

# Waste to Resource Assessment



Prepared for:

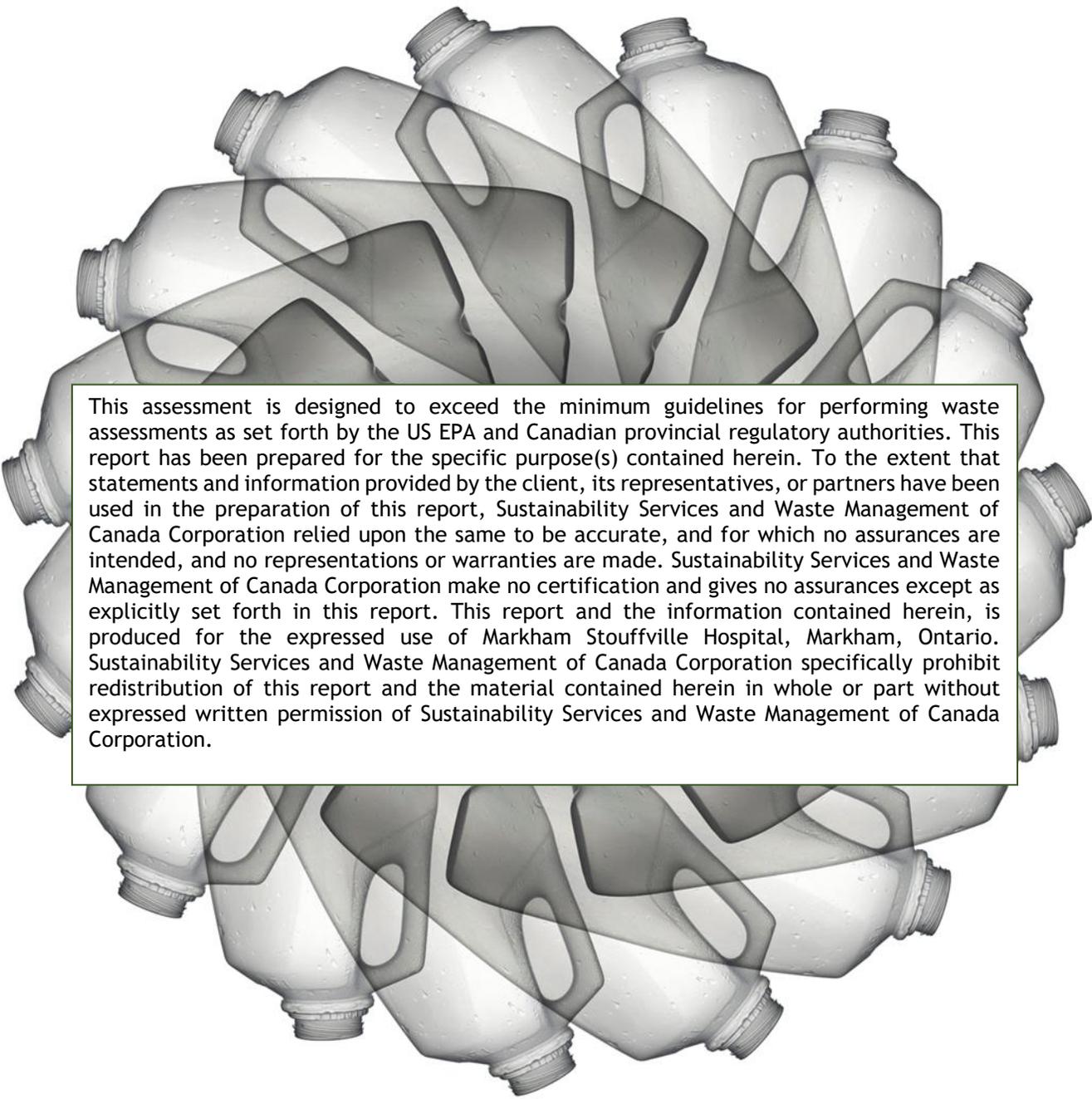


Markham Stouffville Hospital  
381 Church Street, Markham, Ontario  
December 2020

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## Table of Contents

<b>Executive Summary .....</b>	<b>4</b>
Overview .....	4
Assessment Information.....	5
<b>Assessment Findings and Goals Alignment .....</b>	<b>6</b>
Goals, Objectives, and Other Factors .....	6
Options Overview.....	6
Sampling Method .....	7
Limitations.....	7
<b>Material Composition Breakdown.....</b>	<b>8</b>
Landfill Waste Material Comparison by Category .....	8
Diversion Opportunities.....	9
Diverted Material Comparison by Category.....	10
Recycling Stream Content.....	11
<b>Recommendations .....</b>	<b>13</b>
Increase Awareness of Current Diversion Programs (Material Category Breakdown).....	14
Employee, Contractor and Visitor Education and Engagement.....	22
Sustainable Hospital Practices and Additional Recommendations .....	25
<b>Supplementary Information.....</b>	<b>29</b>
Appendix 1 - Recycling Benefits.....	29
Appendix 2 - Detailed Waste Breakdown by Generation Area .....	30
Appendix 3 - Diversion Report.....	31
Appendix 4 - Six Steps to a Successful Sustainability Program .....	32
Appendix 5 - Material Descriptions.....	33



This assessment is designed to exceed the minimum guidelines for performing waste assessments as set forth by the US EPA and Canadian provincial regulatory authorities. This report has been prepared for the specific purpose(s) contained herein. To the extent that statements and information provided by the client, its representatives, or partners have been used in the preparation of this report, Sustainability Services and Waste Management of Canada Corporation relied upon the same to be accurate, and for which no assurances are intended, and no representations or warranties are made. Sustainability Services and Waste Management of Canada Corporation make no certification and gives no assurances except as explicitly set forth in this report. This report and the information contained herein, is produced for the expressed use of Markham Stouffville Hospital, Markham, Ontario. Sustainability Services and Waste Management of Canada Corporation specifically prohibit redistribution of this report and the material contained herein in whole or part without expressed written permission of Sustainability Services and Waste Management of Canada Corporation.

# Executive Summary

## Overview

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On December 2020, Sustainability Services conducted a Waste to Resource™ assessment for Markham Stouffville Hospital located at 381 Church Street in Markham, Ontario. The assessment was based on recorded hauling weights while the composition was based on the facility’s waste audit reports from 2018 and 2019.

A few goals of the assessment were as follows:

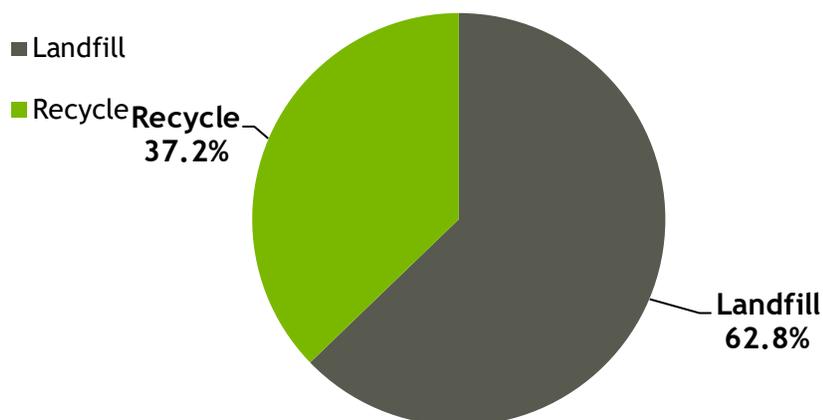
- ♻️ **Develop baseline inventories for waste generation at Markham Stouffville Hospital**
- ♻️ **To identify and quantify waste composition and commodity**
- ♻️ **To determine the recovery performance of existing programs**
- ♻️ **Identify opportunities to increase diversion and reduce cost**
- ♻️ **Develop recycling strategies that could be implemented throughout the facility**

Our goal is to provide Markham Stouffville Hospital with strategies that will maximize the efficiency of your waste management system. During the waste assessment conducted by Sustainability Services, visual inspections of waste generation points throughout the facility resulted in the discovery of additional diversion opportunities. The assessment identified three primary opportunities that should occur to improve your overall waste diversion rate. The following are our recommendations:

- ♻️ **Increase Awareness of Current Diversion Programs**
- ♻️ **Employee, Contractor and Visitor Education and Engagement**
- ♻️ **Sustainable Hospital Practices and Additional Recommendations**

The facility generated a combined 825.73 tonnes of waste and recyclables in the last year. The current diversion rate for your facility is 37.2%.

