



2017 University of Manitoba Waste Audit



Report

Prepared for:
University of Manitoba

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Definitions

Call2Recycle: Call2Recycle is a company that ensures approved battery collection facilities meet a set of standards they have developed.

Contamination Rate: The mass and percentage of the recycling stream that is composed of contaminants.

Contaminant: Any non-recyclable waste that is found within the recycling stream such as food waste and paper cups. Contaminants increase the difficulty of recyclable waste processing and may reduce the value of recycled materials.

Diversion Rate: The diverted waste mass and percentage of the total disposed mass that is prevented from going to a landfill.

Diverted Waste: Any recyclable item that is in the recycling stream, and any item that has a program separate from the waste stream to handle its disposal. If these items are found in the waste stream, they are considered lost material and are not included in the diversion rate.

EPRA: The Electronic Products Recycling Association is a not-for-profit organization that regulates electronic recycling in Canada. They ensure that collectors properly handle and recycle electronics.

Gable Top / Aseptic Container: Liquid containers made up of polyethylene coated paperboard. These containers can contain an aluminum layer and are accepted in the recycling stream. Examples include milk cartons and juice boxes.

Hazardous Waste: Any materials deemed as hazardous under *The Hazardous Waste Regulation (M.R. 195/2015)*. Not included in the waste sample, these items are hazardous to human health or the environment. Includes liquid, solid, gas, and semi-solid materials that are reactive, combustible, toxic, and corrosive. Certain lab wastes fall into this category.

HDPE #2: High Density Polyethylene is a plastic used in a variety of consumer items such as: milk jugs, shampoo bottles, detergent bottles, water jugs, plastic bags, and margarine tubs. HDPE is normally recyclable, however certain products such as plastic bags are not accepted in the regular recycling stream.

Kraft Bag: Common brown paper bags, generally made using kraft paper giving them their name. The paper is recyclable.

LDPE #4: Low Density Polyethylene is the plastic used to line paper cups with a “waxy” waterproof layer that prevents leakage. LDPE is also used in bread and produce bags. Bags and cups are not generally recyclable. Some other LDPE products are accepted.

Lost Material: Any diverted waste item that is disposed of in the waste stream. These items are not recycled and are treated like all other items in the waste stream. Lost items do not contribute to the diversion rate due to their disposal.

Non-Hazardous Waste: Any material not deemed hazardous under *The Hazardous Waste Regulation (M.R. 195/2015)*.

Non-Recyclable: Materials or items within the waste sample that are only suitable for the waste stream. They have no recyclable value, and act as a contaminant if placed in the recycling stream.

Organic Compost: A waste category of potentially compostable subcategories. Includes paper towel, food waste, compostable materials, and organics.

Other #7: This plastic category includes all other resins separate from the listed six. Other #7 plastics are used in a variety of products, however due to the variability, #7 products are not generally recyclable.

PET #1: Polyethylene Terephthalate is a plastic commonly used in water and soda bottles. This plastic is recyclable in Winnipeg.

PP #5: Polypropylene is a plastic commonly used in plastic dishes and reusable bottles. PP is recyclable in Winnipeg.

PS #6: Polystyrene is a polymer used in take-out containers, disposable dishes, CD cases, and packaging peanuts. PS is not recyclable in Winnipeg.

PVC #3: Polyvinyl Chloride is a tougher plastic used in products such as piping, toys, vinyl flooring, and inflatable mattresses. PVC is recyclable in Winnipeg.

Recoverable Waste: Any waste material that has a stream where it is either reduced, reused, or recycled. Includes all items accepted by the co-mingled recycling program, and items with a specific handling program such as batteries and scrap wood. Synonymous with 'Recyclables'.

Total Disposed Mass: The cumulative mass of disposed waste collected from both the waste and recycling streams for the purposes of the audit.

Tote: The standard 64-gallon (242.3 Liter) bin used to collect garbage and recycling in Winnipeg

Waste: Any item that has been disposed of to either the waste or recycling streams. Not to be confused with the waste stream.

Waste Sample: All waste collected and identified throughout the ten days of the audit. Includes waste from both the waste and recycling streams.

Waste Stream: The portion of the waste sample that was disposed of in a stream that does not recycle or reuse materials such as a garbage can. The waste stream is meant for non-recyclables, however recyclables are misplaced on occasion (lost material).

Acknowledgement

The University of Manitoba campuses are located on original lands of Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, and on the homeland of the Métis Nation.

The University of Manitoba respects the Treaties that were made on these territories, acknowledges the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

Executive Summary

The 2017 **Waste** and Recycling Audit for the University of Manitoba was conducted between January 27 and February 10, 2017 by PragmaTech Waste Solutions. The audit began with a tour of collection, disposal, and waste generation sites at each U of M campus. The environmental sustainability and waste management policies along with procedures and practices were then reviewed by the lead waste auditor. Over ten days (January 30 – February 10) the 48-hour **non-hazardous waste** audit was conducted for each building on campus. The **waste sample** was collected by General & Caretaking Services at the U of M, it was then sorted into 6 categories and 32 subcategories to identify the levels of **organic compost, lost materials, diversion**, and **contamination** within the waste and recycling streams. A composition analysis was undertaken to obtain data and provide detailed observations and recommendations to inform the Waste Audit Report and the Organics Study Report.

2015 – 2017 Recorded Waste Management Data

The University of Manitoba provided PragmaTech with the following data for the fiscal years of 2015 – 2017:

- FY 2015 Diversion Rate of **19.35%**, FY 2016 Diversion Rate of **22.02%**, FY 2017 Diversion Rate of **28.36%** (Section 5.1, Table 21)
- Waste stream waste per Student, Staff and Faculty – FY 2015 **46.72 kg**, FY 2016 **42.12 kg**, FY 2017 **35.57 kg** (Section 5.2, Table 23)
- Total disposed mass waste generated per Student, Staff and Faculty – FY 2015 **58.88 kg**, FY 2016 **53.93 kg**, FY 2017 **49.65 kg** (Section 5.2, Table 24)

2017 Waste Audit Data

The **total disposed mass** of the waste sample for the Fort Garry Campus was **7,788.87 kg** (Section 3.3, Table 12). The **diversion rate** during the audit period was **1,383.27 kg (17.76%)**. The total mass of lost materials was **870.89 kg**. The majority of the lost materials consisted of:

- | | |
|------------------------------------|--|
| • Mixed Paper
208.28 kg (3.62%) | • Corrugated Cardboard
81.10 kg (1.41%) |
| • PET #1
194.39 kg (3.38%) | • Glass Bottles/Jars
78.06 kg (1.36%) |

Within the recycling stream of the waste sample, Fort Garry had a **contamination rate** of **32.01% (651.25 kg)**.

The organic compost within the Fort Garry waste sample weighed **2,899.78 kg**, comprising **50.39%** of the total waste sample.

The total disposed mass of the waste sample for the Bannatyne Campus was **1,139.05 kg** (Section 3.3, Table 12). The diversion rate during the audit period was **184.67 kg (16.21%)**. The total mass of lost materials was **109.67 kg**. The majority of the lost materials consisted of:

- | | |
|-----------------------------------|---|
| • Mixed Paper
52.61 kg (5.65%) | • Newsprint/Magazines/Flyers
7.44 kg (0.80%) |
| • PET #1
14.82 kg (1.59%) | • PP #5
6.33 kg (0.68%) |

Within the recycling stream, Bannatyne had a contamination rate of **11.52% (24.05 kg)**.

The organic compost within the Bannatyne waste sample weighed **430.06 kg**, comprising **46.23%** of the total waste sample.

Improvement Opportunities

Improvement opportunities are each further discussed in section 6. The improvement opportunities determined and discussed within this document are:

1. Implement an organics/compost program to divert these materials from the landfill
2. Improve signage, convenience, and clarity to reduce recycling contamination
3. Modify and improve equipment locations at Bannatyne campus
4. Implement and improve further waste reduction programs
5. Align campus waste management with Waste Management Best Practices
6. Conduct compliance audits

1.0 Introduction

1.1 Audit Scope & Objective

The purpose of the audit was to:

- Identify and quantify University of Manitoba's waste and recycling composition including points of generation
- Determine the amount of organic compost generated by the University of Manitoba
- Determine and measure the continued ability to reduce, reuse, and recycle solid waste while finding ways to improve efficiency
- Provide sustainable development performance indicator data (Total Waste Generated, Waste to Landfill, Waste diverted from landfill, waste to landfill per campus user) identified in the University of Manitoba *Sustainability Strategy 2016-2018*
- Identify opportunities for improvements to waste systems currently in place
- Give recommendations for further waste reduction strategies

The University of Manitoba (U of M) retained the services of PragmaTech Waste Solutions to undertake a solid **'non-hazardous' waste** audit. The final report for the 2017 Waste Audit was prepared by the Office of Sustainability using the data and information provided by PragmaTech.

The data collected by PragmaTech includes four key elements:

1. **Waste Management Assessment** – examination of existing **non-hazardous waste** management policies, programs, procurement, product development and production practices (where applicable)
2. **Stakeholder Engagement** – interviews and discussions with management, personnel, contractors and tenants/vendors (where applicable)
3. **Points of Generation Assessment** – inspection and observation of waste and recycling collection and handling practices at the locations where the materials are being produced
4. **Non-Hazardous Solid Waste Analysis** – manual waste separation using a fine sorting process of a sample of all non-hazardous solid waste and recycling generated over a defined period of time (48-hour period)

Information gathered during the audit was used to describe the current state and composition of the **waste streams**, report on the performance indicators and provide program improvement recommendations.

1.2 Site Description

The University of Manitoba is a public university located in Winnipeg, Manitoba. It is the largest university both by total student enrollment and campus area in Manitoba, and is the 17th largest in Canada. In 2015/16, the University had a total student enrolment of 29,987 and a staff/faculty total of 8,977. The audit focused on the two main campuses: the Fort Garry campus located in the southern portion of Winnipeg and the Bannatyne Campus located in downtown Winnipeg. The Fort Garry campus houses over 60 teaching and research buildings on 274 hectares (680 acres) of land. The Bannatyne Campus is comprised of ten building housing both the administrative functions and the instructional units for the Faculties of Medicine, Dentistry, Pharmacy, Medical Rehabilitation and Dental Hygiene.

1.3 Existing Collection and Prevention Programs

The following waste collection and reduction programs were in place during the 2017 Waste Audit at the University of Manitoba:

- Aramark Food Services is contracted by the UofM to service (supply and prepare food) the majority of food areas on both campuses as well as Pembina Hall and University College. Pre-consumer

waste generated in the Aramark kitchens is collected by General Services and disposed of in landfill waste.

- UMSU food vendors have a pre-consumer organic food waste program (with the exception of protein products) which is collected in organic bins and picked up by Progressive Waste. A total of five **totes** are used weekly for the collection and processing of pre-consumer organics.
- Specific faculty/department confidential shredding is arranged independently on an as needed basis. These services are provided by a certified outside contractor; each faculty/department generates their own work order and shredding is paid for by the initiating department's budget.
- Cardboard is collected throughout each building and brought to a recycle area for pick up by general services, then taken to the loading dock for pick up using a dolly.
- The Lug-a-Mug program offers a 25¢ discount to anyone who brings their own reusable mug for coffee from a campus food vendor. All campus food vendors participate in this program.
- Special waste materials, skids, pallets and dirty wood are stacked in a designated area of the loading docks for pick up.
- E-Waste is collected across both campuses and picked up by General Services who delivers the e-waste to an approved collector under the **EPRA**.
- Batteries are collected and sent to **Call2Recycle**. Individual departments sign up for the program through Physical Plant.
- Water bottle refilling stations are located throughout both campuses to reduce the use of plastic water bottles and paper cups.

