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Waste Services Audit

January 30, 2018



Source: Waste Services, 2016-2018 Business Plan

The Office of the City Auditor conducted this
project in accordance with the
*International Standards for the
Professional Practice of Internal Auditing*

Waste Services Audit

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Executive Summary

An estimated one million tonnes of waste is generated by City of Edmonton residents and businesses on an annual basis. The City of Edmonton's Waste Services Branch provides waste management services for the City of Edmonton. They do this through an integrated waste management system that includes the collection of waste, the diversion of waste through recycling and reuse programs, and the recovery of products and energy from residual waste materials. The City's waste management system is designed to minimize the amount of this waste going into the landfills.

The overall objective of this audit was to assess whether or not Waste Services is able to achieve its vision, mission, and desired outcomes in an efficient, effective, and economical manner. Through our risk assessment process, we identified four specific audit objectives for this audit.

The **first** objective of this audit was to assess the effectiveness of the City's waste processing services. Overall, we found that Waste Services can improve the effectiveness of the City's waste processing services. Specifically, we found that:

- Waste Services' Performance Measurement Framework and its publicly reported performance measures do not provide sufficient and reliable information to conclude on the effectiveness or efficiency of the City's waste processing services.
- Waste Services spending is currently not aligned to the internationally accepted solid waste management hierarchy (which indicates prevention and reuse as the most sustainable methods of waste reduction).
- The City's waste processing services components (e.g., composting, separating, processing, and disposal services) do not align with those of other municipalities that also have comprehensive waste reduction or diversion strategies.

We also calculated the amount of waste coming to the Edmonton Waste Management Centre that is diverted from landfills in the past 5 years and found it is trending down. With the highest diversion rate in 2013 at 49.5 percent and the lowest in 2016 at 35.7 percent.

Based on these observations, we made two recommendations to improve the effectiveness of the City's waste processing services. We recommended that the Waste Services Branch Manager:

1. Develops and implements a formal Performance Management Framework procedural document, reviews performance measure targets, and reviews calculation methodologies to ensure they provide reliable, comparable, and consistent information to support management decision-making and demonstrate achievement of Corporate and Branch goals.
2. Works with Council and/or other levels of government to develop new waste prevention strategies to ensure better alignment with the waste management hierarchy, and considers program components of other municipalities with similar waste reduction and diversion goals.

The **second** objective of this audit was to determine if Waste Services is monitoring and managing the cost-effectiveness of waste processing operations. We found that:

- Waste Services does not have effective operational performance monitoring and reporting processes in place that allows management to ensure waste processing facilities are meeting performance expectations.
- We found that Waste Services could improve its processes to measure the cost-effectiveness of the whole system and of the waste processing facilities located at the Edmonton Waste Management Centre. We calculated that the Edmonton Waste Management Centre direct operating costs have increased since 2012; however the total waste processed remained relatively constant and the total waste diverted from landfills has declined.
- The process and methodology for allocating revenues and expenses between regulated and non-regulated activities is not formally documented or accurate to ensure the allocation is reasonable, reliable, and consistent.

We made two recommendations to improve Waste Services' monitoring and managing of the cost-effectiveness of waste processing operations. We recommended that the Waste Services Branch Manager develops and implements a formal process to regularly monitor and receive reports on the operational performance of the waste processing facilities.

In addition, we recommended that the Waste Services Branch Manager develops a formal regulated versus non-regulated cost and revenue allocation methodology and procedural document to ensure the cost and revenue allocation is reasonable, reliable, and consistent.

The **third** objective of this audit was to determine if Waste Services has an effective process to plan for and manage waste processing projects. We reviewed four business cases. The business cases did not provide assurance that information presented in the cases was complete, accurate, supported, and properly retained. In addition, project management practices for the reviewed business cases were not effective in 7 of the 8 project management knowledge areas assessed.

We recommended that Waste Services Branch Manager designs and implements a process to ensure that information presented in business cases is complete, accurate, supported and retained to ensure Council and/or Utility Committee can make informed decisions impacting waste services. We also recommended that Waste Services Branch Manager ensures branch project management processes align with the corporate processes to ensure projects provide value-for-money and demonstrate sound stewardship.

The **fourth** objective of this audit was to assess if Waste Services has efficient and effective processes in place to manage and maintain the EWMC, the waste processing facilities (including equipment), and the on-site mobile equipment. We found that Waste Services does not have effective asset management processes in place, in particular related to condition assessments and preventative maintenance on building structures.

We recommended that the Waste Services Branch Manager defines and documents a condition assessment and data verification procedures. In addition, we recommended that the Waste Services Branch Manager establishes formal maintenance process documentation and clarifies maintenance roles and responsibilities in accordance with Administrative Directive “Maintenance of City Owned Facilities”.

The implementation of our eight recommendations should improve Waste Services’ ability to deliver value-for-money to the City of Edmonton.

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Waste Services Audit

1 Introduction

An estimated one million tonnes of waste is generated by City of Edmonton residents and businesses on an annual basis. The City of Edmonton's Waste Services Branch (Waste Services) provides waste management services for the City of Edmonton. They do this through an integrated waste management system that includes the collection of waste, the diversion of waste through recycling and reuse programs, and the recovery of products and energy from residual waste materials. The City's waste management system is designed to minimize the amount of waste going into the landfills.

The Office of the City Auditor (OCA) included a value-for-money audit of the City's waste management system delivered through the Waste Services Branch in its approved *2017 Annual Work Plan*. The scope of this audit included waste management activities and records from 2011 to November 2017.

The results of the risk assessment, audit scope, and audit methodology are provided in Appendix 1 and background information on Waste Services, including a financial overview, is provided in Appendix 2.

2 Edmonton's Waste Management System

In 1994, City Council approved Edmonton's 30-year Waste Management Strategic Plan, which provides the framework for the integrated waste management system that Edmonton has today. The system includes a strong emphasis on "voluntary community engagement programs, an effective collection system, and innovative waste processing."

In 2007, City Council adopted a goal of 90 percent of residential waste diverted from landfills by 2012. Subsequently, Waste Services updated the strategic plan in 2008 to

include sustainability as the primary focus. This means that Edmonton's waste management system focuses on protecting the environment for future generations by reducing the amount of waste sent to landfills, reducing greenhouse gas emissions and pollution, and conserving natural resources. It also focuses on financial sustainability, ensuring that the long-term costs of managing Edmonton's waste are within the City's control.

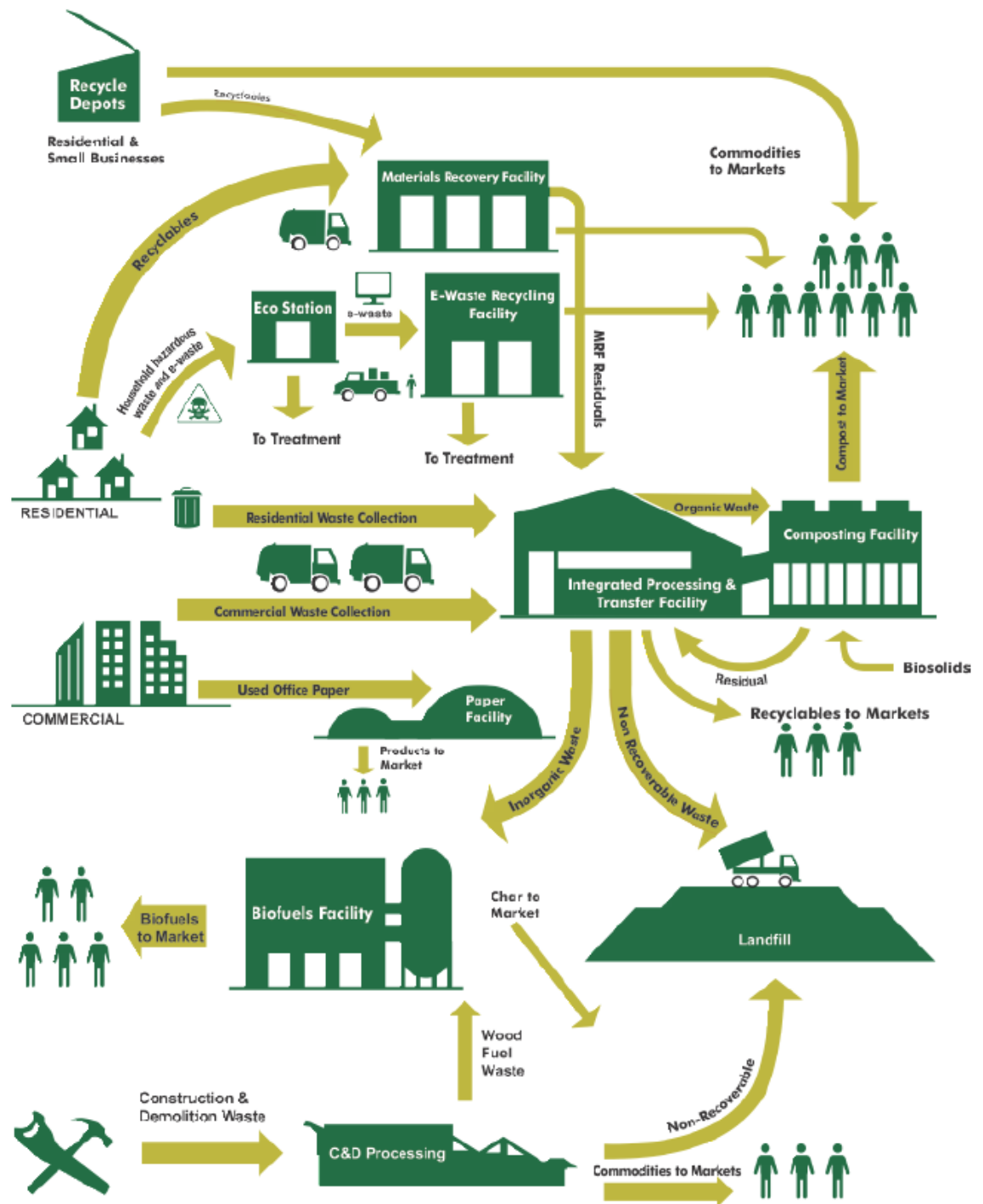
Over the past several decades, the City has implemented a number of collections and recycling programs to support its diversion efforts, including (but not limited to):

- Household hazardous waste collection since 1995 with the opening of the first Eco Station. In 2015, the City opened its fourth Eco Station.
- Urban-scale composting since 2000.
- Electronic waste recycling since 2007.
- Construction and demolition recycling since 2008.