**Figure 1- Current Diversion Rate at Markham Stouffville Hospital**



The following is a summary of key findings identified during the assessment:

-  The current diversion rate is 37.2%
-  Annually, it is estimated that 518.43 tonnes of waste and 307.30 tonnes of recyclables will be generated from your facility
-  Of all the material generated on site, up to 54.1% potentially could have been diverted through currently available diversion programs
-  Plastics account for 26.9% of the waste sent to landfill
-  Organics account for 22.9% of the waste sent to landfill
-  Papers account for 20.2% of the waste sent to landfill

## Assessment Information

**Table 1 - Facility Information**

Item	Comments
Facility Name:	Markham Stouffville Hospital
Description:	Markham Stouffville Hospital (MSH) is a 'Group B' hospital (>100 beds). It is an acute and community hospital and an affiliated teaching hospital linked with University of Toronto's Faculty of Medicine.
Address:	381 Church Street, Markham, Ontario
Contact Name:	Valerie Stockhaus-Shank
Contact Number:	9054727373 ext6026

**Table 2 - Assessment Summary**

Item	Comments
Performed By:	Jessy Rajan
Performed On:	December 2020
Report Written:	Jessy Rajan
Report Reviewed:	Christopher Doyle
Assessment Type:	Waste to Resource Assessment - Waste Audit
Assessment Level:	<input checked="" type="checkbox"/> Basic Material Characterization <input type="checkbox"/> Detailed Material Characterization <input checked="" type="checkbox"/> Basic Options Analysis <input checked="" type="checkbox"/> Detailed Option Analysis <input type="checkbox"/> Carbon Analysis <input type="checkbox"/> Material Process Mapping <input checked="" type="checkbox"/> Implementation Feasibility Analysis <input checked="" type="checkbox"/> Action Plan
Account Manager:	Keira Toscan

## Assessment Findings and Goals Alignment

### Goals, Objectives, and Other Factors

The following is a list of company goals, objectives, or other factors considered during this assessment.

-  Apply findings from the waste audit to reduce waste, maximize collection of recycling materials and optimize waste management efficiencies
-  Set goals, monitor waste generation and track recovery levels on a regular basis
-  Streamline and standardize handling routines of materials throughout the facility
-  Reduce waste spend and disposal costs
-  Provide ongoing and improved employee training and education avenues
-  Identify areas of new or enhanced diversion opportunity
-  Increase capture rate of divertible materials and reduce overall generation of non-recyclable materials

### Options Overview

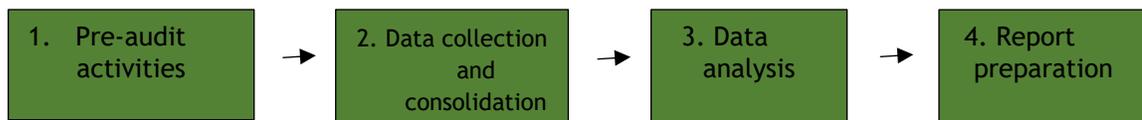
Three options were identified during the assessment. The table below lists key options that represent the most significant opportunities.

**Table 3 - Options Summary Table**

Option	Description	Benefit	Rationale
<b>Increase Awareness of Current Diversion Programs</b>	All stakeholders need to receive consistent messages about current diversion programs available to them	<ul style="list-style-type: none"> <li>✓ Increase diversion and capture rates</li> <li>✓ Reduced waste spend</li> </ul>	Majority of the materials generated throughout the facility can be diverted from landfill through current reuse, recycling or compost programs
<b>Employee, Contractor and Visitor Education and Engagement</b>	Promote, re-educate and expand diversion program within the facility	<ul style="list-style-type: none"> <li>✓ Increase awareness and engagement on environmental programs and issues</li> <li>✓ Ensure effective education is offered</li> </ul>	<p>All stakeholders need to be encouraged and re-educated regarding waste and recycling procedures within the facility</p> <p>A dedicated and knowledgeable team will create the opportunity for the facility to achieve superior capture rates and manage an effective program</p>
<b>Sustainable Hospital Practices</b>	To establish and maintain a green culture at the hospital	<ul style="list-style-type: none"> <li>✓ Expand programs available</li> <li>✓ Ensure the tools and infrastructure are in place to support waste management goals</li> </ul>	<p>Control decision-making and input regarding material brought into the facility</p> <p>Determine how to best to capture non-traditional materials for recycling or reuse</p>

## Sampling Method

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1. **Pre-audit activities** - Assessment of current infrastructure and programs in place. Collecting background information, historical data/ diversion reports and service receptacles information.
2. **Data collection and consolidation** - The facility was not able to conduct a physical waste audit for 2020 due to Covid-19 restrictions. This assessment is a summary of the waste characterizations of the previous reports (2018-2019).

Waste composition and recycling composition data was extracted from MOE Waste Audit Summary forms.

The sampling methods for the historical waste audits included characterizations of the material stream, collected over 24 hours. The sample material was collected in a safe, designated location and separate from other waste collection areas for the assessment. The materials were sorted and divided into waste categories and weights of each material sub-category were recorded.

3. **Data analysis** - The data from 2018-2019 waste audits was used against waste hauling and diversion reports for the period of November 2019 to Octo 2020 as well as any additional diversion data provided by the facility's manager.
4. **Report preparation** - Full report prepared including site specific recommendations and Ministry of the Environment, Conservation and Parks - Audit and Workplan forms. The methods followed in this project adhere to the standards outlined for BOMA and LEED requirements.

## Limitations

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A physical waste audit was not completed for this report and it will depict waste types of previous reports. Waste content may have changed, and this report may not be applicable to certain types of material generation. The facility's recycling program has changed since previous reports were completed and some material types may not be applicable. Details will be indicated in waste summary breakdowns.

As the waste composition was based on MOE forms, there is no waste category breakdown of the *other* category. This report outlines waste content of papers, metals, plastics, organics and electronics. There is no detailed breakdown available of any other or mixed material.

Biomedical, Medical Waste and Sharps were not included in the scope of this assessment. Additionally, Hazardous, Industrial, and Liquid Industrial Wastes were not included within the scope of this assessment. These materials are not typically included in MOE Reg. 102/94 solid waste audits and specialized processes are required to handle these materials due to the health and safety concerns associated.

## Material Composition Breakdown

### Landfill Waste Material Comparison by Category

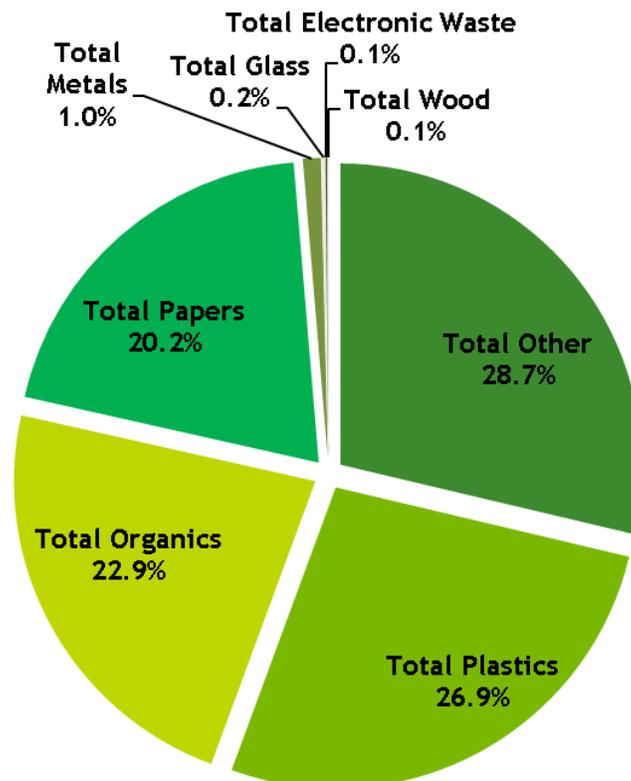
This section displays a breakdown of general material categories by weight and volume.