Table 1: Collection Company, Material, Equipment and Removal Frequency

Note: Current handling equipment is identified in Appendix A – Photo Display 1

Material	Collection Company	Equipment	Removal Frequency
Co-mingled Recycling	University of Manitoba	64 gallon totes	Once per day
Food Waste (UMSU)	Progressive Waste	64 gallon totes	Once per week
Cardboard	University of Manitoba	Baler	Daily
Confidential Shredding	Confidential shredder		As required
Scrap Metal	Orloff Scrap Metal	Roll off Bin	On Call
Wooden Pallets	A1 Pallets	Stacked	On Call
Electronics Waste	Urbanmine	Super Sacs	On Call
Printer Cartridges	Returned to Xerox	Boxed	As required
Non-Recyclable Waste (B)	Progressive Waste	Compactor	Once per week
Non-Recyclable Waste (FG)	University of Manitoba	64 gallon totes	Once per day

2.0 Audit Methodology

2.1 Audit Description

Waste Stream

The waste stream from the Fort Garry and Bannatyne campuses was categorized by area and hand sorted into 32 sub-categories using a fine sorting process, then weighed. The waste stream is meant for **non-recyclables**, however there is often recycling misplaced in this stream. Misplaced recycling is treated the same as the non-recyclables and is considered as **lost material**.

Recycling Stream

The recycling stream from the Fort Garry and Bannatyne campuses was also categorized by area and hand sorted into 32 sub-categories then weighed. The recycling stream is a multi-stream process meant for **recyclables** such as cardboard, electronics, and scrap metal. Non-recyclables in the recycling stream are considered a **contaminant** and cause issues with recycling processes, they can also reduce the value of recycled materials.

2.2 Points of Waste Generation

For this audit, 48 hours of waste was collected for each building over a period of 10 days (January 30 – February 10, 2017) with February 3rd and 10th reserved for sorting and catch up for any missed buildings. Eight zones were created to group buildings together, and they were each further categorized into 5 different areas. Upon collection from each zone bags were tagged with their corresponding area for later identification. Following is a list of zones and areas.

Waste Audit Zone Breakdown

Active Living Zone (Day 1)

- Investors Group Athletic Centre
- Max Bell Centre
- Frank Kennedy Centre
- T.K. Cheung Centre for Animal Science Research
- Animal Sciences
- Ag Lecture Block
- Ellis Building (Food & Soil Sciences)
- Active Living Centre
- UofM Welcome Centre

Residences (Day 1)

- Arthur V. Mauro
- Mary Speechly Hall
- Pembina Hall
- University College (Residence)

North Zone (Days 2 & 3)

- Allen Building
- Parker Building
- Wallace Building (Geological Sciences)
- Machray Hall
- Fitzgerald Building
- University College (Academic)
- Duff Roblin Building
- Chancellor's Hall
- Biological Sciences

East Zone (Days 3 & 4)

- Elizabeth Dafoe Library
- The Point Lands (Equipment Buildings)
- Crop Technology Centre
- Fletcher Argue Loading Dock
- ARTLab
- Drake Centre

Central Zone (Day 5)

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- University Centre
- Helen Glass Centre
- Migizii Agamik (Bald Eagle Lodge)
- St. John's College
- St. Paul's College
- St. Andrew's College
- Daycare Centre
- Education Building
- Administration Building

South Zone (Days 6 & 7)

- Engineering (EITC 1, 2 & 3)
- Physical Plant
- Dairy Sciences Building
- Canadian Wheat Board Centre for Grain Storage Research
- Central Energy Plant
- Music Annex Two
- Agriculture Building
- Marcel A. Desautels Music Building
- Art Barn Studio Building
- Russell Building
- Architecture II Building
- Sculpture/Ceramics Building

Smart Park (Days 6 & 7)

- Any regularly serviced buildings

Bannatyne Campus (Days 7 & 8)

- Any regularly serviced buildings

Waste Audit Area Breakdown

The five areas are listed below. Bannatyne campus does not have any residence buildings, so residence was not included as an area within the Bannatyne areas.

Fort Garry Campus Areas

- Common Areas
- Classrooms / Theatres
- Office Areas
- Residence
- Food Vendors

Bannatyne Campus Areas

- Common Areas
- Classrooms / Theatres
- Office Areas
- Food Vendors

2.3 Waste Categories

The waste and recycling streams retrieved from the 8 zones were sorted into 32 categories and then grouped into 6 main categories:

Mixed Recycling

- Glass Bottles/Jars
- Aluminum Cans
- Steel Food/Beverage Cans
- **PET #1**
- **HDPE #2**
- **PVC #3**
- **LDPE #4**
- **PP #5**
- **Other #7**

Mixed Fibres

- Mixed Paper
 - Boxboard
- **Kraft Bags**
- **Gable Top/Aseptic Containers**
- Newsprint/Magazines/Flyers
- Corrugated Cardboard

Electronic Waste

- Electronics
- Ink Cartridges
- Light Bulbs
- Batteries

Scrap Materials

- Scrap Wood
- Scrap Metal

Organic Compost

- Food Waste
 - Fruit & Vegetables
 - Grains
 - Breads
 - Eggs & Egg Shells
 - Composted Food Waste
- Compostable Materials
 - Compostable Fibers, Cups, Plates, Cutlery
 - Parchment Paper
 - Paper Food Packaging
- Organics
 - Meat (Raw & Cooked)
 - Bones
 - Plants
- Paper Towel

Non-Recyclable Materials

- **PS #6**
- Disposable Paper Cups (Waxy)
- Plastic Bags (HDPE/LDPE)
- Non-Recyclable Waste
 - Styrofoam
 - Diapers
 - Textile
 - Label Paper
 - Coffee Pods
 - Expanded Polystyrene (EPS) #6
- Liquid
- Lab Waste
- Aerosol Cans
- Aluminum Foil/Trays

3.0 Audit Results

The following sections contain tables and figures that provide a summarized view of the 2017 Waste Audit. Appendix A (Tables 15 – 23) provides a further detailed breakdown of Section 3.1.1 during the 48-hour collection periods. A composition summary of the audit can be found within Section 3.2 of this report.

3.1 Waste Audit Analysis

3.1.1 Waste Stream Composition Analysis

The total waste stream sample for each campus was grouped into 6 categories and a further 32 subcategories. From this data the waste composition was found, and individual category percentages were calculated. The waste stream contained many lost materials from the categories: Mixed Recycling, Mixed Fibres, Electronic Waste, and Scrap Metals. The total lost material mass was calculated and compared with the total waste stream mass.

The 48-hour audited waste stream sample demonstrates that **870.89 kg (15.14%)** of the Fort Garry total waste stream mass (**5,754.35 kg**) consisted of lost materials that could have been recycled, while the Bannatyne sample demonstrates that **109.67 kg (11.79%)** of the sample (**930.33 kg**) was made up of lost materials.

Table 2: Waste Stream Summation and Lost Materials – Fort Garry Campus

Categories	kg Over a 24 hr. Period	kg Over a 48 hr. Period	% Of Waste Stream
Mixed Recycling	230.97	461.93	8.03%
Mixed Fibres	183.785	367.57	6.39%
Electronic Waste	10.92	21.84	0.38%
Scrap Materials	9.775	19.55	0.34%
Organic Compost	1449.89	2899.78	50.39%
Non-Recyclable Materials	991.84	1983.68	34.47%
Totals	2877.18	5754.35	100.00%
Lost Materials	435.45	870.89	15.14%

See Section 2.3 for category descriptions

Table 3: Waste Stream Summation and Lost Materials – Bannatyne Campus

Categories	kg Over a 24 hr. Period	kg Over a 48 hr. Period	% Of Waste Stream
Mixed Recycling	18.08	36.15	3.89%
Mixed Fibres	34.48	68.96	7.41%
Electronic Waste	1.015	2.03	0.22%
Scrap Materials	1.265	2.53	0.27%
Organic Compost	215.03	430.06	46.23%
Non-Recyclable Materials	195.3	390.6	41.99%
Totals	465.17	930.33	100.00%
Lost Materials	54.84	109.67	11.79%

See Section 2.3 for category descriptions

Table 4: Waste Stream Composition Analysis – Fort Garry Campus

	Categories	kg Over a 48 Hr. Period	% Of Waste Stream
Mixed Recycling	Glass Bottles/Jars	78.06	1.36%
	Aluminum Cans	31.19	0.54%
	Steel Food/Beverage Cans	18.43	0.32%
	PET #1	194.39	3.38%
	HDPE #2	62.78	1.09%
	PVC #3	0.02	0.00%
	LDPE #4	7.44	0.13%
	PP #5	65.57	1.14%
	Other #7	4.05	0.07%
Mixed Fibres	Mixed Paper	208.28	3.62%
	Gable Top/Aseptic Containers	42.30	0.74%
	Newsprint/Magazines/Flyers	35.44	0.62%
	Corrugated Cardboard	81.10	1.41%
	Kraft Bags	0.45	0.01%
Electronic Waste	Electronics	17.79	0.31%
	Ink Cartridges	1.50	0.03%
	Light Bulbs	2.23	0.04%
	Batteries	0.32	0.01%
Scrap Materials	Scrap Wood	7.53	0.13%
	Scrap Metal	12.02	0.21%
Organic Compost	Paper Towel	812.56	14.12%
	Food Waste	827.37	14.38%
	Compostable Materials	268.92	4.67%
	Organics	990.93	17.22%
Non Recyclable Materials	PS #6	77.26	1.34%
	Disposable Paper Cups (Waxy)	205.23	3.57%
	Non-Recyclable Waste	1500.56	26.08%
	Aerosol Cans	11.15	0.19%
	Aluminum Foil/Trays	9.27	0.16%
	Lab Waste	48.43	0.84%
	Liquid	131.78	2.29%
	Total Mixed Recycling	461.93	8.03%
	Total Mixed Fibres	367.57	6.39%
	Total Electronic Waste	21.84	0.38%
	Total Scrap Materials	19.55	0.34%
	Total Organic Compost	2899.78	50.39%
	Total Non-Recyclable Materials	1983.68	34.47%
	Total	5754.35	100.00%

Table 5: Waste Stream Composition Analysis – Bannatyne Campus

	Categories	kg Over a 48 Hr. Period	% Of Waste Stream
Mixed Recycling	Glass Bottles/Jars	5.14	0.55%
	Aluminum Cans	1.79	0.19%
	Steel Food/Beverage Cans	3.21	0.35%
	PET #1	14.82	1.59%
	HDPE #2	4.02	0.43%
	PVC #3	0.00	0.00%
	LDPE #4	0.62	0.07%
	PP #5	6.33	0.68%
	Other #7	0.22	0.02%
Mixed Fibres	Mixed Paper	52.61	5.65%
	Gable Top/Aseptic Containers	4.85	0.52%
	Newsprint/Magazines/Flyers	7.44	0.80%
	Corrugated Cardboard	4.06	0.44%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	1.95	0.21%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	0.00	0.00%
	Batteries	0.08	0.01%
Scrap Materials	Scrap Wood	1.85	0.20%
	Scrap Metal	0.68	0.07%
Organic Compost	Paper Towel	153.52	16.50%
	Food Waste	192.46	20.69%
	Compostable Materials	40.99	4.41%
	Organics	43.09	4.63%
Non Recyclable Materials	PS #6	12.12	1.30%
	Disposable Paper Cups (Waxy)	22.41	2.41%
	Non-Recyclable Waste	324.46	34.88%
	Aerosol Cans	0.00	0.00%
	Aluminum Foil/Trays	2.23	0.24%
	Lab Waste	20.51	2.20%
	Liquid	8.87	0.95%
	Total Mixed Recycling	36.15	3.89%
	Total Mixed Fibres	68.96	7.41%
	Total Electronic Waste	2.03	0.22%
	Total Scrap Materials	2.53	0.27%
	Total Organic Compost	430.06	46.23%
	Total Non-Recyclable Materials	390.60	41.99%
	Total	930.33	100.00%

3.1.2 Co-mingled Recycling Stream Composition Analysis

Tables 6 – 9 provide a summary of the waste sample collected from the recycling stream during the 48-hour collection period. The 48-hour audited recycling sample demonstrates that **651.25 kg (32.01%)** of the Fort Garry recycling sample (**2,034.52 kg**) contained contaminant (non-recyclable) materials, while the Bannatyne sample demonstrates that **24.05 kg (11.52%)** of the sample (**208.72 kg**) was made up of contaminants.

