

2023 Waste Management Asset Management Plan



HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table of Contents

SUMMARY AND QUICK FACTS	6
1. INTRODUCTION	8
2. BACKGROUND	9
2.1 SERVICE PROFILE.....	9
2.1.1 SERVICE HISTORY	9
2.1.2 SERVICE FUNCTION.....	10
2.1.3 USERS OF THE SERVICE.....	12
2.1.4 UNIQUE SERVICE CHALLENGES	14
2.2 LEGISLATIVE REQUIREMENTS	14
2.3 ALIGNMENT WITH COUNCIL PRIORITIES	15
2.4 ASSET HIERARCHY	16
3. DETAILED SUMMARY OF ASSETS	18
3.1 ASSET CONDITION GRADING	22
3.2 ASSET CLASS PROFILE ANALYSIS.....	24
3.2.1 <i>LANDFILLS</i>	24
3.2.1.1 LANDFILLS - AGE PROFILE.....	24
3.2.1.2 LANDFILLS - CONDITION METHODOLOGY	25
3.2.1.3 LANDFILLS - ASSET CONDITION PROFILE	26
3.2.1.4 LANDFILLS - ASSET USAGE AND PERFORMANCE	27
3.2.2 <i>FACILITIES</i>	28
3.2.2.1 FACILITIES - AGE PROFILE.....	28
3.2.2.2 FACILITIES - CONDITION METHODOLOGY	29
3.2.2.3 FACILITIES - ASSET CONDITION PROFILE.....	30
3.2.2.4 FACILITIES - ASSET USAGE AND PERFORMANCE	30
3.2.3 <i>FLEET AND EQUIPMENT</i>	32
3.2.3.1 FLEET AND EQUIPMENT - AGE PROFILE.....	32
3.2.3.2 FLEET AND EQUIPMENT - CONDITION METHODOLOGY	33
3.2.3.3 FLEET AND EQUIPMENT - ASSET CONDITION PROFILE.....	34
3.2.3.4 FLEET AND EQUIPMENT - ASSET USAGE AND PERFORMANCE	35
4. MUNICIPALLY DEFINED LEVELS OF SERVICE	36
4.1 SURVEY METHODOLOGY.....	36
4.2 CUSTOMER VALUES	37
4.3 CUSTOMER LEVELS OF SERVICE	39
4.3.1 CUSTOMER INDICES.....	41

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

4.3.2	TECHNICAL LEVELS OF SERVICE	44
4.3.3	PROPOSED LEVELS OF SERVICE DISCUSSION	47
5.	FUTURE DEMAND	49
5.1	DEMAND DRIVERS	49
5.2	DEMAND FORECASTS	49
5.3	DEMAND IMPACT AND DEMAND MANAGEMENT PLAN	49
5.4	ASSET PROGRAMS TO MEET DEMAND	51
6.	RISK MANAGEMENT	52
6.1	CRITICAL ASSETS	52
6.2	RISK ASSESSMENT	53
6.3	INFRASTRUCTURE RESILIENCE APPROACH	54
6.4	SERVICE AND RISK TRADE-OFFS	54
7.	CLIMATE CHANGE MITIGATION & ADAPTATION	56
7.1	CLIMATE CHANGE MITIGATION	56
7.2	CLIMATE CHANGE ADAPTATION	60
8.	LIFECYCLE MANAGEMENT PLAN	67
8.1	ACQUISITION PLAN	68
8.2	OPERATIONS AND MAINTENANCE PLAN	71
8.3	RENEWAL PLAN	75
8.4	DISPOSAL PLAN	79
8.5	SUMMARY OF CURRENT ASSET FORECAST COSTS	80
9.	FINANCIAL SUMMARY	82
9.1	SUSTAINABILITY OF SERVICE DELIVERY	82
9.2	FORECAST COSTS FOR THE LONG-TERM FINANCIAL PLAN	84
9.3	FUNDING STRATEGY	85
9.4	VALUATION FORECASTS	85
9.5	ASSET VALUATIONS	86
9.6	KEY ASSUMPTIONS MADE IN FINANCIAL FORECASTS	86
9.7	FORECAST RELIABILITY AND CONFIDENCE	87
10.	PLAN IMPROVEMENT AND MONITORING	89
10.1	STATUS OF ASSET MANAGEMENT PRACTICES	89
10.2	IMPROVEMENT PLAN	89
10.3	MONITORING AND REVIEW PROCEDURES	95

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

10.4 PERFORMANCE MEASURES	96
---------------------------------	----

Appendix A: Survey Analysis	97
------------------------------------	-----------

Tables & Figures

Table 1: Legislative Requirements	14
Table 2: Asset Class Hierarchy	16
Table 3: Detailed Summary of Assets.....	18
Table 4: Equivalent Condition Grading	23
Table 5: Inspection and Condition Information	26
Table 6: Known Service Performance Deficiencies	28
Table 7: Inspection and Condition Information	29
Table 8: Known Service Performance Deficiencies	31
Table 9: Known Service Performance Deficiencies	35
Table 10: Customer Values	37
Table 11: Customer Levels of Service	40
Table 12: Customer Indices.....	41
Table 13: Technical Levels of Service	45
Table 14: Demand Management Plan	50
Table 15: Critical Assets	52
Table 16: Risks and Treatment Plans.....	53
Table 17: Services And Risk Trade-Offs.....	55
Table 18: Climate Change Demand - Mitigation	58
Table 19: Building Asset Mitigation to Climate Change	60
Table 20: Managing the Demand of Climate Change on Assets and Services.....	61
Table 21: Adapting to Climate Change	65
Table 22: Operation and Maintenance Summary	72
Table 23: Useful Lives of Assets	75
Table 24: Assets Identified for Disposal.....	79
Table 25: Forecast Costs For the Long-Term Financial Plan .	85
Table 26: Data Confidence Assessment for Data Used in AM Plan	87
Table 27: Improvement Plan.....	90
Figure 1: Hamilton Waste Services	13
Figure 2: Landfill Age Profile.....	25
Figure 3: Landfill Asset Condition Distribution	27
Figure 4: Facilities Age Profile	28
Figure 5: Facilities Asset Condition Distribution.....	30
Figure 6: Fleet and Equipment Age Profile	32
Figure 7: Fleet and Equipment Asset Condition Distribution.....	34
Figure 8: Importance Versus Performance Index Score	42
Figure 9: Net Promoter Score.....	43
Figure 10: Rates Versus Value for Money Index Score	44
Figure 11: Acquisition (Constructed) Summary	69

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Figure 12: Acquisition Summary.....	70
Figure 13: Operations and Maintenance Summary	74
Figure 14: Forecast Renewal	78
Figure 15: Summary of Current Asset Forecast	80

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

SUMMARY AND QUICK FACTS

SERVICE PROFILE



Waste Management provides waste collection, processing, and disposal of solid waste within the City of Hamilton. The Purpose of this Asset Management Plan (AM Plan) is to ensure that Waste Management has the required assets to deliver safe and effective waste management services to the City. This service is delivered using a combination of city staff and contracted resources.

ASSET SUMMARY



Replacement Value
\$560M

FAIR CONDITION
Average Age of **39** years
or **43%** of the average
remaining service life



Level of Service Summary

- Average survey respondents felt Waste Management has had Good performance overall the last 24 months.
- Average survey respondents agreed that waste collection vehicles were operated safely in the community.
- Average survey respondents felt Waste management provided Good value for money.
- Average survey respondents indicated that Waste Management meets their needs overall.
- Average survey respondents indicated Waste Management rarely missed a collection



Asset Highlights				
ASSETS	QUANTITY	REPLACEMENT COST	AVERAGE CONDITION	STEWARDSHIP MEASURES
Waste Management Facilities	10	\$284.6M	Good	Building Condition Assessments
Waste Management Landfills & Site Assets	13 (1 Open, 12 closed)	\$258.2M	Fair	Regular Inspections and Maintenance
Fleet	43 Packer Trucks 30 support Vehicles	\$15.6M	Poor	Regular Maintenance

DATA CONFIDENCE



VERY GOOD

FAIR

VERY LOW



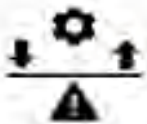
HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

DEMAND DRIVERS

Population change – Hamilton’s population will continue to grow, and Waste Management will likely see an increase in a number of residences that need service which will require additional collection vehicles and staff.

Environmental Awareness – Waste Management may be impacted by new services/processes for new waste streams. This may change the way waste is collected and processed in the future.

Regulatory Change – Implementation of the Expanded Producer responsibility model in 2025 as legislated will change the collection of recycling in the City.



RISK

- Critical Assets are identified as Leachate pumping station and the Open Landfill

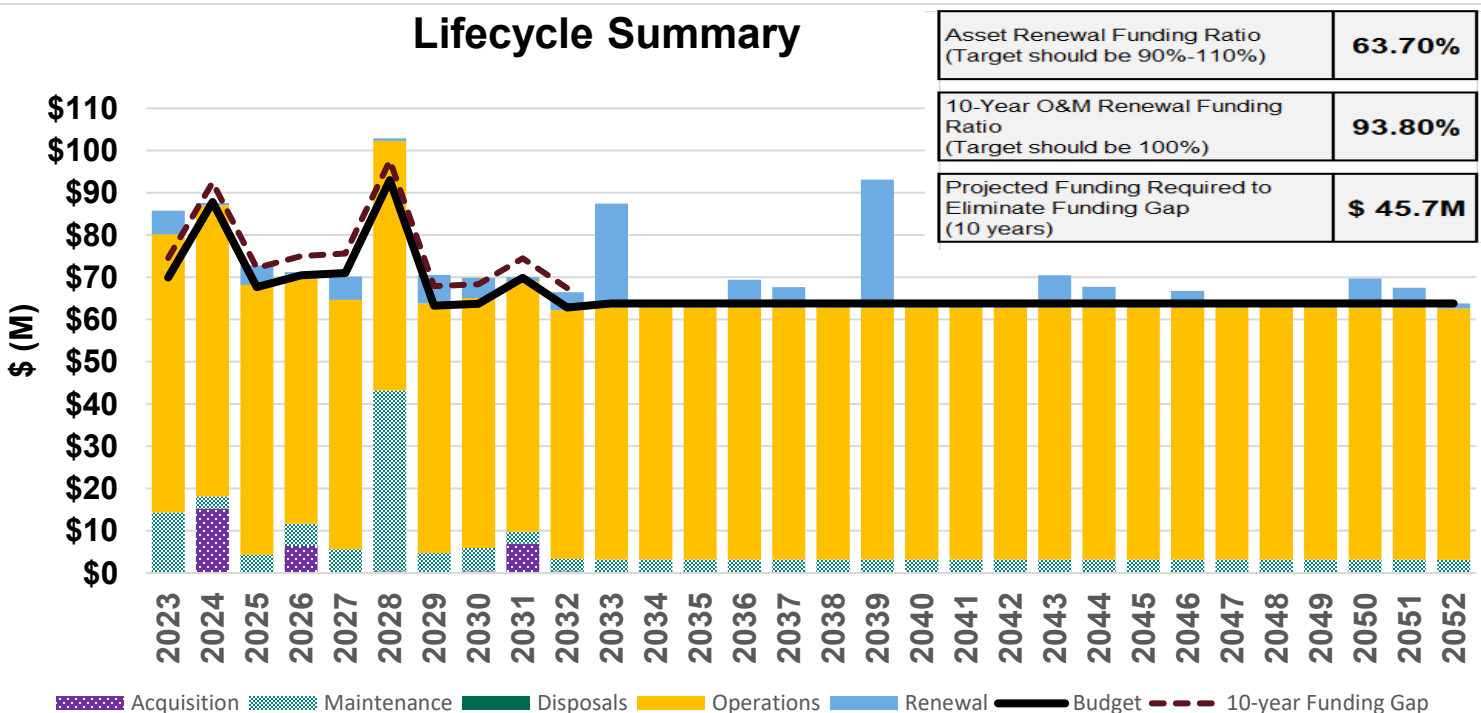


CLIMATE CHANGE MITIGATION

- Conduct feasibility studies to consider renewables on existing facilities
- Fleet transformation from diesel to natural gas vehicles
- Key Contributor to action 17 in the energy emissions plan goal of 95% organic waste sent to anaerobic digestion by 2050

LIFECYCLE SUMMARY

Lifecycle Summary



HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

1. INTRODUCTION

Waste Management provides waste collection, processing, and disposal of solid waste within the City of Hamilton. The Purpose of this Asset Management Plan (AM Plan) is to ensure that Waste Management has the required assets to deliver safe and effective waste management services to the City.

This AM Plan is intended to communicate the requirements for the sustainable delivery of services through the management of assets, compliance with regulatory requirements and required funding to provide the appropriate levels of service over the 2023 to 2052 planning period.

The Waste Management Division assets include Transfer Stations, Community Recycling Centres (CRC), Glanbrook Landfill (which includes the Leaf Waste Composting Facility), scale houses, and Resource Recovery Centre (RRC) facilities that include the Waste Collection office/yard, Material Recycling Facility (MRF) and Central Composting Facility (CCF). The City owns machinery and equipment used for operations at its facilities and by its customers and contracted service providers.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

2. BACKGROUND

The information in this section is intended to give a snapshot in time of the current state of Waste Management's service areas by providing background on the service, outlining legislative requirements, defining the asset hierarchy used throughout the report, and providing the detailed summary and analysis of the existing inventory information as of February 28, 2023 including age profile, condition methodology, condition profile, and asset usage and performance for each of the asset classes. This section will provide the necessary background for the remainder of the AM Plan.

2.1 SERVICE PROFILE

Listed below are related documents reviewed in preparation of the Asset Management Plan:

- Asset Management Plan Overview Document;
- City of Hamilton 2012 Solid Waste Management Master Plan;
- City of Hamilton Solid Waste Management 2020 Master Plan Update; and,
- Solid Waste Management Master Plan Five-Year Review (PW200072).

Additional financial related documents are identified in **Section 10** Plan Improvement and Monitoring.

The service profile consists of four (4) main aspects of the service:

- Service History;
- Service Function;
- Users of the Service; and,
- Unique Service Challenges.

2.1.1 SERVICE HISTORY

Waste management is a fundamental service provided by municipal governments. An effective and efficient waste management system is essential for preserving and enhancing healthy and safe communities.

Between 2000 and 2001 the City of Hamilton (the City) developed its first modern Solid Waste Management Master Plan (SWMMP) which included nineteen (19) recommendations intended to guide the service for the next twenty-five (25) years. In 2012 a new Solid Waste Management Master Plan was developed building on the guiding principles from 2001 and updated to include the community's philosophy and the provincial waste management value chain of reduce, reuse, divert and dispose.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

In 2020 a Solid Waste Management Master Plan update was prepared to operationalize the final five years of the existing SWMMP to include eleven (11) action items to guide the Waste Management System (2021 to 2025).

The City is developing a new Solid Waste Management Master Plan with a targeted completion in 2025. It is expected that this SWMMP will investigate changes to waste collection and processing in the City including development of a new organics processing strategy and will consider future stages beyond the current Glanbrook Landfill. Once completed this SWMMP will require updating of the AM Plan as it will likely propose changes to existing facilities, assets, processes, and current and future Levels of Service.

The City provides waste management programs to the community through a mix of municipal and contracted service models. The collection of garbage, green bin organics and yard waste is provided by both municipal and contracted forces within assigned geographic boundaries, and the recycling program being entirely provided by a contracted service.

Waste Management has multiple third-party contracts in place as part of the service delivery. These contracts have different terms and end dates. Any changes to services or processes may require renegotiation of these contracts or may need to wait until the current contracts have ended and changes defined in new contracts.

2.1.2 SERVICE FUNCTION

Waste Management provides services to residents and businesses in the City of Hamilton. Waste Management operates solid waste management facilities and programs to increase the recycling, reduction, and reuse of waste materials to maximize landfill life while protecting the natural environment. The service also supports downtown cleanliness to create a vibrant and clean downtown. Waste Management is also involved with providing waste diversion services for festivals and special events. Waste Management requires assets in order to provide these services.

Curb side waste collection services are delivered through a combination of City of Hamilton staff and a contracted service. The City is divided into six geographical zones identified as A1, A2, A3, B1, B2 and B3 which include urban, suburban, and rural areas. The Contractor is responsible for recycling collection services in all six zones. City staff collect garbage, green bin, leaf and yard waste and bulk waste in the A Zones while the contractor is responsible for collecting the same waste streams in the three B zones.

The City owns the Materials Recovery Facility (MRF) and contracts out the operation of this facility to process blue box materials. The future of the MRF will be subject to review once the City changes over to the Expanded Producer Responsibility Model for the collection and processing of recyclable material. The City's Central Composting Facility (CCF) which treats green bin organic waste began operating in 2006. The facility has a rated capacity of 60,000

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

tonnes per year and currently has approval to process up to 20,000 tonnes per year of household organic materials collected through the green bin program. The City owns the CCF building and equipment and operations to run the facility are completed under contract.

The City owns three Community Recycling Centres (CRC) and three co-located Transfer Stations (TS) which are also operated under contract. The Mountain CRC also has a reuse store where the public can purchase reusable items which diverts items from the waste stream. The CRCs are available for use by the general public. Transfer stations are used by commercial customers and municipal waste collection trucks only. The City owns the Glanbrook Landfill, which is operated under a contract with a service provider. The facility includes the landfill, landfill gas-to-energy facility, and yard waste processing facility. The landfill gas-to-energy facility is operated under contract. City staff are responsible for contract management and environmental monitoring at the sites. Waste Management is also responsible for monitoring and continuous care of the City's twelve (12) closed landfills.

Public space litter container collection includes roadsides, transit stops, and special events. As with other services, the City has a combination of in-house and contracted services for waste collection from containers.

Waste Management also has responsibility for the Downtown Cleanliness Program which has dedicated staff and equipment to maintain the cleanliness of sidewalks, provide litter collection services, collect waste from specific alleyways, and provide collection support to the division in the downtown area.

Waste also provides development review services related to developing and implementing standards for development and growth and implementation of waste collection for eligible developments. This ensures that waste can be efficiently collected from new developments.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

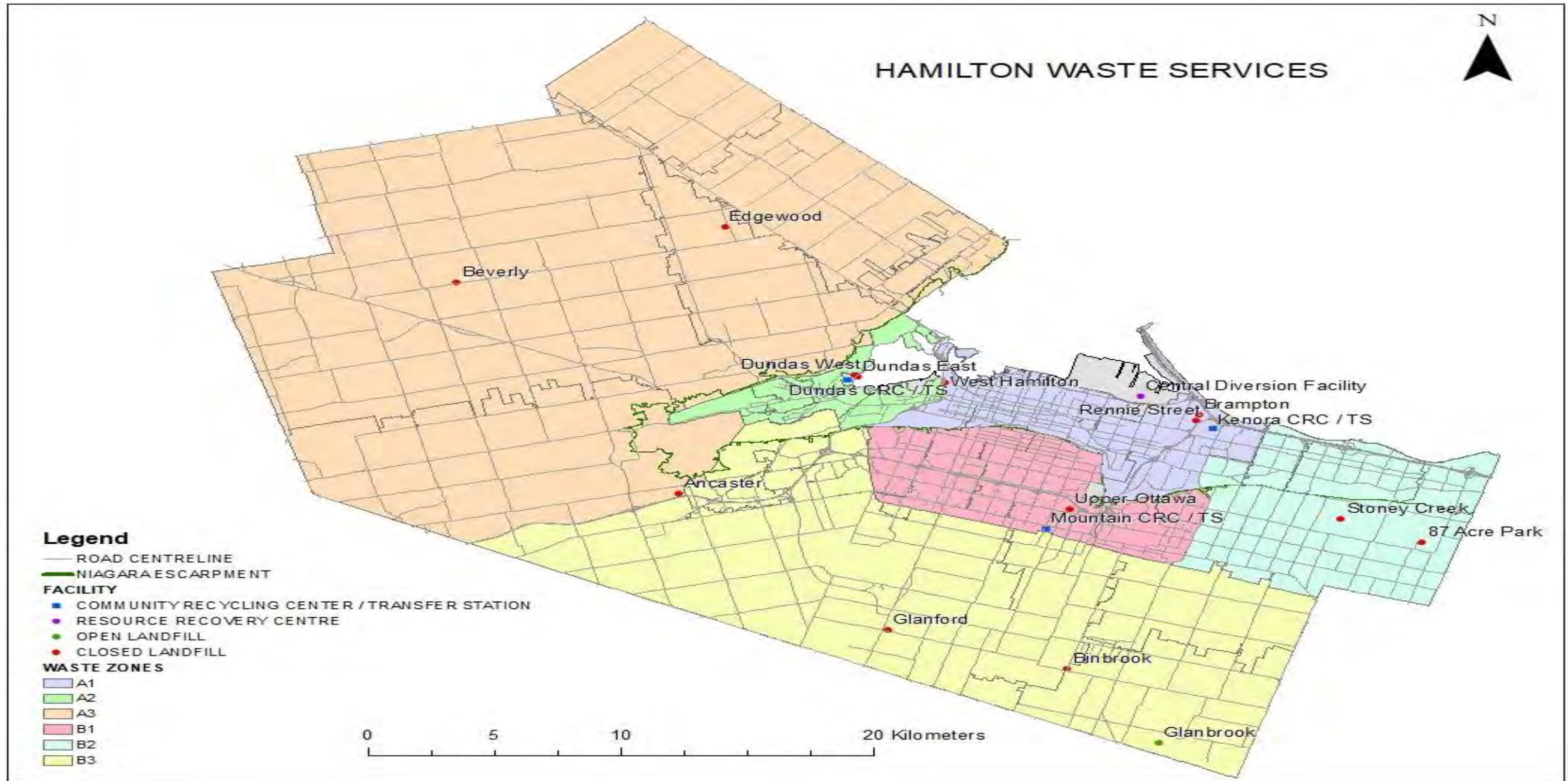
2.1.3 USERS OF THE SERVICE

The City of Hamilton is comprised of a diverse population living in diverse housing types. To meet the needs of users, waste management must be equipped to collect waste from all building types such as multi-unit residential buildings, commercial properties along narrow alleyways, public parks, residential streets, and locations on high-volume roadways all with differing population densities.

Based on the 2021 (2016) Census results¹, Hamilton's population is 569,353 (536,917), and the average household size is 2.5 (2.5) people. Nearly 72% (72%) of houses are single/row/semi with 28% (28%) multi-residential comprising 222,805 (211,605) occupied dwelling units with a population density of 509.1 (480.6) per square kilometre.

¹ <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&GENDERlist=1&STATISTIClist=1&HEADERlist=0&DGUIDlist=2021A00033525&SearchText=Hamilton>

Figure 1: Hamilton Waste Services



HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

2.1.4 UNIQUE SERVICE CHALLENGES

Waste has several unique service challenges including:

- Meeting the historical waste diversion targets set in previous waste management plans which results in the Operating Landfill reaching capacity sooner than anticipated;
- Several waste collection vehicles have exceeded end of life due to challenges in obtaining new vehicles due to pandemic related supply challenges. Resulting in relying on older vehicles with higher maintenance needs causing higher downtime;
- Staffing challenges as side loaders require a single operator and rear packers require two staff. This is a challenge when side loaders break down and need to be replaced with a rear packer to drive the route;
- The current waste collection contract ends in 2028. Any changes to level of service prior to the contract end date would require renegotiation of the waste collection contract;
- In 2025 the Blue Box collection and processing will transition to Expanded Producer Responsibility Model for the collection and processing of recyclable material which will impact existing operating contracts for collection and operation of the Materials Recovery Facility (MRF). This also raises the question of the most appropriate future use of the MRF; and,
- Collection from multi-residential properties with varying degrees of accessibility for waste container storage and collection methods.

2.2 LEGISLATIVE REQUIREMENTS

The most significant legislative requirements that impact the delivery of Waste Management services are outlined in **Table 1**. These requirements are considered throughout the report, and where relevant, are included in the levels of service measurements.

Table 1: Legislative Requirements

LEGISLATION	REGULATION	REQUIREMENT
Environment Protection Act R.S.O 1990, c. E.19	<p>Part V – Waste Management</p> <p>Section 27 - Approval, Waste Management System or Waste Disposal Site</p>	<p>No person shall use, operate, establish, alter, enlarge or extend a waste management system or a waste disposal site except under and in accordance with an environmental compliance approval (ECA).</p> <p>ECA's outline site-specific conditions that the City's waste management systems must operate under. These conditions include, but are not limited to, requirements for inspections, training, environmental monitoring, operational restrictions and record keeping.</p>

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

LEGISLATION	REGULATION	REQUIREMENT
Environment Protection Act R.S.O 1990, c. E.19	O. Reg 101/94 Recycling and Composting of Municipal Waste	A local municipality that has a population of at least 5,000 shall establish, operate and maintain a blue box waste management system. This requires the services of community recycling centers, curbside collection of blue box waste, as well as a material recycling facility for processing. <i>NOTE: to be revoked following blue box transition to Expanded Producer Responsibility Model for the collection and processing of recyclable material</i>
		The leaf and yard waste system of a local municipality that has a population of at least 50,000 must include the collection or acceptance of leaf and yard waste in a manner that is reasonably convenient to the generators of leaf and yard waste in the municipality. This requires the services of a transfer station and community recycling center, curbside collection of leaf & yard waste, and a leaf & yard waste composting facility.
	Each operator and owner of a leaf and yard waste composting site shall ensure that the site is operated in accordance with the monitoring and sampling requirements outlined in the regulation.	
	Reg. 347, R.R.O. 1990 General - Waste Management	As a requirement for operating a municipal hazardous and special waste depot at the transfer stations and community recycling centers, the City must register as a Generator within the Hazardous Waste Program Registry, report on wastes leaving the facilities, and keep records of completed waste manifests.

2.3 ALIGNMENT WITH COUNCIL PRIORITIES

As referenced in the AM Plan Overview in **Section 5.4**, Strategic Alignment, The City's strategic goals and objectives are shaped by internal drivers such as Council approved strategies and plans, as well as external forces such as citizen expectations, and legislative and regulatory requirements. The specific legislative and regulatory requirements for service areas are provided in each AM Plan.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

City objectives provide asset owners with direction regarding levels of service and asset investment priorities. This AM Plan will demonstrate how the City's objectives for core assets can influence levels of service and direct asset expenditures.

2.4 ASSET HIERARCHY

In order to deliver adequate and effective services, Waste Management requires assets. The Waste Management Service Area has been broken down into three (3) asset classes for this AM Plan section: Landfill, Facilities, and Fleet and Equipment.

- **Landfill:** refers to the open and closed landfills and the installed equipment to support landfill function;
- **Facilities:** refers to facilities related to waste processing, collection, and administration; and,
- **Fleet and Equipment** refers to mobile fleet assets and Information Technology (IT) equipment that support waste management. This category also includes public space litter containers as they are deployed throughout the City.

An Asset Hierarchy is also being developed for implementation for the Enterprise Asset Management program (EAM). The hierarchy presented in this AM Plan may be different from the EAM hierarchy.

