

Report to Civic Works Committee

To: Chair and Members
Civic Works Committee

From: Kelly Scherr, P.Eng., MBA, FEC
Deputy City Manager, Environment & Infrastructure

Subject: RFP-2022- 224 Green Bin Processing Services

Date: July 18, 2023

Recommendation

That, on the recommendation of the Deputy City Manager, Environment and Infrastructure, the following actions **BE TAKEN** with respect to the award of the work outlined in Request for Proposals (RFP-2022-224) Green Bin Processing Services:

- a) The proposal submitted by Convertus Canada Inc., 307 Commissioners Rd W, No. 8, London, Ontario, N6J 1Y4, for Green Bin Processing Services to manage food waste and soiled paper **BE ACCEPTED** at their quoted processing unit rate of \$89.75 per tonne (excluding HST), it being noted that this is being reported as an irregular bid as per the Procurement of Goods and Services Policy Section 19.4 (c) as only one (1) bid was received for this Request for Proposals, and that:
 - i. the quoted processing unit rate of \$94.50 per tonne (excluding HST) be accepted as submitted in 2023 to manage pet waste and/or food waste contained inside plastic bags should City Council wish to make Green Bin Program adjustments in the future,
 - ii. the proposed annual rate be adjusted annually for inflation by the Consumer Price Index,
 - iii. the term of contract be for four (4) years, with three (3), one (1) year renewal options at the sole discretion of the City, and
 - iv. the minimum amounts of Green Bin materials that must be delivered to Convertus's processing facility are 15,000 tonnes (in 2024), 15,750 tonnes (in 2025), 16,540 tonnes (in 2026 and 17,360 tonnes (in 2027);
- b) Civic Administration **BE AUTHORIZED** to undertake all the administrative acts that are necessary in connection with this work; and
- c) Approval hereby given **BE CONDITIONAL** upon the Corporation entering into a formal contract or having a purchase order, or contract record relating to the subject matter of this approval.

Executive Summary

Part A – Procurement of Green Bin Processing Services

Procurement Process

Request for Proposal (RFP) 2022-224 for the Green Bin Processing Services was issued on December 20, 2022 and closed on March 13, 2023. Bidders were provided the evaluation criteria and specific details under the following categories:

- Project Team Experience and Capability
- Operation Plan and Details including process description, beneficial use of products, contingency plans, regulatory compliance and community impact
- Quality Assurance
- Innovative Features

Initially seven bidders registered by downloading the RFP documents and received the Addenda (i.e., called plan takers on Bids&Tenders procurement system). At time of closing, six bidders remained listed. One bid was received.

Results

The proposal from Convertus Canada Inc. (hereafter referred to as Convertus) was the one bid received. The Convertus bid met all terms and conditions of the City of London. References were reviewed. The status of environmental compliance was reviewed with the Ministry of the Environment, Conservation and Parks (MECP). Three meetings and two site visits were held with senior management staff at Convertus.

Overview of the Processing Services and Unit Price Offered by Convertus

The RFP included two mixes of Green Bin Materials to be processed:

- Material Mix #1: Food waste, non-recyclable/soiled paper, cooking oils and grease, and household plants; and
- Material Mix #2: Food waste, non-recyclable/soiled paper, cooking oils and grease, household plants, and pet waste (e.g., dog, cat, other).

Convertus submitted pricing and details for managing both mixes of materials:

- Material Mix #1 = \$89.75 per tonne delivered of Green Bin materials. Assuming 15,000 tonnes per year is delivered, the amount would be \$1,346,250; and
- Material Mix #2 = \$94.50 per tonne delivered for Green Bin materials. Assuming 18,500 tonnes per year is delivered, the amount would be \$1,728,250.

Cost Comparison with Other Municipal Organics Processing Facilities Contracts and Operations

Green Bin processing data from 13 Ontario municipalities responsible for processing Green Bin materials was collected by City staff. Approximate per tonne prices ranged from \$90 to \$200 per tonne for various mixes of Green Bin materials and processing technologies. London's proposed processing pricing provided by Convertus:

- is on the lower end of the municipal cost range;
- is viewed by City staff as being very competitive; and
- provides flexibility for future consideration and/or program changes.

Products to be Created from London's Green Bin Materials

London's Green Bin materials will be processed into three different products as noted below with further details provided in Appendix A:

1. Non-agricultural source materials (NASM) - which is applied to agricultural lands following the Nutrient Management Regulation.
2. Fertilizer (ammonium sulphate) – which is produced during the odour abatement process, at Convertus.
3. Compost (Small Supply) – Category AA compost (about 200 tonnes) to be made available to the City of London for special events promoting the Green Bin program.

Recommended Materials to be Collected in London's Green Bin Program

City staff are recommending that Material Mix #1 be collected at the start of the Green Bin program because they:

- generally ranked higher from London resident feedback in 2021;
- are the most commonly collected materials in other municipalities;
- are the easiest materials to compost;
- have lower processing costs;
- contribute to the cleanest possible end-product;
- reduce the inherent confusion that is introduced with the exclusion of non-degradable plastic bags; and
- represent more than 65% of available organics for the Green Bin.

City staff also recommend that Material Mix #2, which includes Material Mix #1 plus pet waste (e.g., dog waste, cat waste and litter, other pet waste), be identified as a future item for Council consideration. Convertus has identified pricing for Materials Mix #2 and has also offered the City of London the ability to introduce non-biodegradable plastic bags as a liner option for food waste at the unit rate of \$94.50 per tonne.

Financial Impact/Considerations

Both Green Bin processing unit estimates provided by Convertus are below City staff estimates from 2018. All funding required for Green Bin processing is within the approved budget allocated for this service.

Part B – Other Green Bin Related Matters

Climate Change in the Context of the Climate Emergency Action Plan (CEAP)

Collecting source separated organics (Green Bin materials) and diverting this material from landfill avoids the creation of methane – a potent greenhouse gas with a global warming potential 28 times higher than carbon dioxide - as well as providing benefits through the production of a usable end product(s) to support this goal.