The largest category by weight was Other materials representing 28.7% of the landfill waste stream.

**Table 4 - Landfill Waste Material Comparison**

Waste Category	Total Audited Waste Material (kg)	Material Composition (%)	Annual Projected Generated (kg)
Total Other	879.89	28.7%	148,782
Total Plastics	825.35	26.9%	139,560
Total Organics	702.02	22.9%	118,706
Total Papers	617.99	20.2%	104,497
Total Metals	29.28	1.0%	4,951
Total Glass	6.43	0.2%	1,087
Total Electronic Waste	2.69	0.1%	455
Total Wood	2.32	0.1%	392
<b>Total</b>	<b>3,065.97</b>	<b>100.0%</b>	<b>518,430</b>

**Figure 2 - Landfill Waste Material by Category**



## Diversion Opportunities

Increased diversion opportunities represent the largest potential cost savings and landfill diversion opportunity for Markham Stouffville Hospital. While diversion programs are currently in operation, the audit shows that they are not working at their optimal efficiency.

Diversion rate is calculated as follows:

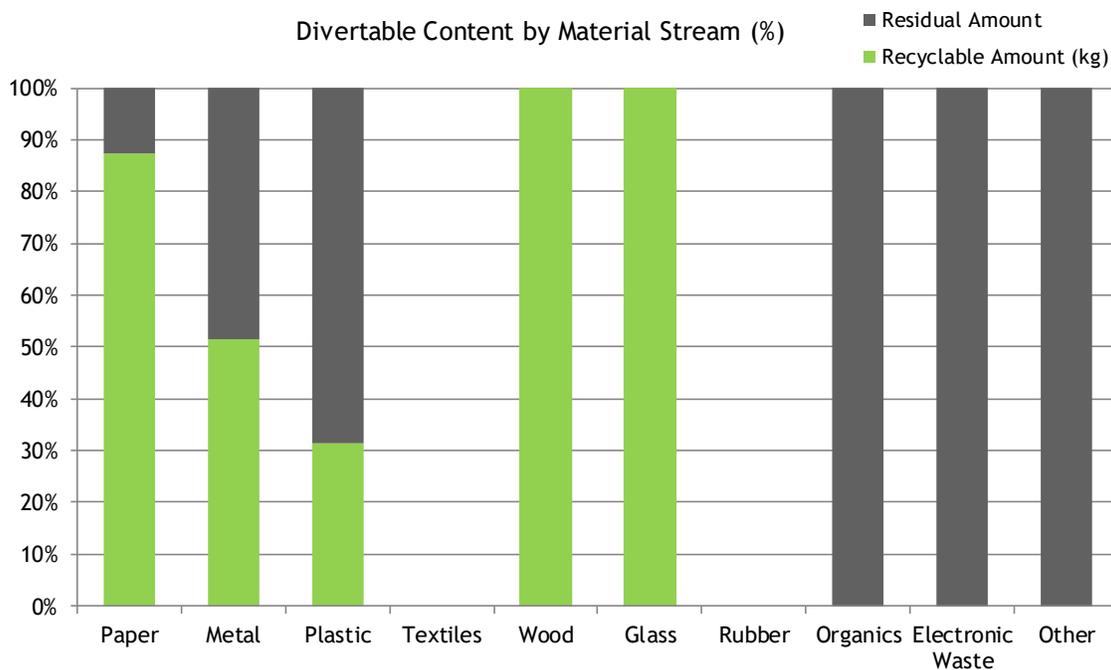
$$\text{Diversion Rate} = \frac{\text{Weight of recovered material}}{\text{Total weight of material generated on-site}} \times 100\%$$

The current diversion rate at the site is 37.2%. Based on the diversion program currently in place 54.1% of the material generated at the facility is recyclable or divertible. Therefore, there is room for improvement within the diversion program where most employees in the facility handle their waste.

Should a full organics program be implemented the potential diversion would jump to a significant 68.5% diversion rate. This represents a huge opportunity to increase your waste diversion and reduce associated waste removal costs.

Figure 3 outlines the material in each category which could potentially be diverted.

**Figure 3 - Diversion Opportunity by Material Category**



## Diverted Material Comparison by Category

The following table displays a breakdown of assessed diverted, recycled, reused and composted materials. The facility currently has programs in place to capture the following waste streams:

**Table 5 - Waste Diversion Program Summary**

Diversion Program	Service Provider/s	Container Type	Note
Cardboard	Waste Management	40 YD Compactor	
Single Stream	Waste Management	20 YD Open Top	
Confidential Paper Shredding			Data source: Green Hospital Scorecard.
Organics	N/a	Pulper	Back of house use.
E-Waste			Data source: Green Hospital Scorecard.
Batteries	-		Data source: Green Hospital Scorecard.
Scrap Metals	Waste Management	40 YD Open Top	
Scrap Wood	Waste Management	20 YD Open Top	
Construction & Demolition			As needed.
Reduction Programs	Various Reuse Programs		Wood pallet return.

Landfill waste is collected in a 32 YD compactor and 14 YD open top bin.

NOTE: Biomedical, Medical Waste and Sharps and well as linens were not included in the scope of this assessment.

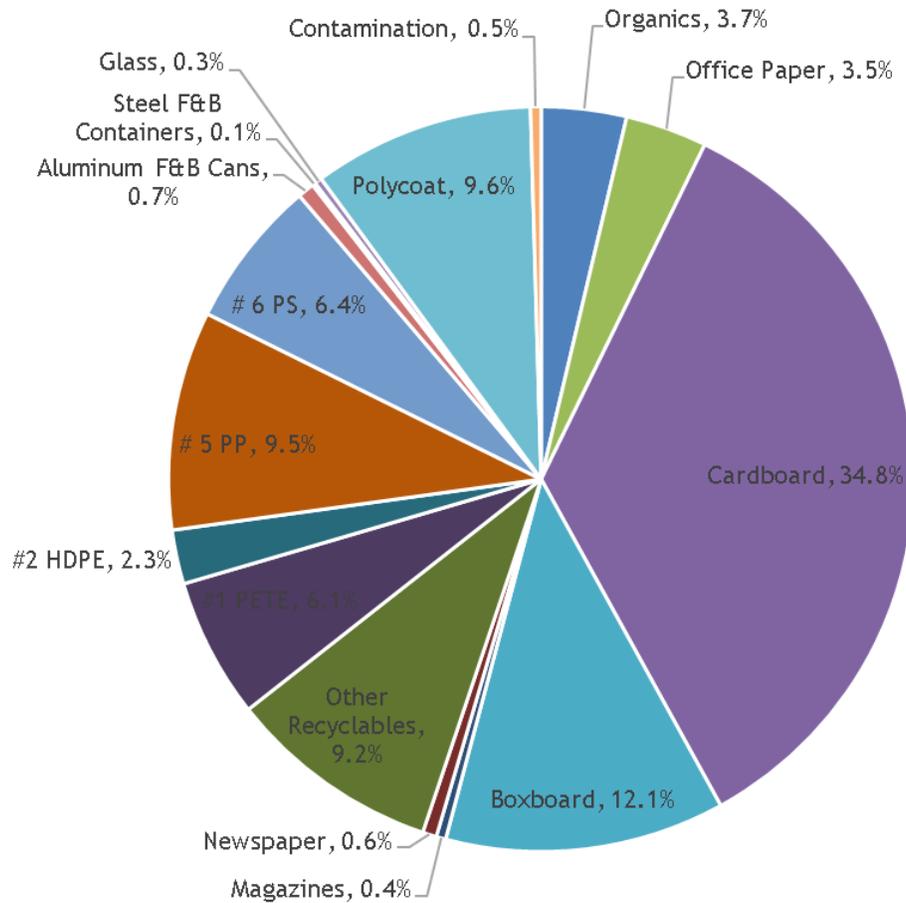
**Table 6 - Diverted Material Comparison**

