Eastview Landfill Site
2018 Annual Report

City of BRANDON

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Introduction

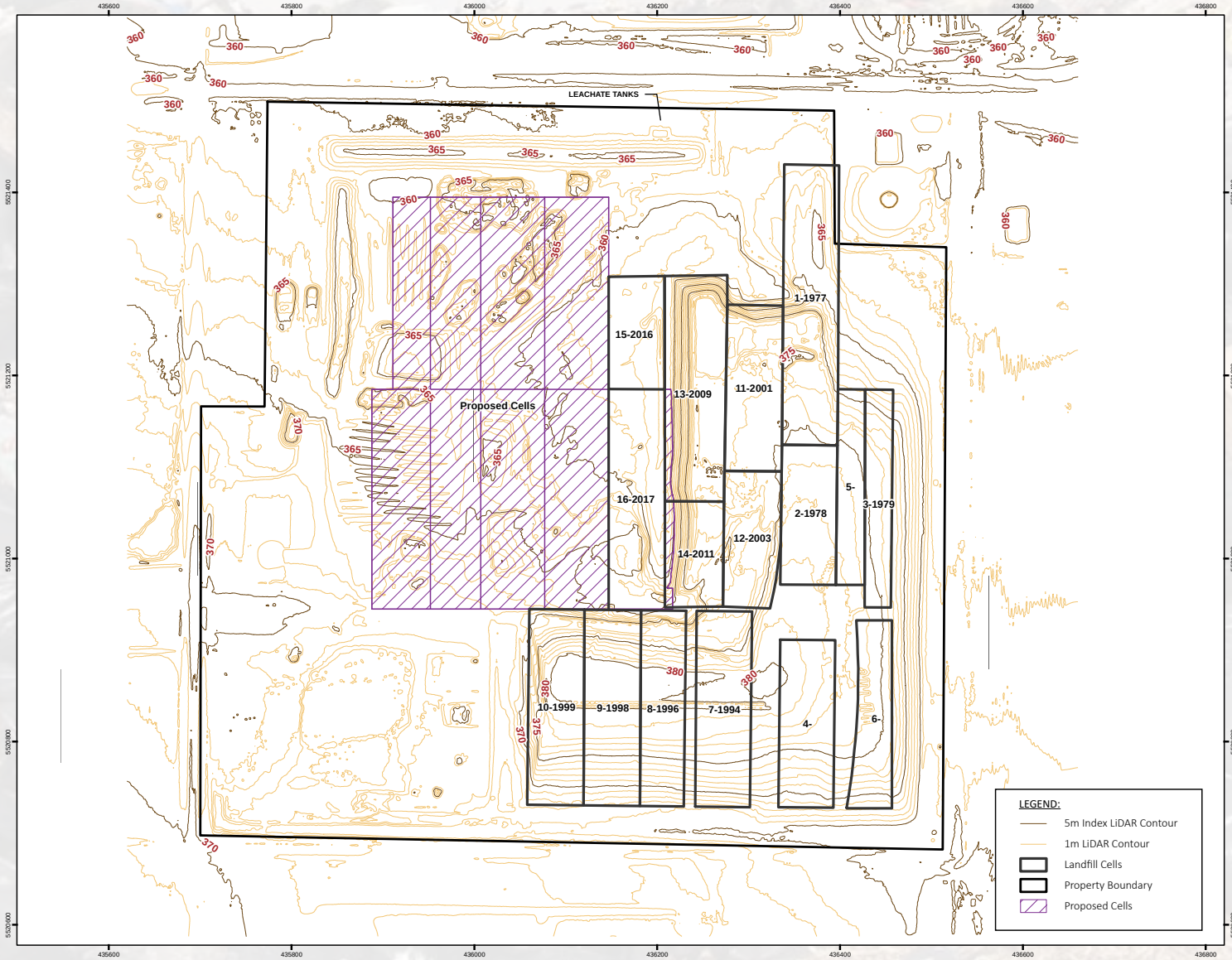
This annual report covers the period from January 1, 2018 to December 31, 2018, and has been prepared in accordance with our Environmental Act license number 3149. The license was issued August 25, 2015 in accordance with *The Environment Act* (C.C.S.M.c.E125) under the direction of Manitoba Conservation. The Eastview Landfill Site operates as a Class 1 Waste Disposal Ground (WDG) under the Manitoba Environment Act.

- Former and active disposal areas;
- Full depot for residential and commercial waste, including contaminated soil, all directed to the tipping face;
- Leachate collection that is pumped to a wastewater treatment facility;
- Scale house and operator;
- Snow removal dump site (City use only);
- Clean fill disposal;
- Concrete disposal area;
- Landfill gas collection system (waiting to be commissioned by Department of Labor);
- Material Recovery Facility (MRF);
- Separation of metals, propane tanks, tires, yard waste and tree brush from waste stream which is stored in designated areas of the site;
- Freon depleting device depot;
- Eco-Centre for used oil, filters and containers;
- Tree and wood chipping;
- Composting;
- E-Waste Depot;
- Household hazardous waste depot ;

The purpose of this report is to meet the operational reporting requirements by providing the following information at a minimum:

- Updates to the operating manual;
- Closure/Post closure plans and financial evaluation;
- Planned improvements;
- Records of waste, recyclable materials, and compost quantities;
- A review of environmental monitoring data;
- Details on environmental protection programs;
- Operational information;

Below is a copy of the landfill section map.



Updates to Operating Manual

The operating manual was submitted in 2008 to meet the requirements of the operating permit. The manual was completed internally by Sanitation administration and was to address at a minimum the following:

1. Cell developing and sequencing;
2. Waste receiving, placement and covering;
3. Nuisance control;
4. Surface water management;
5. Landfill gas management;
6. Leachate management;
7. Monitoring and reporting;
8. Inspections and maintenance

The operating manual also provides criteria for the acceptance, handling and disposal of special wastes such as hydrocarbon impacted soils, mold and asbestos. The manual provides information for dealing with hot loads within City collection trucks, commercial haulers, and commercial and residential self-haulers.

Closure & Post Closure Plans

In 2018, the City of Brandon issued a bid opportunity and subsequently hired the consulting firm Golder Associates Ltd. to update the site's closure and post closure plan. Prior to this, the most recent Closure and Post Closure Plan had been completed in 2015 by Golder Associates Ltd. The decision to update the plan was based on the following criterion that had changed since 2015:

- A Landfill Master Plan was completed in 2016
- The final design contour of the landfill site was changed
- There has been an increase in participation in the City's curbside organics collection program
- The amount of commercial refuse received at the site has decreased since 2015

As part of the work, Golder Associates reviewed historical waste generation data provided by the City, reviewed current site operations and conducted a survey of the site's current elevations. Specifically, the updated plan included the following:

- Current waste generation estimate received at the Eastview Landfill Site based on current population trends;
- An estimate of the remaining useable life of the landfill site based on waste generation and available airspace;
- Estimated closure costs;
- An estimation of ongoing maintenance costs following site closure (post closure); and
- Preparation and submission of a report providing costing models and site development drawings.

According to the Closure and Post Closure Report prepared in 2015, the estimated useful life of the existing landfill site was predicted to be 27 years or an estimated closure date of 2041 however the updated plan, prepared by Golder in 2018, estimates that the Eastview Landfill Site will reach capacity in year 2044.

