SM4RT LIVING

YORK REGION'S INTEGRATED WASTE MANAGEMENT MASTER PLAN

November 2013

Source Separated Organics Strategy

York Region

SM4RT LIVING
YORK REGION'S INTEGRATED WASTE MANAGEMENT MASTER PLAN

REDUCE
REUSE
RECYCLE
RECOVER

Source Separated Organics Strategy

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York Region

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Strategy Summary

Objectives:

- Identify SSO Processing and Implementation Options
- Develop a process for evaluating long-term SSO processing options
- Ensure the Region's organic diversion goals are not hampered by organics processing constraints

Targets:

- Resource conservation goals through the ability to recover materials, and if possible energy;
- A prescribed process for engagement, consultation and support of the community.
- Specific performance measures that incorporate all other aspects of the integrated waste management system.
- Flexibility to adapt to changes in waste streams and new programs and initiatives recommended elsewhere in the master plan.
- A recognition and priority placed on the waste management hierarchy.

Benefits:

- Consolidates and documents relevant background information pertaining to source separated organics diversion in York Region and Ontario to support and inform subsequent analysis and decision-making;
- Identifies the need for extension of the separated organics processing contingency to span the entire near-term period to 2017 and recommends and approach for consideration;
- Identifies the need to secure long-term source separated organics processing;
- Explores the dimensions of key decision topics associated with defining a long term source separated organics processing strategy including technology selection, business models and facility location; and
- Identifies the process steps, timelines and resources needed for the Region to proceed to evaluate the options and develop an implementation plan to secure organics processing capacity to continue the Region's Province-leading organics diversion program.

1.0 Introduction

The source separated organics (SSO) management strategy is one component of York Region's first Integrated Waste Management Master Plan, also known as the SM4RT LIVING Plan, which establishes the planning framework and strategic direction for waste management in York Region for the next 40 years. SM4RT Living Plan builds on the Region's position as a waste management leader, by focusing on driving waste reduction and reuse, while maximizing recycling and energy recovery from the materials that remain.

Primary objectives of this strategy are to:

- **Identify SSO processing and implementation options**
- **Develop a process for evaluating long-term SSO processing options**
- **Ensure the Region's organic diversion goals are not hampered by organics processing constraints**

In the development of the plan, the lack of a stable long-term option for processing York Region's source separated organics was identified as a potential gap in the Region's waste management system. This report reviews background information regarding organic waste management programs in the Region and throughout Ontario, outlines technological and implementation options available to secure source separated organics processing capacity for York Region going forward, identifies triggers to initiate actions , describes the process to evaluate and develop a long-term plan for processing source separated organics, provides an implementation approach, including suggested timelines and summarizes the key benefits of the strategy.

2.0 Background and Trends

2.1 Organics Diversion In York Region

As one component of integrated waste management in the Region, organic waste diversion currently encompasses the following activities:

- Residential curbside collection of organic waste by the local municipalities, including:
  - Source separated organics such as food waste, pet waste, soiled fibre materials, household plants, small amounts of shredded paper, sanitary products, diapers, tissues and paper towels
  - Leaf and yard waste materials such as branches, twigs, soil and leaves
  - Receipt of leaf and yard waste dropped off by residential and commercial customers at the Georgina Transfer Station and at Miller Waste System's Bloomington Road facility
- Transfer of collected leaf and yard waste and source separated organics from York Region's transfer stations to third party processing facilities
- Processing including:

  - Pre-processing of leaf and yard waste materials sourced within the Asian Long-horned Beetle quarantine zone (site closed June 2013)
  - Third party composting of leaf and yard waste
  - Third party composting of source separated organics
- Project management and customer service to support organic diversion programs
- Promotion and education regarding backyard composting, leaf mulching, grass-cycling, as well as the Green Bin and leaf and yard waste programs
- Provision/sale of backyard composters, kitchen organics containers and green bins to residents

Despite the temporary challenges experienced by the Green Bin Program in York Region due to private sector processing upsets in recent years, the long-term trending illustrated on Figure 1 demonstrates that collection of residential source separated organics through the Green Bin Program has been embraced by the public. This report presents strategies to consider for managing the risk of instability in the private sector organics processing market in Ontario.

Figure 1 - Organic Waste Diversion in York Region

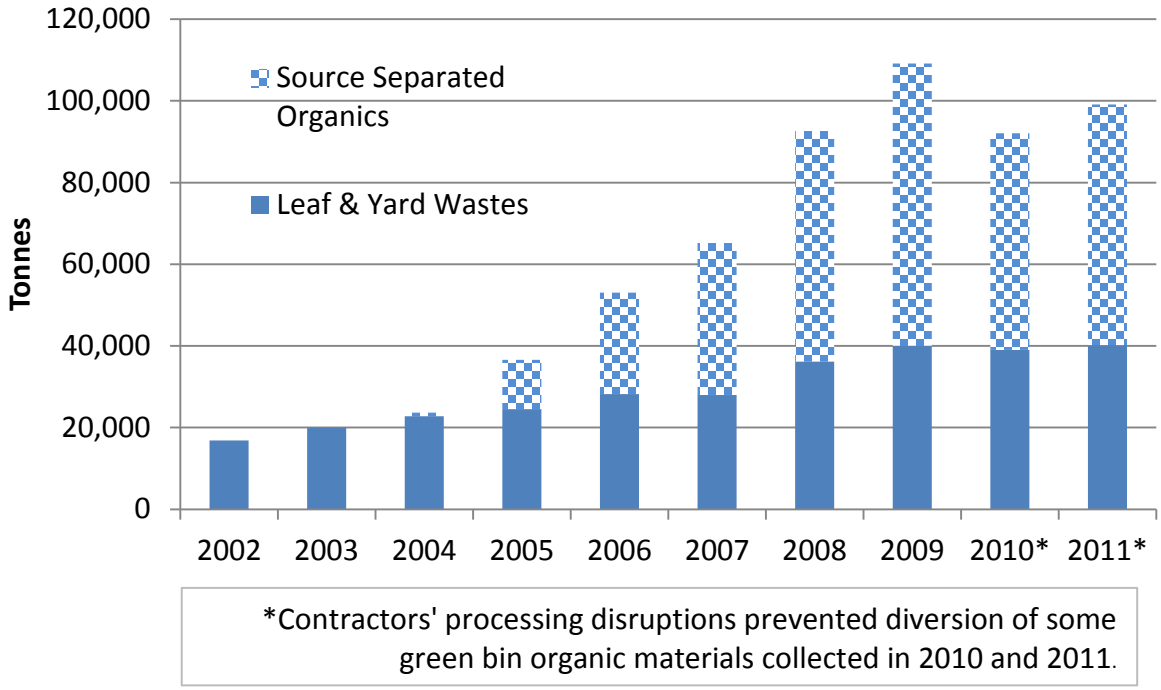
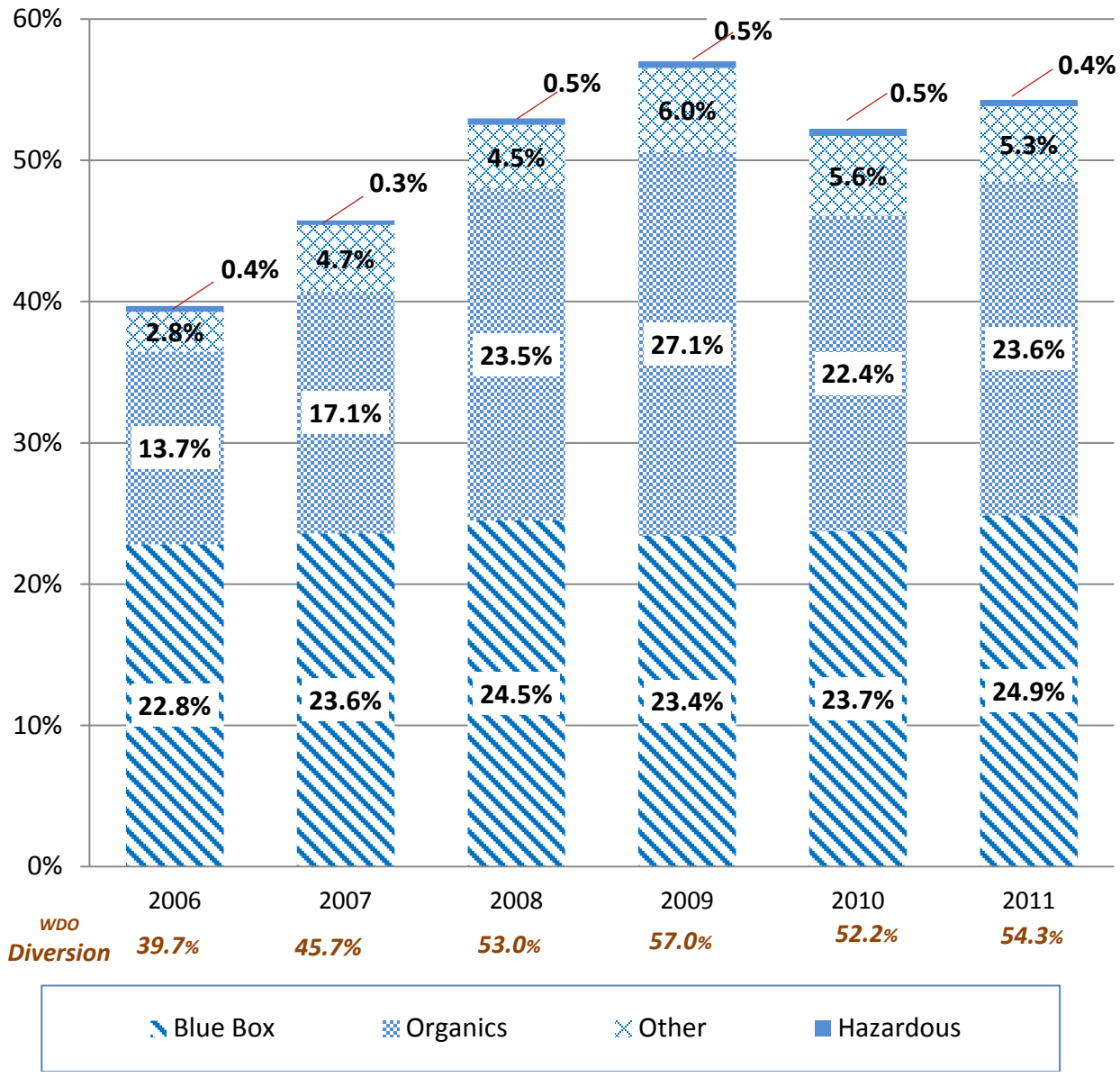