It is estimated that the net GHG emissions from organic waste management for the year 2030 would be approximately 20 to 27 per cent lower than if organics continued to be sent to landfill. The net cumulative GHG emissions over a 30-year period would be approximately 24 to 32 per cent lower.

Preliminary analysis suggests that when GHG reductions associated with the Green Bin program are added with the current and future capture of methane gas at the W12A Landfill, almost 90 per cent of the GHG associated with food waste and other organic material being targeted will be reduced.

Next Steps – Green Bin Start Date, Collection Schedule and Related Matters

Final Green Bin decisions and related matters will be presented to Civic Works Committee on August 15, 2023. This will include details on:

- Overview of multi-residential Green Bin pilot project;
- Start date for Green Bin curbside service;
- Start date for shifting from six collection zones to five collection zones;
- How Statutory Holidays will be handled as part of the collection system; and
- Proposed handling practices for pet waste, diapers and bulky materials.

Linkage to the Corporate Strategic Plan

Municipal Council continues to recognize the importance of waste management and the need for a more sustainable and resilient city in the development of its 2023-2027 Strategic Plan for the City of London. Specifically, London's efforts in waste management address the following Areas of Focus; Climate Action and Sustainable Growth and Well-Run City.

On April 23, 2019, the following was approved by Municipal Council with respect to climate change:

Therefore, a climate emergency be declared by the City of London for the purposes of naming, framing, and deepening our commitment to protecting our economy, our eco systems, and our community from climate change.

On April 12, 2022, Municipal Council approved the Climate Emergency Action Plan which includes Area of Focus 5, Transforming Consumption and Waste as Part of the Circular Economy. In addition, the 60% Waste Diversion Action Plan, including the Green Bin program, addresses various aspects of climate change mitigation within the waste management services area including greenhouse gas (GHG) reduction.

Analysis

1.0 Background Information

1.1 Previous Reports Related to this Matter

Relevant reports that can be found at www.london.ca under Council meetings include:

- RFP-2022-105 Supply and Distribution of Green Bins and Kitchen Containers, (April 21, 2023 meeting of the Civic Works Committee (CWC), Item #2.3)
- Updates: Green Bin Implementation, (June 21, 2022 meeting of the Civic Works Committee (CWC), Item #2.3)
- Green Bin Program Design – Community Engagement Feedback (March 30, 2021 meeting of the CWC, Item #2.13)
- Community Engagement on Green Bin Program Design (November 17, 2020 meeting of the CWC, Item #2.3)
- Business Case 1 – 60% Waste Diversion Action Plan – 2020-2023 Multi -Year Budget (January 30, 2020 meeting of the Strategic Priorities & Policy Committee (SPPC), Item #4.12a)
- 60% Waste Diversion Action Plan – Updated Community Feedback (September 25, 2018 meeting of the CWC, Item #3.2)
- Public Participation Meeting 60% Waste Diversion Action Plan – Additional Information (September 25, 2018 meeting of the CWC, Item #3.2)
- 60% Waste Diversion Action Plan (July 17, 2018 meeting of the CWC, Item #3.1)

1.2 Previous Community Engagement with Respect to Types of Green Bin Materials Accepted

The Green Bin community engagement process was conducted in early 2021 to engage the community and solicit feedback in designing London's Green Bin program. The community engagement focused on five key decisions for overall program design which influence one another: types of materials accepted, size of curbside container, type of kitchen container and type of bin liners permitted. The engagement process also asked Londoners what concerns they may have with bi-weekly garbage collection.

The City's community engagement online platform, GetInvolved.ca, was used to provide information, and collect feedback on each of the key decision areas. The online feedback form received 3,777 responses, the webpage had 9,180 unique visitors and about 54,000 total page views. A comprehensive report was presented to CWC on March 30, 2021. With respect to what type of materials should be placed inside the Green Bin can be found below in Table 1.

**Table 1: 2021 Online Feedback Form Question:
What Materials Should Be Placed Inside the Green Bin?**

Material Type (check all that apply)	Responses (%)	Number of Responses
Food waste	99%	3,691
Soiled paper	79%	2,941
Cooking oils and grease	63%	2,335
Household plants	73%	2,738
Pet waste (dog and cat feces and kitty litter)	45%	1,679
Diapers/sanitary products(a)	21%	778
Yard waste	53%	1,990
Total Responses		3,734

(a) Diapers includes adult incontinence products and sanitary products refers to feminine hygiene products.

On April 13, 2021, Council resolved that:

- a) the Civic Administration **BE AUTHORIZED** to undertake the Request for Proposals procurement process for a Green Bin material processor(s) that can compost and/or anaerobically digest:
 - i) Mix #1 - Food waste, non-recyclable/soiled paper, cooking oils and grease, and household plants; and/or
 - ii) Mix #2 - Food waste, non-recyclable/soiled paper, cooking oils and grease, household plants; and pet waste (e.g., dog, cat, other);

it being noted that processors will have to clearly state what types of products will be created (e.g., compost categories AA, A, B, digestate, renewable natural gas, electricity, etc.) as well as describe the final end uses for these products.

At the June 15, 2023 meeting of the W12A Landfill Public Liaison Committee (PLC), the members passed a motion stating that the PLC is opposed to contaminating materials, such as human diapers and animal waste, being included within the Green Bin program.

2.0 Discussion and Considerations

Section 2.0 is divided into two parts:

Part A – Procurement of Green Bin Processing Services

Part B – Other Green Bin Related Matters

Part A – Procurement of Green Bin Processing Services

2.1 Procurement Process

Request for Proposal 2022-224 for the Green Bin Processing Services was issued on December 20, 2022 and closed on March 13, 2023. The RFP used a two-stage approach whereby a technical component and a separate financial component were required in bidders' submissions. Bidders were provided the evaluation criteria and specific details as part of the RFP under the following categories:

- Project Team Experience and Capability
- Operation Plan and Details including process description, beneficial use of products, contingency plans, regulatory compliance, and community impact
- Quality Assurance
- Innovative Features

Initially seven bidders registered by downloading the RFP documents and received the Addenda (i.e., called plan takers on Bids&Tenders procurement system). At time of closing six bidders remained listed. One bid was received.