The updated plan also provided detailed information on the requirements and procedures required during the closure of the current site along with post closure requirements. The updated plan determined that the following requirements be adhered to during the closure of the Eastview Landfill Site:

1 Prior to the application of the final cover, regrading to the final contours should take place in order to promote drainage away from the site and to discourage infiltration and local ponding of surface water.

2 A 4H:1V slope was proposed for the side slopes and a 2% grade is designed for the top of the landfill, directing drainage to the northeast.

3 The following final cover design has been proposed:

a. A vegetative layer consisting of a minimum of 15 cm of topsoil, capable of supporting vegetative growth.
b. A subsoil layer 0.35 m in thickness
c. A barrier layer that is constructed by compacted clay soils to a thickness of no less than 0.50 m measured perpendicular to the compacted waste surface and achieving maximum permeability of 1 x 10 -7.
d. Contoured such that no water pools over the landfill cells.
e. Grade to achieve a minimum slope of 2%.

4 A policy be implemented to monitor top of waste elevations to assist in planning the placement of the final cover within a year of reaching the final elevations.

a. The policy will minimize the amount of leachate that will be generated and handled.
b. It will also allow for the initial settlement of the landfill to take place prior to placement of the final cap.

5 General allowance including decommissioning of site facilities such as upgrading the storm water control work and modification of the landfill gas collection system.

6 Submittal of a formal detailed Closure and Post Closure Plan which may include the following allowances:

a. Testing
b. Quality assurance/control
c. Legal fees

The updated plan also cited the following requirements for the post-closure phase for the Eastview Landfill Site:

1. That a post closure plan should operate for a period of no less than 25 years to ensure proper care of the site, associated infrastructure and environmental control systems.
2. Protect and maintain integrity of final cover system.
3. Provide repairs to the final cover system as necessary to correct settlement, subsidence, erosion, leachate break-out
4. Protect, maintain, and monitor groundwater, leachate and landfill gas.

A schedule of costs was included as part of the plan to allow the City to prepare for the pending closure of the landfill in a fiscally responsible manner. The updated plan estimates that the average monthly tonnage to be landfilled between 2018 and 2044 is 3,471 tonnes.

The projected closure and post closure plans based on 2018 dollars in expected to range from $2.7 million to $3.5 million. This will require annual contribution to a capital recovery fund of between $3.17 and $3.98 on a per tonne basis. These costs are in addition to the costs already being covered through the landfill tipping fees.

Closure and Post Closure Fees

In 2015, Sanitation presented to City Council and requested that a $4.00 per tonne closure levy be put in place to cover the costs of landfill closure. Council agreed to the request and the $4.00 per tonne levy was implemented on January 1, 2016 on every tonne of material that enters the tipping face. The $4.00 per tonne closure levy was maintained in the 2018 fee schedule for the landfill site and will be maintained as such for 2019 as the updated *Closure and Post Closure Plan* determined that this amount was adequate.

$4.00

per tonne closure levy was implemented on every tonne of material entering the tipping face.


CAT

Planned Improvements and Major Projects in 2018

2018 Project Update: New Depot Bins

In 2018, ten (10) new depot bins were purchased. These depot bins are compatible with the front load truck purchased in 2016 and have been useful in providing additional capacity at the City's existing depots. In addition, the new bins have been utilized for solid waste collection at several City of Brandon facilities, as well as providing temporary refuse and recycling collection for residents in areas impacted by major roadway construction.

Solid Waste Quantities

As part of the City of Brandon's Solid Waste Management System, the City owns and operates the Eastview Landfill Site located at NW 17-10-18, in the City of Brandon. This landfill is considered a Class 1 site, due to population (>5,000), services not only residents of the City, but also a number of municipalities within close proximity to the site along with commercial and industrial businesses. Starting in 2011, the Eastview Landfill Site started receiving solid waste from the RM of Cornwallis.

To segregate larger commercial vehicle traffic from residential traffic, waste from commercial haulers was placed in cells 13 and 14, waste from City refuse collection was landfilled in cell 16, and cell 15 was used for waste hauled directly to site by residential customers.

Active Cell

All waste generated within the City of Brandon is either hauled directly by City refuse trucks, commercial haulers, or self-hauled by small businesses and residents. In 2018, the total amount of waste disposed of in the active cell was **33,342.376** tonnes.

Eastview Landfill Material Quantities

MATERIALS (Tonnes)	2015	2016	2017	2018
Asbestos	139.56	294.34	163.45	375.78
Commercial Mixed Refuse	33,097.38	27,511.37	20,545.88	18,666.59
Residential Mixed Refuse	5,331.84	5,621.29	5,758.87	4,379.07
City Curbside Collection	9,272.96	9,567.67	9,155.07	9,361.11
Wastewater Treatment Facility Sludge	426.71	941.23	730.31	559.83
Total	**48,268.45**	**43,935.90**	**36,353.58**	**33,342.38**

Contaminated commercial loads are loads containing more than 5% in volume of recyclable material.

Asbestos is placed along the East side of the cell 11-12 where it is covered and surveyed. In order for anyone to bring asbestos to the landfill site for disposal, they first need to purchase a daily permit. A separate permit is required for each day that asbestos is being delivered on site. Contractors or anyone responsible for the disposal of asbestos must insure that safe handling of the material occurs when transporting and disposing.

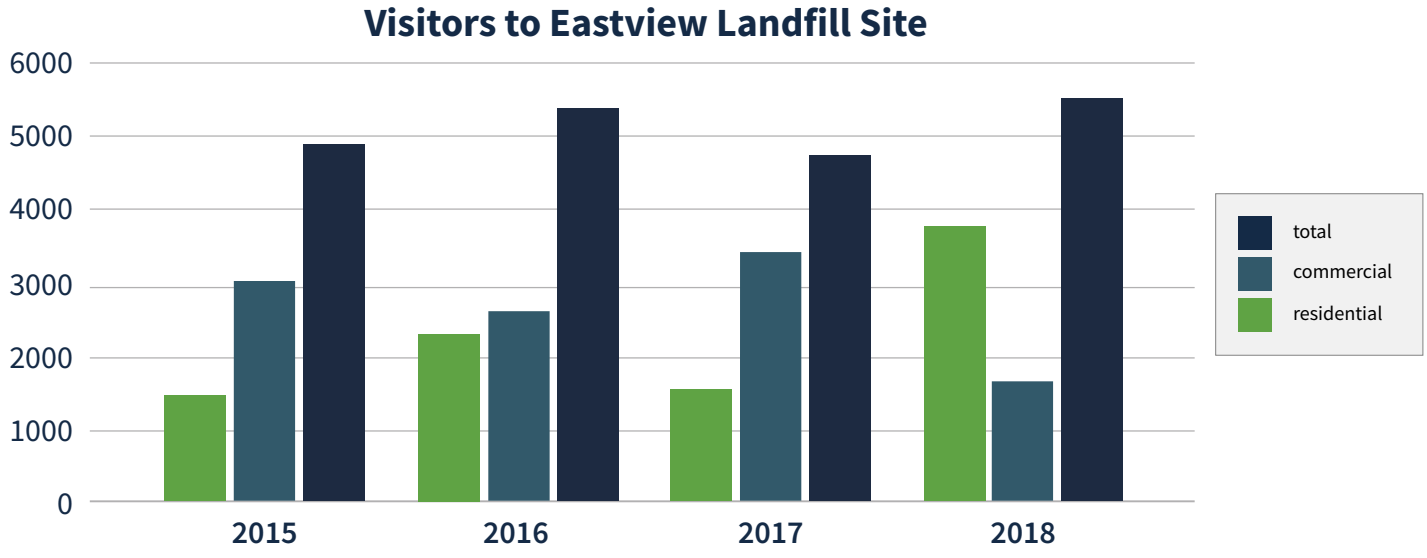
Residential refuse is the waste hauled to the landfill site by homeowners and/or occupiers of residential property. This includes all material that is not considered recyclable, compostable or requires special handling. City residential is the waste hauled by City of Brandon refuse trucks and delivered to the active cell.

