

Technical Memo 8

Better Practices

Niagara Region // December, 2023



Executive Summary

This technical memorandum summarizes proven waste diversion policies, programs, processes and practices in place or would be feasible for implementation in Niagara Region's waste management operation and congruent with its strategic direction including development of a circular economy. The information contained in this memo is intended to inform the development of Niagara Region's upcoming Waste Management Strategic Plan and broader decision making by Niagara Region's Waste Management Services Division.

Key Take Aways

Best practices in waste management continue to evolve in response to changes in the types of waste generated, emerging technologies and changing community priorities. Niagara Region has been a leader in adopting proven better practices as opportunities present themselves. Development of Niagara Region's new Waste Management Strategic Plan creates an opportunity to consider additional changes to ensure its waste management system continues to meet its long term needs. Some of the proposed actions warrant immediate consideration. Others may be worth considering at some point in the future when circumstances warrant change and/or the associated technology becomes commercially available and economically feasible. The proposed actions are sorted accordingly:

Short Term (1-5 Years):

- Consideration to review options to providing recycling services to local businesses starting January 1, 2026;
- Consideration of establishing a cost recovery fee structure for services provided to businesses;
- Prepare to ban organics from landfill;
- Expanded support for local non-municipal waste diversion services;
- Support municipal advocacy work to encourage producers to provide improved accessibility to services;¹
- Development of a policy for management of excess soils and consideration of obtaining additional soil disposal capacity;
- Expanded support for diversion of construction and demolition waste; and

¹ "Producers" refers informally to companies that are obligated by regulation to operate or participate in recovery and recycling programs for designated materials.

- Review curbside waste composition and set outs in 2025 to assess the need to amend current services.

Mid Term (6-9 Years):

- Review planning approval requirements for collection services for new multi-residential and downtown core developments;
- Explore options for expanded drop off services in downtown cores;
- Consider automated cart based collection at start of new collection contract;
- Give preference during the next collection contract procurement process for electric or alternative fuel vehicles;
- Review Waste Management Services Division procurement opportunities to support circular economy and climate change goals;
- Monitor curbside set out for potential additional program changes;
- Ban divertible construction and demolition waste;
- Implement an excess soils management policy; and
- Phase out involvement in collection of materials that are part of producer responsibility programs unless full cost recovery is possible.²

Long Term (10+ Years*):

- Research feasibility of mixed waste processing; and
- Research feasibility of alternative disposal options

* Note that these activities could begin sooner

In addition to these specific options, ongoing consideration of public/private partnerships should continue, where applicable, to amplify Niagara Region's waste diversion efforts.

² Producer responsibility programs refer to programs operated by producers to fulfil their obligations to recover and recycle designated wastes they are responsible for under regulation.

Disclaimer

This report has been prepared for the exclusive use and benefit of the Regional Municipality of Niagara (Niagara Region) to inform decision making related to the particulars discussed herein. It is not intended to be, and should not be, used by any other person or entity other than Niagara Region. Any use of this report, or any reliance on it or decisions made based on it, by any person or entity other than Niagara Region are the responsibilities of such person or entity. Birett and Associates assumes no responsibility or liability for losses incurred by Niagara Region or any other party as a result of the circulation, publication, reproduction or use of this report contrary to the provisions of this Disclaimer.

In preparing this report, Birett and Associates has relied upon information and material provided by Niagara Region and other parties. Birett and Associates has not audited any of the information or material nor independently verified that is accurate, reliable, complete, or current. While all reasonable care consistent with that exercised by members of the environmental profession has been taken in the preparation of this report, its content and conclusions are, in part, based on estimations and forecasts about future conditions that are subject to changes in the underlying macroeconomic factors, legislative changes and other events. Consequently, Birett and Associates makes no representations or warranties as to the accuracy, reasonableness or completeness of the information or conclusions set forth in this report.

