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HAMILTON DEVELOPMENT GUIDELINE REVIEW: WASTE STANDARDS

PREPARED BY **KRCM CONSULTING**

TO **THE WEST END HOME BUILDERS' ASSOCIATION (WE HBA)**

NOVEMBER 2023

This report was prepared by KRCM Consulting in response to the *Request for Proposal for "Infill Development Guideline Review – Urban Standards"* for the West End Home Builders' Association (WE HBA).

This research project was conducted as a component of the Master's in Planning program's *PLAN 721 – Advanced Planning Project Studio* course at the School of Planning, University of Waterloo.

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November 2023

EXECUTIVE SUMMARY

This document highlights the current challenges posed by urban standards governing waste collection facilities in new multi-unit residential developments in the City of Hamilton. Many aspects of these standards have been recently pointed out as potential barriers to the achievement of both provincial policy objectives and the Hamilton's own intensification targets. Responding to these impediments, this report compiles potential avenues to making Hamilton's urban standards more conducive to harmonizing the interests of developers, the municipality, province, and the goal of waste reduction for the public good.

To this end, a program evaluation focused on the City's waste collection guidelines was conducted to identify inadequacies. This evaluation was supported by engagement with local developers through a survey and a virtual discussion facilitated by the research team. Four main issues were identified and emphasized in this report: turnaround requirements, continuous forward motion, storage requirements, and clarity in the application process for private pickup.

It was found that there is a current mismatch between the City's waste removal standards and its targets to densify its built-up area. Additionally, a lack of clarity in the phrasing of certain guidelines was identified. However, an examination of how nearby municipalities address these highlighted issues reveals a consistent pattern across the Greater Golden Horseshoe Area, with slight variations among these municipalities.

Supported by the examination of neighboring municipalities' practices on waste collection standards and international examples of innovation in this regard, this report recommends a variety of both short and long-term potential pathways to be considered by the City of Hamilton to address the issues discussed.

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1. INTRODUCTION

This report was pursued with the intent of understanding the impact of the City of Hamilton's urban standards governing waste collection on residential development by members of the WE HBA. The WE HBA is an association advocating for the interests of the residential construction industry. The WE HBA works to ensure construction remains an accessible process, to allow an adequate number of cost-effective homes to be built for current and future residents of the Hamilton-Halton region. This report was informed by research on two axes: preliminary research constituted of a policy scan of waste standards throughout the region, before being complimented by data obtained from a survey and semi-structured interviews with local developers. After reviewing initial findings on the challenges faced by the WE HBA homebuilders, a second round of research on international best practices was conducted.

The structure of the report is as follows: A preface first explains the relationship between intensification and waste reduction goals, laying the ground to explore the roles urban standards regulating waste both currently and ought to play. Second, Hamilton's current urban standards regulating waste are evaluated. Third, the results of the survey and interviews are analyzed. Best practices from neighbouring regions and abroad are analysed for their strengths before recommendations are provided.

2. INTENSIFICATION AND WASTE COLLECTION IN THE CITY OF HAMILTON

In the City of Hamilton, urban standards regulating waste requirements in the design of new developments are perceived by many developers to create spatial and fiscal inefficiencies that hamper long-term municipal and provincial policy objectives. Waste management challenges are arising as Major Transit Station Areas (MTSA) are expected to accommodate between 30-40% of Hamilton's residential intensification, as targeted by the City's Official Plan. Developers must meet the City's waste requirements if a new multi-unit residential building is to be serviced by public pickup. In multi-unit residential buildings, developers may opt to sacrifice satisfying waste standards if the development is to be financially feasible. Condo boards must then pay for private services, causing residents of new-build developments to pay twice for waste collection services. Private pickup is contracted out to the same provider as the City, indicating the means for pickup already exist.

This report scopes common challenges faced by property developers, desired solutions, contrasts urban standards in other municipalities and looks to the horizon for industry best practices both local and abroad. As the facilities required to process household waste and the standards that regulate them are tied to the volumes of waste produced, this report transitions into a broader study of waste reduction strategies.

The ultimate recommendations outlined in this report align with Canada's waste management strategy, which is guided by the overarching goal of reducing the volume of solid waste destined for landfills. This comprehensive strategy adopts a hierarchical approach, as illustrated by Figure 1.

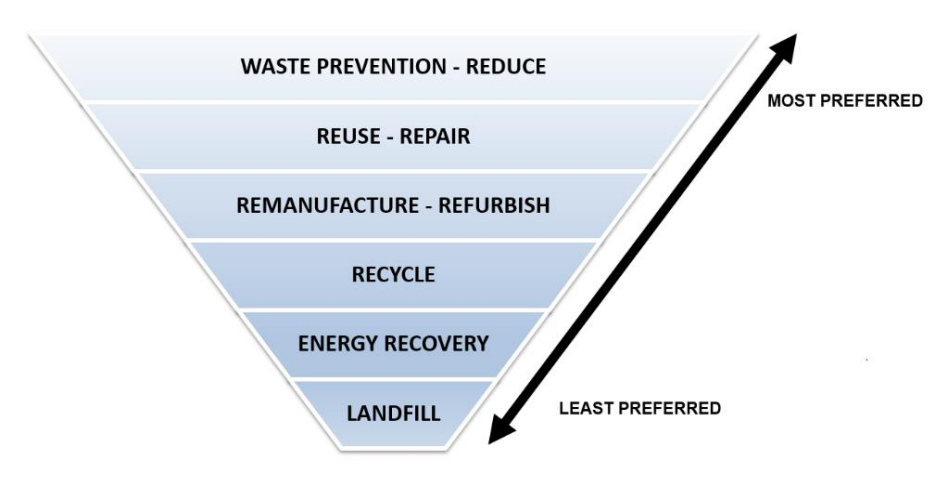

Figure 1 - Canada's waste management strategy[1]

The strategy begins with a focus on waste prevention, aiming to curb the generation of waste at various levels. The subsequent step involves the reduction of materials entering the recycling and solid waste stream, contributing to a more sustainable waste management system. The next step is promoting the reuse of materials. This involves the repair and refurbishment of materials and products before they enter the recycling or solid waste stream.

The strategy also places significant importance on recycling, where materials are collected, sorted, and repurposed, either as a resource input or by selling them to secondary markets. Additionally, recovery plays a role, focusing on utilizing materials or waste that cannot be reused or recycled to produce fuel or energy through innovative technologies.

This waste reduction strategy seeks to reintroduce materials into the manufacturing process, thereby preventing waste and generating economic benefits. By transitioning away from the linear "take, make, waste" model, the circular economy concept promotes

[1] Government of Canada. (2021). *Reducing municipal solid waste.* Retrieved from https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/reducing.html

the continuous use of materials and products, extending their lifespan through recycling, refurbishing, or repurposing[2].

