City of BRANDON

Eastview Landfill
2024 Annual Operations Report

Prepared by: TETRA TECH


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Contents

Executive Summary

The City of Brandon (City) owns and operates the Eastview Landfill (Landfill) located at 765 33rd Street East in Brandon, Manitoba. The Landfill operates as a Class 1 Waste Disposal Ground (WDG) under Manitoba Environment Act License No. 3149 (License). The License was issued by Manitoba Conservation and Climate, now Manitoba Environment and Climate Change (MECC) on August 25, 2015.

Tetra Tech Canada Inc. (Tetra Tech) was retained by the City to prepare this Report.

The 2024 Annual Operations Report is provided to fulfill the City's License requirement to annually report on operations and monitoring at the Landfill. This Annual Operations Report covers the period from January 1, 2024 to December 31, 2024.

Site facilities include:

- Former and active disposal areas.
- Commercial and residential disposal areas.
- Scale and scale house.
- Snow removal dump site (City use only).
- Clean fill disposal.
- Concrete disposal area.
- Landfill Gas (LFG) collection system.
- Material Recovery Facility.
- Designated stockpiles for metals, propane tanks, tires, yard waste, and branches.
- Freon device removal depot.
- Eco-Centre for used oil, filters, and containers.
- Tree and wood chipping.
- Composting.
- Electronic waste (E-waste) depot.
- Household hazardous waste depot.

The areas of the Landfill are shown on Figure E-1.

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Detailed environmental monitoring is provided in the 2024 Water Quality Monitoring Report by Tetra Tech (2025) and Landfill Gas Annual Report by Comcor Environmental Limited (Comcor) (2025).

Historical records show a decreasing trend in customer visits over the past five years and a general increase in total materials diverted such as recyclables, organics, household hazardous waste, E-waste, tires, and scrap metal. Total waste disposal increased in 2024 compared to previous years. Total waste materials managed at the site show a slight decreasing trend over the past ten years. Organic materials collected increased by approximately 53% from 2023 to 2024.

Environmental monitoring showed results consistent with historical data. Groundwater, surface water, and LFG are monitored throughout the year to assess potential impacts from the Landfill on the surrounding environment. The following findings were noted:

- The LFG Collection and Flaring System had significant system downtime in 2024 caused by weather and equipment failures. Data from LFG operations was available intermittently from January 2024 to November 2024. LFG Collection and Flaring and associated greenhouse gas emission reductions decreased in 2024 compared to 2023.

- The inferred groundwater flow direction is predominantly towards the north-northeast. This flow direction is consistent with regional groundwater flows towards the Assiniboine River; however, a clear flow pattern could not be established with the monitoring data collected.

- Groundwater quality analysis showed exceedances of the Maximum Acceptance Concentrations (MAC) or Aesthetic Objectives (AO) Health Canada – Canadian Drinking Water Quality (HC-CDWQ) Guidelines for parameters such as nitrate, iron, manganese, and uranium at several up-gradient and down-gradient locations in the Landfill. Tetra Tech concluded that there was no apparent groundwater quality impact at the monitoring well locations that can be clearly attributed to Landfill operations.

- Surface water quality analysis showed exceedances of HC-CDWQ Guidelines MAC and AO in some samples. Tetra Tech concluded the surface water monitoring results were consistent with historical data. Exceedances in surface water are not considered a risk to the surrounding environment, as surface water from the site is contained on site and either evaporates or is transferred to the wastewater treatment plant (WWTP) rather than being discharged directly into the environment.

The City logged one major (lost time) health and safety incident in 2024. There were no nuisance, noise, or odour complaints in 2024.

As the City moves forward with annual operations reporting, a number of key metrics have been identified to assess overall Landfill and solid waste system performance. Table E-1 summarizes the metrics considered most relevant to the Landfill's ongoing operations.

The following were recommended in reports prepared by others:

- As per the recommendations by Comcor (2025) for the LFG Collection and Flaring System:
  - Improve runtime through a series of repairs and improved winterization of the LFG Collection and Flaring System.
  - Budget to overhaul the landfill gas blower and motor.
  - Expand the gas collection wellfield to improve runtimes. The City is considering a LFG Collection and Flaring System expansion for 2026.
  - Continue to operate and monitor the LFG system full time according to t he Operation and Maintenance Manual for the Landfill.

- As per the recommendations by Tetra Tech (2024) for groundwater and surface water sampling:
  - Conduct a review of current and historical land uses near the Landfill. The areas around the Landfill all have potential to affect the groundwater quality at up-gradient monitoring well locations.
  - To better define the groundwater flow pattern in the shallow and deeper groundwater strata and variations in groundwater quality with the monitoring well network, review all borehole log information for the primary monitoring network (PMN) and any available information on the secondary monitoring network (SMN), and prepare geological cross sections and a conceptual site model.
  - Continue to follow the streamlined Environmental Monitoring Plan, as approved by MECC on December 2, 2017.