The asset class hierarchy outlining assets included in this section is shown below in **Table 2**.

Table 2: Asset Class Hierarchy

SERVICE AREA	WASTE MANAGEMENT		
ASSET CLASS	LANDFILLS	FACILITIES	FLEET & EQUIPMENT
Asset	Landfill Sites (All remaining assets not detailed below)	Transfer Stations (TS)	Waste Collection Packer Trucks
	Stormwater Management Ponds	Community Recycling Centres (CRC)*	Waste Support Vehicles
	Pumping Stations	Material Recycling Facility (MRF)	Waste Fleet Equipment
	Leachate Collection Systems	Central Composting Facility	IT Equipment

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

SERVICE AREA	WASTE MANAGEMENT		
ASSET CLASS	LANDFILLS	FACILITIES	FLEET & EQUIPMENT
	Groundwater Monitoring Wells	Leaf and Yard Waste Composting Facility	Public Space Litter Containers
	Landfill Gas Collection Systems	Glanbrook Facilities (Garage/Admin/Scale)	
	Site Assets (Fencing/Roads)		

*Community Recycling Centres include Hazardous Household Waste Collection facilities and the Mountain Reuse Centre.

**Administrative Facilities are combined into the MRF/CRC and Glanbrook garage facilities at this time.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

3. DETAILED SUMMARY OF ASSETS

Table 3 displays the detailed summary of assets for the Waste Management service area. The sources for this data are a combination of data included in the City's database information. It is important to note that inventory information does change often, and that this is a snapshot of information available as of May 31, 2023.

The City owns approximately **\$560M** in Waste Management assets which are on average in **Fair** condition. Assets are a weighted average of **39 years** in age which is **43%** of the average remaining service life (RSL). The majority of the weighting for these averages comes from the Landfill and Central Composting Facility asset classes. For most assets, this means that the City should be completing preventative, preservation, and minor maintenance activities per the inspection reports as well as operating activities (e.g., inspection, cleaning) to prevent any premature failures.

The Corporate Asset Management (CAM) Office acknowledges that some works and projects are being completed on an ongoing basis and that some of the noted deficiencies may already be completed at the time of publication. In addition, the assets included below are assets that are assumed and in service at the time of writing. Finally, it is possible that there are assets that may not be owned by Public Works which may be considered waste management assets which may be missing from this inventory. This has been identified as a continuous improvement item in **Table 27**.

Table 3: Detailed Summary of Assets
***Weighted Average by Replacement Value**

ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% RSL)	AVERAGE EQUIVALENT CONDITION
LANDFILLS				
Landfill Sites	13 (1 Open / 12 Closed)	\$250M (open landfill only)	43 years (43%)	3-FAIR
Data Confidence	Very High	Low	Low	Low
Stormwater Management Ponds	5	\$674K	36 years (64%)	3 - FAIR
Data Confidence	Very High	Low	Medium	Low
Landfill Pump Stations	3	\$1.6M	17 years (58%)	3 - FAIR
Data Confidence	Very High	Low	Very High	Low
Leachate Collection Systems	4000m	\$544K	37 years (63%)	3 - FAIR

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% RSL)	AVERAGE EQUIVALENT CONDITION
Data Confidence	Medium	Low	Low	Low
Groundwater Monitoring Wells	260	\$3.0M	22 years (12%)	5- VERY POOR
Data Confidence	High	Very High	Low	Low
Landfill Gas Collection Systems	1100m	\$117K	32 years (68%)	3 - FAIR
Data Confidence	Medium	Low	Low	Low
Landfill Flare	1	\$350K	16 years (84%)	2 - GOOD
Data Confidence	Very High	Medium	Very High	Low
Site Assets (Fence/Roads)	4500m	\$1.95M	17 years (45%)	4 - POOR
Data Confidence	Medium	Low	Low	Low
SUBTOTAL		\$258.2M	42 years* (43%)*	3-FAIR*
Data Confidence		Low	Low	Low

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

FACILITIES				
ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% RSL)	AVERAGE EQUIVALENT CONDITION
Transfer Station (TS)	3	\$49.7M	41 years (25%)	3 - FAIR
Data Confidence	Very High	Medium	High	High
Community Recycling Centres (CRC)	3	\$19.3M	13 years (76%)	2 – GOOD
Data Confidence	Very High	Medium	High	High
Material Recycling Facility (MRF)	1	\$88.1M	11 years (80%)	2 - GOOD
Data Confidence	Very High	Medium	High	High
Central Composting Facility	1	\$114M	13 years (76%)	2 - GOOD
Data Confidence	Very High	Medium	High	High
Glanbrook Landfill Facilities (Garage/Admin/Scale)	1	\$8.5M	17 years (31%)	2 – GOOD
Data Confidence	Very High	Medium	High	High
Leaf and Yard Waste Composting Facility	1	\$5M	27 years (51%)	2 - GOOD
Data Confidence	Very High	Medium	High	Low
SUBTOTAL		\$284.6M	23 years* (63%) *	2 – GOOD*
Data Confidence		Medium	High	High

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

FLEET AND EQUIPMENT				
ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% RSL)	AVERAGE EQUIVALENT CONDITION
IT Equipment (Computers)	88	\$155K	4 years (20%)	4-POOR
Data Confidence	Medium	Medium	Medium	Medium
Waste Collection Packer Trucks**	43	\$14.2M	5 years (29%)	4-POOR
Data Confidence	High	Medium	High	Low
Waste Support Vehicles**	30	\$1.4M	9 years (0%RSL)	5-VERY POOR
Data Confidence	High	Medium	High	Low
Waste Fleet Equipment**	8	\$0.5M	10 (0%RSL)	5-VERY POOR
Data Confidence	High	Medium	High	Low
Public Space Litter Containers	724	\$960K	No Data	No Data
Data Confidence	Medium	Medium	Very Low	Very Low
SUBTOTAL		\$17.2M	5 years* (26%)*	4-POOR*
Data Confidence		Medium	High	Low
TOTAL		\$560.0M	39 years* (43%)*	3-FAIR*
Data Confidence		Low*	Low*	Low*

The overall replacement value data confidence for the registry is Low. Replacement values for the highest value items are generally based on staff expert opinion or inflated values of original purchase/replacement cost estimates. In some of the asset classes there isn't current market data available for replacement value. Generally, landfills as an asset class, are replaced very rarely in the province and developing an accurate replacement value is difficult given the low sample size. For facilities, these replacement costs are calculated using an internal tool which

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

encompasses current market rates, building type and size. Fleet, equipment and technology assets replacement costs were gathered from the most recent purchase price for similar assets.

The overall average age data confidence is rated as Low as most of the highest replacement value asset classes data is largely estimated based on staff expert opinion. Data confidence is much higher for facilities and fleet and equipment hierarchy as service dates are generally known for these asset types.

The overall average condition data confidence is rated as Low. For the majority of the assets the condition is based on age and not based on actual physical inspection and data condition analysis. Exceptions to this are Facilities where, with the exception of the yard waste processing facility, the condition is based on Facility Condition Index (%FCI). More details can be found in **Section 3.2.2.2**


Please refer to the AM Plan Overview for a detailed description of data confidence.

3.1 ASSET CONDITION GRADING

Condition refers to the physical state of the waste management assets and is a measure of the physical integrity of these assets or components and is the preferred measurement for planning lifecycle activities to ensure assets reach their expected useful life. Since condition scores are reported using different scales and ranges depending on the asset, **Table 4** below shows how each rating was converted to a standardized 5-point condition category so that the condition could be reported consistently across the AM Plan. A continuous improvement item identified in **Table 27**, is to review existing internal condition assessments and ensure they are revised to report on the same 5-point scale with equivalent descriptions.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 4: Equivalent Condition Grading



EQUIVALENT CONDITION GRADING CATEGORY	CONDITION DESCRIPTION	% REMAINING SERVICE LIFE	FACILITIES CONDITION INDEX (FCI)
1-Very Good	The asset is new, recently rehabilitated, or very well maintained. Preventative maintenance required only.	>79.5%	N/A
2-Good	The asset is adequate and has slight defects and shows signs of some deterioration that has no significant impact on asset's usage. Minor/preventative maintenance may be required.	69.5% – 79.4%	< 5%
3-Fair	The asset is sound but has minor defects. Deterioration has some impact on asset's usage. Minor to significant maintenance is required.	39.5% - 69.4%	>= 5% to < 10%
4-Poor	Asset has significant defects and deterioration. Deterioration has an impact on asset's usage. Rehabilitation or major maintenance required in the next year.	19.5% - 39.4%	>= 10% to <30%
5-Very Poor	Asset has serious defects and deterioration. Asset is not fit for use. Urgent rehabilitation or closure required.	<19.4%	>= 30%

The following conversion assumptions were made:

- For assets where a condition assessment was not completed, but age information was known, the condition was based on the % of remaining service life; and,
- Facilities Condition Index was based on ranges provided by the consultant who completed the Building Condition Assessment (BCA).

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

3.2 ASSET CLASS PROFILE ANALYSIS

This section outlines the Age Profile, Condition Methodology, Condition Profile, and Performance Issues for each of the asset classes.

- The age of an asset is an important consideration in the asset management process as it can be used for planning purposes as typically assets have an estimated service life (ESL) where they can be planned for replacement. Some lower cost or lower criticality assets can be planned for renewal based on age as a proxy for condition or until other condition methodologies are established. It should be noted that if an asset's condition is based on age, it is typically considered to be of a low confidence level. Although typically, age is used when projecting replacements beyond the 10-year forecast to predict degradation.
- Condition refers to the physical state of assets and is a measure of the physical integrity of assets or components and is the preferred measurement for planning lifecycle activities to ensure assets reach their expected useful life. Assets are inspected/assessed at different frequencies and using different methodologies to determine their condition which are noted in this section.
- Finally, there are often insufficient resources to address all known asset deficiencies, and so performance issues may arise which must be noted and prioritized.

3.2.1 LANDFILLS

Waste Management has one open and active Landfill and maintains twelve (12) closed landfills.

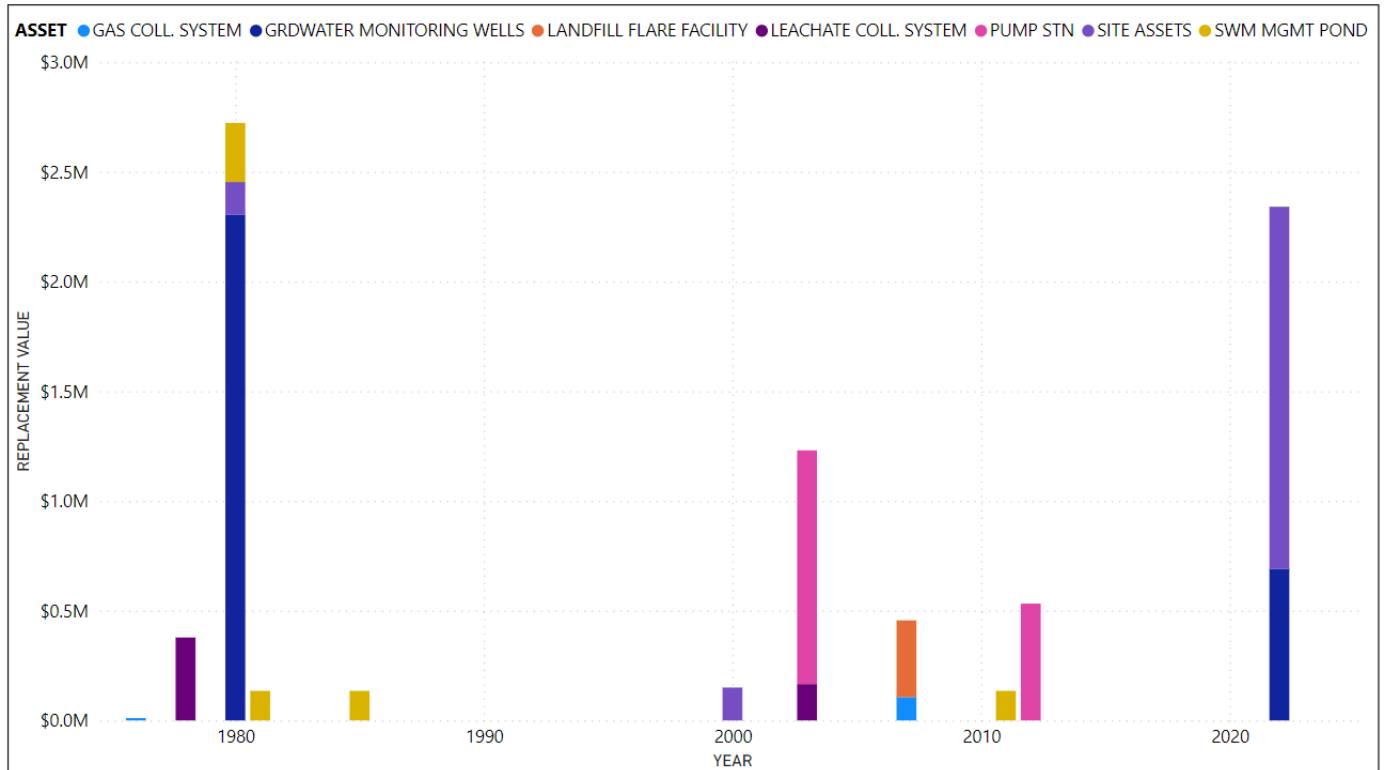
3.2.1.1 LANDFILLS - AGE PROFILE

The age profile of the landfill assets is shown in **Figure 2**. An analysis of the age profile is provided below. For landfill assets, the data confidence for age is typically low because the age of most assets in the Landfills category is assumed to correspond to the date of closure for the closed landfills where those assets are installed.

The Estimated Service Life for many landfills assets is very long. As a legal obligation, closed landfills are essentially maintained into perpetuity and the assets are not readily renewed in their entirety but rather the systems require continual maintenance.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Figure 2: Landfill Age Profile



*The Landfill Age Profile above does not show the Landfill Asset Category, as the Replacement Value of \$250 Million would distort the scale of the remaining assets.

- The gas collection and leachate system are installed in stages as the landfill is constructed and used in phases. The age of these systems is assumed as the same year of closure for the closed landfills and is likely older than assumed; and,
- Age of the groundwater wells was assumed equally distributed across their service life as the actual age distribution is not readily available.

3.2.1.2 LANDFILLS - CONDITION METHODOLOGY

Condition for Waste Management Landfills assets are determined based on remaining service life. Although assets are inspected regularly as part of the Condition of Approval requirements a formalized condition assessment is not completed as part of those inspections. The development of a Condition Rating tied to the regular inspections is a Continuous Improvement Item identified in **Table 27**.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 5: Inspection and Condition Information

ASSET	INSPECTION FREQUENCY	LAST INSPECTION	CONDITION SCORE OUTPUT
Landfill Site Assets (Cover/Vegetation/Drainage control/Fence/Road) All Locations	Semi-Annual	2022	N/A
Leachate Treatment and monitoring facilities inspection and maintenance (6 Locations)	Annual	2022	N/A
Leachate Condition Assessments (6 Locations)	Every 5 years	2015 2020 Delayed due to pandemic To Be Scheduled	N/A
Pumping Stations (3 Locations)	Annual	2022	N/A
Gas Recovery Facilities Inspection and Maintenance (1 Location)	Annual	2022	N/A

3.2.1.3 LANDFILLS - ASSET CONDITION PROFILE

The condition profile for Landfills is shown below in **Figure 3**.

The landfill category includes twelve (12) closed landfills and one (1) open landfill. The condition of the closed landfills is generally rated as unknown as condition is based on age at this time. All landfills are operated and maintained as required under their Environmental Clearance Approvals. The open landfill is listed as 3-FAIR condition solely based on the age of the asset and remaining service life. At this time there is not a weighted overall condition assessment available for the open landfill. The closed landfills are shown as condition unknown however they are regularly monitored, and systems maintained in operating condition as required by legislation and due diligence requirements.

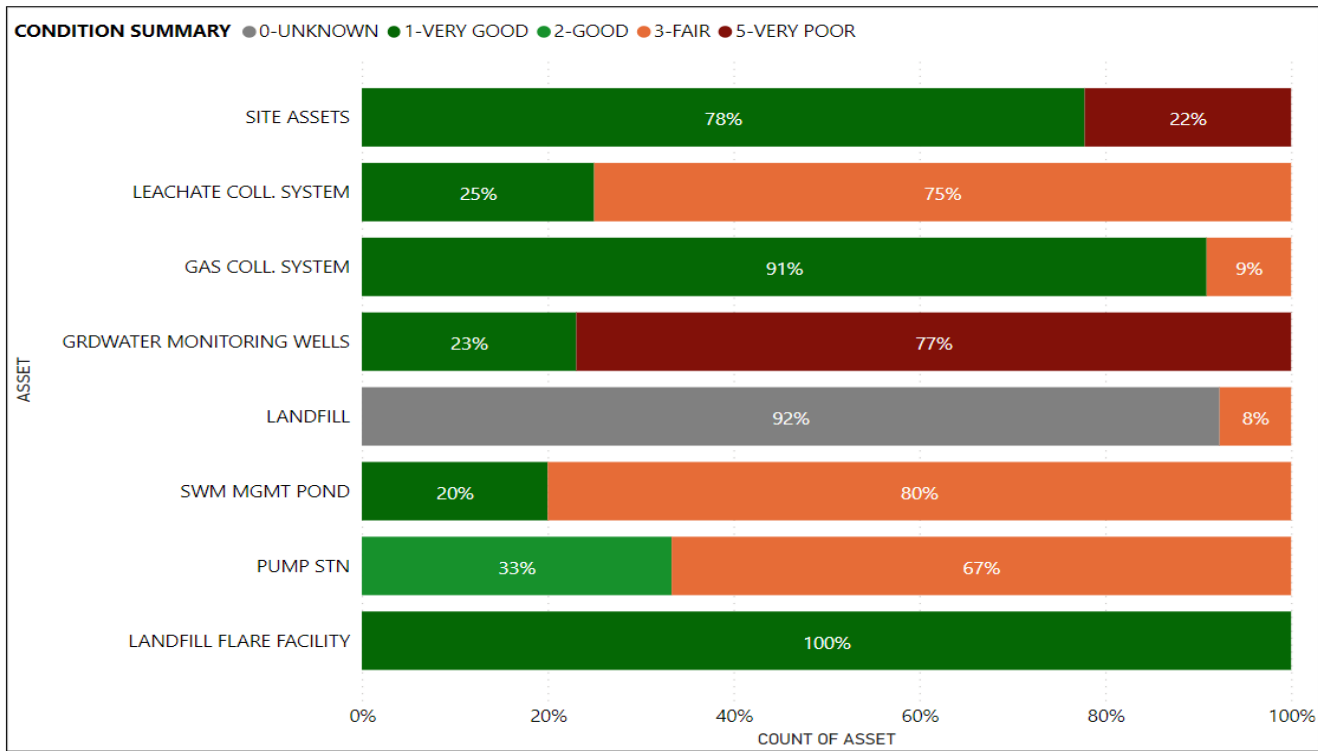
The condition of landfill assets is based on age and remaining estimated service life. A continuous improvement item identified in **Table 27** is to develop a 5-point condition rating scale to be included as part of the regular inspections. In practice landfill assets are generally not permitted to deteriorate below a 3 – FAIR condition in order to be compliant with permit requirements which require regular inspections, monitoring and reporting.

The condition of a majority of the ground monitoring wells is identified as Poor. This is based on assumed age of the assets and not based on an individual condition assessment. The ages of these assets have been assumed in two (2) groupings and is not likely representative of the

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

actual age or actual condition distribution. It is known that several wells do require closure and replacement. For more details, see Asset Usage and Performance **Section 3.2.1.4**.

Figure 3: Landfill Asset Condition Distribution



3.2.1.4 LANDFILLS - ASSET USAGE AND PERFORMANCE

Assets are generally provided to meet design standards where available. However, there are often insufficient resources to address all known deficiencies.

The largest performance issues with Landfill Assets involve groundwater monitoring wells. The known service performance deficiencies in **Table 6** were identified using staff input.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 6: Known Service Performance Deficiencies

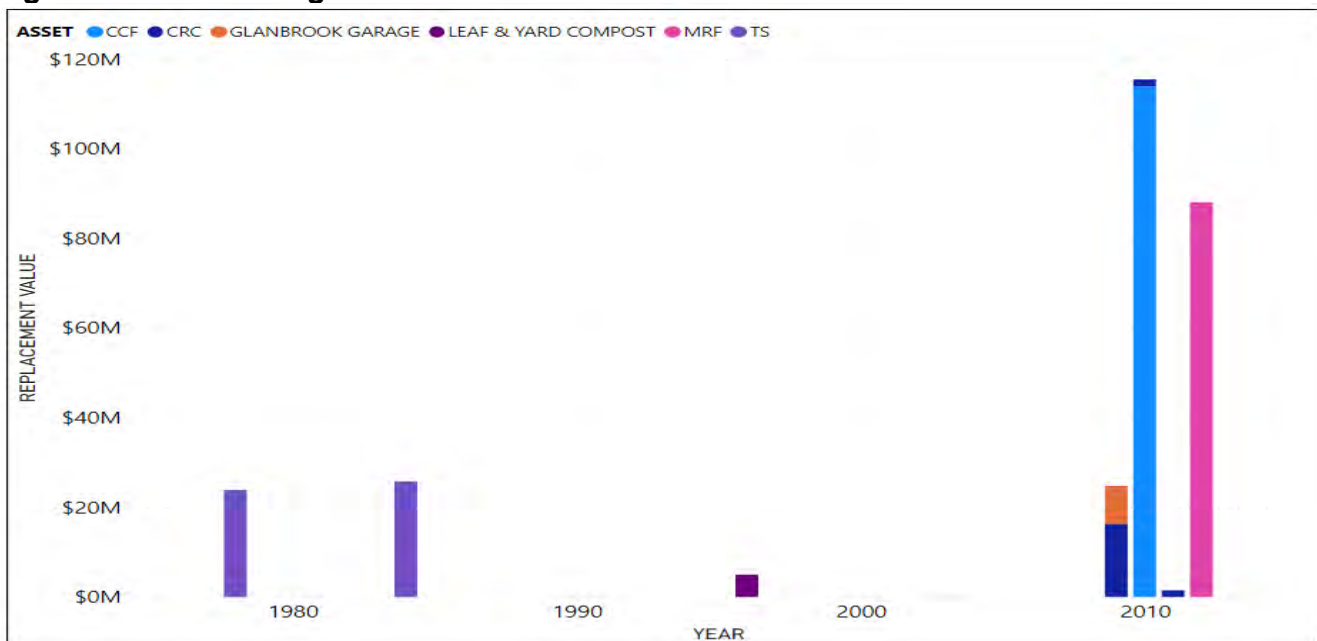
ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Groundwater Monitoring Wells	Various	Some wells exceed service life and require replacement	<p>Wells are not able to provide water for testing due to conditions, and testing must be completed at other wells.</p> <p>An inventory or quantity of these wells is not readily available at this time.</p> <p>Plan to decommission these wells if no longer required and replace some as needed in fall of 2023.</p>

3.2.2 FACILITIES

3.2.2.1 FACILITIES - AGE PROFILE

The age profile of the Waste Management Facilities assets is shown in **Figure 4**. An analysis of the age profile is provided below. For Facilities assets, the data confidence for age is typically high because this data was formally recorded at the time of construction.

Figure 4: Facilities Age Profile



HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

3.2.2.2 FACILITIES - CONDITION METHODOLOGY

Condition for Waste Management facilities is determined based on the results of a Building Condition Assessment (BCA). BCAs are completed on waste facilities every five (5) years and output a score called a Facility Condition Index (FCI) which is considered to be a high confidence level source. The FCI is calculated based on a ratio of the cost of work required on the facility to the total replacement cost of the facility. The condition conversion from FCI to the standardized 5-point scale used in Asset Management is shown in **Table 4**.

The BCA is a visual, surface level inspection which is typically a high confidence indicator of condition but does not involve detailed analysis such as cutting into walls or removing mechanical panels.

Waste Management also completed a Building and Process Equipment Condition Assessment on the CCF in 2020.

Table 7: Inspection and Condition Information

ASSET	INSPECTION FREQUENCY	LAST INSPECTION	CONDITION SCORE OUTPUT
All Facilities	5 Year Regular Facilities Inspection	2020	% Facilities Condition Index (FCI)
Central Composting Facility		2016 2020	Building and Process Equipment Condition Assessment

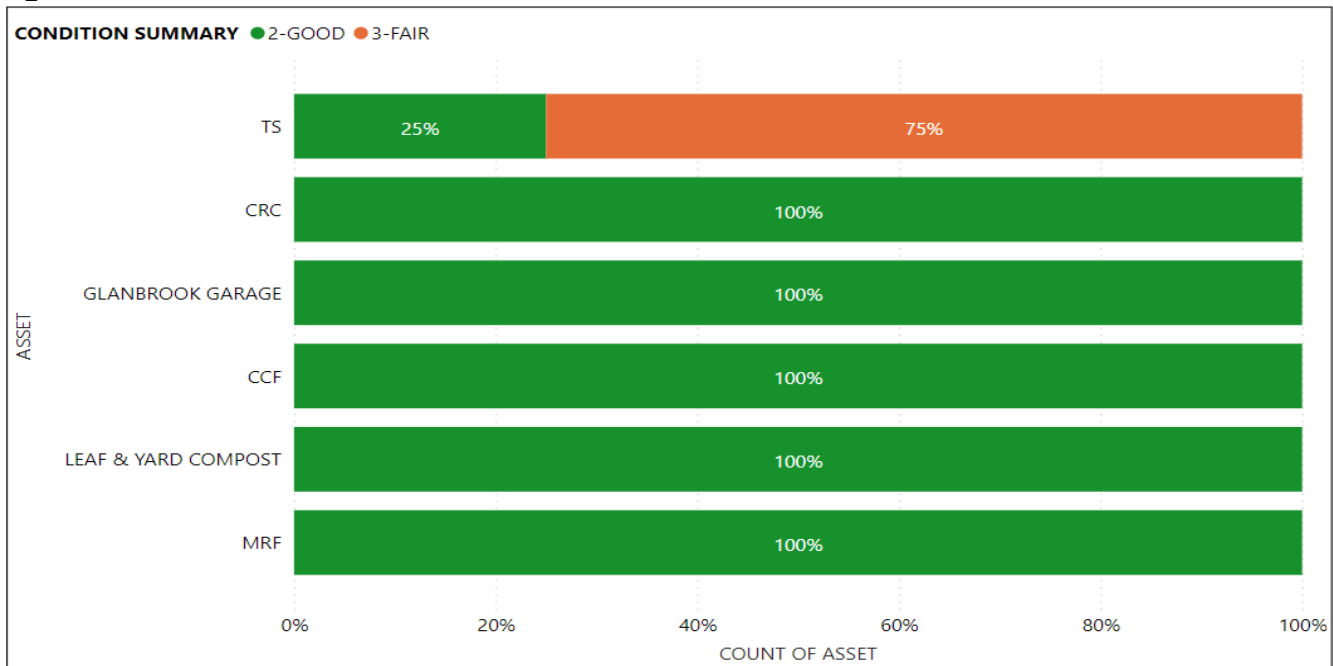
HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

3.2.2.3 FACILITIES - ASSET CONDITION PROFILE

The condition profile for Waste Management Facilities is shown *in Figure 5* below.