Figure 1 illustrates the fully integrated waste management system and the interrelationships of its components.

The Edmonton Waste Management Centre (EWMC) is the site of the City's waste processing and research facilities. It is a key component of the City's fully integrated waste management system. Waste that cannot be recovered at the EWMC is disposed at landfills. The City does not own an operating landfill, so it incurs costs to haul and dispose of residential waste at landfills that are outside of the City limits.

Figure 1: Edmonton's Integrated Waste Management System



Source: Waste Management Utility, 2016-2018 Business Plan

Facilities and operations at the EWMC are either owned and operated by Waste Services and/or contracted staff, or owned and operated by third parties. Some of the key facilities at the EWMC are:

- **Materials Recovery Facility** – opened in 1999 and operated by a third party. This facility processes the recyclables collected through the City's Blue Bag program.
- **E-Waste Recycling Facility** – opened in 2007, owned and operated by a private company. This facility processes and recycles a wide range of electrical and electronic waste.
- **Edmonton Composting Facility (Composter)** – built in 2000 and operated by a contractor. Edmonton's organics processing program uses the organic portion of the residential waste collected in combination with biosolids to create compost. The facility processes 160,000 tonnes of organic waste and biosolids per year.
- **Integrated Processing and Transfer Facility** – opened in 2009 and operated by a third party. This facility prepares residential and non-residential waste for composting, conversion to biofuels (future operations), and transfer to landfills. This facility also houses the Refuse Derived Fuel Plant, which converts primarily residential household waste to refuse derived fuel (RDF). This becomes the feedstock for the Waste-to Biofuels Facility.
- **Construction and Demolition Recycling Facility (C&D)** – opened in 2012 and operated by Waste Services. This facility collects segregated and mixed construction and demolition waste for processing, transferring, and diversion from landfills.
- **Research and Development Facilities** – The EWMC is also home to a number of research and development facilities continually researching new technologies and processes to improve the City's waste operations and find new ways to transform waste into useful resources.

Two more facilities are currently being constructed at the EWMC that will impact waste operations:

- **Waste-to-Biofuels and Chemical Facility (Biofuels Facility)** – scheduled to be operational by 2019. This facility will process refuse derived fuel (waste that is not recyclable or compostable) into methanol and ethanol.
- **Anaerobic Digestion Facility (ADF)** – scheduled to be operational by 2018. This facility will be complementing the composting facility, expanding the City's organic waste processing capacity by an additional 48,000 tonnes of organic waste per year.

3 Audit Objectives

The overall objective of this audit was to assess whether or not Waste Services is able to achieve its vision, mission, and desired outcomes in an efficient, effective, and economical manner.

Through our risk identification and assessment process, we identified the following four specific audit objectives for this audit:

1. To assess the effectiveness of the City's waste processing services. (Section 4.1)
2. To assess if Waste Services is monitoring and managing the cost-effectiveness of waste processing operations. (Section 4.1)
3. To determine if Waste Services has an effective process to plan for and manage waste processing projects. (Section 4.2)
4. To assess if Waste Services has efficient and effective processes in place to manage and maintain the EWMC, the waste processing facilities (including equipment), and the on-site mobile equipment. (Section 4.3)

4 Observations and Recommendations

4.1 Effectiveness of Waste Services

We defined effectiveness as the extent to which Waste Services is able to achieve its vision, mission, and desired outcomes.

To assess the effectiveness of the City's waste processing services, we:

- Evaluated Waste Services' Performance Measurement Framework and performance measures. We found that Waste Services' Performance Measurement Framework and its publicly reported performance measures do not provide sufficient and reliable information to conclude on the effectiveness or efficiency of the City's waste processing services. (Section 4.1.1)
- Assessed the cost-effectiveness of Waste Services. We found that Waste Services could improve its processes to measure the cost-effectiveness of the whole system and of the waste processing facilities located at the EWMC. (Section 4.1.2)
- Compared Waste Services' spending to the activities in the waste management hierarchy. We found that Waste Services' spending is currently not aligned to the internationally accepted solid waste management hierarchy. (Section 4.1.3)
- Compared the City's waste processing services components (e.g., composting services, separating services, processing services, disposal services) with those of other municipalities that also have comprehensive waste reduction or diversion strategies. We observed that Waste Services' program differs from that of other municipalities with similar diversion targets. (Section 4.1.4)

4.1.1 Performance Measurement Framework and Performance Measures

Performance Measurement Framework

The purpose of a performance measurement framework is to provide a consistent approach for systematically collecting, analyzing, utilizing, and reporting on the

performance of programs and activities in achieving their established goals and intended outcomes.

Waste Services publicly reports on 16 performance measures split over the following 5 Branch goals:

- A Healthy Community Well Served
- Environmental Stewardship
- Operational Effectiveness
- Fiscal Sustainability, and
- Organizational Excellence

We found that there is no formal Performance Management Framework document to clearly define the roles, responsibilities, accountabilities, and procedures for performance management activities. Without a formal document, performance measures might not align with corporate and/or Waste Services strategic goals and measure results may be inaccurate and incomparable.

Consistency of performance measures reporting

In the last three years Waste Services has released five reports containing performance information. We found the following inconsistencies in these reports:

- The branch goals and their names were different.
- The actual results of some measures were reported differently. For example, in two reports the 2016 actual result for the number of users of Eco Stations and Big Bin Events showed two different numbers (298,496 and 297,000).
- Annual targets for some measures were adjusted without providing an explanation. Adjusted targets can give misleading information about actual progress towards the goals.

Sufficiency of performance measures

We reviewed the goals, strategic directions and measures included in the Waste Services 2018-2020 Business Plan and assessed whether the measures sufficiently support the strategic direction and Branch goals they are linked to.

We found that performance measures in place only addressed part of each strategic direction. We also found that measures in place did not completely address two out of five Branch goals and four out of five corporate goals.

Reliability and comparability of performance measures results

We assessed the reliability (results are accurate and replicable) and comparability (methodology is consistent with previous years) of five performance measures results for 2016 published in the Waste Services 2018-2020 Business Plan. Table 1 shows the results of our review.

Table 1: Reliability and Comparability of Performance Measures

Performance Measures		2016 Results	Reliable	Comparable
1	Residential waste diversion rate	52%	No	No
2	Tonnes of non-residential waste diverted from landfill	55,000	No	No
3	Cost per tonne of material processed at the Edmonton Waste Management Centre	\$95	No	No
4	Debt to Net Asset Ratio	81%	Yes	Yes
5	Employee Engagement Survey Score	68%	No	No

We found the results to be unreliable for various reasons including that the raw data contained errors, the methodology used in the calculation was not reasonable, the calculation was inaccurate, and the name of the measure does not reflect the results presented. We found the measure results not comparable with previous years because Waste Services used inconsistent methodologies in their calculations.

In the following section we further describe the issues we identified with the Residential Waste Diversion Rate measure. As Waste Services is responsible for collecting and processing all residential household waste¹ in the City of Edmonton, and Council set a residential waste diversion target of 90 percent, the Residential Waste Diversion Rate has been the primary focus of Waste Services since 2007. This measure illustrates the success of Edmonton's sustainable waste management system.

Residential Waste Diversion Rate

Waste Services calculates its residential waste diversion rate as the volume of residential waste generated by Edmonton residents (including an estimate for the tonnes of waste prevented by residents leaving grass clippings on yards (grasscycling) and backyard composting) less the amount of residential waste brought to landfills divided by the volume of residential waste generated by Edmonton residents.

$$\frac{\text{Volume of waste generated by Edmonton residents}^2 - \text{Volume of residential waste landfilled}}{\text{Volume of waste generated by Edmonton residents}}$$

During our review of the reliability and comparability of the residential waste diversion rate, we found the following issues:

- Waste Services has not defined the residential waste diversion rate in any public document. Residential diversion rate can be defined and calculated in many ways (for example, some include the results of waste prevention efforts such as grasscycling and/or backyard composting and some do not). By not having a clear definition published, readers may not have a clear understanding of what is included in the measure.

¹ Non-residential waste includes industrial, commercial, and institutional waste, as well as construction and demolition waste. While some non-residential waste is delivered to the EWMC and processes by Waste Services, the majority is hauled to privately owned landfills in the region.