List of Acronyms

C&D: Construction and Demolition

GHG: Greenhouse Gas

NGOs: Non-governmental Organizations

PPP: Public Private Partnerships

RDF: Refuse Derived Fuel

RFID: Radio Frequency Identification Detection

RNG: Renewable Natural Gas

Table of Contents

Executive Summary	i
Key Take Aways	i
Disclaimer	iii
List of Acronyms	iv
Table of Contents	v
1 Introduction.....	1
2 Practices That Support Convenience	1
2.1 Garbage Set Out Alternatives	2
2.2 Yellow Bag Programs	2
2.3 Municipal Public Drop Offs.....	3
2.4 Alternative Collection Options.....	3
2.5 Special Considerations	4
3 Practices That Foster Behavioural Change.....	4
4 Waste Diversion Initiatives	5
5 New Technologies.....	7
6 Services for Local Business	8
7 Accessibility Provisions	8
8 Service Delivery Models	9
9 Climate Change and Sustainability.....	10
10 Resource Conservation	11
11 Conclusions.....	11

1 Introduction

The field of waste management has evolved significantly since the institutionalization of curbside recycling collection programs in the 1980's. Since then, a number of better practices have been identified that aid in encouraging waste diversion efforts and/or optimize costs. New initiatives are also underway which will further refine better practices for reducing Greenhouse Gas (GHG) emissions and respond to other important social issues such as sustainability and development of a circular economy.

Niagara Region currently employs many of the known better practices in the industry. The following sections examine new and emerging practices that may warrant consideration by Niagara Region for future adoption. They focus around several themes including:

- Enhanced diversion of major waste streams for which there is no producer responsibility program;
- Potential phase out of involvement in management of waste for which there are producer responsibility programs;
- Opportunities to improve convenience and program accessibility;
- Optimizing curbside collection services to minimize climate change impacts; and
- Improving support in the development of a circular economy.

2 Practices That Support Convenience

Municipalities have established a number of better practices that support the provision of convenient and effective waste management. They include:

- Weekly collection of recyclable and compostable waste to encourage full participation in curbside waste diversion programs;
- Ensuring residents have sufficient collection container capacity to fully participate in curbside waste diversion programs;
- Provision of public drop off depots to accommodate excess quantities of waste and other materials;
- Providing exemptions to garbage set out limits to accommodate special needs;
- Supporting alternative collection options for reusable and producer managed materials;

- Provision of timely communications designed to accommodate local demographics; and
- Alignment of programs to accommodate quantities and types of wastes generated in different settings like leash-free dog parks, business improvement areas, etc.

Niagara Region currently operates a robust integrated waste management system which has incorporated all of these better practices at levels that meet or exceed those of its peers as further described in Technical Memo 4 - Comparative Scan of Peer Municipal Better Practices. While Niagara Region's current waste management system is optimized to meet existing needs, there are a number of trends and opportunities designed to improve convenience levels that may warrant future consideration.

2.1 Garbage Set Out Alternatives

The use of set out limits for garbage has long since been recognized as a better practice to encourage participation in waste diversion programs. However, it is recognized that residents occasionally encounter situations where they generate excess quantities of waste that might exceed their municipality's waste set out limits. Consequently, higher performing municipalities provide their residents with options such as diaper and medical waste exemptions, amnesty days (i.e., periodic exemptions to the bag limit after holiday events) or a limited number of bag tags allowing them to set out overflow quantities at the curb or obtain free disposal at the local landfill. Niagara Region currently allows residents to purchase bag tags and set out excess quantities for collection at the curb. These approaches all seek to balance resident convenience with waste diversion goals. In contrast to these trends, the City of Markham adopted a policy allowing residents to set out unlimited amounts of waste provided it is in clear plastic bags to ensure there is no divertible waste present. This approach requires additional monitoring at the curb and its efficacy is currently unknown. If successful, it is a unique way of overcoming set out issues. Consideration should be given to consulting with the public to determine which will best meet Niagara Region's long term needs. It should be noted that clear bag collection has limited utility if Niagara Region pursues automated cart based collection as recommended in Section 5 - New Technologies.

2.2 Yellow Bag Programs

In July of 2023, transition of Ontario's residential Blue Box program to the new producer responsibility program was initiated. In light of this change, municipalities that offer curbside recycling and waste management services to local businesses are examining ways to effectively separate residential and commercial set outs at the curb. Several are considering requiring commercial waste be set out in distinctive yellow bags for ease of

identification. The use of colour coded bags not only simplifies collection but also allows municipalities to establish cost recovery programs for garbage and recycling services offered to local businesses. Examination of this, or similar approaches, may be warranted if Niagara Region opts to continue providing recycling collection services to local businesses after its residential Blue Box program transitions.