Waste Management facilities are generally in Good Condition based on the results of the BCA. Two of the TS facilities are identified as Fair Condition. The condition index also considers any processing equipment located within the facilities as this is part of the BCA evaluation.

Figure 5: Facilities Asset Condition Distribution



3.2.2.4 FACILITIES - ASSET USAGE AND PERFORMANCE

Assets are generally provided to meet design standards where available. However, there are often insufficient resources to address all known deficiencies.

The largest performance issues with Waste Management Facilities involve poor condition of asset components. The known service performance deficiencies in **Table 8** were identified using information from the 2020 Building Condition Assessment (BCA).

The MRF Facility has an uncertain future. This is the City’s recycling processing facility which is currently operated under contract. As part of the change to the Expanded Producer Responsibility Model for the collection and processing of recyclable material the future use and need for this facility is uncertain at this time. Additionally, the current operation uses approximately 70% of the building and the other portion of the building is currently being evaluated on how to use this building most efficiently. This will impact the future replacement value of waste management assets if a portion of this building ends up being used by an outside third party or another city service.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 8: Known Service Performance Deficiencies

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Facilities	Central Composting Facility	Asphalt floor topping in curing storage building in fair to poor condition	The asphalt topping was worn and significantly rutted and cracked at the time of the site assessment including large cracks and uneven sections. The floor topping is considered to be in fair to poor condition.
		South office roof replacement	Blisters, ridges and signs of previously ponded water were found during the site assessment. The roof flashings were also noted to be deficient along the roof to parapet transitions. Failed sealants around flashing details and roof penetrations were also observed. Immediate repair and early term replacement are recommended.
		Bio Digester Roof Replacement	The membrane is blistered and delaminating from the below roof deck structure. Failed sealants around flashing details and roof penetrations were also observed. Immediate repair and early term replacement are recommended.
		Shredder	Shredder is at end of life
		Overhead Filling Machine	Machine showed signs of high wear.
	Dundas Transfer Station	Roof	Roof reported to have some leaks. Lifecycle replacement recommended.
		Tipping Bay concrete Floor	Floor in poor condition with areas of exposed rebar. Entrance observed to be very steep causing difficulty for vehicles to enter.
	Kenora Transfer Station	Tipping bay concrete floor	The floors in the tipping bay were observed to be in poor condition, with many areas of exposed re-bar. Repairs anticipated in 2023.
	Mountain Community	Skylights over storefront and Hazardous	Skylights reported by staff to be leaking. Repairs anticipated in 2023

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

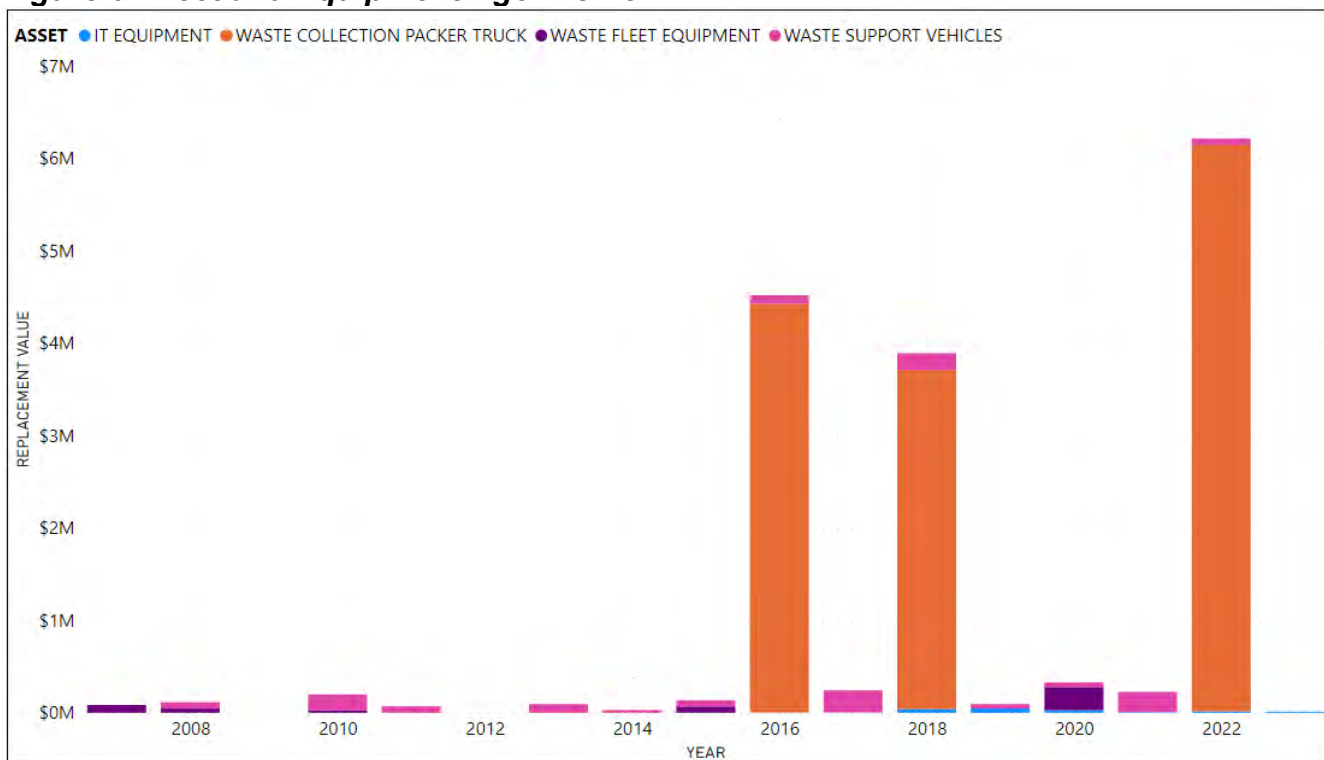
ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
	Recycling Center	household waste sorting area	
	Mountain Transfer Station	Tipping bay concrete floor	The floors in the tipping bay were observed to be in poor condition, with many areas of exposed re-bar.
	Material Recycling Facility	Radiant Tube Heaters	The radiant tube heaters were found to be in poor condition. Replace tube heaters to maintain proper building heating.

3.2.3 FLEET AND EQUIPMENT

3.2.3.1 FLEET AND EQUIPMENT - AGE PROFILE

The age profile of the Fleet and Equipment assets is shown in **Figure 6**. An analysis of the age profile is provided below. For Fleet and Equipment assets, the data confidence for age is typically High because asset ages are formally tracked, and many assets are replaced based on age.

Figure 6: Fleet and Equipment Age Profile



Waste Packer vehicles have an estimated seven (7) year service life. Most other light duty vehicles and equipment have an estimated service life of eight (8) years. Three quarter (¾) ton

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

pickups and some additional equipment is estimated to have a nine (9) year estimated service life. Due to complications from COVID-19 and associated supply chain issues, many vehicle assets are being used for longer durations than anticipated.

It can be seen from the age profile graph that there are significant upcoming replacements required for IT equipment and for Waste Collection Packer Trucks based on age.

Information Technology (IT) Equipment is generally managed by the City's centralized IT group. Estimated service lives are four (4) years for enhanced laptops and five (5) years for laptops and desktop computers.

Public Space litter containers have been omitted from the graph as age information is not available.

3.2.3.2 FLEET AND EQUIPMENT - CONDITION METHODOLOGY

Vehicles are inspected and maintenance activities are conducted at specific intervals throughout the asset's lifecycle, however, no formal condition rating is assigned to each vehicle.

Condition rating is not available for public space litter containers. These are generally a binary, (i.e., they work, or they don't work) type of asset and are replaced as needed. These assets are informally inspected by staff on a regular basis when emptied and issues reported for repair or replacement.

Since there is no formal condition rating for these asset classes based on inspection the condition was estimated using the % of remaining service life and assigned a condition based on the conversion shown in **Table 4**.

A Continuous Improvement item identified in **Table 27** is to incorporate a condition rating during regular vehicle inspection/maintenance activities. This will assist waste with capital forecasting for all vehicles and provide information to make decisions about vehicle renewal.

Table 9: Inspection and Condition Information

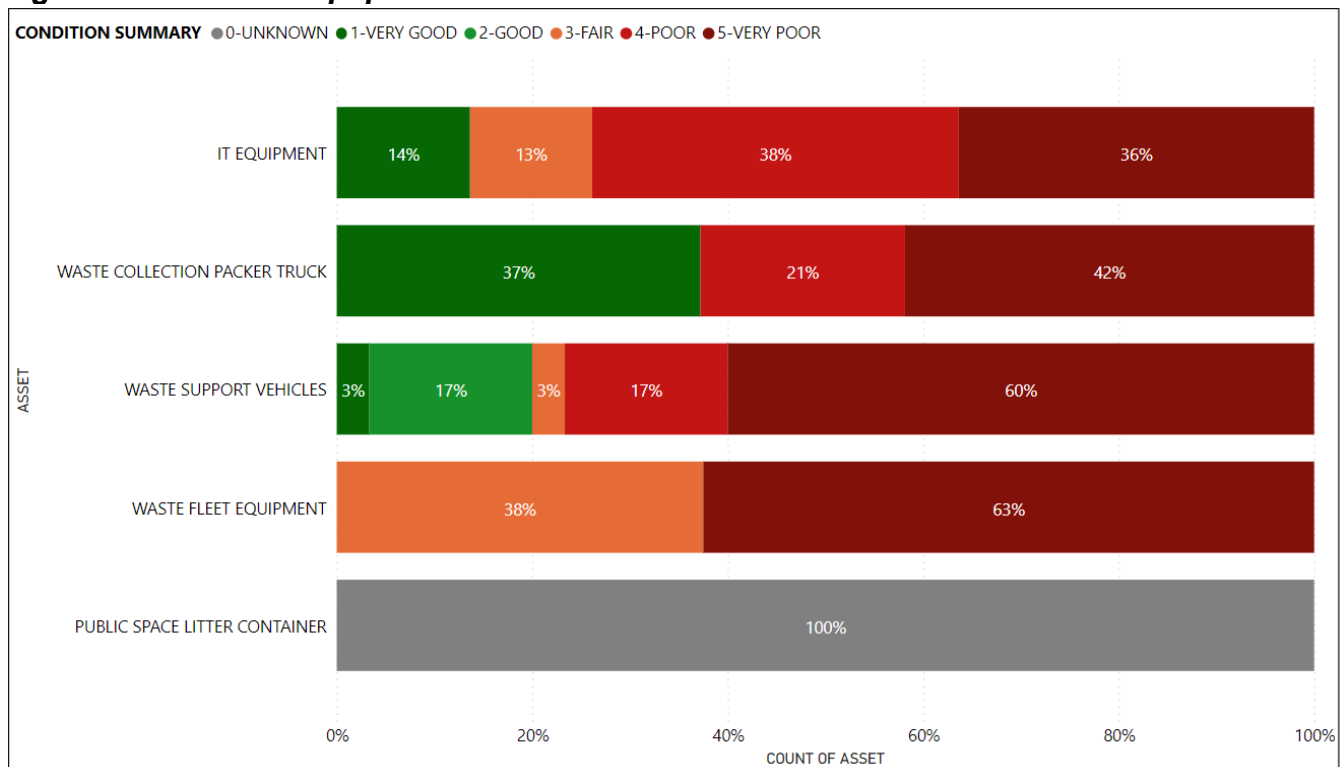
ASSET	INSPECTION FREQUENCY	LAST INSPECTION	CONDITION SCORE OUTPUT
Fleet and Equipment	Ad Hoc	Varies	None
Public Space Litter Containers	Ad Hoc	Varies	None
IT Equipment	Ad Hoc	Varies	None

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

3.2.3.3 FLEET AND EQUIPMENT - ASSET CONDITION PROFILE

The condition profile of Waste Management's Fleet and Equipment assets is shown in **Figure 7**. It can be seen that many of the vehicles and equipment are in Poor or Very Poor condition. The condition was estimated using the % of remaining service life and assigned a condition based on the conversion shown in **Table 4**.

Figure 7: Fleet and Equipment Asset Condition Distribution



There are fourteen (14) extended use vehicles included in the above fleet information. These are vehicles that have already had replacements put into service, but the area is maintaining the replaced vehicle for a period of time beyond the arrival of the replacement vehicle. The extended use vehicles have been included in the age and condition details in the Figures above and contribute to the increased percentage of Very poor vehicles. Extended use vehicles are not included in the replacement value calculations as they are still in use but upon disposal are not intended to be replaced. A continuous improvement item as shown in **Table 27** is to review the extended use vehicles/equipment and develop a long-term strategy for the fleet and their usage.

Much of the waste management services relies on fleet and equipment provided by and operated by external service providers as part of the operationally contracted services. The heavy equipment to operate the landfill, equipment operated at the Transfer Stations and Community Recycling Centres are largely all owned and operated by the contractors. Fleet equipment at

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

the Central Composting Facility and the Material Recovery Facility are also owned and operated by third parties. Recycling collection vehicles across the City and Waste Collection vehicles within Zone B are also provided by the contractor.

3.2.3.4 FLEET AND EQUIPMENT - ASSET USAGE AND PERFORMANCE

Assets are generally provided to meet design standards where available. However, there are often insufficient resources to address all known deficiencies.

The known service performance deficiencies in **Table 9** were identified using staff input.

Table 9: Known Service Performance Deficiencies

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Waste Packer Trucks	Various	Waste Collection Vehicles used beyond expected replacement interval	Vehicle shortage due to pandemic causing delays in replacing Waste Collection vehicles and will be ongoing until 2025. Increase to maintenance costs and vehicle downtime affects daily operations.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

4. MUNICIPALLY DEFINED LEVELS OF SERVICE

Levels of service are measures of what the City provides to its customers, residents, and visitors, and are best described as the link between providing the outcomes the community desires, and the way that the City provides those services.

O. Reg 588/17 does not define levels of service for Waste Management assets and therefore the City has developed municipally defined levels of service. Levels of service are defined in three ways, customer values, customer levels of service and technical levels of service which are outlined in this section. An explanation for how these were developed is provided in **Section 6.5** of the AM Plan Overview.

4.1 SURVEY METHODOLOGY

To develop customer values and customer levels of service, a Customer Engagement Survey entitled *Let's Connect, Hamilton – City Services & Assets Review: Waste Management Services* was released February 13, 2023, on the Engage Hamilton platform and closed on March 20, 2023. The survey results can be found in **Appendix "A"** of this document.

The survey received submissions from 187 respondents and contained thirteen (13) questions related to Waste Management's service delivery. Based on the number of responses, a sample size of 187 correlates to a 95% confidence level with a 7.2% margin of error based on an approximate population size of 570,000. This was determined to be an acceptable confidence level to use to develop the customer values and customer performance measures for this AM Plan. It is important to note that respondents were allowed to opt out of questions, and as such different questions may have different confidence levels depending on the opt out rate for that question.

While these surveys were used to establish customer values and customer performance measures, it is important to note that there were also limitations to the survey methodology which may reduce the confidence level in the survey data. The survey was only released using an online platform and did not include telephone surveys and consequently there is no way to confirm the identity information provided in the survey. In addition, the survey did not control for IP addresses, and therefore it is possible that respondents could complete the survey more than once and skew the survey results.

However, when reviewing the demographic responses for the survey, there was no clear evidence that the survey results had been skewed. In addition, the responses were distributed across the City with responses from most communities as well as from a variety of self-identifications. Responses were also received from single family homes and multi-unit homes. Even when assessing the spikes in respondents per day, the results were distributed across different ages, postal codes, and self-identifiers. Therefore, although there are limitations to the survey, it does appear that these results can be used to make some conclusions about the feelings of customers on the services Waste Management provides.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

The future intent is to release this survey on a regular basis to measure the trends in customer satisfaction and ensure that the City is providing the agreed level of service as well as to improve the marketing strategy by incorporating telephone surveys and IP controls to improve confidence levels in the survey responses. This has been noted in **Table 27** in the continuous improvement section.

4.2 CUSTOMER VALUES

Customer values are what the customer can expect from their tax dollar in “customer speak” which outline what is important to the customer, whether they see value in the service, and the expected trend based on the ten (10) year budget. These values are used to develop the level of service statements.

Customer Values indicate:

- What aspects of the service is important to the customer;
- Whether they see value in what is currently provided; and,
- The likely trend over time based on the current budget provision.

As previously mentioned, the customer values below were determined using the results from the *Let’s Connect, Hamilton – City Services & Assets Review: Waste Management survey*.

Table 10: Customer Values

SERVICE OBJECTIVE:			
CUSTOMER VALUES	CUSTOMER SATISFACTION MEASURE	CURRENT FEEDBACK	EXPECTED TREND BASED ON PLANNED BUDGET (10-YEAR HORIZON)
Garbage Collection Program, Blue Box Program, Yard Waste Program, Community Recycling Centre/Transfer Station, Green Bin Program	2023 Waste Management City Services & Assets Review Survey	Survey respondents on average feel these are very important services for Waste Management to be responsible for providing.	Maintain

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

SERVICE OBJECTIVE:			
CUSTOMER VALUES	CUSTOMER SATISFACTION MEASURE	CURRENT FEEDBACK	EXPECTED TREND BASED ON PLANNED BUDGET (10-YEAR HORIZON)
Bulk/Large Item pickup up program, Trash Tag Program, Education in Schools/Community Groups/Multi Residential Buildings		Survey respondents, on average, feel these are important services for Waste Management to be responsible for providing.	Maintain
Recycling and Waste Collection Calendar, Reuse Stores at CRC's.		Based on survey responses, there are differing opinions on if these services are considered important for Waste Management to be responsible for providing.	Maintain
Recycle Coach App		Based on survey responses, there are differing opinions on if this service is considered fairly important for Waste Management to be responsible for providing.	Maintain
Waste to Energy, Waste Digestion Chambers, Waste Palletization plants, Community Garden/Composting, Upgrading Processes and infrastructure should be considered as future needs.		Survey respondents, on average, feel these are important services for Waste Management to consider supporting and/or promoting in the future.	N/A

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

SERVICE OBJECTIVE:			
CUSTOMER VALUES	CUSTOMER SATISFACTION MEASURE	CURRENT FEEDBACK	EXPECTED TREND BASED ON PLANNED BUDGET (10-YEAR HORIZON)
Reduction in garbage pickup frequency (i.e., biweekly collection) is a divided subject.		Based on survey Responses, there are differing opinions on if this service is considered fairly important for Waste Management to consider supporting and/or promoting in the future.	N/A
Rate Levels should be maintained.		Survey respondents, on average, would prefer to minimize rate level increases and maintain service levels.	Maintain

4.3 CUSTOMER LEVELS OF SERVICE

Ultimately customer performance measures are the measures that the City will use to assess whether it is delivering the level of service the customers desire. Customer level of service measurements relate to how the customer feels about the City's Waste Management service in terms of their quality, reliability, accessibility, responsiveness, sustainability and over course, their cost. The City will continue to measure these customer levels of service to ensure a clear understanding on how the customers feel about the services and the value for their tax dollars.

The Customer Levels of Service are considered in terms of:

Condition	How good is the service? What is the condition or quality of the service?
Function	Is it suitable for its intended purpose? Is it the right service?
Capacity/Use	Is the service over or under used? Do we need more or less of these assets?

In **Table 11** under each of the service measures types (Condition, Function, Capacity/Use) there is a summary of the performance measure being used, the current performance, and the expected performance based on the current budget allocation.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 11: Customer Levels of Service

TYPE OF MEASURE	LEVEL OF SERVICE STATEMENT	SOURCE	PERFORMANCE MEASURE	CURRENT PERFORMANCE	EXPECTED TREND BASED ON PLANNED BUDGET	
Quality / Condition	Provide high performing waste management services.	2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on how Waste Management has performed overall in the last 24 months in all service areas (Q2)	Good	Maintain	
		Confidence levels			Average 9% margin of error on a 95% confidence interval with a standard deviation of 1.15	
	Provide services in a safe and effective manner.	2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on if users felt safe and comfortable while accessing Waste Management services. (Q6)	Comfortable	Maintain	
		Confidence levels			Average 9% margin of error on a 95% confidence interval with a standard deviation of 0.93	
		2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on if waste collection vehicles were operated safely in the community	Agree	Maintain	
	Confidence levels			Average 7% margin of error on a 95% confidence interval with a standard deviation of 0.96		
	Ensure that waste management assets are kept in good condition.	2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on if waste collection vehicles do not have strong odours	Agree	Maintain	
		Confidence levels			Average 8% margin of error on a 95% confidence interval with a standard deviation of 1.01	
	Be fiscally responsible when delivering services.	2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on if Waste Management is providing good value for money when providing infrastructure and services. (Q13)	Good	Maintain	
		Confidence levels			Average 9% margin of error on a 95% confidence interval with a standard deviation of 1.16	
Function	Ensure waste management services are meeting needs.	2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on if the services provided by Waste Management are meeting needs overall (Q5)	Meets	Maintain	
		Confidence levels			Average 9% margin of error on a 95% confidence interval with a standard deviation of 1.00	
Capacity	Ensure waste management services are accessible to the public when required.	2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on satisfaction with their ability to be access waste management services overall (Q4)	Satisfied	Maintain	
		Confidence levels			Average 9% margin of error on a 95% confidence interval with a standard deviation of 1.00	
	Ensure waste management has resources to deliver timely collection.	2023 Waste Management City Service & Assets Review survey	Average survey respondent opinion on if Waste Management missed a collection (Green Bin, Blue Box, Garbage Collection, Yard Waste)	Rarely (twice a year)	Maintain	
		Confidence levels			Average 8% margin of error on a 95% confidence interval with a standard deviation of 0.99	

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

4.3.1 CUSTOMER INDICES

The three (3) indices calculated to assess how customer expectations for a service are aligning with the perceived performance for a service are listed below in **Table 12**. These indices are explained and analyzed in detail in the sections below.

Table 12: Customer Indices

Customer Indices	Average Result	Confidence Level
Service Importance Versus Performance Net Differential	-11	TBD
Net Promoter Score (%)	32.37%	TBD
Service Rates Versus Value for Money Net Differential	15	TBD

The information below is intended to provide context around the survey results to assist waste management with areas to further investigate before proposing any new levels of service.

SERVICE IMPORTANCE VERSUS PERFORMANCE INDICE

The Service Importance versus Performance indices is used to determine if a service's importance correlates with the perceived performance. Service areas where the average importance rating exceeds the average performance rating by twenty (20) points is indicative of a mismatch between expectations and service levels, equal to one point on the Likert scale.

Per Figure 8 below the net differential exceeds twenty (20) points for Education in Schools / Community Groups / Multi-Residential Buildings and for Garbage Collection Program. This indicates that although survey responders consider these services to be Important and Very Important respectively, they also perceive that Waste Management only performed average and good in these areas. The Education component may be skewed as the opt out rate for responding on the comparison was nearly 63% and the standard deviation for performance and importance both exceed 1.23 indicating there is some difference of opinion by customers. The agreement for Garbage Collection program is less divided for importance however when considering performance, the standard deviation is 1.25 meaning people are experiencing this program differently leading to a wider variety of answers.

Overall, the performance of all services is less than Importance by 11%. To reduce the net differential Waste Management would need to increase their performance from Average to Good which could be accomplished by altering their Technical Levels of Service, explained **in Section 4.3.2**. If Waste Management were looking for service areas to improve, these would be the key services to investigate further. However, whether the customer is willing to pay for this increase in service is determined by the Service Rates Versus Value for Money Net Differential which is explained in the section below.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Although there were percentages of respondents who opted out of the question, there is still a significant enough sample size to have a degree of confidence in these results.

Figure 8: Importance Versus Performance Index Score

Service Area	Importance (index score)	Performance (index score)	Net Differential	Opt Out %
Average	83	73	-11	26.6
Education in Schools / Community Groups / Multi-Residential Buildings	79	52	-27	62.9
Garbage Collection Program	96	73	-23	5.0
Blue Box Program	92	75	-17	4.4
Green Bin Program	90	75	-15	11.2
Yard Waste Program	91	76	-14	12.3
Bulk/Large Item Pick Up Program	86	73	-13	35.5
Community Recycling Centre/Transfer Station	90	79	-12	16.7
Trash Tag Program	80	76	-5	16.9
Reuse Stores at Community Recycling Centres	73	75	2	55.2
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	78	81	3	16.0
Recycle Coach APP	63	67	3	65.4

NET PROMOTER SCORE INDICE

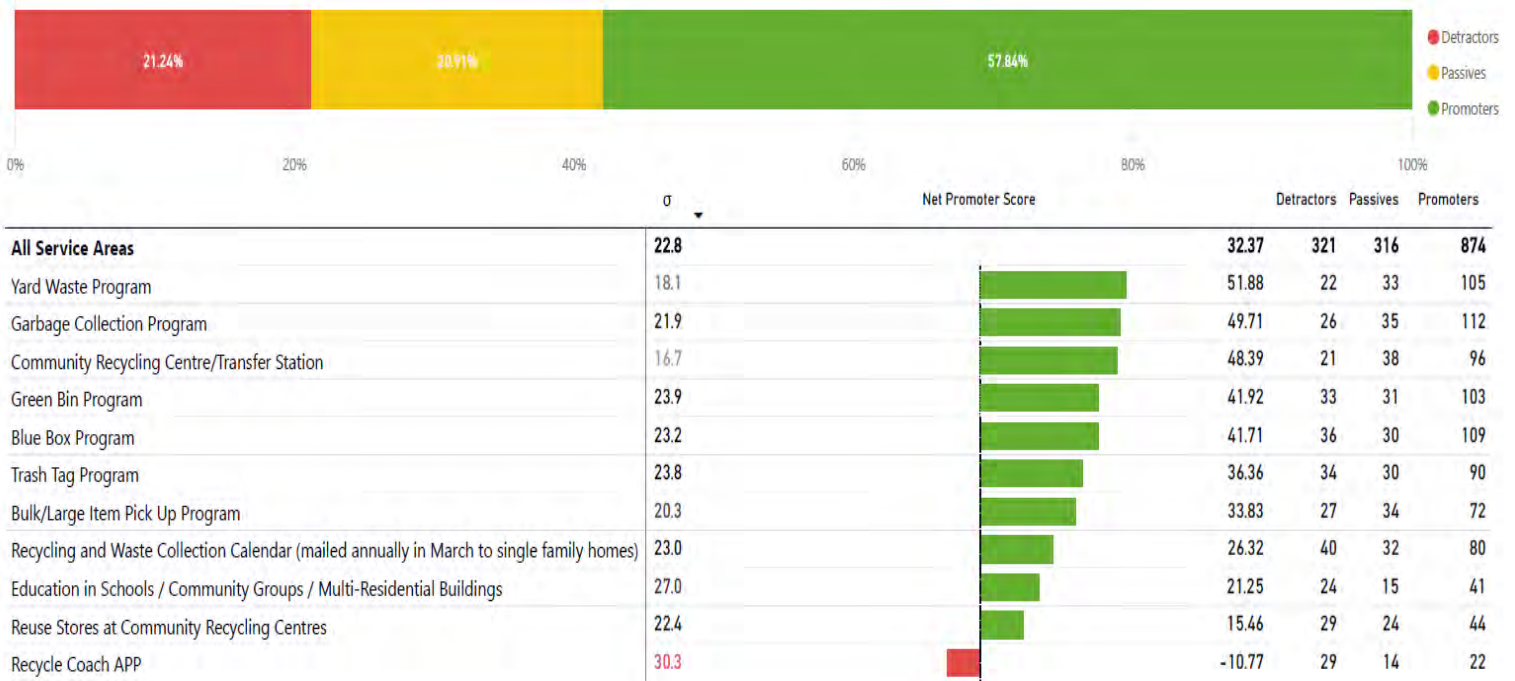
The Net Promoter Score indices outline how likely an individual is to recommend a service to another person and measures customer loyalty. For municipal services, this score is difficult to interpret because often times individuals do not have many alternatives for utilizing different services and also there may be internal biases for certain service areas, however, this score does provide valuable information for if customers would recommend using the service or whether they may seek alternatives or avoid using the service altogether.