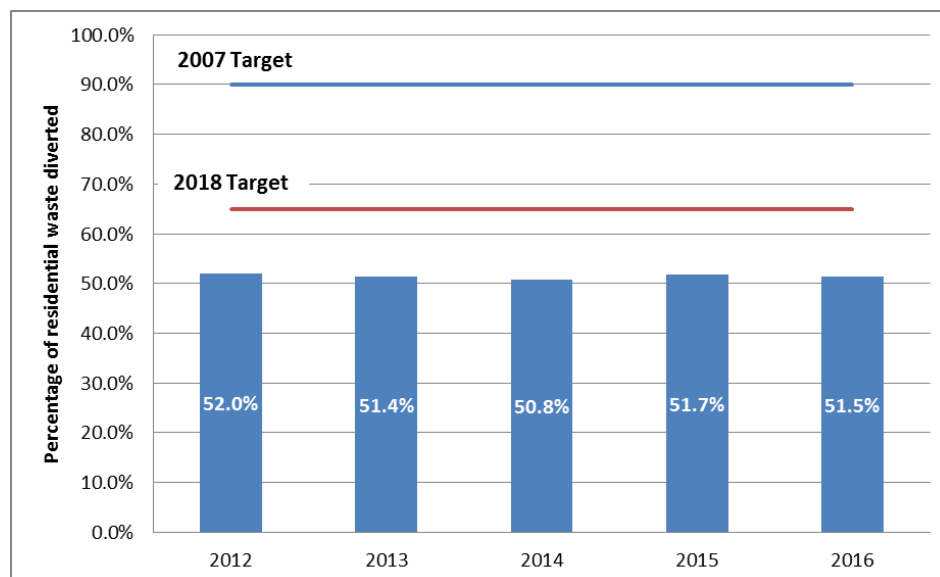
² The volume of waste generated by Edmonton residents includes an estimate for the tonnes of waste prevented by residents leaving grass clippings on yards and backyard composting.

- The methodology document is outdated and Waste Services did not use a consistent methodology to calculate the measure from year to year.
- Based on Waste Services calculation, grasscycling and backyard composting by residents accounted for 13.6 percent of the Residential Waste Diversion Rate in 2016. We performed a reasonability assessment of the assumptions Waste Services used to determine this and found them to be aggressive.
- The allocation of various waste streams between residential and non-residential is subjective and inconsistent.

We also found that the target of 90 percent of residential waste diverted, which is contained in the City Policy, does not seem attainable with the current waste management system. The City established this target in 2007 expecting to achieve it by 2012. Waste Services has adjusted its target in the 2018-2020 Business Plan to 65 percent by end of 2018. However, Waste Services has not updated the City Policy to reflect this change.

Figure 2 shows the diversion rates reported by Waste Services in the past five years compared to the targets of 90 percent and 65 percent.

Figure 2: Residential Waste Diversion Rate
(Publicly reported by Waste Services)



Without consistent, sufficient, reliable, and comparable performance measure information, measure results do not adequately demonstrate Waste Services' progress towards the strategic direction, Branch goals and corporate goals. Inaccurate measure results provide misleading information and do not support organizational decision-making processes.

Recommendation 1 – Performance Management Framework Implementation
The OCA recommends that the Waste Services Branch Manager develops and implements a formal Performance Management Framework procedural document, reviews performance measure targets, and reviews calculation methodologies to ensure they provide reliable, comparable, and consistent information to support management decision-making and demonstrate achievement of Corporate and Branch goals.
Management Response
<p>Accepted</p> <p>Action Plan:</p> <p>A new Waste Strategy is currently under development scheduled to be presented to the Utility Committee in Q1 2018. This new strategy will align new outcomes, measures and targets which will follow a formal performance measurement framework. Waste Services is in the process of developing a set of management and analytic processes that will include formal procedural documentation that will clearly define the roles, responsibilities, accountabilities, calculation methodologies and targets to ensure information reported is effective for evidence-based decision-making.</p> <p>Planned Implementation Date: December 31, 2018</p> <p>Responsible Party: Branch Manager, Waste Services</p>

4.1.2 Cost Effectiveness of Waste Services

The City's waste management system focuses on financial sustainability, ensuring that Waste Services is managing the long-term cost of processing Edmonton's waste effectively.

To assess the cost effectiveness of Waste Services, we reviewed the following:

- The operational performance monitoring processes;
- The effectiveness of the EWMC; and
- The allocation of costs and revenue between regulated versus non-regulated activities.

We observed that Waste Services does not have effective operational performance monitoring and reporting processes in place that allows management to ensure waste processing facilities are meeting performance expectations.

We also found that the effectiveness of diverting waste coming into the EWMC has been trending down in the last 5 years, with the highest diversion rate in 2013 at 49.5 percent and the lowest in 2016 at 35.7 percent³. In addition, the cost-effectiveness of the waste processing facilities located at the EWMC has declined in the last 5 years.

Finally, we observed that the process and methodology for allocating revenues and expenses between regulated and non-regulated activities is not formally documented or accurate to ensure the allocation is reasonable, reliable, and consistent.

Operational performance monitoring

The performance measures discussed in Section 4.1.1 are strategic measures that inform senior management and Council. However, performance measures and metrics need to be defined, calculated, and monitored at the operational level as well. Operational monitoring ensures that specific programs or waste processing facilities are meeting performance expectations and allows management to identify and resolve potential issues before they can impact progress.

³ Waste coming into the EWMC includes both residential and non-residential waste. It does not include waste collected at the Reuse Centre and Eco Stations or waste reduced by grass cycling and backyard composting.

We found that:

- Waste Services management does not receive regular (consolidated) reporting on operational performance and/or cost-effectiveness of the waste processing operations.
- There are no clearly defined measures that are linked to business outcomes at a business area level and facility level.
- There is no reporting process in place to communicate information upwards.

In the absence of operational monitoring processes management does not have the information it needs to assess the health of the operations and be proactive in identifying potential performance bottlenecks. Regular reporting on an operational level demonstrates accountability and transparency, encourages continuous improvement, and provides evidence for managerial decision-making.

Effectiveness of the EWMC

To determine the effectiveness of the EWMC we:

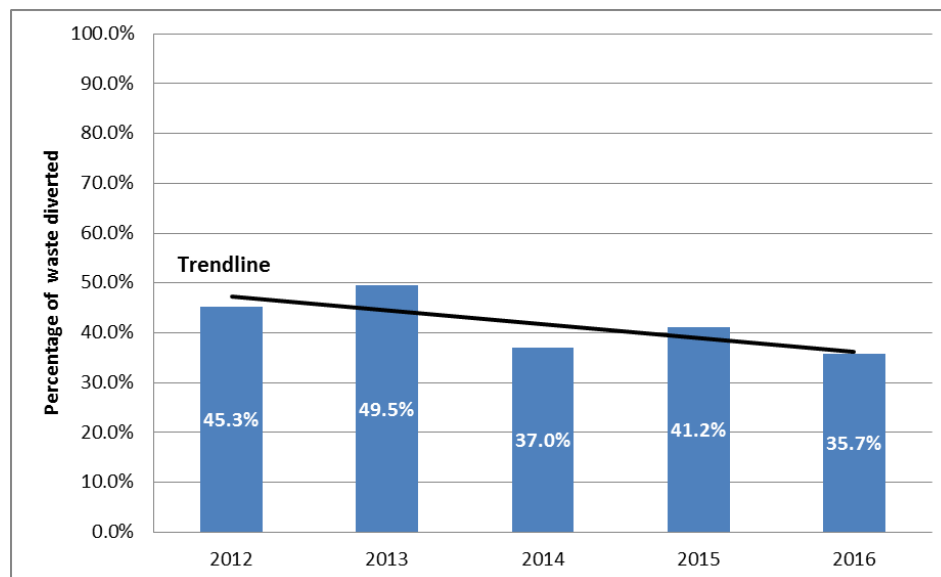
- Calculated the EWMC's waste diversion rate for the past five years;
- Compared the EWMC operating costs with the total waste processed at the EWMC over the past five years; and
- Compared the EWMC operating costs with the total waste the EWMC has diverted from landfills over the past five years.

We calculated the EWMC's waste diversion rate as the volume of total waste processed at the EWMC less the amount of waste leaving the EWMC to be disposed of at landfill, divided by the volume of total waste processed at the EWMC. This measure includes residential and commercial waste, but does not include any materials brought to waste facilities such as Reuse Centre and Eco Stations or waste reduced by residents leaving grass clippings on yards and backyard composting.

$$\frac{\text{Volume of waste processed at the EWMC - the amount of waste brought to landfills}}{\text{Volume of waste processed at the EWMC}}$$

Figure 3 shows the results of our calculations of the EWMC's waste diversion rate over the past five years. The diversion rate is trending down, with the highest diversion rate in 2013 at 49.5 percent and the lowest in 2016 at 35.7 percent.

Figure 3: EWMC Waste Diversion Rate
(Calculated by OCA)

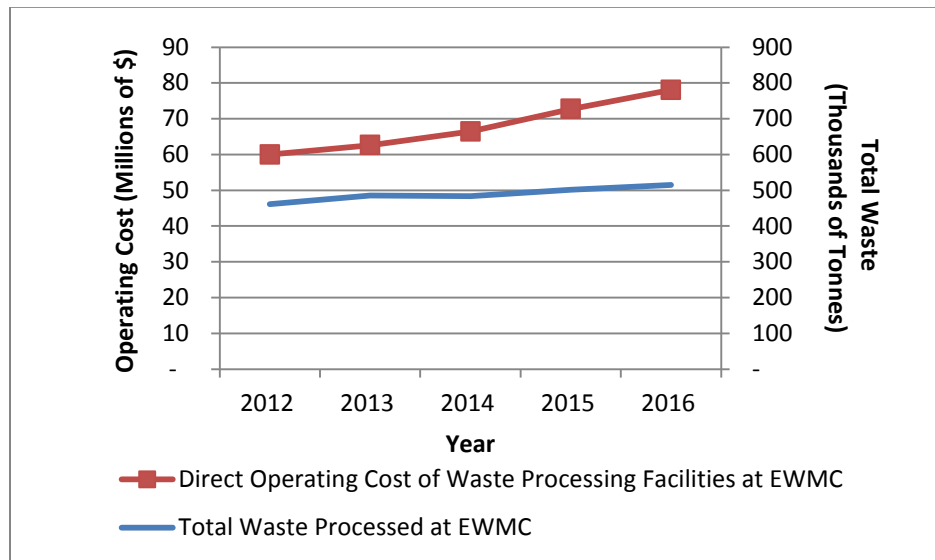


To assess the cost-effectiveness of the EWMC, we compared its operating costs (adjusted for inflation) with the total waste processed at the EWMC, as well as with the total waste diverted from landfills. The operating costs we reviewed included the operating costs of 10 waste processing facilities located at EWMC.