While the national agenda presents a broad strategy, the provinces bear responsibility for shaping waste reduction policies, wielding the authority to approve waste management facilities. In Ontario, the Provincial Policy Statement (PPS) requires waste management systems to simultaneously *"accommodate present and future requirements" and "facilitate, encourage and promote reduction, reuse and recycling objectives*" (1.6.10.1). Municipalities, in turn, are responsible for the management of these facilities in addition to the collection and disposal of household waste[3].

In alignment with this framework, Hamilton's official plan places emphasis on waste reduction: "*The City's waste management system shall facilitate, encourage and promote reduction, re-use, composting, and recycling objectives"* (5.5.6). To this end, the City claims to pursue new forms of waste disposal that divert waste from landfills.

[2] Government of Canada. (2021). *Reducing municipal solid waste.* Retrieved from https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/reducing.html

[3] Government of Canada. (2022). *Municipal solid waste: a shared responsibility.* Retrieved from https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/shared-responsibility.html

3. THE CITY'S WASTE COLLECTION DESIGN GUIDELINES

In November 2021, the City approved new *Waste Requirements for Design of New Developments and Collection*[4] (Figure 2). These requirements were created to ensure safe waste collection services, efficient movement of waste collection vehicles, and that designs provided equal access to garbage disposal and waste diversion programs for all building occupants.

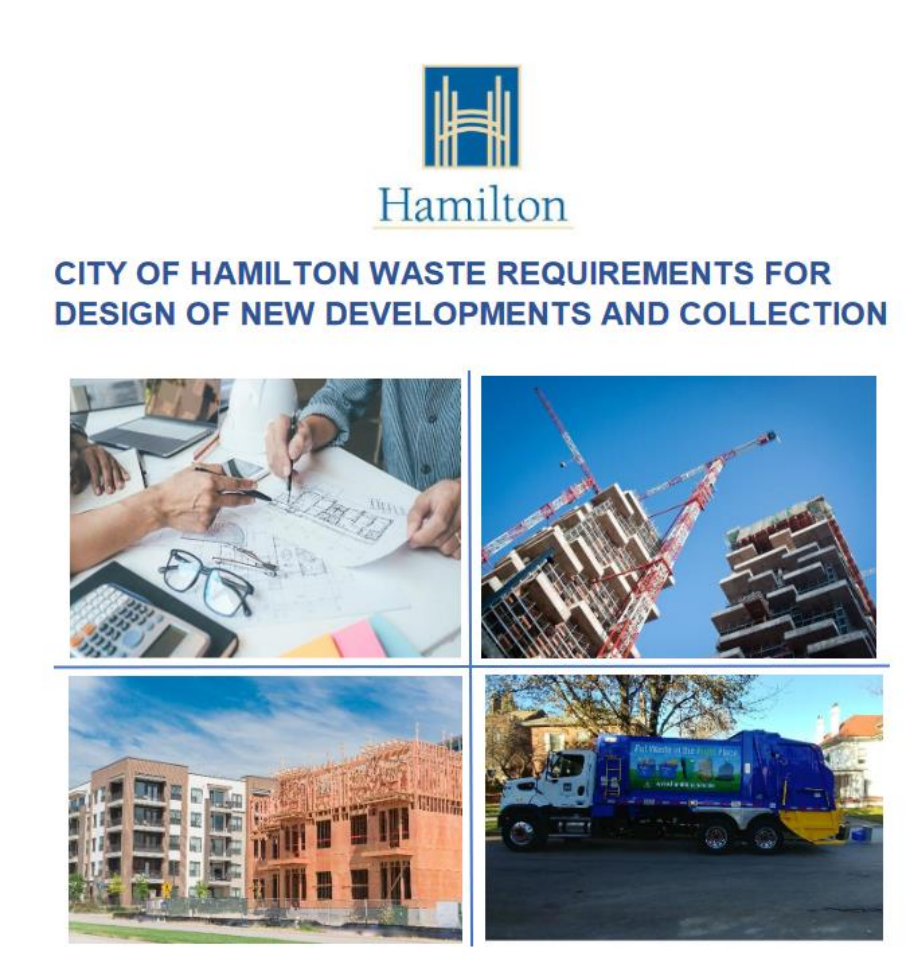

Figure 2 - Hamilton's Document for Waste Design Requirements

[4] City of Hamilton. (2021). Waste Requirements for Design of New Developments and Collection. *City of Hamilton*. Retrieved from https://www.hamilton.ca/sites/default/files/2022-11/pedpolicies-waste-requirements-new-development-design.pdf

To meet these goals, the design requirements include specific provisions regulating aspects of waste management for new developments such as:

- Waste storage
- Waste separation
- Collection vehicle access
- Collection vehicle movement
- Safety measures for collection

All of these guidelines must be adhered to by new developments in order to receive waste collections services from the City. However, the City's waste design requirements have provisions that can act as barriers and prevent developments from receiving municipal waste collection. Many of these provisions require dedicated infrastructure, which on intensification sites with spatial restraints can interfere with other site aspects such as parking, greenspace, density, or the number of units provided.

The growth targets set out through Hamilton's Official Plan, the Ontario Provincial Policy Statement, and the Places to Grow Growth Plan require most of the Hamilton's growth to occur as intensification within the existing urban boundary. However, as the City's waste design requirements require dedicated infrastructure, these guidelines act as a barrier for intensification. Out of the existing provisions, three key issues have been identified as having the most negative impact on site design:

- Turnaround requirements for collection vehicles,
- The continuous forward motion of collection vehicles, and,
- On-site storage requirements.

To address these issues, developments would need to be altered in a way that could reduce the financial viability of a project. As an alternative, developments may wish to receive private waste collection services, however the City's waste design requirements include restrictive and often ambiguous regulations on qualifying for private pickup, limiting the ability for developers to receive private services.

The four main issues, and their related policies, will be discussed in the subsequent sections:

- Turnaround requirements
- Continuous forward motion
- Storage requirements
- Process for private pickup

3.1 Turnaround requirements

Space for collection vehicles to navigate is throughout a development currently assured by turnaround requirements. The permitted dimensions are as follows:

> *3.1.4.1 – Changes of direction on the Access Route must have turning radii of at least 10.4 metres for the inside of the curve, and 13 metres for the outside of the curve if the curb or sidewall is higher than 0.375 metres.*
>
> *3.1.4.1 – The Access Route may have a Turning Radius of 9.4 metres for the inside of the curve and 12 metres for the outside of the curve if the curb is shorter than 0.375 metres and, if the City will permit a portion of the Waste Collection Vehicle to hang over areas not designated as Access Routes as indicated on plans during movement.*

Dead-ends are only permitted in temporary situations, meaning larger cul-de-sacs are required. It's not only the space dedicated to waste collection vehicles that must remain clear of other uses, but adjacent areas as well. This entails no parking at all times, with signage to be placed around the entrance to the waste collection area. In addition to parking, this impacts snow storage, density, greenspace, and location of waste storage.