Figure 2 shows that organics has become a significant contribution to the Region's overall diversion.

Figure 2 – York Region Waste Diversion by Material Groups



The Region's Green Bin Program includes acceptance of the following:

- Food and Food Products:
  - Fruits and vegetables
  - Meat and fish products including bones, fat, skin and shellfish
  - Grain products including pasta, bread, rice and cereal
  - Baked goods or baking ingredients including cake, cookies, flour, sugar, spices, eggs and egg shells
  - Dairy products including milk, cheese and yogurt
  - Other food products including candy and confectionary, coffee grounds, coffee filters and tea bags
- Soiled papers including paper towels, facial tissue, muffin paper, microwave popcorn bags and paper candy wrappers
- Personal hygiene wastes including diapers, sanitary products, incontinence products, nail clippings and hair
- Pet waste including kitty litter, dog waste, pet bedding and fur, feathers, pet food and bird seed
- Other organic wastes including small amounts of shredded paper, houseplants including soil, flowers (dried and fresh cut) and sawdust (clean un-coated wood sources only - not pressure treated)

One of the distinctive characteristics of the Region's organics diversion program is the acceptance of personal hygiene products and pet waste in the green bin. While sanitary products and pet waste can be safely processed as part of high quality compost, they are excluded from many other municipal source separated organics diversion programs. Certified compostable bags are encouraged in the program as bin liners.

The inclusive nature of the Region's Green Bin program increases the potential diversion tonnage while producing high-quality marketable compost. On a per capita basis, the Region's Green Bin Program offers the potential to capture and divert more organic waste than other less inclusive organics diversion programs. This also increases the amount of organic material that must be processed and reduces the number of processing facilities available to the Region, since not all processors are licensed to accept these materials.

2.2 Provincial Context

The following facts derived from Waste Diversion Ontario's 2011 annual report provide a snapshot of the current status of municipal organic waste diversion in Ontario:

- A total of 880,126 tonnes of organic waste were diverted from landfill disposal in Ontario in 2011; this is an increase of three per cent over 2010
- Organics diversion programs were provided by 99 of the 231 (or 43 per cent) Ontario communities reporting to Waste Diversion Ontario; those communities reporting organics diversion in 2011 represent a total of approximately 13 million people - more than 90 per cent of the province's entire population

- Roughly 85 per cent of all organic waste diverted in Ontario in 2011 were captured in curbside collection programs while the remaining materials were delivered to drop-off depots
- Approximately 46 per cent of the organics diverted in Ontario in 2011 were from household sources (i.e. green bin materials), 52 per cent were leaf and yard waste and the remaining two per cent were bulky organic materials such as Christmas trees

Table 1 illustrates the substantial participation of York Region's residents in organics waste management over the past several years.

Table 1 – York Region's Contribution to Organics Diversion in Ontario

	Organics Collected				
	Ontario		York Region*		
	Tonnes	Per Capita (kg/person)	Tonnes	Per Capita (kg/person)	Fraction of Ontario Total
2008	808,109	63.8	92,587	91.5	11.5%
2009	845,547	66.5	109,137	105.7	12.9%
2010	852,102	66.5	92,048	86.6	10.8%
2011	880,126	67.4	98,573	90.7	11.2%

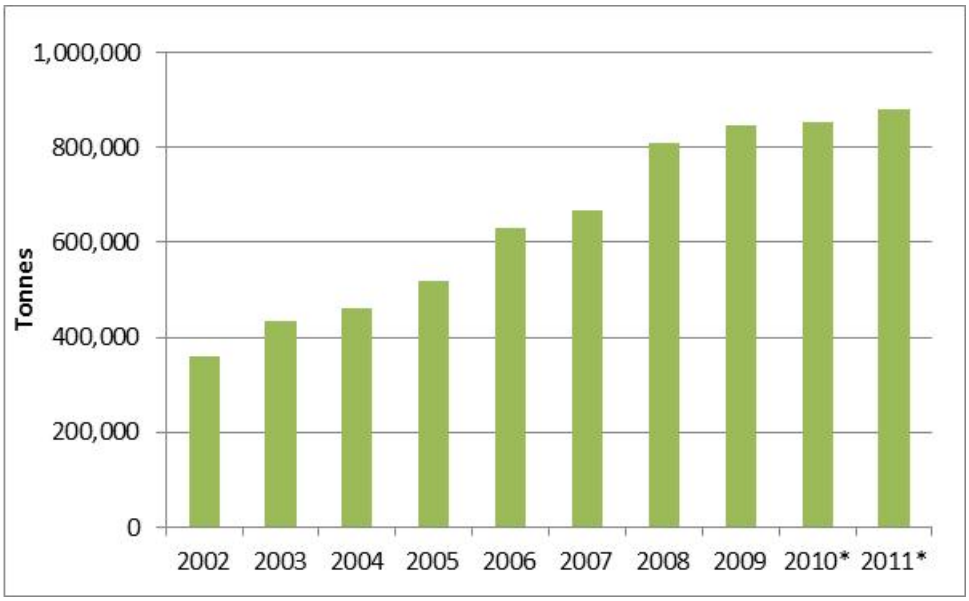
*Contractor's processing disruptions prevented diversion of some organic materials collected by York in 2010 and 2011. Numbers shown are organics collected as reported by Waste Diversion Ontario.