Likert choices less than a score of four (4) are considered 'Detractors' meaning that they would not recommend the service, while scores of five (5) are considered 'Promoters' who would recommend the service, and scores of four (4) are considered 'Passive' which means they do not have strong feelings about the service. Respondents who opted out by not answering or selecting 'Can't Say' were removed from the sample. Net Promoter score is calculated by subtracting (% Promoters) and (% Detractors). The Standard Deviation (σ) is calculated in percent, the same units as the Net Promoter Score.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Per **Figure 9** below, generally most users of the service would recommend Waste Management to another person. A net promotor score above thirty (30) is considered “great”. However, the standard deviation is greater than twenty (20) which does show that survey respondents were divided on their opinion on most of these services. It is evident that the least recommended service offered by Waste Management is the Recycle Coach App. This may be worth investigating by Waste Management why this free App is not recommended.

Figure 9: Net Promoter Score



SERVICE RATES VERSUS VALUE FOR MONEY INDICE

The Service Rates versus Value for Money indices is used to determine if the rate an individual is paying for a service correlates with the perceived value for money. Service areas where rate level ratings exceed value for money ratings by twenty (20) points is indicative of a mismatch between expectations and service levels, equal to one point on the Likert scale. Positive Net Differential values indicate that 'Value for Money' was greater than willingness for 'Rates'. Low index scores in 'Rates' indicate that respondents are not willing to pay increased rates for the service area. All values were calculated and then rounded to the nearest whole number.

Per **Figure 10** below, survey respondents generally perceived they were getting Good value for money across all services and thought that Waste Management should minimize service cuts and maintain rates across all services as well. The average standard deviation for Value for Money was 1.16 and for Rate Level was 1.06 showing general agreement on the responses. Value exceeds rate by 20 for the Recycling Coach App and the Recycling and Waste Collection

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

calendar. These are two service areas where the perception is that value exceeds rates and could be areas to investigate for service reduction to better align rates and value. There are no service areas where rates exceed value meaning Waste Management provides good value for rates. Therefore, based on these conclusions, Waste Management should consider only increasing rate levels to the minimum required to maintain the current levels of service.

Figure 10: Rates Versus Value for Money Index Score

Service Area	Rates (index score)	Value for Money (index score)	Net Differential	Opt Out %
Average	60	75	15	26.2
Recycle Coach APP	44	67	23	60.2
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	56	77	22	19.0
Trash Tag Program	60	76	16	17.9
Reuse Stores at Community Recycling Centres	56	71	15	47.6
Green Bin Program	64	79	14	11.5
Community Recycling Centre/Transfer Station	66	80	14	17.9
Yard Waste Program	67	79	13	13.7
Garbage Collection Program	65	77	12	7.3
Bulk/Large Item Pick Up Program	62	75	12	29.4
Education in Schools / Community Groups / Multi-Residential Buildings	58	69	12	56.4
Blue Box Program	66	75	9	7.5

4.3.2 TECHNICAL LEVELS OF SERVICE

Technical levels of service are operational or technical measures of performance, which measure how the City plans to achieve the desired customer outcomes and demonstrate effective performance, compliance and management. The metrics should demonstrate how the City delivers its services in alignment with its customer values; and should be viewed as possible levers to impact and influence the Customer Levels of Service. The City will measure specific lifecycle activities to demonstrate how the City is performing on delivering the desired level of service as well as to influence how customers perceive the services they receive from the assets.

Technical service measures are linked to the activities and annual budgets covering Acquisition, Operation, Maintenance, and Renewal. Asset owners and managers create, implement and control technical service levels to influence the service outcomes.^{2F2}

² IPWEA, 2015, IIMM, p 2|28.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 14 shows the activities expected to be provided under the current ten (10)- year Planned Budget allocation and the Forecast activity requirements being recommended in this AM Plan.

Table 13: Technical Levels of Service

LIFECYCLE ACTIVITY	LEVEL OF SERVICE STATEMENT	ACTIVITY MEASURE	CURRENT PERFORMANCE* (2022)	CURRENT TARGET PERFORMANCE (2023)	PROPOSED 10-YEAR PERFORMANCE (2023-2032)
Acquisition	Ensure Waste Management has the capacity to meet collection service needs due to growth	Number of new Waste Collection vehicles purchased or added to contracts due to growth / demand to 2023 baseline. This may also be accomplished by growth provisions in the contract depending upon if the growth occurs in A zone or B Zone	0	1 additional truck per 1,900 additional low and medium density units	6
		Budget			\$2.4 M Acquisition, \$0.6 M Annually by 2032 Operation /Mtce
Operation	Ensure Waste Management Assets are kept in safe and acceptable repair and issues are resolved in a timely manner	Litter Complaints at Glanbrook Landfill (2754)	0	0	0
		Verified Odour Complaints at Glanbrook Landfill (2755)	1	0	0
		Verified Odour Complaints at Central Composting Facility (1400)	0	0	0
		Number of Missed collections per 10,000	3.55	4	4

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

LIFECYCLE ACTIVITY	LEVEL OF SERVICE STATEMENT	ACTIVITY MEASURE	CURRENT PERFORMANCE* (2022)	CURRENT TARGET PERFORMANCE (2023)	PROPOSED 10-YEAR PERFORMANCE (2023-2032)
		pickups (excludes bulk) (1410)			
		Number of TSCRC Audits and MRF Truck Audits Completed (Metric 4052, 4054, 4055, 4056)	57	48	48
		Total Presentations Delivered (4655) <i>*Quantity will decrease as transition from Virtual to In Person</i>	351	218*	218
		# of Recycle Coach App on Phones (4488)	20,071	21,476	22,000
		Budget			No Change
	Ensure waste management assets have optimal use/lifecycle	Residential Waste Diversion Rate (4546) <i>*Unverified by RPRA</i>	42%*	65%	65%
		Waste to Soil Ratio Glanbrook (1580)	7.48	7	7
		Leachate Volume Glanbrook (1581)	11.49	7	7
		Budget		TBD	TBD
	Maintenance*	Ensure Waste Management Assets are kept in safe and acceptable repair and issues are	Active Waste Collection Fleet Actual Maintenance Costs to Budget (<i>*Monthly Average - 2021 actuals</i>)	415.7 %*	100%
Average %FCI of CRCs and TS's			2.2%	<5%	<5%
Average %FCI of MRF			N/A	<5%	<5%

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

LIFECYCLE ACTIVITY	LEVEL OF SERVICE STATEMENT	ACTIVITY MEASURE	CURRENT PERFORMANCE* (2022)	CURRENT TARGET PERFORMANCE (2023)	PROPOSED 10-YEAR PERFORMANCE (2023-2032)
	resolved in a timely manner	Average %FCI of CRC	0.24%	<5%	<5%
		Budget		TBD	TBD
Renewal	Ensure that Waste Management Assets are replaced when required	% of Waste Management Collection vehicles over replacement service life target (7 years)	14%	0%	0%

It is important to monitor the service levels regularly as circumstances can and do change. Current performance is based on existing resource provision and work efficiencies. It is acknowledged changing circumstances such as technology and customer priorities will change over time.

It is important to note that these metrics were created specifically for this 2023 AM Plan with available data. These metrics should be improved to include a target to be in line with SMART objectives identified in the AMP Overview. In addition, performance measure data should be both easy to extract and measured over time, and a data collection process may likely need to be created. These have been identified as a continuous improvement items in **Table 27**.

4.3.3 PROPOSED LEVELS OF SERVICE DISCUSSION

At this time, the City's technical metrics for the waste management service area are largely based on the number of complaints received or the reported condition of assets. It is evident per **Table 13** that the City is typically meeting these standards with a few exceptions. Customer preferences and expectations do not always match our Technical LOS requirements and are better measured through customer feedback including surveys. As mentioned in **Section 4.1**, while these surveys were used to establish customer values and customer performance measures, it's important to note that the number of survey respondents currently only represents a small portion of the population however the Customer Survey responses overall can be taken as a 95% confidence level with a 7% margin of error. It has been assumed in the interim that the current levels of service will be the proposed levels of service moving forward past 2025 in accordance with O.Reg 588/17. Therefore, the information below is intended to provide context to direct Waste Management to areas for further investigate before proposing any new levels of service.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

CONDITION/QUALITY

Based on **Table 11** above, survey respondents rated the overall service as good and felt comfortable accessing services. Waste management should consider that customers are not identifying a need for changes related to the condition or quality of the services provided and that any proposed changes would be done at their discretion in terms of operational needs. Customers were divided when asked about the reduction in waste collection frequency. Based on survey responses, there are differing opinions, if changes to frequency are considered fairly important for Waste Management to consider supporting and/or promoting in the future. At this time, it appears that rate levels should only be increased to the minimum required to maintain current levels of service and any legislated requirements.

FUNCTION

Based on **Table 11**, survey respondents felt that waste management services generally meet their needs. Waste management should consider that customers are not identifying a need for changes related to function of their services and any proposed changes would be done at their own discretion in terms of operational needs.

Change in Function related to recycling programs is required through legislated change and is not discretionary for Waste Management. Customers also felt it was important for Waste Management to continue to investigate alternative waste treatment technologies as future needs (i.e., Waste to Energy, Waste Digestion Chambers, Waste Palletization plants, Community Garden/Composting, Upgrading Processes and infrastructure should be considered as future needs. These ideas need to be further developed before future levels of service could be proposed relating to new technologies. At this time, it appears that function should be maintained and increased as driven by growth to maintain current levels of service and any legislated functions.

CAPACITY

Based on **Table 11**, survey respondents were generally satisfied with their ability to access Waste Management services. Waste Management is currently reviewing the operational needs at the existing three (3) TS/CRC locations. They are also studying the need for a potential fourth location. For the TS/CRC service, survey respondents rated importance higher than performance and identify that value exceeds rates so waste management should consider this input as part of their analysis that customers might benefit from additional capacity at TS/CRC and may be supportive of increasing rates to match the value. Waste collection vehicle collection capacity at this time should be increased only to match growth and as needed to maintain current levels of service.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

5. FUTURE DEMAND

Demand is defined as the desire customers have for assets or services and that they are willing to pay for. These desires are for either new assets/services or current assets.

The ability of the City to be able to predict future demand for services enables the City to plan and identify the best way of meeting the current demand while being responsive to inevitable changes in demand. Demand will inevitably change over time and will impact the needs and desires of the community in terms of the number of services (growth-driven household increases or changes to pick-up schedules) and types of service required (e.g., new waste collection/diversion/processing services)

5.1 DEMAND DRIVERS

For the Waste service area, the key drivers are population change, growth in low and medium-density housing units, climate change, and customer preferences and expectations. Legislative changes can also impact demand such as the Expanded Producer Responsibility Model for the collection and processing of recyclable material by 2026.

5.2 DEMAND FORECASTS

The high-level present position and projections for demand drivers that may impact future service delivery and use of assets have been identified and documented in **Table 14**. At this time, specific projections have not been calculated and will be updated in the 2025 AM Plan per the timelines stated in the AMP Overview. In addition, growth projections have been shown in the AMP Overview.

Where costs are known, these additional demands as well as anticipated operations and maintenance costs or reductions have been encompassed in the Lifecycle Models in **Section 8**.

5.3 DEMAND IMPACT AND DEMAND MANAGEMENT PLAN

The impact of demand drivers that may affect future service delivery and use of assets are shown in **Table 14**. Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices can include non-asset solutions, insuring against risks, and managing failures.

Opportunities identified to date for demand management are shown in **Table 14**. Climate change mitigation and adaptation demands are included in **Section 7.0**. Many of these demands are difficult to predict at this time and therefore they are not included in the Lifecycle Management Plan at this time.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 14: Demand Management Plan

DEMAND DRIVER	CURRENT POSITION	PROJECTION	IMPACT ON SERVICES	DEMAND MANAGEMENT PLAN
Population Growth and Development	569,355 (2021)	636,080 (2031) Growing by 7,000 low and medium density units over next 10 years	Population growth will increase demand on waste management collection and processing services with new properties to collect from and additional material to process. (1 Truck per 1,900 additional low and medium density units) Increase in development review requirements and customer service requests	Solid Waste Management Master Plan Actions Route Optimization Study 6 additional collection vehicle trucks and/or contract expansion needed due to growth in next 10 years TS/CRC require expansion or 4 th TS/CRC location required
Environmental awareness	2 Stream Recycling system with specified recyclable materials and Green Bin Organics	Desire for additional product recycling/waste diversion (e.g., black plastic & Styrofoam) Public desire or regulatory requirement for additional organic diversion	Possible new services/processes required for new waste streams Public recycles incorrect items causing contamination of waste streams	Support Community reduce and reuse programs Increase curb side enforcement Investigate management of construction and demolition waste

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

DEMAND DRIVER	CURRENT POSITION	PROJECTION	IMPACT ON SERVICES	DEMAND MANAGEMENT PLAN
Regulatory Change - Waste Free Ontario Act	Municipalities are currently Responsible for Blue Box Program	<p>Hamilton Transition Date is 2025-04-01</p> <p>By 2026, all blue box related materials from eligible properties will be managed by the Expanded Producer Responsibility Model for the collection and processing of recyclable material</p>	<p>Impact to existing Waste Collection contracts which end in 2028.</p> <p>Possible changes in what/how recycling collection occurs</p> <p>Possible changes in how and where materials are processed</p> <p>Potential service by the municipality if acting as a service provider to the Producers, i.e. non-residential customers</p>	<p>Transition Plan development is underway.</p> <p>Carryout feasibility study related to MRF and CCF should processing no longer be completed at our facilities</p>

5.4 ASSET PROGRAMS TO MEET DEMAND

The new assets required to meet demand may be acquired, donated or constructed. Additional trucks and/or expanded services under existing contracts are required to service demand. This has already been anticipated and captured in the waste collection contract, B Zones. Regarding city waste collection operations in the A Zones, it is projected that six (6) additional waste collection vehicles are needed to meet growth in households over the next ten (10) years. The City is also examining the expansion of and/or process improvements of the three (3) existing TS/CRC to improve capacity at peak times. The study to identify and recommend improvements at the existing TS/CRC is currently underway and the impacts on lifecycle and costs will be better defined in a future AM Plan.

Acquiring new assets would commit the City to ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operations, maintenance and renewal costs for inclusion in the long-term financial plan where they are known.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

6. RISK MANAGEMENT

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk'³.

The City is developing and implementing a formalized risk assessment process to identify risks associated with service delivery and to implement proactive strategies to mitigate risk to tolerable levels. The risk assessment process identifies credible risks associated with service delivery and will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

The risk assessment process identifies credible risks, the likelihood of those risks occurring, and the consequences should the event occur. The City utilizes two risk assessment methods to determine risk along with subject matter expert opinion to inform the prioritization. Hamilton is further developing its risk assessment maturity with the inclusion of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable in the next iteration of the plan.

6.1 CRITICAL ASSETS

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified and along with their typical failure mode, and the impact on service delivery, are summarized in **Table 15**. Failure modes may include physical failure, collapse or essential service interruption.

Table 15: Critical Assets

CRITICAL ASSET(S)	FAILURE MODE	IMPACT
Leachate Pumping Station	Failure of pump system	Leachate backup into landfill can cause embankment failures or overflow of storage system causing discharge to the environment
Landfill (Open)	Loss of ECA Permit from non-compliance	Unable to accept waste – would need to ship waste to alternative facility until restored.

³ ISO 31000:2009, p 2

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

By identifying critical assets and failure modes an organization can ensure that investigative activities, condition inspection programs, maintenance, and capital expenditure plans are targeted at critical assets.

6.2 RISK ASSESSMENT

The risk assessment process identifies:

- Credible risk:
- The likelihood of the risk event occurring;
- The consequences should the event occur;
- The development of a risk rating;
- Evaluation of the risk; and,
- Development of a risk treatment plan for non-acceptable risks.

An assessment of risks associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment costs of implementing the selected treatment plan is shown in **Table 16**. It is essential that these critical risks and costs are reported to management. Additional risks will be developed in future iterations of the plan and is identified in **Table 27** in the Continuous Improvement Section of the plan.

Table 16: Risks and Treatment Plans

Note * The Residual Risk Is the Risk Remaining After the Selected Risk Treatment Plan Is Implemented.

SERVICE OR ASSET AT RISK	WHAT CAN HAPPEN	RISK RATING	RISK TREATMENT PLAN	RESIDUAL RISK *	TREATMENT COSTS
Waste Packer Trucks	Higher level of breakdowns due to delayed replacements. Spare vehicles require 2 staff to operate (rear loader) than scheduled with side loaders. Routes run short or delayed. Will continue until 2025 when fleet replacement back on schedule	High	Replace End of Life Vehicles as soon as supply chain permits.	Medium	\$4.1 Million in 2023 for 8 new vehicles

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

SERVICE OR ASSET AT RISK	WHAT CAN HAPPEN	RISK RATING	RISK TREATMENT PLAN	RESIDUAL RISK *	TREATMENT COSTS
Waste Collection	Contracted collection services withdrawn with little notice. Waste not collected.	High	Alternative collection strategies; waste drop off locations	Medium	TBD
Waste Processing	Contracted processing services (Transfer Stations/Community Recycling Centers, Landfill) withdrawn with little notice. Materials go to landfill and reduce diversion rate. Loss of sales on recoverable materials	High	Short term waste diversion strategy to alternative locations, landfill of organics / recyclables	Medium	TBD

6.3 INFRASTRUCTURE RESILIENCE APPROACH

The resilience of our critical infrastructure is vital to the ongoing provision of services to customers. To adapt to changing conditions the City needs to understand its capacity to 'withstand a given level of stress or demand', and to respond to possible disruptions to ensure continuity of service. We do not currently measure our resilience in service delivery and this will be included in the next iteration of the AM Plan.

Resilience covers the capacity of the City to withstand any service disruptions, act appropriately and effectively in a crisis, absorb shocks and disturbances as well as adapting to ever changing conditions. Resilience is built on aspects such as response and recovery planning, financial capacity, climate change risk, assessment and crisis leadership.

6.4 SERVICE AND RISK TRADE-OFFS

The decisions made in AM Plans are based on the objective to achieve the optimum benefits from the available resources.

The following table outlines what activities Waste Management cannot afford to do over the next ten (10) years with their existing budget and provides the associated service and risk tradeoffs.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 17: Services And Risk Trade-Offs

WHAT WE CANNOT DO (WHAT CAN WE NOT AFFORD OVER NEXT 10 YEARS?)	SERVICE TRADE OFF (HOW WILL NOT COMPLETING THIS AFFECT OUR SERVICE?)	RISK TRADE OFF (WHAT RISK CONSEQUENCES ARE WE UNDERTAKING)
Construction of 4 th CRC/TS, current budget amount will permit operational improvements only at existing locations. Study underway.	Existing CRC/TS may continue to experience long lines and impacts to roadway traffic at peak periods	Increased risk of illegal dumping as people don't want to wait. Longer operating hours and increased volumes create wear and tear on existing facilities.
Expansion of yard waste compost pad capacity when being relocated to permit opening of Glanbrook Landfill Phase 3.	Unable to expand the capacity of the Compost Pad when being relocated	Unable to accept increasing volumes of yard waste due to processing limitations

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

7. CLIMATE CHANGE MITIGATION & ADAPTATION

Cities have a vital role to play in reducing the emission of greenhouse gases (mitigation), as well as preparing assets for the accelerating changes we've already begun to experience (adaptation). At a minimum, the City must consider how to manage our existing assets given potential climate change impacts for our region.

Changes to Hamilton's climate will impact City assets in the following ways:

- Affect the asset lifecycle;
- Affect the levels of service that can be provided and the cost to maintain;
- Increase or change the demand on some of our systems; and,
- Increase or change the risks involved in delivering service.

To quantify the above asset/service impacts due to climate change in the Asset Management Plan, climate change is considered as both a future demand and a risk for both mitigation and adaptation efforts. These demands and risks should be quantified and incorporated into the lifecycle models as well as levels of service targets.

If climate change mitigation/adaptation projects have already been budgeted, these costs have been incorporated into the lifecycle models. However, many asset owners have not yet quantified the effects of the proposed demand management and risk adaptation plans described in this section, and so associated levels of service and costs will be addressed in future revisions of the plan. This has been identified as a Continuous Improvement item in **Table 27**.

7.1 CLIMATE CHANGE MITIGATION

Climate Mitigation refers to human intervention to reduce GHG emissions or enhance GHG removals (e.g. building transportation infrastructure that can support cycling and public transit and reduces need for car travel). The City of Hamilton's Community Energy + Emissions Plan (CEEP includes five (5) Low-carbon Transformations necessary to achieve the City's target of net-zero GHG emissions by 2050:

- Innovating our industry;
- Transforming our buildings;
- Changing how we move;
- Revolutionizing renewables; and
- Growing Green.

MITIGATION DEMAND ANALYSIS

These transformations were incorporated into the climate mitigation demand analysis for this service area by:

- Identifying the City's modelled targets for the low carbon transformations that applied to the service/asset;

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

- Discussing the impact, the targets would have on the service/asset; and,
- Proposing a preliminary demand management plan for how this modelled target will be achieved by 2050 as shown in **Table 18** below.

As previously mentioned, due to the high level of uncertainty with the demand management plans, the cost of the demand impacts below have not been included in the lifecycle models or levels of service at this time. The demand management plans discussed in this section should be explored by asset owners in more detail following the AMP, and new projects should incorporate GHG emissions reduction methods, and changes which will be incorporated into future iterations of the AMP. This has been identified as a continuous improvement item in **Table 27**.

Moving forward, the Climate Lens tool discussed in the AMP Overview will assess projects based on these targets and will assist with the prioritization of climate mitigation projects.

Waste Management is a key contributor to the *revolutionizing renewables* transformation with the development of a future organic waste strategy.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 18: Climate Change Demand - Mitigation

CLIMATE CHANGE MITIGATION TRANSFORMATION	MODELLED TARGET	POTENTIAL IMPACT TO SERVICE/ASSET	DEMAND MANAGEMENT PLAN
Changing how we move	100% of new municipal small and light-duty vehicles are electric by 2040. 100% of new municipal heavy-duty vehicles switch to clean hydrogen by 2040.	Moving towards purchasing new packer trucks using CNG as a fuel source. Currently investigating the feasibility of electric waste collection packers.	<p>Purchase of 8 CNG powered packer trucks in 2023.</p> <p>Develop on-site refueling infrastructure using mobile refillable tanks</p> <p>Continue to investigate technology to capture gas at Landfill to net zero goals with Hamilton Renewable Power Inc at end of current Ontario Power Authority generator contract.</p>
		Electric vehicle chargers for support vehicles will need to be installed that yards. Initial upfront cost for electric vehicles.	Climate lens tool and business case will be used to develop rationale for electric vehicle fleet conversion and charger requirements.
Revolutionizing Renewables	By 2050, 50% of municipal buildings will add rooftop solar PV, covering 30% of the building's electrical load.	The addition of solar at the facilities would not impact operations and has been considered before at the CCF and at the landfill.	<p>Work with Energy and facilities division to conduct feasibility studies. Consider this goal for any few facilities to be constructed.</p> <p>Monitor feasibility of ground mounted solar at Landfill and availability of grid connection capacity.</p>
	By 2050, 95% of organic waste is sent to anaerobic digestion for local energy use.	Waste management has the ability to contribute towards this goal. To contribute to the goal the central composting facility	<p>Support action 17 in the energy emissions plan</p> <p>In order to reach net zero, as much organic waste as possible should be diverted from the landfill and used as</p>

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

CLIMATE CHANGE MITIGATION TRANSFORMATION	MODELLED TARGET	POTENTIAL IMPACT TO SERVICE/ASSET	DEMAND MANAGEMENT PLAN
		<p>would need major capital changes to the facility to allow for gas capture and improved odor equipment. Alternatively, to meet this goal the organics from the curbside program could be sent to a facility other than the CCF. (this would leave the CCF without a use) Finally A new anaerobic digester could be built, this would require radical collaboration between city groups and industry partners. (Waste Management, Hamilton water, Energy and facilities division)</p>	<p>feedstock for anaerobic digester (AD) systems. Ideally, the City needs a centralized system for multiple local organic waste streams to achieve economies of scale.</p> <p>Organics opportunities report will be developed by the end of Q2 2024. May require significant capital investment once opportunities are better developed and a preferred alternative developed.</p>

MITIGATION RISK ANALYSIS

Additionally, since the risk of not completing climate change mitigation projects is that the City continues to contribute to climate change in varying degrees which were modelled in the Climate Science Report for the City of Hamilton completed by ICLEI Canada, a risk analysis has not been completed in this AMP for not completing climate mitigation projects (ICLEI Canada, 2021).

CURRENT MITIGATION PROJECTS

Mitigation projects waste management is currently pursuing are outlined below in **Table 19**. These projects may already be included in the budget and may be quantified in the lifecycle models.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Table 19: Building Asset Mitigation to Climate Change

PROJECT	PROJECT DESCRIPTION	CLIMATE CHANGE IMPACT
CNG Fleet Conversion	Replacement of 8 end of life Diesel powered garbage packer trucks with Compressed Natural Gas packer trucks in 2023	Reduction in Greenhouse Gases approximately 99 tonnes annually
Various LED (Light Emitting Diode) Conversion Projects	10 Year Facilities Needs identifies 15 possible LED conversion projects at Waste Facilities locations when existing lighting reaches end of life (Approx. \$335k of identified forecast maintenance needs)	Reduction in electricity consumption, reducing greenhouse gases.