Contamination materials are made up of the materials within the categories: Electronic Waste, Scrap Materials, Organic Compost and Non-Recyclable Waste listed in Section 2.3 of this report. These materials are not currently accepted in the co-mingled program at the University of Manitoba, however some have a separate recycling program such as electronics and scrap metal. Non-Recyclables and Organic Compost are each only accepted in the waste stream at the time this report was created.

Table 6: Recycling Stream Summation and Contamination Rate – Fort Garry Campus

Categories	kg Over a 24 hr. Period	kg Over a 48 hr. Period	% of Each Waste Stream
Mixed Recycling	145.69	291.37	14.32%
Mixed Fibres	545.95	1,091.90	53.67%
Contamination Materials	325.63	651.25	32.01%
Totals	1,017.26	2,034.52	100.00%
Audit Contamination Rate			32.01%

Table 7: Recycling Stream Summation and Contamination Rate – Bannatyne Campus

Categories	kg Over a 24 hr. Period	kg Over a 48 hr. Period	% of Each Waste Stream
Mixed Recycling	8.63	17.26	8.27%
Mixed Fibres	83.71	167.41	80.20%
Contamination Materials	12.03	24.05	11.53%
Totals	104.36	208.72	100.00%
Audit Contamination Rate			11.53%

Table 8: Recycling Stream Composition Analysis – Fort Garry Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream	
Mixed Recycling	Glass Bottles/Jars	44.41	2.18%	
	Aluminum Cans	48.33	2.38%	
	Steel Food/Beverage Cans	11.79	0.58%	
	PET #1	123.83	6.09%	
	HDPE #2	24.92	1.22%	
	PVC #3	0	0.00%	
	LDPE #4	12.83	0.63%	
	PP #5	24.07	1.18%	
	Other #7	1.19	0.06%	
Mixed Fibres	Mixed Paper	432.05	21.24%	
	Gable Top/Aseptic Containers	21.61	1.06%	
	Newsprint/Magazines/Flyers	127.12	6.25%	
	Corrugated Cardboard	510.67	25.10%	
	Kraft Bags	0.45	0.02%	
Contamination Materials	Electronics	1.74	0.09%	
	Ink Cartridges	1.65	0.08%	
	Light Bulbs	0	0.00%	
	Batteries	0.17	0.01%	
	Scrap Wood	4.78	0.23%	
	Scrap Metal	5	0.25%	
	Paper Towel	22.05	1.08%	
	Food Waste	230.93	11.35%	
	Compostable Materials	26.91	1.32%	
	Organics	11.97	0.59%	
	PS #6	27.17	1.34%	
	Disposable Paper Cups (Waxy)	90.35	4.44%	
	Non-Recyclable Waste	166.76	8.20%	
	Aerosol Cans	0.14	0.01%	
	Aluminum Foil/Trays	1.92	0.09%	
	Plastic Bags (HDPE/LDPE)	8.29	0.41%	
	Lab Waste	6.18	0.30%	
	Liquid	45.24	2.22%	
	Total Mixed Recycling		291.37	14.32%
	Total Mixed Fibres		1091.9	53.67%
Total Contamination Materials		651.25	32.01%	
Total		2,034.52	100.00%	

Table 9: Recycling Stream Composition Analysis – Bannatyne Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	0.1	0.05%
	Aluminum Cans	1.11	0.53%
	Steel Food/Beverage Cans	0.92	0.44%
	PET #1	6	2.87%
	HDPE #2	7.15	3.43%
	PVC #3	0	0.00%
	LDPE #4	0	0.00%
	PP #5	1.88	0.90%
	Other #7	0.1	0.05%
Mixed Fibres	Mixed Paper	46.96	22.50%
	Gable Top/Aseptic Containers	1.68	0.80%
	Newsprint/Magazines/Flyers	6.2	2.97%
	Corrugated Cardboard	112.57	53.93%
	Kraft Bags	0	0.00%
Contamination Materials	Electronics	0	0.00%
	Ink Cartridges	0	0.00%
	Light Bulbs	0	0.00%
	Batteries	0	0.00%
	Scrap Wood	0	0.00%
	Scrap Metal	0	0.00%
	Paper Towel	3.85	1.84%
	Food Waste	3.13	1.50%
	Compostable Materials	0	0.00%
	Organics	0.21	0.10%
	PS #6	2.95	1.41%
	Disposable Paper Cups (Waxy)	5.9	2.83%
	Non-Recyclable Waste	2.56	1.23%
	Aerosol Cans	0	0.00%
	Aluminum Foil/Trays	0.12	0.06%
	Plastic Bags (HDPE/LDPE)	0.04	0.02%
	Lab Waste	4.25	2.04%
	Liquid	1.04	0.50%
	Total Mixed Recycling		17.26
Total Mixed Fibres		167.41	80.20%
Total Contamination Materials		24.05	11.53%
Total		208.72	100.00%

3.2 2017 Waste Audit Capture Rate

Capture rate is the total mass of a **recoverable waste (RW)** that is diverted for recycling as a percentage of the total mass of the recoverable waste generated. Recoverable waste that ends up in the waste stream is considered lost material and reduces the capture rate. A capture rate can be used as a measure of the success of a recycling and/or reuse program. A higher capture rate is indicative of more material being reused or recycled, rather than being sent to the waste stream for disposal.

$$\text{Total RW (kg)} = \text{RW in the Waste Stream (kg)} + \text{RW in the Recycling Stream (kg)}$$

$$\text{Capture Rate (\%)} = \frac{\text{RW in the Recycling Stream (kg)}}{\text{Total RW (kg)}} * 100\%$$

Table 10: Fort Garry Capture Rate over 48-Hour Period

Material	RW in Waste Stream (kg)	RW in Recycling Stream (kg)	Total Disposed Mass (kg)	Capture Rate (%)
Glass Bottles/Jars	78.06	44.41	122.47	36.26%
Aluminum Cans	31.19	48.33	79.52	60.78%
Steel Food/Beverage Cans	18.43	11.79	30.22	39.01%
PET #1	194.39	123.83	318.22	38.91%
HDPE #2	62.78	24.92	87.70	28.42%
PVC #3	0.02	0.00	0.02	0.00%
LDPE #4	7.44	12.83	20.27	63.30%
PP #5	65.57	24.07	89.64	26.85%
Other #7	4.05	1.19	5.24	22.71%
Mixed Paper	208.28	432.05	640.33	67.47%
Gable Top/Aseptic Containers	42.30	21.61	63.91	33.81%
Newsprint/Magazines/Flyers	35.44	127.12	162.56	78.20%
Corrugated Cardboard	81.10	510.67	591.77	86.30%
Kraft Bags	0.45	0.45	0.90	50.00%
Total	829.50	1383.27	2212.77	62.51%

Table 11: Bannatyne Capture Rate over 48-Hour Period

Material	RW in Waste Stream (kg)	RW in Recycling Stream (kg)	Total Disposed Mass (kg)	Capture Rate (%)
Glass Bottles/Jars	5.14	0.10	5.24	1.91%
Aluminum Cans	1.79	1.11	2.90	38.28%
Steel Food/Beverage Cans	3.21	0.92	4.13	22.28%
PET #1	14.82	6.00	20.82	28.82%
HDPE #2	4.02	7.15	11.17	64.01%
PVC #3	0.00	0.00	0.00	0.00%
LDPE #4	0.62	0.00	0.62	0.00%
PP #5	6.33	1.88	8.21	22.90%
Other #7	0.22	0.10	0.32	31.25%
Mixed Paper	52.61	46.96	99.57	47.16%
Gable Top/Aseptic Containers	4.85	1.68	6.53	25.73%
Newsprint/Magazines/Flyers	7.44	6.20	13.64	45.45%
Corrugated Cardboard	4.06	112.57	116.63	96.52%
Kraft Bags	0.00	0.00	0.00	0.00%
Total	105.11	184.67	289.78	63.73%

3.3 2017 Waste Audit Diversion Rate

Diversion Rate refers to the proportion (by mass and expressed in a percentage) of all recoverable waste that is prevented from going to a landfill or incinerator to the total disposed mass of the waste sample (both waste and recycling streams). Diversion rate is an expression of how much waste is prevented from ending up in a landfill. Any recoverable material that ends up in the waste stream is considered lost material and reduces the diversion rate.

The diversion rate is calculated from all recoverable materials found in their proper streams divided by the total disposed mass of the waste sample generated over the waste audit period.

$$\text{Diversion Rate} = \frac{\text{RW in the Recycling Stream}}{\text{Total Disposed Mass}} * 100$$

Table 12: Diversion Rate over 48-Hours by Campus

Campus	RW in Recycling Stream (kg)	Total Disposed Mass (kg)	Diversion Rate
Fort Garry	1383.27	7788.87	17.76%
Bannatyne	184.67	1139.05	16.21%

4.0 2017 Waste Audit Analysis

This section seeks to analyze the previous data and assess the overall impacts associated with lost materials, recycling contamination, and wasted organics.

4.1 Fort Garry Campus

The Fort Garry Campus had a total disposed mass of 7,788.87kg over 48 hours. In an average school year (September – April) with 125 school days, there is an approximate total generated waste of 486,804kg (486 metric tonnes). Basing the 48 hour waste composition data on the 125 day school year, several waste categorizations were scaled up below.

Table 13: Fort Garry Fiscal Year Waste Stream

Waste Type	Percent of Total Waste Stream	kg Over a 48 Hr. Period	kg Over One Month	kg Over One School Year
Total Waste Stream	-	5754.35	62510.05	359646.875
Lost Materials	15%	849.37	9226.79	53085.625
Organic Waste	50%	2899.78	31500.59	181236.25

Based on the data in the above table, approximately 15% of the waste stream is composed of lost materials. In a full school year this equates to about 53,000kg of waste that could be diverted from landfills with improvements to recycling programs, infrastructure, and education. Organic waste makes up about half of the entire waste stream or 181,236kg. Due to the magnitude of organic waste it is clear organic waste reduction programs have strong potential at the U of M. Using the composition data, the mass of the four most common lost materials was calculated for a fiscal year below.