3.2 Continuous forward motion

Linked to the City's turnaround requirements, there is a requirement for waste collection vehicles to be continuously forward moving throughout the property. This means the vehicle must enter and exit the property in a forward motion. Continuous forward motion extends to the path that collection vehicles must take throughout the development. One

notable instance where continuous forward motion doesn't translate into public pickup is that Laneways not maintained by the City are not to receive service from the City. While collection performed by doing no more than a three-point turn is also permitted, this must be done within turnaround areas within the development. The City will nonetheless permit turnaround areas in multi-unit residential developments with one private road as long as they meet the following requirements:

- *Have no more than one entrance;*
- *The one Private Road terminates with a dead-end;*
- *Reversing of collection vehicles is only made on the turnaround area; and*
- *Collection of Waste from all Dwelling Units can occur by the Waste Collection Vehicle making no more than one three-point turn*

In addition to potentially limiting the number of units provided, the space required for continuous forward motion impacts parking space provision, snow storage, density, greenspace, and location of waste storage.

3.3 Storage requirements

As public pickup is offered on 8-day cycles, enough storage must be provided to accommodate eight days of waste. Developers are expected to provide 2.5 square meters of waste storage per household, enough to contain vessels for recycling, compost, and garbage. This storage area is excluded from being in the front yard. However, multi-residential townhouse developments are expected to have a designated receptacle area located no more than 100 metres from any occupant. Garbage compactors are an existing avenue for reducing the amount of storage space required in multi-residential townhouse developments, reducing the number of required storage bins by one third (1/3). In ground *Earth Bin* waste storage containers are currently being contemplated by the City.

3.4 Process for private pickup

Developments that cannot meet Hamilton's design requirements will not receive municipal waste collection and must instead rely on private collection services. However the process

for receiving private collection is based on City staff's subjective evaluation that can be ambiguous to developers:

> *2.1 - The Design Requirements include specific requirements that should be satisfied when designing certain development types, however, staff will exercise on a case by case basis flexibility in applying the Design Requirements. This flexibility is intended to satisfy the purpose of Occupants receiving equal access to Waste Diversion Programs and Garbage collection in cases where application of the Design Requirements could result in a new development conflicting with the existing character of the street, the urban design and density objectives of the applicable land use policies, existing heritage features and/or the existing surrounding context.*
>
> *3.1.6 - It is the responsibility of the Developer to inform the City in all Development Applications if there is a desire to retain Private Waste Collection Services for the Development. The City may allow for an eligible Development to be designed in a manner that does not conform to the Design Requirements and retain Private Waste Collection Services but only if staff determine the site has constraints that make it impossible for all the applicable requirements in the Design Requirements to be met without having a significant negative impact on the development with respect to the City's objectives related to land use, urban design and density.*

4. WHAT DEVELOPERS ARE SAYING

A 19-question survey was developed for WEHBA to be forwarded to its members. It was comprised of a mix of discussion-based and multiple-choice questions, aiming at eliciting past residential development experiences by respondents. The survey focused on critical issues related to three items: *Waste Storage, Vehicle Turnaround Radii and Continuous Forward Motion*. While the survey emphasized these items, respondents were also encouraged to address any of their other perceived issues. Furthermore, respondents were asked to compare their experiences in the City of Hamilton against those in other municipalities they have worked with. Finally, respondents were asked about their willingness to participate in a more in-depth interview to elucidate upon survey results.

The Google Forms survey (Appendix I) was disseminated with the client having assumed responsibility for engaging with a select group of respondents. The survey received a total of eight (8) respondents and three (3) members of the *West End Home Builders' Association* engaged in a virtual discussion in coordination with the research team and client.

All respondents stated public pickup would be preferable if they could comply with the waste removal standards. The survey highlighted barriers preventing new-build developments from qualifying for the public pickup of waste. Among projects worked on by respondents, difficulties in meeting urban standards were especially challenging among townhomes, midrise and high-rises. One respondent estimated that if these waste removal standards had applied to their previous project, conformity would have cost a 22% reduction in residential units.

It can be deduced that waste removal guidelines posed the greatest challenges where developers sought compact urban form in pursuit of an "*efficient use of land, infrastructure, and public service facilities*" as stated by Ontario's PPS (1.1.3.6). the following subsections outline the participants' responses on the four main issues addressed in this report.

4.1 Turnaround requirements

Survey respondents were split as to whether Hamilton's required turning radii for waste removal vehicles alone were to blame for impeding the satisfaction of waste removal standards. As one respondent pointed out, the required turnaround radii were not dissimilar to other municipalities. Instead, the need for exclusive loading areas and continuous forward motion were causing the most difficulty. Nonetheless many respondents felt as if the required radii still occupied too much of the site and could significantly alter the structure of residential buildings if collection occurs indoors.

A site plan was shared by one the participants illustrating how the City's turnaround requirements can impact the development. Figure 3 outlines the site plan before and after applying Hamilton's turnaround requirements. The right-hand side shows a Hammerhead turn which is in line with Hamilton's requirements. This requirement reduced the unit count by 20 as a result of the decreased parking and reduction in building area.

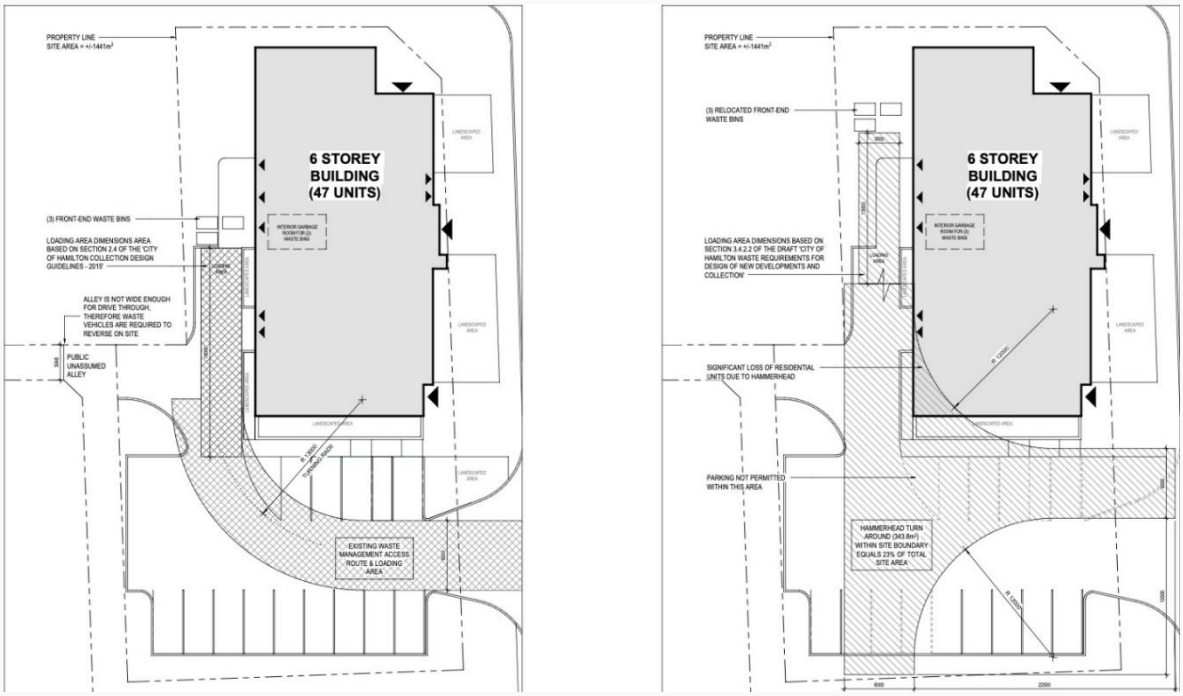

Figure 3 - Site plan before and after the City's approval

One respondent highlighted what they perceived to be unfair standards compared to fire routes, which allegedly require smaller turning radii. While respecting the City's layouts requirements, it was thought more recognition ought to be given to industry-leading software tools to assist in the road design such as *Autoturn* (Figure 4).