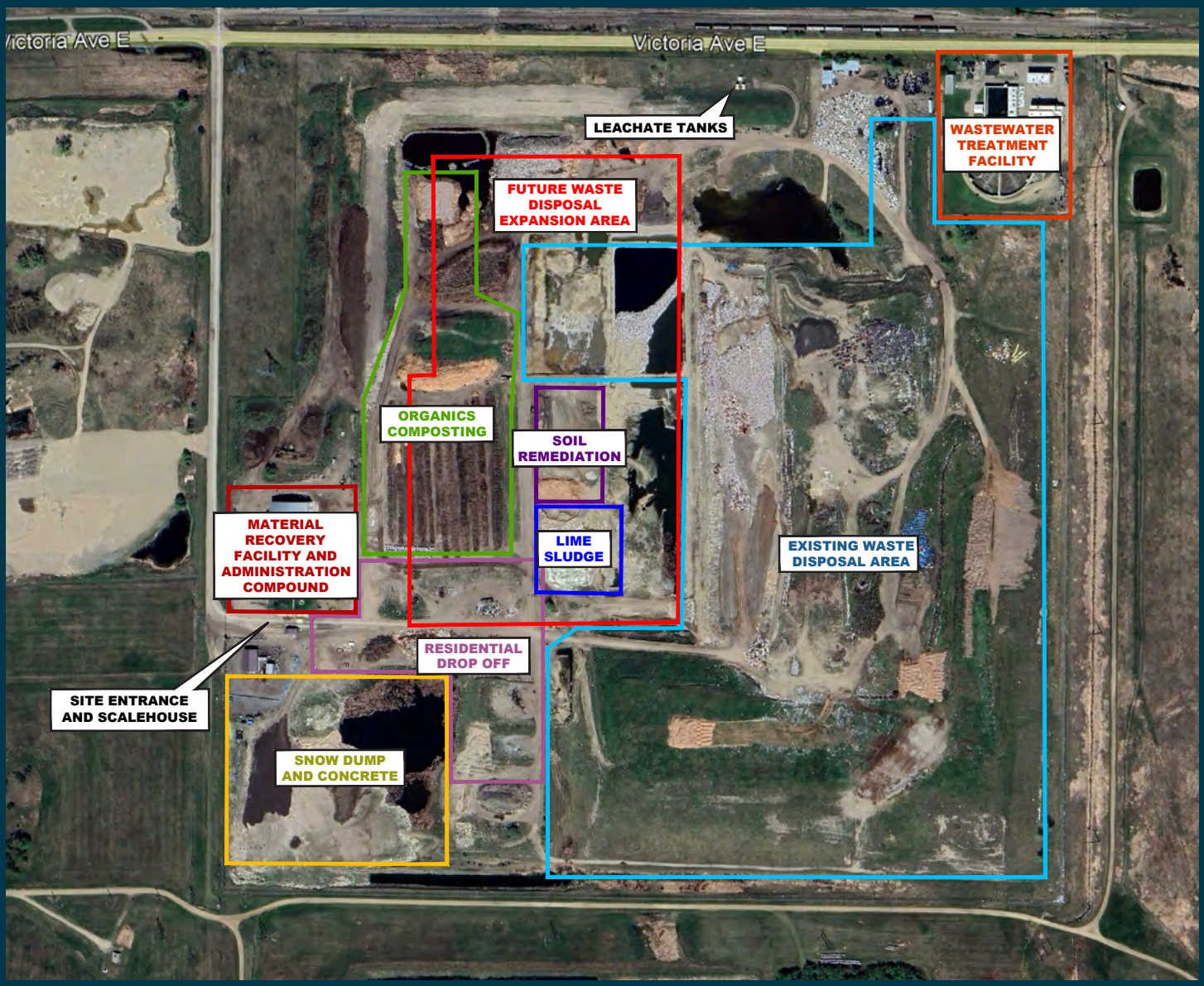

Figure E-1: Landfill Site Plan

Table E-1: Summary of Landfill Performance Metrics

Item	2024 Value	Change from 2023
Waste Disposed	31,680 tonnes	+6.1%
Waste Disposal Per Capita*	0.59 tonnes/capita	+0.03 tonnes/capita
(All) Materials Diverted	14,136 tonnes	-2.7%
Customer Visits	45,263	-0.6%
Apparent Waste Density	Not Assessed	Not Assessed
Groundwater Quality	No Significant Concerns	No Significant Concerns
Surface Water Quality	No Significant Concerns	No Significant Concerns
Greenhouse Gas Emissions Reduction by LFG Collection and Flaring	4,158 tonnes CO_2e	-37%
Annual LFG Flow Volume	34,369,568 scf	-13%
Lost Time Incidents	One	Increased by one from 2023
Remaining Airspace**	270,327 m^3	Not Assessed

Notes:

*** – Population estimates extrapolated from 2021 Canadian Census assuming 1.2% growth year-over-year (StatCan 2024).**

**** – 2024 Airspace assessed in August 2024 and included Cell 15, Cell 16, Cell 17, and Cell 19.**

Scf – standard cubic feet.

Introduction

The City of Brandon (City) operates the Eastview Landfill (Landfill) located in Brandon, Manitoba. The Landfill operates as a Class 1 Waste Disposal Ground (WDG) under Manitoba Environment Act License No. 3149 (License). The License was issued by Manitoba Conservation and Climate, now Manitoba Environment and Climate Change (MECC) on August 25, 2015.

The 2024 Annual Operations Report is provided to fulfill the City's License requirement to annually report on operations and monitoring at the Landfill. This Annual Operations Report covers the operational period from January 1, 2024 to December 31, 2024.

Tetra Tech Canada Inc. (Tetra Tech) was retained by the City to prepare this Report.

Site Ownership

The Landfill is owned and operated by the City, and serves the City, the Rural Municipality (RM) of Cornwallis, and surrounding areas.

Registration and Reporting Requirements

Landfill design and operation in Manitoba is regulated by the *Manitoba Environment Act*, the Standards for Landfills in Manitoba, and the *Landfill Gas* (LFG) *Management Regulation*. Health Canada's *Guidelines for Canadian Drinking Water Quality* are also used in assessment of groundwater quality. The License details general operational terms and conditions for the Landfill.

The Landfill is classified as Class 1 WDG, which is defined as a landfill that:

- Receives more than 5,000 tonnes of solid waste in a year or 400 tonnes of solid waste in a 30-day period;
- Receives solid waste from outside the province; or
- Is operated by anyone other than a municipality or regional waste management authority, and:
    - Disposes of solid waste generated by the operator; or
    - Receives solid waste generated by others for commercial purposes.

The License details performance criteria for surface and groundwater quality, leachate management, LFG, and public health and safety. Clause 104 of the License identifies that an annual operations and monitoring report should be submitted to MECP. Table 1-1 summarizes the required information and location within the Annual Operations Report.

Table 1-1: Table of Concordance

License Requirement	Page
A summary of any construction activities which occurred at the Landfill	14
The mass of each type of waste received (solid waste to tipping face, compost feedstock, petroleum contaminated soils, special wastes, etc,)	16
The mass of each type of material that was removed from the Landfill (recyclables, treated soils, compost, etc)	18
A summary of the monitoring report results from air, groundwater, and surface water as per Clauses 86, 94, and 99 of the License, respectively	30
The volume of leachate which was removed from the Landfill for treatment	34
Summary reports and details of all incidents that required implementation of the contingency plan	36
Summary report of noise or odour complaints received	36
Summary report of any fires within the Landfill requiring notification as per Clause 11 of the License	36
Comparison of results of reports submitted in previous years to show trends and variances	38

The report contents are based on operational information provided to Tetra Tech by the City. Information regarding the Landfill groundwater and surface water monitoring program has been summarized from the *2024 Annual Environmental Monitoring Report* by Tetra Tech (2025). Information regarding the LFG reporting program has been summarized from the *2024 Annual Monitoring Report Eastview Landfill Gas Collection and Flaring System* by Comcor Environmental Limited (Comcor) (2025).

Site Description

The Landfill is located at 765 33rd Street East in Brandon and is accessed via 33rd Street East from the west side of the site. The Landfill operates six days per week from 8:00 a.m. to 4:45 p.m. and is closed on Sundays and Statutory Holidays.

Site facilities include:

- Former and active disposal areas.
- Commercial and residential disposal areas.
- Scale and scale house.
- Snow removal dump site (City use only).
- Clean fill disposal.
- Concrete disposal area.
- LFG collection system.
- Material Recovery Facility (MRF).
- Designated stockpiles for metals, propane tanks, tires, yard waste, and branches.
- Freon device removal depot.
- Eco-Centre for used oil, filters, and containers.
- Tree and wood chipping.
- Composting.
- Electronic waste (E-waste) depot.
- Household hazardous waste (HHW) depot.