Despite strong support for organic collection by residents and communities, growth of organics diversion in Ontario has been highly variable.

In recent years, many Ontario communities have launched and/or expanded programs for collection and processing of organic wastes to include source separated organics as a means of increasing diversion. While the demand for organics processing capacity has increased, many processing operators have experienced difficulties, primarily associated with controlling odours. These difficulties have resulted in capacity reductions and/or shut-downs of some existing facilities and contributed to growing public opposition to establishment of new source separated organics processing facilities.

The increasing supply of source separated organics in Ontario as seen in Figure 3, coupled with limited growth in establishment of new processing facilities has resulted in a deficit in available source separated organics processing capacity within the province.

Figure 3 - Organics Diversion in Ontario



Review of the Ontario context of organics diversion leads to the following key conclusions:

- Many Ontarians have embraced organics diversion and live in communities committed to provision of services similar to the Region's green bin curbside collection program. Pressure for growth in organics processing capacity is expected to continue to increase.
- Inclusiveness of the Region's Green Bin Program has been enthusiastically embraced by residents.
- By leading the province in participation rates, York Region residents contribute more than 10 per cent to Ontario's total organics diversion achievement
- Despite strong citizen and community support, achieving growth in organics diversion remains challenging due to the shortage of established and stable processing capacity in Ontario
- York Region's Green Bin Program is the second largest in Ontario, second only to the City of Toronto
- The Toronto and York Region organics programs are the only major programs in the province accepting diapers, sanitary products and pet waste; there are a limited number of processing facilities in Ontario licensed to process this material, which magnifies impacts the Region experiences resulting in processing disruptions
- There are many factors that can contribute to processing disruptions; prime among these are odour management difficulties, which in some cases has resulted in direct actions by the regulator , including short term capacity constraints and voluntary shut-downs

Instability in the organics processing market in Ontario carries with it the following consequences:

- Hampers private sector investment in the capital infrastructure needed to establish sufficient processing capacity
- Creates upward pressure on the cost of organics processing
- Inhibits continued achievement of organics diversion province-wide
- Threatens the Region's position as an organics diversion leader

As a purchaser of organic processing services in a very limited market-place, the Region has few options available to respond to service disruptions. Due to factors beyond the Region's control or ability to influence, the current market for organics processing services in Ontario does not appear to support the competitive forces that municipalities typically rely upon for procurement of cost-effective and reliable services. There are no fundamental changes underway or pending that would change this situation in the near future.

It is clear that organic waste collection and processing offers substantial potential for additional organics diversion throughout Ontario and within the Region – now and in the future. This can be realized through increased capture of materials in the curbside residential collection program along with potential expansion of the program to serve additional organic waste generating customers (e.g. multi-residential), but only if long-term, stable organic waste processing capacity can be secured.

2.3 Market Scan of Source Separated Organics Processing in Ontario

Table 2 provides a profile of the status of organics processing in Ontario. The following summarizes some key information:

- Total organic processing capacity in Ontario is insufficient to meet the needs of Ontario's organic waste diversion programs; this is true for both current and near future conditions
- Implementation of all planned/pending processing capacity increases will add an additional 29 per cent to Ontario's organics processing capacity, still falling short of Ontario's organic waste processing needs
- Aerobic composting represents 96 per cent of current processing capacity available in Ontario, with anaerobic digestion making up the remaining four per cent of capacity; no other technologies are currently available or planned/pending for implementation in Ontario
- Private sector firms own more than 74 per cent of the current processing capacity available in Ontario, while municipalities own the remaining 26 per cent; there are currently no public/private partnerships for organic waste processing facilities

- Approximately 35 per cent of processing capacity currently available in Ontario is able to accommodate diapers, sanitary products and pet waste feedstock included in the Region's Green Bin program

Table 2 - Profile of Ontario's Source Separated Organics Processing Market[1]

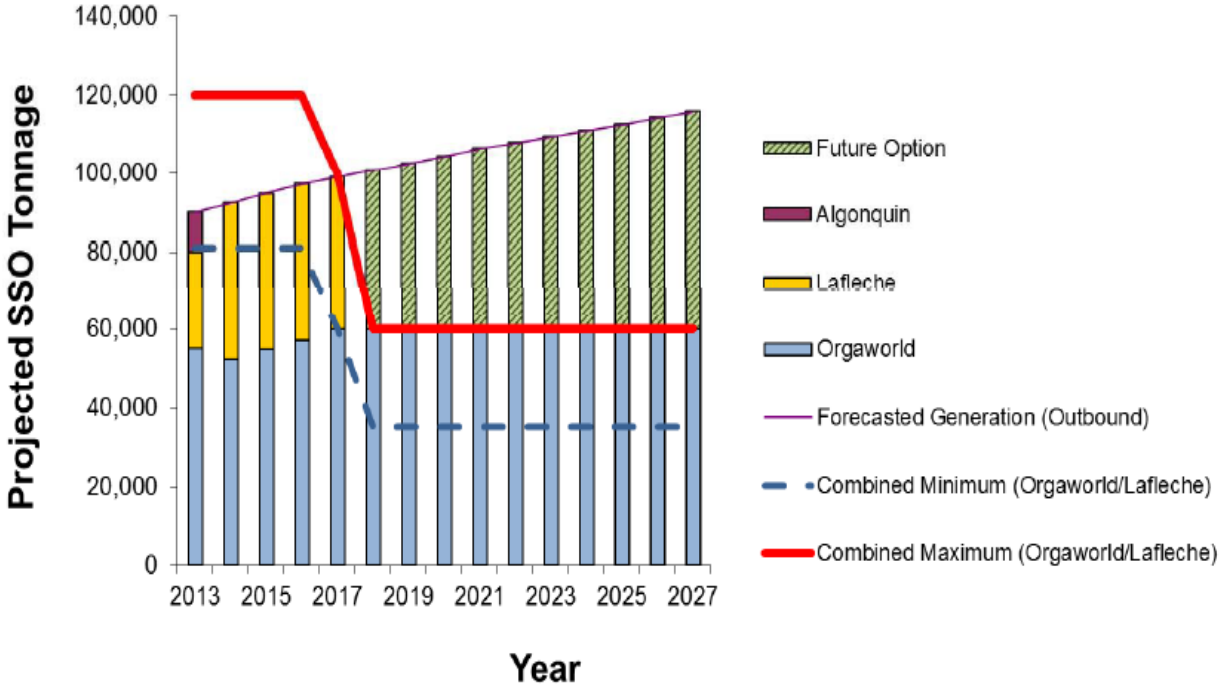
	Units	Totals	Breakdown by Technology			Breakdown by Ownership			Breakdown by Acceptable Feedstock	
			Aerobic Composting	Anaerobic Digestion	Other	Public	Private	Public/Private Partnership	Narrow SSO and Leaf & Yard	Broad SSO and Leaf & Yard
Organics processing facilities in operation	Number of facilities	15	14	1	0	6	9	0	11	4
Existing approved/constructed capacity of organics processing facilities in operation	input tonnes/year	651,500	626,500	25,000	0	189,000	462,500	0	424,000	227,500
Utilized capacity of organics processing facilities in operation	input tonnes/year	574,800	549,800	25,000	0	189,000	385,800	0	369,600	205,200
Remaining capacity of organics processing facilities in operation	input tonnes/year	76,700	76,700	0	0	0	76,700	0	54,400	22,300
Organics processing facilities planned/pending*	Number of facilities	6	4	2	0	3	3	0	Acceptable feedstock breakdown not known	
Anticipated capacity of planned/pending organics processing facilities*	input tonnes/year	190,000	105,000	85,000	0	100,000	90,000	0	Acceptable feedstock breakdown not known	
Existing organics processing facilities not in service	Number of facilities	1	0	1	0	0	1	0	0	1
Design capacity of existing organics processing facilities not in service	input tonnes/year	120,000	0	120,000	0	0	120,000	0	0	120,000

[1]Derived from information compiled in "*Source Separated Organic Waste Study – Part 1 Status of Source Separated Organics (SSO) Programs in Ontario*" dated June 2011, prepared for Halton Region by Stantec Consulting.