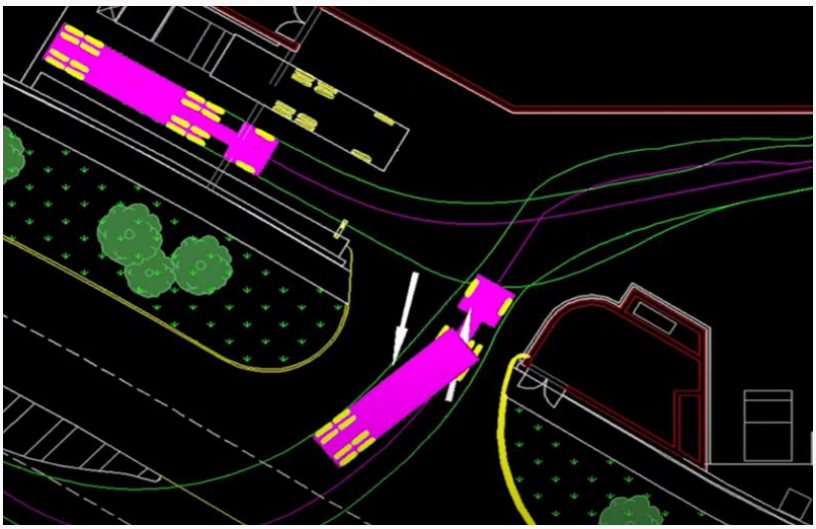

Figure 4 - Autoturn software for turning radius design[5]

As stated above, the most severe source of problems related to turnaround requirements was the need for exclusive loading areas, particularly the exclusion of parking. Respondents were aware of the potential for conflict uses such as parking could pose for waste collection, however thought the waste removal standards did not account for how vehicles could maneuver in practice. Areas of a site devoted to waste removal must remain free of obstacles, yet tend to be the same areas conducive to parking. The exclusion of parking from near waste removal areas is cited as a major hinderance to the provision of visitor parking. It's suggested waste removal standards should allow visitor parking adjacent to turnaround areas to maximize the efficient use of space.

[5] Source: AutoTURN - Swept Path Analysis Software. Retrieved from: https://www.youtube.com/watch?v=wQtvea4Keb4

4.2 Continuous forward motion

The need for waste pickup to be executed with continuous forward motion of waste collection vehicles was cited as a barrier to obtaining municipal service. It was commented that the need for continuous forward motion wasn't experienced when applying to other municipalities. Additionally, there were perceived double-standards about continuous forward motion requirements fueled further frustration as a respondent highlighted seeing waste removal vehicles performing three-point turns in what they saw as exceptions for some recent residential developments.

Seven out of eight (7/8) respondents thought waste collection vehicles should be allowed to make more than a three-point turn and be able to reverse even then the road is not dead-end. Additionally, six respondents stated that reversing should be allowed in areas other than turnaround areas.

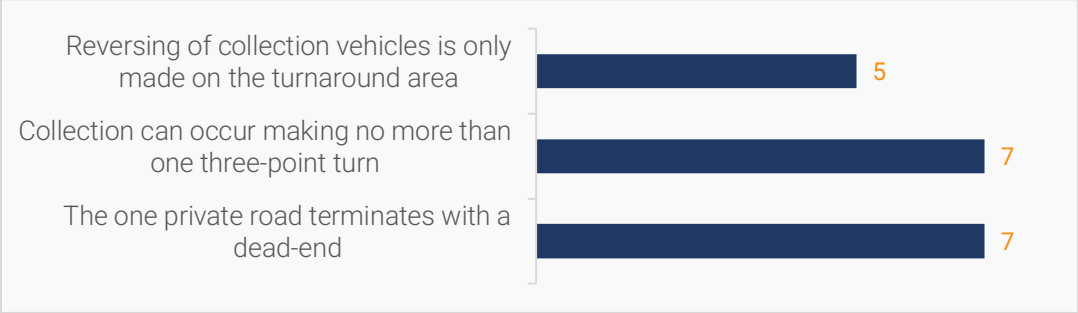

Figure 5 - What requirements should be lifted or made more flexible regarding continuous forward motion.

The principal problem posed by waste removal standards to be overcome are spatial inefficiencies, due to cul-de-sacs needed for continuous forward motion and the storage. One respondent suggested hammerhead turn-arounds as a more efficient alternative. According to them, tried and tested compact turn-around designs are available, most notably hammerhead turn-arounds allowing 3-point turns.

4.3 Storage requirements

As illustrated by Figure 6, more flexibility was sought by developers with regards to several of the storage requirements. One aspect receiving more votes than others was reducing the space devoted to waste storage per household.

Figure 6 - What requirements should be lifted or made more flexible according to respondents.

To this end, as Figure 7 outlines, technological solutions that stood out among respondents was permitting in-ground waste storage containers and models other than earth bin.