In accordance with the Procurement of Goods and Services Policy, the Senior Manager, Procurement and Supply and the Deputy City Manager, Environment and Infrastructure, approved opening the technical submission of the only bid received. The Policy permits the review of a single submission (Irregular Bid) as follows (Section 19.4 c):

19.4 Only One Bid Received

- a. In the event only one bid is received in response to a competitive bid, the Senior Manager, Procurement and Supply may return the unopened bid to the bidder when, in the opinion of the Deputy City Manager (or delegate) and the Senior Manager, Procurement and Supply (or delegate), using criteria, based on the number of bids which might reasonably be expected on a given type of bid, additional bids could be secured. In returning the

unopened bid, the Senior Manager, Procurement and Supply shall inform the bidder that the City may be re-issuing the competitive bid at a later date.

b. In the event that only one bid is received in response to a request for competitive bid, the bid may be opened and evaluated in accordance with the City's usual procedures when, in the opinion of the Deputy City Manager (or delegate) and the Senior Manager, Procurement and Supply (or delegate), the bid should be considered by the City. If, after evaluation by the Deputy City Manager (or delegate) and the Senior Manager, Procurement and Supply (or delegate), the bid is acceptable, an award will follow the irregular result process described in Section 8.10. If the bid is found not to be acceptable, the procedures set out in Section 19.3.a. may be followed, with necessary modifications.

c. In the event that the bid received is found acceptable, it will be awarded as an Irregular Result under Schedule "A" of this Policy.

The technical submission was evaluated by an evaluation team from Waste Management, Waste Collection, Procurement and Supply with technical assistance provided by Dr. Paul van der Werf (i.e., an organics management specialist). The submission is required to have a technical submission score of 70 percent or higher to have their sealed financial submission opened and reviewed.

The one bid received a score of 70 percent or higher and the financial submission was opened to complete the evaluation scoring.

2.2 Results

Background

The proposal from Convertus Canada Inc., London, Ontario (hereafter referred to as Convertus) was the one bid received. The Convertus bid met all terms and conditions of the City of London. References were reviewed. The status of environmental compliance was reviewed with the Ministry of the Environment, Conservation and Parks (MECP). Three meetings and two site visits were held with senior management staff at Convertus to discuss and/or view different aspects of the proposal.

Convertus operates 11 organic processing facilities across Canada and 1 facility in the United States. Its large municipal customers include the:

- Region of York, Ontario
- City of Ottawa, Ontario
- City of Surrey, British Columbia
- Regional District of Nanaimo, British Columbia
- City of Fredericton, New Brunswick

Overview of the Processing Services and Unit Price Offered by Convertus

The RFP included two mixes of Green Bin Materials to be processed:

- Material Mix #1: Food waste, non-recyclable/soiled paper, cooking oils and grease, and household plants; and
- Material Mix #2: Food waste, non-recyclable/soiled paper, cooking oils and grease, household plants, and pet waste (e.g., dog, cat, other).

The Convertus organics processing facility uses an in-vessel composting technology to produce compost and fertilizer. The facility is designed to process food waste, leaf and yard, diapers, sanitary products and pet waste. The in-vessel composting technology provides flexibility for the City of London.

In-vessel composting at Convertus involves the use of large concrete bunkers (containers) with a door. Inside the container monitoring takes place for temperature, moisture, and air flow as the decomposition process takes place. Green Bin materials are shredded before entering the container. After 14 to 16 days, the product is removed from the container and enters the screening line to create the final end product. Activities are completed indoors.

The odour abatement system includes a series of equipment, processes, and monitors (i.e., scrubbers, air-water heat exchangers, biofilters, dispersion stack). The odour abatement system was last upgraded in 2021.

Convertus submitted pricing and details for managing both mixes of materials:

- Material Mix #1 = \$89.75 per tonne delivered of Green Bin materials. Assuming 15,000 tonnes per year is delivered, the amount would be \$1,346,250; and
- Material Mix #2 = \$94.50 per tonne delivered for Green Bin materials. Assuming 18,500 tonnes per year is delivered, the amount would be \$1,728,250.

The above pricing also applies to Green Bin materials that may arrive from the multi-residential pilot project buildings that may start in advance of the curbside program.

Cost Comparison with Other Municipal Organics Processing Facilities Contracts and Operations

For the purpose of determining if competitive pricing was received from a single bid, additional comparisons were undertaken. Green Bin processing data from 13 Ontario municipalities responsible for processing Green Bin materials representing a total population of approximately 10.3 million people (about 70% of Ontario's population) was collected by City staff using direct contact with municipal representatives, available public reports from municipalities, and/or summary reports produced by others (Table 2). Also included in Table 2 is the City of London's proposed unit rates for both mixes of Green Bin materials.

It is important to note that prices vary by municipality due to many factors including, but not limited to:

- Quantity of materials to be processed from municipality;
- Type of materials contained in the Green Bin;
- How the materials are delivered to the processing facility;
- Location of the processing facility;
- Processing capacity of the processing facility;
- Minimum tonnage guaranteed;
- Age of processing facility;
- Type of processing facility (i.e., aerobic composting, anaerobic digestion) and technology used;
- Length and conditions of contract;
- When contract was signed;
- Public or private ownership of the processing facility; and
- How municipal overheads may be assigned.

Approximate per tonne prices ranged from \$90 to \$200 per tonne for various mixes of Green Bin materials and processing technologies. In summary, compared with available information, the following comments can be made with respect to London's proposed processing pricing:

- It is on the lower end of the municipal cost range;
- It is viewed by City staff as being very competitive; and
- It provides flexibility for future consideration and/or program changes.