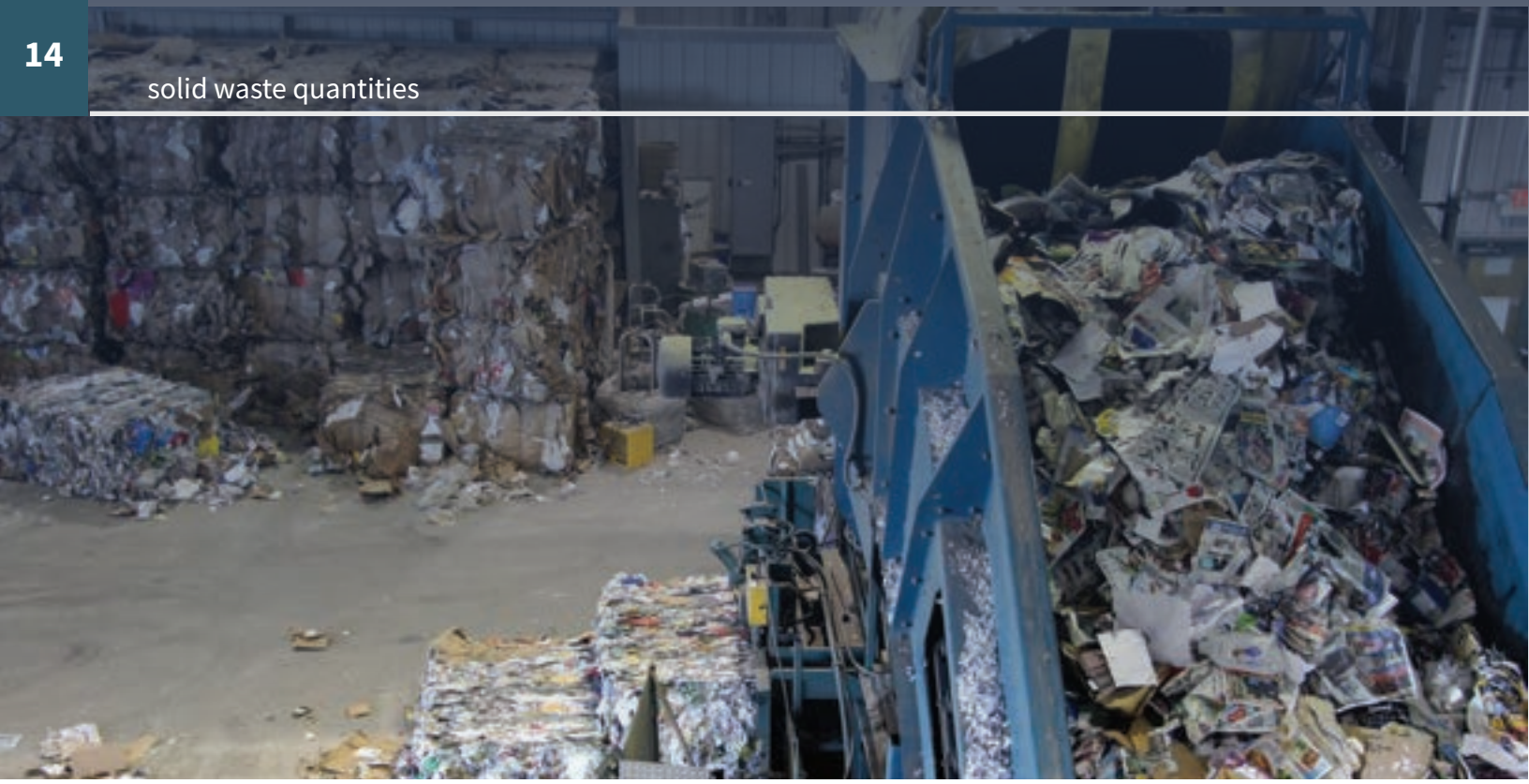
Since 2010, the annual average for the total number of visitors entering the landfill has been 59,700. As illustrated in the following chart, the total number of visitors to the landfill site in 2018 was 55,341, with 38,771 of the visitors being residential and 16,570 of the visitors being commercial.

The number of commercial and residential visitors has decreased annually since 2016. Implementation of a new $2 entrance fee for residential loads under 500kg, commencedJanuary 1, 2017. In addition, the commercial tipping fees increased from $64 per tonne to $75 per tonne on January 1, 2017.

59,700

annual average number of visitors entering the landfill





Recycling and Organics Material Weights

Throughout 2018, the Sanitation Department of the City of Brandon continued in its efforts to divert as much material from the active cell as possible. This effort is made in order to extend the useful life of the landfill and spread the costs of developing new cells over longer periods of time.

In 2014, the City assumed responsibility for the processing of residential and commercial recyclables within the Material Recovery Facility (MRF) and awarded the shipping and marketing of recyclables to a third-party contractor. Processing of the recyclable material consists of the manual removal of residue (i.e. non-recyclable material) and old corrugated cardboard (OCC) from mixed recyclable material (or comingled material) on a sort line.

The MRF also accepts loads of OCC and shredded office paper (SOP) from commercial sources and in 2018, 791 tonnes of OCC and 78 tonnes of SOP were brought into the MRF by commercial haulers as single-stream loads.

Once sorted and comingled, OCC and SOP material are baled separately by MRF staff. The baled material is shipped by truck to the respective comingled processing plants for further sorting, and OCC and SOP are shipped by truck by the Contractor to end market.

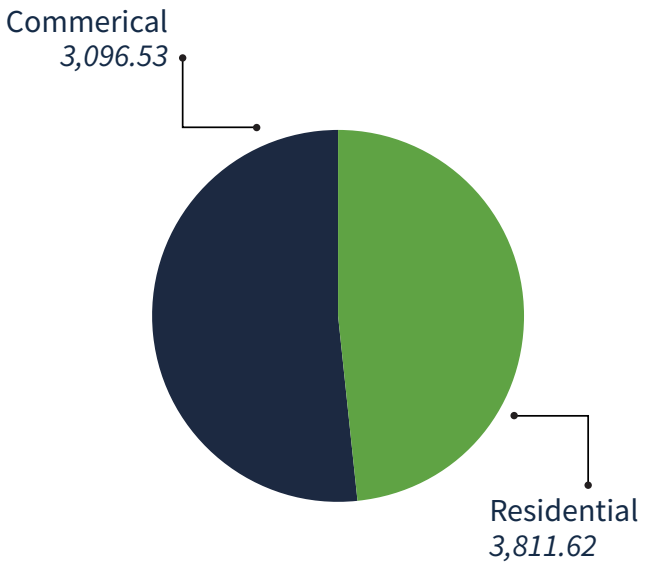
Comingled material, or mixed recycling, is comprised of the following materials collected from residential and commercial sources:

- Recyclable plastics (PET #1, HDPE #2, #4, #5 & #7 plastics)
- Newspaper & flyers
- Aluminum food and beverage containers
- Glass food and beverage containers
- Steel food and beverage containers
- Magazines and catalogues
- Gable top containers
- Boxboard
- Paper directories
- Corrugated cardboard
- Aseptic packaging

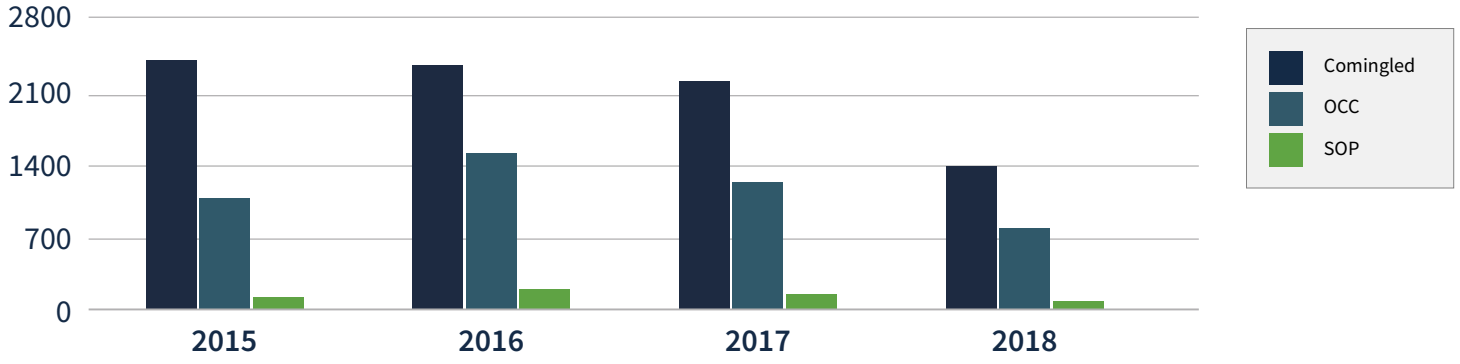
Recycling Comparison

MATERIALS	2015	2016	2017	2018
Residential	3,854.00	3,940.00	3,777.06	3,811.62
Commercial	3,703.00	4,171.00	3,634.21	3,096.53
Total	**7,557.00**	**8,111.00**	**7,411.27**	**6,908.15**

The City of Brandon receives a rebate from the shipping and marketing contractor for the sale of OCC and SOP. The total amount of OCC shipped and marketed in 2018 was 1,903.04 tonnes, which means that approximately 1,112.04 tonnes of OCC was pulled from the comingled recycling stream on the MRF sort line. The 2018 Waste Audit performed by Multi-Material Stewardship Manitoba (MMSM) revealed that approximately 23% of the comingled material collected in residential blue bins is OCC.



Breakdown of Recyclables from Commerical Sources



Compost Facility

Since the early 1990's, the City of Brandon has been operating a yard and tree trimming collection facility. In the mid to late 1990's, the facility was upgraded to include a retention pond for the collection of any surface water runoff that originates from the compost windrows.

In 2018, 6,917.73 tonnes of organic material (including tree and wood waste) was collected on site and diverted from the active cell – this represents an increase of 644.31 tonnes from the amount of organic material collected in 2017.

6,917

tonnes of compostable material was collected on site and diverted from the active cell

Organic Quantities

MATERIALS (Tonnes)	2015	2016	2017	2018
Residential	3,458.42	2,114.91	3,518.05	3,759.9
Commercial	4,630.46	3,225.20	1,477.60	1,630.70
Industrial	1,796.37	1,899.32	1,277.77	1,526.38
Total	**9,885.25**	**7,239.43**	**6,273.42**	**6,917**

Note: Industrial material is comprised of manure and bedding from sources such as the Keystone Centre. Both Residential and Commerical material is comprised of both yard waste and wood waste.

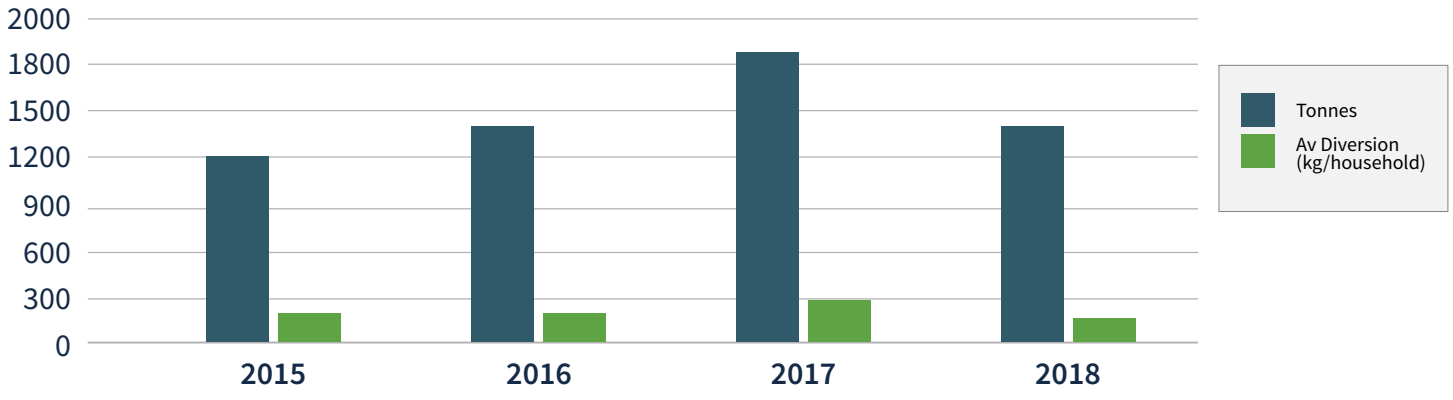
Tree chips made from the tree waste collected on site are utilized in the composting process to facilitate aerobic decomposition of the yard waste and manure feed stock materials. Once the windrowed material has completed the active composting phase, it is placed in a separate curing pile. Once curing is complete, the finished compost is mixed with black dirt at a ratio of 3 parts black dirt to 1 part compost, screened and then stored on site until it is utilized by the City departments for landscaping purposes.

Six samples of processed compost product from 2018 were sent to A & L laboratories for analysis and all six samples met the requirements for Category A compost as determined by the Compost Quality Alliance (CQA).

The City of Brandon Parks, Airport, and Streets and Roads departments used a total of 240.31 tonnes of compost material in 2018 in their operations, some of which was delivered to the various community gardens located throughout the city. Compost was also made available for purchase as Soil Amendment in the 2018 City of Brandon Fee Schedule at a cost of $22.95 per tonne. A total of 112.64 tonnes of compost was sold as soil amendment in 2018. All customers who purchased the product were instructed to mix one part soil amendment with three parts top soil. Also, 5.75 tonnes of compost was given to Assiniboine Community College in the fall of 2018 for use in their ongoing study of the effects of compost application on vegetable growth.

By the end of 2018 there were **7,306** participating households registered and participating in the residential green cart program. Based on this participation, the average household participating in the green cart program in 2018 diverted approximately 242 kilograms.