CLIMATE MITIGATION DISCUSSION

At this time Waste Management has made progress on moving towards *Changing How we Move* pursuing the renewal of diesel-powered vehicles with Natural Gas Heavy Duty vehicles. Waste will also support and implement any Central Fleet requirements for moving towards electric powered light duty vehicles at the appropriate replacement cycles.

Waste Management is a key contributor to the *Revolutionizing Renewables* target as the service provider who collects and disposes of organic waste for the City of Hamilton. Work is just beginning on what this strategy and plan requires into the future.

7.2 CLIMATE CHANGE ADAPTATION

Climate Adaptation refers to the process of adjusting to actual or expected climate and its effects (e.g. building stormwater pipes under roads that will handle forecasted increased stormwater capacity and reduce regular road flooding).

The impacts of climate change may have a significant impact on the assets we manage and the services they provide. Climate change impacts on assets will vary depending on the location and the type of services provided, as will the way in which those impacts are responded to and managed.^{3F4}

In 2021, the City of Hamilton completed a Vulnerability and Risk Assessment Report guided by ICLEI's Building Adaptive and Resilient Communities (BARC) Framework as part of the Climate Change Impact Adaptation Plan (CCIAP) (ICLEI, 2021). The BARC Framework identified thirteen high impact areas.

⁴ IPWEA Practice Note 12.1 Climate Change Impacts on the Useful Life of Infrastructure

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

ADAPTATION DEMAND ANALYSIS

These impact areas were incorporated into the climate change adaptation analysis for this service area by:

- Identifying the asset specific adaptation impact statements that affected the service areas;
- Discussing the potential impacts on the asset/service using the projected change in climate using the RCP4.5 Scenario; and,
- Proposing a preliminary demand management plan to adapt to these impacts as shown in **Table 20** below.

It is important to note that due to the high level of uncertainty with the demand management plans, the cost of the demand impacts below have not been included in the lifecycle and financial models at this time. The demand management plans discussed in this section should be explored by asset owners in more detail following the AMP, and new projects should consider these adaptation impacts during the planning and design processes. Once the demand management plans are more finalized, the information will be incorporated into future iterations of the AMP. This has been identified as a continuous improvement item in **Table 27**.

Moving forward, the Climate Lens tool discussed in the AMP Overview will assess projects based on these targets and will assist with the prioritization of climate adaptation projects.

Table 20: Managing the Demand of Climate Change on Assets and Services

ADAPTATION IMPACT STATEMENT	BASELINE** (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
Increased instances of heat-related issues due to extreme heat.	25.9 degrees Celsius average summer seasonal temperature	27 degrees Celsius average summer seasonal temperature	Due to extended extreme heat Waste Collection staff would need to take more frequent breaks to cool down in their trucks, causing possible delays in collecting waste.	Standard procedure for communicating delays in collection

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

ADAPTATION IMPACT STATEMENT	BASELINE** (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
	25.9 degrees Celsius average summer seasonal temperature And; 16.1 average days where temperature is 30 degrees Celsius or more	27 degrees Celsius average summer seasonal temperature And; 34.4 average days where temperature is 30 degrees Celsius or more	The temperature of the biofilter is affected by the ambient outdoor temperature. Environmental Compliance Approval (ECA) prescribes a Maximum Operating Temperature for the materials at the Central Composting Facility	The biofilter at the CCF would need to be closely monitored for temperature to ensure proper conditions for bacteria. Temperature exceedances monitored for reporting to Ministry of Environment Conservation and Parks if required for compliance to operating conditions.
Changes in the frequency of extreme rainfall events will result in increased instances of flooding on private and public properties.	6.7 heavy precipitation days (20 mm)	7.7 heavy precipitation days (20 mm)	Transfer stations play an important role in the management of storm and flooding events. These facilities accept branches and yard material collected after storm events. They also accept waste and recyclables cleaned up after flood events.	Ensure sufficient capacity at transfer stations prior to storm events. extend facility hours. Waive tipping fees for storm damage. Continue plans for 4th transfer station and keep in mind it's need during climate change related events (wind, rain, flooding)

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

ADAPTATION IMPACT STATEMENT	BASELINE** (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
<p>Prolonged power outages during winter months due to an increase in ice storms resulting in public safety concerns.</p>	<p>187 mm average total winter precipitation</p>	<p>204 mm average total winter precipitation</p>	<p>May affect processing organics and odour as outages affect ability to run tunnel fans providing aeration at full capacity Materials Recycling Facility equipment cannot process during outages</p>	<p>Maintain on site backup generator for outages</p> <p>Divert organics to another facility. Send organics to landfill. Verify Backup generation capacity at Materials Recycling Facility and/or develop resiliency plan for extended outages</p>
<p>More rainfall or dry periods will change tonnage peaks. This changes hours of collection (clean ups)</p>	<p>6.7 heavy precipitation days (20 mm)</p>	<p>7.7 heavy precipitation days (20 mm)</p>	<p>More tonnages to be collected at curb and more tonnage to be transferred from the Transfer Station and then processed at the landfill.</p>	<p>Ensure sufficient capacity at transfer stations prior to storm events. Extend facility hours. Waive tipping fees for storm damage. Continue plans for 4th transfer station and keep in mind the need during climate change related events (wind, rain, flood)</p>

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

ADAPTATION IMPACT STATEMENT	BASELINE** (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
<p>Reduced capacity of flood protection measures and water storage caused by an increase in rainfall intensity leading to flooding.</p>	<p>6.7 heavy precipitation days (20 mm) and; 217mm average total summer precipitation</p>	<p>7.7 heavy precipitation days (20 mm) And; 221mm average total summer precipitation</p>	<p>Pump stations may need to be directed to water treatment plant Greater leachate and surface flow volumes to ponds</p>	<p>Stay on top of maintenance at the facility to ensure its in good working order Consider Modelling stormwater and pumping Systems at higher days and increase average to check resiliency Environmental Technicians are on call and can take samples from ponds to determine ability to discharge from stormwater ponds in emergencies</p>

*RCP4.5 Scenario: Moderate projected GHG concentrations, resulting from substantial climate change mitigation measures. It represents an increase of 4.5 W/m² in radiative forcing to the climate system. RCP 4.5 is associated with 580-720ppm of CO₂ and would more than likely lead to 3°C of warming by the end of the 21st century.

**Baseline and Projected numbers based on 2021 Climate Science Report.

ADAPTATION RISK ANALYSIS

Additionally, the City should consider the risks for the asset or service as a result of climate change and consider ways to adapt to reduce the risk. Adaptation can have the following benefits:

- Assets will withstand the impacts of climate change;
- Services can be sustained; and,

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

- Assets that can endure may potentially lower the lifecycle cost and reduce their carbon footprint.

Similarly, to the exercise above and using the risk process in **Section 6**, asset owners:

- Reviewed the likelihood scores in the Vulnerability and Risk Assessment Report for the adaptation impact occurring;
- Identified the consequence to the asset/service if the event did happen to develop a risk rating; and,
- If the risk was identified as high, the asset owner came up with a preliminary risk adaptation plan shown below in **Table 21**.

It is important to note that due to the high level of uncertainty with the climate change risk adaptation plans, the cost of the mitigating the risks below have not been included in the lifecycle and financial models at this time. The adaptation plans discussed in this section should be explored by asset owners in more detail following the AMP, and new projects should consider these risks during the planning and design processes. Future changes will be incorporated into future iterations of the AMP. Moving forward, the Climate Lens tool will assess projects based on these targets and will assist with the prioritization of climate adaptation projects. This has been identified as a continuous improvement item in **Table 27**.

Table 21: Adapting to Climate Change

ADAPTATION IMPACT STATEMENT	SERVICE OR ASSET AT RISK DUE TO IMPACT	WHAT CAN HAPPEN	RISK RATING	RISK ADAPTATION PLAN
Increased intensity and frequency of ice storms lead to increased hazardous roads, pathways, and sidewalk conditions.	Field Staff / Vehicles	Increase in injury risk to field staff from slips and falls Increased risk of motor vehicle collisions	HIGH	Existing health and safety mitigation plan for working in icy conditions. Monitor Road conditions and work closely with road operations to modify collection routes as needed
More rainfall or dry periods will change tonnage peaks. This	Landfill – Compost Pad	Climate change can impact weather and precipitation which leads to changes in the amount of yard waste collected	HIGH	Ensure equipment availability to handle the increased

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

ADAPTATION IMPACT STATEMENT	SERVICE OR ASSET AT RISK DUE TO IMPACT	WHAT CAN HAPPEN	RISK RATING	RISK ADAPTATION PLAN
changes hours of collection (clean ups)		due to growth or wind damage cleanup Climate change can also increase likelihood of major storms and flooding. Which can change the amount of demolition debris		volume of material. Contract provisions flexible to allow for changes in the amount of material processed.
Increased instances of heat-related issues due to extreme heat.	CCF Biofilter Field Staff	CCF Biofilter must be maintained at proper operating temperatures to be in compliance In extended high heat field staff require periods of relief from heat which can cause delays in collecting curbside materials	HIGH	Monitor conditions of bioreactor and adjusting flow of material in and out. Existing health and safety mitigation techniques to allow additional cooling time for staff and access to liquids.

CURRENT ADAPTATION PROJECTS

Currently Waste Management does not have any current or past climate change adaptation specific projects identified. The impact of climate change on assets and how the City will adapt is a new and complex discussion and further opportunities will be developed in future revisions of this AM Plan.

CLIMATE ADAPTATION DISCUSSION

Currently, Waste Management has focused their climate change efforts on mitigation efforts and not yet onto adaptation methods. This is because climate effects are more difficult to assess on Waste Management services and assets and need to be investigated further which has been identified as a continuous improvement item in **Table 27**.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

8. LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the City plans to manage these assets at the agreed levels of service and at the accepted lifecycle costs while excluding inflationary values. The costs included in the lifecycle management plan includes costs from both the Capital and Operating budget. Asset management focuses on how taxpayer or ratepayer dollars are invested by lifecycle activities and not by budget allocation. Since both budgets contain various lifecycle activities, they have been consolidated together and separated by lifecycle activity in this section.

As a result of this new process, there may be some areas where the budget was not able to be broken down perfectly by lifecycle activity. Future AM Plans will focus on improving the understanding of Whole Life Costs and funding options. However, at this time the plan is limited on those aspects. Expenditure on new assets and services will be accommodated in the long-term financial plan but only to the extent that there is available funding.

At the time of writing, Waste Management creates a Capital forecast for ten (10) years into the future, with higher confidence values in the earlier years and decreasing confidence in the later years. The remainder of the forecast was assumed based on predicted demands and averages. The Operating budget is created annually, but there is an additional estimated three (3) year projection (current year plus two (2)) which was used to estimate the operational budget for the first three (3) years for Waste Management. These projections were then flatlined for the remaining twenty-seven (27) years of the lifecycle.

Legislated changes will occur relating to the recycling collection and processing program. Waste Management is estimating a reduction in operating costs related to this change of \$6.9 Million in 2025 due to the partial year transition of the program and impacts to existing subsidies, and then approximately \$14.7 Million per year beginning in 2026. The total lifecycle budget estimate for these years has been reduced by these amounts in the following graphs. This is an estimate only at this time and it is not known with certainty if the budget can be reduced by the full amount as portions of this budget may need to be reallocated to provide waste collection activities for properties not covered by the legislated change or to implement new programs/services. This assumption will need to be re-evaluated in future updates to the AM Plan as the impacts of this transition become more known.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

8.1 ACQUISITION PLAN

Acquisition reflects new assets that did not previously exist or works which will upgrade or improve an existing asset beyond its current capacity. They may result from growth, demand, legal obligations or social or environmental needs. Assets can either be donated through development agreements to the City or through the construction of new assets which are mostly related to population growth. Waste Management does not receive donated or assumed assets through development agreements.

CURRENT PROJECT DRIVERS – 10 YEAR PLANNING HORIZON

The City prioritizes capital projects based on various drivers to help determine ranking for project priorities and investment decisions. As part of future AM Plans, the City will continue to develop its understanding of how projects are prioritized and ensure that multiple factors are being considered to drive investment decisions in the next iteration of the AM Plan. These drivers will include legal compliance, risk mitigation, O&M impacts, growth impacts, health and safety, reputation, and others. These drivers should be reviewed during each iteration of the AM Plan to ensure they are appropriate and effective in informing decision-making.

SELECTION CRITERIA

Proposed acquisition of new assets and upgrade of existing assets are identified from various sources such as community requests, proposals identified by strategic plans or partnerships with others. Potential upgrades and new works should be reviewed to verify that they are essential to the City's needs. The proposed upgrade and new work analysis should also include the development of a preliminary renewal estimate to ensure that the services are sustainable over the longer term. Verified proposals can then be ranked by priority and available funds and scheduled in future works programs.

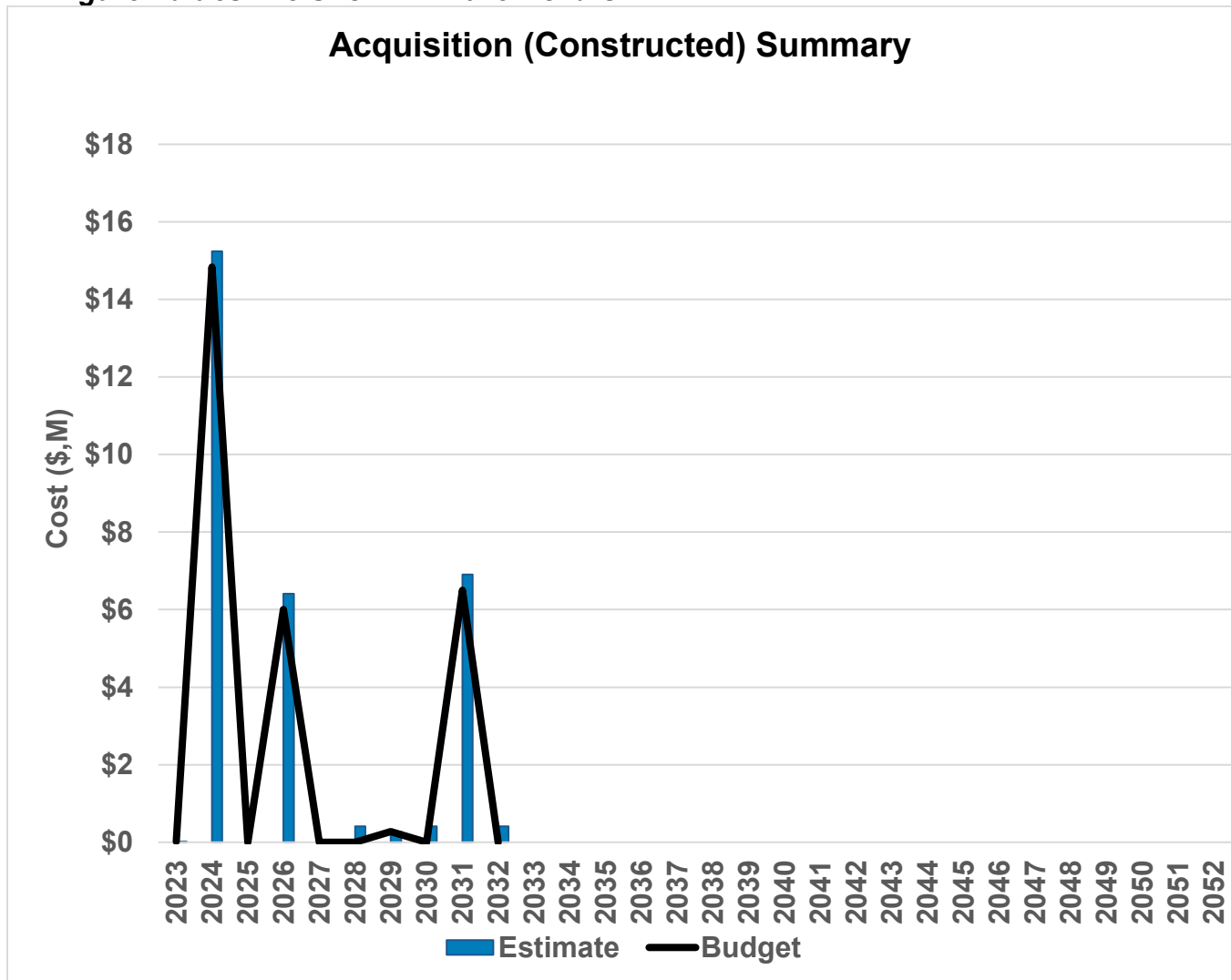
SUMMARY OF FUTURE ASSET ACQUISITION COSTS

Forecast acquisition asset costs are summarized in **Figure 12** and show the cumulative effect of asset assumptions over the next ten (10) year planning period.

Waste Management does not receive Donated Assets. All acquisitions are constructed.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Figure 11: Acquisition (Constructed) Summary
All Figure Values Are Shown In 2023 Dollars.



Over the next 10 Year planning period the City will acquire approximately **\$29.3M** of constructed assets which can either be new assets which did not exist before or expansion of assets when they are to be replaced. Major acquisition expenditures over the next ten years include:

- **\$14.5 million** for Transfer Station / CRC improvements at existing locations;
- **\$13.0 million** for Stage 3 Development of the Glanbrook Landfill; and,
- **\$1.6 million** for development driven acquisition of additional collection vehicles.

The acquisition forecast generally meets the budget. Acquisition forecast also includes the purchase of six additional waste collection vehicles between 2023 – 2032. The current 2023 DC study identifies the need for four waste collection vehicles and waste management route analysis indicates that six overall will be required in this timeframe.

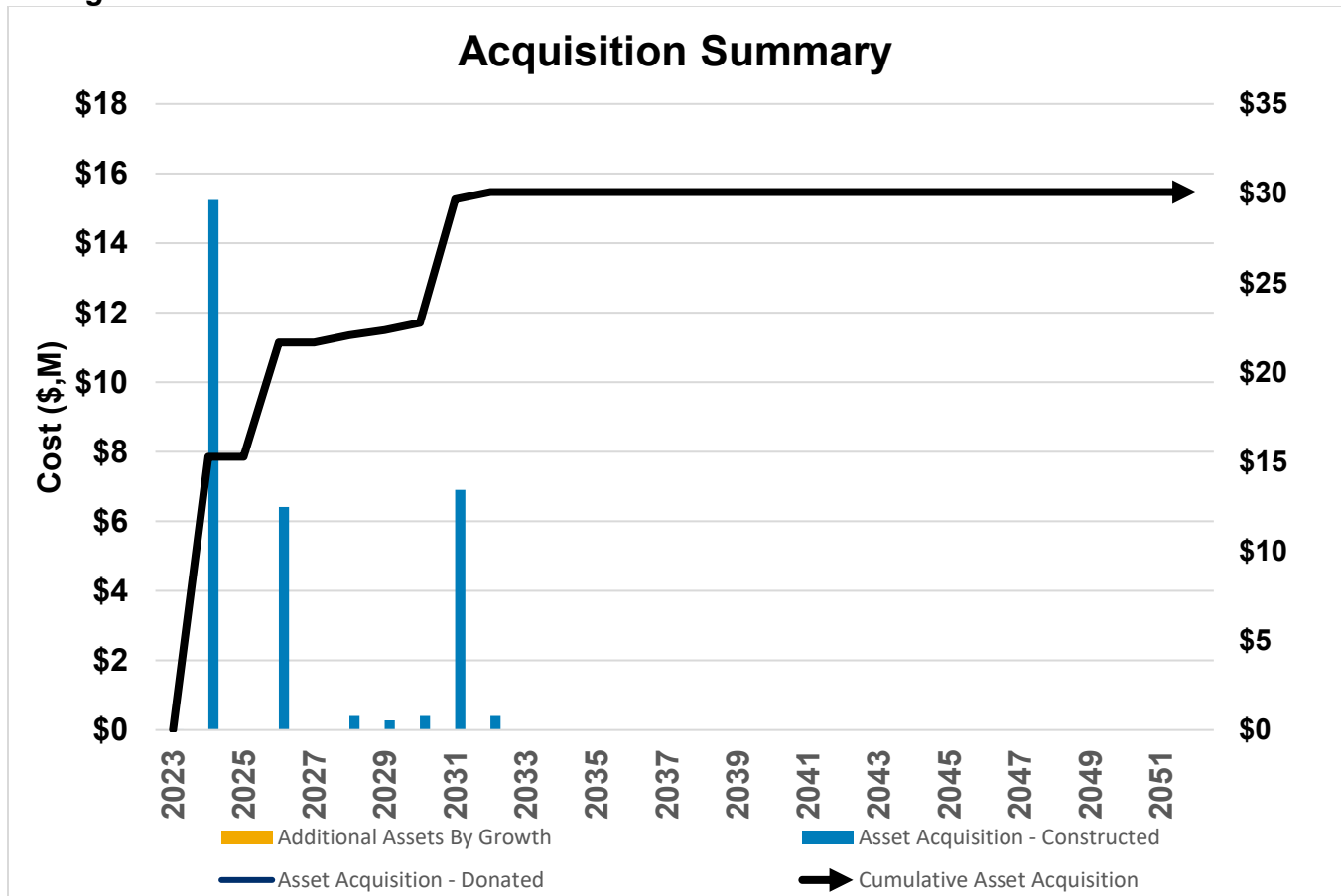
HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

The lack of acquired assets from 2032-2052 is due to a lack of data and limited forecasting ability at this time and not from the likelihood of actual construction projects or needs. These future acquisitions will be better defined once the next iteration of the Solid Waste Master Plan is completed. As AM knowledge, practices and abilities mature within the City then in all likelihood there will be significant projects with equally significant costs that will appear within the later years of the ten (10) year planning horizon.

The City has sufficient budget for its planned constructed acquisitions at this time; however, this does not address future asset needs that may need to be constructed to ensure service levels are maintained over the long term. With competing needs for resources across the entire city there will be a need to investigate tradeoffs and design options to further optimize asset decisions and ensure intergenerational equity can be achieved.

Hamilton will continue to monitor its constructed assets annually and update the AM Plan when new information becomes available.

Figure 12: Acquisition Summary
All Figure Values Are Shown In 2023 Dollars.



HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

When Hamilton commits to constructing new assets, the municipality must be prepared to fund future operations, maintenance, and renewal costs. Hamilton must also account for future depreciation when reviewing long term sustainability. When reviewing the long-term impacts of asset acquisition, it is useful to consider the cumulative value of the acquired assets being taken on by Hamilton. The cumulative value of all acquisition work, including assets that are constructed and contributed shown in Figure 11 above.

Over the next ten (10) year planning period Hamilton will acquire approximately **\$30.1 M** of forecast Waste Management network assets.

Hamilton has insufficient budget for its planned constructed acquisitions at this time. It will become critical to understand that through the construction of new assets, the City will be committing to funding the ongoing operations, maintenance and renewal costs which are very significant. Hamilton will need to address how to best fund these ongoing costs as well as the costs to construct the assets while seeking the highest level of service possible.

Future AM Plans will focus on improving the understanding of Whole Life Costs and funding options. However, at this time the plan is limited on those aspects. Expenditure on new assets and services will be accommodated in the long-term financial plan but only to the extent that there is available funding.

8.2 OPERATIONS AND MAINTENANCE PLAN

Operations include all regular activities to provide services. Daily, weekly, seasonal and annual activities are undertaken by staff to ensure the assets perform within acceptable parameters and to monitor the condition of the assets for safety and regulatory reasons. Examples of typical operational activities include waste collection and processing contracts and internal collection activities, utility costs and the necessary staffing resources to perform these activities.

Some of the major operational investments over the next 10 years include:

- **\$12.2 million** annually for Employee related costs; and,
- **\$73.8 million** annually for Contracted costs.

Maintenance should be viewed as the ongoing management of deterioration. The purpose of planned maintenance is to ensure that the correct interventions are applied to assets in a proactive manner and to ensure it reaches its intended useful life. Maintenance does not significantly extend the useful life of the asset but allows assets to reach their intended useful life by returning the assets to a desired condition.

Examples of typical maintenance activities include equipment repairs and component replacements along with appropriate staffing and material resources required to perform these activities.

Proactively planning maintenance significantly reduces the occurrence of reactive maintenance which is always linked to a higher risk to human safety and higher financial costs. The City

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

needs to plan and properly fund its maintenance to ensure the transportation network is reliable and can achieve the desired level of service.

Major maintenance projects the City plans to continuously manage over the next ten (10) years include:

- **\$36 million** (2024-2028) for CCF Equipment Replacement;
- **\$8.4 million** allocated for Open and Closed Landfill Maintenance and Capital Improvement Program;
- **\$2.8 million** allocated for TS/CRC Maintenance and Capital Improvement Program; and,
- **\$3.3 million** allocated for MRF Maintenance and Capital Improvement Program.

From **2023-2032** the City will invest an additional estimated **\$10.2 Million** for various projects across the City. These investments for maintenance are intended to allow these assets to reach their estimated service life and minimize reactive maintenance costs. It should be acknowledged that these forecasted costs do not yet fully include the recommended works that need to be undertaken to ensure the entire inventory of assets will achieve their desired service lives and level of service.

Deferred maintenance (i.e. works that are identified for maintenance activities but unable to be completed due to available resources) will be included in the infrastructure risk management plan in future iterations once those works have been identified and prioritized.

The major lifecycle activities for the Landfills with their estimated costs in 2023 dollars (if known) are shown below in **Table 22**.