Table 2: Summary of Green Bin Processing (Composting and Anerobic Digestion) Costs in Ontario

Tonnes of Organics Managed Per Year by Municipality	Information from Number of Municipalities (and Combined Population)	Approximate Processing Cost Per Tonne Range	Average Processing Cost Per Tonne
10,000 to 45,000	8 (3,100,000)	\$90 to \$165	\$125
Greater than 45,000	5 (7,200,000)	\$90 to \$200	\$135
Averages Across Municipalities	13 (10,300,000)	\$90 to \$200	\$130
City of London Material Mix #1			\$89.75
City of London Material Mix #2			\$94.50

Products to be Created from London's Green Bin Materials

London's Green Bin materials will be processed into three different products as summarized below with further details provided in Appendix A.

1. Non-agricultural source materials (NASM)

The Convertus facility produces mostly Category B compost, which is applied to agricultural lands as NASM. It is important to note this compost meets most Category AA compost requirements (e.g., metals, pathogens, foreign matter) but is designated as Category B because of how (i.e., lower moisture content) it is matured (i.e., cured).

NASM comprises treated and recycled materials from non-agricultural sources (e.g., food processing wastes, sewage biosolids, digestate) that can be applied to farmland in a beneficial way (e.g., add organic matter, plant nutrients to soil). Land application of NASM is intended to help maintain agricultural soil productivity and soil health. NASM is governed by the Nutrient Management Act and its Nutrient Management Regulation (i.e., Ontario Regulation 267/03).

The Nutrient Management Regulation includes rules for the storage, sampling, analysis and land application of NASM. The quality of NASM is assessed by determining the regulated metal concentrations, pathogen concentrations and odour potential. Further, a Nutrient Management Plan (Plan) must be developed for the location of land application. This is to ensure that material is land applied in an environmentally responsible way. The Plan is a legal document that must be prepared by a certified NASM Plan developer. Most require approval by the Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

2. Fertilizer (ammonium sulphate)

Ammonium sulphate fertilizer is produced during the odour abatement process at Convertus. Ammonia (a form of nitrogen) is naturally generated during composting. When the air from the composting process, containing ammonia, leaves the composting vessels, it is scrubbed from the airstream using ammonia scrubbers. This system binds ammonia to sulphuric acid to create an ammonium sulphate fertilizer. The ammonium sulphate fertilizer has been registered with the Canadian Food Inspection Agency (CFIA) and is applied to agricultural lands.

3. Compost (Small Supply)

Convertus will produce small amounts (about 200 tonnes) of Category AA compost, at its London facility, from London Green Bin materials. They will adjust the moisture content of immature compost when it is discharged from a composting tunnel to facilitate the on-site maturation (i.e., curing) requirements for Category AA compost.

This compost will be made available to the City of London for special events promoting the Green Bin program.

Recommended Materials to be Collected in London's Green Bin Program

Material Mix #1

City staff are recommending that Material Mix #1 be collected at the start of the Green Bin program because they:

- generally ranked higher from London resident feedback in 2021;
- are the most commonly collected materials in other municipalities;
- are the easiest materials to compost;
- have lower processing costs;
- contribute to the cleanest possible end-product;
- reduce the inherent confusion that is introduced with the exclusion of non-degradable plastic bags; and
- represent more than 65% of available organics for the Green Bin.

List of Recommended Materials Mix #1 Items Include:

Food waste:

- Baked goods, candies
- Bread, cereal, pasta, noodles, rice, beans, grains
- Coffee filters and grounds, paper teabags
- Dairy products, including milk, yogurt, butter, cheese
- Dry baking ingredients, herbs, spices
- Eggs, eggshells
- Fats, cooking oils, food grease (liquid or solid)
- Fruits and vegetables (cooked or raw, including peels, scraps and pits)
- Meat, poultry, seafood, giblets, bones
- Nuts, seeds
- Salad dressing, mayonnaise, gravy, sauces

Food-soiled paper products:

- Paper napkins, paper towel, tissues (provided they are free of contaminants, such as household cleaners)
- Paper plates, cups, muffin wrappers (un-waxed and un-plasticized)
- Pizza boxes, cardboard
- Un-plasticized soiled paper food packaging (such as flour bags)
- Cardboard egg cartons

Other items:

- Household plants (including soil), cut flowers
- Pumpkins
- Wooden stir sticks, chop sticks, popsicle sticks, toothpicks
- Newsprint, paper bags (to wrap food and line containers)
- Waxed paper

Material Mix #2 – Future Considerations:

City staff also recommend that Mix #2 which includes Mix #1 plus pet waste (e.g., dog waste, cat waste and litter, other pet waste) be identified as a future item for Council consideration. Convertus has identified pricing for Mix #2 and has offered the City of London the ability to introduce non-biodegradable plastic bags as a liner option at the unit rate of \$94.50 per tonne.

Comparison with Other Municipalities

A review of 15 Ontario municipalities and three Canadian programs found that all municipalities have a material mix that includes food waste, soiled paper, cooking oils and grease and household plants (except for one). About half of municipalities allow pet

waste and only two municipalities (York Region and Toronto) allow diapers/sanitary products (Table 3).

Table 3: Summary of Materials Included in Other Green Bin Programs

Municipality	Food	Soiled paper	Cooking oils and grease	Household plants	Pet waste	Diapers/Sanitary Products	Yard waste
City of Toronto	Y	Y	Y	Y	Y	Y	
Region of York	Y	Y	Y	Y	Y	Y	
City of Guelph	Y	Y	Y	Y	Y		
Region of Niagara	Y	Y	Y	Y	Y		
City of Ottawa	Y	Y	Y	Y	Y		Y
Simcoe County	Y	Y	Y	Y	Y		
City of St Thomas	Y	Y	Y	Y	Y		Y
Region of Waterloo	Y	Y	Y	Y	Y		
City of Barrie	Y	Y	Y	Y			
Dufferin County	Y	Y	Y	Y			
Region of Durham	Y	Y	Y	Y			
City of Hamilton	Y	Y	Y				
Region of Halton	Y	Y	Y	Y			
City of Kingston	Y	Y	Y	Y			Y
Region of Peel	Y	Y	Y	Y			
City of Vancouver	Y	Y	Y	Y			Y
City of Calgary	Y	Y	Y	Y	Y		Y
City of Halifax	Y	Y	Y	Y			Y

Note: Y – Yes Included

2.3 Summary - City Staff Recommendations

Summary staff recommendations are highlighted on Table 4.