3.0 York's Current Processing Capacity

Establishment and growth of the Green Bin program has strongly influenced the Region's province-leading diversion achievements, however difficulties experienced by the Region's processing contractors negatively impacted the Region's organics diversion in recent years. These difficulties are not unique to the Region's situation and have been experienced in other similar jurisdictions. As a result, York Region has established short and medium-term source separated organics processing plans, but gaps remain to be addressed in the long term. Figure 4, taken from Report No. 1 of the York Environmental Services Committee February 21, 2013, shows the Region's future organics processing capacity and anticipated needs.

Figure 4–Future Source Separated Organics Processing Capacity and Needs[2]



The Region currently has contracts with two private composting facilities: Orgaworld Canada's (Orgaworld) facility in London, Ontario, and Lafleche Environmental's (Lafleche) facility in Moose Creek, Ontario.

The contract with Orgaworld includes capacity to process source separated organics in the range from 56,000 tonnes per year (i.e. minimum contracted delivery commitment) to a maximum of 80,000 tonnes per year until 2016. From 2016-2022, York Region's contracted capacity with Orgaworld ranges from a minimum of 35,000 tonnes per year to a maximum of

[2]York Region, Environmental Services Committee Regional Council Meeting. February 21, 2013

60,000 tonnes per year. York has an option to extend their contract with Orgaworld for a further five years to 2027).

At the time of this report, Orgaworld London has been operating at reduced capacity due to odour management challenges experienced at the facility and is only able to receive and process approximately 55,000 tonnes per year of source separated organics from York.

The Region's contract with Lafleche includes capacity to receive and process source separated organics in the range from 25,000 tonnes per year (i.e. minimum contracted delivery commitment) to a maximum of 40,000 tonnes per year until June 2016. The Region has the option to extend the term of its agreement by one year.

In the short term (i.e. through 2017), York Region's contracts with Orgaworld and Lafleche provide sufficient contracted capacity to process all of the Region's source separated organics. To the extent possible, all source separated organics collected should be composted by York Region's primary processors. Source separated organic waste will only be incinerated as a contingency option when composting options are not available.

4.0 Potential Triggers to Seek Additional/New Capacity

York Region's successful Green Bin Program relies on continuous access to sufficient, suitable processing for the source separated organics collected from residents.

Currently, the Region's primary contracts for processing source separated organics uses two private sector contractors, operating aerobic composting facilities located 200 to 450 kilometres outside of York Region. It is important to be aware that these haul distances are a reflection of the current status of the source separated organics processing market in Ontario. York Region's contracts with its primary processors provide a plan with contracted capacity to address the Region's near-term needs to 2017.

Given the challenges which have contributed to historical performance instability of some source separated organics processing operations in Ontario, it is prudent to establish contingencies as back-up to the primary plan. It is anticipated and preferred that all source separated organics collected by York Region be composted, however as concluded in Section 2.3, there is not sufficient source separated organics processing capacity available in Ontario to meet basic market demands, let alone provide flexibility to be able to respond to process upsets or unanticipated conditions.

Scope of the contingency plan required is dependent on an assessment of the reliability and risk associated with the primary plan. Given that the maximum capacity for primary processing arrangements to 2017 are distributed between two processors and exceed the Region's anticipated needs, contingency allocation of 25,000 tonnes/year at Algonquin Power is reasonable.

In the longer term, the Region does not currently have arrangements for sufficient capacity to meet its anticipated needs for processing of source separated organics after 2017. Given that

new processing capacity may be required to meet the Region's long-term needs, and the timeframe required for planning, regulatory approvals and development of waste management facilities, it is recommended that within the next year, the Region initiate steps to secure processing capacity to meet its long-term needs. It should be noted that while an Environmental Compliance Approval (ECA) from the Ontario Ministry of Environment is required for any new source separated organics processing facility, aerobic composting facilities for processing source separated organics at the scale anticipated to meet York Region's needs are exempt from the requirements of the Ontario Environmental Assessment Act (Ontario Regulation 107/07).

The following table summarizes the triggers described above, which are recommended to establish and maintain source separated organics processing capacity to support York Region's Green Bin Program:

Table 3 – Summary of triggers for processing capacity

Trigger	Time Frame for Processing Need	Action (timing)
Near-term		
Primary Processing Capacity	Present to 2017	No action currently required
Contingency Processing Capacity	Present to 2017	Renew or secure alternate disposal contracts as required when contract with Algonquin Power expires in 2014
Long-term		
Primary and Contingency Processing Capacity	2017 +	Complete strategy outlined in Section 6.0 (initiate in 2013)

5.0 Source Separated Organics Processing Options

The primary decision points in developing a source separated organics processing strategy include selection of preferred options with respect to:

- Processing technology
- Business model
- Location of facility

Considering the potential combinations among these factors, a wide range of options are available to the Region to meet the Region's long-term source separated organics processing needs. The following sub-sections provide an overview of the options available for each of the three primary decision points identified.

5.1 Technology Options

The following table profiles the primary characteristics of technologies that are currently available and commonly applied for processing of source separated organic wastes. This information is provided as an overview only. More comprehensive and detailed information regarding technology options would need to be considered as part of conducting the process described in Section 6. It is important to note that under the "Generally Accepted Principles" defined by Waste Diversion Ontario, only technology categories that produce compost (aerobic composting and anaerobic digestion) are considered diversion[3].

Table 4 - Overview of Source Separated Organics Processing Technologies

Technology Option	Status	Description	Commercial Readiness
Aerobic Composting	Proven and accepted in WDO's diversion calculation	Biological decomposition of organic materials in the presence of oxygen under controlled conditions producing carbon dioxide, water, some solid residues and impacted liquids, and compost (a nutrient rich, humus-like soil amendment)	Aerobic composting is widely used on a commercial scale basis for many types of organic wastes. This is the predominant technology category currently employed for processing source separated organic wastes in Ontario. An operating example of this technology would be the compost facility located at the Peel Integrated Waste Management Facility located in Brampton, Ontario.

[3] http://www.wdo.ca/files/5413/5886/9869/Background_information_for_2011_Residential_GAP_Diversion_Rate_Nov_16_2012.pdf

Technology Option	Status	Description	Commercial Readiness
Anaerobic Digestion	Proven and accepted in WDO's diversion calculation	Biological decomposition of organic materials in the absence of oxygen under controlled conditions producing biogas (mostly methane, water, and carbon dioxide), some solid residues and impacted liquids, and compost	Anaerobic digestion is widely used on a commercial-scale basis for many types of organic wastes, as well as wastewater treatment. Several commercial-scale applications of processing organic wastes using anaerobic digestion exist in North America. A number of small facilities in the U.S. operating on either mixed municipal solid waste, SSO, or in some cases co-digested with biosolids. There are examples of anaerobic digestion technology being applied to processing mixed municipal solid waste/source separated organics in the City of Toronto and Europe.
Waste-to-Fuel	Emerging and excluded from WDO's diversion calculation	Typically involves the use of a thermal conversion process to generate a syngas followed by use of a chemical catalytic process to convert syngas into fuel. Other outputs include residues and process liquids.	The component systems that comprise this technology are viable on a commercial scale on an individual basis using selected uniform feedstocks. However, the combination of these individual technologies in a single system using organic waste streams as a feedstock has not been demonstrated commercially.