Residential Green Cart Collection



In comparison, there are approximately 14,938 households that use the depots or self-haul compostable material to the landfill, which amounts to 1,989 tonnes of organic material diverted from the landfill cell.

Comparison of Collection Systems of Organic Materials

SYSTEM (Tonnes)	2015	2016	2017	2018
Depots	561.89	390.83	399.33	390.29
Self-Haul	297.98	334.39	1,500.48	1,584.63
Curbside	1,411.02	1,899.32	1,618.25	1,784.99
Totals	**2,270.89**	**2,624.54**	**3,518.06**	**3,759.9**

Landfill Gas Volume

In 2018, we collected and flared 81,590,597 (cfm) of landfill gas. This equates to approximately 12,412 tonnes of CO2 being diverted from the landfill site during the year, which is a slight decrease of 744 tonnes from 2017.

Given that the average passenger vehicle emits approximately 4.7 tonnes of CO2 per year, the amount of CO2 collected and flared from the landfill site in 2018 is equivalent to taking approximately 2,640 vehicles off the road.

81,590,597

(cfm) of landfill gas we collected and flared 81,590,597 (cfm) of landfill gas.

Annual Landfill Gas Generation

	2015	2016	2017	2018
Annual C02 equivalents (tonnes)	15,748	17,929	13,156	12,412
Landfill Gas Flow (scf)	89,654,006	91,325,592	77,763,752	81,590,597

Why did the CO2 equivalents decrease in 2018 even though the landfill gas flow increased?
The reason behind this has to do with a decrease in gas concentration. In 2017, the average methane values were 35.9% whereas in 2018, they were 33%. The calculation of CO2 equivalents primarily involves landfill gas volume and the methane (CH4) percentage of the gas, and is based on CH4 being 25 times more polluting than CO2 (CH4 has a Global Warming Potential of 25 while CO2 has a Global Warming Potential of 1 since it is being used as a reference). Thus, based on the difference in the methane values and the role methane plays in the CO2 equivalents calculation, even though the landfill gas flow increased in 2018, the CO2 equivalents did not.

Residential Collection

Refuse
627 kg/household

Recycling
207 kg/household

The City of Brandon's residential curbside collection provides year-round weekly collection of residential recycling and refuse along with the weekly collection of green carts (for participating households) during the months of April through to November. Collection occurs on the same day each week (Tuesdays to Fridays) for each household, which has proven to be convenient for both residents and City operations.

The City of Brandon tracks bins issued to properties using a Bin Database, where the serial numbers assigned to each recycling, refuse and green bin are linked to the street address of the property they were issued. As per the Bin Database, there are 15,052 black bins (or refuse bins) in service and 14,928 blue bins (or recycling bins) in service. As there are approximately 14,938 households in the City of Brandon, the average rates of residential waste generation are 627 kg in refuse and 207 kg in recycling.

There is no such thing as "away".

When you throw anything away it must go somewhere.

-Annie Leonard

Waste Reduction and Diversion Initiatives

Residential Drop-off Area

At the Eastview Landfill Site there are a number of areas that are used for residential and commercial customers. Outside of the entrance gate, there are containers located for the drop-off of mixed recycling as well as yard waste.

Inside the landfill customers are able to drop off grass, trees, wood, metal, tires and glass in separate piles along the south side of the main landfill road. People delivering these items more often than not have loads mixed with other items that are non-recyclable. The scale operator is responsible for ensuring that each customer is notified of the need to separate each material into the proper pile and not to contaminate any pile with mixed refuse.

Customers entering the landfill with large amounts of recyclable materials are encouraged to deliver these items directly into the MRF.

Recycling Depots

The recycling depot system was first implemented in the City of Brandon in 1990. At that time there was only three (3) locations for drop off and they were limited to only metals as that was the only product that could be sold locally. At that time, materials were picked up on a weekly basis.

At its peak, before the introduction of the curbside collection system, nine (9) depots were available throughout the City of Brandon for residents to drop off their recyclable materials. The need to service these sites quickly grew from weekly to daily collection.

A major downfall of the depot network is the amount of illegal dumping that occurs at these sites. This has a negative impact on our recycling efforts as many loads become contaminated, and depending on the amount of contamination, may need to be landfilled. Unfortunately, due to the depots being unmanned, large volumes of items that are not recyclable end up at these locations. In 2018, the City of Brandon collected 354.18 tonnes of recyclable materials from its network of depots located throughout the City. The location of depots that accept recyclable materials are:

1	Sportsplex	3	Keystone Centre (newly added)
2	34th and Victoria	4	Eastview Landfill

As well as recyclables, the City also offers the collection of compostable material at the following depot locations:

1	Sportsplex	4	1st and Richmond
2	34th and Victoria	5	Rideau Park
3	Westridge Community Centre	6	Eastview Landfill

In 2018, the City purchased ten (10) new depot bins to add to the twenty (20) bins purchased in both 2016 and 2017. In addition to being utilized at the City's depot locations, the front-load style depot bins are used for refuse and recycling collection in residential areas affected by major roadway re-construction projects during the summer months.

At the end of December 2017, the recycling depot located at the Capitol Theatre was forced to close because the property owner required additional parking to accommodate the redevelopment of the Brandon Shoppers Mall. The recycling depot bins were removed from this location and additional blue bins were placed at the 34th & Victoria and 1st & Richmond depots as a temporary measure until the City was able to set-up a new recycling depot in the south end of the Keystone Centre property at the end of August 2018.

E-Waste

In June of 2007, the City of Brandon in partnership with Green Manitoba started a pilot project to start an E-waste collection program for residential customers. This program would run from May to the end of September each year and became a year round program in 2010. City staff stack e-waste items on pallets and secures them for travel. Once a sufficient number of pallets of e-waste products are collected, the product is transported to an EPRA-approved facility for dismantling and recycling. Approximately 115.894 tonnes of e-waste was diverted from the landfill in 2018, which represents a slight increase from the quantity collected in 2017.

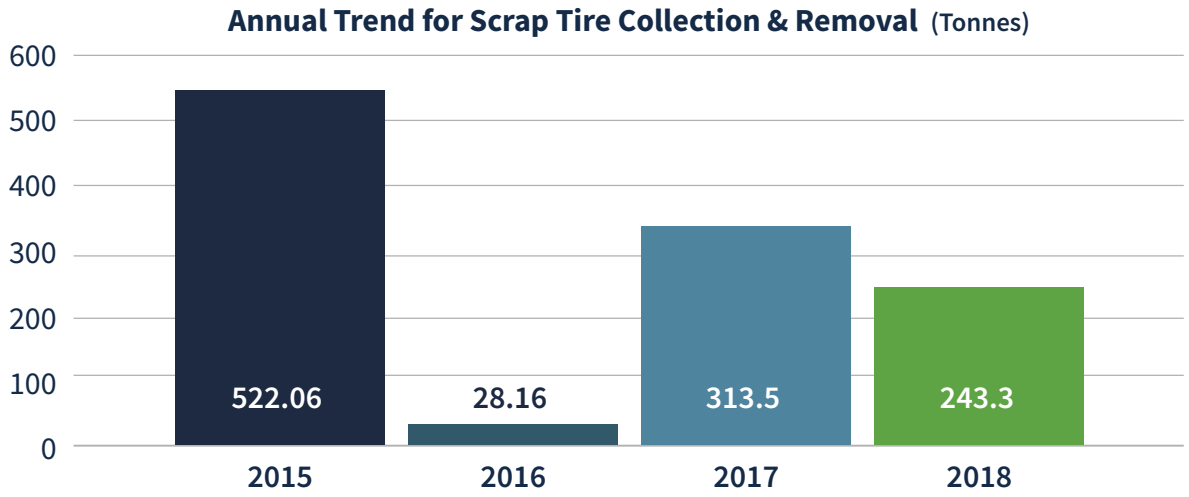
Annual Trend for E-Waste Collection (Tonnes)

	2015	2016	2017	2018
Annual Total	**178.52**	**147.23**	**104.41**	**115.89**

Tires

Tire Stewardship Manitoba was launched in April of 2008 as a not-for-profit organization to help manage the problem of scrap tires. In 2017, 313.5 tonnes of scrap tires were removed from the Eastview Landfill Site, which is an increase from the 28.16 tonnes, removed in 2016.