The EWMC direct operating costs have increased since 2012; however, the total waste processed remained relatively constant (Figure 4). Consequently, EWMC direct operating

cost per tonne of waste processed has increased from \$130 per tonne in 2012 to \$152 per tonne in 2016.

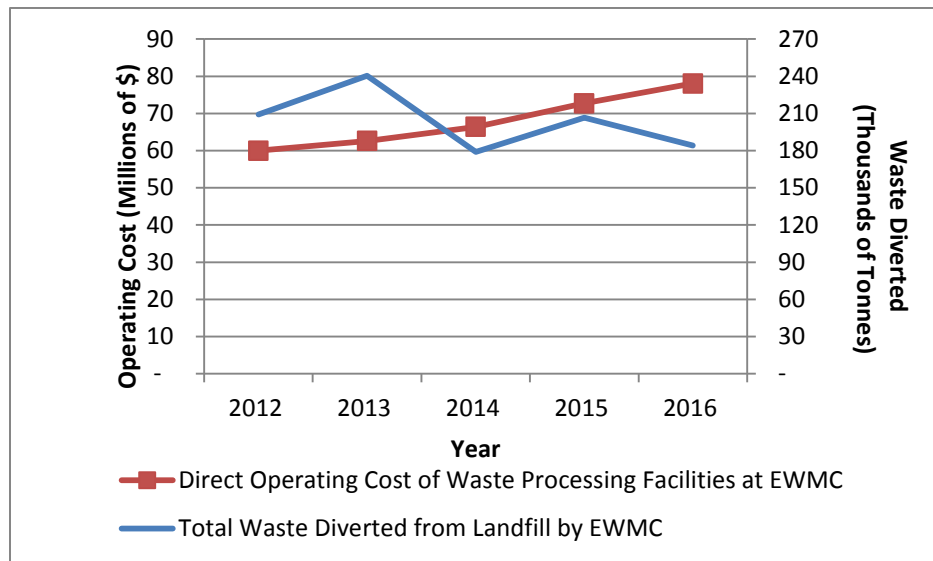
Figure 4: Operating Cost (adjusted for inflation) versus Total Waste Processed at EWMC



In addition, as direct operating costs increased, total waste diverted from landfills has decreased (Figure 5).

Based on these calculations, we conclude that the cost-effectiveness of the waste processing facilities located at the EWMC has declined in the last five years.

Figure 5: Operating Cost (adjusted for inflation) versus Waste Diverted by EWMC



Based on our observations relating to operational monitoring and the effectiveness of waste processing operations at EWMC, we recommend that Waste Services develop and document a process to regularly monitor operational performance, in particular but not limited to the cost-effectiveness of each waste processing facility and the EWMC site as a whole.

Recommendation 2 – Operational Performance Reporting

The OCA recommends that the Waste Services Branch Manager develops and implements a formal process to regularly monitor and report on the operational performance of the waste processing facilities. This includes but is not limited to the development of cost-effectiveness metrics for each waste processing facility and the EWMC site.

Management Response

Accepted

Action Plan:

In 2017, work has been completed, in conjunction with the Business Performance and Customer Experience branch, to define operational performance measures as part of the

development of a formal performance management framework. As part of the Performance Management framework (see Management Response to Recommendation 1), Waste Services is developing and will implement a comprehensive operational Performance Management system capable of proactively assessing the financial and operational health across all facilities and sites.

Key to the Waste Services Performance Management Framework in 2017 was the development of Waste Services outcomes and measures at the service level. Next steps, scheduled for Q2 2018, will be the development of measures at the sub-service and facility level which will be regularly reported to and monitored by management and branch leadership to ensure Waste operations, including waste processing facilities, meet performance expectations.

Planned Implementation Date: December 31, 2018

Responsible Party: Branch Manager, Waste Services

Regulated versus non-regulated cost and revenue allocation

The third element we reviewed to assess the cost effectiveness of Waste Services was the allocation of revenues and expenses between regulated and non-regulated activities. It is important for Waste Services to properly allocate revenue and expenditures to regulated activities because they determine the monthly residential waste rates. This ensures projected revenues generated will be equal to projected expenses (operating and capital).

Regulated activities are the core services provided by Waste Services, including residential curbside collection and disposal of residential waste. Waste Services covers all regulated costs through monthly rates charged to residents. Between 2012 and 2018, the single and multi-family monthly rates have increased 38 percent, resulting in a cost increase of \$153 per year for a single-family home and \$99 for a multi-family home.

Non-regulated activities are those that are not essential to the provision of services by Waste Services. Examples include commercial waste collection and disposal of

commercial, construction and demolition waste, etc. These activities are covered on a fee-for-service model.

To determine the appropriate regulated revenues and expenditures, Waste Services separates the total budgeted revenue and expenses into regulated and non-regulated activities based on a consultant's 2011 Cost of Service Study (COSS). Waste Services made some changes throughout the years to the allocation used for some revenues and expenditures. We found that there is no documented procedure; therefore, rationale for the changes are not supported and tracked.

During our review for the accuracy of the revenue and expenditures allocation between regulated and non-regulated activities, we found the following:

- Waste Services does not have defined criteria in formal documented procedures to categorize their activities into regulated or non-regulated. Therefore categorization decisions can be subjective.
- Waste Services calculates a percentage to allocate revenue and expenditures to regulated versus non-regulated activities. Depending on the nature of the activities, the allocation method is based on tonnage split or percentage of revenue. For example, Waste Services determines the allocation percentage for the Compost Facility based on the tonnages of residential and non-residential organic waste collected. The calculation for the percentage of revenue allocation is unclear and the tonnages used to determine the split between regulated and non-regulated is unreasonable.
- The same allocation percentage is applied to all revenue and costs for each functional activity. Waste Services does not further analyze the nature of each cost to determine a more accurate allocation percentage. A more detailed analysis might be appropriate in some cases. For example: all cost associated with the scale house operations are included in the functional activity of Site Operations. Site Operations is allocated to regulated activities. However, the scale house operated on extended hours during the summer to accommodate commercial

customers. Waste Services could directly attribute the extra personnel cost to non-regulated activities.

When Waste Services does not have a formal allocation methodology and procedural document in place to allocate revenue and costs between regulated and non-regulated activities, there may be a risk that the allocation is not reasonable, reliable, and consistent. We reviewed the process and methodology for the allocation; we did not determine the financial impact of our observations.

Recommendation 3 – Regulated versus Non-Regulated Allocation Methodology
<p>The OCA recommends that the Waste Services Branch Manager develop a formal regulated versus non-regulated cost and revenue allocation methodology and procedural document to ensure the cost and revenue allocation is reasonable, reliable, and consistent.</p>
Management Response
<p>Accepted</p> <p>Action Plan:</p> <p>Waste Services will formalize the cost and revenue allocation model developed and implemented in 2011 to ensure accurate, reliable and consistent revenue and expenditure allocations between regulated and non-regulated activities. Formal documentation will include procedures to ensure monthly residential waste rates continue to be equitably maintained.</p> <p>Planned Implementation Date: July 31, 2018</p> <p>Responsible Party: Branch Manager, Waste Services</p>

4.1.3 Waste Hierarchy

Edmonton's integrated waste management system is based on the internationally accepted solid waste management hierarchy (Waste Hierarchy). This hierarchy sets an order of priority for dealing with solid waste. The order starts with the most sustainable

option of waste avoidance or prevention, followed by preparing waste for reuse, recycling and energy recovery, with disposal at landfills as the last resort.

To determine if Waste Services uses its resources in line with the principles of the Waste Hierarchy, we compared program expenditure to Waste Hierarchy activity. Table 2 shows the results of our analysis.

Table 2: Percent Spent on Waste Hierarchy Activities

Waste Hierarchy Activity		% of Waste Services Actual Expenditures (2016)
<div> <div>Most Sustainable</div> <div>↑</div> <div>Least Sustainable</div> </div>	Avoidance (Prevention)	4%
	Reuse	1%
	Recycling	53%
	Recovery	7%
	Disposal	35%

In 2016 Waste Services focused the majority of funding on recycling and disposal. Although the waste hierarchy places a higher priority on waste prevention through avoidance and reuse, our analysis found that the City spends relatively little on these activities. The City's prevention and reuse strategies mainly consist of promoting grasscycling and backyard composting, facilitating educational programs, and operating the Reuse Centre.

Waste Services primary focus has been on processing the residential household waste that is collected and enabling the City to meet its diversion target of 90 percent of household waste from the landfills. This is included in the recycling and recovery categories of the Waste Hierarchy. As long as Waste Services success is primarily measured by the rate of residential diversion, it will be difficult to shift focus to strategies that have a greater impact on waste prevention.

The effectiveness of waste prevention activities is also difficult to measure. We observed that there is currently no effective way to determine total waste generated. Waste Services can measure the amount of waste generated by the residential sector; however,

waste generated by the non-residential sector is harder to measure as it is mostly hauled to privately owned landfills in the region.