Diverted Material	Annual Projected Volume (kg)	Percentage of all Diverted Materials (%)
Confidential Paper Shredding	187,600	61.0%
Mixed Recycling	58,760	19.1%
Cardboard	38,310	12.5%
Organics	9,450	3.1%
Wood	4,640	1.5%
Metal	4,360	1.4%
E-Waste	2,800	0.9%
Light Tubes, Ballasts	670	0.2%
Batteries	630	0.2%
Printer Cartridges	80	<0.1%
<b>Total</b>	<b>307,300</b>	<b>100.0%</b>

## Recycling Stream Content

A sample of the materials collected for the recycling programs was reviewed during the assessments in 2018 and 2019. There have been some program changes since these assessments and coffee cups and LDPE #4 plastic bags are no longer accepted. When possible, a physical assessment should be completed of the recycling stream to ensure these materials will no longer be collected for diversion; they will be treated as contamination.

**Figure 4 - Breakdown of Audited Material Collected for Recycling and Compost**



The **capture rate** indicates the percentage of a material (i.e. office paper, organics) that is being disposed of via one of the sites recovery programs (i.e. single stream, mixed recycling, organics). A 100% capture rate indicates that all recoverable materials being produced on-site has been placed in the correct receptacle and the landfill garbage contains no recoverable materials.

$$\text{Capture Rate} = \frac{\text{Recovered material (e.g. paper in mixed recycling)}}{\text{Recovered material (e.g. paper in mixed recycling)} + \text{Waste material (e.g. paper in garbage)}} \times 100\%$$

Based on the assessment findings, of the 825,730 kg of material generated at the facility in the last 12 months, 446,736 kg of that material is potentially divertible in the available diversion programs. As 307,300 kg of material was captured for recycling or compost, the facility wide Capture Rate was determined to be 68.8%. Table 7 below outlines the capture rate per material.

**Table 7 - Capture Rate Calculations by Material**

Diverted Material	Total Generated (kg)	Captured for Diversion (kg)	Landfilled (kg)	Capture Rate (%)
Aluminum food and beverage cans	2,578	444	2,134	17.2%
Cardboard	98,159	59,620	38,539	60.7%
Fine paper	202,395	189,774	12,621	93.8%
Glass food and beverage bottles/jars	1,283	195	1,087	15.2%
Newsprint	3,786	372	3,414	9.8%
Steel food and beverage cans	504	83	421	16.5%
PET (#1) plastic	12,723	3,724	8,999	29.3%
HDPE (#2)	8,808	1,440	7,367	16.4%
LDPE (#4) plastic film	30,737	-	30,737	0.0%
PP (#5) plastic containers	22,575	5,828	16,747	25.8%
Polystyrene (#6)	14,750	3,949	10,802	26.8%
Organics	128,156	9,450	118,706	7.4%
Boxboard	15,050	7,437	7,613	49.4%
Glossy magazines, catalogues, flyers	252	252	-	100.0%
Wood	5,032	4,640	392	92.2%
Steel	6,756	4,360	2,396	64.5%
Drywall	630	630	-	100.0%
Skids	-	-	-	-
Paper towels	-	-	-	-
Printer cartridges	80	80	-	100.0%
IT equipment/audio-visual equipment	2,800	2,800	-	100.0%
Furniture	-	-	-	-
Building/renovation material	-	-	-	-
Disposable food packaging (incl. polycoat)	7,918	5,884	2,034	74.3%
Cell phones	-	-	-	-
Diapers	-	-	-	-
Clothing/textiles	-	-	-	-
Other	260,758	6,337	254,420	2.4%



## Recommendations

Several options have been identified that can help Markham Stouffville Hospital make its operations more sustainable. Each option should be carefully reviewed for operational, financial, social, and strategic fit.

-  Increase Awareness of Current Diversion Programs
-  Employee, Contractor and Visitor Education and Engagement
-  Sustainable Hospital Practices and Additional Recommendations

## **Increase Awareness of Current Diversion Programs (Material Category Breakdown)**

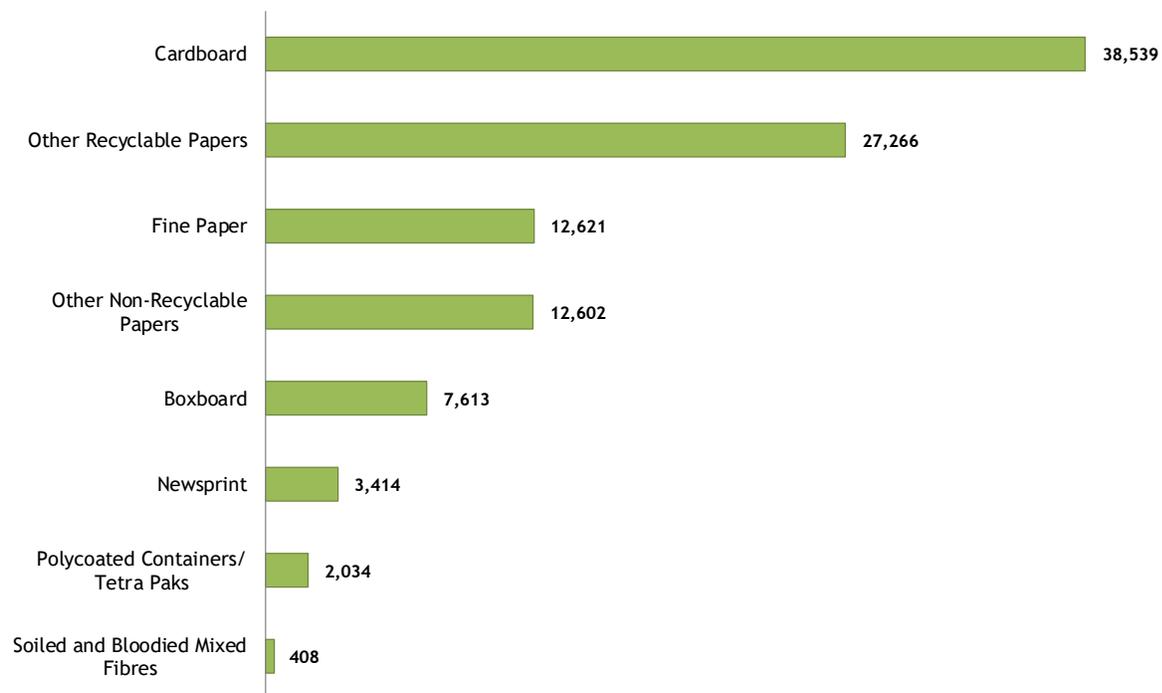
Below is a breakdown of the composition of the audited landfill material generated on site based on the analysis of the audited sample. As well as recommendations for selected sub-category material types.



### Papers

Paper materials sent to landfill accounted for 20.2% of your total waste; nearly 104,497 kg of paper will be sent to landfill annually. The facility currently has programs in place to capture confidential paper shredding, cardboard and mixed paper collection for recycling.