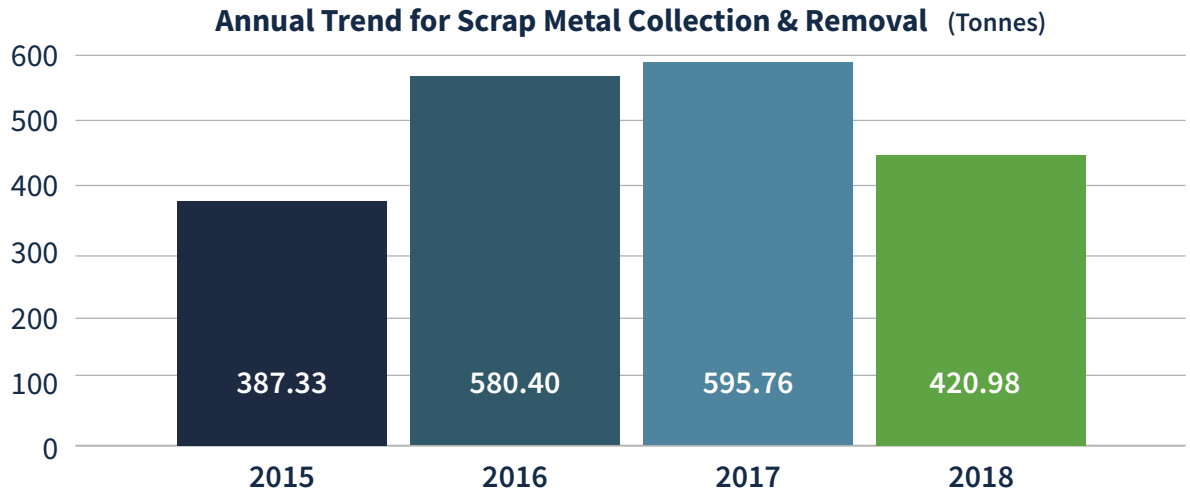
As shown, the amount of tires collected at the site in 2015 was significant at 522.06 tonnes. However this peak in 2015 was the result of the large backlog of stockpiled tires which was removed at the end of the 2015 calendar year thus skewing the quantity logged for that year.



Properly managed scrap tires reduce environmental risk and create jobs and economic opportunities in Manitoba. Manitoba's scrap tire products are sold locally and internationally. Scrap tires can be used to make flooring products for agricultural, recreational, and industrial use. They are used for artificial turf fields, rubberized asphalt, blast mats, geo-technical projects and energy recovery.

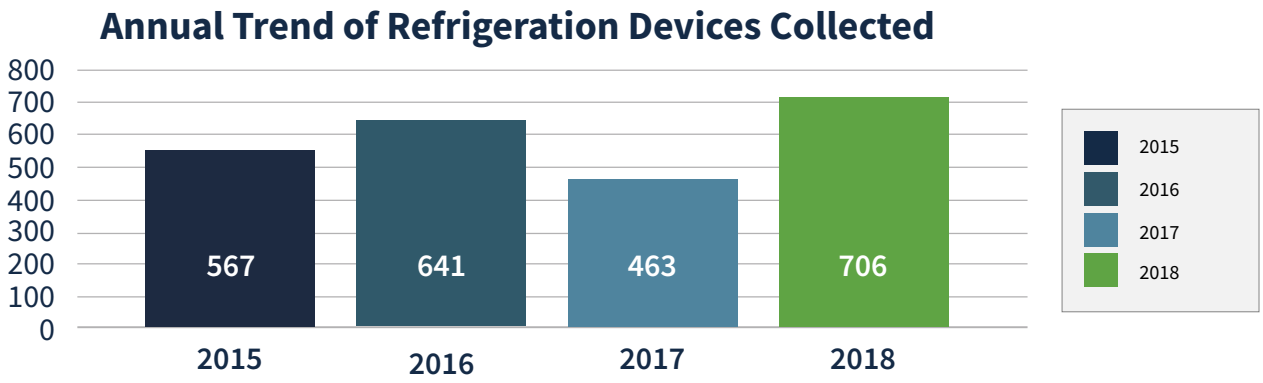
Metals

The chart below shows the annual trend of scrap metal collection and removal for the site. In 2018, 420.98 tonnes of metal was removed from the Eastview Landfill Site, which represents a decrease from the 595.76 tonnes removed from the site in 2017. In February 2018, the City issued a bid opportunity for scrap metal and as a result, changed the contractor employed for scrap metal removal and disposal from Gerrard Metals to Westman Salvage. All metals diverted and collected at the landfill site are loaded by Sanitation staff into bins provided by the contractor which, when full, are hauled by the contractor to their site for further processing.



Refrigeration & Air Conditioning Equipment

In 2018, a total of 706 devices containing refrigerant were delivered to the Eastview Landfill Site for proper disposal – an increase from the 463 devices collected on site in 2017.



Units containing refrigerant (or halocarbons) are stored in a segregated location on site until proper disposal. The City of Brandon extended its agreement with a third-party contractor (Puresphera) for 2018 to both remove and destroy the refrigerants from the device and then recycle its components. Puresphera decommissioned a total of 1,227 devices throughout the 2018 calendar year, including:

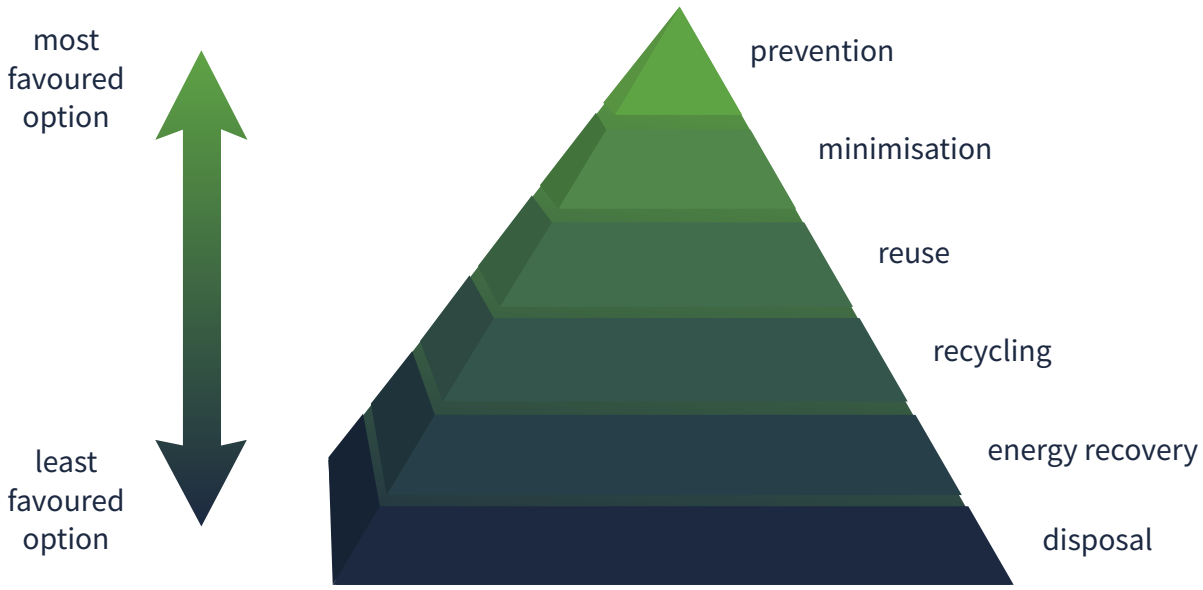
576	165	128	43	315
Refridgerators	Freezers	Air Conditioners	Water Coolers	Dehumidifiers