Technology Option	Status	Description	Commercial Readiness
Hydrolysis	Emerging and excluded from WDO's diversion calculation	A chemical reaction in which the organic fraction of the waste is converted to glucose or other simple sugars that can then be fermented or digested to produce other products or chemicals (e.g. ethanol)	Technical understanding and process of chemical hydrolysis is well established for some selected uniform organic feedstocks, but application to municipal solid waste-derived organics has been limited and primarily focused on laboratory or pilot-scale research and technology development.
Pyrolysis	Emerging and excluded from WDO's diversion calculation	A thermochemical reaction in an oxygen-lean environment in which organic fraction of waste is converted to biofuel and "biochar,"a high-carbon content solid by-product with a number of commercial uses.	Technical understanding and process of pyrolysis is well established for selected uniform organic feedstocks, but application to municipal solid waste-derived organics has been limited and primarily focused on laboratory or pilot-scale research and technology development.

Technology Option	Status	Description	Commercial Readiness
Thermal Treatment	Proven and excluded from WDO's diversion calculation	Processing waste using elevated temperatures. Combustion processes incinerate the waste to generate energy from heat recovery. Gasification processes produce a syngas from the waste and result in creation of solid residues. The syngas can be used to generate energy.	Waste combustion is a well-established technology for converting waste products into energy. Projects of various sizes are currently operating in North America and throughout the world. However not typically used to manage a source separated organics stream as it only generates energy and the residual product has little to no value when compared to other organics processing technologies. Gasification is well established for some selected uniform feedstocks, but has only been applied to municipal solid waste-derived organics on a conceptual basis, or limited to laboratory-or-pilot-scale.

Section 6.0 describes the strategy recommended to evaluate and select a preferred approach for long-term processing of source separated organics from available options, including consideration of various technology options.

5.2 Business Model Options

A number of business models are available for the Region to secure organic waste processing capacity. Key distinctions between the different approaches relate primarily to ownership and roles and responsibilities for project development and service delivery.

At their most fundamental level, decisions on these matters are basically choices regarding the degree of control required and preferences with respect to allocation and/or assumption of risk. Successful implementation relies on delegation of responsibilities and allocation of risk to the party or parties best suited to fulfil those responsibilities and manage the risk exposures to achieve the desired outcomes.

5.2.1 Ownership

In terms of ownership, options that are available that span the range of:

- Fully private ownership

- Public/private partnership
- Fully public ownership

Ownership relates directly to the degree of control a party is able to exert. There is risk exposure associated with any undertaking. It is important to be aware that while a limited ownership role can constrain the Region's ability to exert control, it does not necessarily prevent exposure to some risk. As the provider of waste management services to the public, regardless of the ownership option selected,the Region will retain responsibility for funding the services it purchases, ensuring continuity of service during disruptions, management of the overall program (i.e. monitoring and control), co-ordination with other waste system operations, and management of public perceptions regarding delivery of the service.

When establishing a business model for delivery of source separated organics processing, the Region must consider who will own the following assets:

- Site
- Facility (i.e. buildings, equipment, supporting infrastructure, utilities etc.)
- Outputs (i.e. products, and revenues)

Business and contractual arrangements may be made to accommodate various ownership relationships relating to these elements.

The site owner has primary control over the access and use of its property. Site ownership represents investment of financial resources in a project and dependent on the project-specific allocation of risk and division of responsibilities, will also include some degree of involvement in obtaining the necessary site-specific regulatory approvals for development of the project. Ownership of the site also carries with it other rights, liabilities and legal implications, the consideration of which are beyond the scope of this strategy, but which should be carefully evaluated when deciding on the preferred business model.

Ownership of the facility represents a substantial financial investment and provides the facility owner with authority for the design, operation and maintenance of the facility as a business asset. Facility ownership typically carries with it control of critical business decisions and functions such as defining the design capacity for the facility, marketing of processing services (including potentially merchant capacity) and realizing revenue from sale of outputs. Dependent on the development and service delivery model selected, an owner may choose to delegate or contract out various activities associated with design, financing, construction, operation and maintenance of the facility.

Defining ownership of the outputs is an important aspect of business management and risk allocation, particularly related to the linkages between design, construction, processing performance, marketing of outputs and control of revenue.

In the context of its current waste management system assets, the Region has taken a hybrid approach. While the Region owns a large portion of the "front-end" waste collection and transfer infrastructure, much of the "back-end" processing and disposal infrastructure is owned

by private sector parties. This ownership mix carries its own strengths and risks in terms of management, control and flexibility for overall delivery of waste management services.

5.2.2 Project Development and Service Delivery

Similar to ownership, the options for project development and service delivery cover a broad spectrum of public sector and private sector participation, with a variety of potential structures available to define the relationships and responsibilities. The development and service delivery models available include:

- Traditional Design Bid Build
- Engineering, Procurement & Construction
- Design Build
- Design, Build, Operate & Maintain

Variations on these typical models also exist to allow the owner to delegate financing of the project and in some cases to defer taking ownership of the project until a pre-defined date or milestone event. These variations are referred to as:

- Design Finance Build Operate
- Design, Finance, Build, Own, Operate
- Design, Finance, Build, Own, Operate & Transfer

A key aspect to consider in selecting a project development and service delivery approach is the typical assignment of roles and responsibilities within the industry. It is important to consider the degree to which potential participants are familiar with, able and willing to shoulder their roles and responsibilities.

The current arrangements that York Region has with its source separated organics processors can be characterized as a public customer – private sector service provider relationship. York Region does not currently have any equity or ownership role in an SSO facility.

To structure the project development and service delivery program, options for assignment/delegation of responsibilities and preferences for allocation of risk should be carefully evaluated for the roles and activities required including the following (as a minimum):

Table 3 - Project Development and Service Delivery Program Considerations

Consideration	Requirements
Siting:	Site selection Zoning and site plan approvals
Funding:	Land acquisition Construction financing Operation and maintenance costs

Consideration	Requirements
	Preservation of asset value Control and management of revenue
Project communications:	Stakeholder consultations Public and political relations
Engineering:	Pre-engineering investigations Regulatory approvals Infrastructure, utilities, site preparation Facilities and equipment Environmental mitigations Design drawings and specifications Operating plans
Procurement:	Requests for Expressions of Interest (i.e. market intelligence) Pre-qualifications Tendering/proposal processes Preparation and execution of contracts Negotiations and contract renewals
Construction:	Contract administration Health and safety Quality management Earthworks and roadways Structures Equipment Electrical Finishes
Service delivery:	Secure and manage inputs Personnel management Staff health and safety Facility operations Liaison with regulatory agencies and public stakeholders Marketing of outputs to realize revenue Financial management and reporting requirements Preventive maintenance and repairs
Closeout:	Facility decommissioning and recovery of remaining asset value

Once an approach is chosen, the delegated roles and responsibilities can then be defined in the various contract agreements necessary to bring all the pieces of the project together.

5.2.3 Summary of Business Models

Roles, responsibilities, control, risk and reward profiles are all defined by the choices made regarding ownership, project development and service delivery.

An advantage of a public entity having a leading role in implementation of long-term operating infrastructure is the degree of control that can be exerted. Public ownership is generally more transparent, accountable and motivated to take actions in response to dynamic conditions. Public organizations also typically have the ability to finance capital investments at lower borrowing costs. These advantages carry increased risk exposure for the public entity.