**Figure 5 - Annual Papers Disposed in Landfill (in kg)**



**Boxboard** (eg. tissue or nitrile glove boxes) was identified in notable quantities (1.5% of the sample), while **cardboard** was a significant contributor of paper materials destined for the landfill at 7.4% of the audited sample. These materials are currently accepted your current recycling program. Employees, e.g. nurses or cleaners who handle these containers should be made aware of the recyclability of these items in order to eliminate these items from the landfill stream and in turn reduce disposal costs.

**Other recyclable papers** occupied 5.3% of the landfill material. This category would have included kraft paper, recyclable notebooks, post-it notes and any other paper that is not classified as fine paper.

**Fine paper** represented 2.1% of all landfilled materials. Continued education for employees should be provided to ensure awareness of current programs and recycling opportunities. As well, management should ensure that receptacles for collection are placed in targeted locations where these items are most often generated such as photocopy/ printers near reception areas. Staff should be reminded to place sensitive material into confidential shredding collection.

**Newsprint** accounted for 0.7% of the material audited and is accepted in current diversion programs available at the site.

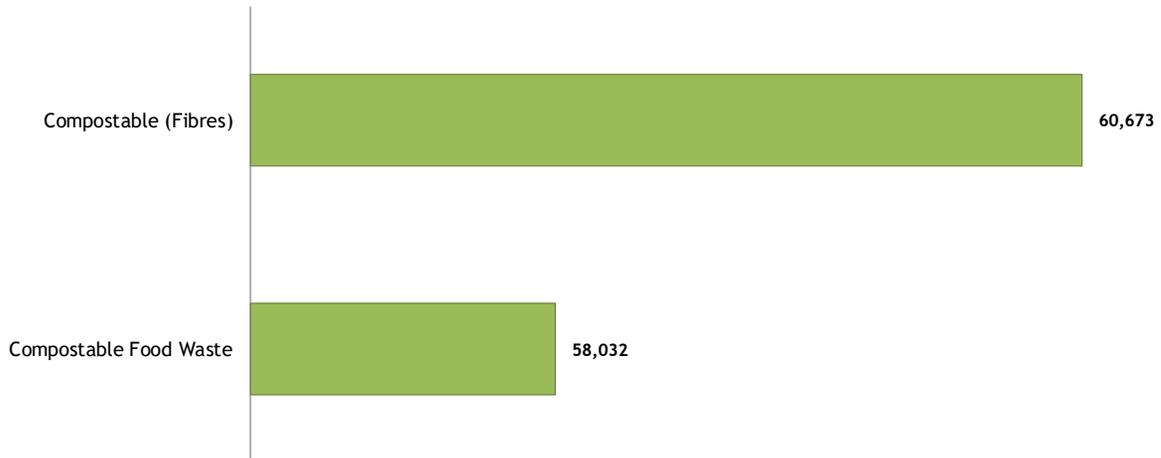
It is recommended that the facility regularly check with their waste hauler to confirm recyclability of these materials. As some of these materials may be integral to the operations of the facility, it is recommended that they regularly review opportunities to reduce or substitute these materials in their operations.



## Organics

Organics materials sent to landfill accounted for 22.9% of your total waste; nearly 118,706 kg of Organics will be sent to landfill annually. A program currently exists at the facility to capture organic materials for pulping in back of house areas. No front of house program is available.

**Figure 6 - Annual Organics Disposed in Landfill (in kg)**



**Compostable fibres** include compostable food packaging and paper towel. The facility currently has both paper towel and hand dryers at the facility. In areas where hand dryers are not an option due to medical and health guidelines, the facility should aim to capture this material in an organics program, if implemented.

**Compostable food waste** included both pre-consumer food waste as well as post-consumer food waste. Pre-consumer food waste primarily included pre-packaged food whereas post-consumer refers primarily to leftover food.

A pulper is available in a back of house kitchen to capture some, but not all of these organic materials. The site should consider implementing a full organics program to capture front of house organics and food waste generated from onsite food vendors, including Tim Hortons.

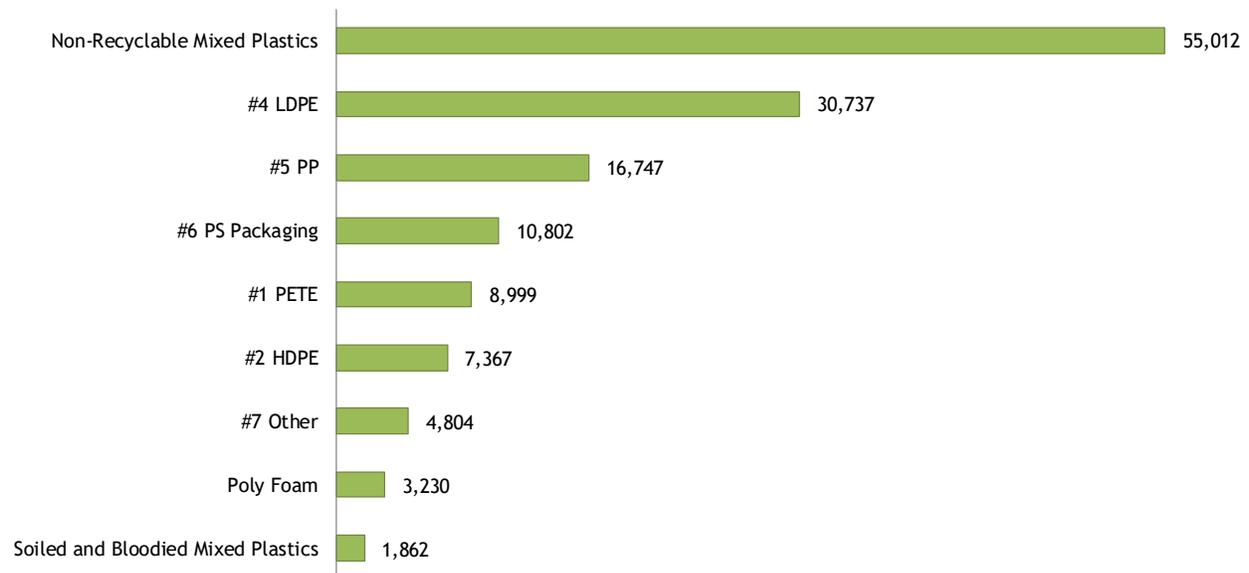


## Plastics

Plastic materials account for 26.9% of your waste stream composition; 139,560 kg of plastic materials will be sent to landfill this year from your facility. The facility currently has programs in place to capture bottles and cans throughout the facility. All plastic material will be marked with a number indicating the type of plastic that was used to make the item.

Plastic is generally not a heavy material therefore the high weight generated indicated a huge volume of material. Utilizing current recycling programs will ensure this material is diverted. This number can be used to determine if recycling programs exist for that item. Most commonly, recycling programs will exist for #1, #2 & #5. Limited recycling programs exist for #3, #4 and #6 plastics.

**Figure 7 - Annual Plastics Disposed in Landfill (in kg)**



**Non-recyclable mixed plastics** included medical plastics (IV bags, tubing) and medical plastics (unlabeled containers/ other) representing 10.6% of the audited sample. This material is considered not recyclable at this time, much of the material is not identified with a recyclable logo or is composed of mixed material types. Materials when used in patient care could represent a health and safety risk due to exposure including airborne pathogen contamination risks. Any recyclable materials would have to be identified with service providers on a case-by case basis. Materials such as IV bags may also include significant liquid content.

**#4 LDPE film bags & packaging** accounted for 5.9% of landfilled materials when combined. At this time, LDPE materials are not accepted in mixed recycling programs.

**PP #5** was also a potentially recyclable plastic found in the landfill waste stream at 3.2%. Juice, yogurt, fruit containers are the most common sources of #5 and users should be aware that these products are recyclable, examples of these materials should be included in educational signage.

**PS#6** representing 2.1% overall, this most often included food packaging, take out containers, beverage lids (excluding Styrofoam). If clean, these are often accepted as part of single stream recycling programs. Food service providers should be encouraged to provide recyclable or compostable options for the products they bring onto on facility.

