one-time-only event)
Strategy	Convenience, a very low cost and 'meet and greet' discussions with residents: • Assembled & delivered to the home • Direct encouragement and interaction	Local community sale of 3 different units at low cost • Pre-order and pick up at local community school (convenient location, but one-time-only sale) • Not assembled
Compost Units & price	• 'Earth Machine' same unit as supplied at City Depots • $10	• 'Earth Machine', Rotating unit, 'Green Cone' (digester) • $20
Promotion	• Flyer delivered door-to-door • Promoted again during the door-to-door visit (mid-summer)	• Flyer delivered door-to-door
Participation	• 13% (160 households) purchased composters	• 3% (25 households) purchased composters • Approximately 50% of the units sold were the rotating barrel units

The Northridge Pilot also included door-to-door visits of residents in August 2010 to obtain feedback. The approach used was not designed to be statistically valid nor was it designed to be a survey. The desire was for direct engagement with a City representative about their home composting routines.

Feedback information was compiled from 40% of the households (about 500 homes). Summary findings included:

- 60% indicated they had home composters (on average 1.5 composter per household)

- 45% indicated they were actively composting (i.e., using their composter at least weekly)
- 5% of the homes that participated were new to home composting the remaining 8% were already home composting

Initial estimates suggest that an additional 500 to 2,000 tonnes of food scraps could be diverted (up to 1.5% increase in overall diversion) with an aggressive home composting program modeled on the Northridge pilot project. Similarly, initial estimates suggest that less than 1,000 additional tonnes would be diverted (less than 1.0% increase in overall diversion) with a home composting program modeled on the Old South pilot project.

Appendix F
Potential Materials to be Added to the EnviroDepots

Introduction

The existing EnviroDepots are popular destinations which provide a convenient "one stop drop" location for residents to dispose of a variety of materials.

A review of other municipalities in Ontario found eight materials that could potentially also be managed at the depots.

These materials are:

1. Vegetable Oil (expand from one to three locations)
2. Used Motor Oil (expand from one to three locations)
3. Expanded Polystyrene (e.g., meat trays, foam cups, packaging materials)
4. Unused Paint (expanded from one to three locations)
5. Mattress
6. Carpets
7. Film plastic (e.g., plastic bags)

The financial, environmental and social considerations as well as technical issues of adding these materials to the City's Depot program are presented in tables F-1, F-2 and F-3.

In summary, the following materials should be considered to be added to the Oxford and Clarke Road EnviroDepots in 2014 given these initiatives are relatively low cost and are expected to have public support: vegetable oil and used motor oil.

The following materials require further investigation before a final recommendation can be made with respect to adding them to the EnviroDepot Program: paint; expanded foam polystyrene (e.g., meat trays, foam cups, packaging materials, furniture and mattresses.

The following materials are not recommended to be added to the Blue Box Program: film plastic (e.g., plastic bags.

Table F-1: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials Recommended to be Added to the EnviroDepots

Consideration		Material Recommended to be Added: Vegetable Oil	Material Recommended to be Added: Used Oil
Environmental	Estimated Annual Volume Diverted	4,000 litres (new volume)	20,000 litres (new volume)
	Estimated Annual Units Diverted (a)	Not applicable	Not applicable
	Annual GHG Savings Equivalent to (b)	Not available	Not available
	Annual Energy Savings Equivalent to (c)	Not available	Not available
Social	Public Support	• Average	• Average
	Resident Issues	• Limited locations	• Limited locations
Financial	Additional Collection Cost (d)	$0	$500
	Estimated Processing Cost (d)	$0	$0
	Market/Revenue	• Ontario • Stable • $50 per m³ (about $200 per year)	• Ontario • Stable • $0.25 per litre (about $5,000 per year)
Technical	Collection Issues	• One time capital cost of $6,000 • Need to ensure only vegetable placed in container	• One time capital cost of $10,000 • Need to ensure only used oil placed in container
	Processing Issues	• No processing issues	• No processing issues

Notes

(a) Based on average size of units.
(b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated based on *EPA Warm Model*.
(c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.
(d) Based on industry estimates, literature review and data from other municipalities.