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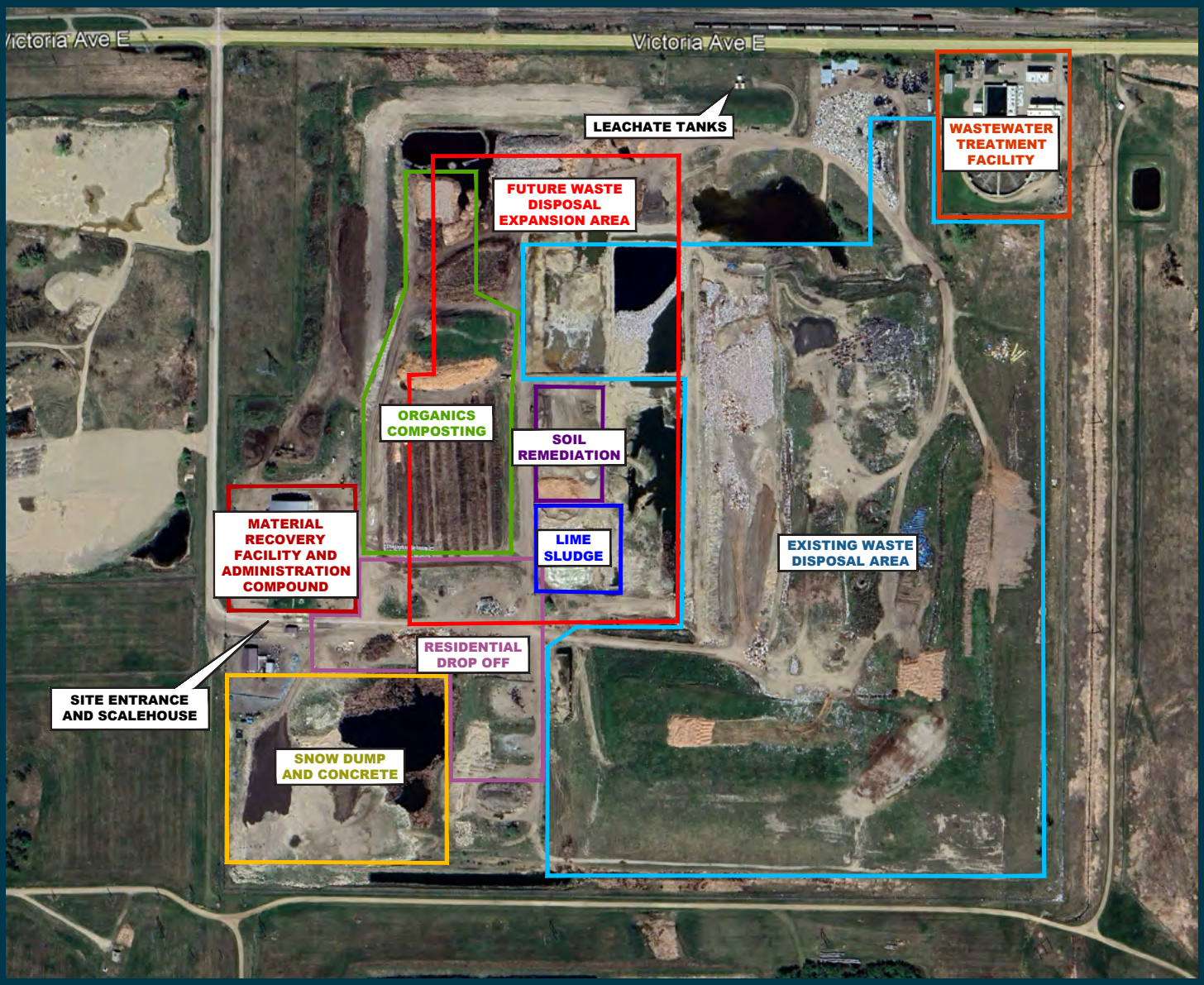


Figure 1: Landfill Site Plan

Site History and Development

The Landfill covers approximately 61.5 hectares in an eastern industrial area of the City. Previous site investigations conducted by Earth Tech identified distinct three stratigraphic units underlying the Landfill: sand and gravel fill (0 m to 4 m), brown to grey till (3 m to 14 m), and silty sand (14 m to end of logs) (Earth Tech 1999).

Landfilling is reported to have commenced in the 1970s and waste was historically placed in the southeast and east areas of the Landfill.

The following summarizes the developed and undeveloped areas within the Landfill design footprint, also shown on the KGS Group Cell Design Master Plan (2017), shown as Figure 2.

- Cell 1 to Cell 6 – Developed along the eastern edge of the Landfill, unlined cells from the 1970s and 1980s that have been closed and capped.
- Cell 7 – Developed in 1994, a Geosynthetic Clay Liner that has been closed and capped.
- Cell 8 to Cell 12 – Developed between 1996 and 2003, High-Density polyethylene (HDPE) lined cells that have been closed and capped.
- Cell 13 and Cell 14 – Developed between 2009 and 2015, HDPE lined cells that reached capacity in 2023.
- Cell 15, Cell 16, Cell 17, and Cell 19 - Developed between 2015 and 2024, HDPE lined cells that are currently in use. Cell 15 has approximately one year of capacity remaining.

The City has several proposed cells planned for the northwest portion of the Landfill.

There are eleven manholes located around the perimeter of the Landfill that have been collecting leachate from waste cells since 1994. Leachate from Cell 7, Cell 11, Cell 12, and Cell 13 drains into a manhole at the north end of Cell 11 via perforated leachate collection pipes installed within previous granular fill and is pumped to the leachate storage tanks located northwest of the existing waste disposal area. Leachate from Cell 15, Cell 16, Cell 17, and Cell 19 drain to manholes at the north edge of each cell and are pumped to the WWTP for treatment and is pumped through a meter so that the City can measure leachate flow. Leachate manholes on the south side of the landfill have not been pumped in the past few years.

Asbestos is placed in Cell 16 where it is covered and surveyed. Customers must purchase a permit to dispose of asbestos in the Landfill. A separate permit is required per tonne of asbestos that is disposed in the Landfill.

In 2021, KGS Group developed an updated Closure and Post Closure Plan for the Landfill, which included final design contours based on a Landfill lifespan that predicted closure in 2053. The City has a levy of $6.00 per tonne to cover Landfill closure and post closure costs.

Site Operations and Development

Waste is received from City municipal, commercial, and industrial sectors, the RM of Cornwallis, and drop-off loads from surrounding areas. To assist with traffic flow, waste is segregated into the following areas for disposal:

- Cell 15 for commercial direct haul loads, contaminated wood, and shingles.
- Cell 16 for residential direct haul loads and asbestos burial.
- Cell 17 for City collection vehicles, commercial direct haul loads, hog hair, and wood chips.
- Cell 19 was constructed in 2024 and the City is placing residential direct haul loads as a base layer on the liner.

A public recycling and yard waste drop off depot is located outside of the entrance gate to the Landfill. Inside the Landfill, incoming loads are scaled with scalehouse staff providing traffic to the appropriate drop off areas. There are segregated public drop off areas for grass, trees, wood, metal, tires, and glass along the south side of the main road.

2024 Projects

The following projects were completed by the City at the Landfill in 2024:

- Construction of Cell 19 was completed in Fall 2024. Cell 19 was constructed with a HDPE liner for expansion of the Landfill.
- The City completed Phase 1 of the Hog Hair Management Plan for improving management practices of incoming hog hair at the Landfill.
- The City purchased walkway bins and additional residential collection bins for use in the City.
- The City hosted three compost giveaway days at Dinsdale Park in May 2024 to provide free compost to the public.

Future Capital Projects

KGS Group was contracted by the City to complete a Long-Term Capital Plan in 2021 which laid out a timeline and vision for capital improvements at the Landfill. Projects identified include:

- Expansion of the LFG collection system.
- Recommendations for future options on alternative daily cover.
- Technologies for reducing landfilling.
- Vertical and horizontal expansion.
- Alternate composting solutions.
- Wood waste management.

Figure 2: Landfill Cell Design Master Plan (KGS Group 2017)

Waste Received, Recycled, and Discharged

All waste generated within the City is either hauled directly by City collection trucks, commercial haulers, or self-hauled by small businesses and residents. In 2024, the total waste disposed in the active cells was 31,680 tonnes. The City tracks the following categories of waste:

- Asbestos.
- Commercial mixed refuse.
- Residential mixed refuse.
- City curbside collection.
- WWTP sludge.