4.1.4 Other Municipalities

We also compared the City’s waste management program components (e.g., composting services, separating services, processing services, disposal services) to six other North American municipalities that have similar diversion targets.⁴ We observed that Edmonton does not have the following components in place compared to these other municipalities:

- Requiring recycling and separating of organics and yard waste and implementing fines for non-compliance.
- Requiring owners and property managers to implement recycling and organics collection programs for their multi-residential and commercial properties.
- Specific disposal bans on targeted items such as textiles, glass, plastic grocery bags, and non-recyclable food ware.
- Basing fees on the amount of garbage thrown out (“Pay-as-you-throw” fees).

In order to achieve the City’s diversion goal, the City has adopted an integrated waste management program based on voluntary participation. However, the high-level benchmark indicates that there are a number of ways the City’s program does not align in with the efforts of other municipalities pursuing similar goals. Specific local conditions have an impact on which program components work best for a municipality.

Waste Services is reviewing and revising its Waste Management Strategy. We suggest they consider developing new waste prevention strategies as part of the strategic update. In addition, we also encourage them to look at the program components of other municipalities with similar waste reduction and diversion goals. This will ensure Waste Services activities are better aligned with the Waste Hierarchy.

⁴ The Cities included Calgary, Metro Vancouver, San Francisco, Seattle, Markham and Regional Municipality of Peel (includes municipalities of Brampton, Caledon, and Mississauga).

Recommendation 4 – Strategic Update

The OCA recommends that the Waste Services Branch Manager, as part of its strategic update:

- Works with Council and/or other levels of government to develop new waste prevention strategies to ensure better alignment with the Waste Hierarchy, and
- Consider program components of other municipalities with similar waste reduction and diversion goals.

Management Response

Accepted

Action Plan:

The task of implementing the waste hierarchy in waste management practices within a country may be delegated to the different levels of government (national, regional, local) and to other possible factors including industry, private companies and households.

Local and regional authorities can be particularly challenged by issues outside of their direct control.

Waste Services will strengthen the components of its Waste Strategy to include a formal Waste Prevention Framework that will increase focus on waste reduction and reuse. Enhancements to the Waste Strategy and development of the framework will be based on a comprehensive jurisdictional scan of other comparable municipalities and will include promoting public awareness of waste prevention, and emerging best practices regarding the diversion of organic, recyclable and compostable materials from the garbage stream.

Waste Services will work with the Utility Committee and Council in an effort to influence other levels of government to introduce new or modify existing legislation.

Planned Implementation Date: February 28, 2019

Responsible Party: Branch Manager, Waste Services

4.2 Business Case Development and Project Management

The development, construction, and operation of the waste processing facilities requires efficient and effective project development and management processes.

To determine if Waste Services has effective processes to plan for and manage waste processing projects, we:

- Assessed if Waste Services has effective processes in place for the development of business cases to support decision-making on projects. We found that the four business cases we reviewed and the business case documentation currently in place, do not provide assurance that information presented in business cases is complete, accurate, supported and properly retained. As a result there is a risk that Council and/or Utility Committee did not have sufficient information to make informed decisions impacting waste services.
- Assessed if Waste Services has effective processes in place for the management of waste processing projects. We observed that project management practices for the reviewed cases were not effective in seven of the eight project management knowledge areas assessed.

4.2.1 Business Case Documentation and Analysis

A business case is typically a proposal to an authority (e.g., Utility Committee) by a business area seeking funding, approval, or both for an activity, initiative, or project. A business case puts an investment proposal into a strategic context. The business case helps decision makers to make an informed decision about whether to proceed with the investment and in what form.

We compared Waste Services business case template to the Project Management Centre of Excellence recommended corporate standard template for City projects. We also compared these two business case templates to the Treasury Board of Canada's model as the best practice. This model sees the development of the business case progressing

through three phases with key steps that collectively make up a solid business case. We determined that the corporate template is consistent with best practices, but that the Waste Services business case template requires enhancements in a number of sections to ensure that a quality document is developed.

We reviewed the business case documentation for four actual projects that have been completed or are currently in progress at the EWMC. We assessed if the business case provided decision makers with the necessary information to make an informed decision about the investment.

The four business cases we reviewed were:

1. **Waste-to-Biofuels and Chemical Facility (Biofuels Facility)** – The Biofuels Facility proposal was approved by Council in 2006. It is scheduled to be 75 percent operational by the spring of 2019⁵.
2. **Anaerobic Digestion Facility (ADF)** – The business case was approved in 2013. The facility is currently under construction and scheduled to start operating in 2018.
3. **Construction and Demolition Recycling Facility (C&D)** – Original business case was developed in 2009 and a revised business case was approved in 2011. The facility opened in 2012.
4. **Refuse Derived Fuel Dryer (RDF Dryer)** – This facility is located inside the Integrated Processing and Transfer Facility and will include a natural gas-fired dryer system intended to reduce the moisture content in the refuse derived fuel feedstock. The business case was approved in 2014. Facility is scheduled to be operational in 2018.

⁵ In 2006, Waste Services entered into a grant agreement with the Province for \$38.6 million towards the development of a biofuels-to-waste project. By signing this agreement, the City committed itself to the development of a Biofuels Facility, as well as other facilities such as a waste preparation facility (Integrated Processing and Transfer Facility) and an advanced energy research facility. The City paid the grant amount to a private company to develop the Biofuels facility and operate the research facility.

We reviewed the business case documentation (or similar documentation that was provided to a decision making body), reviewed construction and/or operating contracts, reviewed additional supporting documentation, and interviewed project management personnel. Our observations are presented in Table 3, using the Treasury Board business case model.

Table 3: Overview of Business Case Review Findings

Treasury Board Business Case Elements	Sufficient	Could be Strengthened	Not Sufficient
Phase 1 - Define Opportunity			
Step 1: The case for change is established and the need for investment is clearly defined.	<ul style="list-style-type: none"> ADF RDF Dryer 	<ul style="list-style-type: none"> C&D 	<ul style="list-style-type: none"> Biofuels Facility
Phase 2 - Identify the Alternatives and Make Recommendation			
Step 2: The identification, analysis, and screening of a comprehensive list of options to demonstrate due diligence in their selection has been completed.		<ul style="list-style-type: none"> Biofuels Facility RDF Dryer 	<ul style="list-style-type: none"> C&D ADF
Step 3: Each viable option is subject to an increasing level of rigorous analysis.			<ul style="list-style-type: none"> Biofuels Facility C&D RDF Dryer ADF
Step 4: A case is made to recommend a preferred option based on its net advantages over all other viable options.			<ul style="list-style-type: none"> Biofuels Facility ADF RDF Dryer C&D
Phase 3 - Managing the Investment (High-level implementation Plan)			
Step 5: Processes are defined and in place for managing the Investment (including but not limited to governance and oversight strategy, project management strategy and milestones, outcome management, risk mitigation strategies, change management, performance measurement).		<ul style="list-style-type: none"> Biofuels Facility ADF RDF Dryer 	<ul style="list-style-type: none"> C&D

We were unable to validate all information included in the business cases for various reasons, including but not limited to:

- Waste Services does not have a central repository of information related to the projects. As well, they do not have processes in place to ensure timely and appropriate generation, collection, storage and retrieval of project information.
- Turnover of staff involved with the initial development of the business case has resulted in loss of knowledge.
- Waste Services was unable to provide supporting documentation for assumptions and estimates used in business cases.

Based on our review of four business cases there is a risk that Council and/or Transportation and Public Works Committee (now Utility Committee) may not have received complete and accurate information to make informed decisions at key moments in the development of the EWMC.

When Administration does not fully present viable options in their business cases, they are using the business cases to justify a decision already made or an option already selected. This does not provide City Council or Committee with objective or transparent information required for their decision making.

Recommendation 5 – Improve Business Case Process

The OCA recommends that the Waste Services Branch Manager designs and implements a process to ensure that information presented in business cases is complete, accurate, supported and retained to ensure Council and/or Utility Committee can make informed decisions impacting Waste Services. This process should align with corporate wide standards to support the development of strong business cases.

Management Response

Accepted

Action Plan:

Identified as a need in mid-2017 during the 2018 Utility Rate Filing, Waste Services is currently in the process of establishing greater discipline in capital program management, such as reviewing templates and developing procedures to ensure that Business Cases are consistent with the corporate Project Management Centre of Excellence standard. Documentation and implementation of these procedures will ensure business cases have clearly defined cases for change, comprehensive accounts of viable options and associated risks and rigorous, analysis-based recommendation sufficient to enable fully informed decision-making. Also included in the process is a new series of reviews by stakeholders, such as IIS, Finance, Business Performance and Customer Experience and Law, prior to final approval by Branch Leadership.

Planned Implementation Date: June 29, 2018

Responsible Party: Branch Manager, Waste Services

4.2.2 Project Management

Project management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements. Project management includes planning, monitoring, and reporting of ongoing activities, cost/schedule tracking, and contract management. Effective management of projects is key to providing value for money and demonstrating sound stewardship to the citizens of Edmonton.

The City's Project Management Reference Guide, developed by the Project Management Centre of Excellence, identifies 13 project management knowledge areas that are needed to achieve effective project management.

We reviewed the project documentation and interviewed project management staff for four projects that are complete or are currently in progress at the EWMC (same projects

as discussed in Section 4.2.1). Our assessment was limited to a review of 8 of the 13 project management knowledge areas⁶. We determined these 8 to be the primary knowledge areas. Table 4 shows the results of our assessment.