Table 4: Summary of Staff Recommendations

Item	Rationale
Accept the unit rate of \$89.75 per tonne for Material Mix #1	<ul style="list-style-type: none"> • Lowest price • Contributes to the cleanest possible end-product; and • Represents more than 65% of available organics.
For future consideration, accept the unit rate of \$94.50 per tonne for Material Mix #2	Should Council wish to add pet waste and/or food waste contained inside plastic bags in the future, a price approved in 2023 and subject to inflation has been established.
Flexibility in meeting Londoner's needs	Convertus, based on experience in other jurisdictions, has offered two pricing options that provide additional benefits.
Minimum tonnages as specified in the RFP	The minimum amounts of Green Bin materials that must be delivered to Convertus's processing facility are 15,000 (in 2024), 15,750 tonnes (in 2025), 16,540 tonnes (in 2026) and 17,360 tonnes (in 2027).
Term of contract	The term of contract will be four years, with three, one year options at the sole discretion of the City.

Part B – Other Green Bin Related Matters

2.4 Acceptable Material Types for Liners

Background

London's Green Bin program will not permit the use of (non-degradable) plastic bags to contain Green Bin materials. Direction was received from Council on April 13, 2021, as part of preparing for the Request for Proposal for Green Bin processing services:

- b) the Civic Administration **BE AUTHORIZED** to design a Green Bin program that permits the use of the following liners, if a liner is deemed necessary by the household:
- i) Newsprint/household paper;
 - ii) Purchased paper liners/bags; and
 - iii) Purchased certified compostable bag liners;
- it being noted that should Mix #2 be selected all pet waste must be contained inside a purchased certified compostable bag (leak free and tied tightly) to be an eligible item for the Green Bin.

Households can avoid a cost by using no-cost options such as household paper and paper bags (e.g., newsprint, cardboard, paper grocery bags, etc.). No-cost options may be less convenient, but they will be a preferred option for some. Paper retail bags are becoming more common as many stores are required to move away from plastic bags. Many municipalities promote creative "origami methods" of reusing household paper to wrap food waste.

For those that wish to purchase liners, it will be a new expense for some households. Liners can be purchased from hardware and grocery stores as well as online. The approximate cost per bag varies depending on the product, the amount purchased, and where it is purchased. Some examples on the price ranges as follows:

- Small Green Bin liners: Between \$0.37 to \$1.50 per bag;
- Kitchen container liners: Between \$0.15 to \$0.67 per bag.

In some cases, there will be a switch in purchasing practices whereby those household that currently purchase liners for garbage may switch some of those purchases to a certified compostable bag liner.

Comparison with Other Municipalities

A review of the use of Green Bin liners in 15 Ontario municipalities and three Canadian programs is found on Table 5. Most Ontario municipalities do not make liner use mandatory; however, some municipalities require the use of an approved liner when pet waste is placed in the Green Bin. Before the pandemic only Durham and Halton Regions required the use of liners, and due to the Covid-19 pandemic other municipalities now require the use of liners.

In many instances the liner is mandatory for either Green Bin (GB) or Kitchen Container (KC), but not for both. In these examples, the organics inside the cart cannot be loose for collection. In 2019 Ottawa began to allow plastic bags as a convenience. The liner material permitted is contingent on which materials are permitted in the Green Bin; for example, municipalities that accept diapers/sanitary products also permit the use of plastic bag liners.

Table 5: Summary of Acceptable Green Bin Liners

Municipality	Paper	Certified Compostable	Non-degradable plastic	Are liners mandatory for food waste?	Are liners mandatory for pet waste?
City of Toronto	Yes	Yes	Yes	Yes, for either GB or KC not both	Yes, for Green Bin
Region of York	Yes	Yes	Yes	Yes, for either GB or KC not both	Yes, for Green Bin
City of Guelph	Yes	Yes			
Region of Niagara	Yes	Yes			Yes
City of Ottawa	Yes	Yes	Yes (added in 2019)		Yes
Simcoe County	Yes	Yes			Yes
City of St. Thomas	Yes	Yes			Yes
Region of Waterloo	Yes	Yes		Yes for either GB or KC not both	Yes, for Green Bin
City of Barrie	Yes	Yes			Does not Collect
Dufferin County	Yes	Yes			Does not Collect
Region of Durham	Yes	Yes		Yes for either GB or KC not both	Does not collect
City of Hamilton	Yes	Yes			Does not collect
Region of Halton	Yes	Yes		Yes	Does not collect
City of Kingston	Yes	Yes			Does not collect
Region of Peel	Yes	Yes			Does not collect
City of Vancouver	Yes				Does not collect
City of Calgary	Yes	Yes			Yes
City of Halifax	Yes				Does not collect

Notes: GB – Green Bin; KC – Kitchen container

2.5 Climate Change Considerations

As part of the City's Climate Emergency Action Plan (CEAP), Municipal Council has established a target of being net-zero community greenhouse gas (GHG) emissions by 2050. Collecting source separated organics (Green Bin materials) and diverting this material from landfill avoids the creation of methane – a potent greenhouse gas with a

global warming potential 28 times higher than carbon dioxide - as well as provides benefits through the production of a usable end product(s) to support this goal. It is important to note that the creation of methane within the landfill, as the organics break down, takes several years from the time the materials are buried until they decompose. Therefore, measuring climate change benefits requires an analysis that covers several decades to demonstrate the full benefit.

The net GHG emissions reduction benefit from using aerobic composting to process Green Bin materials is significantly greater than landfilling organics. For example, it is estimated that the net GHG emissions from organic waste management for the year 2030 would be approximately 20 to 27 per cent lower than if organics continued to be sent to landfill (Table 6).