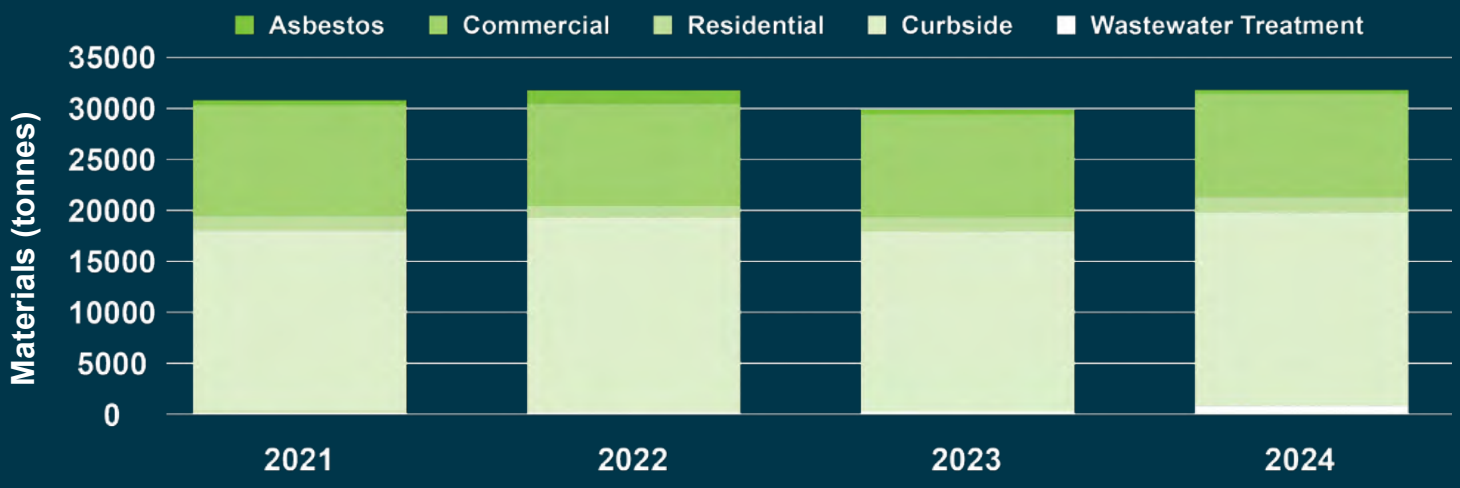
Table 3-1 shows materials disposed in the Landfill from 2021 to 2024.

The City's License allows for disposal of several special wastes including asbestos, WWTP sludge, and animal hair from a local meat processing plant. In 2024, 675 tonnes of asbestos, 393 tonnes of WWTP sludge, and 3,749 tonnes of animal hair were safely disposed of at the Landfill. Animal hair is included under commercial mixed refuse and a surcharge is added on a per load basis for the special handling required.

Compared to 2023, annual total waste disposal increased by 6.0% in 2024, with an overall decrease of 26.8% since annual total waste disposal of 43,715 tonnes in 2013. Apparent waste density was not assessed in 2024.

Table 3-1: Waste Disposed in the Eastview Landfill Annually

Materials (Tonnes)	2021	2022	2023	2024
Asbestos	305.03	74.12	126.08	675.34
Commercial Mixed Refuse	17,573.40	19,065.26	17,674.39	18,997.24
Residential Mixed Refuse	1,465.76	1,149.81	1,401.84	1,487.04
City Curbside Collection	10,815.32	10,024.82	10,025.06	10,127.63
Wastewater Treatment Facility Sludge	528.38	1,339.43	529.74	393.12
Total	30,687.89	31,653.47	29,757.11	31,680.37



Visitors

The total number of visitors to the Landfill site in 2024 was 45,263, with 21,715 residential visits and 23,548 being commercial visits as summarized in Table 3-2.

As shown in Table 3-2, annual customer visits decreased by 0.6% in 2024 compared to 2023. There has been an overall decrease in residential visits.

Table 3-2: Annual Customer Visits

Visitors	2021	2022	2023	2024
Residential	34,951	29,940	26,399	21,715
Commerical	18,654	19,340	19,121	12,548
Total	53,605	49,280	45,250	45,263

Compost Feedstock

The City has operated a yard and tree trimming collection facility since the early 1990s, with material composted in turned windrows. In the subsequent years, the collection facility was upgraded to include a contact water pond collecting surface water from the composting area. Once windrowed materials have completed the active composting phase, they are placed in a curing pile. Following the curing process, the finished compost is mixed with soil, screened, and stored at the Landfill. The mixed compost and soil are used by the City for landscaping projects or sold as soil amendment to the public.

In 2024, 5,723 tonnes of organic material were diverted from disposal with municipal solid waste (MSW) to the compost area at the Landfill. Organic material included green waste (yard waste, tree brush, wood waste etc.) and household organic waste. As shown in Table 3-3, the highest organic inputs are from residential and commercial sources.

Table 3-3 shows organic quantities collected at the Landfill from the residential, commercial, and industrial sector annually over the past four years. Industrial organic materials include manure and bedding wastes from the agriculture sector.

Typical compost collection programs are composed of 80% green waste and 20% household organic waste. Based on this assumption, approximately 4,578 tonnes of incoming organic material was green waste and 1,145 tonnes of incoming organic material was household organic waste in 2024.

In 2024, approximately 227 tonnes of compost was removed from the Landfill as soil amendment. Approximately 48 tonnes of finished compost was purchased by City residents and approximately 179 tonnes of finished compost was used for City projects and given away to residents during Compost Awareness Week in May 2024. The City has a large stockpile of compost remaining at the Landfill and is investigating options for removal of the compost.

Table 3-4 depicts the collection of diverted organic materials between depot, self-haul, and curbside collection over the past four years.

Self-haul loads of organic materials increased substantially in 2024 compared to previous years. Self-haul loads represented approximately 50% of the total incoming organics in 2024. Overall, organic materials collected increased by approximately 53% from 2023 to 2024.

The City released a number of public advertisements on best practices for compostable materials in 2024 in partnership with Multi-Material Stewardship Manitoba including curbside collection schedules and accepted materials.

Table 3-3 Organic Materials Diverted from Disposal Annually

Material (Tonnes)	2021	2022	2023	2024
Residential	3,940.42	3,850.70	3,113.88	3,461.53
Commercial	2,193.94	1,307.60	1,745.86	2,121.24
Industrial	159.62	683.97	1,327.47	140.24
Total	6,293.98	5,842.27	6,232.21	5,723.02