Table 14: Fort Garry Common Lost Materials in a School Year

Material	Percent of Total Waste Stream	Kg Over a 48 Hr. Period	kg Over One School Year
Mixed Paper	3.6%	208.28	13017.5
PET #1	3.4%	194.39	12149.4
Corrugated Cardboard	1.4%	81.1	5068.75
Glass Bottles / Jars	1.4%	78.06	4878.75

The most common lost materials at the Fort Garry campus are mixed paper and PET #1. They are both around 3.5% of the total waste stream and contribute to over 10,000 kg of waste annually. This data implies there are some issues with regards to recycling paper and plastic bottles (PET #1) on campus.

Table 15: Fort Garry Fiscal Year Recycling Stream

Waste Type	Percent of Total Recycling Stream	kg Over a 48 Hr. Period	kg Over One Month	kg Over One School Year
Total Recycling Stream	-	2034.52	22101.18	127157.5
Contaminants	32%	651.25	7074.59	40703.125
Organic Waste	14%	291.86	3170.50	18241.25

The waste collected over a school year from the recycling stream weighs a total 127,157kg. 32% of the recycling stream is composed of contaminants which equates to 40,703kg of improperly disposed waste annually. The four most prevalent contaminants and their masses over a school year were calculated below.

Table 16: Fort Garry Common Contaminants in a School Year

Material	Percent of Total Recycling Stream	Kg Over a 48 Hr. Period	Total Mass Over a 125 Day School Year (kg)
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University of Manitoba 2017 Waste Audit

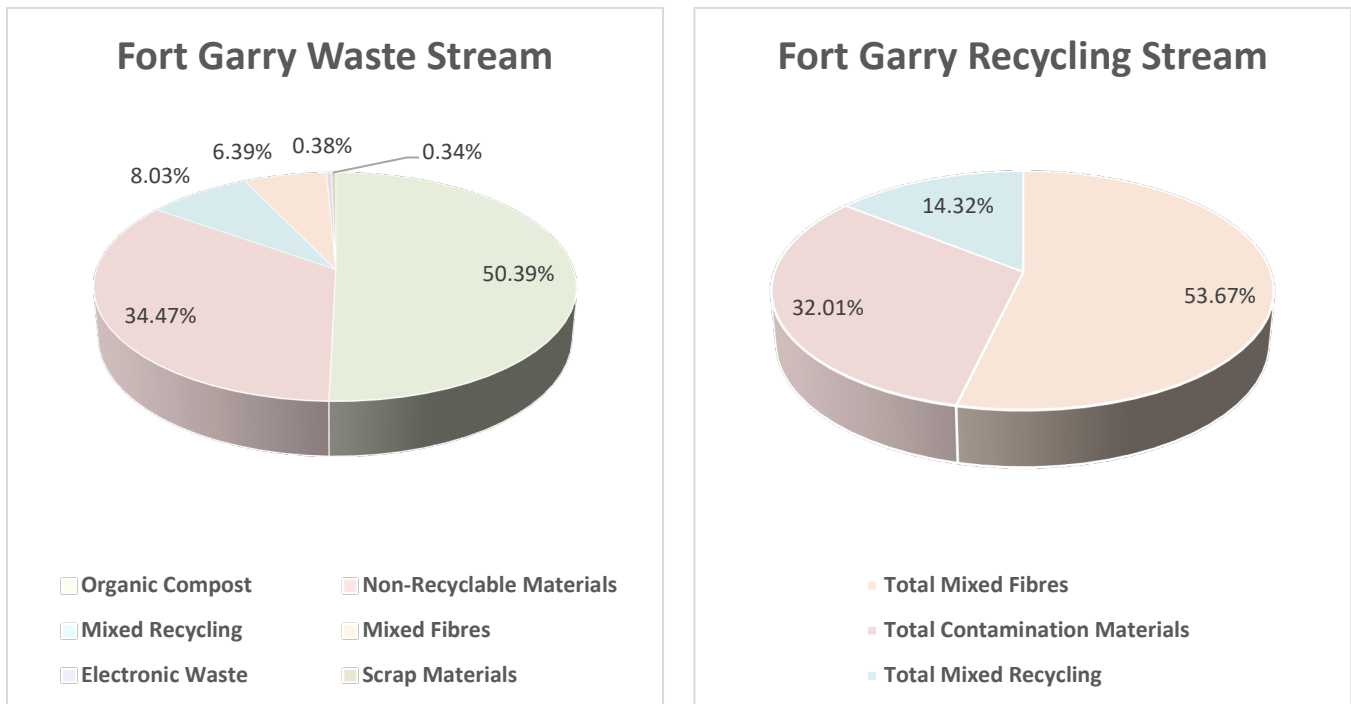
Food Waste	4.0%	230.93	14433.13
Non-Recyclable Waste	2.9%	166.76	10422.50
Disposable Paper Cups	1.6%	90.35	5646.88
Liquid	0.8%	45.24	2827.50

Food waste contributes to 4% of the recycling stream or 14,433kg annually. The following category “Non-Recyclable Waste” is 2.9% of recycling or 10,422kg annually and it includes a variety of items such as Styrofoam, coffee pods, diapers, and other general items.

When combining both streams, the organic compost category makes up 40.98% of the total disposed mass equating to nearly 200,000kg in a school year. There are currently no large-scale programs on campus to deal with organic compost, so it is generally treated the same as non-recyclable waste and sent to a landfill. Due to the magnitude of organic compost (nearly half of the total disposed mass), an effective organic composting system would displace a large portion of the total waste stream mass.

Following are waste composition breakdown charts for the waste and recycling streams. It can be seen that organic compost makes up over half of the waste stream. The charts also show the proportion of lost materials and contaminants in their respective streams.

Figure 1 & 2: Waste and Recycling Breakdown by Category – Fort Garry campus



4.2 Bannatyne

The Bannatyne Campus had a total disposed mass of 1,139.05 kg over 48 hours. In an average school year (September – April) with 125 school days, there is an approximate total generated waste of 71,190.63kg (71 metric tonnes). Basing the 48-hour waste composition data on the 125-day school year, several waste categorizations were scaled up below.

Table 17: Bannatyne Fiscal Year Waste Stream

Waste Type	Percent of Total Waste Stream	kg Over a 48 Hr. Period	kg Over One Month	kg Over One School Year
Total Waste Stream	-	930.33	10106.26	58145.625
Lost Materials	12%	107.72	1170.17	6732.5
Organic Waste	46%	430.06	4671.78	26878.75

Based on the data in the above table, approximately 12% of the waste stream is composed of lost materials. In a full school year this equates to about 7,000kg of waste that could be diverted from landfills with improvements to recycling programs, infrastructure, and education. Organic waste comprises 46% of the waste stream, over a year this works out to 26,878kg. Using the composition data, the mass of the four most common lost materials was calculated for a fiscal year below.

Table 18: Bannatyne Common Lost Materials in a School Year

Material	Percent of Total Waste Stream	Kg Over a 48 Hr. Period	Total Mass Over a 125 Day School Year (kg)
Mixed Paper	5.7%	52.61	3288.13
PET #1	1.6%	14.82	926.25
All other materials contribute <1% of the waste stream mass			

Lost material is a significantly smaller issue at Bannatyne compared with the Fort Garry Campus. The most common material is Mixed paper at 5.7% of the waste stream and 3,288kg annually. The next material is PET #1 at 1.6% and 926kg annually, and all subsequent lost materials are less than or equal to 1% of the waste stream.

Table 19: Bannatyne Fiscal Year Recycling Stream

Waste Type	Percent of Total Recycling Stream	kg Over a 48 Hr. Period	kg Over One Month	kg Over One School Year
Total Recycling Stream	-	208.72	2267.35	13045
Contaminants	12%	24.05	261.26	1503.125
Organic Waste	3%	7.19	78.11	449.375

The waste collected over a school year from the recycling stream weighs about 13,000kg. 12% of the recycling stream is composed of contaminants. The four most prevalent contaminants and their masses over a school year were calculated below.

Table 20: Bannatyne Common Contaminants in a School Year

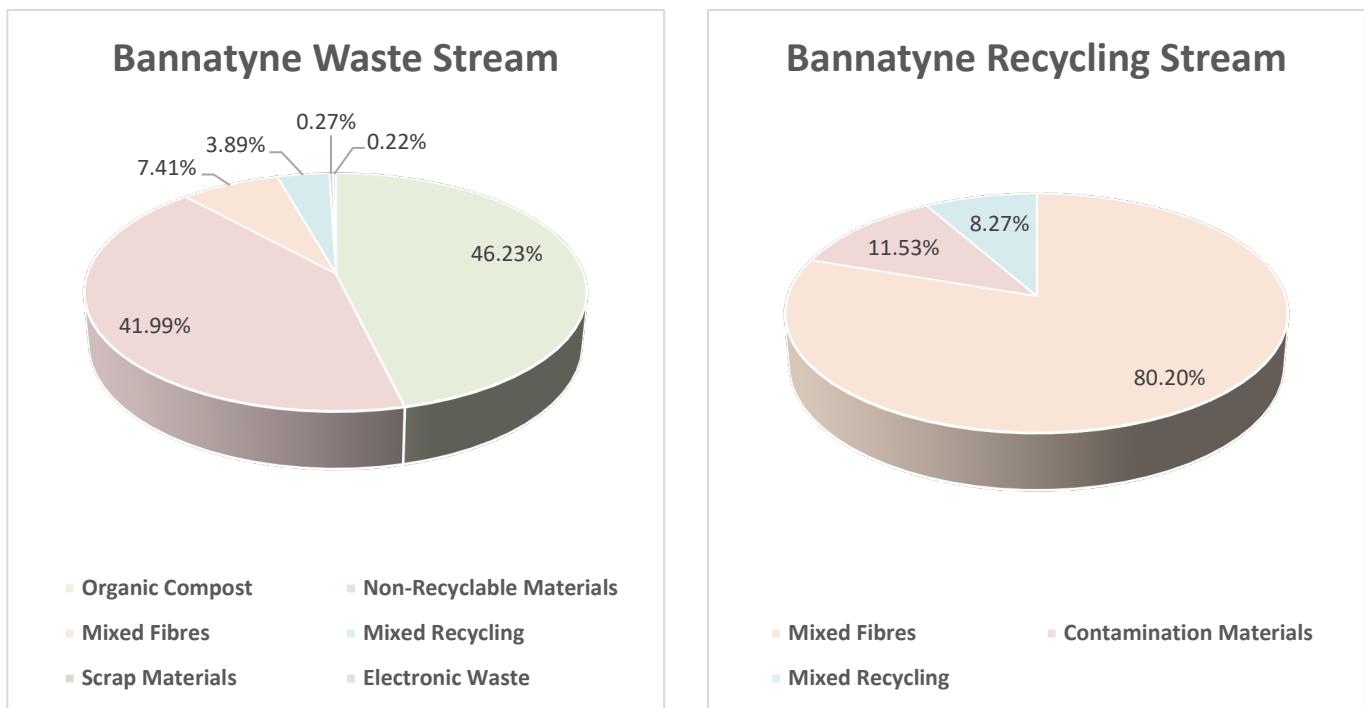
Material	Percent of Total Recycling Stream	Kg Over a 48 Hr. Period	Total Mass Over a 125 Day School Year (kg)
Disposable Paper Cups	2.8%	5.9	368.8
Lab Waste	2.0%	4.25	265.6
Paper Towel	1.8%	3.85	240.6
Food Waste	1.5%	3.13	195.6

Disposable paper cups contribute to 2.8% of the recycling stream or 368.8kg annually. Following this there is lab waste at 2% and 265.6kg annually. Contamination rates are much lower at Bannatyne, resources should be focused on Fort Garry to produce the greatest contamination reductions.