Table 6: Greenhouse Gas Emissions from Green Bin Aerobic Composting (Greenhouse Gas (GHG) Calculator for Waste Management)

Organic Waste Management Option	Estimated Net Annual GHG Emissions (Tonnes CO₂ equivalents) for the year 2030	Estimated Net Cumulative GHG Emissions (Tonnes CO₂ equivalents) over 30 years
Without Green Bin (base case)	7,100 tonnes/year	313,000 tonnes
Green Bin with aerobic composting (15,000 tonnes per year of organics diverted from landfill)	5,700 tonnes/year (20% reduction - 1,400 tonnes/year lower)	237,000 (24% reduction – 74,000 tonnes lower)
Green Bin with aerobic composting (20,000 tonnes per year of organics diverted from landfill)	5,200 tonnes/year (27% reduction – 1,900 tonnes/year lower)	212,000 (32% reduction – 101,000 tonnes lower)

The net cumulative GHG emissions over a 30-year period would be approximately 24 to 32 per cent lower by diverting organics from landfill to aerobic composting (Table 4). The Organic Waste Greenhouse Gas (GHG) Calculator, available from Environment and Climate Change Canada, was used in these GHG emission reduction calculations. Additional details are presented in Appendix B.

Additional GHG reductions and benefits for the Green Bin Program include:

- Waste collection packers collecting the organics will be fuelled with compressed natural gas (CNG), which has lower greenhouse gas emissions and air pollutant emissions compared to diesel burning packers; and
- Convertus is within close proximity to the City's Exeter Road Operations Centre (ERO) where the vehicles are parked and maintained, the W12A Landfill Site, and the Flying J CNG fueling station.

Preliminary analysis suggests that when GHG reductions associated with the Green Bin program are added with the current and future capture of methane gas at the W12A Landfill, almost 90 per cent of the GHG associated with food waste and other organic material being targeted will be reduced.

2.6 Next Steps – Green Bin Start Date, Collection Schedule and Related Matters

Final Green Bin decisions and related matters will be presented to Civic Works Committee on August 15, 2023. This will include details on:

- Overview of multi-residential Green Bin pilot project;
- Start date for Green Bin curbside service;
- Start date for shifting from six collection zones to five collection zones;

- How Statutory Holidays will be handled as part of the collection system; and
- Proposed handling practices for pet waste, diapers and bulky materials.

3.0 Financial Impact/Considerations

Funding for the Green Bin program as part of the 60% Waste Diversion Action Plan was approved on March 2, 2020 and with budget amendments made and approved on January 12, 2021. The estimated amount allocated for the Green Bin program and related matters is \$5 million annually with a capital cost estimated at \$15 million. These estimates were prepared in 2018.

Both Green Bin processing unit estimates provided by Convertus in response to City's RFP are below City staff estimates from 2018. All funding required for Green Bin processing is within the approved budget allocated for this service.

Funding for Green Bin processing services was approved as part of the 2023 Annual Budget update on the understanding that the program was going to be implemented in mid-2023. Further delays dealing with vehicle supply chain issues have pushed the start date to late fall/early winter. For 2023, the unspent amount will be identified and reported through the 2023 Mid-Year Operating Budget Monitoring report that will be brought forward to committee in September 2023 and will form part of the Corporation's overall budget position for 2023.

Conclusion

The proposal from Convertus meets all terms and conditions of the City of London. The Green Bin processing units estimates provided by Convertus for both Material Mix #1 and #2 are below City staff estimates from 2018. Compared with other municipalities, are on the lower end of the municipal range; are viewed by City staff as being very competitive; and provide flexibility for future consideration and/or program changes.

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Appendix A Overview of Products from Green Bin Materials Processed Through Composting Processes

Appendix B Additional Details – Climate Change Considerations

Appendix A

Overview of Products from Green Bin Materials Processed Through Composting Processes (prepared by Dr. Paul van der Werf)

A1.0 Introduction

Green Bin materials processed via composting results in the production of compost and in some cases fertilizer products. Detail in this appendix describe these products, their potential benefits and value, as well as summarizing their legal product quality requirements.

Convertus produces mostly Category B compost and ammonium sulphate fertilizer, at its London facility, and can produce small amounts of Category AA compost.

A2.0 Definitions

Compost

Compost is the solid output produced through the controlled aerobic microbial decomposition process (i.e., composting). The composting process goes through high temperature (>55C), which significantly reduces pathogens and weed seeds, and lower temperature phases. It results in a stable product that includes organic matter and small amounts of plant nutrients that can be beneficial to soil. In Ontario, this results in the production of Category AA, A or B composts.

Environmental Compliance Approval (ECA)

Facilities that process Green Bin materials are typically governed by an Environmental Compliance Approval (ECA) that is administered and supervised by the Ministry of the Environment, Conservation and Parks (MECP). The ECA includes various legally binding conditions that dictate how a site must be operated as well as the quality of compost.

Land Application

Ultimately compost will be applied to land. For highest quality AA and A composts this can include a wide spectrum of uses from home gardens to golf courses to agricultural use. Category B composts have some restrictions in terms of land application. They are often, with appropriate permitting, applied to agricultural land, as a non-agricultural source material (NASM).

Non-Agricultural Source Materials

Non-Agricultural Source Materials (NASM) comprise treated and recycled materials from non-agricultural sources that can be applied to farmland in a beneficial way (e.g., add organic matter, plant nutrients to soil).

A3.0 Materials Produced from Green Bin Material

The key material produced from the composting of Green Bin materials that can be applied to land is compost.

A3.1 Compost

Ontario's *Compost Quality Standards*^a and the *Guideline for the Production of Compost in Ontario*^b enable the composting of a broad range of materials and provide guidance for compost facility operators while protecting the environment and human health.

^a Ontario Compost Quality Standards <https://www.ontario.ca/page/ontario-compost-quality-standards>

^b Guideline for the Production of Compost in Ontario
<https://www.ontario.ca/page/guideline-production-compost-ontario>

Under Ontario's Compost Quality Standards there are three categories of compost (AA, A and B) and each have quality standards for metals, pathogens, foreign matter and maturity. Category AA composts meet the highest quality standards. Compost facilities typically target the production of AA or A compost from Green Bin materials.