2.3 Municipal Public Drop Offs

Public drop off depots have been an important part of municipal integrated waste management systems for over 30 years. While less convenient than curbside services, they provide residents with an effective outlet to dispose of, and divert, excess quantities of waste that might typically be collected curbside (e.g., yard waste). They are usually located at municipal landfills and transfer stations to facilitate convenient one stop shopping and effectively separate small vehicle traffic from commercial traffic and heavy equipment at these sites.

Niagara Region has three public drop off depots and one private site under contract to Niagara Region that accept a broad range of waste such as garbage, reusable, recyclable, and household special wastes. Continued operation of these sites should be considered to ensure residents and local businesses have an option for the management of overflow quantities of waste that are not part of established producer responsibility programs.

2.4 Alternative Collection Options

Producer operated diversion programs currently rely heavily on municipal collection infrastructure to manage their designated materials. As producer responsibility programs evolve, it is expected that they will increasingly rely on alternative systems such as return to retail and private collection drop offs (e.g., collection of tires at local automotive garages). This trend will be accelerated if Ontario pursues expansion of its deposit return legislation to include non-alcoholic beverage containers.

Development of these alternative collection systems will ultimately provide residents with additional and convenient options through which to divert their waste without impacting the municipal tax base. Niagara Region actively promotes producer operated collection options that are available within the region. Promotion of these private initiatives should continue along with support for municipal advocacy efforts to encourage producers to improve accessibility to their programs and reduce reliance on municipal infrastructure.

2.5 Special Considerations

Increasingly, there is a trend towards standardization of curbside collection programs across Ontario as a cost savings and to improve service consistency across the province. Despite this trend, there is a recognition that the growing diversity of the population may occasionally result in a need to provide additional support for special needs groups. Niagara Region already provides additional support to groups such as those generating excess quantities of diapers, incontinence products and medical waste. Periodic monitoring of service needs should be undertaken to ensure that Niagara Region's service continues to effectively identify and support changes in community demographics over time.

3 Practices That Foster Behavioural Change

There are several underlying and proven principles that achieve effective behavioural change. Operationally, the most significant set of practices that encourage waste diversion have been policies that limit waste collection frequency and quantities, as noted in Section 2 - Practices That Support Convenience. It should be noted that these changes must be supported by comprehensive promotion and educational campaigns to optimize the chances of public acceptance.

Preferential collection of materials intended for diversion, as described in Section 2 - Practices That Support Convenience, is considered to be a better practice. Weekly curbside collection of key waste streams such as Blue Box recyclables, Green Bin organics and yard waste (collected seasonally) has been shown to maximize diversion rates. In contrast, every other week collection of garbage has been proven to be one of the most effective factors in achieving high levels of waste diversion program participation.

Garbage set out limits are also known to be an important means of encouraging residents to participate in available diversion programs. Bag limit standards vary with population demographics but at present the consensus position amongst higher performing municipalities, and viewed as the better practice, is a limit of one bag per household per week and preferably two bags every other week.

As outlined more fully in Technical Memo 3 – Demographic Trends, younger generations are technologically savvy. They are expected to continue applying pressure on governments to provide convenient and interactive electronic access to program information and to be able to access programs through a variety of media platforms. Consequently, large major municipalities (e.g., greater than 100,000 households) continue to invest in the expansion of their customer service and communications

systems. These activities range from providing interactive cell phone applications through to pushing notices and information to subscribers by text and email. It should be noted that Niagara Region already maintains an extensive multimedia communications program in support of its waste diversion programs. The current program encompasses industry established better practices to ensure effective public awareness of its programs.

Provision of sufficient funds is a key underlying requirement of effective communications programs to ensure residents are continuously engaged. Currently, funding levels of over \$2.50 per household in the first year of new program implementation are considered a better practice to properly support major behavioural change campaigns with many communities spending as much as \$3 per household. Most larger municipalities in Ontario budget funding levels of \$1.50 to \$2 per household to maintain awareness in subsequent years.

Ongoing review of future developments in social media trends should be considered to ensure effective communications with residents and local business is maintained as community demographics change.

More importantly, if Niagara Region is to be successful in advancing its waste diversion and circular economy goals, it may wish to consider expanding its efforts to support and develop local non municipal waste diversion options as is being done by some of its peers. In particular, development of closer relationships with food banks and promotion of food loss prevention is expected to be a priority activity for municipalities across Ontario in the coming years.