When combining both streams, the organic compost makes up 38.39% of the total disposed mass equating to about 27,000kg in a school year. There are currently no large-scale programs at Bannatyne campus to deal with organic compost, so it is generally treated the same as non-recyclable waste and sent to a landfill.

Following are waste composition breakdown charts for the waste and recycling streams. It can be seen that organic compost makes up nearly half of the waste stream. The charts also show the proportion of lost materials and contaminants in their respective streams. Lost materials and contamination rates are much lower at the Bannatyne campus, it is unclear why this has been observed.

Figure 3 & 4: Waste and Recycling Breakdown by Category – Bannatyne Campus



5.0 Performance Indicators Comparison – FY 2015 to FY 2017

The effectiveness of waste management programs is measured according to benchmarks such as diversion rate, capture rate and waste generation indexes. This section reviews diversion rate and waste generation indexes as performance indicators for the fiscal years of 2014/15 to 2016/17 (based on data provided by the U of M). In order to use capture rate as a performance indicator, continued waste audits would need to be conducted to gather more data.

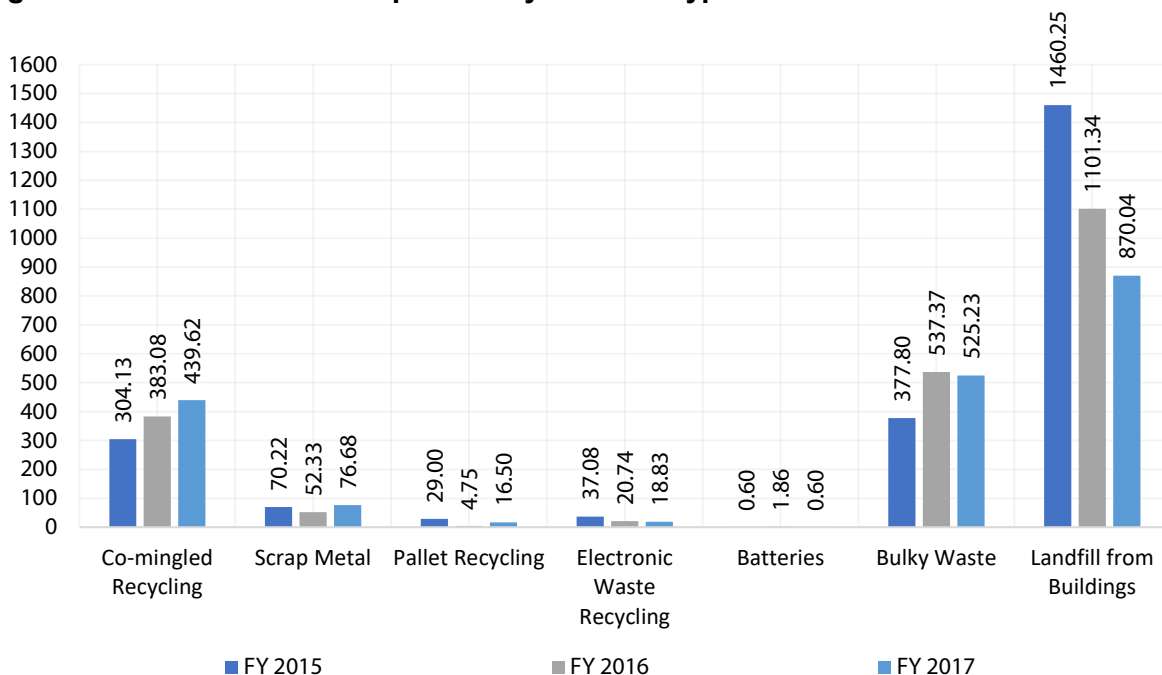
5.1 Diversion Rate

Table 21: Diversion Rate Composition Comparison – FY 2015 to FY 2017

The non-recyclable waste and recycling weights provided by the University of Manitoba

Diversion Rate Composition Comparison	FY 2015		FY 2016		FY 2017	
	Weight (MT)	Percentage	Weight (MT)	Percentage	Weight (MT)	Percentage
Co-mingled Recycling	304.13	13.34%	383.08	18.23%	439.62	22.57%
Scrap Metal	70.22	3.08%	52.33	2.49%	76.68	3.94%
Pallet Recycling	29.00	1.27%	4.75	0.23%	16.50	0.85%
Electronic Waste Recycling	37.08	1.63%	20.74	0.99%	18.83	0.97%
Batteries	0.60	0.03%	1.86	0.09%	0.60	0.03%
Total Recyclables	441.03	19.35%	462.76	22.02%	552.23	28.36%
Bulky Waste	377.80	16.58%	537.37	25.57%	525.23	26.97%
Landfill from Buildings	1460.25	64.07%	1101.34	52.41%	870.04	44.67%
Total Non-Recyclable Waste	1838.05	80.65%	1638.71	77.98%	1395.27	71.64%
Total Generated	2279.08	100.00%	2101.47	100.00%	1947.50	100.00%
Diversion Rate	441.03	19.35%	462.76	22.02%	552.23	28.36%

Figure 5: Diversion Rate Comparison by Material Type Breakdown – FY 2015 to FY 2017



5.2 Waste Generation Index

Waste Generation refers to the amount of waste generated by a specific waste stream in a fiscal year. The Waste Generation Index is the mass of the indicated stream divided by the U of M population of that corresponding fiscal year. As waste tends to increase with an increase in population, this formula is an effective, normalized indicator, particularly for comparing year-over-year waste generation rates against the waste reduction goals per unit.

Table 22: University of Manitoba Population – 2014/15 to 2016/17

	FY 2015	FY 2016	FY 2017
Number of Staff & Faculty	9,051	8,977	9,235
Number of Students	29,657	29,929	29,987
Total	38,708	38,906	39,222

Table 23: Waste Stream Waste Generation Index– 2014/15 to 2016/17

	FY 2015	FY 2016	FY 2017
Waste to Landfill Generated (kg)	1,808,350	1,638,710	1,395,270
Student, Staff and Faculty	38,708	38,906	39,222
Waste Generation (kg) / person	46.72	42.12	35.57

Figure 6: Waste Stream Mass (kg) Comparison

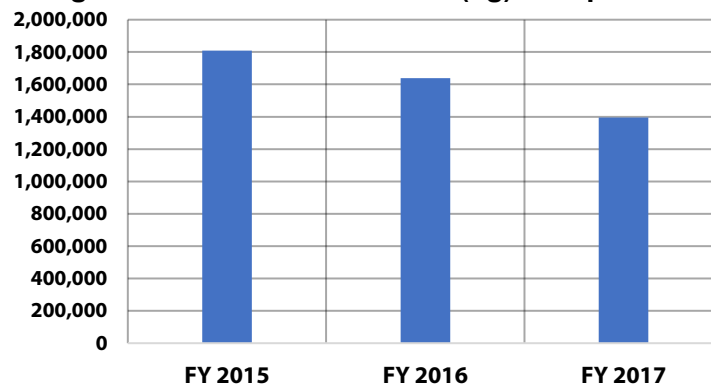
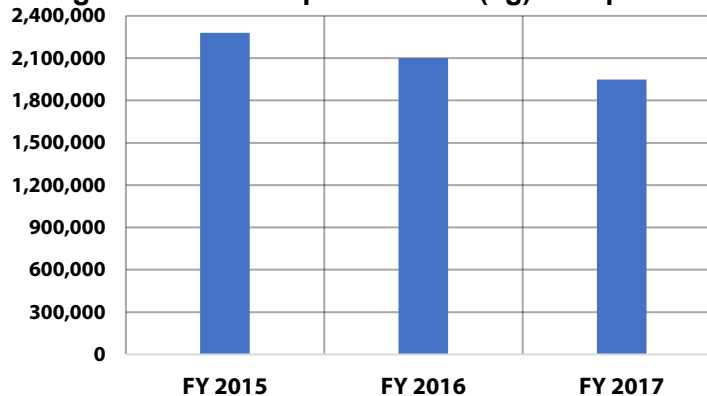


Table 24: Total Disposed Mass Waste Generation Index – 2014/15 to 2016/17

	FY 2015	FY 2016	FY 2017
Total Waste Generated (kg)	2,279,080	2,101,470	1,947,500
Student, Staff and Faculty	38,708	38,964	39,222
Waste Generation (kg) / person	58.88	53.93	49.65

Figure 7: Total Disposed Mass (kg) Comparison



6.0 Improvement Opportunities

6.1 Organics and Compost

It is recommended that the University of Manitoba undertake a 3 stage pilot composting program. A 3 stage pilot program will allow the university to incrementally test and adjust a pilot program that will provide information to move to a permanent composting solution for the university. For example, the first stage of a pilot program could be framed as a small-scale compost initiative at one or both campuses on a short-term basis (3-6 month). During this period data would be collected and feedback obtained from the cohort of participants. With this information, the next stage of the pilot could be designed and implemented while incorporating a larger group of participants. It is anticipated that a final stage would simulate a full program and would allow the university to implement an interim or permanent program based on the feedback and results. It is anticipated that a pilot of this nature would run from 12 to 18 months. Design of the program would require input from several stakeholders including Operations and Maintenance, Office of Sustainability, Dining Food Services and other interested parties. It is suggested that a working group be established to design and implement the pilot program.

Continued Research: Investigate alternative and more sustainable long term organic collection and composting options such as University of Manitoba disposing of the waste and managing and utilizing the resulting compost product.

Build in pre-consumer organics disposal into future food vendor contracts.

6.2 Reduce Contamination in the Co-mingled recycling

A co-mingled recycling program exists on campus, but inconsistent use of receptacles and lack of adequate signage across the campuses has negatively impacted the performance outcomes of the program. Program performance opportunities are generally found in 5 categories:

- Consistency – The consistent use of the same size, types and colours of receptacles will help program users easily identify the appropriate receptacle to dispose their waste across all campus locations.
- Clarity – Ensure that the program acceptance criteria is clearly identified on all receptacle signage and placed above the receptacle at an easy to read level. To help reduce waste stream contamination, signage should be consistent with the materials accepted by Cascade Recovery Inc.
- Convenience – Review the logistics of recycling receptacles across the campus especially in food service and common areas to provide a sufficient number of containers to create the highest level of convenience and accessibility for all users.
- Collaboration – Work with the collection staff to ensure they follow a consistent practice of using clear bags for recycling containers.
- Communication – Develop a campus wide communication strategy that includes information (both digital and written), education and awareness events and media to inform students, faculty, staff and visitors about the campus wide co-mingled program. The educational material should be consistent with the acceptance criteria of the program offered through Cascade Recovery Inc.

6.3 Equipment Modifications

During the Bannatyne campus site-tour, opportunities to improve the positioning of the waste compactor were identified. Consideration should be given to retro-fit the compactor with a cart tipper.