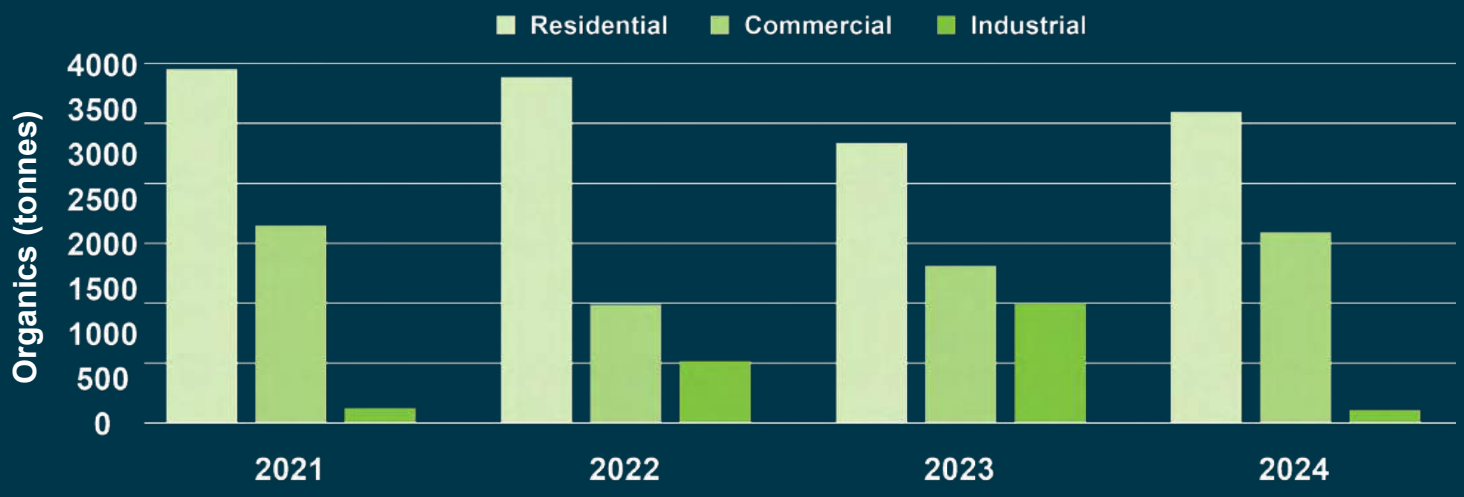
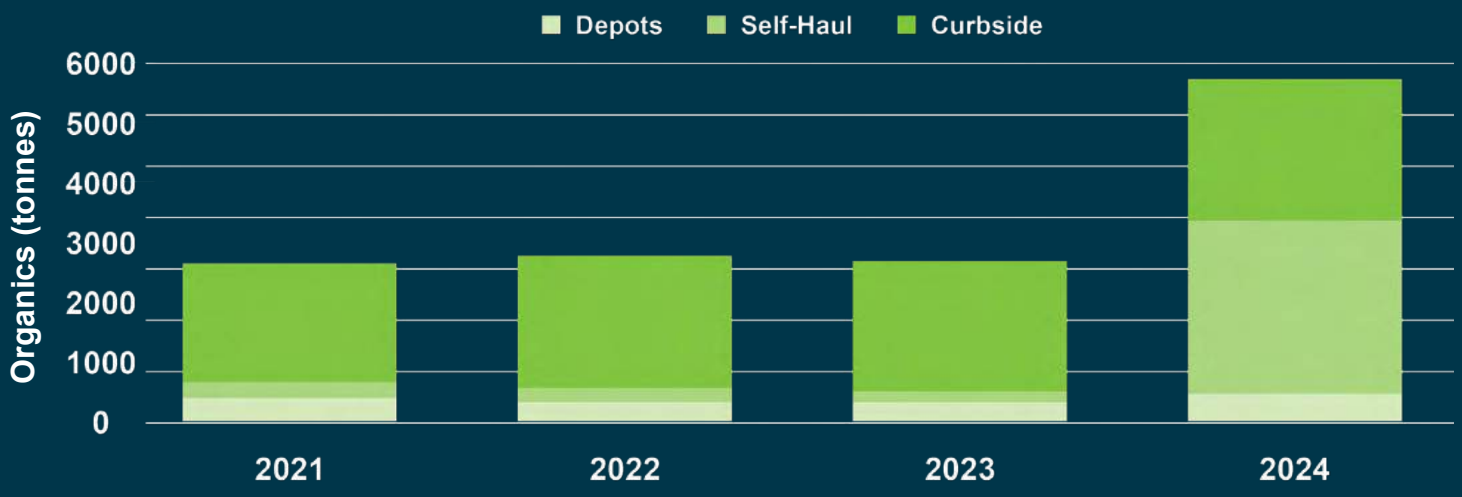


Table 3-4 Comparison of Collection Methods for Organic Materials

Material (tonnes)	2021	2022	2023	2024
Depots	381.53	313.76	312.49	453.18
Self-Haul	268.58	238.06	177.53	2,920.45
Curbside	1,988.94	2,219.42	2,190.16	2,367.39
Total	2,639.05	2,771.24	2,680.18	5,725.02



Household Hazardous Waste

The City has operated a HHW depot at the Landfill since 2012. The HHW depot is serviced by Product Care Manitoba in conjunction with Miller Environmental with Landfill staff receiving training on HHW handling and storage. The HHW depot at the Landfill accepts items from residential sources including:

- Fluorescent lights.
- Flammables.
- Acids.
- Aerosols.
- Caustics.
- Corrosives.
- Oxidizers.
- Paint.
- Toxins.
- Physically hazardous materials such as non-refillable gas cylinders.

The Landfill received approximately 44 tonnes of HHW in 2025, a slight decrease from the 60.7 tonnes received in 2023. Table 3-5 shows the total HHW received at the Landfill from 2021 to 2024.

Petroleum Contaminated Soils

The Contaminated Soil Remediation Facility accepts contaminated soils for treatment. Contaminated soils are treated with the use of a rome plow attached to a tracked bulldozer. Once materials meet the guidelines stated in Guideline 96-05, Treatment Disposal of Petroleum Contaminated Soil (MECP 2010), they are stockpiled for use as cover material in the active waste disposal areas. The Landfill received approximately 214 tonnes of contaminated soil in 2024, and none was removed in 2024.

Customers are required to obtain a permit to dispose Contaminated Soils at the Landfill. Permits are issued by the City and may require pre-disposal laboratory testing. No Contaminated Soil loads are accepted without a permit.

E-Waste

The City has been diverting E-waste from the Landfill since 2010. E-waste accepted for diversion includes most types of household electronics (i.e., televisions, monitors, computers, printers, audio systems, etc.). A total of 59 tonnes of E-waste was collected in 2024. Table 3-5 summarizes trends in E-waste diverted since 2021.

Tires

Scrap tires are stockpiled at the Landfill and removed from the Landfill via Tire Stewardship Manitoba. In 2024, 428 tonnes of scrap tires were removed from the Landfill. Table 3-5 shows the annual tonnes of scrap tire removed from the Landfill for recycling.

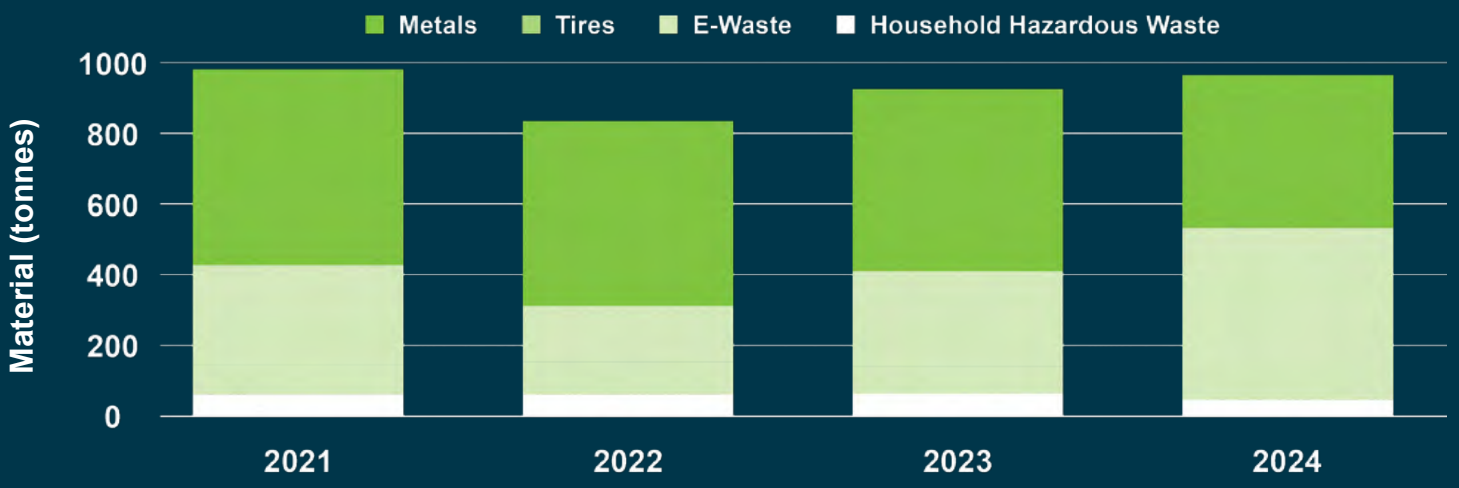
Metals

Scrap metals and household appliances that do not contain refrigerant are stockpiled at the Landfill and periodically sent to a processor. In 2024, approximately 434 tonnes of scrap metal were removed from the Landfill. Table 3-5 shows total scrap metal removed from the Landfill for recycling from 2021 to 2024.