**PETE#1** plastic materials representing 1.7% of the landfill sample. Water, juice and beverage containers are the most common sources of #1 PETE and most users are aware that these types of products are recyclable, but these items are being found in the waste stream. Examples of these materials should be included in educational signage.

**HDPE #2** was generated in the form of large hard plastic food or fluid containers or cleaning supplies. These materials represented 1.4% of the landfill waste stream. Food vending tenants and custodial/cleaning staff should be educated through awareness programs that these are recyclable materials and receptacles for these items are available for their collection. Staff throughout the hospital should be educated through awareness programs that these are recyclable materials and receptacles for these items are available for their collection.

**Other plastics** representing 0.9% of the audited sample, this included hard scrap plastics and unlabeled plastic containers. Each of these materials should be reviewed on an individual basis regarding their recyclability.

**Polyfoam/ Polystyrene** (incl. storage boxes, cups for patient use) was the next significant material in the audited landfill sample, representing 0.6% of all materials identified. Limited recycling options currently exist for Poly Foam plastic materials. Until new recycling developments are created, and viable options exist, this waste stream should be closely monitored for future possibilities and cost savings.

## Other Materials

Other materials sent to landfill accounted for 28.7% of your total waste; nearly 148,782 kg of this category of material will be sent to landfill annually. Currently there are no programs in place to capture most of these materials from landfill, programs may be available for construction & demolition on an as needed basis;

**Figure 8 - Annual Other Disposed in Landfill (in kg)**



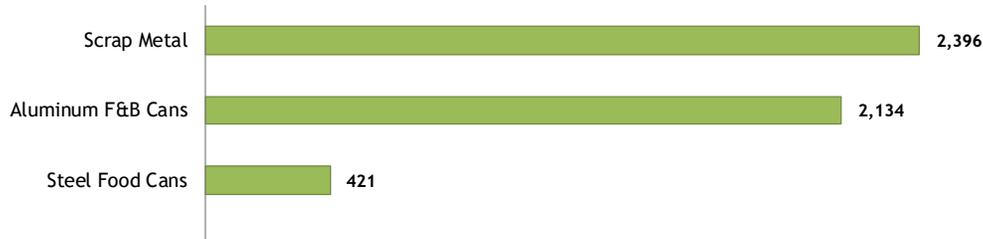
A detailed breakdown of the **other materials** category was not available in reference reports. A physical audit will need to be conducted, when safe, to gain a better understanding of this material generation.



## Metals

Metals materials sent to landfill accounted for 1.0% of your total waste; nearly 4,951 kg of Metals will be sent to landfill annually. The facility has programs in place to capture most metal food and beverage containers.

Figure 9 - Annual Metals Disposed in Landfill (in kg)



Aluminum food and beverage cans (0.4%) and steel cans are all recyclable materials, clearly labeled and easily accessible recycling receptacles are key to ensure that employees and visitors can participate. Scrap metal also found in this category at 0.5%



## Glass

Glass materials sent to landfill accounted for 0.2% of your total waste; nearly 1,087 kg of Glass will be sent to landfill annually. The facility has programs in place to capture most glass food and beverage containers.

Figure 10 - Annual Glass Disposed in Landfill (in kg)



Glass bottles all recyclable materials, clearly labeled and easily accessible recycling receptacles are key to ensure that employees and visitors can participate.



## Wood

Wood materials sent to landfill accounted for 0.1% of your total waste; nearly 392 kg of Wood will be sent to landfill annually. Scrap wood materials may be captured through a select program in specific areas of the facility.

Figure 11 - Annual Wood Disposed in Landfill (in kg)



## Electronic Waste

Electronic Waste materials sent to landfill accounted for 0.1% of your total waste; nearly 455 kg of Electronic Waste will be sent to landfill annually. Programs are readily available for E-Waste, Batteries and Toner Cartridges through qualified haulers or through supplier take-back programs, efforts should be made to divert these materials from landfill to avoid negative environmental issues.

Figure 12 - Annual Electronic Waste Disposed in Landfill (in kg)



## Employee, Contractor and Visitor Education and Engagement

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The success of a Diversion Program is driven by user participation. If those who generated the waste are not utilizing diversion programs, success will never be achieved as it is not enough to simply implement programs and expect those programs to be effective. There are two critical factors necessary to ensure that diversion programs are effective. These factors are education and engagement.

As many different stakeholders are involved and contribute to the waste and diversion program it is important to target education towards each group.

1. Communication Program - The facility could maintain a communication program to communicate to educate all stakeholders. The following are all methods that can ensure stakeholders understand the steps that are being taken to achieve environmental sustainability within the facility and feel included in its successes.

**Promotion** - The facility could use internal communication such as newsletters, internal emails and educational boards to relay their message. As well as Earth Day or Environment Days to promote the waste management program through promotional materials or information booths; Waste Reduction Week in October is another opportunity for communication around waste reduction;



As well, the facility could create a **slogan or branding** to help promote their diversion program and create continuity for all promotional or educational materials.

Information can be tailored to reflect the findings of this assessment. For example, create a campaign to encourage employees to take a moment to put their mixed paper in the correct receptacle, no matter where they are on site.

Green information boards, similar to health and safety boards, can be a centralized place for relevant environmental information and reference material, example below.



The following is an example of a customized signage in the cafeteria of a hospital.



Below, is an example of colour coded pictorial signage. Each provider should be able to provide similar material to educate stakeholders.



2. Training - Regular training of employees, custodial staff and contractors on diversion procedures help demonstrate the facility's commitment to diversion programs, update staff on policy changes and account for changes in workforce. Regular training has also been shown to aid in the elimination of inconsistency and complacency in diversion programs.
  - Training can be provided with power point presentations and examples of educational signage and recyclable materials;
  - Training can be just a few minutes during safety talks or weekly check-ins;
  - Ongoing training and education are critical due to turnover of employees and contractors as well as occasional program changes;
  - Management and supervisors could be trained on all aspects of the diversion program which will allow them to be an ambassador and a resource to support employees and visitors;

3. Maintenance/ Custodial Review - Facility management could regularly meet with the custodial manager and maintenance staff (custodians) as they may be able to provide hands on insight into aspects of the diversion program and areas of improvement.

Custodial staff should be trained on the diversion program during their orientation and reminded on a regular basis by their managers. Input from custodians and custodial managers may prove beneficial as they have firsthand knowledge of the program;

## Sustainable Hospital Practices and Additional Recommendations

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The following are suggested actions to help the facility improve their internal processes and strive to reach higher diversion rates while maintaining a strong, efficient Diversion Program.

It is recommended that the facility regularly check with their waste hauler to confirm what materials are recyclable in their jurisdiction. As some of these materials may be integral to the operations of the facility, it is recommended that you regularly review opportunities to reduce or substitute these materials in your operations.

### i. Educate Staff on 'Easy Targets' for Diversion

The hospital should target specific recyclable materials used throughout the facility, particularly in active patient areas. Some materials may be unique to the hospital environment and not be commonly understood as recyclable like household blue box items. The facility should create an education campaign to capture materials in these areas such as Kleenex boxes that are used on patient floors and managed in Nursing Stations, Linen Collection Rooms. Education could include specific instruction from Supervisors to nursing staff in weekly meetings and specific promotional posters placed where these materials are handled, e.g. Material Storage Rooms, Nursing Stations.

Examples of materials include:

- Boxboard such as Kleenex boxes or latex gloves used by cleaning staff and medical staff.
- HDPE containers of cleaning products including sanitary wipe containers, soap dispensers, and other cleaning products used by cleaning staff, vendors and medical staff.



## ii. Contamination in Recycling Sample

The 2018 and 2019 reports showed that some non-recyclable materials were identified within the recycling samples. This included some liquids, food, polyfoam and wrappers.