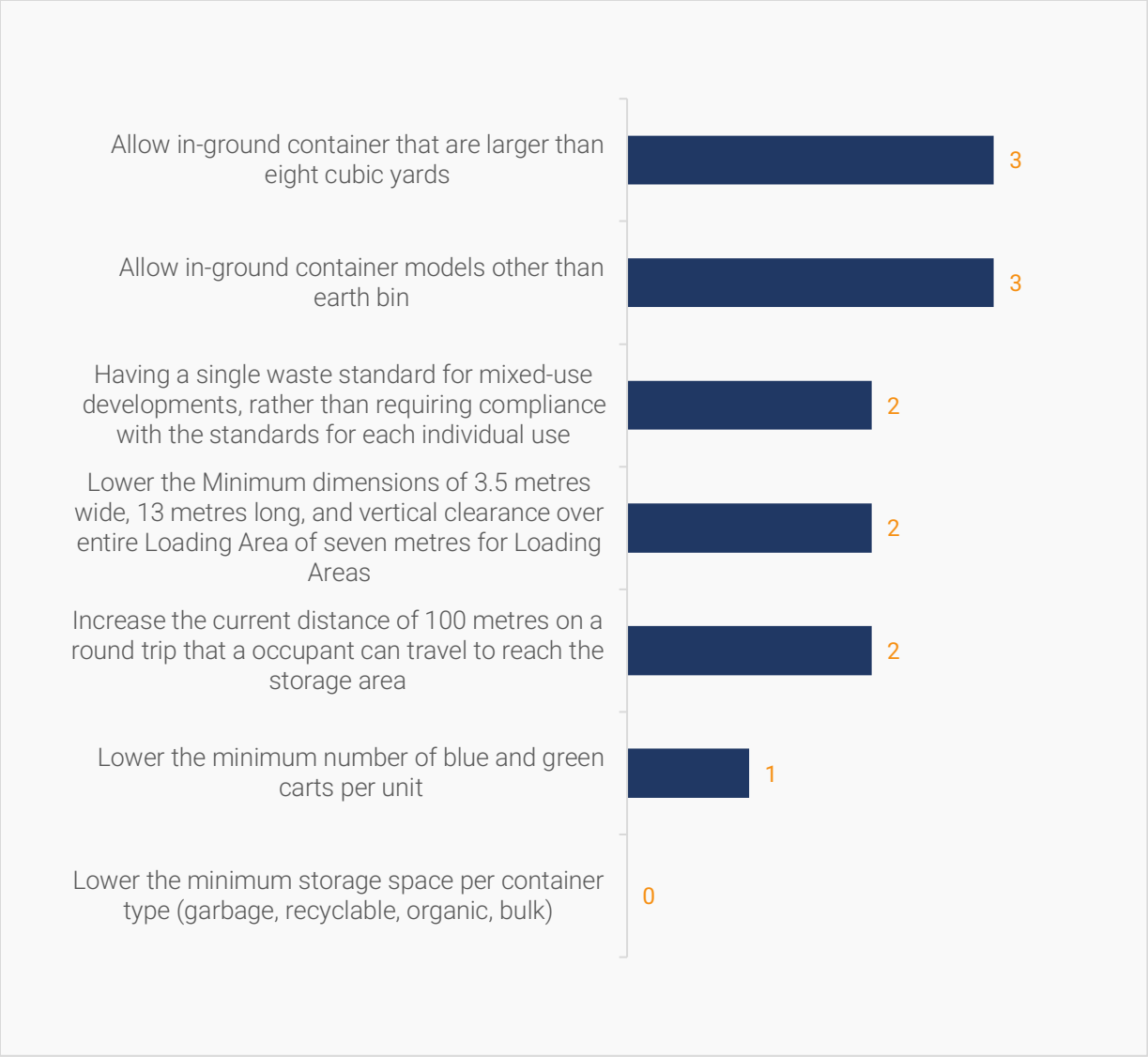

Figure 7 - What changes would facilitate Multi-Residential Townhouse Developments in meeting the storage requirements for public waste collection.

The root cause of what was deemed excessive storage areas in multi-residential units was the infrequency of public collection. Private pickup would occur multiple time per week, whereas public pickup would only be offered every eight (8) days.

With regards to storage, it was suggested that less space would be required if the municipality provided pickup more frequently than its current 8-day schedule. Developers have expressed openness to in-ground storage containers as an innovative, convenient, and compact pickup solution. The most impactful way to reduce the amount of space

devoted to waste storage without paying for private pickup, according to one of the respondents, is to reduce the amount of storage space required per household. This, however, would require a reduction the amount of waste permissibly produced per household.

4.4 Process for private pickup

Regarding the application process for private pickup, respondents desired clarity and consistency from the municipality. Complaints emerged about the lack of clearly written standards and comments from municipal staff during the application process. For example, the City of Hamilton indicated it could provide public pickup for townhouse developments on a private road if a concrete pickup platform were constructed. Despite the City's initial gesture towards accommodation, there was no further instruction on what shape or form the concrete platform must take. In another instance, the City of Hamilton initially stated in the site-plan approval stage that a development was eligible for public pickup, only to later tell the developer at the occupancy dates the City would never consider their project for public pickup and were simply stating everyone is technically eligible.

5. LEARNING FROM NEIGHBOURING PRACTICES

To provide benchmarks on how other municipalities address the key issues outlined, a policy review of neighboring municipalities with similar urban structures and that have recently adopted MTSAs policies in alignment with the Growth Plan was conducted. The three municipalities examined may serve as case studies for the City of Hamilton in an eventual process of updating its waste collection design standards.

Experiencing population growth and pursuing intensification like Hamilton, the City of Vaughan[6] and Peel Region[7] offer suitable precedents in the GTHA. Both are concentrating intensification near MTSAs and improving infrastructure to adapt to population growth. Situated in the GTHA, both municipalities are more likely to have overlapping developers with Hamilton. Additionally, the Niagara Region[8] was chosen as another example, as it had been cited as an exemplary precedent by survey respondents. Its waste standards were analyzed to evaluate the source of their praise.

The following subsections provide an overview of the current state of intensification and public waste collection eligibility in each municipality and explore key policies on turnaround requirements, continuous forward motion, and storage requirements. Additionally, the application process for private pickup is discussed.

5.1 City of Vaughan

The City of Vaughan (Figure 8) offers Public Municipal Waste Collection for residential units. However, institutional and commercial developments are not eligible for this service

[6] City of Vaughan. (2022). *Waste Collection Design Standards*. Retrieved from: https://www.vaughan.ca/sites/default/files/2022-12/Waste%20Collection%20Design%20Standards%20-%20October%202022.pdf?file-verison=1679367600043

[7] Region of Peel. (2020). *Waste Collection Design Standards Manual.* Retrieved from: https://www.peelregion.ca/public-works/design-standards/pdf/waste-collection-design-standards-manual.pdf

[8] The Regional Municipality of Niagara. (2022). *By-Law No. 2022-32 – A by-law o regulate the use of the waste management system for the Regional Municipality of Niagara.* Retrieved from: https://www.niagararegion.ca/government/bylaws/pdf/by-law-2022-32-waste-management.pdf

and must seek a private waste collection service provider. Mixed Use Developments may be eligible for Municipal Collection Services for residential waste only if the owner can demonstrate clear separation of residential waste from commercial waste and fulfill a series of specific requirements.

Figure 8 - Envision plan for the Vaughan Metropolitan Centre[9]

5.2 Niagara Region

Niagara Region (Figure 9) is looking to accommodate the Region's growth through intensification and higher densities in specific areas. These areas are meant to be serviced by the appropriate infrastructure, public services, and transit. They have been identified in the Official Plan, and future infrastructure investments are targeted for these areas specifically. The Region offers public pickup services for a wide variety of developments, including Institutional, Commercial, and Mixed-Use Premises within Designated Business Areas (DBAs) every week. For Low-Density Residential, Multi-Residential, Mixed-Use Premises, and Accommodations with four (4) or more bedrooms outside the DBAs, pickup occurs every other week. The Region also provides enhanced services as requested, approved, and funded by local municipalities.