Household appliances containing refrigerant are stockpiled at the Landfill and were delivered to Puresphera in Winnipeg in 2024 for proper refrigerant removal and recycling of components.

Table 3-5 Annual Tonnage of Materials Diverted from the Landfill

Material (Tonnes)	2021	2022	2023	2024
E-Waste	86.88	93.23	77.21	59.31
Tires	280.00	159.91	270.30	428.29
Scrap Metal	555.00	528.18	517.50	433.83
Household Hazardous Waste	58.19	57.90	60.69	43.49



Recyclables

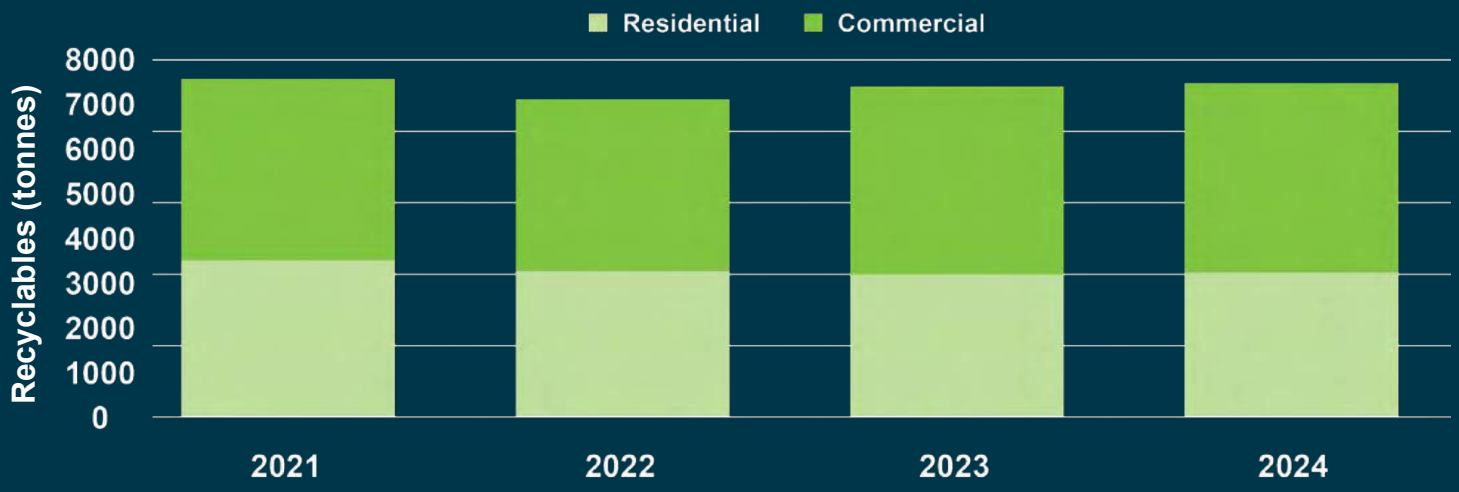
The City owns and operates an MRF for the processing of residential and commercial recyclables, with shipping and marketing contracted. The incoming material is segregated into non-recyclables, old corrugated cardboard (OCC), shredded office paper (SOP), and co-mingled recyclable material. Mixed recyclable materials are baled and shipped to processing plants for further sorting, while OCC and SOP are baled separately and shipped to end markets.

Recyclable materials are collected via curbside residential collection, commercial collections by private haulers, and from four recycling depots in the City. In 2024, a total of 7,448 tonnes of recyclables were collected, with 3,212 tonnes being residential recyclables and 4,236 tonnes being commercial recyclables. Table 3-6 shows the tonnage of material recycled annually from 2021 to 2024.

In 2024, approximately 2,293 tonnes of OCC, 4,391 tonnes of mixed recyclables, and 178 tonnes of SOP were shipped out from the MRF.

Table 3-6 Recyclable Materials Collected Annually by Source

Material (Tonnes)	2021	2022	2023	2024
Residential	3,483.96	3,231.55	3,161.87	3,212.50
Commercial	4,062.74	3,863.07	4,215.34	4,236.02
Total	7,546.70	7,094.62	7,377.21	7,448.52



Progress in Waste Diversion

Annual waste diversion rates have been generally consistent, with similar diversion noted between 2013 (28.6%) and 2024 (30.9%). 2020 had the highest rate observed to date of 37.8%. Table 3-7 provides a summary of waste diversion tracking from 2021 to 2024. Total materials diverted includes recyclables, organics, HHW, E-waste, tires, and scrap metal.

As shown in Table 3-7, total materials diverted decreased by 2.8% in 2024 compared to 2023.

Table 3-7 Annual Waste Diversion Rate

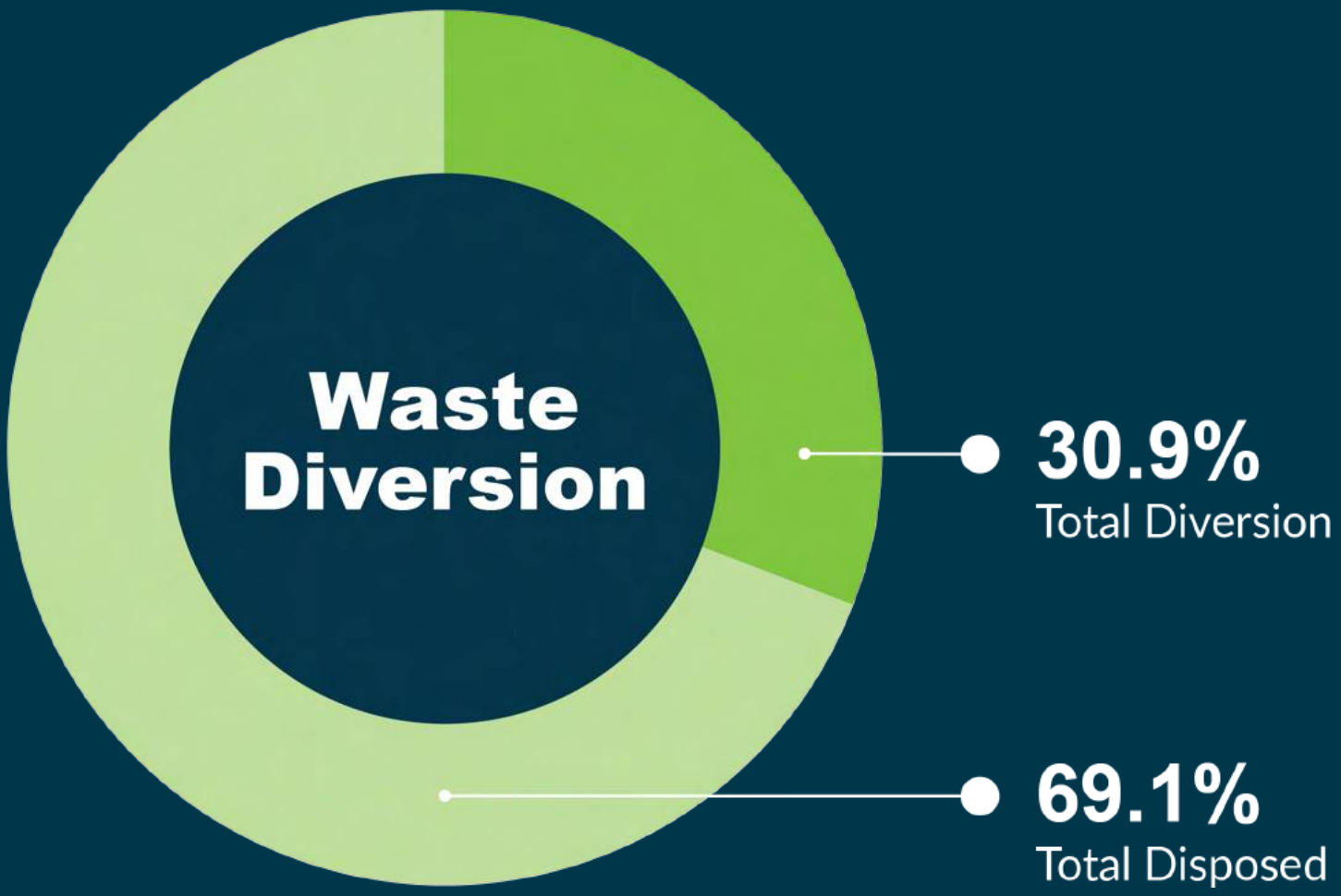
Year	2021	2022	2023	2024
Waste Diversion Rate (%)	32.6%	30.3%	32.8%	30.9%
Total Tonnes Diverted (tonnes)	14,820.75	13,773.11	14,535.06	14,136.46