Table 22: Operation and Maintenance Summary

ASSET	LIFECYCLE STAGE	LIFECYCLE ACTIVITY	FREQUENCY	2023 ESTIMATED COST	UNIT
Landfills	Operations and Maintenance	Site Works (Inspection of Road, Fence, Vegetation, Ditch Cleaning, Plowing/Grading Roads)	Bi-Annual Inspections, rest as per operating contracts	\$305 K	Annually
	Operations	Leachate Treatment, Monitoring, Flushing, Condition Assessments,	Treatment/ Flushing As Needed, Assessments every 5 years, Header	\$1.24 M	Annually

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

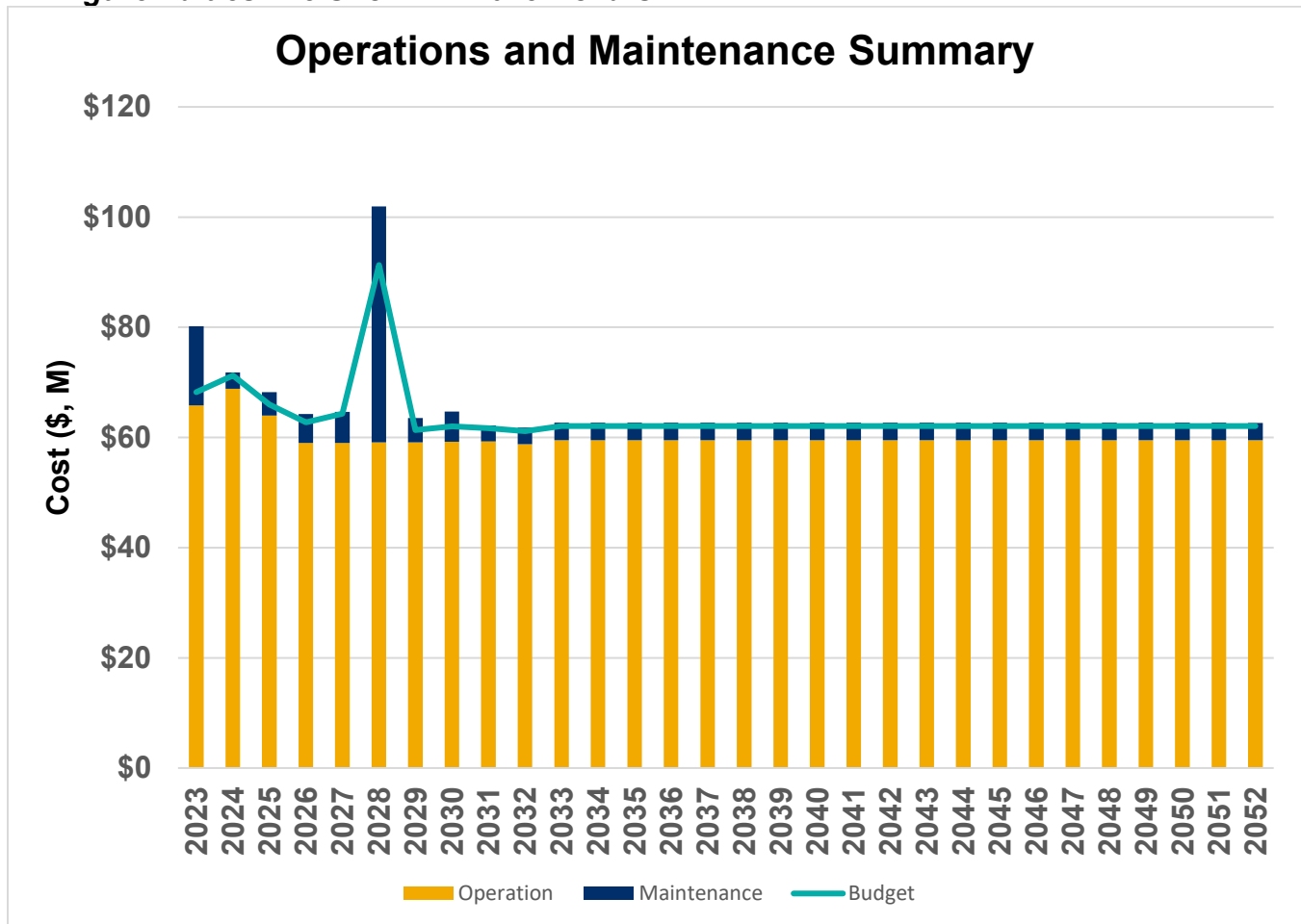
ASSET	LIFECYCLE STAGE	LIFECYCLE ACTIVITY	FREQUENCY	2023 ESTIMATED COST	UNIT
		Header Maintenance	Maintenance, Annual		
	Operations & Maintenance	Gas Recovery Facilities Inspection & Maintenance	Annual	\$50 K	Each
	Operations	Monitoring Program – Ground Water, Surface Water & Leachate and Maintenance	On Going	\$442 K	Per Location
	Operation	Reporting – Annual Reporting to MECP (Ministry of Environment, Conservation & Parks) (Operating Landfill & Closed Landfill,	Every 3 Years	\$94 K	Each
	Operations	Reporting - Annual Reporting to MECP (closed Landfills)	Every 3 Years	\$72 K	Each
	Operations	Reporting – Landfill Gas Emission & Benthic Study	Emission – Annual; Benthic – Bi-Annual	\$14 K	Each

Assessment and priority of reactive maintenance is undertaken by staff using experience and judgement.

Forecast operations and maintenance costs vary in relation to the total value of the asset registry. When additional assets are acquired, the future operations and maintenance costs are forecast to increase. When assets are disposed of the forecast operation and maintenance costs are reduced. **Figure 13** shows the forecast operations and maintenance costs relative to the proposed operations and maintenance Planned Budget. As mentioned in **Table 14** the planned operating budget shown below has been reduced by the estimated needs reduction related to moving to the Expanded Producer Responsibility Model for the collection and processing of recyclable material.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Figure 13: Operations and Maintenance Summary
All Figure Values Are Shown In 2023 Dollars.



The forecast costs include all costs from both the Capital and Operating budgets. Asset management focuses on how taxpayer or ratepayer dollars are invested by lifecycle activities and not by budget allocation since both budgets contain various lifecycle activities, they must both be consolidated for the AM Plans. An approved 2023 and forecast 2024/2025 operating budget were received as inputs to the model and a ten (10) year capital proposed capital budget for 2023-2032. No escalation of budgets or costs was included for inflationary reasons and assumptions have been flatlined to project into the future. It is clear that operations and maintenance budgets will need to increase in the future to continue to deliver the current levels of service.

The forecast of operations and maintenance costs are largely stable over time, with the large spike in maintenance in 2028 related to a large project (**\$30M**) to replace processing equipment at the Central Composting Facility as part of a larger multi-year project. The City has insufficient budget to achieve all of the works required to ensure that assets will be able to achieve their estimated service life at the desired level of service. It is anticipated that at the current budget

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

levels, there will be insufficient budget to address all operating and maintenance needs over the thirty (30) - year planning horizon. The graph above illustrates that without increased funding or changes to lifecycle activities, there is a significant shortage of funding which will lead to:

- Higher cost reactive maintenance;
- Possible reduction to the availability of the assets;
- Impacts on private property; and,
- Increased financial and reputational risk

This shortfall is primarily due to the additional operating and maintenance costs for growth driven waste collection vehicles and forecast 10 Year Facilities needs estimates. Adding additional assets over time impacts the operational and maintenance resources required to sustain the expected or mandatory level of service. It should be noted that a significant amount of operational and maintenance expenditures is mandatory due to legislative requirements and cannot simply be avoided or deferred.

As the City continues to develop condition profiles and necessary works are identified based on their condition, it is anticipated this operation and maintenance forecasts will increase significantly. Where maintenance budget allocations will result in a lesser level of service, the service consequences and risks have been identified and are highlighted in the **Risk, Section 6**.

Deferred maintenance (i.e. works that are identified for maintenance activities but unable to be completed due to available resources) will be included in the infrastructure risk management plan for the next iteration.

Future iterations of this plan will provide a more thorough analysis of operations and maintenance costs including types of expenditures for training, mandatory certifications, insurance, staffing costs and requirements, equipment, and maintenance activities.

8.3 RENEWAL PLAN

Renewal is major works which does not increase the assets design capacity but restores, rehabilitates, replaces, or renews an existing asset to its original service potential. Works over and above restoring an asset to original service potential is considered to be an acquisition resulting in additional future operations and maintenance costs

Asset renewals are typically undertaken to either ensure the assets reliability or quality will meet the service requirements set out by the City. Renewal projects are often triggered by service quality failure and can often be prioritized by those that have the highest consequence of failure, have high usage, have high operational and maintenance costs, and other deciding factors.

The typical useful lives of assets used to develop projected asset renewal forecasts are shown in **Table 23** and are based on the estimated design life for this iteration. Future iterations of the plan will focus on the Lifecycle approach to ESL which can vary greatly from design life. Asset

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

useful lives were last reviewed in 2022 however they will be reviewed annually until their accuracy reflects the City's current practices.

Table 23: Useful Lives of Assets

ASSET (SUB)CATEGORY	EXPECTED USEFUL LIFE (YEARS)
Landfill	75 (Estimated)
Glanbrook Garage/Admin Facilities	55
Stormwater Management Ponds	100
Pump Stations	40
Gas Collection Systems	100
Landfill Flare Facility	100
Leachate Collection System	100
Groundwater Monitoring Wells	25
Fencing / Security	25
Site Assets - Roads	50
Transfer Stations (TS)	55
Community Recycling Centres (CRC)	55
Material Recycling Facility (MRF)	55
Central Composting Facility (CCF)	55
Leaf and Yard Waste Composting Facility	55
Vehicles and Fleet (Excluding Packer Trucks)	8 – 9 <i>(depends on vehicle classification)</i>
Waste Collection Packer Trucks	7
Public Space Litter Containers	7
IT Equipment	5

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Many Waste Management assets have very long useful lives which may not fall within the period of this current AM Plan. These significant renewal costs will require significant investment in future years related to waste processing and disposal.

The estimates for renewals in this AM Plan were based on the register method which utilizes the data from the City's asset registry to analyse all available lifecycle information and then determine the optimal timing for renewals.

RENEWAL RANKING CRITERIA

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g., Facilities can process required volumes); or,
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g., Vehicles are reliable).⁵

Future methodologies may be developed to optimize and prioritize renewals by identifying assets or asset groups that:

- Have a high consequence of failure;
- Have high use and subsequent impact on users would be significant;
- Have higher than expected operational or maintenance costs; and,
- Have potential to reduce life cycle costs by replacement with a modern equivalent asset that would provide the equivalent service.⁶

At this time Waste Management does not have an asset renewal priority ranking criterion. A continuous improvement item has been identified to develop one, see details in **Table 27**.

SUMMARY OF FUTURE RENEWAL COSTS

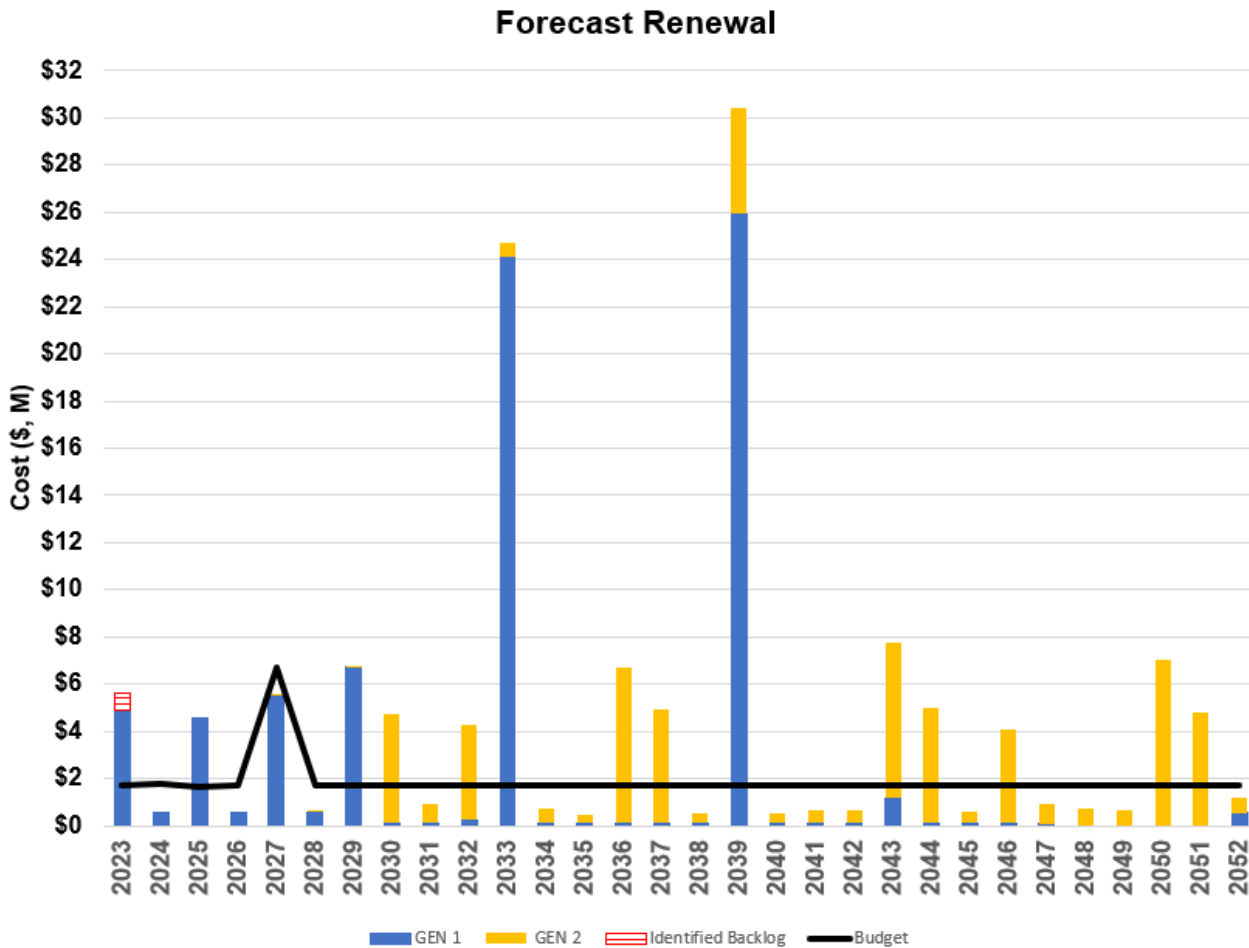
Forecast renewal costs are projected to increase over time if the asset stock increases. The forecast costs associated with renewals are shown relative to the proposed renewal budget in **Figure 14**.

⁵ IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.

⁶ Based on IPWEA, 2015, IIMM, Sec 3.4.5, p 3|97.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

Figure 14: Forecast Renewal Costs
All Figure Values Are Shown In 2023 Dollars.



The amount highlighted in 2023 represents the cumulative backlog of deferred work needed to be completed that has been either identified through its current estimated condition or age per **Table 4** when condition was not available. This back log represents approximately **\$737,040** of deferred works that have accumulated over multiple decades and for and have created a backlog of necessary works.

Deferred renewals (assets identified for renewal and not funded) are included and identified within the risk management plan. Prioritization of these projects will need to be funded and managed over time to ensure renewal occurs at the optimal time.

There is sufficient budget to support the planned projects only. Without additional funding the backlog will remain and continue to grow as future projects outside of the ten (10) year planning horizon continue to move forward into the 10-year scope. Continued deferrals of projects will lead to significantly higher operational and maintenance costs and will affect the availability of services in the future and impact levels of service.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

The expected renewal works over the ten (10) year planning horizon include **\$5 million** dollars in **2027** for renewal of the Leaf and Yard Waste composting facility and relocation. This does not include any additional funds that may be needed to accommodate expansion. In **2023** the City will invest **\$4.1 million** to renew eight (8) waste collection vehicles using natural gas as well as **\$2.4 million** renewing public space litter collection and special event containers over the next ten (10) years.

The large renewal spike in 2033 is related to the renewal of the Kenora Transfer Station, **\$23.9M**. The large spike in 2039 is related to the renewal of the Mountain Transfer Station, **\$12.9M**, and Dundas Transfer Station, **\$12.9M**.

Deferring renewals create risks of higher financial costs, decreased availability, and decreased satisfaction with asset performance. Ultimately, continuously deferring renewals works ensures Hamilton will not achieve intergenerational equality. If Hamilton continues to push out necessary renewals, there is a high risk that future generations will be unable to maintain the level of service the customers currently enjoy. It will burden future generations with significant costs that inevitably they will be unable to sustain.

Properly funded and timely renewals will ensure the assets perform as expected and it is recommended to continue to analyze asset renewals based on criticality and availability of funds for future AM Plans.

8.4 DISPOSAL PLAN

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, possible closure of service, decommissioning, disposal of asset materials, or relocation. Disposals will occur when an asset reaches the end of its useful life. The end of its useful life can be determined by factors such as excessive operation and maintenance costs, regulatory changes, obsolescence or demand for the asset has fallen.

Assets identified for possible decommissioning and disposal are shown in **Table 24**. A summary of the disposal costs and estimated reductions in annual operations and maintenance of disposing of the assets are also outlined in **Table 24**. Any costs or revenue gained from asset disposals is included in future iterations of the plan and the long-term financial plan.

Table 24: Assets Identified for Disposal

ASSET	REASON FOR DISPOSAL	TIMING	DISPOSAL COSTS	OPERATIONS & MAINTENANCE ANNUAL SAVINGS
Waste Collection Packer Truck	End of Service Life	2024/2025	N/A	\$7,367.16 average per unit per year reduced maintenance for unit <7 years old

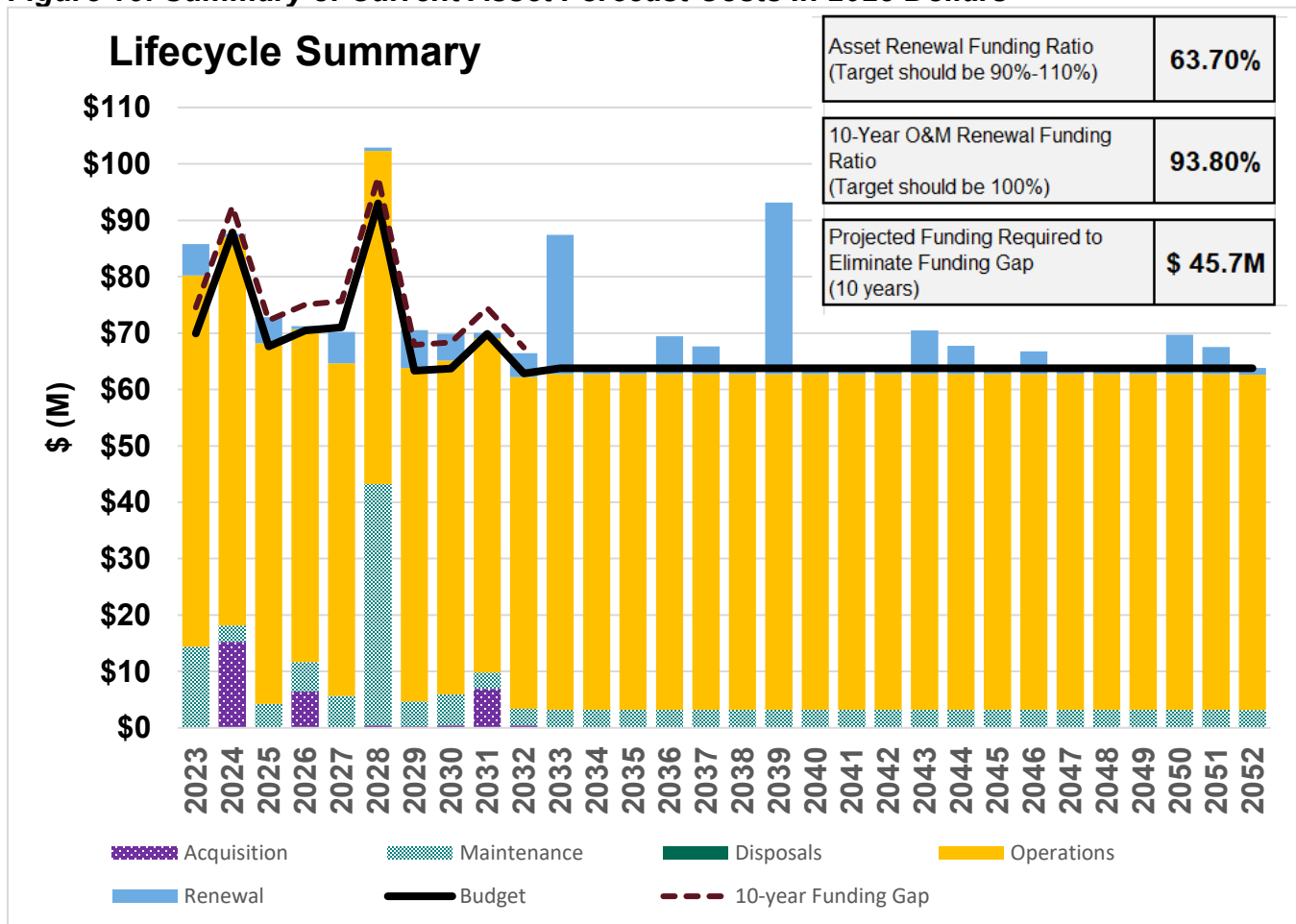
HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

8.5 SUMMARY OF CURRENT ASSET FORECAST COSTS

The financial projections from this asset plan are shown in **Figure 15**. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget.

The bars in the graphs represent the forecast costs needed to minimize the life cycle costs associated with the service provision. The proposed budget line indicates the estimate of available funding. The gap between the forecast work and the proposed budget is the basis of the discussion on achieving balance between costs, levels of service and risk to achieve the best value outcome.

Figure 15: Summary of Current Asset Forecast Costs In 2023 Dollars



The lack of funding allocated for the backlog of renewals and the necessary lifecycle activities creates an additional issue which is intergenerational equity. Each year the City defers necessary lifecycle activities it pushes the ever-increasing financial burden on to future generations. It is imperative the City begin addressing the lack of consistent and necessary funding to ensure that intergenerational equity will be achieved. Over time, allocating sufficient

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

funding on a consistent basis ensures that future generations will be able to enjoy the same standards being enjoyed today.

Over time the City will continue to improve its lifecycle data, and this will allow for informed choices as how best to mitigate those impacts and how to address the funding gap itself. This gap in funding future plans will be refined over the next three (3) years and improve the confidence and accuracy of the forecasts in future revisions of this AM Plan.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

9. FINANCIAL SUMMARY

This section contains the financial requirements resulting from the information presented in the previous sections of this AM Plan. Effective asset and financial management will enable the City to ensure its Transportation network provides the appropriate level of service for the City to achieve its goals and objectives. Reporting to stakeholders on service and financial performance ensures the City is transparently fulfilling its stewardship accountabilities.

Long-Term financial planning (LTFP) is critical for the City to ensure the networks lifecycle activities such as renewals, operations, maintenance, and acquisitions can happen at the optimal time. The City is under increasing pressure to meet the wants and needs of its customer while keeping costs at an affordable level and maintaining its financial sustainability.

Without funding asset activities properly for its Transportation network; the City will have difficult choices to make in the future which will include options such as higher costs reactive maintenance and operational costs, reduction of service and potential reputational damage.

Aligning the LTFP with the AM Plan is critical to ensure all of the networks needs will be met while the City is finalizing a clear financial strategy with measurable financial targets. The financial projections will be improved as the discussion on desired levels of service and asset performance matures.

9.1 SUSTAINABILITY OF SERVICE DELIVERY

There are two key indicators of sustainable service delivery that are considered within the AM Plan for this service area. The two indicators are the:

- Asset renewal funding ratio (proposed renewal budget for the next ten (10) years / forecast renewal costs for next ten (10) years); and,
- Medium-term forecast costs/proposed budget (over ten (10) years of the planning period).

ASSET RENEWAL FUNDING RATIO

Asset Renewal Funding Ratio⁵⁷ **63.71%**

The Asset Renewal Funding Ratio is used to determine if the City is accommodating asset renewals in an **optimal** and **cost-effective** manner from a timing perspective and relative to financial constraints, the risk the City is prepared to accept, and targeted service levels it wishes to maintain. The target renewal funding ratio should be ideally between **90% - 110%** over the entire planning period. A low indicator result generally indicates that service levels are achievable however the expenditures are below this level because the City is reluctant to fund the necessary work or prefers to maintain low levels of debt.

Over the next ten (10) years the City expects to have **63.71%** of the funds required for the optimal renewal of assets. This is a moderate number and should be addressed through this plan in the

⁷ AIFMM, 2015, Version 1.0, Financial Sustainability Indicator 3, Sec 2.6, p 9.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

next iteration. By having sufficient funding to renew **63.71%** of the required assets at the appropriate timing it will inevitably require trade-off choices that could include:

- A reduction of the level of service and availability of assets;
- Increased complaints and reduced customer satisfaction;
- Increased reactive maintenance and renewal costs; and,
- Damage to the City's reputation and risk of fines or legal costs.

The lack of renewal resources will be addressed in future AM Plan's while aligning the plan to the LTFP. This will allow staff to develop options and long-term strategies to address the renewal rate. The City will review its renewal allocations once the entire inventory has been confirmed and amalgamated.

MEDIUM-TERM – 10 YEAR FINANCIAL PLANNING PERIOD

10 Year Lifecycle Financial Ratio **93.8%**

Although this AM Plan includes forecast projections to thirty (30) years, the higher confidence numbers are typically within the first ten (10) years of the lifecycle forecast. The ten (10) year Lifecycle Financial Ratio compares the Planned Budget with the Lifecycle Forecast for the optimal operation, maintenance, and renewal of assets to provide an agreed level of service over the next ten (10) years. Similarly to the AARF, the optimal ratio is also between 90-110%. A low ratio would indicate that assets are not being funded at the rate that would meet the organization's risk and service level commitments.

The forecast operations, maintenance, and renewal costs over the ten (10) year planning period are **\$73.8M** on average per year. Over time as improved information becomes available it is anticipated to see this number increase. In future AM Plans, staff will connect the operational and maintenance needs to the forecasts, and this will result in a significantly higher cost than is outlined here.

The proposed (budget) operations, maintenance, and renewal funding is **\$69.2M** on average per year giving a ten (10) year funding shortfall of **\$4.6M** per year or **\$46M** over the ten (10) year planning period. This indicates that **93.8%** of the forecast costs needed to provide the services documented in this AM Plan are accommodated in the proposed budget. Note, that these calculations exclude acquired assets (if any).

Funding an annual funding shortfall or funding 'gap' should not be addressed immediately. The overall gap in funding city-wide will require vetting, planning, and resources to begin to incorporate gap management into the future budgets for all City services. This gap will need to be managed over time to reduce it sustainably and limit financial shock to customers. Options for managing the gap include;

- Financing strategies – increased funding, block funding for specific lifecycle activities, long-term debt utilization;

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

- Adjustments to lifecycle activities – increase/decrease maintenance or operations, increase/decrease frequency of renewals, limit acquisitions or dispose of underutilized assets;
- Influence level of service expectations or demand drivers; and,
- Adjust the size of any contemplated budget reduction related to the legislated change to Expanded Producer Responsibility for recycling to improve the Asset Renewal Ratio and to match forecast costs.

These options and others will allow Hamilton to ensure the gap is managed appropriately and ensure the level of service outcomes the customers desire.

Providing sustainable services from infrastructure requires the management of service levels, risks, forecast outlays, and financing to achieve a financial indicator of approximately **90-110%** for the first years of the AM Plan and ideally over the ten (10) year life of the Long-Term Financial Plan.

9.2 FORECAST COSTS (OUTLAYS) FOR THE LONG-TERM FINANCIAL PLAN

Table 25 shows the forecast costs (outlays) required for consideration in the ten (10) year long-term financial plan.

Providing services in a financially sustainable manner requires a balance between the forecast outlays required to deliver the agreed service levels with the planned budget allocations in the operational and capital budget. The City will begin developing its long-term financial plan (LTFP) to incorporate both the operational and capital budget information and help align the LTFP to the AM Plan which is critical for effective asset management planning.

A gap between the forecast outlays and the amounts allocated in the financial plan indicates further work is required on reviewing service levels in the AM Plan (including possibly revising the long-term financial plan).