A private sector contractor/service provider in a leadership role can provide more flexibility. Private entities typically have streamlined bureaucracy, which can facilitate responsiveness if motivated. Private organizations can also offer performance guarantees and supporting securities. It is important to note that these guarantees are built into risk models, which may drive up costs of service provision, particularly in the absence of a competitive market.

It is also important to be aware that regardless of involvement by a private sector entity, risk exposure related to public perception of the overall operation of the organics diversion program will remain focused on the municipality as the primary contact for service delivery to the public.

Choices regarding ownership and implementation models must not only take into consideration the preferences of the Region, but also a realistic view of the options that would be available and supported in the market place.

Section 6.0 describes the strategy recommended to evaluate and select a preferred approach for long-term processing of source separated organics from the available options, including consideration of alternative business models.

5.3 Location Options

The location of source separated processing facilities is a critical decision that can substantially influence the long-term sustainability of the program in terms of environmental impact, economic and community perception. Technology and business model preferences can also be inter-related with and influenced by location options. It is important that all factors be taken into account when making a decision on the location of a facility.

At the time of this report, York Region staff continue to work on technology options suitable for the site identified in Dufferin County.

Should an alternative site be required in the future, the following location categories are defined for the purpose of evaluating options:

- **Regional** - within York Region
- **Neighbouring**- Outside of York Region but within two hours driving distance (including potential Dufferin County Site)
- **Remote** - Outside of a two hour driving distance but within Ontario

- **Export** - Outside of Ontario

6.0 Preliminary Long-Term Options Evaluation Strategy

The following provides a recommended evaluation strategy that should be applied to secure long-term source separated organics processing capacity by 2017. This preliminary process has been developed to narrow the list of options defined above by developing answers to some key questions which include:

- Is it consistent with the SM4RT Living Vision and Guiding Principles?
- Is the model affordable and does it provide good value to the Region?
- Is it reliable to process the Region's SSO?
- Will it be able to process tonnage from outside of the Region to provide revenue?
- Will implementation be met with public opposition?
- Will it operate reliably for the long-term (i.e. 25 years, or should some other time frame be defined)?
- Is the implementation schedule acceptable?
- Will it meet current and future environmental regulatory requirements?
- Is it protective of the environment and does it promote environmental sustainability?
- Does it complement and enhance existing waste diversion and resource recovery efforts?

The recommended evaluation process focuses on making choices regarding the three primary decision topics of:

- Processing technology
- Business model
- Facility location

The following sub-sections describe a step-by-step approach to allow the Region to evaluate and make informed choices from the available options to define its long-term source separated organics processing strategy.

It is important to note that there are different methods (qualitative or quantitative or a combination of both) that can be used to evaluate the potential location, technology, and business model options. In undertaking this type of evaluation, there is no requirement to apply any specific methodology in its entirety. The proposed methodology and approach used in the proposed evaluations in Section 6.1-6.3 is commonly applied and consistent with the more exhaustive and stringent systems analysis requirements undertaken to address the approval requirements of the Ontario Environmental Assessment Act and the Individual Environmental Assessment process.

6.1 Technology Evaluation

The following steps provide a preliminary pathway to evaluate organics processing technology options.

STEP 1 **Establish and Assess Long-Term Source Separated Organics Processing Requirements**

The first key element in securing a long-term source separated organics processing option is to understand what the quantity and composition of the materials to be processed will be over the planning term. This step has been completed as part of the master planning process, however, these projections will need to be updated once the formal evaluation process has been initiated to ensure the most accurate and up-to-date information is being used. For example, increased capture of materials in the curbside residential collection program may result in a need to increase organics tonnage projections. This step should also include identification of needs for contingency processing capacity.

STEP 2 **Establish the Methodology and Criteria to Evaluate Source Separated Organics Processing Technology Options**

A critical aspect of the evaluation is establishing the methodology upon which the selection process will proceed. It is important that the proposed criteria to be used in the evaluation process are robust, effective and capture all key relevant factors and principles of the Region and local municipalities.

STEP 3 **Establish the List of Available Source Separated Organics Processing Technologies**

Section 5.1of this report provides an overview of the current technologies available to process source separated organics. However, the options identified represent the current list which may need to be expanded/refined depending on timing of the evaluation.

STEP 4 **Screen to Identify Established and Emerging Technology and Develop Potential source separated organics processing Technology Options**

Using screening criteria (to be developed in Step 2), the lists of source separated organics processing technologies available and viable for the Region should be identified. The following provides a preliminary list of screening criteria for consideration:

a) **Commercial Readiness.** The degree to which the technology and the proposed components have been demonstrated on source separated organics, including status of reference or demonstration facilities (i.e., where else is this being done for a similar application?)

b) **Applicability to Subject Waste Stream.** The degree to which the proposed technology is suitable for the Region's source separated organics

c) **Compatibility with Existing Waste Diversion Efforts.** The degree to which the proposed technology does not compete with and can potentially enhance existing waste diversion programs in place in the Region

d) **Consistency with Regional Planning Principles.** The degree to which the technology satisfies the Vision and Guiding Principles established in this Master Planning process

e) **Stability of Operation.** The ability of the technology to process the Region's source separated organics waste stream without the risk of service interruptions or lowered capacity

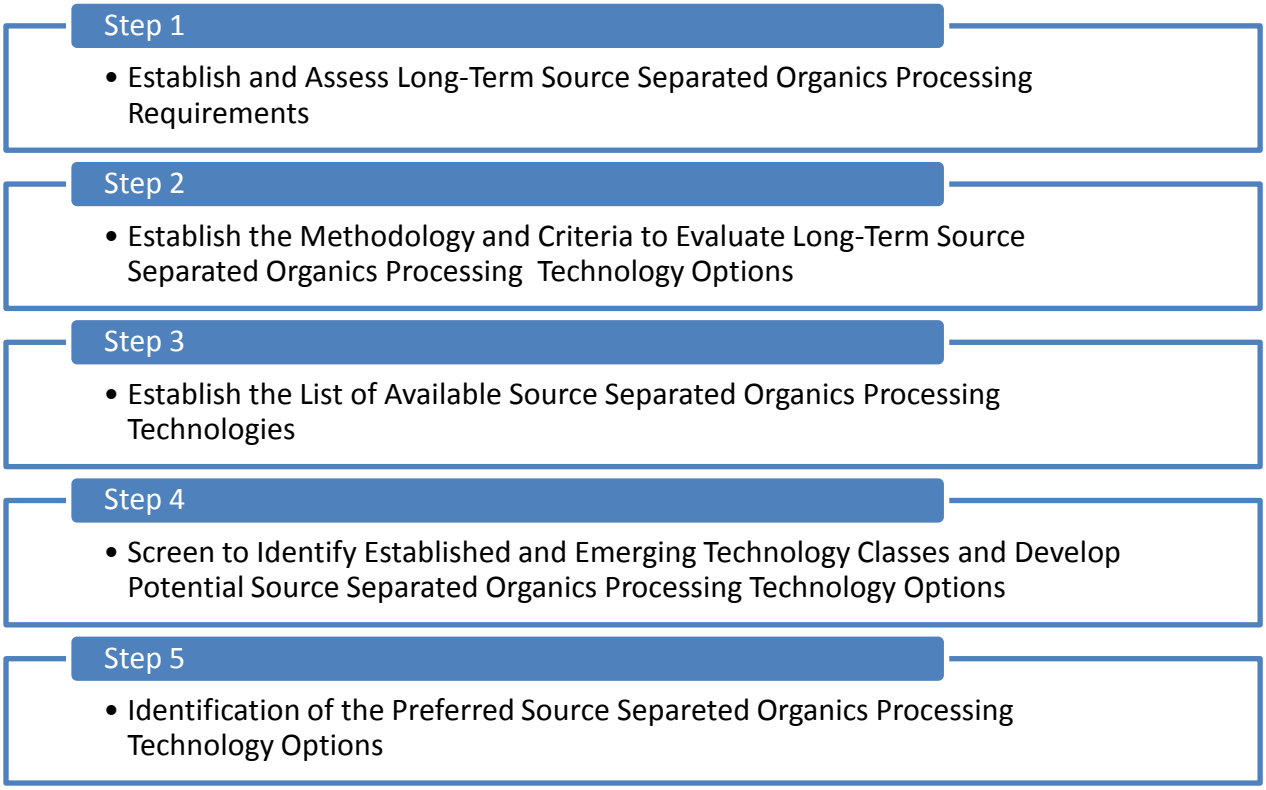
f) **Approvability.** The potential ability of the technology to be able to meet all regulatory requirements in Ontario