Effective by-law enforcement has also been cited by a number of municipalities as an important component of their efforts to foster desired behaviours from residents. By-law enforcement and, more importantly, program compliance staff can serve to educate and reinforce curbside policies and are an integral part of programs involving bag limits and clear bag policies. Municipalities undertaking major new initiatives, such as a change to automated cart based service, have recognized the importance of having teams of compliance staff available to visit residents and resolve customer service and compliance issues. Again, provision of sufficient budget over multiple years for such activities is necessary to ensure ongoing compliance and public support.

4 Waste Diversion Initiatives

As curbside waste diversion programs reach maximum diversion levels, municipalities across Ontario are looking at non curbside options to improve their waste diversion performance. These efforts include prioritizing the diversion of electronic waste, textiles,

pet waste and construction and demolition (C&D) waste in response to the projected trends noted in Technical Memo 2 – Waste Generation Trends. Niagara Region already has established diversion programs for these waste streams but further efforts to improve accessibility through the development and promotion of non municipal services may be warranted to maximize diversion of these growing waste streams.

Many municipalities are also now focusing their efforts on development and promotion of waste avoidance options in support of their circular economy and climate change goals. As noted in Section 3 - Practices That Foster Behavioural Change, food waste avoidance has become a priority area of focus for many regional governments for this reason and to reduce reliance on their Green Bin organics programs. Others are focusing on expanding support for reuse and recycling options through partnerships with various not for profit organizations (i.e., NGO's or nongovernmental organizations) and producer organizations to develop additional diversion options for their residents. Several are, for example, already exploring opportunities to partner with organizations to develop reuse options for high value durable goods such as toys and furniture.

Active support for, and development of, local waste diversion options is expected to be an important part of future municipal waste diversion efforts. In many instances, local charities and private companies such as Goodwill or Habitat for Humanity are better equipped to handle specific waste streams such as textiles or construction and renovation waste. Niagara Region already has a significant number of local drop off locations operated by charities and private companies which it actively promotes.

For example, Salvation Army and Goodwill are located at two of the landfill sites in Niagara, and charity exemptions are provided to non-profits.

Expanding collection of organic waste from the multi-residential and public space sectors will also be an important element of long term municipal efforts to support the goals of the provincial Food and Organic Waste Policy Statement as discussed in Technical Memo 1 – Legal Review. Consideration should be given to reviewing Niagara Region's current diversion from these sectors and potentially developing a suite of options to capture additional materials as required. Consideration should be given to partnering with local municipalities to collect pet waste from parks and expanding organic waste collection from the multi-residential sector through below ground storage installations and other proven options.

Niagara Region regularly undertakes studies of its resident's set out rates and waste composition to monitor program performance and trends in types of waste being generated. Continued funding of this practice will become increasingly important for assessing program performance in this regard.

5 New Technologies

One of the most significant trends underway across many larger jurisdictions in Ontario is a planned move to automated cart based collection. This collection methodology offers significant benefits such as improved driver safety, reduced emissions and lower collections costs as discussed in Technical Memo 5 - Trends in Alternative Technologies. All indications are that automated cart based collection will become a standard for garbage and Green Bin collection in the province because of these benefits. Transition to automated carts for curbside collection should be considered when Niagara Region's current collection contract ends.

In addition to automated cart based collection, a major shift towards electrification of vehicles and use of alternative fuels (e.g., hydrogen) is expected to occur in the next five years. While these technologies are still under varying degrees of development, they collectively represent important opportunities to support municipal climate change goals through GHG emissions reduction. Specifying these low emissions options in Niagara Region's future collection contract and vehicle procurement processes should be considered.

Integration of smart technologies into all aspects of waste collection and handling continues to be an ongoing trend in the industry. Technologies such as radio frequency identification detection (RFID) systems, container capacity readers and real time data collection systems have the potential to improve performance monitoring and collection efficiencies in everything from landfill heavy equipment and depot operations through to collection routing in public spaces. For example, several municipalities successfully use automated and remote technologies to operate unstaffed public drop off sites for small quantities of waste and recyclables. These types of innovations reduce operating costs and improve accessibility. Others are using automated compaction systems with remote sensors systems to monitor and reduce collection frequency in depots and public spaces and to improve real time communications with the public about the status of services such as collection vehicle locations while on route.