[9] Source: Downtown Vaughan Metropolitan Centre. Retrieved from: https://myvmc.ca/welcome-to-downtown-vaughan/

Figure 9 - St. Catharines' Downtown area[10]

5.3 Peel Region

The Region of Peel's (Figure 10) Official Plan defines MTSAs as areas including and around major transit stations within a radius of approximately 500 metres or about a 10-minute walk. They are recognized as focal points for the investment of public services and infrastructure. Development in these areas is intended to be compact and encourage public transit and active transportation uses. A minimum density of 200 residents and jobs combined per hectare is required by 2031 or earlier in these areas to optimize the use of the existing land supply of the Region by directing a significant portion of growth to the built-up areas through intensification.

[10] Source: City of St. Catharines. Retrieved from: https://www.stcatharines.ca/en/index.aspx

Figure 10 - Downtown Mississauga[11]

The Region is responsible for waste management in Peel and is committed to planning for the current and future needs of residents. The Region provides waste collection services to residential units, some institutions, and small businesses within Business Improvement Areas and located within Residential Neighborhoods. Industrial, Commercial, and Institutional establishments are not serviced by public waste collection.

Additionally, Peel's Official Plan states that the Region shall adopt policies that actively encourage, promote, and support the efforts of government, the area municipalities, the private sector, and the public to reduce waste or emphasize reuse and recycling.

5.4 Turnaround requirements

Regarding Turnaround requirements, the Peel Region sets a minimum radius of 13m from the center line for all turns. Meanwhile, the City of Vaughan requires that the depth of the turnaround shall be no less than 11m. Additionally, the inside curb radius must be no less than 9m, and the cul-de-sac outside curb radius should be no less than 13m. These are consistent with Hamilton's requirements for turning radii. In contrast, the Niagara Region does not prescribe a specific turnaround depth. Instead, they seem to provide general wording, which can likely be interpreted as necessary and then advocated for. As the City's

[11] Source: Insauga. Retrieved from: https://www.insauga.com/6-reasons-why-downtown-mississauga-is-the-future-of-urban-living/

design standards state in its *20.1.a.ii* item, "the Region may enter Private Property for collection purposes provided that":

> *have widths, turning radii, means of access, and means of egress meeting or exceeding the requirements of the Region's Policy on Requirements for Waste Collection, as amended from time to time. (p. 38)*

None of the case studies examples require an exclusive turnaround area such as the City of Hamilton. Adjacent areas can be used for parking and other uses.

5.5 Continuous forward motion

Peel Region requires that road layouts be designed to allow Waste Collection Vehicles to move forward without reversing. If this requirement cannot be met, a Cul-de-sac or T-turnaround is necessary. The City of Vaughan also requires roads to facilitate forward motion, as collection vehicles can only reverse up to 11m. When these requirements are not met, a three-point turn or cul-de-sac is specified as an alternative. The Niagara Region, however, has no specific guidelines for continuous forward motion.

5.6 Storage requirements

The collection point For Curbside Waste Collection in the Peel Region must be as close as possible to the travelled portion of the road, be accessible by waste collection vehicle, and be free from obstructions.

For multi-residential complexes, the internal waste storage rooms must be a minimum of 10 square metres for the storage of bulky items and the indoor collection point must be a minimum of 6 metres wide for the storage of multiple front-end bins. A 6 cubic yard bin is only permissible for multi residential or stacked townhouse developments where garbage and recycling are stored outdoors. They must be permanently located at a collection point accessible to the front-end waste collection vehicle. The size of the waste storage room is determined by the number of Front-End Bins and Recycling Bins needed, as opposed to prescribing a specific storage area, as Figure 11 illustrates.

Multi-Residential Complexes and Stacked Townhouses

Type of Bin	3 yd^3 (units/bin)	4 yd^3 (units/bin)	6 yd^3 (units/bin)
Compacted Garbage	54	72	N/A
Non-compacted Garbage	18	24	36
Recyclable Materials	45	60	90

Figure 11 - Number of required bins in muti-residential developments in the Peel Region[12]

This allows for flexibility for developers, as they can choose what size of bin is most appropriate, rather than prescribing a specific storage space requirement

Additionally, the Waste Storage room must be within 100 metres to all occupants and the area should be sufficient to accommodate the required number of front-end of recycling carts. Garbage is collected twice weekly, and recycling and bulky items are collected weekly.

If a chute system is used, then separate chutes must be provided for garbage and recyclable materials. If a single chute is used it must be equipped with an automated mechanical separation system to direct garbage and recyclable materials into separate front-end bins. Additionally, recycling cannot be compacted.

The City of Vaughan requires Waste Storage Facilities to be able to store up to eight (8) days of waste generated on the premises.

Regarding multi-residential dwellings, there are no specific requirements for the storage of waste materials, collection location and method of collection in small residential premises (2 to 6 units). The City's stands states, however, that design of storage facilities for this type of development *"will be to the satisfaction of the Deputy City Manager of Public Works or designate"* (p. 16).

While not providing explicit requirements for developments with 2 to 6 units, the City presents clear guidelines for mid-sized and large developments. Mid-size Residential

[12] Region of Peel. (2020). *Waste Collection Design Standards Manual.* Retrieved from: https://www.peelregion.ca/public-works/design-standards/pdf/waste-collection-design-standards-manual.pdf

premises (7 to 29 units) are required to meet one or more of the following collection types to be provided with collection services:

> *a) Recycling & Other Waste Streams*
>
> *· cart – 32 to 95 gallons*
>
> *· front-end (bulk lift) un-compacted – 1.5 yds^3 to 8 yds^3*
>
> *b) Garbage*
>
> *· front-end (bulk lift) mechanically compacted – 2 yds^3 to 4 yds^3*
>
> *· front-end (bulk lift) un-compacted – 1.5 yds^3 to 8 yds^3* (p. 16)

Whereas collection for large residential premises (30 or more units) shall be provided using one or more of the following collection types:

> *a. Recycling & Other Waste Streams*
> *· cart – 32 to 95 gallons (up to 45 units)*
>
> *· front-end (bulk lift) un-compacted – 1.5 yds^3 to 8 yds^3*
>
> *b. Garbage*
> *· front-end (bulk lift) mechanically compacted – 2 yds^3 to 4 yds^3* (p.16)

Waste storage room requirements are 2sqm per residential unit. There is no specific distance required between residential units and the waste storage room

Regardless the size of the multi-residential development, they are required to provide a three-stream waste system using three separate chutes. The access to three-stream disposal must be installed on each floor – through chute room, for instance – and each separate building of a Multi-residential or Mixed-Use Development must have its own Waste Storage Facility. This includes developments that have a shared walkway/podium.

The Niagara Region requires owners to not to place the material out for collection at any Premises except at their own Premises. Specific guidelines regarding location and where to properly accommodate the material for pickup are stated in the items *15.1* and *15.2* of the document:

> *15.1 Except as set out in Section 15.2 the Owner of Premises shall set out Material for collection by placing it at Curbside in front of the Premises in a location to*

clearly distinguish separation from a neighbouring Premises and as close as possible to the travelled portion of the road without obstructing or interfering with the travelled portion of the road or any sidewalk.