6.4 Improve and Implement Reduction Programs

Wooden Pallets – Currently Aramark does not ask vendors to take back their pallets at the time of shipment drop-offs. This requirement could be included in contract renewals, vendor bidding and selection process as well as added to the signed vendor contracts.

Paper Towels – A significant amount of paper towel waste is currently being disposed of in landfills. Hand dryers should be considered to reduce paper towel use.

Disposable Paper Cups (Waxy) –The audited waste sample composition revealed that 162kg (2.26% of the daily waste generation) of disposable paper coffee cups are currently being disposed of daily in landfill. A re-usable mug campaign (Lug-a-Mug) has been implemented across the campuses in previous years to reduce the number of cups in landfill. A revamping of the 'Lug-a-Mug' program is needed to further awareness to students, staff and faculty.

Bulky Waste – According to the truck load weight information provided to the waste auditors, 7,510kg of bulky waste was disposed of in a landfill in January, 2017. The materials are comprised of primarily broken office chairs and wooden furnishings. Due to budgetary constraints, the Reshop is not able to mend these items and reuse them in their program. Allocating more funds and hiring a part time student that could evaluate the status of items beforehand and feasibly fix them would reduce the amount of bulky waste sent to landfills

Green Meetings and Events – Encourage the use of technology around a zero-waste concept; print double sided, use of reusable dishware, use of bulk drinks instead of multiple individualized drinks, and distribute bulk creamers and sugar instead of individual packets. All these simple changes are cost effective and reduce the amount of the waste that could have been generated.

Green Office Representative Program (GOREps) – Support sustainability initiatives by encouraging practices such as double-sided printing, the use of e-documents and greater use of the U of M Mini Bin Program to reduce individual waste generation.

6.5 Prioritize Waste Management Following of Waste Management Best Practices

Regularly communicate best practices and program specific acceptance criteria for all faculty, staff, students and visitors. Best practice initiatives include:

- I. Signage design and placement – Have receptacle signage; up-to-date acceptance criteria; easy to understand information including wording and images, all in good condition and affixed at an easily identifiable location on all collection/disposal receptacles.
- II. Policies – Maintain updated site-specific Waste Management Policies as well as Procurement Policies to include environmental stewardship and sustainability procurement/purchasing procedures and practices.
- III. Communication and Awareness – Continually distribute emails, memos and postings to clearly communicate the current waste management programs and their acceptance criteria. Be sure to use all forms of education and communication; including lunch and learns sessions, team meetings, postings on bulletin boards and company social media, intra and internet sites.
- IV. Best Practice Documents – Develop a one-page document such as a poster that can be posted as well as used in education sessions. The document/poster should include both illustrations and language to identify the different recycling programs available and the associated material acceptance criteria.

- V. Education and Training – Ensure that orientation packages and education sessions include information on all waste management policies, practices and programs. Conduct regular interactive training through lunch and learns with a waste free lunch included to keep all employees updated on any new waste handling/collection/disposal practices and/or changes to program specific material acceptance criteria.
- VI. Recognition and Rewards – Consider developing programs to recognize, reward and positively reinforce acceptable waste management behaviors by students, faculty and University employees. Program could also be extended to include other stakeholders and visitors to the University. Recognition programs could include giving a coffee card to employees observed disposing of recyclables using the proper program.
- VII. Environmental Stewardship Champions –Creating a student Ambassadors and/or implementing a Green Team to encourage student, faculty and employee participation, generate ideas and solutions to recycling barriers and provide leadership for implementing new program initiatives.

6.6 Conduct Compliance Audits

To help the University with the effective management and recovery of waste generated to end of life, it would be helpful to:

- host regular waste audit at different points in time i.e. fall/winter/summer semester;
- collaborate with knowledge partners to develop and implement innovative solutions; and
- work with food vendors to demonstrate transparency, accountability and integrity that ensure sustainable development and responsible waste management practices.

7.0 Conclusion

The *2016-2018 Sustainability Strategy* highlights goals and strategies in waste reduction, composting and reuse of electronic waste at the University of Manitoba. The success of these initiatives depends on the involvement of all parties, from management to students.

Information contained in this Waste Audit Report is based on site specific waste and recycling information collected by the audit team during the 2017 Waste Audit. Waste Figures and information were provided by the University of Manitoba to PragmaTech develop certain parts of the 2017 Waste Audit Report with the Office of Sustainability writing and compiling.

Based on audit figures and estimates, the University of Manitoba generates **1,160.63 MT** of materials annually; **291.62 MT** of which is sent for recycling and **869.01 MT** of which is disposed of as waste. The annual amount of Organic Compost from the waste stream that could be composted is estimated at **432.88 MT** which compromises **49.8%** of the approximated annual waste figure.

The following suggestions should be considered to improve the effectiveness of existing waste reduction programs and efforts from students, staff, faculty and visitors at the University of Manitoba:

- Review and consideration of the improvement opportunities provided in this report to help increase the capture and diversion rates.
- Communicate to all stakeholders updated information for each of the programs at the University of Manitoba, including program specific acceptance criteria.
- Provide training for collection staff on all the University's new and existing recycling policies, programs and practices.
- Review all waste and recycling receptacles and locations and target clear, consistent and legible signage is affixed to all containers. Post signage strategically throughout the campuses to provide accurate information about current recycling programs.

The Office of Sustainability would like to acknowledge the following parties for their support and assistance during the waste audit period:

Ophelia Morris (*Special Projects Coordinator – Caretaking Services*)

Caretaking Services (*Physical Plant – University of Manitoba*)

General Services (*Physical Plant – University of Manitoba*)

Aramark Corporation

St. John's College

St. Andrew's College

University of Manitoba Student's Union (UMSU)

Appendices

Appendix A: Waste Collection by Area

Table 25: Common Areas – Fort Garry Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	52.63	2.47%
	Aluminum Cans	10.64	0.50%
	Steel Food/Beverage Cans	9.66	0.45%
	PET #1	83.87	3.94%
	HDPE #2	35.42	1.67%
	PVC #3	0.02	0.00%
	LDPE #4	4.17	0.20%
	PP #5	26.46	1.24%
	Other #7	1.81	0.09%
Mixed Fibres	Mixed Paper	88.07	4.14%
	Gable Top/Aseptic Containers	17.41	0.82%
	Newsprint/Magazines/Flyers	23.22	1.09%
	Corrugated Cardboard	43.87	2.06%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	6.03	0.28%
	Ink Cartridges	0.54	0.03%
	Light Bulbs	0.67	0.03%
	Batteries	0.04	0.00%
Scrap Materials	Scrap Wood	6.78	0.32%
	Scrap Metal	7.54	0.35%
Organic Compost	Paper Towel	496.23	23.33%
	Food Waste	220.22	10.36%
	Compostable Materials	104.04	4.89%
	Organics	114.48	5.38%
Non Recyclable Materials	PS #6	32.08	1.51%
	Disposable Paper Cups (Waxy)	96.89	4.56%
	Non-Recyclable Waste	572.98	26.94%
	Aerosol Cans	1.14	0.05%
	Aluminum Foil/Trays	3.95	0.19%
	Lab Waste	4.25	0.20%
	Liquid	61.59	2.90%
		Total Mixed Recycling	224.68
	Total Mixed Fibres	172.57	8.11%
	Total Organic Compost	934.97	43.96%
	Total Electronic Waste	7.28	0.34%
	Total Scrap Materials	14.32	0.67%
	Total Non-Recyclable Materials	772.88	36.34%
	Total	2126.70	100.00%

Table 26: Common Areas – Bannatyne Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	0.91	0.33%
	Aluminum Cans	0.84	0.31%
	Steel Food/Beverage Cans	1.03	0.38%
	PET #1	7.31	2.68%
	HDPE #2	1.24	0.45%
	PVC #3	0.00	0.00%
	LDPE #4	0.61	0.22%
	PP #5	2.89	1.06%
	Other #7	0.22	0.08%
Mixed Fibres	Mixed Paper	11.08	4.06%
	Gable Top/Aseptic Containers	1.12	0.41%
	Newsprint/Magazines/Flyers	2.20	0.81%
	Corrugated Cardboard	0.82	0.30%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	0.28	0.10%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	0.00	0.00%
	Batteries	0.00	0.00%
Scrap Materials	Scrap Wood	0.00	0.00%
	Scrap Metal	0.43	0.16%
Organic Compost	Paper Towel	80.17	29.41%
	Food Waste	20.27	7.43%
	Compostable Materials	15.14	5.55%
	Organics	16.07	5.89%
Non Recyclable Materials	PS #6	3.14	1.15%
	Disposable Paper Cups (Waxy)	3.28	1.20%
	Non-Recyclable Waste	97.77	35.86%
	Aerosol Cans	0.00	0.00%
	Aluminum Foil/Trays	0.87	0.32%
	Lab Waste	0.62	0.23%
	Liquid	4.33	1.59%
	Total Mixed Recycling	15.05	5.52%
	Total Mixed Fibres	15.22	5.58%
	Total Organic Compost	131.65	48.29%
	Total Electronic Waste	0.28	0.10%
	Total Scrap Materials	0.43	0.16%
	Total Non-Recyclable Materials	110.01	40.35%
	Total	272.64	100.00%

Table 27: Food Vendors – Fort Garry Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	0.00	0.00%
	Aluminum Cans	0.86	0.06%
	Steel Food/Beverage Cans	2.17	0.15%
	PET #1	21.72	1.52%
	HDPE #2	5.58	0.39%
	PVC #3	0.00	0.00%
	LDPE #4	0.40	0.03%
	PP #5	10.80	0.76%
	Other #7	0.42	0.03%
Mixed Fibres	Mixed Paper	21.53	1.51%
	Gable Top/Aseptic Containers	5.74	0.40%
	Newsprint/Magazines/Flyers	1.11	0.08%
	Corrugated Cardboard	13.44	0.94%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	0.00	0.00%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	0.00	0.00%
	Batteries	0.20	0.01%
Scrap Materials	Scrap Wood	0.00	0.00%
	Scrap Metal	0.00	0.00%
Organic Compost	Paper Towel	21.76	1.52%
	Food Waste	355.77	24.91%
	Compostable Materials	58.28	4.08%
	Organics	607.15	42.51%
Non Recyclable Materials	PS #6	10.88	0.76%
	Disposable Paper Cups (Waxy)	22.64	1.59%
	Non-Recyclable Waste	254.12	17.79%
	Aerosol Cans	3.91	0.27%
	Aluminum Foil/Trays	1.56	0.11%
	Lab Waste	0.00	0.00%
	Liquid	8.34	0.58%
	Total Mixed Recycling	41.95	2.94%
	Total Mixed Fibres	41.82	2.93%
	Total Organic Compost	1042.96	73.02%
	Total Electronic Waste	0.20	0.01%
	Total Scrap Materials	0.00	0.00%
	Total Non-Recyclable Materials	301.45	21.10%
	Total	1428.38	100.00%