Table 4: High-level Assessment of Key Project Management Knowledge Areas

Area	Criteria	Biofuels Facility	ADF	RDF Dryer	C&D
Time Management	Is project meeting original timelines?	X	X	X	X
Scope Management	Is project within scope?	O	X	X	O
Quality Management	Is project delivering a quality product according to specifications?	O	✓	✓	O
Cost Management	Is project delivered within budget?	X	✓	X	O
Procurement/Contract Management*	Are contracts being monitored and administrated effectively?	X	X	O	✓
Human Resources^	Are project roles and responsibilities clearly defined?	X	✓	✓	X
Risk Management	Are project risks identified and managed?	X	O	O	✓
Communication Management	Is project information collected and stored for easy retrieval?	X	X	X	O

* Contract management falls under the procurement management knowledge area. Our review was limited to looking at contract management practices.

^ Our review was limited to assessing if project roles and responsibilities were clearly defined to ensure effective leadership.

Legend:

X	Knowledge area is not sufficiently managed or practices are not working as intended.
O	Knowledge area is managed but could be strengthened
✓	Knowledge area is sufficiently managed

Based on our assessment, we determined that project management practices for the four business cases under review were not effective in 7 of the 8 project management

⁶ We did not review the following knowledge areas: safety management, claims management, environment management, integration management and financial management. Financial management refers to all activities that are managed through Financial Services to fund the project.

knowledge areas assessed. We concluded that Quality Management was effective. For all other areas, we observed that in at least one of the business cases under review, the knowledge area was not sufficiently managed or the project management practices were not working as intended.

We found that some causes of the project management concerns are very specific to individual projects. However, we also found some general causes including:

- Waste Services may not have implemented certain corporate project management practices in the past, due in part to the independent culture of the EMWC.
- In the last two to three years, Waste Services management has experienced significant turnover (Branch Manager and Director). High turnover is disruptive and can have an impact on project performance as knowledge is lost and relationships with vendors need to be reestablished.
- Two of the four projects under review were initiated prior to 2013. In 2013, the City implemented an Administrative Procedure for the project management of construction projects.

Two risks associated with weak project management practices are contract non-compliance and savings leakage, each of which can cost the City significantly. When the project management process is ineffective, there is lack of clear direction, oversight and control over the projects. Also, due to turnover, a new project manager/owner might underestimate or not have a full understanding of the complexity, cost and/or schedule of the project. There is a risk that the vendor can take advantage of the lack of knowledge by the project manager.

Through our analysis of the business cases and the project management practices, we observed that because of weak business cases and poor project management practices there is a risk that the projects will not be achieving established objectives. For example, while the Biofuels Facility project is still expected to recover resources from the waste

stream and capture carbon emissions, it has not (yet) met all of the intended objectives envisioned in 2008, such as:

1. Operating at a net cost comparable to remote landfill disposal - Currently the hauling and disposal costs for landfilling are lower than the RDF processing costs and tipping fees payable to the third party operating the Biofuels Facility: \$127 per tonne for conversion to biofuels versus \$111 per tonne for landfill (2017).
2. Enabling the City to get to 90 percent diversion – The City currently calculates its diversion rate as 52 percent. Once operating at full capacity, the Biofuels Facility will contribute an estimated 20 percent to the diversion rate. This will bring the City's diversion rate to only 72 percent.
3. Processing 100,000 tonnes of dry RDF annually (equivalent to 8,333 tonnes per month) –The actual RDF feedstock delivered in 2016 and 2017 has been consistently below 8,333 tonnes per month.
4. Having a facility operational by 2012 – The latest schedule update is that the Biofuels Facility will be 75 percent operational by March 1, 2019.

Recommendation 6 – Improve Project Management

The OCA recommends that Waste Services Branch Manager ensures branch project management processes align with the corporate processes to ensure projects provide value-for-money and demonstrate sound stewardship.

Management Response

Accepted

Action Plan:

Waste Services is in the process of establishing and implementing a Branch wide project initiation, priority evaluation and decision making process to identify, recommend and manage future projects to align well with Branch's investment and budget priorities. Waste Services has been working with City Operations Department's Business Performance and Customer Experience Branch and Integrated Infrastructure Services (IIS) Department's Project Management Centre of Excellence to establish a Waste capital management framework.

Additionally, Waste Services has worked closely with IIS to align to the Capital Project Governance Policy C591 and adopt the Project Development and Delivery Model. Moving forward, projects will be managed per the corporate processes (Project Management Reference Guide and Project Development and Delivery Model) under the stewardship of IIS. Waste Services has enrolled all key staff in the Checkpoint Orientation Sessions and will ensure continued and consistent participation in Capital Growth Project sessions with IIS.

Planned Implementation Date: December 31, 2018

Responsible Party: Branch Manager, Waste Services

4.3 Asset Management and Preventative Maintenance

Asset management applies to the management of the entire life cycle of an asset, including the acquisition, maintenance, operation, rehabilitation, and disposal of an asset. Effective asset management ensures that organizations have the resources to achieve their objectives by connecting the organization's strategic plan (what we want to achieve) and the on-the ground daily activity (how we are achieving it).

To assess if Waste Services has efficient and effective processes in place to manage and maintain the EWMC, the waste processing facilities (including equipment), and the on-site mobile equipment, we:

- Evaluated if Waste Services has effective asset condition assessment and reporting process in place to provide accurate information for the Infrastructure Inventory Report. We found that Waste Services does not have a documented process in place to ensure condition assessments give an accurate reflection of the state of its assets.
- Assessed if Waste Services has an effective preventative maintenance process in place to ensure consistent uninterrupted service and to conserve the capital investment and ensure long-term reliability and efficiency of the asset. We found that Waste Services does not have an effective formal maintenance process in

place. The process does not ensure proper (preventative) maintenance is conducted. As well they have not clearly defined the roles and responsibilities for preventative maintenance.

4.3.1 Condition Assessments

Condition assessments of EWMC's assets are an integral part of an effective asset management system and ensuring assets are used efficiently.

The City produces the annual Infrastructure Inventory Report in order to keep track of the different assets and their conditions. This report updates replacement value, average age, as well as life expectancy and condition of the City's Infrastructure. The standardized evaluation criteria are as follows:

- **Physical Condition:** The actual condition of the infrastructure that allows it to meet the intended service level.
- **Demand/Capacity:** The amount of demand placed on the physical infrastructure relative to its intended use and how this impacts its ability to meet service needs.
- **Functionality:** The ability of the physical infrastructure to function in its intended manner to meet program delivery needs.

Business areas are responsible for conducting the condition assessments annually and providing the information to the Infrastructure Planning and Design Branch of the Integrated Infrastructure Services Department. The Infrastructure Planning and Design Branch collects the information and compiles the Infrastructure Inventory Report.

We observed that Waste Services currently does not have an effective asset condition assessment and reporting process in place to provide accurate information for the Infrastructure Inventory Report. Asset condition assessment and reporting is not well coordinated between Waste Services business areas. Waste Services does not have a formally documented process. In reviewing the Infrastructure Inventory Reports and

supporting spreadsheets from 2006 to 2016, we observed that assessments were not conducted consistently and appropriately.

We also observed four examples whereby the condition assessments might not reflect actual conditions in one or more categories:

1. Leachate Treatment Plant⁷ (physical condition)
2. Groundwater Diversion System (physical condition/functionality)
3. Edmonton Compost Facility (physical condition)
4. Cure Sites⁸ (demand/capacity)

When condition assessment ratings do not give an accurate reflection of the asset condition, business decisions may be influenced by the inaccurate information. For example, the 2014 and 2015 cure site condition assessment ratings for Demand/Capacity category were very positive, indicating capacity was not an issue. However, there has been a shortage in cure site capacity for a number of years. Until the recent shutdown of the Composter, lack of cure sites was a bottleneck for composting operations.

Recommendation 7 – Condition Assessment and Data Verification Procedures

The OCA recommends that the Waste Services Branch Manager defines and documents a condition assessment and data verification procedure. This procedure should indicate when and how assets are assessed or inspected and who is responsible to verify the data. There should be collaboration on asset condition reporting between maintainers, operators and technical services.

⁷ The Leachate Treatment Plant is part of the Clover Bar landfill maintenance program. Leachate is contaminated water coming from the landfill that if left untreated is an environmental risk. This plant processes 12,000 litres per day of liquid extracted from the landfill. Pre-treated leachate is then pumped to Clover Bar Waste Water treatment plant through sanitary sewer system.

⁸ Cure site is the area where compost from the Composter is stored and cured, which is the final stage of the composting process.

Management Response

Accepted

Action Plan:

In November 2017, Waste Services established dedicated asset management staff within the Technical Services section. In collaboration with corporate partners (IIS, Facility & Fleet Services, IT etc.), Waste Services is in the process of developing and implementing a condition assessment and data verification procedure. The procedure will outline the Branch Asset Management Framework and Plan, clarify roles and responsibilities between Waste Services and corporate partners, as well as different business areas within the Branch. When fully implemented, Waste Services will maintain a listing of all Branch assets, their condition, useful life, replacement value, and how critical they are to continue daily operations as well as schedules for ongoing asset condition inspections and replacement.

Planned Implementation Date: The new standard operating procedures will be completed June 30, 2018.

Responsible Party: Branch Manager, Waste Services

4.3.2 Preventative Maintenance

Waste Services should be ensuring that preventative maintenance is performed regularly throughout the life cycle of its assets to lessen the likelihood of the asset failing unexpectedly. It is critical to the operations of Waste Services that its assets are maintained to ensure consistent uninterrupted service and to conserve the capital investment and ensure long-term reliability and efficiency of the asset.