Category AA compost cannot include sewage biosolids, pulp and paper biosolids and domestic septage and this arguably precludes Green Bin materials that include diapers and sanitary products. The three categories of compost have different maximum concentrations of metals (Table A1) that cannot be exceeded. Importantly, all three categories must meet the same pathogen reduction and maturity requirements. Category AA and A have the same foreign matter (i.e., glass, metal and plastic) requirements while these requirements are less stringent for B composts.

Composts meeting Category AA and A standards are exempt from provincial approvals for transport and use. This means that these composts have broad uses including household gardens and landscaping; commercial gardens and landscaping; and horticultural applications.

Category B compost is not an exempt waste and requires ECA approvals for transportation and land application. "However, where Category B compost is applied to agricultural land as a nutrient and satisfies the requirements of O. Reg. 267/03 under the NMA^c, it is exempt from Part V of the EPA and Regulation 347 for use (it still requires approval for transportation)."^d

All composts are considered a nutrient, under the *Nutrient Management Act* and require a *Nutrient Management Plan* and/or *NASM Plan* for application to farmland. The compost must be applied in accordance with the NMP or NASM Plan and O.Reg. 267/03 (see additional detail in Section A3.2 of this report).^e

Table A1: Maximum Concentration for Metals in Compost

Metal	Category AA (mg/kg dry weight)	Category A (mg/kg dry weight)	Category B (mg/kg dry weight)
Arsenic	13	13	75
Cadmium	3	3	20
Chromium	210	210	1060
Cobalt	34	34	150
Copper	100	400	760
Lead	150	150	500
Mercury	0.8	0.8	5
Molybdenum	5	5	20
Nickel	62	62	180
Selenium	2	2	14
Zinc	500	700	1,850

^c Nutrient Management Act (NMA) <https://www.ontario.ca/laws/statute/02n04>

^d Ontario Compost Quality Standards <https://www.ontario.ca/page/ontario-compost-quality-standards>

^e Nutrient Management Protocol for Ontario Regulation 267/03 Made under the Nutrient Management Act, 2002
<http://omafra.gov.on.ca/english/nm/regs/nmpro/nmpro07-12.htm>

A3.2 Non-Agricultural Source Materials (NASM)

Some outputs from the composting of Green Bin materials are directed to farmland for land application. This can include Category B compost, as discussed above, which are designated as NASM.^f NASM is governed by the Nutrient Management Act^g and its Nutrient Management Regulation (i.e., Ontario Regulation 267/03^h).

NASM is made from treated and recycled materials from non-agricultural sources (e.g., food processing wastes, sewage biosolids, digestate) that can be applied to farmland in a beneficial way (e.g., add organic matter, plant nutrients to soil). It is important to note the land application of NASM is intended to help maintain agricultural soil productivity and soil health rather than a just a place to dispose, in this context, compost.

A full list of NASM is included in Schedule 4 of the Nutrient Management Regulation. In the context of Green Bin programs, it can include materials that meet Category 3 NASM standards such as compost that meets the requirements for Category B of the Compost Standards.

NASM does not include compost that meets the standards for Category AA or A, as described in the Ontario Compost Standard.

The Nutrient Management Regulation includes rules for the storage, sampling, analysis and land application of NASM.

The quality of NASM is assessed by determining the regulated metal concentrations, pathogen concentrations and odour potential.

Further, for Category 3 NASM (under which outputs from the Green Bin can fall) a Nutrient Management Plan (Plan) must be developed for the location of land application. This is to ensure that material is land applied in an environmentally responsible way.

Plan development includes measuring soils for pH, phosphorus and the concentration of 11 regulated metals. Plans must also include appropriate setbacks from sensitive features such as wells, surface water and adjacent properties and must also consider field topography (i.e., slopes) and soil depth. Further, NASM application rates (i.e., to determine nutrients being applied) need to consider the crop that is being grown and the soil itself.

The Plan needs to include a contingency plan that outlines what would be done if there is an emergency or spill.

The Plan is a legal document that must be prepared by a certified NASM Plan developer. Most require approval by the Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

A3.3 Fertilizer

In some cases, where a compost nutrient(s) content is predictable and consistent, a compost facility can register this fertilizer content (i.e., guaranteed analysis) with the federal Canadian Food Inspection Agency (CFIA). In some cases, fertilizers can be manufactured from the chemical scrubbing of nutrient rich composting off-gases and these (e.g., ammonium sulphate) can be registered with the CFIA.

^f Non Agricultural Source Materials <http://omafra.gov.on.ca/english/nm/nasm.html>

^g Nutrient Management Act, 2002

https://www.ontario.ca/laws/statute/02n04?_ga=2.193027565.1395093710.1659437030-127138190.1659437030

^h Nutrient Management Regulation

https://www.ontario.ca/laws/regulation/030267?&_ga=2.194713325.1395093710.1659437030-127138190.1659437030#BK281

A4.0 Green Bin Product Value and Uses

The estimated nutrient, organic matter, dollar value and uses of various Green Bin composts is depicted in Table A2. Dollar values were gathered from the local marketplace. These products are commodities, and their prices can vary widely, between processors, and fluctuate widely, depending on market conditions.

Compost, including those produced from Green Bin materials, can be an important source of soil organic matter. Soil organic matter has been declining in Ontario soils.ⁱ Soil organic matter has chemical benefits which include improving soil nutrient retention; physical benefits which include improving soil structure and water holding capacity; and biological benefits as a source of energy and nutrients to soil microorganisms. Further, soil carbon capture (via organic matter from compost) lowers greenhouse gas emissions to the atmosphere, conferring an important climate change benefit.^j

Compost includes plant nutrients, such as nitrogen, phosphorus and potassium, as well as various plant micronutrients.

In general, higher quality products, that require minimal additional handling or processing will have the highest dollar value and the end uses with highest product quality specifications.