These systems reduce operating costs and GHG emissions from collection activities. Further investigation of the applicability of automation to Niagara Region's collection infrastructure may be warranted.

6 Services for Local Business

As previously noted, many municipalities are reviewing the services they provide to local businesses in light of the transition of the residential Blue Box program to a producer operated system. It is expected that co-collection of residential and business waste will no longer be permitted as of 2026 under the producer operated residential program. Consequently, many municipalities are exploring policies related to collection volumes, frequency and fee for service models for provision of garbage, recycling and organics collection from local businesses. Early indications are that most municipalities will continue to limit such collection services to small quantity waste generators, such as stores in the business improvement areas, to avoid directly competing with private waste haulers. Programs such as the yellow bag collection system described in Section 2.2 - Yellow Bag Programs are being considered as part of these proposed new programs.

Most municipalities continue to make participation in waste diversion programs mandatory for eligible businesses and, in particular, for multi-residential properties, seeking to receive municipal collection services. These policies are often supplemented by landfill bans, where applicable, to encourage participation from the commercial sector irrespective of who is providing collection services.

7 Accessibility Provisions

As population growth leads to densification of Ontario's housing stock, provision of waste management services to the multi-residential sector will become increasingly challenging. Ensuring municipal planning approvals include provisions to accommodate collection vehicles and storage of recyclables and organics will continue to be critical in new condominium complexes and high density environments.

Similarly, provision of waste management services to businesses in the downtown business improvement areas and public spaces is expected to become increasingly problematic. This situation is expected to lead to increasing use of small footprint options such as centralized collection containers, below ground storage solutions, downtown deposit return kiosks and return to retail options. Consideration of these types of options is expected to be necessary to support delivery of expanded services (e.g., pet waste collection in parks and organics from local businesses in downtown cores). These alternative collection solutions are commonplace in Europe for this reason. Niagara Region will need to consider these trends in their planning approvals for new developments and zoning and waste management bylaws to ensure there are no adverse impacts.

8 Service Delivery Models

Since the 1990's there has been a gradual shift towards contracting municipal waste management services. This approach was largely undertaken as a cost containment measure but is not without its challenges and limitations. Private sector service providers are generally less expensive than their public sector counterparts making this approach a recognized better practice. This is generally because of the private sector's ability to achieve larger economies of scale and lower overall operating costs than their municipal counterparts. The ability of a municipality to take advantage of this opportunity is, however, largely dependent on the level of private sector competition in their area. There are many parts of Ontario that are underserved by the private sector, or where competition is limited to one or two large waste haulers, where inhouse services are actually more cost effective. Additionally, a strong commitment to skilled contract management is required to ensure the services are delivered as anticipated. Nevertheless, use of contract services continues to be the better practice for waste management service provision where sufficient competition can be achieved.

Subsequently, municipal staffing levels can vary significantly depending on the extent to which they contract out services. Direct comparison of staffing levels between peer municipalities is not considered to be an effective Key Performance Indicator. As a result, overall comparison of indicators such as service delivery costs continues to be more effective and the better practice.

Public private partnerships (PPP) have also become commonplace across a broad range of government activities. PPP ventures were popularized as an alternative means of financing capital intensive government projects. They have since been recognized as an effective way of marshalling the financial and technical strengths of the private sector expertise while allowing the municipality to control the risk associated with certain categories of projects.

PPP initiatives involving non-governmental organizations (NGOs), producer organizations and the broader private sector are expected to become an increasingly important aspect of municipal waste management service delivery and established better practice. Successful diversion of waste streams such as textiles and electronic waste will, by necessity, require involvement of a broad range of stakeholders. This will also be true as municipalities seek to improve and expand the promotion of waste reduction, avoidance and climate change initiatives. As with service contracts, PPP ventures can be operationally and contractually complex and there are many examples within the municipal sector that have failed and resulted in protracted litigation. They are, therefore, a recognized better practice under the correct circumstances.

Niagara Region currently contracts out significant aspects of its operation and has actively participated in PPP ventures. Continued monitoring of opportunities to foster working relationships with producers and NGO operated waste diversion programs should be considered. Staff resources, workload and training should be reviewed periodically to ensure these initiatives can be managed effectively.