The proper removal and disposal of the refrigerants from these units has avoided the release of equivalent CO2 gas into the atmosphere. Furthermore, Puresphera's method of breaking down each device for further recycling has resulted in the recovery of the following from the devices:

- **Ferrous metals recycled**
- **Non-ferrous metals recycled**
- **Plastics**
- **Mercury**
- **Recycled oil**
- **CFC's collected & destroyed**

Extending Landfill Life

The main purpose in providing alternatives to disposal is to ensure the health and safety of residents, not only in Brandon, but of anyone living in the region that may be impacted by potential impacts to ground water supply. Through these efforts, we also gain the added benefit of extending the life of our current landfill. In the hierarchy of waste, there are 7 options for handling waste with the least favored being disposal and the preferred option being prevention.



Environmental Protection Programs - Monitoring and Reporting

Leachate Management

In 1994, the Sanitation Department developed its first lined waste cell in phase 7 of the cell development plan. This cell was lined using a clay max liner. In addition to the liner, a leachate collection system was included in the design of this cell. The purpose of this collection system was to ensure that leachate that is produced is contained on site before it can have a negative impact on the surrounding environment.

The Eastview Landfill Site has 8 manholes around the perimeter of the site that collect leachate before it is able to migrate into the ground water offsite.

In addition to phase 7 completed in 1994, phases 11, 12 & 13 all drain into a manhole at the north end of cell 11, where it is then pumped directly to the leachate storage tanks located directly west of the old scale building. The pumping of leachate is weather-dependent and typically occurs between May and October.

Leachate is produced when precipitation percolates through landfilled refuse and has leached out some of the chemical and physical constituents of the refuse. Effective leachate management involves collecting leachate at the bottom of a lined refuse cell with perforated pipes that collect and transport the leachate to a manhole where it is stored before it is treated.

Phases 8, 9 & 10 have been closed and capped with 3 to 5 feet of clay and the volume of leachate produced in these cells is much less than when these cells were active. This has reduced the need to have the manholes pumped on a regular basis. Initially these manholes were pumped weekly, and sometimes daily during periods of high precipitation, whereas now these manholes are periodically checked and only pumped as needed.

Development of cell 13 was planned in conjunction with cell 11 so that leachate produced from cell 13 runs into cell 11 and then drains to the manhole at the north end. Once leachate is contained in the storage tanks, the City of Brandon's Wastewater Treatment Facility can control the flow of the leachate to its site for treatment.

In 2018, the total volume of leachate treated for the Eastview Landfill Site was 2,952 cubic metres.

Surface / Ground Water Monitoring Program

In 2018, the ground water monitoring contract was issued for tender and KGS Group was awarded the contract to conduct a 5-year groundwater and surface water monitoring program at the Eastview Landfill Site. According to the streamlined sampling and monitoring program approved by Manitoba Sustainable Development in December 2017, the water quality monitoring program includes:

- Annual measurement of overburden (till and sand units) water levels within all 30 on-site groundwater monitoring wells;
- Establishment of a Primary Monitoring Network consisting of 10 on-site wells, 2 off-site wells, 3 surface water pond locations and a leachate monitoring location to be sampled on an annual basis;
- Establishment of a Secondary Monitoring Network consisting of 18 on-site wells and 1 off-site well sampled once every three years;
- Creation of set groundwater and surface water laboratory analytical packages, tailored to site conditions and current best practices.

A copy of the 2018 Water Quality Monitoring Report shall be provided with this annual report and the monitoring well locations for the site are provided in Figure 1 in the report.

Contaminated Soil Remediation Facility (S.R.F.)

Located at the Eastview Landfill Site, north of the lime sludge pile, is the soil remediation facility. At this location, contractors deliver soil contaminated with hydrocarbons from soil remediation projects or environmental accident sites. Soil is considered contaminated when it is found to be above the required CCME Guidelines.

The material is treated on site with the use of a rome plow attached to a track type dozer and once the level of hydrocarbons meets the guidelines stated in Guideline 96-05, Treatment Disposal of Petroleum Contaminated Soil, June 1996 (revised April 2002) it becomes a beneficial product that can then be used as cover material in the cell. The Eastview Landfill Site received 359.51 tonnes of contaminated soil in 2018 – a decrease from the 493.14 tonnes collected by the site in 2017.

The site at the landfill has been developed to ensure that any surface water runoff is captured in the retention pond at the north end of the landfill.

A. Soil Receiving and Placement

The main objective of the S.R.F. at the Eastview Landfill Site is to reduce hydrocarbon concentrations to acceptable levels such that the soils are suitable for appropriate re-use.

A permit is required for disposal of contaminated soils. Permits are sold and issued by the City of Brandon. Any loads of contaminated soil arriving at the landfill without a proper permit will not be accepted for remediation. The supervisor may also request lab analysis reports from the company doing the excavation.

1. **Low Concentration Levels**
   Contaminated soil which contains levels below Manitoba Level III criteria for soil will be used directly as landfill cover material upon approval by the Site Supervisor and the local regional office of Manitoba Environment.

2. **Permits**
   Upon arrival of a load of contaminated soil with proper permits, the Scale Operator shall record the permit number and attach it to any weigh tickets relating to the permit for documentation and invoicing.

3. **Location**
   The S.R.F. is clearly marked by signs and marker posts to prevent unauthorized access onto the treatment area and possible disturbance or compaction. When the driver is unfamiliar with location and placement procedures for the soil remediation facility, the scale operator shall radio the site supervisor or any available site personnel to escort the driver to the S.R.F. area and place the load accordingly depending on the particular type of contaminate.

4	**Load Placement** All loads placed in the treatment area should be spread in an even layer in a manner that avoids compaction and inter-mixing of different soil shipments. Occasionally (depending on placement area available), soil may be placed in windrows which should not exceed 1 m in height. The windrows will require periodic mixing in a similar fashion to a treatment layer.