Table A2: Benefits and Value of Composts

Material	Nutrients (dry weight basis)	Organic Matter	\$/tonne	Examples of Uses
AA Compost	1-2% Nitrogen 0-1% Phosphorus 0.5-1%Potassium	30-50%	\$30-\$35/tonne	AA - home use
A Compost	1-2% Nitrogen 0-1% Phosphorus 0.5-1%Potassium	30-50%	\$30-\$35/tonne	A - horticultural uses, golf courses
B Compost	1-2% Nitrogen 0-1% Phosphorus 0.5-1%Potassium	30-50%	\$1-\$5/tonne	B - agricultural use, land reclamation (NASM)
Fertilizer			\$1-\$200/tonne for CFIA registered fertilizers	Agricultural use

ⁱ Ministry of Agriculture, Food and Rural Affairs: Written Submission to the Standing Senate Committee on Agriculture and Forestry
https://sencanada.ca/content/sen/committee/421/AGFO/Briefs/CBrown_submission_e.pdf

^j Soil organic matter matters - Investing in soil quality for long-term benefits
https://ec.europa.eu/eip/agriculture/sites/default/files/eip-agri_brochure_soil_organic_matter_matters_2016_en_web.pdf

Appendix B Additional Details - Climate Change Considerations

B1.0 60% Waste Diversion Action Plan

The 60% Waste Diversion Action Plan (2018) identified the environmental benefits of implementing a city-wide Green Bin organics (sometimes referred to as source separated organics) program through waste diversion, reduced landfill impacts, better use of material and resources and the reduction greenhouse gas (GHG) emissions. The source of GHG reduction estimates for each of the proposed action items, including aerobic composting, was evaluated utilizing the Environment and Climate Change Canada's *Greenhouse Gas (GHG) Calculator for Organic Waste Management*, 2009 version.

B2.0 Climate Lens Framework

Since that time, the City of London has developed a Climate Lens Framework to facilitate the inclusion of climate change considerations into decision making. The Climate Lens Framework has been used as a guide for the evaluation of potential waste and organics management approaches compared with current waste management programs. A key piece of the Climate Lens Framework is to evaluate potential organics management approaches by estimating GHG emissions reduction.

Updates to the GHG emissions reduction estimates have been assessed using the Environment and Climate Change Canada's new *Greenhouse Gas (GHG) Calculator for Organic Waste Management*, released in April 2022. This tool has been updated to include additional factors when estimating the impact on GHG emissions of different organic waste management approaches, including composting (e.g., windrow, in-vessel), anaerobic digestion (wet and dry), energy from waste, and landfilling. Greenhouse gas emission reductions are provided for both cumulative lifecycle emission reductions (default assumption is 30 years) and year-by-year annual reductions. Lifecycle emission reductions that are modelled include:

- Avoided GHG emissions associated with reducing the generation of organic waste;
- Emissions from avoided energy commodity use;
- Upstream emissions from avoided fuel production; and
- Upstream emissions from avoided fertilizer production.

GHG Emission Reductions

The user inputs (Table B1) entered into the calculator for the waste composition and quantities were based on the materials accepted in the Green Bin Program (food waste and paper). The GHG analysis also considers the following when calculating GHG reductions:

- The landfill gas collection and flaring system that is in place to reduce methane emissions from the landfill;
- The distance to the compost facility;
- Type of composting facility (i.e. in-vessel, windrow, static pile); and
- If fertilizer offsets are produced from the final compost product.

**Table B1: Environment Canada Greenhouse Gas Emissions Calculator
Inputs and Assumptions**

User Analysis Input	Input/ Assumptions	Explanation
Baseline	User input - landfill	All SSO goes to landfill in the baseline scenario
LFG recovery (option)	LFG recovery for flaring	City of London landfill flares the methane landfill gas collected.

User Analysis Input	Input/ Assumptions	Explanation
Composting	In-vessel	In-vessel aerobic composting is the technology used to process the SSO.
Composting – Offset fertilizer offset	Yes	Aerobic composting product will have beneficial use.
Organic composition proportions	90% - food 10% - paper	Proportion of the type of organic materials have been determined from completing waste composition audits.
Distance (km)	20 km 40 km	Average distance to landfill and Convertus Composting Facility Average distance from compost facility to final destination of compost

The GHG emissions reduction benefit from using source-separated organics aerobic composting is significantly greater than landfilling organics. Overall, it is estimated that the net GHG emissions (equivalent carbon dioxide) for the year 2030 would be approximately 20 to 27 per cent lower. The net cumulative GHG emissions (equivalent carbon dioxide) over a 30 year period would be approximately 24 to 32 per cent lower by diverting organics from landfill to aerobic composting.

The Organics Waste Management model estimates net GHG emissions reductions based on the following:

- The efficiency of the landfill gas collection and flaring system;
- Avoided generation and emission of methane gas from the landfill due to organic material being diverted to aerobic composting;
- Avoided greenhouse gas emissions resulting from applying NASM to soil, which reduces the need for chemical fertilizers and the associated emissions that come from chemical fertilizer production and application;
- Increased transportation-related emissions due to transporting NASM; and
- Increased carbon sequestration from applying NASM to soil, which helps to increase the amount of carbon held in soil organic matter.

The magnitude of the net cumulative GHG emissions over 30 years and the net annual 2030 GHG emissions for composting compared to landfilling are presented in Table B2.

Table B2: Greenhouse Gas Emissions from Green Bin Aerobic Composting (Greenhouse Gas Calculator for Waste Management)

Organic Waste Management Option	Estimated Net Annual GHG Emissions (Tonnes CO ₂ equivalents) for the year 2030	Estimated Net Cumulative GHG Emissions (Tonnes CO ₂ equivalents) over 30 years
Without Green Bin (base case)	7,100 tonnes/year	313,000 tonnes
Green Bin with aerobic composting (15,000 tonnes of organics diverted from landfill)	5,700 tonnes/year (20% reduction - 1,400 tonnes/year lower)	237,000 (24% reduction – 74,000 tonnes lower)
Green Bin with aerobic composting (20,000 tonnes of organics diverted from landfill)	5,200 tonnes/year (27% reduction – 1,900 tonnes/year lower)	212,000 (32% reduction – 101,000 tonnes lower)