The EWMC has 23 facilities including waste processing facilities and support facilities such as the Equipment Storage and Maintenance Facility. Either Facility Maintenance Services from the Fleet and Facility Services Branch, Waste Services, or contractors maintain these facilities. Waste Services personnel maintain the onsite roads, utilities, scales, and gates.

The City has an Administrative Directive in place for the “*Maintenance of City Owned Facilities*”. The Directive is primarily executed by the Facility Maintenance Section (Facility Maintenance) of City Operations Department. Facility Maintenance operates and proactively maintains more than 900 City-owned facilities and also provides custodial services for these facilities through internal and contracted resources. However, they do not manage or monitor the preventative maintenance of City-owned facilities at the EWMC. According to Facility Maintenance, they only conduct maintenance at the EWMC when they have been specifically requested to do so by Waste Services.

Waste Services has contracts in place for the maintenance of key waste processing facilities. We reviewed the maintenance contracts that they have in place for the Materials Recovery Facility, Integrated Processing and Transfer Facility (including the Construction and Demolition Recycling Facility (C&D)) and the Composter (Including the Anaerobic Digester Facility (ADF)). Each contract contains slightly different wording related to the scope of work.

Table 5: Operating and Maintenance Contracts in Place at EWMC

Contract	Start Date	End date	Value
Operating & Maintenance of the Composter (and ADF)	Jan 1, 2014	Dec 31, 2019 [^]	\$46.6 million (up to Jan 1, 2019)
Maintenance of Integrated Processing and Transfer Facility and C&D (and RDF Dryer)	Jan 1, 2014	Dec 31, 2019 [^]	\$16.5 million (up to Jan 1, 2019)
Operating & Maintenance of Materials Recovery Facility	April 1, 2014	March 31, 2019	\$45.2 million (up to Mar 31, 2019)

[^] For these two contracts, various documents give different terms and end dates. In addition, the end date in SAP is set to January 1, 2019.

We observed that Waste Services is not the custodian of maintenance records for City owned facilities and equipment conducted by the contractor. The contractor is the custodian of these records. As a result, Waste Services (project managers) might not have a clear understanding of all the maintenance work that is required and what is being done.

It is important for Waste Services to monitor maintenance history of equipment and building throughout their useful life to identify reliability and production issues.

We also found that roles and responsibilities between Waste Services, Facility Maintenance, and contractors relating to facility maintenance (primarily building structure) have not been clearly defined, documented and communicated.

In addition, we observed that there is no complete oversight to ensure that all preventative maintenance on all building structures was conducted as required. This has potentially resulted in gaps in the preventative maintenance for a number of facilities at EWMC.

The following examples illustrate concerns with how Waste Services manages preventative maintenance of assets (primarily building structures) at EWMC:

- **Composter** – In 2016, during a routine check of the pillars inside the Composter's aeration hall, Waste Services discovered a potential issue with the ceiling panels. In late 2016, Waste Services hired a consultant to conduct a structural inspection of the issue. This inspection identified serious structural issues. In September 2017, further investigation confirmed the seriousness of the deficiencies and Waste Services shut the Composter down. This has resulted in unexpected costs of hauling otherwise compostable waste to the landfills.
- **Materials Recovery Facility** – The City has no records of maintenance conducted by previous contractors prior to 2013. Since, 2013 there is a division of tasks between Facility Maintenance and the contractor. However, this is not consistent with the terms of contract.
- **Integrated Processing and Transfer Facility** – The building structure maintenance at the Integrated Processing and Transfer Facility, its attached administrative

building, C&D, and C&D lunch trailers does not seem to be consistently performed by either Facility Maintenance or the contractor.

- **Groundwater Diversion System** – Built in 1975, the Groundwater Diversion System diverts groundwater run-off from the EWMC to the North Saskatchewan River. In 2017, Waste Services submitted a capital adjustment request of \$13 million to immediately address multiple system failures with the Groundwater Diversion System. The deterioration of the system has resulted in higher than normal groundwater and surface water levels, and has the risk of introducing contaminants into the groundwater, surface water, and North Saskatchewan River. There are no records that show any maintenance was conducted on Ground Water Diversion System prior to 2016. Waste Services assumed Facility Maintenance had conducted preventative maintenance on the system, but Facility Maintenance records indicate no involvement. Lack of preventative maintenance has now resulted in unexpected capital costs to address the deteriorating asset in a timely manner.

During our audit work we did not identify any significant issues with the maintenance of process equipment and or on-site mobile equipment.

We are aware that Waste Services is in the process of implementing the SAP Maintenance Module as the repository of all maintenance work conducted by the contractor going forward.

Recommendation 8 – Preventative Maintenance Processes

The OCA recommends that the Waste Services Branch Manager establishes formal maintenance process documentation and clarifies maintenance roles and responsibilities in accordance with Administrative Directive “*Maintenance of City Owned Facilities*”. In addition:

- Project managers should have a template or checklist for preventative inspections that need to be carried out on their facilities (additional oversight); and

- Waste Services should be custodian of the maintenance records of facilities and critical equipment.

Management Response

Accepted

Action Plan:

Oversight for facility maintenance plan, schedule and activities will be formally shifted to Fleet and Facility Services (FFS). Waste Services will collaborate with FFS staff to set roles and responsibilities, define maintenance levels, prepare the required templates/forms as well as create the required records management system. Primary responsibility and accountability for the maintenance of Waste specific equipment will also be transitioned to FFS, with ongoing reporting being provided to the Waste Management team. The maintenance plan on the Waste specialty equipment will be managed as part of the Waste Branch asset management practice.

Planned Implementation Date: December 31, 2018

Responsible Party: Branch Manager, Waste Services

5 Conclusion

The first objective of this audit was to assess the effectiveness of the City's waste processing services. Overall we found that Waste Services can improve the effectiveness of the City's waste processing services. Specifically:

- They need to ensure they have a performance measurement framework with sufficient, reliable and consistent performance measures. This will allow them to assess their performance in relation to their goals.
- They need to ensure their current focus of diverting 90 percent of residential waste is achievable and in line with the internationally accepted solid waste management hierarchy (which indicates prevention and reuse as the most sustainable methods of waste reduction).

- We calculated the amount of total waste coming to the EWMC that is diverted from landfills in the past 5 years and found it is trending down. With the highest diversion rate in 2013 at 49.5 percent and the lowest in 2016 at 35.7 percent.

The second objective of this audit was to determine if Waste Services is monitoring and managing the cost-effectiveness of waste processing operations. We found they do not have effective operational performance monitoring and reporting processes in place that allows management to ensure waste processing facilities are meeting performance expectations. We also found they could improve their processes to measure cost-effectiveness and the cost-effectiveness of the waste processing facilities located at the EWMC. We calculated that, the EWMC direct operating costs have increased since 2012; however the total waste processed remained relatively constant and the total waste diverted from landfills has declined.

The third objective of this audit was to determine if Waste Services has an effective process to plan for and manage waste processing projects. We reviewed four business cases and found this was also an area for improvement. The business cases did not provide assurance that information presented in the cases was complete, accurate, supported and properly retained. In addition, project management practices for the reviewed business cases were not effective in 7 of the 8 project management knowledge areas assessed.

The fourth objective of this audit was to assess if Waste Services has efficient and effective processes in place to manage and maintain the EWMC, the waste processing facilities (including equipment), and the on-site mobile equipment. We found that Waste Services does not have effective asset management processes in place, in particular those related to condition assessments and preventative maintenance on building structures.

We made eight recommendations to address the issues we observed during this audit. The implementation of our recommendations should improve Waste Services ability to deliver value-for-money to the City of Edmonton. City Administration has provided its responses to these recommendations.

The Office of the City Auditor would like to thank the management and staff of the Waste Services Branch for their cooperation and assistance during this audit.

Appendix 1 – Risk Assessment, Audit Scope, and Audit Methodology

Results of Risk Assessment

We identified four focus areas for this audit based on our risk assessment:

- Effectiveness of the City's waste processing services
- Management and monitoring of waste processing operations.
- Planning and Management of waste processing capital projects.
- Management and maintenance of the EWMC site, the waste processing facilities (including equipment), and the on-site mobile equipment.

We translated these risk areas into the audit objectives.

Audit Scope

The scope of this audit included waste management activities and records from 2011 (date of our last audit) to November 2017. Based on risk identification interviews with Branch management and because waste collection services were addressed in detail in the 2011 Waste Management Services Audit, this audit primarily focused on the waste processing services.

As well, we scoped out the Corporate Aggregate Recycling program, including the aggregate sites on 17th street and 184th street, transferred to Waste Services in late 2016. Waste Services is currently going through a transition process with this program.

Audit Methodology

We used the following methods to address our audit objectives:

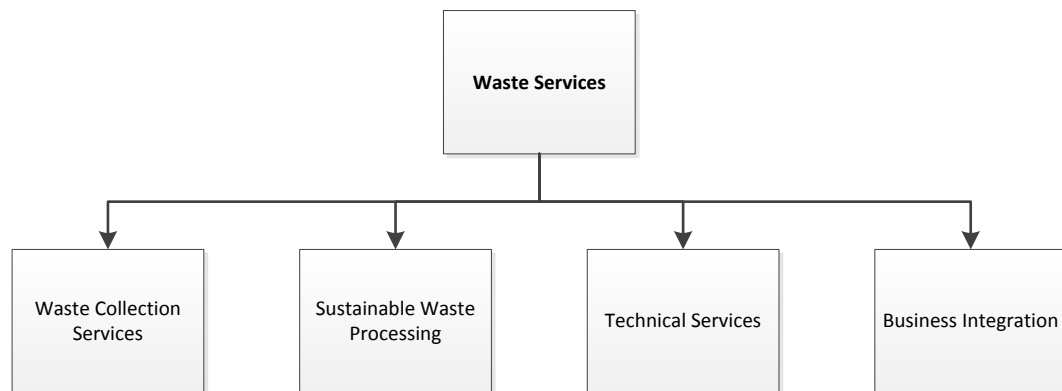
- Discussions with management, general supervisors, and other staff as appropriate.
- Discussion with the Utility Advisor.
- Review of performance measurement information.
- Review of relevant electronic and paper project and contract files.
- Review of invoices and supporting documentation.
- Review of transactions in the City's financial system (SAP).
- Review of relevant policies and directives.