Table 28: Food Vendors – Bannatyne Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	0.00	0.00%
	Aluminum Cans	0.00	0.00%
	Steel Food/Beverage Cans	0.96	0.45%
	PET #1	0.75	0.35%
	HDPE #2	0.00	0.00%
	PVC #3	0.00	0.00%
	LDPE #4	0.01	0.00%
	PP #5	1.21	0.56%
	Other #7	0.00	0.00%
Mixed Fibres	Mixed Paper	3.12	1.45%
	Gable Top/Aseptic Containers	2.66	1.24%
	Newsprint/Magazines/Flyers	0.77	0.36%
	Corrugated Cardboard	0.11	0.05%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	0.00	0.00%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	0.00	0.00%
	Batteries	0.00	0.00%
Scrap Materials	Scrap Wood	0.00	0.00%
	Scrap Metal	0.00	0.00%
Organic Compost	Paper Towel	0.00	0.00%
	Food Waste	132.49	61.63%
	Compostable Materials	22.32	10.38%
	Organics	18.88	8.78%
Non Recyclable Materials	PS #6	1.27	0.59%
	Disposable Paper Cups (Waxy)	4.45	2.07%
	Non-Recyclable Waste	23.78	11.06%
	Aerosol Cans	0.00	0.00%
	Aluminum Foil/Trays	0.01	0.00%
	Lab Waste	2.19	1.02%
	Liquid	0.00	0.00%
	Total Mixed Recycling	2.93	1.36%
	Total Mixed Fibres	6.66	3.10%
	Total Organic Compost	173.69	80.79%
	Total Electronic Waste	0.00	0.00%
	Total Scrap Materials	0.00	0.00%
	Total Non-Recyclable Materials	31.70	14.75%
	Total	214.98	100.00%

Table 29: Office Areas – Fort Garry Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	2.90	0.52%
	Aluminum Cans	2.91	0.52%
	Steel Food/Beverage Cans	3.46	0.62%
	PET #1	42.93	7.67%
	HDPE #2	4.32	0.77%
	PVC #3	0.00	0.00%
	LDPE #4	0.94	0.17%
	PP #5	5.30	0.95%
	Other #7	0.03	0.01%
Mixed Fibres	Mixed Paper	30.70	5.48%
	Gable Top/Aseptic Containers	3.13	0.56%
	Newsprint/Magazines/Flyers	4.25	0.76%
	Corrugated Cardboard	2.09	0.37%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	4.54	0.81%
	Ink Cartridges	0.96	0.17%
	Light Bulbs	0.00	0.00%
	Batteries	0.00	0.00%
Scrap Materials	Scrap Wood	0.10	0.02%
	Scrap Metal	2.32	0.41%
Organic Compost	Paper Towel	95.04	16.97%
	Food Waste	77.12	13.77%
	Compostable Materials	31.55	5.63%
	Organics	35.18	6.28%
Non Recyclable Materials	PS #6	13.51	2.41%
	Disposable Paper Cups (Waxy)	30.89	5.52%
	Non-Recyclable Waste	149.59	26.71%
	Aerosol Cans	0.00	0.00%
	Aluminum Foil/Trays	0.72	0.13%
	Lab Waste	2.30	0.41%
	Liquid	13.19	2.36%
	Total Mixed Recycling	62.79	11.21%
	Total Mixed Fibres	40.17	7.17%
	Total Organic Compost	238.89	42.66%
	Total Electronic Waste	5.50	0.98%
	Total Scrap Materials	241.31	43.09%
	Total Non-Recyclable Materials	210.20	37.54%
	Total	559.97	100.00%

Table 30: Office Areas – Bannatyne Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	3.10	2.24%
	Aluminum Cans	0.57	0.41%
	Steel Food/Beverage Cans	0.63	0.45%
	PET #1	2.53	1.83%
	HDPE #2	0.44	0.32%
	PVC #3	0.00	0.00%
	LDPE #4	0.00	0.00%
	PP #5	0.59	0.43%
	Other #7	0.00	0.00%
Mixed Fibres	Mixed Paper	16.02	11.56%
	Gable Top/Aseptic Containers	0.38	0.27%
	Newsprint/Magazines/Flyers	3.32	2.40%
	Corrugated Cardboard	0.00	0.00%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	0.93	0.67%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	0.00	0.00%
	Batteries	0.00	0.00%
Scrap Materials	Scrap Wood	1.85	1.34%
	Scrap Metal	0.00	0.00%
Organic Compost	Paper Towel	26.78	19.33%
	Food Waste	23.78	17.16%
	Compostable Materials	4.22	3.05%
	Organics	2.08	1.50%
Non Recyclable Materials	PS #6	3.75	2.71%
	Disposable Paper Cups (Waxy)	7.94	5.73%
	Non-Recyclable Waste	37.03	26.73%
	Aerosol Cans	0.00	0.00%
	Aluminum Foil/Trays	0.28	0.20%
	Lab Waste	0.00	0.00%
	Liquid	2.32	1.67%
	Total Mixed Recycling	7.86	5.67%
	Total Mixed Fibres	19.72	14.23%
	Total Organic Compost	56.86	41.04%
	Total Electronic Waste	0.93	0.67%
	Total Scrap Materials	1.85	1.34%
	Total Non-Recyclable Materials	51.32	37.04%
	Total	138.54	100.00%

Table 31: Residence Areas – Fort Garry Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	20.42	2.31%
	Aluminum Cans	13.42	1.52%
	Steel Food/Beverage Cans	1.84	0.21%
	PET #1	25.33	2.87%
	HDPE #2	10.98	1.24%
	PVC #3	0.00	0.00%
	LDPE #4	0.00	0.00%
	PP #5	14.56	1.65%
	Other #7	0.00	0.00%
Mixed Fibres	Mixed Paper	36.09	4.08%
	Gable Top/Aseptic Containers	12.47	1.41%
	Newsprint/Magazines/Flyers	2.23	0.25%
	Corrugated Cardboard	14.53	1.64%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	1.03	0.12%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	1.56	0.18%
	Batteries	0.02	0.00%
Scrap Materials	Scrap Wood	0.00	0.00%
	Scrap Metal	0.00	0.00%
Organic Compost	Paper Towel	93.70	10.60%
	Food Waste	97.77	11.06%
	Compostable Materials	176.14	19.93%
	Organics	37.88	4.29%
Non Recyclable Materials	PS #6	7.85	0.89%
	Disposable Paper Cups (Waxy)	19.55	2.21%
	Non-Recyclable Waste	265.81	30.08%
	Aerosol Cans	6.10	0.69%
	Aluminum Foil/Trays	1.21	0.14%
	Lab Waste	0.00	0.00%
	Liquid	23.23	2.63%
	Total Mixed Recycling	86.55	9.79%
	Total Mixed Fibres	65.32	7.39%
	Total Organic Compost	405.49	45.88%
	Total Electronic Waste	2.61	0.30%
	Total Scrap Materials	0.00	0.00%
	Total Non-Recyclable Materials	323.75	36.63%
	Total	883.72	100.00%

Table 32: Learning Centres – Fort Garry Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	2.11	0.28%
	Aluminum Cans	3.36	0.44%
	Steel Food/Beverage Cans	1.30	0.17%
	PET #1	20.54	2.72%
	HDPE #2	6.48	0.86%
	PVC #3	0.00	0.00%
	LDPE #4	1.93	0.26%
	PP #5	8.45	1.12%
	Other #7	1.79	0.24%
Mixed Fibres	Mixed Paper	31.89	4.22%
	Gable Top/Aseptic Containers	3.55	0.47%
	Newsprint/Magazines/Flyers	4.63	0.61%
	Corrugated Cardboard	7.17	0.95%
	Kraft Bags	0.45	0.06%
Electronic Waste	Electronics	6.19	0.82%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	0.00	0.00%
	Batteries	0.06	0.01%
Scrap Materials	Scrap Wood	0.65	0.09%
	Scrap Metal	2.16	0.29%
Organic Compost	Paper Towel	105.83	14.01%
	Food Waste	76.49	10.12%
	Compostable Materials	37.17	4.92%
	Organics	57.98	7.67%
Non Recyclable Materials	PS #6	12.94	1.71%
	Disposable Paper Cups (Waxy)	35.26	4.67%
	Non-Recyclable Waste	258.06	34.15%
	Aerosol Cans	0.00	0.00%
	Aluminum Foil/Trays	1.83	0.24%
	Lab Waste	41.88	5.54%
	Liquid	25.43	3.37%
	Total Mixed Recycling	45.96	6.08%
	Total Mixed Fibres	47.69	6.31%
	Total Organic Compost	277.47	36.72%
	Total Electronic Waste	6.25	0.83%
	Total Scrap Materials	2.81	0.37%
	Total Non-Recyclable Materials	375.40	49.68%
	Total	755.58	100.00%

Table 33: Learning Centres – Bannatyne Campus

	Categories	kg Over a 48 Hr. Period	% of Each Waste Stream
Mixed Recycling	Glass Bottles/Jars	1.13	0.37%
	Aluminum Cans	0.38	0.12%
	Steel Food/Beverage Cans	0.59	0.19%
	PET #1	4.23	1.39%
	HDPE #2	2.34	0.77%
	PVC #3	0.00	0.00%
	LDPE #4	0.00	0.00%
	PP #5	1.64	0.54%
	Other #7	0.00	0.00%
Mixed Fibres	Mixed Paper	22.39	7.36%
	Gable Top/Aseptic Containers	0.69	0.23%
	Newsprint/Magazines/Flyers	1.15	0.38%
	Corrugated Cardboard	3.13	1.03%
	Kraft Bags	0.00	0.00%
Electronic Waste	Electronics	0.74	0.24%
	Ink Cartridges	0.00	0.00%
	Light Bulbs	0.00	0.00%
	Batteries	0.08	0.03%
Scrap Materials	Scrap Wood	0.00	0.00%
	Scrap Metal	0.25	0.08%
Organic Compost	Paper Towel	46.57	15.31%
	Food Waste	15.92	5.23%
	Compostable Materials	2.75	0.90%
	Organics	2.62	0.86%
Non Recyclable Materials	PS #6	3.96	1.30%
	Disposable Paper Cups (Waxy)	6.74	2.22%
	Non-Recyclable Waste	165.88	54.54%
	Aerosol Cans	0.00	0.00%
	Aluminum Foil/Trays	1.07	0.35%
	Lab Waste	17.70	5.82%
	Liquid	2.22	0.73%
	Total Mixed Recycling	10.31	3.39%
	Total Mixed Fibres	27.36	8.99%
	Total Organic Compost	67.86	22.31%
	Total Electronic Waste	0.82	0.27%
	Total Scrap Materials	0.25	0.08%
	Total Non-Recyclable Materials	197.57	64.95%
	Total	304.17	100.00%

Appendix B: Daily Waste Collection Table (Fort Garry)

Note: Materials missed from St. John's College were sorted on Day 9 from the Fort Garry campus

	Mixed Recycling	Mixed Fibres	Electronic Waste	Scrap Materials	Organic Compost	Non-Recyclable Materials	Total (kg)
<u>Day 1</u> <u>Active Living Zone</u>	134.50	108.08	4.71	3.22	1202.52	720.55	2173.58
<u>Day 2</u> <u>North Zone</u>	110.41	76.55	3.15	2.33	228.60	210.32	631.36
<u>Day 3</u> <u>North Zone</u> <u>East Zone</u>	42.59	54.63	2.76	4.32	337.63	231.82	673.75
<u>Day 4</u> <u>East Zone</u>	42.99	23.75	0.26	0.00	137.54	137.63	342.17
<u>Day 5</u> <u>Central Zone</u>	45.81	38.00	3.21	2.51	401.84	359.25	850.62
<u>Day 6</u> <u>South Zone</u> <u>Smart Park</u>	57.31	29.32	4.59	0.10	321.46	170.41	583.19
<u>Day 7</u> <u>South Zone</u> <u>Smart Park</u>	23.78	31.17	3.16	7.07	188.24	139.66	393.08
<u>Day 8</u> <u>St. Johns</u> <u>College</u>	4.54	6.07	0.00	0.00	81.95	14.04	106.60