Airspace Assessment

An unmanned aerial survey (UAV) was conducted in August 2024 to collect data which was used by the City to estimate the remaining volume capacity of airspace for waste placement within the HDPE lined cells. As of August 2024, the following capacity was estimated for developed cells:

- Cell 15 and Cell 16 available capacity: 66,809 m^3
- Cell 17 available capacity: 99,518 m^3
- Cell 19 available capacity: 102,000 m^3

The total estimated available capacity was 270,327 m^3 as of August 2024.


Waste Diversion
30.9%
Total Diversion
69.1%
Total Disposed

Environmental Monitoring Results

The City monitors and reports on four key sources of environmental impacts: LFG, groundwater, surface water, and leachate.

LFG Collection and Flaring System Monitoring

LFG monitoring was completed by Integrated Gas Recovery Systems (IGRS) and reported by partner company Comcor with the results of the 2024 monitoring program reported in 2025. The 2024 LFG Monitoring Report (Comcor 2025) provides a summary of monitoring and maintenance work and analysis of LFG emissions and greenhouse gas reductions. There are two main components of the LFG system that require monitoring:

- LFG collection wellfield including vertical and lateral wells; and
- Mechanical System including a blower and a flaring system.

Data from LFG operations was available intermittently from January 2024 to November 2024, with multiple periods of system downtime throughout 2024. The LFG system experienced several instances of unavailability, including:

- In January 2024, the LFG auto closure valve seized in a closed position. The valve was removed and cleaned, however the issue persisted and a full valve replacement occurred in February 2024.
- In February 2024, a significant decline in gas quality resulted in the LFG system shutting down. The system remained offline until March 2024 when further investigation revealed that a cover on a condensate sump had become dislodged. Following repairs, the gas production quality improved and the LFG system resumed operation.
- In April 2024, the Variable Frequency Drive (VFD) on the blower failed and needed to be replaced. The LFG system was down until June 2024 when the new VFD was installed.
- A new gas analyzer was installed in August 2024 to ensure compliance with safety standards and improve the accuracy of landfill gas destruction calculations within the flaring system.

- In October 2024, a series of well repairs were carried out to raise the wells to an accessible level, enhancing overall system maintenance capabilities. During the repairs, several wells were found to have lost vacuum and Comcor is working with the City to resolve the issue.
- In December 2024, ice build up at the base of the flare caused an increase in outlet pressure of the blower and shut down the LFG system. Comcor is working with the City on a long-term solution to mitigate ice formation and ensure continuous operation during winter conditions.
- Minor maintenance activities were completed throughout 2024 including inspection of the condensate pump and pump drain trap, and preventative maintenance on the air compressor.

In 2024, the greenhouse gas emissions reduction due to flaring methane was 4,158 tonnes of carbon dioxide equivalent ($CO2_e$) and the total annual LFG flow was 34,369,568 standard cubic feet (scf). Table 4-1 provides a summary of total greenhouse gas emissions reduction and total LFG flow volume from 2021 to 2024.

The recorded LFG collection and flaring decreased by 13% compared to 2023.

Table 4-1: Annual LFG Volumes

Year	2021	2022	2023	2024
Annual Greenhouse Gas Emission Reduction (Tonnes CO_2e)	8,953	2,464	6,641	4,158
LFG Flow (scf)	52,436,969	12,004,720	39,555,214	34,369,568

Groundwater Quality and Monitoring Results

Water quality monitoring was completed by Tetra Tech with results of the 2024 monitoring program reported in 2025. The 2024 Water Quality Monitoring Report (Tetra Tech 2025) provides detailed methodology and analysis of water quality. Based on the streamlined sampling and monitoring program approved by MECC in December 2017, the water quality monitoring program includes:

- Annual measurement of groundwater elevation in overburden (till and sand) materials as measured in 30 onsite groundwater monitoring wells.
- Establishment of a Primary Monitoring Network (PMN) consisting of ten onsite wells, two offsite wells, three surface water locations, and a leachate monitoring location sampled on an annual basis.
- Establishment of a Secondary Monitoring Network (SMN) consisting of 17 onsite wells and one offsite well sampled once every three years.
- Creation of set groundwater and surface water laboratory analytical packages, tailored to site conditions and current best practices.

Groundwater Elevation and Flow

Groundwater elevations were highest along the southern Landfill boundary and southwest corner of the Landfill. Groundwater elevations were lowest towards the north property boundary. The inferred groundwater flow direction in upper groundwater strata is predominantly towards the north-northeast under an estimated hydraulic gradient of 0.07 m/m. This flow direction is consistent with regional groundwater flows towards the Assiniboine River. The groundwater flow direction in deeper groundwater strata is also inferred to be northeasterly. These flow directions appear to mirror the local ground surface topography.

Groundwater Quality

The PMN weas sampled in the 2024 monitoring program. Results of laboratory analysis were compared to Health Canada – Canadian Drinking Water Quality (HC-CDWQ) Guidelines.

The 2024 Water Quality Monitoring Report indicates that groundwater quality is generally stable at PMN monitoring wells and suggests no apparent groundwater quality impact at the monitoring well locations that can be clearly attributed to Landfill operations. Laboratory results

identified nitrate, iron, manganese, and uranium exceeded applicable health related Maximum Acceptance Concentrations (MAC) of HC-CDWQ Guidelines at one or more monitoring wells inside of the Landfill. The parameters exceeding MAC were consistent with historical results. There were two off-site sampling locations that exceeded MAC for iron, manganese, and uranium. Increased concentrations of dissolved iron, manganese, and uranium are not necessarily related to Landfill operations and may be naturally occurring.

Parameters exceeding non-health related HC-CDWQ Guidelines for Aesthetic Objectives (AO) observed at the onsite monitoring locations included total dissolved solids (TDS), chloride, and sulphate. Off-site monitoring wells showed exceedances of TDS.

It was noted that nitrate exceedances may not be due to Landfill operations and may be influenced by offsite activities as the highest nitrate concentrations were measured on the east-central side of the Landfill and generally up-gradient of Landfill activities.