The City will manage the 'gap' by continuing to develop this AM Plan to provide guidance on future service levels and resources required to provide these services in consultation with the community. Options to manage the gap include reduction and closure of low use assets, increased funding allocations, reduce the expected level of service, utilize debt based funding over the long term, adjustments to lifecycle activities, improved renewals and multiple other options or combinations of options.

These options will be explored in the next AM Plan and the City will provide analysis and options for Council to consider going forward.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

**Table 25: Forecast Costs (Outlays) For the Long-Term Financial Plan
Forecast Costs Are Shown In 2023 Dollar Values.**

YEAR	ACQUISITION	OPERATION	MAINTENANCE	RENEWAL	DISPOSAL
2023	\$20,000	\$65,835,752	\$14,340,798	\$5,604,936	0
2024	\$15,242,600	\$68,855,200	\$2,929,125	\$549,540	0
2025	0	\$63,948,776	\$4,250,410	\$4,589,486	0
2026	\$6,407,600	\$58,979,764	\$5,269,534	\$574,330	0
2027	0	\$58,989,764	\$5,670,849	\$5,530,785	0
2028	\$407,600	\$59,084,764	\$42,824,372	\$597,442	0
2029	\$275,000	\$59,094,764	\$4,421,994	\$6,753,690	0
2030	\$407,600	\$59,199,764	\$5,505,955	\$4,737,630	0
2031	\$6,907,600	\$59,294,764	\$2,906,246	\$1,338,807	0
2032	\$407,600	\$58,789,764	\$2,984,304	\$4,275,370	0

9.3 FUNDING STRATEGY

The proposed funding for assets is outlined in the City's operational budget and ten (10) year capital budget.

These operational and capital budgets determine how funding will be provided, whereas the AM Plan typically communicates how and when this will be spent, along with the service and risk consequences. Future iterations of the AM plan will provide service delivery options and alternatives to optimize limited financial resources.

9.4 VALUATION FORECASTS

Asset values are forecast to increase as additional assets are added into service. As projections improve and can be validated with market pricing, the net valuations will likely increase significantly despite some assets being programmed for disposal that will be removed from the register over the thirty (30) year planning horizon.

Additional assets will add to the operations and maintenance needs in the longer term. Additional assets will also require additional costs due to future renewals. Any additional assets will also

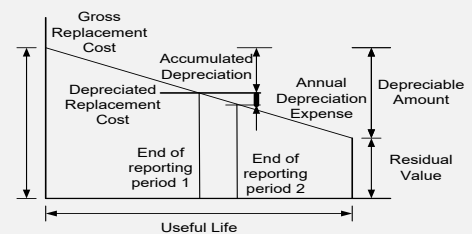
HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

add to future depreciation forecasts. Any disposals of assets would decrease the operations and maintenance needs in the longer term and remove the high costs of renewal obligations. At this time, it is not possible to separate the disposal costs from the renewal or maintenance costs however this will be improved for the next iteration of the plan.

9.5 ASSET VALUATIONS

The best available estimate of the value of assets included in this AM Plan are shown below. The assets are valued at estimated replacement costs:

Replacement Cost (Current/Gross)	\$559,889,408
Depreciable Amount	\$559,889,408
Depreciated Replacement Cost^{6F8}	\$309,395,936
Depreciation	\$ 11,309,516



The current replacement cost is the most common valuation approach for specialized infrastructure assets. The methodology includes establishing a comprehensive asset registry, assessing replacement costs (based on market pricing for the modern equivalent assets) and useful lives, determining the appropriate depreciation method, testing for impairments, and determining remaining useful life.

As the City matures its asset data, it is highly likely that these valuations will fluctuate significantly over the next 3 years, and they should increase over time based on improved market equivalent costs

9.6 KEY ASSUMPTIONS MADE IN FINANCIAL FORECASTS

In compiling this AM Plan, it was necessary to make some assumptions. This section details the key assumptions made in the development of this AM plan and should provide readers with an understanding of the level of confidence in the data behind the financial forecasts.

Key assumptions made in this AM Plan are:

- Operational forecasts are based on current budget allocations and are the basis for the projections for the thirty (30) year planning horizon and do not address other operational needs not yet identified;

⁸ Also reported as Written Down Value, Carrying or Net Book Value.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

- Maintenance forecasts are based on current budget allocations and do not identify asset needs at this time. It is solely based on planned activities; and,
- Replacement costs were based on historical costing. They were also made without determining what the asset would be replaced with in the future

9.7 FORECAST RELIABILITY AND CONFIDENCE

The forecast costs, proposed budgets, and valuation projections in this AM Plan are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is defined in the AMP Overview.

Table 26: Data Confidence Assessment for Data Used in AM Plan

DATA	CONFIDENCE ASSESSMENT	COMMENT
Demand drivers	Medium	Based on Development Charges By-Law Assumptions and previous Solid Waste Management Master Plans
Growth projections	Medium	Based on Development Charges By-Law assumptions, which are subject to change.
Acquisition forecast	Low	The acquisition forecast is based on a 10-year capital plan and proposed 2023 DC study and SME opinion. The remaining years are estimated.
Operation forecast	Low	Currently, the budget is based on 3 years of budget forecast and the remaining years are forecast with zero growth. Category allocation is based on SME opinion.
Maintenance forecast	Low	Currently, the Budget is based on 3 years of budget forecast and the remaining years are forecast with zero growth. Category allocation is based on SME opinion. All proactive maintenance needs may not have been identified and or identified.
Renewal forecast - Asset values	Low	Valuation will need to be reviewed as they are based on a mixture of historical costs and future-based estimates of replacement costs
- Asset useful lives	Low	Based on SME Opinion. Continuous improvement is required to ensure data is vetted and ensure it aligns with Hamilton's actual practices
- Condition modelling	Low	Mixture of assessment methods which are largely based on age or SME opinion. Requires standardization along with predictable timelines for assessments

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

DATA	CONFIDENCE ASSESSMENT	COMMENT
Disposal forecast	Very Low	Current disposal information is largely rolled into renewal. Continuous improvements are required to ensure accurate data is available.

The estimated confidence level for and reliability of data used in this AM Plan is considered to be a **Low-Medium** confidence level.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

10. PLAN IMPROVEMENT AND MONITORING

10.1 STATUS OF ASSET MANAGEMENT PRACTICES⁹

ACCOUNTING AND FINANCIAL DATA SOURCES

This AM Plan utilizes accounting and financial data. The sources of the data are:

- 2023 Approved Operating Budget;
- 2024-2025 Multi-Year Operating Forecast;
- 2023 Approved Capital Budget;
- 2024-2032 Multi-Year Capital Forecast;
- Building Condition Assessment Reports;
- Asset Management Data Collection Templates;
- Audited Financial Statements and Government Reporting (FIR, TCA etc);
- Financial Exports from internal financial systems; and,
- Historical cost and estimates of budget allocation based on SME experience.

ASSET MANAGEMENT DATA SOURCES

This AM Plan also utilizes asset management data. The sources of the data are:

- Data extracts from various city applications and management software;
- Asset Management Data Collection Templates;
- Tender documents, subdivision agreements, and projected growth forecasts as well as internal reports;
- Condition assessments;
- Subject matter Expert Opinion and Anecdotal Information; and,
- Reports from the mandatory inspections, operational, and maintenance activities internal reports.

10.2 IMPROVEMENT PLAN

It is important that the City recognize areas of the AM Plan and planning processes that require future improvements to ensure both effective asset management and informed decision-making. The tasks listed below are essential to improving the AM Plan and the City's ability to make evidence-based and informed decisions. These improvements span from improved lifecycle activities, improved financial planning, and plans to physically improve the assets.

The Improvement Plan **Table 27** below highlights proposed improvement items that will require further discussion and analysis to determine feasibility, resource requirements, and alignment

⁹ ISO 55000 Refers to this as the Asset Management System

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

to current workplans. Future iterations of this AM Plan will provide updates on these improvement plans.

Table 27: Improvement Plan

**p.a – per annum*

TASK	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
1.	Identify Waste Management assets in other divisions and incorporate into next AM Plan.	Lead: CAM Support: Waste Management	\$5,000 total Internal Staff Time	1 Year (2024)
2.	Release public engagement survey annually/regularly to measure customer values and track customer trends	Lead: CAM Support: Waste Management	\$3,100 total Internal Staff Time	1 Year (2025)
3.	Develop Digital Forms for regular Waste Site Facility Inspections and implement overall Condition Assessment using 1-5 scale for Waste Management assets. Implementation will follow once IT Devices (i.e. Tablets) available and training completed. Condition should be based on a 5-point condition rating scale guided	Lead: Waste Management Support: CAM	\$14,000 total Internal Staff Time and 4 x Mobile Devices	1 Year (2024)

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

TASK	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
	by the AM Overview Plan.			
4.	Improve Marketing Strategy of survey and consider telephone surveys and IP controls to improve confidence levels in the survey responses.	CAM	N/A	3 Years (2025-2028)
5.	Develop asset renewal priority ranking criteria	Waste	\$5,000 Internal Staff Time	1 Year (2025)
6.	Further investigate climate mitigation and adaptation projects and effects on assets and revise lifecycle model in future updates to AM Plan (e.g.. when is fleet going to convert to green fuel before 2050; When will organics strategy be implemented).	Lead: Waste Management Support: Climate Office	N/A	Ongoing
7.	Further investigate proposed demand management and risk adaptation plans associated levels of service so costs will be addressed in future revisions of the Lifecycle Model and AM Plans.	Waste Management	\$3,000 Internal Staff Time	Ongoing

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

TASK	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
8.	Investigate Extended Use Vehicles, determine usage needs, and adjust fleet requirements as needed.	Waste Management	\$5,000 Internal Staff Time	1 Year (2024)
9.	Integrate the Climate Lens tool to assess projects based on these targets and will assist with the prioritization of climate adaptation projects.	Waste Management	N/A	Ongoing
10.	Implementation of EAM (Enterprise Asset Management) work order management system will allow future version of AM Plan to better allocate actual costs to Lifecycle Categories.	EAM Team Waste Management	N/A	Ongoing
11.	CCF Operating Strategy currently processes all green bin material, however potential for next operating contract of the CCF to include processing of material offsite or seek regulatory approvals for the site and install	Waste Management	\$150,000 Estimated Consultant Cost	1 Year (2025)

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

TASK	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
	new equipment to allow for expanded site operating and processing capacities and incorporate into future options into the AM Plan lifecycle model			
12.	Develop Long-Term Waste Organics Strategy and update AM Plan when Long Term Solid Waste Plan completed	Waste Management	\$115,000 total \$100,000 Consultant Cost \$15,000 Internal Staff Time	1 Year (2024)
13.	Optimizing TSs and CRCs and study need for fourth TS/CRC. Update costs for future iterations of the AM Plan lifecycle model if need for fourth location confirmed.	Waste Management	\$115,000 total \$100,000 Consultant Cost \$15,000 Internal Staff Time	1 Year (2025)
14.	Planning for Blue Box Transition to Expanded Producer Responsibility Provincial Operator has been incorporated in the current Lifecycle Model for this Asset Management Plan. Update costs for	Waste Management	TBD Internal Staff Time	1 Year (2025)

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

TASK	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
	future iterations of the AM Plan lifecycle model			
15.	Develop and implement a Graffiti Removal Process. There are many containers and assets that Waste Collections has around the City that are often "tagged" and require removal. This process is being measured to understand the costs, time, and other impacts. Incorporate costs into the AM Plan lifecycle model and possible future Level of Service	Waste Management	\$3,000 Internal Staff Time	Undetermined
16.	Warranty Claims - Review the process for warranty claims and identify opportunities for improvement. This will ensure issues covered under warranties are managed under the warranty and not funded by the City.	Waste Management	\$,3000 Internal Staff Time	Undetermined

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

TASK	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
17.	Study implementing Two way/scale attendant at the Glanbrook LF site - We have no outbound ability at the scale currently but send finished compost outbound. Also, a scale operator business case to show the benefits for vehicle processing and site security Incorporate costs into the AM Plan lifecycle model and possible future Level of Service	Waste Management	\$2,000 Internal Staff Time	Undetermined

10.3 MONITORING AND REVIEW PROCEDURES

This AM Plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions.

The AM Plan will be reviewed and updated on a regular basis to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. These forecast costs and proposed budget will be incorporated into the Long-Term Financial Plan once completed.

HAMILTON WASTE MANAGEMENT ASSET MANAGEMENT PLAN

10.4 PERFORMANCE MEASURES

The effectiveness of this AM Plan can be measured in the following ways:

- The degree to which the required forecast costs identified in this AM Plan are incorporated into the long-term financial plan;
- The degree to which the one (1) to ten (10) year detailed works programs, budgets, business plans and corporate structures consider the 'global' works program trends provided by the AM Plan;
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Planning documents and associated plans; and,
- The Asset Renewal Funding Ratio achieving the Organizational target (this target is often 90 – 110%).

APPENDIX A

Survey Analysis

APPENDIX A: SURVEY ANALYSIS



LET'S CONNECT, HAMILTON
**City Services
& Assets Review**



Waste Management Services

Survey Period: February 13 - March 20, 2023

May 2023

187

122

6

Survey Response Demographics

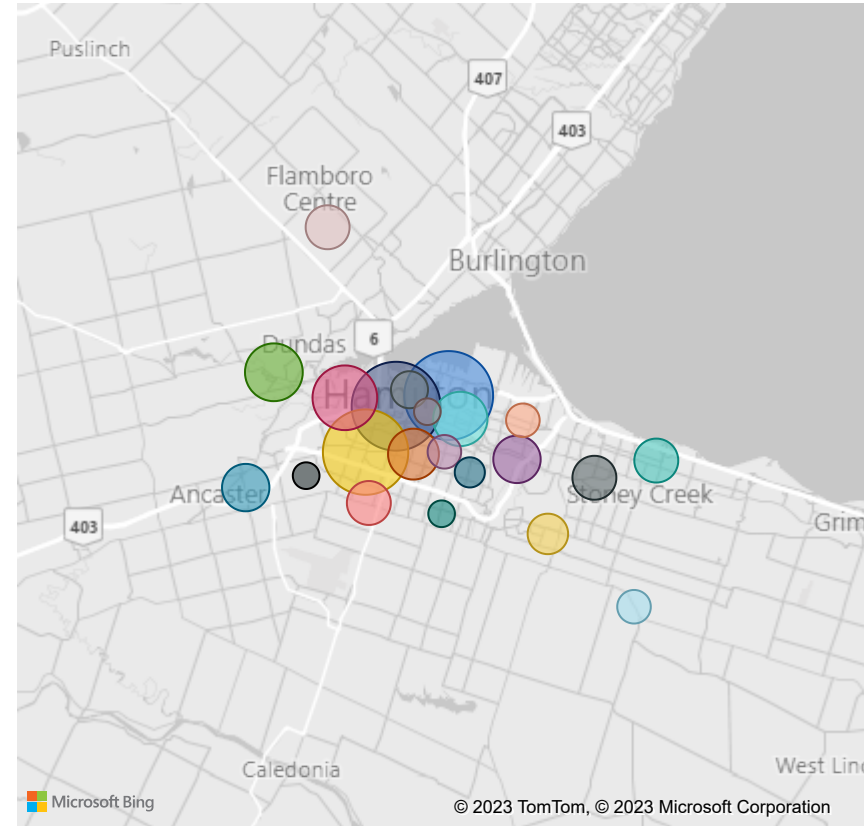
23059

1245

Respondents Survey Questions Demographic Questions Survey Responses Demographic Responses

Postal Code	Respondents	% Respondents	Population
L8L	20	11.24%	50,110
L8P	20	11.24%	42,655
L9C	19	10.67%	64,505
L8S	13	7.30%	26,295
L9H	11	6.18%	50,480
L8M	10	5.62%	22,530
L9A	9	5.06%	40,750
L8K	8	4.49%	52,085
L9G	8	4.49%	38,540
L8B	7	3.93%	38,035
L8E	7	3.93%	64,835
L8G	7	3.93%	36,075
L9B	7	3.93%	38,295
L8J	6	3.37%	42,665
L8R	5	2.81%	19,375
L0R	4	2.25%	123,805
L8H	4	2.25%	41,715
L8V	4	2.25%	34,910
L8T	3	1.69%	31,140
L8N	2	1.12%	26,220
L8W	2	1.12%	39,195
L9K	2	1.12%	23,485

% Respondents by FSA



Respondents by Day



Self Identification	% Respondents	Respondents
2SLGBTQIA+	5.39%	9
I do not identify with any of the above groups	75.45%	126
Immigrant +10	5.99%	10
Immigrant <10	1.80%	3
Indigenous	2.40%	4
People with disabilities	10.78%	18
Racialized	3.59%	6

Age	% Pop. by Age	% Respondents	Respondents
18 to 24	6.8%	0.56%	1
25 to 34	15.3%	8.94%	16
35 to 44	13.8%	21.23%	38
45 to 54	13.2%	13.41%	24
55 to 64	14.7%	25.70%	46
65 to 79	14.3%	29.61%	53
80+	5.2%	0.56%	1

Residence	% Respondents	Respondents
Apartment/Condominium (more than 6 units)	4.92%	9
Multi-Unit building (2 to 6 Units)	3.28%	6
Row/townhouse	9.29%	17
Single Family (detached house; semi-detached house)	82.51%	151

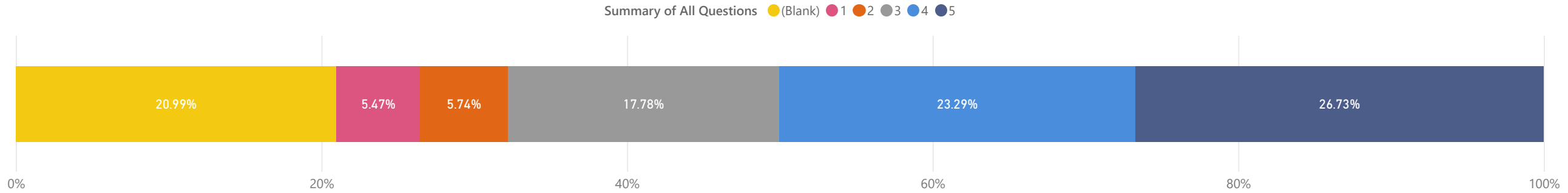
Gender	% Respondents	Respondents
Prefer not to answer	11.35%	21
Male	41.08%	76
Female	54.05%	100

Residency	% Respondents	Respondents
I live in Hamilton	100.00%	181
I run a Hamilton-based business	7.73%	14

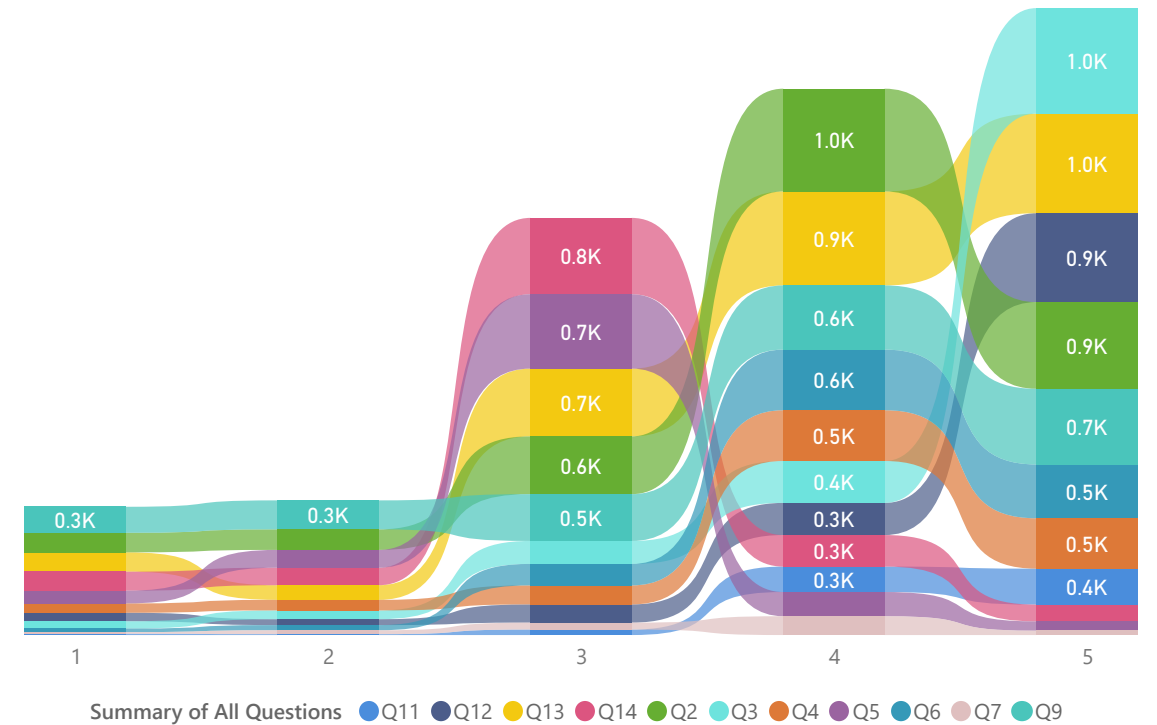
187
Respondents
23059
Responses

Summary of Survey Results

City Services & Asset Review
Waste Management Services
May 2023



	σ	Avg.	Avg. %	Opt Out	Opt out %
All Service Areas	1.21	3.6	75.2	4839	23.9
Q11 Missed Collection	0.83	4.4	87.1	68	9.1
Q3 Importance	0.98	4.2	84.7	224	10.9
Q12 Recommend to Others	1.14	4.2	84.3	546	26.5
Q6 Comfortable and Safe	0.93	4.0	81.6	635	30.8
Q13 Value for Money	1.16	3.7	76.2	606	29.4
Q4 Access, last 24 mo	1.14	3.7	77.4	680	33.0
Q2 Performance, last 24mo	1.15	3.6	75.1	645	31.3
Q7 Agree with Statements	0.99	3.6	71.5	24	6.5
Q9 Future Needs	1.27	3.6	71.1	242	9.2
Q14 Rate Level	1.06	3.0	61.2	472	22.9
Q5 Meet Needs	1.00	2.9	59.9	697	33.9



Performance, last 24mo

Q2

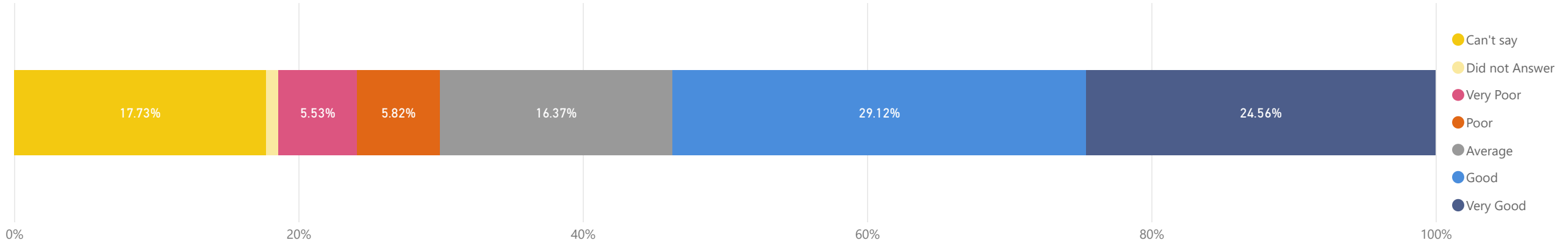
187
Respondents
3469
Responses

City Services & Asset Review

Waste Management Services

May 2023

Over the last 24 months, how do you feel Waste Management Services has performed overall in the following services?



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Very Poor	Poor	Average	Good	Very Good
All Service Areas	1.15	3.6	75.1	645	31.3	96	101	284	505	426
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	0.95	4.1	81.3	23	12.3	4	5	30	62	63
Community Recycling Centre/Transfer Station	0.97	3.9	78.6	31	16.6	5	6	32	65	48
Yard Waste Program	1.04	3.8	76.3	19	10.1	6	13	35	66	48
Trash Tag Program	1.17	3.8	75.6	34	18.1	10	12	29	53	49
Reuse Stores at Community Recycling Centres	0.99	3.8	75.2	129	69.0	1	6	13	24	14
Green Bin Program	1.20	3.7	74.8	21	11.2	13	12	32	57	52
Blue Box Program	1.19	3.7	74.6	1	0.5	15	11	40	63	57
Garbage Collection Program	1.25	3.7	73.2	2	1.0	16	19	34	59	57
Bulk/Large Item Pick Up Program	1.20	3.6	72.6	90	48.2	8	10	17	37	25
Recycle Coach APP	1.35	3.3	66.5	141	75.4	8	3	11	14	10
Education in Schools / Community Groups / Multi-Residential Buildings	1.30	2.6	52.1	154	82.3	10	4	11	5	3

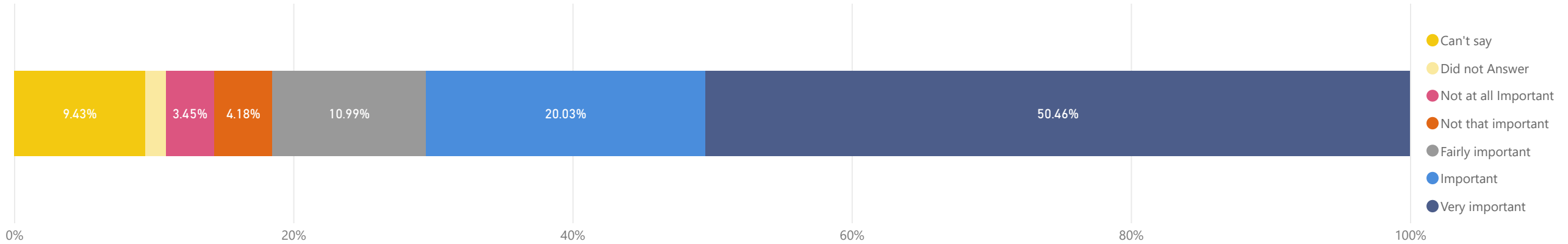
Survey begins at Q2, as Q1 was a demographics question, specific to the Waste Management survey about Household type. Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

Q3

187
Respondents
2057
Responses

Importance

How important should the following services be as a responsibility for Waste Management?



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Not at all Important	Not that Important	Fairly Important	Important	Very Important
All Service Areas	0.98	4.2	84.7	224	10.9	71	86	226	412	1038
Recycle Coach APP	1.42	3.2	63.0	82	43.8	18	18	26	16	27
Reuse Stores at Community Recycling Centres	1.26	3.7	73.3	44	23.5	10	18	31	35	49
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	1.25	3.9	77.9	8	4.3	15	11	27	51	75
Education in Schools / Community Groups / Multi-Residential Buildings	1.24	4.0	79.3	39	20.9	10	11	24	32	71
Trash Tag Program	1.14	4.0	80.1	13	6.9	7	14	28	47	78
Bulk/Large Item Pick Up Program	0.85	4.3	85.9	14	7.5	2	1	30	51	89
Green Bin Program	0.99	4.5	89.7	7	3.7	6	5	14	26	129
Community Recycling Centre/Transfer Station	0.68	4.5	90.4	7	3.8		2	13	54	111
Yard Waste Program	0.76	4.5	90.6	4	2.1		5	15	41	122
Blue Box Program	0.77	4.6	92.0	2	1.1	3	1	11	37	133
Garbage Collection Program	0.48	4.8	96.1	4	2.1			7	22	154

Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

187

Respondents

5526

Responses

Individual Service Areas Importance vs. Performance

Service areas where importance exceeds performance by 20 points is indicative of a mismatch between expectations and service levels, equal to one point on the Likert scale used.