STEP 5 Identification of the Preferred source separated organics processing Technology Options

Once a list of organics processing technology options is identified, a more detailed evaluation should be completed, taking into account the lifecycle impacts of the options, including: technical, environmental, social, economic/financial and legal requirements. There is an opportunity at this step to also use the decision-making framework, developed as part of this Master Plan, as a component of this evaluation. The preferred and secondary technology options are identified in this step for consideration in the overall evaluation process

The following flow chart summarizes the steps in the technology evaluation process.

Figure 5- Preliminary SSO Technology Options Evaluation Process



6.2 Business Model Evaluation

The following steps provide a preliminary pathway to evaluate business model options.

STEP 1 **Identify and Define available Business Model Options**

The first key element in evaluating options is to better understand the business models available to secure source separated organics processing. One model that should be included in the evaluation is continuation of the Region's current practice as a customer to private sector service providers with no Regional ownership of source separated organics processing capacity. Alternative models that should also be explored further and considered in the evaluation are described in Section 5.2 of this report.

STEP 2 **Establish the Methodology and Criteria to Evaluate Business Model Options**

A critical aspect of the business model evaluation is establishing the methodology upon which the selection process will proceed.Proposed criteria to be used in the evaluation process should be robust, effective and capture all key relevant factors and principles of the Region and its local municipalities. Criteria should focus on evaluating the implications of ownership, project development and service delivery options. The following

provides a preliminary list of evaluation criteria:

a) **Performance and Service Delivery Risk** - Risks to successful development and delivery of services and the degree to which the Region is exposed to or can mitigate these risks

b) **Financial Risk** - Degree to which the Region is exposed to or can mitigate these risks

c) **Controls** - Degree of control over development, design, operations, maintenance and administration required by the Region to effectively manage risks

d) **Net Life Cycle Costs** - Quantification of capital, operation, maintenance and administrative costs as well as revenue streams and assessment of financial profile distinctions between business models

e) **Resources, Roles and Responsibilities** - Definition of the resources required to implement, provide service delivery. Should includes assessment of appropriate roles and responsibilities for the parties involved

f) **Administrative and Legal -** Identification of any corporate or Council mandated strategic goals/preferences and/or legal constraints associated with the Region's potential participation in different business models, as well as anticipation of primary contractual requirements

g) **Schedule** - Time necessary to properly implement the business model to secure a fully operating organics processing option

h) **Additional Criteria** - Identification of additional criteria related to evaluation of business models that reflect the priorities and objectives of the Region and its local municipalities

STEP 3 Evaluation of Business Model Options

Using the criteria developed in Step 2, evaluate the business model options identified in Step 1 in terms of the degree to which each criteria is most favourable to the Region's objectives for long-term source separated organics processing.

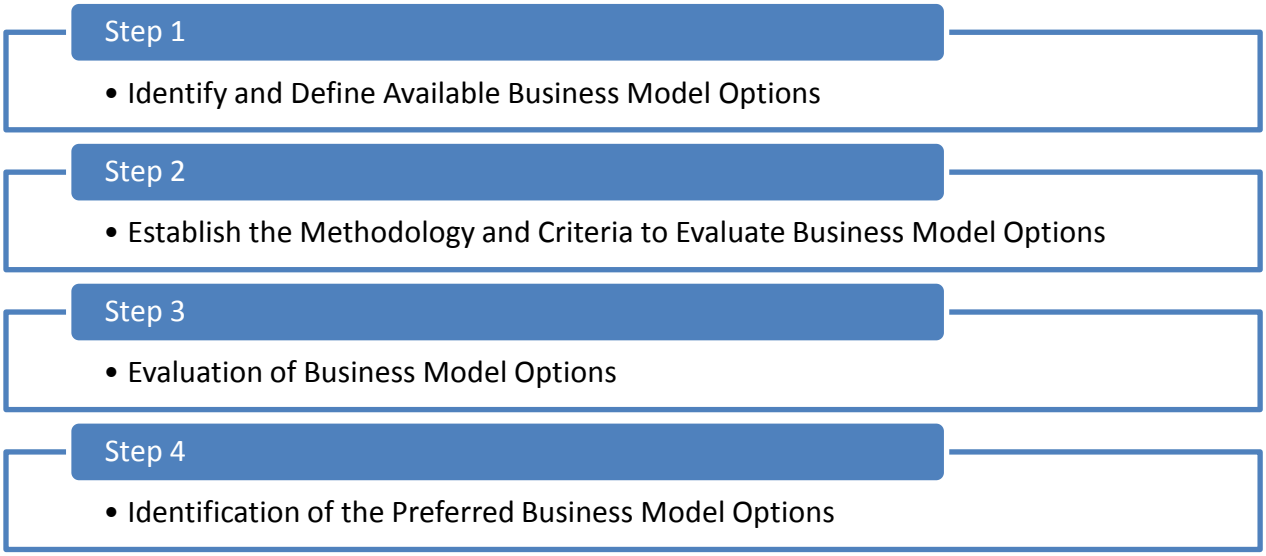
STEP 4 Identification of the Preferred Business Model Options

Once a list of organics processing business model options is identified and a more detailed evaluation is completed, identification of the preferred business model options can be completed. There is an opportunity at this

step to also use the decision-making framework, developed as part of this Master Plan, as a component of this evaluation. The preferred and secondary business model options are identified in this step for consideration in the overall evaluation process

The following flow chart summarizes the steps in the business model evaluation process.

Figure 6- Preliminary Business Model Options Evaluation Process



6.3 Location Evaluation

The following steps provide a preliminary pathway to evaluate organics processing facility locations should a site location other than the Dufferin site be required.

STEP 1 **Establish General Location Boundaries**

The first key element in evaluation facility locations is to establish categories for evaluation of location options. A preliminary overview of this step is presented in Section 5.3 of this report. Defining general locations in this manner will allow for evaluation of key distinctions in terms of environmental, economic and community/social impacts.

STEP 2 **Establish the Methodology and Criteria to Evaluate Location Options**

A critical aspect of the evaluation is establishing the methodology upon which the location evaluation process will proceed. It is important that the proposed criteria to be used in the location evaluation process are robust, effective and capture all key relevant factors and principles of the Region and local municipalities. Evaluation criteria should take into account the life cycle impacts of location options. The following provides a preliminary list of evaluation criteria:

a) **Traffic Impact** - Impact hauling material to the proposed location may

have on existing traffic patterns on a local, regional, and provincial level

b) **Emission Impacts** - Degree to which the proposed technology does not compete with and can potentially enhance existing waste diversion programs in place in the Region

c) **Public Perception** - The potential for public opposition due to a number of factors, including desire to not have a waste processing facility in the Region or opposition to longer haul distances

d) **Flexibility to Choose Alternatives Locations** - The amount of potential viable locations within each area

e) **Approvability** - Types of permits, official plan and zoning amendments, etc. required

f) **Proximity** - Proximity of proposed facility to sensitive land uses.