9 Climate Change and Sustainability

Waste collection and management is an energy intensive activity, and the disposal of waste can lead to significant GHG emissions. Consequently, municipalities have been active in looking at ways to reduce their operation's emissions. Established better practices include options such as:

- Moving towards alternative fuels and electrification for fleets
- Route optimization and every other week collection to reduce collections related emissions
- Use of smart technologies to monitor waste container capacity and scheduling collection on an as needed basis rather than on a regular schedule
- Use of smart technologies to monitor waste collection and processing efficiencies such as landfill gas emissions or heavy equipment movement on site
- Maximizing emissions capture and minimize emissions loss from landfilling and waste processing sites
- Requiring contractors to monitor and implement emissions reductions programs
- Upgrading facilities to use energy efficient lighting and heating systems

Niagara Region has been active in addressing its climate change impacts. Since 2015, for instance, it has been constructing new facilities to LEED's (Leadership in Energy and Environmental Design) standards and implemented every other week collection in 2020. Its waste collection also operates on natural gas to reduce emissions and it actively manages landfill gas emissions at its various sites.

Some municipalities are also exploring opportunities to broaden their 'green procurement' efforts in support of their corporate circular economy initiatives. Initiatives such as production of renewable natural gas (RNG) from landfill gas and anaerobic digestion of Green Bin waste for use in fleet vehicles are unique examples of meaningful circular economy initiatives. Others are exploring alternates to landfill disposal, as described in Section 10 - Resource Conservation, to minimize their associated disposal emissions.

10 Resource Conservation

Niagara Region has significant long term landfill disposal capacity. Regardless, the Region has been active in trying to conserve this valuable resource through its waste diversion efforts and other less public initiatives such as trialing alternative daily cover options.

In the coming years, it is widely anticipated that the province will require municipalities to ban organic waste from landfill. This far reaching initiative will require significant preparatory work by Niagara Region including but not limited to consideration of the provision of expanding organic collection to local businesses and multi-residential buildings, development of a comprehensive outreach campaign, amendment of its by-laws and securing additional staff and enforcement resources.

Additionally, consideration should be given to banning divertible C&D waste. Basic construction and demolition materials such as wood, concrete and shingles have readily available local alternatives. Consideration should also be given to gradually phasing out the acceptance of soil over time, or implementation of a landfill disposal ban for excess soil from land developers. This action would require work by Niagara Region to ensure sufficient capacity is available locally to meet projected development needs and/or develop local capacity. In the mid term, consideration should be given to charging a disposal rate for this waste equivalent to the replacement cost of the lost landfill capacity.

While Niagara Region has sufficient disposal capacity for the immediate future, consideration should also be given to working with other municipalities on long term alternative disposal options. Diversion of recyclables and organic waste from the multi-residential sector remains challenging despite decades of effort by municipalities across the province. Consideration should be given to exploring the feasibility and economics of building one or more centralized mixed waste processing facility to address this portion of the province's housing stock. Furthermore, several municipalities have examined the feasibility of building refuse derived fuel (RDF) facilities as alternatives to landfilling waste. RDF and waste to energy facilities are a recognized better practice compared to landfill disposal and may warrant future consideration by Niagara Region as a way of reducing its GHG emissions and long term disposal needs.

11 Conclusions

Best practices in waste management continue to evolve with current thinking, new technologies and changing priorities. Significant change is expected to occur during the planning period of Niagara Region's Waste Management Strategic Plan. Climate

change, population growth and the accelerating rate of technological change are all expected to be key drivers of change. Development of waste management systems that demonstrate flexibility and responsiveness to change will become paramount in coming years.

Niagara Region's current waste management programs incorporate many of the known industry better practices and is well positioned to meet its residents and businesses needs for the foreseeable future. Opportunities for program enhancement that may deserve further examination include adoption of emerging technologies such as electric vehicles and automated cart based collection. Options to improve program accessibility should also be considered for sectors including multi-residential households and local businesses. Expanding partnerships with producer responsibility organizations, local NGO's and private companies to develop new opportunities to divert key wastes like electronics and textiles should be prioritized. Long term consideration should be given to opportunities to partner with other municipalities to invest in alternative disposal technologies and advocacy efforts to expand and improve producer responsibility programs.