Education and awareness should be provided to ensure staff and employees and volunteers know that these materials may contaminate the recycling stream and, in some instances, force the material to be sent to landfill, thus wasting the efforts of others who made efforts to recycle. It is recommended that recycling receptacles be equipped with labelling reminding users that garbage is not accepted here.

Example of contamination signage.



## iii. Program Change Updates

There have been some recent changes to the recycling program services at Markham Stouffville Hospital. Most notably, the single-stream recycling program is no longer accepting paper coffee cups or LDPE #4 plastic bags and film.

The facility should engage their community through email communication to staff, volunteers, on-site vendors and any community partners that rent or utilize the space. As well, the facility should develop targeted signage indicating the changes.

Some examples:



#### iv. Capture Additional Materials

Some non-traditional recyclable materials were identified in the landfill waste sample. Programs are available from companies like Terracycle in to provide the resources to set up a collection station at your facility.

Recycling programs for common non-conventional materials which were identified primarily in break rooms during the audit. These include single use beverage pods, creamer containers, plastic wrappers, plastic cutlery and plates.

#### Example of non-conventional materials which can be recycled by Terracycle



#### v. Stakeholder Buy-In

Get 'Buy In' and support from contractors and service providers who work on site. All service providers should be aware of Markham Stouffville Hospital's environmental goals and be active participants, including any contractors who work on site (e.g. cafeteria staff, custodians, security).

- All service providers should be aware of the facility's environmental goals and be active participants.
- Waste and recycling material management should be a significant aspect within future contracts with service providers.
- The facility should regularly meet with their waste and recycling providers to review what options are available in the area for diversion.

While the facility may not be able to completely control what material employees or contractors bring into the facility, they will have significant influence over purchasing and sourcing products that the facility employees use at work. The facility must develop and enforce purchasing policies that:

- Call for minimum packaging;
- Enforce take-back programs for hard to recycle items;
- Increase the recyclable content of expendable and durable goods;
- Follow actions known as extended producer responsibility;
- Look for opportunities to substitute multiple use items for single-use items;
- Avoid any products that are shipped in hard to recycle 'hybrid' packaging;

## **vi. Purchasing Power**

Markham Stouffville Hospital should use its purchasing power to influence its tenants, suppliers and contactors to follow the same recommendations, such as Tim Hortons. A commitment to waste management should be a significant aspect within future contracts with service providers.

- The facility should establish a vendor selection protocol to reflect a commitment to the 3R's: reduction, reuse and recycling;
- The facility should conduct "vendor pre-qualifications" to evaluate the protocol and vendor environmental track records;
- Contract language should reflect the facility's objectives and allow periodic reviews to determine if those objectives are being met throughout the life of the contract;
- Get buy-in and support from contractors and service providers who work on site. All service providers, vendors or contractors should be aware of the environmental goals and be active participants, including education programs and purchasing decisions.

## **vii. Bin Assessment**

Facility's managers should, as part of their duties, periodically and routinely tour the facility to monitor the infrastructure of the waste management program. By ensuring recycling stations are present, and conveniently available throughout the facility, the recycling participation rate will improve. Ensuring that there are recycling receptacles in every area of the facility, where waste is generated, will allow for the proper source separation of materials.

The manager should ensure that all receptacles are clearly labelled, and pictorial guidelines are present to educate staff, as described above.

Black bags should never be used in recycling receptacles as they can often be confused as landfill waste and there is a risk that already sorted recyclables are disposed incorrectly.

## **viii. Green Team**

A good way to ensure engagement and consistency is to set up a Green Team, comprised of representatives from all departments of the facility. This team will be able to monitor, evaluate and provide to the group recommendations and consultation on the recycling program and other environmental issues.

Members of the team will be able to monitor receptacles; signage required and perform spot checks on all phases of the waste management Program.

It is recommended that Green Team and Managers have a system in place to review the infrastructure on site monthly, including:

- Identify gaps & areas of improvement;
- Ensure recycling receptacles available and replace missing bins;
- Ensure signage or labelling is present;
- Have a protocol in place to ask for replacements for missing signage or to notify management if receptacles are damaged or missing;
- Have a protocol in place for staff suggestions on how to increase participation.

## Supplementary Information Appendix 1 - Recycling Benefits

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### Waste Management Sustainability Services 2019 Recycling Benefits for Markham Stouffville Hospital

In 2019, we recycled 282 tons of aluminum, cardboard/paper, scrap metals, plastics, and glass.



These recycling efforts conserved the following resources/prevented these emissions:



#### 6,167 Mature Trees

Represents enough saved timber resources to produce 104,845,100 sheets of printing and copy paper!

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#### 650 Cubic Yards of Landfill Airspace

Enough airspace to fulfill the annual municipal waste disposal needs for 741 people!

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#### 328,513 Kw-Hrs of Electricity

Enough power to fulfill the annual electricity needs of 30 homes!

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#### Avoided 918 Metric Tons (MTCO<sub>2</sub>E) of GHG Emissions

The recycling of these materials prevented these GHG emissions!

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#### 743,418 Gallons of Water

Represents enough saved water to meet the daily fresh water needs of 9,912 people!

Sources: U.S. Environmental Protection Agency, U.S. Energy Information Administration, Environmental Paper Network-Paper Calculator V4.0, Domtar Paper, Gaylor Corporation, U.S. Forest Products Laboratory, and Waste Management. ©Waste Management 2019  
Notes: GHG = Greenhouse Gas; MTCO<sub>2</sub>E = Metric Tons of Carbon Dioxide Equivalent

## Appendix 2 - Detailed Waste Breakdown by Generation Area

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Area	Paper	Metal	Plastic	Textile	Wood	Glass	Rubber	Organic	Electric	Other	Total
2019 Waste Data	389.72	14.66	407.08	0.00	0.00	2.92	0.00	248.89	0.00	517.54	1,580.81
2018 Waste Data	228.27	14.62	418.27	0.00	2.32	3.51	0.00	453.13	2.69	362.35	1,485.16
<b>Grand Total</b>	<b>617.99</b>	<b>29.28</b>	<b>825.35</b>	<b>0.00</b>	<b>2.32</b>	<b>6.43</b>	<b>0.00</b>	<b>702.02</b>	<b>2.69</b>	<b>879.89</b>	<b>3,065.97</b>

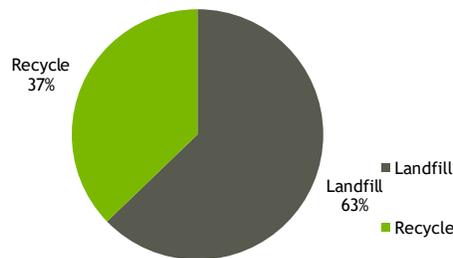
## Appendix 3 - Diversion Report



### Diversion Overview Markham Stouffville Hospital, Markham Ontario

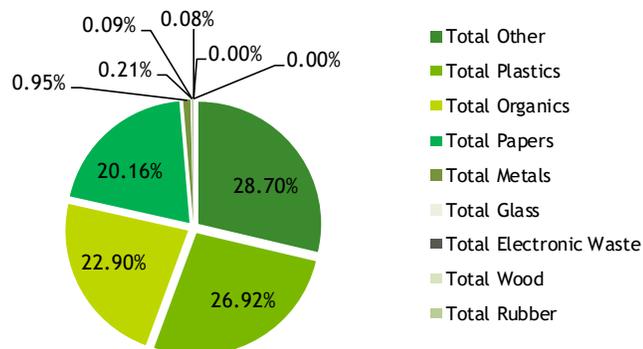
Diverted Materials	Annual Projected Volume (kg)	% of Diverted Materials
Confidential Paper Shredding	187,600	61.0%
Mixed Recycling	58,760	19.1%
Cardboard	38,310	12.5%
Organics	9,450	3.1%
Wood	4,640	1.5%
Metal	4,360	1.4%
E-Waste	2,800	0.9%
Light Tubes, Ballasts	670	0.2%
Batteries	630	0.2%
Printer Cartridges	80	-0.1%
<b>Total</b>	<b>307,300</b>	<b>100.0%</b>