Table F-2: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials for the EnviroDepots that Need Further Investigation

Consideration		Material Recommended for Further Investigation	
		Paint	Expanded Polystyrene (e.g., meat trays)
Environmental	Estimated Annual Amount Diverted	150,000 litres (new volume)	40 tonnes
	Estimated Annual Units Diverted (a)	Not applicable	4,500,000
	Annual GHG Savings Equivalent to (b)	Not available	40 tonnes 10 cars removed from the road
	Annual Energy Savings Equivalent to (c)	Not available	1,700 GJ 50 homes supplied with electricity
Social	Public Support	• Strong • Many residents already bring paint to depots in error	• Strong • 5% to 10% of material already being placed in Blue Box
	Resident Issues	• EnviroDepots will provide convenience as some retailers that collected unwanted paint have recently stopped	• May result in increase street litter as materials are light and can blow away
Financial	Additional Collection Cost (d)	$20,000	$20,000
	Estimated Processing Cost (d)	$0	$10,000
	Market/Revenue	• Ontario, stable • Paint collected & recycled at no cost as part of stewardship program	• Ontario, stable • $400 to $900/tonne ($10,000 to $15,000/year)
Technical	Collection Issues	• Will require modifications to existing EnviroDepots; One time capital cost of $100,000 (approximate)	• None
	Processing Issues	• No processing issues • Regional MRF capable of processing	• One time capital cost of $80,000 for densifer; will need to kept EPS separate from other recyclables

Notes

(a) Based on average size of units.

(b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.

(c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.

(d) Based on industry estimates, literature review and data from other municipalities.

Table F-2 continued on next page

Table F-2: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials for the EnviroDepots that Need Further Investigation (continued)

Consideration		Material Recommended for Further Investigation: Mattresses	Material Recommended for Further Investigation: Carpets
Environmental	Estimated Annual Tonnes Diverted	200 (if curbside ban implemented & 20% capture rate)	200 (if curbside ban implemented & 10% capture rate)
Environmental	Estimated Annual Units Diverted (a)	10,000	3,400
Environmental	Annual GHG Savings Equivalent to (b)	Not available	Not available
Environmental	Annual Energy Savings Equivalent to (c)	Not available	Not available
Social	Public Support	• Low • Most residents will use/ prefer existing free curbside collection	• Low • Most residents will use/ prefer existing free curbside collection
Social	Resident Issues	• Will likely need to charge fee to cover cost of program (approximately $20 per mattress or box spring)	• Will likely need to charge fee to cover cost of program
Financial	Additional Collection Cost (d)	$5,000	$5,000
Financial	Estimated Processing Cost (d)	$200,000	$30,000
Financial	Market/Revenue	• Ontario • Limited (1 recycler) • $0	• Ontario • Limited (2 recyclers) • $0
Technical	Collection Issues	• May require modifications (& Capital costs) to existing EnviroDepots	• May require modifications (& Capital costs)to existing EnviroDepots
Technical	Processing Issues	• Will need to transport to recycling facilities in Toronto	• Will need to transport to recycling facilities in Toronto

Notes

(a) Based on average size of units.

(b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.

(c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.

(d) Based on industry estimates, literature review and data from other municipalities.

Table F-3: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials not Recommended to be Added to the EnviroDepot Program

Consideration		Material not Recommended to be Added: Film Plastic (e.g., grocery bags)
Environmental	Estimated Annual Tonnes Diverted	40
	Estimated Annual Units Diverted (a)	5,000,000
	Annual GHG Savings Equivalent to (b)	40 tonnes 10 cars removed from the road
	Annual Energy Savings Equivalent to (c)	1,800 GJ 50 homes supplied with electricity
Social	Public Support	• Strong • Many residents already place some film plastic in Blue Box
	Resident Issues	• Residents can already recycle plastic bags at many retail outlets • Potential exists to enhance retail take back programs to include more locations and types of film plastic accepted
Financial	Additional Collection Cost (d)	$20,000
	Estimated Processing Cost (d)	$5,000
	Market/Revenue	• North American • Stable • Revenue significantly less than processing cost • Revenue = 0 to $30/tonne ($0 to $1,200/yr)
Technical	Collection Issues	• None
	Processing Issues	• Regional MRF capable of processing • May cause cross-contamination • May increase equipment maintenance requirements

Notes

(a) Based on average size of units.
(b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.
(c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.
(d) Estimates based industry estimates, literature review and data from other municipalities.

This page is intentionally left blank.