Tetra Tech concluded that groundwater quality is generally stable at PMN monitoring wells and suggests no apparent groundwater quality impact at the monitoring well locations that can be clearly attributed to Landfill operations.

Surface Water Monitoring Results

Three surface water locations are sampled on site on an annual basis. During the 2024 monitoring period, the surface water monitoring results identified exceedances of MAC for health-related HC-CDWQ Guidelines for ammonia, iron and manganese at two locations, arsenic and lead at one location, and nitrate at one location. AO Guideline exceedances included chloride, TDS, and sodium in at least one of the samples. The surface water monitoring results were consistent with historical data.

Exceedances in surface water are not considered a risk to the surrounding environment, as surface water from the site is contained on site and either evaporates or is transferred to the WWTP rather than being discharged directly into the environment.

Leachate Removal and Treatment

As part of the 2024 water quality monitoring program, leachate samples were collected from two of the central leachate collection systems at the Landfill. Leachate analysis identified elevated levels of most parameters tested, consistent with historical results.

There are eleven manholes located around the perimeter of the Landfill that have been collecting leachate from waste cells since 1994. Leachate from Cell 7, Cell 11, Cell 12, and Cell 13 drains into a manhole at the north end of Cell 11 via perforated leachate collection pipes installed within previous granular fill and is pumped to the leachate storage tanks located west of the old scale building. Leachate from Cell 15, Cell 16, Cell 17, and Cell 19 drain to manholes at the north edge of each cell and are pumped to the WWTP for treatment, and is pumped through a meter so that the City can measure leachate flow. Leachate extraction is weather-dependent and typically occurs between May and October. Once leachate is contained in the storage tanks, the City WWTP controls the flow of the leachate into the WWTP.

Cell 8, Cell 9, and Cell 10 have been closed and capped with approximately 1 m to 1.5 m of clay. The volume of leachate produced in these cells has decreased from their active use. This has reduced the need to have the manholes pumped on a regular basis. The manholes are periodically checked and have not needed to be pumped over the past few years.

In 2024, approximately 13,079 m^3 of leachate was pumped to the WWTP for treatment.

Incident Reporting

Health and Safety

In 2021, the City adopted a new Landfill Contingency/Emergency Response Plan in order to meet the requirements of the new operating Permit.

Health and Safety Incidents

There was one serious health and safety incident in 2024, in which a worker cut their hand while cleaning out the undercarriage of a bulldozer.

Landfill Fire Reporting

No landfill fires were reported at the Landfill in 2024.

Complaints Received

The City did not receive any nuisance, noise, or odour complaints regarding Landfill operations in 2024.

All nuisance complaints reported to Landfill staff are investigated by the Manager of Solid Waste. The Landfill does not typically have issues with noise complaints due to the location of the facility being approximately 0.8 km from the nearest residential dwelling. The use of daily cover has proven successful in mitigating odours.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Key Performance Metrics

Table 7-1 summarizes key metrics used to assess Landfill and solid waste management system performance. Targets for key metrics will be developed by City staff and these metrics will be tracked in future years to assist City Administration in assessing and managing performance.

As shown in Table 7-1, overall waste disposal increased by 6.1% and materials diverted decreased by 2.7% in 2024 compared to 2023.

Table 7-1: Key Landfill Performance Metrics

Item	2024 Value	Change from 2023
Waste Disposed	31,680 tonnes	+6.1%
Waste Disposal Per Capita	0.59 tonnes/capita	+0.03 tonnes/capita
(All) Materials Diverted	14,136 tonnes	-2.7%
Customer Visits	45,263	-0.6%
Apparent Waste Density	Not Assessed	Not Assessed
Groundwater Quality	No Significant Concerns	No Significant Concerns
Surface Water Quality	No Significant Concerns	No Significant Concerns
Greenhouse Gas Emissions Reduction by LFG Collection and Flaring	4,158 tonnes CO_2e	-37%
Annual LFG Flow Volume	34,369,568 scf	-13%
Lost Time Incidents	One	Increased by one from 2023
Remaining Airspace	270,327 m^3	Not Assessed

Notes:

*** – Population estimates extrapolated from 2021 Canadian Census assuming 1.2% growth year-over-year (StatCan 2024).**

**** – 2024 Airspace assessed in August 2024 and included Cell 15, Cell 16, Cell 17, and Cell 19.**

Scf – standard cubic feet.

Summary

The following summarizes the key aspects of Landfill operations in 2024:

- The City completed construction of Cell 19 in 2024 and the cell is currently in use.
- During 2024, 31,680 tonnes of waste material were received at the Landfill for disposal at the active face.
- Organic materials collected increased by approximately 53% from 2023 to 2024.
- As of August 2024, the estimated capacity of developed landfill cells was 270,327 m^3.
- A total of 14,136 tonnes of materials were diverted from the waste stream as recycling, compost, scrap metal, scrap tires, E-waste, and HHW. This represents a diversion rate of 30.9%.
- Following MECC recommendations in 2017, groundwater and surface water monitoring events were conducted once during 2024 for the PMN. Laboratory results identified nitrate, iron, manganese, and uranium exceeded applicable health related MAC of HC-CDWQ Guidelines at one or more onsite locations. The parameters exceeding MAC were consistent with historical results. Tetra Tech concluded that there was no apparent groundwater quality impact at the monitoring well locations that can be clearly attributed to landfill operations.
- The surface water monitoring program identified exceedances of the MAC for health-related HC-CDWQ Guidelines for ammonia, iron, and manganese at two locations, arsenic and lead at one location, and nitrate at one location. AO Guideline exceedances included chloride, TDS, and sodium in at least one of the samples. The surface water monitoring results were consistent with historical data.
- LFG collection and flaring decreased by 13% compared to 2023. Significant LFG system downtime and maintenance occurred in 2024 due to various system issues. The greenhouse gas emissions reduction due to flaring methane was 4,158 tonnes of $CO2_e$ and the total annual LFG flow was 34,369,568 scf.
- In 2024, approximately 13,079 m^3 of leachate was removed from site for treatment at the WWTP.
- In 2024, there was one serious incident in which a worker cut their hand while cleaning out the undercarriage of a bulldozer
- The City did not receive any nuisance, noise, or odour complaints regarding Landfill operations in 2024.

Recommendations

Based on the 2024 operational results, Tetra Tech makes the following recommendations for consideration by the City:

- Update data review and tracking systems to reflect information requested by the Environment Act License.
- Calculate landfill airspace consumption annually.
- Begin tracking and reporting on key Landfill performance metrics such as apparent waste density.
- Continue to improve the LFG collection system.

The following were recommended in reports prepared by others:

- As per the recommendations by Comcor (2025) for the LFG Collection and Flaring System:
  - Continue to operate and monitor the LFG system full time according to the Operation and Maintenance Manual for the Landfill.
  - Budget for an overhaul of the landfill gas blower and motor.
  - Repair the lateral piping that is causing some of the well field to be offline.
  - Expand the gas collection wellfield, which the City is planning for in 2026.
- As per the recommendations by Tetra Tech (2025) for groundwater and surface water sampling:
  - Conduct a review of current and historical land uses near the Landfill site. The areas around the Landfill all have potential to affect the groundwater quality at up-gradient monitoring well locations.
  - To better define the groundwater flow pattern in the shallow and deeper groundwater strata, and variations in groundwater quality with the monitoring well network, review all borehole log information for the PMN and any available information on the SMN, and prepare geological cross-sections and a conceptual site model.
  - Continue to follow the streamlined Monitoring, Sampling, and Analysis Plan, as approved by MECC on December 2, 2017.

City of BRANDON

Closure

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
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