15.2 The Owner of Premises shall set out Material at a collection point or Communal Collection point approved or as determined by the Region. Dwelling Units that place their Material at a Communal Collection point must ensure all collection containers are labelled with the Dwelling Unit address to clearly distinguish separation from neighbouring Dwelling Units.

5.7 Process for private pickup

In Peel Region, the developer is responsible for waste collection and disposal until 90% occupancy has been achieved. The developer must then apply for public pickup. The Waste Management Division will visit the site within 5-10 business days and determine if the site is compliant with the Manual. Private waste collection for developments that include residential units will not be permitted unless approved by the council. The application process involves the submission of a form to the Commission of Public Works by developers.

In the City of Vaughan, private residential developments eligible for Municipal Collection Service are limited to registered condominiums under the Condominium Act and do not include apartments with rental units. Eligibility is restricted to Condominium developments that have facilities, access, and containers for the collection of waste materials, as approved by the City of Vaughan, following the residential board turnover meeting, and achieving seventy (70) percent occupancy.

To gain access to the service, condominiums are required to submit an application, facilitate an on-site inspection, and execute an Agreement with the City of Vaughan. The form is not publicly available, and developers must contact the Environmental Services Department, Solid Waste Management Division to access it. Private Residential Developments/redevelopments not currently eligible for Municipal Collection Services are required to seek a private waste collection service provider.

The Niagara Region's waste collection guidelines do not address the process for private pickup, implying that developers may opt for private pickup at their discretion if requirements for public service are not met.

5.8 The main takeaways

In Peel Region, the design guidelines provide extra flexibility and services to multi-residential units. This is likely to promote high density areas, as in line with their Official Plan. The municipality offers twice weekly garbage collection to minimize the need for a larger storage space. There is also added flexibility for the developer to choose what type of storage space will be available, instead prescribing one rate for all developments. The private pickup process is transparent and easy to follow. Turnaround areas are also not prohibited to have adjacent uses.

In the City of Vaughan, the private pickup process is similarly straightforward, and while continuous motion is encouraged, some reversal is allowed, limited to 11 meters. Waste storage requirements are less stringent. Waste storage room requirements are 2sqm per unit as opposed to 2.5sqm in Hamilton despite having the same 8-day collection cycle. There is also no prescribed distance required from dwelling units and the waste storage room.

In the Niagara Region, waste management policies are less specific, relying on a case-by-case basis. The directions for applying for private pickup are undefined, offering developers flexibility in waste management practices within the Region.

While disparities in waste collection standards weren't overwhelming, the differences do allow developers in other GTHA municipalities to have added flexibility and clarity. These differences can promote higher density development, as opposed to hindering it which is what the City of Hamilton's policies currently appear to do. Table 1 outlines an overview of the waste collection standards in the three municipalities examined.

	City of Vaughan	Niagara Region	Peel Region
Turnaround Requirements	▪ Turning radius requirements were consistent with Hamilton ▪ No restriction was placed on the use of adjacent spaces	▪ No specific turnaround radius required. Instead, it is stated that widths, turning radii, and means of access should meet the requirements of the Region's Policy	▪ Turning radius requirements were consistent with Hamilton ▪ No restriction was placed on the use of adjacent spaces
Continuous Forward Motion	▪ Continual forward motion is required ▪ Waste collection vehicles can only reverse up to 11m	▪ No specific guidelines against continual forward motion are prescribed	▪ Require continual forward motion ▪ A cul-de-sac or T Turnaround is permitted if not possible
Storage Requirements	▪ Garbage is collected twice weekly from multi-residential complexes ▪ Recycling and Bulky items are collected weekly ▪ Size of the waste storage room is determined by the number of Front-End Bins and Recycling Bins needed	▪ Few standards exist ▪ It is prescribed that the collection point must be approved by the Region	▪ 2sqm of storage space is required per residential unit ▪ There are no distance requirements between residential units and waste storage areas
Private Pickup Process	▪ Developments that are not eligible for municipal collection are required to seek private waste collection	▪ No prescribed policy	▪ Developer must apply for private pickup, subjected to Council approval

Table 1 - Summary of the local practices review

6. LOOKING AHEAD: INTERNATIONAL EXAMPLES

While tackling the issues outlined in the short term, the City of Hamilton should also explore the implementation of long-term waste management broader and innovative policies. Embracing comprehensive strategies that incorporate innovation to reduce waste and improve its management has the potential to facilitate the introduction of greater flexibility into its waste collection standards in the future as the City potentially experiences a more intense densification of its built-up area.

This section offers an overview of best practices drawn from various cities worldwide that have implemented innovative initiatives to enhance their waste management services. These initiatives are designed not only to improve operational efficiency but also to foster positive economic, social, and environmental outcomes. Among these strategies are integrated waste management and social inclusion, the promotion of innovative waste collection services, and the utilization of digital mapping for solid waste management.

The showcased examples have been sourced from two reports[13,14] produced by the C40 Cities Climate Leadership Group, a global network that comprises nearly 100 mayors from cities around the world who are collaboratively addressing the climate crisis. These cities are actively engaged in critical areas aimed at reducing greenhouse gas emissions and mitigating climate risks. By drawing inspiration from such innovative practices, the City of Hamilton can position itself to navigate its challenges in waste management while striving for sustainability and resilience in the long run.

[13] C40 Cities. (2016). *Good Practice Guide: Sustainable Solid Waste Systems*. Retrieved from: https://www.c40.org/wp-content/uploads/2022/02/C40-Good-Practice-Guides-Sustainable-Solid-Waste-Systems.pdf

[14] C40 Cities. (2020). *C40 Advancing Towards Zero Waste Declaration*. Retrieved from: https://www.c40.org/wp-content/uploads/2022/02/C40-Advancing-Towards-Zero-Waste-Declaration_Public-progress-report_Feb-2022.pdf

6.1 Buenos Aires

Buenos Aires, the capital city of Argentina, introduced a Municipal Solid Waste Reduction Project aiming to reduce landfill waste through waste separation, recovery, and recycling (Figure 12). They aimed to create a shared sense of responsibility for waste management amongst citizens through education campaigns. Additionally, the city has made significant investments into local recycling centers for organic and recyclable materials. This has made waste sorting and reduction more accessible to local communities, leading to a reduction in overall landfill use, simultaneously reducing emissions from waste transportation.

Figure 12 - Recycling collection spot in Buenos Aires[15]

6.2 Bogota

Bogota, the Colombian capital city, has created a zero-waste education program that aims to integrate all members of society and change waste management behaviours. This program focuses on a behavioural shift in waste practices emphasizing the reduce-reuse-recycle model, moderated consumerism, and social integration at all levels. While this program explicitly targets the informal economy and underserved workers, it has had

[15] Source: La Defensoría del Pueblo de CABA. Retrieved from: https://defensoria.org.ar/noticias/consejos-de-reciclaje-para-un-ambiente-sano-2/

success at all social levels in reducing CO_2 emissions as well as the cost of waste collection services by 15%.