STEP 3 **Evaluation of location options**

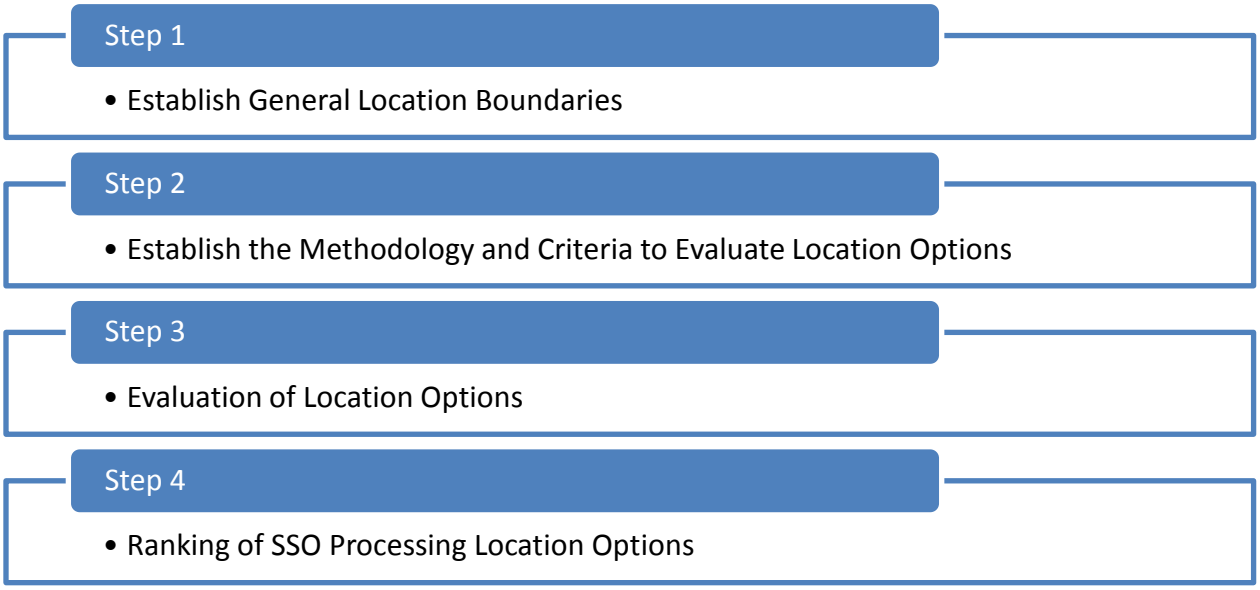
Using the criteria developed in Step 2; evaluate the location options defined in Step 1.

STEP 4 **Rank the source separated organics processing Location Options**

Once the location options are defined and a more detailed evaluation is completed, identification of preferences among the location options can be undertaken. Recognizing that there may be limitations on the range of locations that are available, it is appropriate to incorporate flexibility in the evaluation. It is recommended that the range of location options be ranked in order of preference, with the recognition that compromises may be necessary. There is an opportunity at this step to also use the decision-making framework, developed as part of this Master Plan, as a component of this evaluation.

The following flow chart summarizes the steps in the location evaluation process.

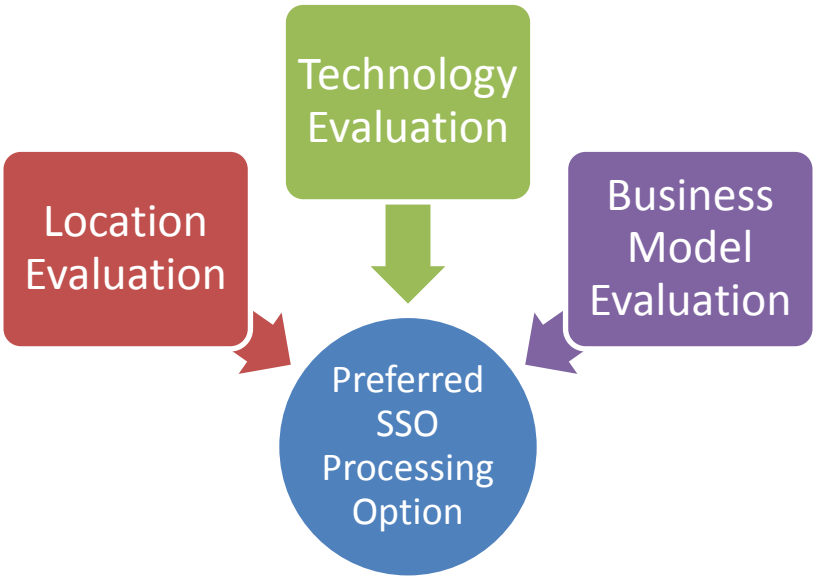
Figure 7- Preliminary SSO Location Options Evaluation Process



6.4 Compilation of Options

The preceding three evaluations can be conducted in parallel or in a linear manner, to suit the Region's schedule objectives. Following completion of the evaluations, the preferred options for technology, business model and location can be combined as shown graphically in Figure 8.

Figure 8- Compilation of Evaluated Options



Interactions and relationships between the preferred technology, business model and location options should be carefully explored and a long-term source separated organics processing implementation plan should then be developed detailing the actions, resources, timelines and outcomes necessary to meet the Region's objectives.

7.0 Implementation

7.1.1 Resources

As a minimum baseline, staffing resources and budgets allocated to the source separated organics management program should keep pace with future growth projections to maintain the success of this important diversion program. At the appropriate time when significant program changes are required to be contemplated, such changes should include corresponding adjustments to staffing and budgets necessary to support the program.

7.1.2 Preliminary Timeline for Implementation

Based on the Region's current contracts, a long-term source separated organics processing option should be fully implemented by 2017. In order to accomplish this, the planning phase, which is already underway, should continue through 2014 and the implementation phase should start as soon as possible and no later than 2015 to achieve the anticipated implementation date.

7.1.3 Targets

The targets for source separated organics processing will need to be established through the detailed options evaluation to be completed at the appropriate time. At a minimum, to maintain consistency with the overall Vision and Guiding Principles of the Master Plan, the proposed targets should include:

- Resource conservation goals through the ability to recover materials, and if possible energy
- Local economic growth opportunities
- A prescribed process for engagement, consultation and support of the community
- Specific performance measures that incorporate all other aspects of the integrated waste management system
- Flexibility to adapt to changes in waste streams and new programs and initiatives recommended elsewhere in the master plan
- A recognition and priority placed on the waste management hierarchy

7.1.4 Performance Evaluation

There are two primary metrics to measure performance of this particular strategy:

- Identification of a preferred long term source separated organics processing option
- Successful implementation of the preferred option

The overall source separated organics processing system should also be measured by:

- Cost/tonne
- GHG reduction when compared to landfill only alternative
- Financial and process Risk
- Quality of product produced
- Marketability of product produced
- Contribution to overall diversion

8.0 Key Benefits of this Strategy

The source separated organics processing strategy presented herein provides the following key benefits:

- Consolidates and documents relevant background information pertaining to source separated organics diversion in York Region and Ontario to support and inform subsequent analysis and decision-making
- Identifies the need for extension of the separated organics processing contingency to span the entire near-term period to 2017 and recommends an approach for consideration
- Identifies the need to secure long-term source separated organics processing
- Explores the dimensions of key decision topics associated with defining a long term source separated organics processing strategy, including technology selection, business models and facility location
- Identifies the process steps, timelines and resources needed for the Region to proceed to evaluate the options and develop an implementation plan to secure organics processing capacity to continue the Region's Province-leading organics diversion program