Appendix 2 – Waste Services Background Information

General

The Waste Services Branch (Waste Services) is one of six branches in the City Operations Department. Figure 6 provides an overview of Waste Services structure.

Figure 6: Waste Services Branch Structure



Source: Waste Services (August 2017)

Waste Services Governance

Governance structure

On January 1, 2009, the City converted Waste Services (then named Waste Management Branch) from a tax levy supported City branch to a self-sustaining utility without subsidy from property taxes. The current governance structure of Waste Services consists of City Council, a Utility Committee, a Utility Advisor, and the City's Administration. The following is a high-level summary of the roles relating to the governance of Waste Services:

- **City Council:** Provides policy direction, sets utility rates, and approves budgets and discharges Waste Services matters to the Utility Committee.
- **Utility Committee:** Consists of four Councillors and the Mayor. Their role is:
 - To review reports from Waste Services that are directly or indirectly related to budgets, policy, and rate decisions.

- To deal with, and recommend to Council, items relating to policy and rate setting with respect to Waste Services.
- **Utility Advisor:** The Utility Advisor is appointed by Council and reports to Council through the Utility Committee, thus is independent of Administration. This independence ensures the following responsibilities are performed in an objective and impartial manner:
 - Reviews operational and budget submissions from Waste Services and assesses the submissions for reasonability and accuracy.
 - Provides utility costing advice and assistance to City Council and the Utility Committee.
 - Provides rate-setting advice and assistance to City Council and the Utility Committee.
- **Administration:** Waste Services proposes plans, budgets, and utility rates to the Utility Committee and Council for approval. Waste Services also prepares policies for Council's approval on waste management and implements the approved Waste Services program.

Governing documents

Waste Services operates under the following two Council approved policies:

- The Waste Management Policy (C527): This policy outlines the environmental, economic, and social requirements necessary to guide Edmonton's integrated waste management system.
- The Waste Management Utility Fiscal Policy (C558A): This policy supplements the existing Waste Management Policy C527 by providing direction and setting targets that will guide the long-term sustainability of the Utility. The Policy contains four financial indicators that collectively provide information on Waste Services financial sustainability. Table 6 provides a summary of these indicators.

Table 6: Actual and Forecasted Financial Indicators (2014-2018)

Financial Indicator	Actuals			Forecast	Target
	2014	2015	2016	2017	2018
Annual Net Income (in millions of dollars)	\$0.24	\$2.75	\$10.50	\$18.4	\$19.4
Percentage Rate Increase	5.6%	9.0%	5.7%	4.4%	2.3%
Debt to Net Asset Ratio	82%	83%	81%	78%	73%
Cash Position (in millions of dollars)	\$3.8	\$14.9	\$21.7	\$25.7	\$18.6

The targets for the financial indicators, as per Fiscal Policy C558A, are as follows:

- Annual net income: Achieve positive net income.
- Rate increases: Achieve stable consistent rate increases.
- Debt to net asset ratio: Ratio is between 50 percent and 70 percent.
- Cash position: Meets the minimum balance, equaling pay-as-you-go requirement plus risk allowance.

In addition to the documents mentioned, other governing documents include Waste Services Annual Report and Annual Business Plan, Bylaw 13777 *Waste Management Bylaw*, and *The Way We Green*.

Waste Services in Numbers

Following is a description of current and historical operating and capital costs related to Waste Services.

Operating budget

Shown in Figure 7 are Waste Services actual and budgeted expenditures from 2011 to 2018. The 2018 expenditure budget, approved at \$205 million, is comprised of \$73 million for collection services and \$132 million for waste processing (previously called processing and disposal).

Figure 7: Waste Services Actual and Budgeted Operating Expenditures (Years 2011-2018)
(In thousands of dollars)

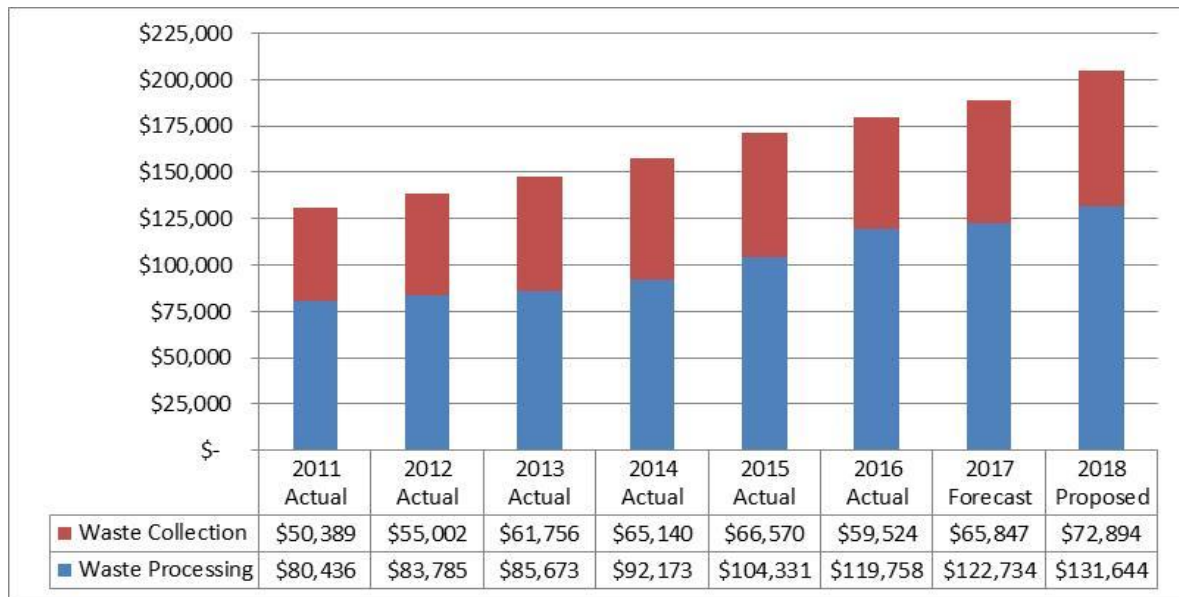
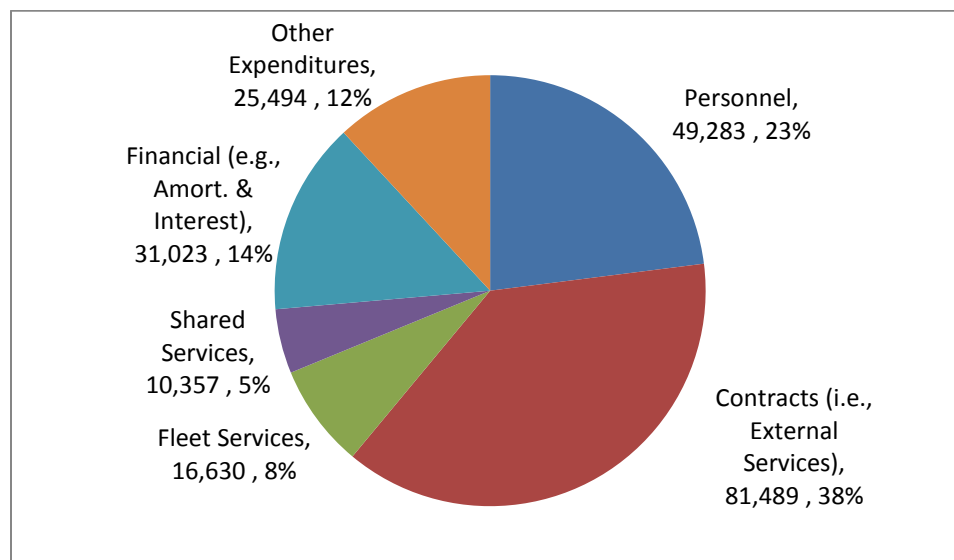


Figure 8 provides an illustration of Waste Services 2017 forecasted expenses by resource type. In 2017, contract resources at 38 percent represent the largest resource type. This illustrates Waste Services close collaboration with contractors for the delivery of waste services.

Figure 8: Waste Services 2017 Forecasted Operating Expenditures by Type
(In thousands of dollars and percentages)



Capital budget

The actual and planned investment for capital projects between 2012 and 2027 is shown in Table 7.

Table 7: Actual and Proposed Capital Forecast (2012-2027)
(In thousands of dollars)

Capital Plan	Incurred 2012 to 2016	Forecast 2017	Forecast 2018	Planned 2019 to 2027	Total Capital Plan
Collection Services Facilities	\$29,045	\$350	\$1,663	\$42,420	\$73,478
Sustainable Waste Processing Facilities and EWMC Infrastructure	62,231	41,799	35,327	192,516	331,873
Vehicles and Equipment	26,632	10,302	10,568	145,161	192,663
Waste Program Changes				71,330	71,330
Total Capital Plan	\$117,908	\$52,451	\$47,558	\$451,427	\$669,344

Waste Services capital requirements and expenditures vary greatly from year to year. As a result of a thorough capital budget review and re-prioritization completed in 2017, the Branch has adjusted its planned net capital spending for the coming years. This is included in the numbers presented in Table 7.