Service Area	Importance (index score)	Performance (index score)	Net Differential	Opt Out %
Average	83	73	-11	26.6
Education in Schools / Community Groups / Multi-Residential Buildings	79	52	-27	62.9
Garbage Collection Program	96	73	-23	5.0
Blue Box Program	92	75	-17	4.4
Green Bin Program	90	75	-15	11.2
Yard Waste Program	91	76	-14	12.3
Bulk/Large Item Pick Up Program	86	73	-13	35.5
Community Recycling Centre/Transfer Station	90	79	-12	16.7
Trash Tag Program	80	76	-5	16.9
Reuse Stores at Community Recycling Centres	73	75	2	55.2
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	78	81	3	16.0
Recycle Coach APP	63	67	3	65.4

Performance Q2 Over the last 24 months, how do you feel Waste Management Services has performed overall in the following services?

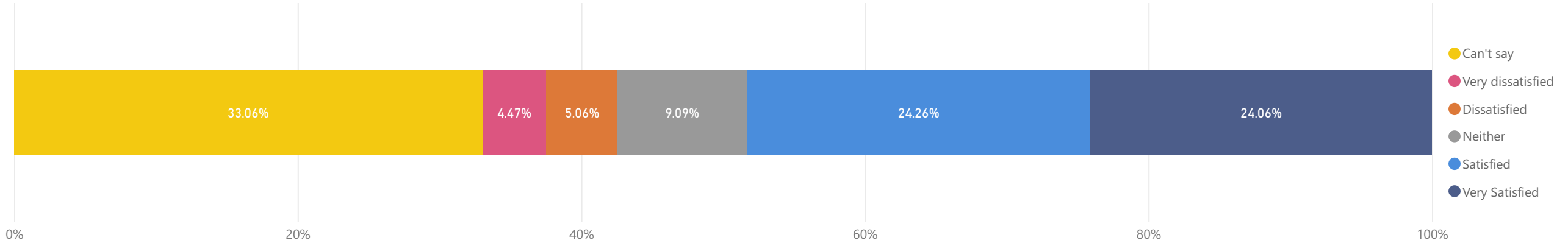
Importance Q3 How important should the following services be as a responsibility for Waste Management? All values were calculated and then rounded to the nearest whole number.

Q4

187
Respondents
2057
Responses

Access, last 24 mo

In the last 24 months if you have used Waste Management Services, how satisfied are you with your ability to access services? If you have not used the service, please select can't say.



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
All Service Areas	1.14	3.7	77.4	680	33.0	92	104	187	499	495
Community Recycling Centre/Transfer Station	0.94	4.2	83.1	39	20.9	4	5	16	62	61
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	0.95	4.1	82.5	29	15.5	4	6	21	62	65
Yard Waste Program	1.06	4.0	80.5	28	15.0	5	14	15	63	62
Trash Tag Program	1.11	4.0	79.6	41	21.9	9	6	20	55	56
Garbage Collection Program	1.17	3.9	79.0	10	5.3	11	14	18	64	70
Blue Box Program	1.21	3.9	78.9	10	5.3	16	8	15	69	69
Green Bin Program	1.18	3.9	78.8	27	14.4	11	12	15	60	62
Bulk/Large Item Pick Up Program	1.31	3.5	70.7	95	50.8	10	11	17	28	26
Reuse Stores at Community Recycling Centres	1.20	3.3	66.1	128	68.4	5	10	17	16	11
Recycle Coach APP	1.24	3.1	62.9	132	70.6	8	7	17	15	8
Education in Schools / Community Groups / Multi-Residential Buildings	1.21	2.7	53.9	141	75.4	9	11	16	5	5

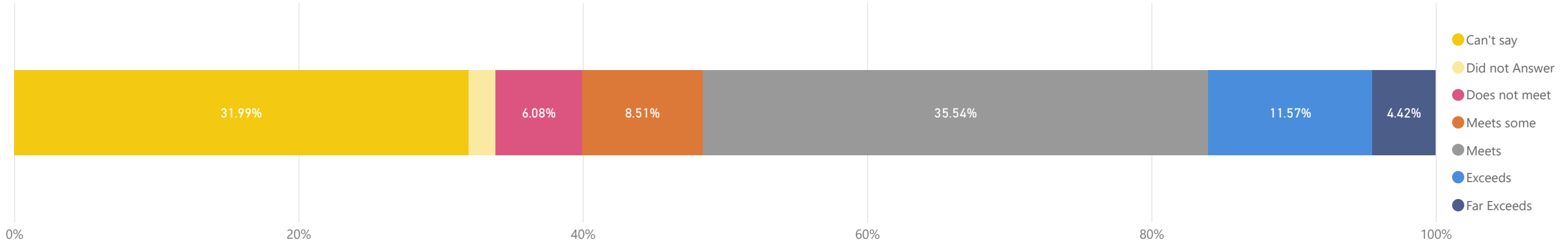
Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

Q5

187
Respondents
2057
Responses

Meet Needs

Do the following services provided by Waste Management meet your needs?



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Does not meet	Meets some	Meets	Exceeds	Far Exceeds
All Service Areas	1.00	2.9	59.9	697	33.9	125	175	731	238	91
Community Recycling Centre/Transfer Station	0.76	3.2	64.1	39	20.9	2	14	95	26	11
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	0.92	3.2	63.7	36	19.2	10	10	86	32	13
Trash Tag Program	0.99	3.1	62.5	34	18.2	12	16	81	29	15
Garbage Collection Program	0.95	3.0	60.7	7	3.8	16	18	103	30	13
Yard Waste Program	0.90	3.0	59.3	26	13.9	11	28	86	28	8
Green Bin Program	0.99	2.9	58.7	19	10.2	20	17	96	24	11
Blue Box Program	0.91	2.9	58.5	5	2.7	14	32	99	28	9
Bulk/Large Item Pick Up Program	1.03	2.9	57.0	93	49.7	11	21	37	21	4
Reuse Stores at Community Recycling Centres	1.07	2.8	56.7	139	74.4	7	8	22	8	3
Recycle Coach APP	1.16	2.7	53.0	144	77.0	11	4	19	7	2
Education in Schools / Community Groups / Multi-Residential Buildings	1.27	2.4	47.5	155	82.8	11	7	7	5	2

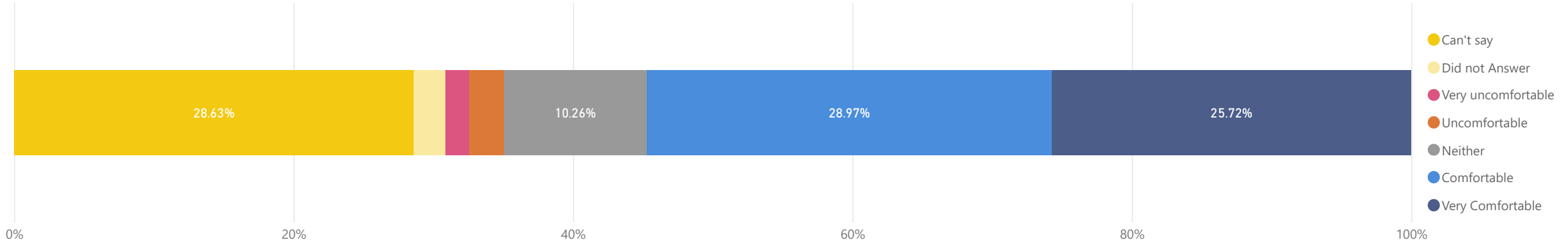
Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

Comfortable and Safe

Did you feel comfortable and safe accessing services provided by Waste Management?

Q6

187
Respondents
2057
Responses



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Very Uncomfortable	Uncomfortable	Neither	Comfortable	Very Comfortable
All Service Areas	0.93	4.0	81.6	635	30.8	35	51	211	596	529
Trash Tag Program	0.82	4.2	84.6	31	16.5	2	2	20	66	66
Yard Waste Program	0.79	4.2	84.2	28	14.9	1	5	16	75	62
Garbage Collection Program	0.91	4.2	84.1	12	6.4	5	3	19	72	76
Blue Box Program	0.93	4.2	84.0	10	5.3	6	4	14	78	75
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	0.77	4.2	83.9	38	20.3	1	1	24	65	58
Green Bin Program	0.97	4.2	83.0	23	12.3	6	5	15	70	68
Community Recycling Centre/Transfer Station	0.89	4.1	81.7	34	18.1	2	8	19	70	54
Bulk/Large Item Pick Up Program	1.06	3.8	75.5	75	40.1	6	7	21	50	28
Reuse Stores at Community Recycling Centres	0.99	3.8	75.4	117	62.6	1	5	23	21	20
Recycle Coach APP	1.13	3.5	70.9	132	70.6	4	3	20	15	13
Education in Schools / Community Groups / Multi-Residential Buildings	1.01	3.4	68.5	135	72.2	1	8	20	14	9

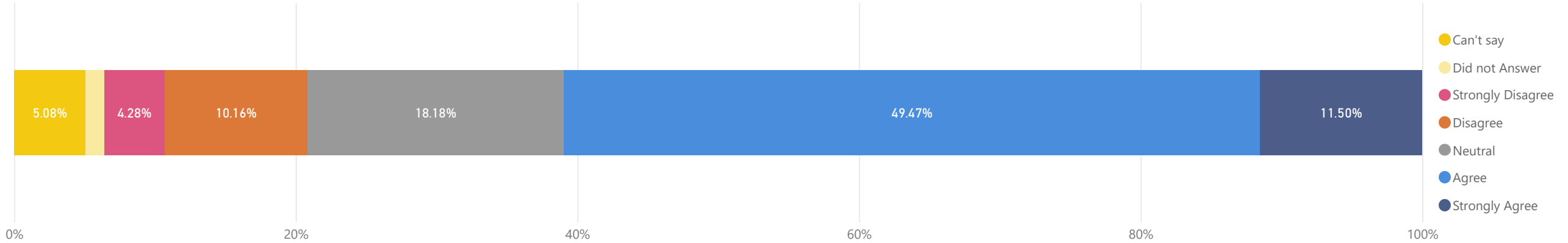
Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

Q7

187
Respondents
374
Responses

Agree with Statements

Thinking about waste collection vehicles that you have seen in Hamilton; do you agree with the following statements:



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
All Service Areas	0.99	3.6	71.5	24	6.5	16	38	68	185	43
Waste collection vehicles were operated safely in the community.	0.96	3.7	73.6	7	3.8	8	15	29	103	25
Waste collection vehicles did not have strong odours.	1.01	3.5	69.3	17	9.1	8	23	39	82	18

Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

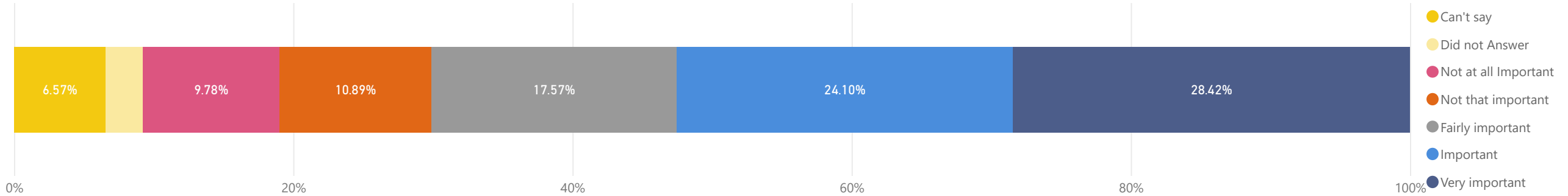
Q9

187
Respondents
2618
Responses

Future Needs

City Services & Asset Review
Waste Management Services
May 2023

Please rate the following potential services and program based on their importance to you? The City could consider supporting and/or promoting these services/programs in the future.



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Not at all Important	Not that Important	Fairly Important	Important	Very Important
All Service Areas	1.27	3.6	71.1	242	9.2	256	285	460	631	744
Reduction in Garbage Pickup Frequency (ie. biweekly collection)	1.45	2.6	52.5	12	6.4	54	40	27	26	28
Bicycle Repair Programs	1.39	3.2	64.1	26	13.9	26	27	33	38	37
Food Waste Reduction Workshops	1.42	3.3	65.2	14	7.5	30	26	28	47	42
Repair and re-use Workshops Repair and re-use workshops for electronics, small appliances, and small engines	1.36	3.3	66.9	20	10.7	22	26	35	40	44
Alternative Fuel Collection Vehicles	1.37	3.3	67.0	15	8.0	24	24	38	40	46
Share and Re-Use Spaces	1.30	3.5	69.3	17	9.1	19	20	39	47	45
Furniture Banks	1.28	3.6	72.5	17	9.1	16	17	37	45	55
Landfill Mining	1.28	3.7	73.1	20	10.7	12	25	28	46	56
Textile and Clothing Programs	1.38	3.7	73.8	18	9.6	18	22	22	39	68
Upgrading Processes and Infrastructure	1.11	3.7	74.9	17	9.1	7	15	44	52	52
Community Garden/Composting	1.22	3.9	77.5	17	9.1	12	11	33	44	70
Waste Pelletization Plants	1.11	3.9	78.1	15	8.0	6	15	33	53	65
Waste Digestion Chambers	1.05	4.0	80.1	18	9.7	5	9	36	49	70
Waste-to-Energy	1.00	4.0	80.9	16	8.5	5	8	27	65	66

Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

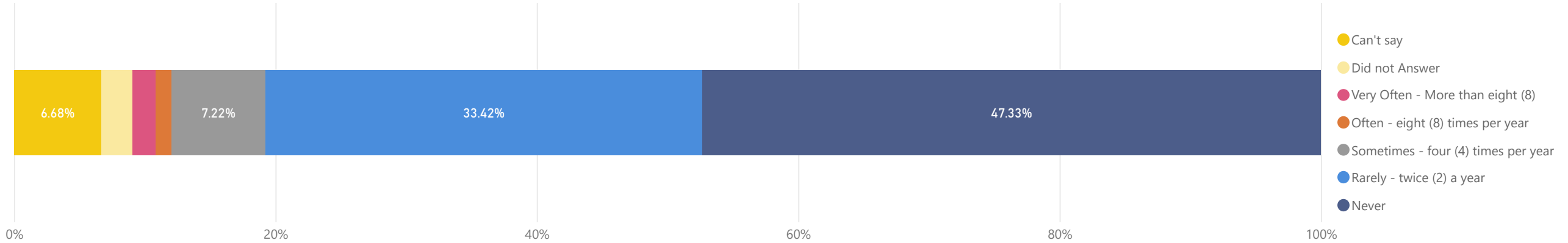
Q11

187
Respondents
748
Responses

Missed Collection

City Services & Asset Review
Waste Management Services
May 2023

How often have you experienced a missed waste pickup on your regular collection day?



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Very Often - More than eight (8)	Often - eight (8) times per year	Sometimes - four (4) times per year	Rarely - twice (2) a year	Never
All Service Areas	0.83	4.4	87.1	68	9.1	13	9	54	250	354
Green Bin Program	0.78	4.4	88.7	29	15.5	2	2	11	53	90
Blue Box Program	0.77	4.4	88.0	6	3.2	2	2	14	67	96
Garbage Collection Program	0.91	4.3	86.1	8	4.2	4	5	16	61	93
Yard Waste Program	0.86	4.3	85.8	25	13.3	5		13	69	75

Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

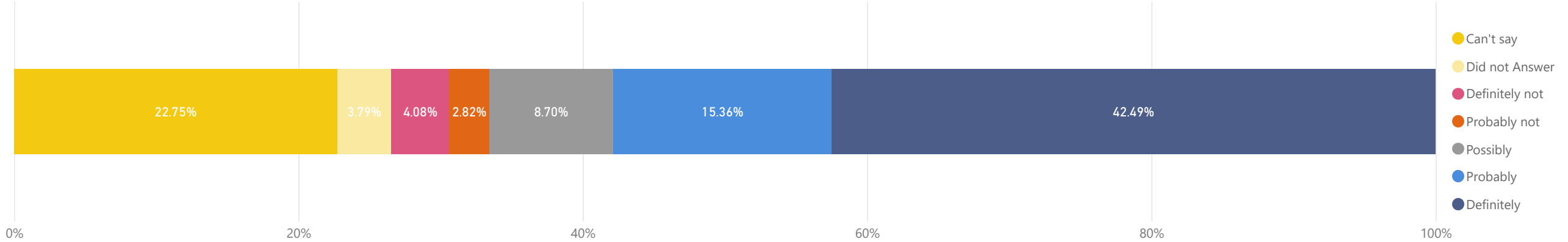
Q12

187
Respondents
2057
Responses

Recommend to Others

City Services & Asset Review
Waste Management Services
May 2023

How likely would you be to recommend these services to others?



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Definitely not	Probably not	Possibly	Probably	Definitely
All Service Areas	1.14	4.2	84.3	546	26.5	84	58	179	316	874
Yard Waste Program	0.91	4.5	89.1	27	14.4	4	2	16	33	105
Community Recycling Centre/Transfer Station	0.84	4.4	88.9	32	17.1	2	2	17	38	96
Garbage Collection Program	1.10	4.4	87.2	14	7.5	10	4	12	35	112
Blue Box Program	1.16	4.3	85.1	12	6.4	9	10	17	30	109
Bulk/Large Item Pick Up Program	1.01	4.2	85.0	54	28.8	5	2	20	34	72
Green Bin Program	1.19	4.2	84.8	20	10.7	11	8	14	31	103
Trash Tag Program	1.19	4.2	83.8	33	17.6	9	9	16	30	90
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	1.15	4.1	82.2	35	18.7	7	9	24	32	80
Reuse Stores at Community Recycling Centres	1.12	4.0	80.4	90	48.2	5	3	21	24	44
Education in Schools / Community Groups / Multi-Residential Buildings	1.35	4.0	79.0	107	57.2	9	3	12	15	41
Recycle Coach APP	1.52	3.4	68.0	122	65.2	13	6	10	14	22

Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

Q12

187
Respondents
2057
Responses

Net Promoter Score

City Services & Asset Review
Waste Management Services
May 2023

Typically the Net Promoter Score is used to measure customer loyalty.

How likely would you be to recommend these services to others?



	σ	Net Promoter Score	Detractors	Passives	Promoters	
All Service Areas	22.8		32.37	321	316	874
Yard Waste Program	18.1		51.88	22	33	105
Garbage Collection Program	21.9		49.71	26	35	112
Community Recycling Centre/Transfer Station	16.7		48.39	21	38	96
Green Bin Program	23.9		41.92	33	31	103
Blue Box Program	23.2		41.71	36	30	109
Trash Tag Program	23.8		36.36	34	30	90
Bulk/Large Item Pick Up Program	20.3		33.83	27	34	72
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	23.0		26.32	40	32	80
Education in Schools / Community Groups / Multi-Residential Buildings	27.0		21.25	24	15	41
Reuse Stores at Community Recycling Centres	22.4		15.46	29	24	44
Recycle Coach APP	30.3		-10.77	29	14	22

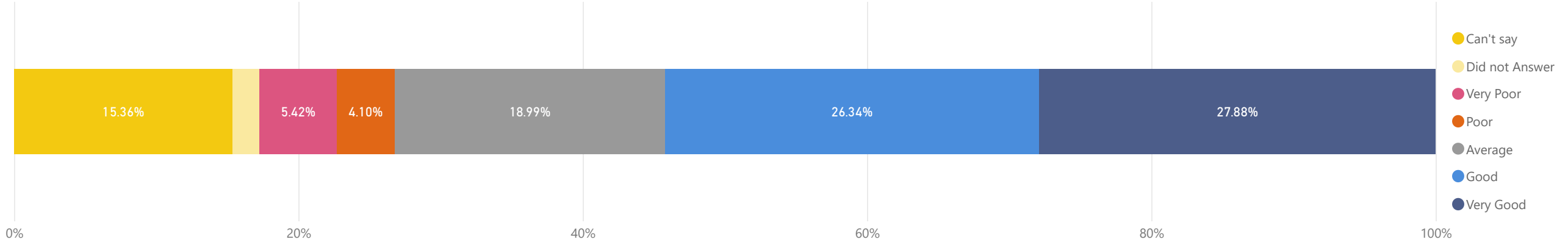
Likert choices less than 4 are considered 'Detractors' while 5s are considered 'Promoters' and 4s are 'Passive'. Respondents who opted out by not answering or selecting 'Can't Say' were removed from the sample. Net Promoter score is calculated by subtracting (% Detractors) from (% Promoters). σ (Standard Deviation) is calculated in percent, the same units as the Net Promoter Score.

Q13

187
Respondents
3508
Responses

Value for Money

How would you rate the Waste Management Division for providing good value for money in the infrastructure and services provided to your community?



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Very Poor	Poor	Average	Good	Very Good
All Service Areas	1.16	3.7	76.2	606	29.4	95	72	333	462	489
Community Recycling Centre/Transfer Station	1.02	4.0	80.0	34	18.2	5	4	37	47	60
Yard Waste Program	1.07	4.0	79.0	24	12.8	8	6	32	57	60
Green Bin Program	1.15	3.9	78.5	23	12.3	10	7	33	49	65
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	1.17	3.9	77.4	36	19.2	10	7	34	42	58
Garbage Collection Program	1.12	3.9	77.3	10	5.4	10	10	34	63	60
Trash Tag Program	1.14	3.8	76.0	32	17.1	10	8	36	50	51
Blue Box Program	1.18	3.7	74.9	9	4.8	13	11	41	56	57
Bulk/Large Item Pick Up Program	1.09	3.7	74.6	65	34.7	8	5	31	46	32
Reuse Stores at Community Recycling Centres	1.02	3.6	71.1	108	57.7	3	7	27	27	15
Education in Schools / Community Groups / Multi-Residential Buildings	1.36	3.5	69.5	132	70.5	8	4	13	14	16
Recycle Coach APP	1.41	3.3	66.7	133	71.1	10	3	15	11	15

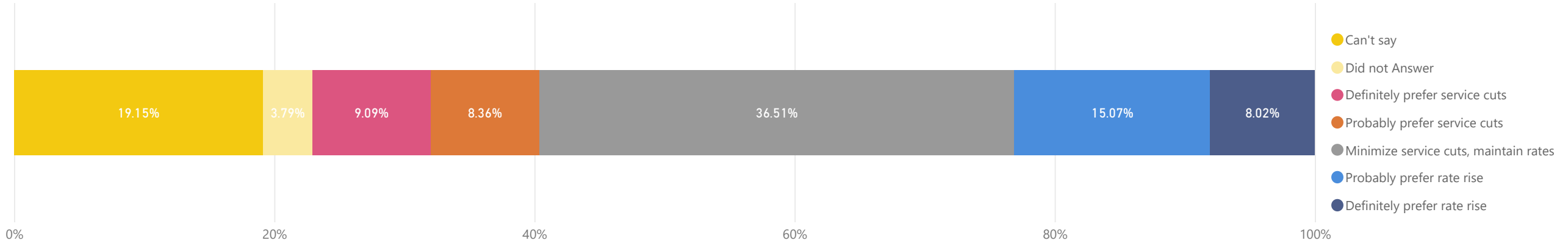
Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

Q14

187
Respondents
2057
Responses

Rate Level

If you had to choose, would you prefer to see tax rates increase to improve local services OR would you prefer to see service level cuts to minimize tax rate increases?



	σ	Avg.	Avg. %	Opt Out	Opt Out %	Definitely prefer service cuts	Probably prefer service cuts	Minimize service cuts, maintain rates	Probably prefer rate rise	Definitely prefer rate rise
--	---	------	--------	---------	-----------	--------------------------------	------------------------------	---------------------------------------	---------------------------	-----------------------------

All Service Areas	1.06	3.0	61.2	472	22.9	187	172	751	310	165
Yard Waste Program	0.93	3.3	66.5	27	14.5	6	13	84	37	20
Blue Box Program	0.98	3.3	66.1	19	10.2	10	12	84	41	21
Community Recycling Centre/Transfer Station	0.93	3.3	65.8	33	17.6	8	10	82	37	17
Garbage Collection Program	1.02	3.2	64.8	17	9.1	12	15	85	36	22
Green Bin Program	1.07	3.2	64.2	20	10.7	16	12	81	37	21
Bulk/Large Item Pick Up Program	0.96	3.1	62.3	45	24.0	9	20	71	30	12
Trash Tag Program	1.08	3.0	59.7	35	18.7	20	15	78	25	14
Education in Schools / Community Groups / Multi-Residential Buildings	1.30	2.9	57.8	79	42.2	24	12	38	20	14
Reuse Stores at Community Recycling Centres	1.18	2.8	56.4	70	37.4	19	25	43	18	12
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	1.04	2.8	55.5	35	18.7	26	18	79	22	7
Recycle Coach APP	1.18	2.2	43.8	92	49.2	37	20	26	7	5

Respondents who opted out by not answering or selecting 'Can't Say' are included in Opt out.

187

Individual Service Areas Rates vs. Value for Money

Respondents

5565

Responses

Service areas where reasonable fees exceed value for money by 20 points is indicative of a mismatch between expectations and service levels, equal to one point on the Likert scale used.

Service Area	Rates (index score)	Value for Money (index score)	Net Differential	Opt Out %
Average	60	75	15	26.2
Recycle Coach APP	44	67	23	60.2
Recycling and Waste Collection Calendar (mailed annually in March to single family homes)	56	77	22	19.0
Trash Tag Program	60	76	16	17.9
Reuse Stores at Community Recycling Centres	56	71	15	47.6
Green Bin Program	64	79	14	11.5
Community Recycling Centre/Transfer Station	66	80	14	17.9
Yard Waste Program	67	79	13	13.7
Garbage Collection Program	65	77	12	7.3
Bulk/Large Item Pick Up Program	62	75	12	29.4
Education in Schools / Community Groups / Multi-Residential Buildings	58	69	12	56.4
Blue Box Program	66	75	9	7.5

Positive Net Differential values indicate that 'Value for Money' was greater than willingness for 'Rates'. All values were calculated and then rounded to the nearest whole number. Low index scores in 'Rates' indicate that respondents are not willing to pay increased rates for the service area.

Value for Money Q13 How would you rate the Waste Management Division for providing good value for money in the infrastructure and services provided to your community?

Rates Q14 If you had to choose, would you prefer to see tax rates increase to improve local services OR would you prefer to see service level cuts to minimize tax rate increases?