B. Soil Remediation Procedures

1	**Treatment Layer** The final thickness of the treatment layer normally should not exceed 300 mm or the effective mixing depth of on-site equipment (rome plow), whichever is less.
2	**Debris** Boulders and other large debris should be removed from the treatment layer to avoid potential damage to the tilling/aeration equipment, and to provide for optimum soil tillage.
3	**Aeration** Handling of material will be done by employees that have read and understands the proper handling techniques that have been put forward in the GOG's and SOP's . The material is to be aerated by our rome plow which will be pulled with a track type dozer. Depending on the stability of soil, more than 1 pass may be required to turn and fully aerate the impacted soil.
4	**Irrigation** The treatment layer shall be thoroughly aerated (mixed) on a regular basis. In most cases, a tillage frequency of 1 to 2 weeks should provide optimum soil aeration. Periodic irrigation of the treatment layer may be necessary to avoid desiccation or prevent excessive windblown dust. However, saturation of the soil should be avoided to prevent run off from occurring and potential migration of contaminates outside S.R.F .facility.
5	**Equipment Contamination** After material has been aerated, the rome plow is to be placed in an area that will not interfere with ongoing work, but must remain in the soil remediation facility. The track type dozer must be cleaned off so no contaminates leave the area and have the chance of falling off and contaminating other areas.

C. Inspections and Maintenance

Regular inspections shall be made by the operator at the time of aeration. They will report to the site supervisor any:

- Erosion, slope increase or damage to the berms surrounding the S.R.F. area.
- Excessive “ponding” of surface water.
- Improper placement of contaminated loads.
- Visible signs of migration or leaching of surface water and/or contaminates.
  Once reported to the supervisor, they shall take corrective actions to insure the proper maintenance of the S.R.F.

D. Surface Water Management

The Eastview Landfills’ S.R.F. is designed to contain internal storm runoff and seepage in order to prevent offsite losses. Surface water is controlled by the use of ditches, along with a properly graded land surface. Prior to any discharge or removal of impounded surface water from the PCS treatment facility, thorough laboratory testing of the water for petroleum hydrocarbon compounds will be conducted and the results reviewed by Manitoba Environment.

E. Monitoring and Reporting

All contaminated soil material entering the landfill will be weighed and logged at the scale by the scale attendant. The attendant will log where the material originated, the hauler that has brought the material into the site and the final placement of the load. The weigh scales software program can generate reports on any contaminated soil entering the landfill based on a variety of parameters, e.g. Origin, Company, Hauler, type of material, etc.

Information is also transferred to an Excel spreadsheet by the scale operator at the end of each shift.

Household Hazardous Waste (HHW)

In 1999, the City of Brandon, in partnership with the Rotary Club of Brandon implemented a pilot HHW collection depot, which was open to the public two times each year, at the Civic Service Complex on Richmond Avenue East. Residents were encouraged to drop off any unwanted Household Hazardous Waste at the pilot depot so that the product could be disposed of in an environmentally responsible manner.

Annual Trend for HHW Material Collected (Tonnes)

	2015	2016	2017	2018
Annual Total	48.85	51.92	35.56	25.65

Starting on May 1st, 2012 the first phase of the Product Care Manitoba program was implemented with the following locations being allowed to accept paint for disposal.

- Windsor Plywood
- J & G Rona
- Janzen's Paint & Decorating
- General Paint
- Brandon Home Hardware

With the help of Product Care Manitoba, a year-round HHW depot was set up at the landfill site in the fall of 2012 and since that time, the depot has seen a steady flow of visitors to the facility. Landfill staff receive training from Product Care Manitoba and Miller Environmental during regular site visits to ensure the safe and proper handling of these potentially dangerous products takes place.

This program is facilitated by Product Care on behalf of product manufacturers and retailers in Manitoba in response to the provincial Household Hazardous Material and Prescribed Material Stewardship Regulation. The cost of the Manitoba HHW program is fully funded by Environmental Handling Fees that manufacturers and retailers pass onto the consumer.

The HHW depot at the landfill is equipped to accept the following items from residential sources:

1. Fluorescent lights
2. Flammables
3. Acids
4. Aerosols
5. Caustics
6. Corrosives
7. Oxidizers
8. Paint
9. Toxins
10. Physically hazardous materials such as non-refillable gas cylinders

ECO Centre

In 2018, a total of 16,100 litres of used oil, 600 litres of glycol, 843 kg of used oil filters and 1,264 kg of used oil and antifreeze jugs were collected at the ECO centre, as well as 354 pails of oil/grease. All used oil, filters and containers are collected on a regular basis by Green For Life Environmental where they are taken to be processed and recycled into a valuable new product.

Used Oil Products Collected

USED OIL PRODUCT	2015	2016	2017	2018
Used Oil	15,300 L	10,600 L	17,000 L	16,100 L
Glycol / Antifreeze	800 L	1,000 L	200 L	600 L
Used Oil Filters	1,368 kg	828 kg	553 kg	843 kg
Used Oil & Antifreeze Containers	1,567 kg	1,176 kg	259 kg	1,264 kg

Eco Centre at the Eastview Landfill Site

Operational Information

Contingency Plan Implementation

In February of 2008, the Sanitation department adopted its new Landfill Contingency/Emergency Response Plan in order to meet the requirements of its new operating permit. As required by the permit, it was developed and shall be maintained in accordance with the Industrial Emergency Response Planning Guide (MIAC September, 1996).

In 2018, there were no major incidents that occurred at the Eastview Landfill Site.

Nuisance Control

All nuisance complaints reported to landfill staff are promptly investigated by either the landfill supervisor or the Public Works Manager. Once the nature, location and quantity of the nuisance has been determined, management will then notify either animal control or the contractor to take the proper course of action in managing the situation.

In 2018, sightings of nuisances were within reasonable levels when compared to activity seen in prior years. The Material Recovery Facility continues to be monitored on a monthly basis by the Poulin's, the contractor responsible for this service and no areas of concern were brought to our attention in 2018.

Odour and Noise Control

The Eastview Landfill Site does not typically have any issue with noise control due to the location of the facility which is approximately 0.5 miles from the nearest residential dwelling. The use of daily cover has proven successful in mitigating the unpleasant odours that can originate from the site.

Weigh Scale Operations

The inbound and outbound scales for the Eastview Landfill site are monitored and managed by a scale operator who works out of the scale building located between the scales. The scale operator utilizes a weigh scale program called PC Scale (implemented in July 2014) to help expedite traffic flow into and out of the landfill site. The scale operator is responsible to both monitor and control the material accepted into the landfill. If the scale operator becomes suspicious of any incoming loads, he or she is able to communicate via two-way radio with the landfill equipment operators so that they can closely monitor the hauler as the load is tipped.

All vehicles entering the site are weighed on the inbound scale upon entry and are weighed again on the outbound scale prior to exiting the site to obtain a net weight and customers are then billed according to City of Brandon Fee Schedule. The scale operator is also responsible for setting up new customers and updating existing customer information as required. The scale operator advises customers on the location that drop off will occur depending on the type and amount of waste brought to site.

Based on information provided by the customer, the scale operator is able to segment loads by material type to help determine the amounts of each type of waste that are entering the site on any given day. The scale operator is also responsible for ensuring that the appropriate permits have been obtained by the haulers for special wastes such as asbestos and contaminated soil.

Training of new staff on weigh scale operations takes place with guidance from the scale operator to ensure that all procedures and tasks are completed in a consistent manner. Training includes, but is not limited to, proper opening procedures, account setup, weighing procedures, reporting standards, monitoring of loads, and proper closing procedures.

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