6.3 Dhaka

Dhaka, the capital city of Bangladesh, has partnered with an NGO to transform its organic waste into fertilizer at 5 decentralized community-based composting plants. The fertilizer is then sold off to companies. While profits belong to the NGO, it the initiative has also helped create new jobs, as well as offset CO_2 emissions and local contamination. This approach was an effective solution for adopting options beyond landfill disposal and boosting the local economy.

6.4 Boston

Boston, Massachusetts, has implemented a comprehensive municipal residential recycling and composting program that focuses on waste separation at the source, including yard waste collection as part of the curbside collection services. Additionally, the city has provided neighbourhood textile drop boxes (Figure 13) for the decentralized textile collection to promote textile recycling.

Figure 13 - Textiles drop boxes in Boston[16]

[16] Source: The Boston Scope. Retrieved from: https://thescopeboston.org/5419/news-and-features/news/have-old-clothes-you-plan-to-throw-in-the-trash-you-can-now-recycle-them-through-city-drop-boxes-instead/

6.5 Milan

Milan, Italy, has implemented a waste weighing system during the collection phase and allow for the identification of users. This has helped the city target areas of higher waste production in the city. Additionally, Milan has created tax-based incentives for the reduction of food waste. These programs have contributed to a local waste reduction rate of 63%.

6.6 San Francisco

San Francisco, California, launched the "ReThink Disposable" initiative, initially targeting food service businesses in a specific district, to transition to reusable foodware. This project has now been extended city-wide. Additionally, San Francisco is collaborating with local non-profits and restaurant associations for the "Reusables Win" campaign, promoting the adoption of reusable items in restaurants. The city has utilized a $500,000 state grant to help large food businesses minimize food waste and donate edible items, employing advanced data technology tools. Furthermore, San Francisco continues to offer new grants to non-profits for developing unique approaches in source reduction, reuse, recycling, and composting.

6.7 New York City

New York City, United States, has banned single-use foam products, supported a state-level prohibition on plastic bags, and introduced a 5-cent charge on paper bags to encourage the use of reusable alternatives. To improve its waste diversion rate, New York City is focusing on a significant portion of its waste stream by reinstating and expanding its curbside composting program and increasing the availability of food scrap drop-off locations (Figure 14) for community composting.

Additionally, New York City is broadening various programs targeting materials beyond traditional recyclables like metal, glass, plastic, and paper. These initiatives include the

proper disposal of electronics, textiles, and hazardous household waste, helping to divert these more challenging materials from landfills and incinerators.

Figure 14 - Drop-off composting site in New York City[17]

6.8 The main takeaways

While the exploration of international practices may not align perfectly as case studies offering immediate insights for the City to address its current issues, they serve as a valuable resource for envisioning and shaping the city's future. The variety of inspiring models from both the Global North and the Global South suggests that certain initiatives could be effectively incorporated within the context of Hamilton.

[17] Source: Brooklyn Paper. Retrieved from: https://www.brooklynpaper.com/smart-compost-bins-appear-in-bed-stuy/

7. KEY FINDINGS AND CONSIDERATIONS

The challenges faced by developers in meeting waste collection standards in high-density developments highlight a disconnect between these policies and the City's objectives to intensify its built-up areas, particularly within the MTSAs. Specifically, local developers face challenges in meeting guidelines related to continuous forward motion, turnaround requirements, storage requirements, and the private pickup process. However, examining how nearby municipalities address these specific issues reveals a consistent pattern across the Greater Golden Horseshoe Area, with slight variations among the municipalities. In terms of future work beyond these suggestions the following two distinct assumptions require further exploration:

1. There is a widely disseminated over-restrictive approach across the region concerning waste collection guidelines. This may necessitate adaptations to accommodate the region's intense population growth and the province's goal to concentrate that population in built-up areas, particularly around transit stations. It could even warrant a provincial initiative mandating municipalities to adopt more flexible guidelines suited for high-density areas.
2. The restrictive guidelines might reflect technical and financial constraints requiring the municipality to adopt specific standards to provide pickup services with quality and efficiency. In this scenario, further investigation is necessary to identify the specific causes leading to these restrictive guidelines. This knowledge would guide the City in determining the measures needed before adopting more flexible guidelines, ensuring it does not overwhelm its own capacity.

8. EVALUATING ALTERNATIVES AND RECOMMENDATIONS

Close collaboration with all stakeholders involved, particularly local developers, is crucial to achieving a set of guidelines that ensures high quality waste collection while adapting to the city's current intensification. The key findings highlighted in this report suggest a variety of ways for the City of Hamilton to address the mismatch between the municipality's design standards and its current intensification.

- There are several road design technologies available that enable more precise studies on the feasibility of vehicle movement. The city could allow developers to adopt these technologies and include vehicle movement studies in the development's application material, resulting in increased efficiency and accuracy when reviewing applications.
- The city may consider increasing the frequency of waste collection in areas facing intense densification to meet the growing demand for this service. A higher collection frequency would address the increased demand while enabling the city to reduce storage requirements. This, in turn, would provide developers with more space to build additional residential units.
- Adopting clear directions and more well-defined guidelines would facilitate streamlining practices, resulting in faster application process approvals. This is particularly critical in the context of the urgent need for increased housing supply in the region. While the application process for private pickup was identified as a main point requiring clarity, an approach to identify other specific standards lacking clarity which resulted in delays in past development applications processes should also be considered.
- The City may consider implementing a tax rebate policy as a solution for situations where the minimum requirements for eligibility for public waste collection services are not met. In such cases, residents living in developments that do not meet the specified criteria would be eligible for a tax rebate, effectively exempting them from

the financial burden of paying for a service that is collectively funded by their taxes. This approach acknowledges that not all developments may be able to comply with the minimum requirements for public waste collection and seeks to mitigate any potential financial strain on residents.

Table 2 provides additional policy recommendations for each of the four key issues addressed in this report.

Turnaround Requirements	▪ Permit for feasibility studies to be provided through *AutoTurn* or other recognized software ▪ Remove the restriction placed on areas adjacent to the turning area
Continuous Forward Motion	▪ Permit for feasibility studies to be provided through *AutoTurn* or other recognized software ▪ Allow for waste removal vehicles to reverse and/or make more than 3-point turns
Storage Requirements	▪ Increase garbage collection days for high density areas ▪ Allow in-ground waste collection bins, which can help maximize capacity and efficiency
Private Pickup Process	▪ Private pickup process should be transparent and simple ▪ Some form of property tax rebate should be contemplated especially if public pickup feasibility is demonstrated but still not accepted

Table 2 - Recommendations for policy updates

While there is a sense of urgency among stakeholders to address the issues discussed, the City may also explore innovative strategies to enhance waste management efficiency in the long run. Measures to reduce waste could lead to a decreased need for pickup, and, as illustrated by international examples, circular economy initiatives can be integrated into strategies to achieve positive economic, social, and environmental outcomes.