Appendix C: Daily Waste Collection Tables (Bannatyne)

Note: Bannatyne waste collection only occurred on Days 7 & 8

	Mixed Recycling	Mixed Fibres	Electronic Waste	Scrap Materials	Organic Compost	Non-Recyclable Materials	Total (kg)
<u>Day 7</u> <u>Bannatyne</u> <u>Campus</u>	15.98	44.22	1.75	2.53	128.61	235.28	428.37
<u>Day 8</u> <u>Bannatyne</u> <u>Campus</u>	20.17	24.74	0.28	0.00	301.45	155.32	501.96

Appendix D: Daily Recycling Collection Table (Fort Garry)

	Mixed Recycling	Mixed Fibres	Contamination Materials	Total (kg)
Day 1 Active Living Zone	89.22	205.95	98.52	393.69
Day 2 North Zone	36.13	203.58	47.55	287.26
Day 3 North Zone East Zone	27.53	63.17	50.92	141.62
Day 4 East Zone	31.90	131.22	36.08	199.20
Day 5 Central Zone	34.18	197.16	263.56	494.90
Day 6 South Zone Smart Park	54.11	238.38	88.16	380.65
Day 7 South Zone Smart Park	16.25	51.35	36.54	104.14
Day 8 St. Johns College*	2.05	1.09	29.92	33.06

Appendix E: Daily Recycling Collection Table (Bannatyne)

	Mixed Recycling	Mixed Fibres	Contamination Materials	Total (kg)
Day 7 Bannatyne Campus	17.26	167.41	24.05	208.72

Appendix F: Waste Handling Observations and Anomalies

General Anomalies

- Day 5 (collected on February 6) - a truck load of garbage contained 5 bags tagged as office and a few bags tagged as common area – approximately 70% of the load was not tagged – with the exception of the bags identified as being generated from the office areas, the entire sample was weighed and classified as Common Area.
- A number of staff inquired as to whether coffee cups are recyclable. Confusion between the types of cups that are recyclable as well as which ones are accepted in the co-mingled program could result in increased contamination of the recycling materials.
- A full bin of foil wrap was brought to the auditors; however, it was undetermined where the material was generated as well as the material type – the material weights were not included in the audited waste sample.

Common Areas – Observations

- An entire bag of soccer balls that could have been donated was in this area sample
- Clear bags of contaminated recycling were in the exterior waste sample and included in the common area sample

Classroom / Theatre Areas – Observations

- Very few garbage bags were provided for a waste sample from lab areas. A lab area category was not corrected meaning these bags were labeled incorrectly.
- Containers and vials with unknown liquids were present
- A significant amount of lab waste (small test tubes) were present
- Syringe casings were found in the sample
- A large bag weighing 6.29 kgs was filled with plaster dental casting moulds
- 4.86 kgs of an organic type material that resembled chia seeds were in the sample
- A large bag containing bio-hazardous waste was present in the sample
- A box containing screws, scrap metal, rocks and small pebbles was present

Office Areas – Observations

- Recycling stations (either slims or large totes (blue/grey) depending on generation) are used throughout both campuses. However, the style of the stations and containers used are not consistent across each campus and the acceptance criteria signage is inconsistent and in some cases not present.
- Some offices have grey recycling bins with a black side mini-bin labeled “landfill” while other offices are equipped with a centralized waste and recycling station
- Washrooms observed during the site tour were equipped with 2 paper towel holders and 1 air hand dryer. No standards currently exist to reduce paper towels in washrooms

Residence Areas – Observations

- Pembina Hall has 10 floors; each floor has a kitchenette and common area equipped with a residential type blue box and one grey bin for garbage; each resident room has a small garbage and recycling receptacle. The main cafeteria/food hall is used by approximately 1200 students.
- Students bring their own waste to a collection room that is serviced daily by caretaking staff.

Food Vendors – Observations

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- The Bannatyne food vendors sample had quite a bit of coffee grounds and filters as well as stir sticks and sugar packets present
- Milk cartons and jugs generated by the food vendors at the Bannatyne campus were placed in black bags
- Plastic liner bags are not used consistently at Fort Garry campus in Campo (black and clear bags are interchanged between the waste and recycling totes)
- Bread, grains, vegetables, and fruit peels were present in the non-recyclable waste sample
- One black bag full of soil was found in the sample
- A small amount of brown shredded paper was present – perhaps packing paper
- A large bag of compostable food containers was found

Appendix G: Photo Displays

Photo Display 1: Current Waste & Recycling Programs (Fort Garry campus)

Pictures taken during the on-site audit from January 27 - February 10, 2017



Reusable Dishes



Non-Recycling Waste Collection Totes



Organic Collection Totes (UMSU)



Pallet Recycling



Air Hand Dryer



Common Area Recycling Collection Totes

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Common Area Collection Totes



Electronic Waste Recycling



Water Fountain



Water Bottle Refill Station



Cardboard Baler



Baled Cardboard

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Exterior Common Area Collection Containers



Waste Collection Room



Paper Towel Dispenser



Office Recycling



Waste and Recycling Station

Photo Display 2: Materials Identified in the Audited Waste Sample (Fort Garry campus)

Pictures taken during the on-site audit from January 27 – February 10, 2017



Food Waste in Black Bag



Soil in Black Bag



Grain Type Material in Black Bag



Shredded Paper in Black Bag



Wheat in Black Bag



Bulky Waste Items

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Expanded Foam



Coffee Pods



Food Waste



Styrofoam



LDPE #4 (Plastic)



Non-Recyclable Waste

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Aluminum Beverage Cans



Printer Cartridge



Used Textiles



Gable Top & Aseptic Containers



Food Waste (post-consumer)



Batteries

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Glass Jars/Bottles



PS #6 (Plastic)



Aluminum Foil/Trays



Disposable Paper Cups (Waxy)



Plastic Strapping



HDPE #2 (Plastic Bottles)

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Plastic Bags (LDPE #4)



Disposable Paper Cups (Waxy)



Other #7 (Plastic)



Cardboard



Magazines/Flyers



Non-Recyclable Waste

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PP #5 (Plastics)



PET #1(Plastic Bottles)



Aerosol Cans



PET #1 (Plastic Containers)



Paper Towels



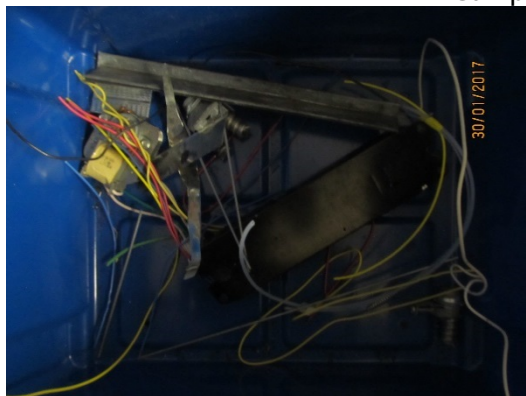
Mixed Paper



Lab Waste



Compostable Take-out Containers

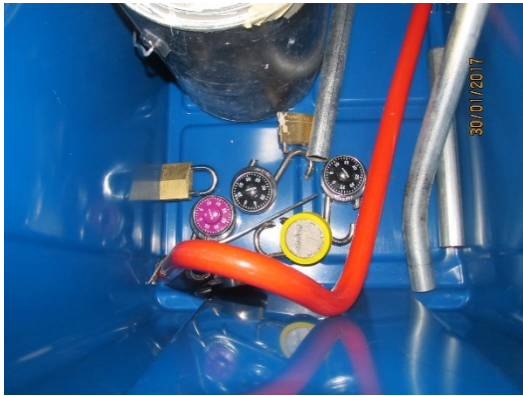


Electronics



Electrical Wiring

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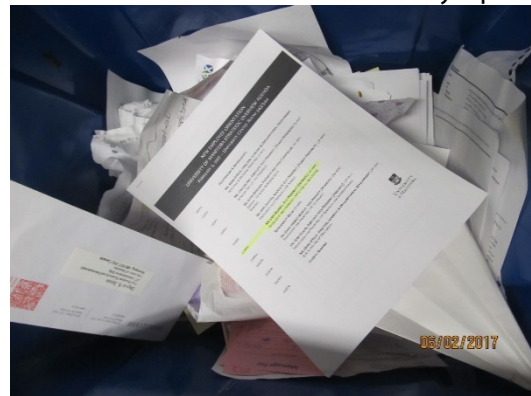
Scrap Metal



Plastic Container for Soft Drink Syrup



Light Bulbs



Mixed Paper



LDPE #4



Mixed Paper

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Boxboard



PVC #3



Newsprint



Food Waste (Pre-consumer)

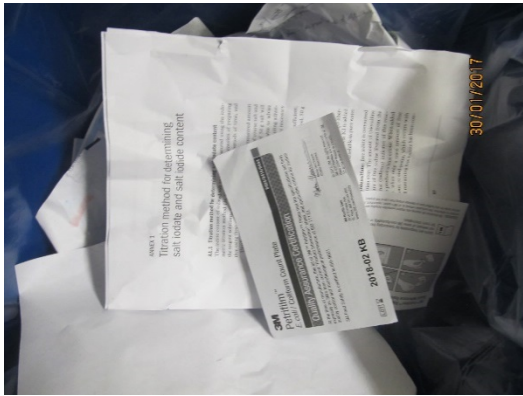


Diapers



Food Waste (Post-Consumer)

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Mixed Paper



Biohazard Plastic Bag



Mixed Paper



Compostable Materials

Photo Display 3: Current Waste & Recycling Programs (Bannatyne Campus)

Pictures taken during the on-site audit from January 27 – February 10, 2017



E-Waste Collection



Recycling Containers for Pickup

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Waste Compactor



Cardboard Baler



Bulb Recycling



Electronic Recycling



Cardboard Recycling



Water Bottle Refill Station

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Common Area



Collection Containers

Photo Display 4: Materials Revealed from the Waste Sample (Bannatyne Campus)

Pictures taken during the on-site audit from January 27 – February 10, 2017



Food Waste



Boxboard



Non-Recyclable Waste



Newsprint



Non-Recyclable Waste



PET #1 (Plastic Bottles)



Expanded Foam



Coffee Pods



PET #1 (Plastic Containers)



Compostable Materials



LDPE #4 (Plastic)



Aluminum Beverage Cans



Styrofoam Containers



Denture Mold Material



Food Waste (Post-consumer)



Lab Waste



Steel Food Cans



Aluminum Foil



Gable Top & Aseptic Containers



Plastic Strapping



Lab Waste



PS #6 (Plastics)



Food Waste (Pre-consumer)



Food Waste (Pre-consumer)



HDPE #2 (Plastic Bottles)



Disposable Paper Cups (Waxy)



Plastic Bags (LDPE #4)



Cardboard



Mixed Paper



Non-recyclable Waste



PP #5 (Plastics)



Packing Peanuts (Waste)



Paper Towels



Coffee Grounds in Black Bags



Cement & Stones



HDPE #2 (Plastic Container)