Diversion Summary



Waste Category	Material Composition (%)	Annual Projected Volume (kg)
Total Other	28.7%	148,782
Total Plastics	26.9%	139,560
Total Organics	22.9%	118,706
Total Papers	20.2%	104,497
Total Metals	1.0%	4,951
Total Glass	0.2%	1,087
Total Electronic Waste	0.1%	455
Total Wood	0.1%	392
Total Rubber	0.0%	-
Total Textiles	0.0%	-
<b>Total</b>	<b>100.0%</b>	<b>518,430</b>

Waste Material By Category



## Appendix 4 - Six Steps to a Successful Sustainability Program

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WM Sustainability Services has extensive experience in managing on-site sustainability programs safely, and in a manner that provides a framework for achieving our customers' waste reduction, continuous improvement and diversion goals. The following are several steps that we have found useful in implementing sustainability programs:

1. **Make sure that you sustain your company's ability to compete.** Any improvement or innovation should have economic *and* environmental benefit.
2. **Make sure that your first recycling initiative provides a quick payback.** It is important that the first initiative delivers a quick payback to get continued support from operational management.
3. **Explore the entire value chain.** For every dollar spent on disposal and transportation, another \$3.00 - \$10.00 is spent in generating the material in the first place.
4. **Use quantitative analysis to identify the best opportunities.** Typically, Pareto charts work best, i.e. 20% of by-products account for 80% of the cost or 80% of the cost savings.
5. **Work with your vendors, tenants, suppliers and employees.** Often times, the best ideas come from those working in a particular area every day. You should push vendors and suppliers to develop programs that positively impact your goals and ask your staff for input.
6. **Win people over with enthusiasm.** Enthusiasm and communication of goals and achievements are critical for sustaining a strong Program.

### Source Reduction and Reuse Strategies

Studies indicate that between 2 and 5 percent of waste streams are reusable. There are many ways to prevent waste, at the source, and reuse products to reduce waste, including:

#### Implementing Purchasing Practices that Reduce Waste

- ✓ Purchase reusable, rather than disposable products
- ✓ Request that vendors deliver products in reusable containers, such as plastic totes, rather than cardboard boxes
- ✓ Purchase in bulk to reduce packaging, while purchasing only the amount that is needed
- ✓ Purchase products with minimal packaging
- ✓ Work with suppliers to minimize the packaging used to protect their products

#### Reducing the Amount of Material Used

- ✓ Establish a facility-wide, double-sided, copying policy
- ✓ Create scratch pads from used paper
- ✓ Use outdated letterhead for in-house memos
- ✓ Circulate documents, post on bulletin boards, or send electronically, rather than making multiple copies
- ✓ Use central files to reduce the number of hard copies that are made

#### Using Reusable Rather than Single-Use, or Disposable, Products

- ✓ Change to reusable dishes in the cafeteria
- ✓ Place reusable coffee mugs in break rooms
- ✓ Offer a discount on drink prices for using reusable beverage containers
- ✓ Use rechargeable batteries
- ✓ Install hot air dryers in public restrooms and remove paper towels

#### Reusing Materials for Other Purposes at Your Facility

- ✓ Reuse cardboard boxes and foam peanuts for shipping from your facility
- ✓ Use newspaper and shredded paper for packaging

## Appendix 5 - Material Descriptions

Material	General Descriptions
#1 PETE	Polyethylene Terephthalate, Water Bottles, Soft Drink Bottles
#2 HDPE	High Density Polyethylene Containers, Chemical Containers or Jugs; High Density Polyethylene Bags or Film, Strong "crispy" Bags
#4 LDPE	Low Density Polyethylene Bags and Film, Garbage Bags, Shopping Bags
#5 PP	Poly Propylene, Yogurt Containers, Straws
#6 PS	Poly Styrene, Beverage Containers, Packaging Materials, Take-out Food Containers, Packing Popcorn
#7 Other	Products Labeled #7, Unlabeled Plastic Items
Aerosol Cans	Spray Cans
Air Filters	Furnace Filters, Vehicle Filters
Aluminum	Aluminum Parts and Products
Aluminum F & B Cans	Aluminum Food and Beverage Cans, Pop Cans
Aluminum Foil / Wrappers	Food Wrappers and Packaging
Batteries	Dry Cell Batteries, Large Batteries
Boxboard	Cereal, Tissue Box Material
Building Material	Construction Material, Drywall, Insulation
Bulbs	CFL, LED, Fluorescent Bulbs and Tubes
Ceramics	Objects Formed with Clay (e.g. Pottery)
Coffee Grounds	Used Coffee Grounds
Coloured Glass	Coloured Beverage Bottles and Jars
Cooking Grease	Fats, Oils and Grease
Compostable Containers	Compostable Take Out Containers, Paper Plates
Cores and Tubes	Paper-Based Cores and Tubes
Courier and Shipping Bags	Poly Mailer Bags
Clear Glass	Clear Beverage Bottles and Jars
Drinking Glass	Glass Cups, Wine Glass
Electronics	Cables, Computer Equipment, Toasters, TVs, Phones, Printers
Face Coverings	Surgical Masks, Dust Masks, N95 Masks
Floor Sweepings	Debris, Dust
Furniture	Chairs, Desks, Lamps, Shelves
Hygiene Materials	Feminine Hygiene Materials, Disposable Diapers, Cloth Diapers
Kraft Paper	Paper Bags, Heavy Brown Paper
Label Paper	Sticker Paper
Liquid in Container	Significant Liquid in Bottle, Container or Cup
Magazines	Glossy Magazines and Newspapers
Metal Banding	Metal Straps
Molded Pulp	Drink Trays, Egg Cartons, Product Packaging
Misc. Metals	Metal Shavings, Nuts and Bolts, Metal Clothes Hangers, Scrap Metal
Misc. Plastics	Plastic Utensils
Misc. Textiles	Rags, Mop Heads, Cloth Gloves

<b>Mixed Material Packaging</b>	Condiment Containers, Envelope with Window, Miscellaneous Product Packaging
<b>Napkins</b>	Paper Napkins and Tissues
<b>Newsprint</b>	Newspapers, Weekly Flyers
<b>Nitrile and Latex Gloves</b>	Nitrile and Latex Gloves
<b>OCC</b>	Old Corrugated Cardboard
<b>Paint Cans</b>	Empty Paint Cans
<b>Pallets and Skids</b>	Wooden Pallets and Skids
<b>Paper Cups</b>	Paper or Polycoated Cups
<b>Paper Towels</b>	Paper Hand Towels
<b>Personal Clothing</b>	Used Shirts, Uniforms, Hats
<b>Photo Paper</b>	Glossy Paper
<b>Plants / Flowers / Yard Waste</b>	Indoor and Outdoor Plants, Flowers, Leaves, Yard Waste
<b>Plastic Cutlery</b>	Plastic Forks, Spoons, Knives, Stirring Sticks
<b>Plastic Strapping</b>	Plastic Shipping Straps, Plastic Banding
<b>Polycoat</b>	Milk Cartons, Tetra Packs
<b>Polyfoam</b>	Foam Protective Packaging Materials, Styrofoam
<b>Post-Consumer Waste</b>	Scrap Food Waste
<b>Pre-Consumer Waste</b>	Food Preparation Waste
<b>Rubber Tubing</b>	Cable Protection, Metal Coverings, Pipe Fittings
<b>Safety Gear</b>	Safety Vests, Jackets, Harness, Safety Toe Covers, Work Gloves
<b>Scrap Wood</b>	Construction Materials, Misc. Wood Pieces
<b>Shoes and Boots</b>	Assorted Footwear
<b>Shrink Wrap</b>	Shrink Wrap, Plastic Film
<b>Single Use Beverage Pods</b>	K-Cups and Pods
<b>Steel</b>	Steel Food Cans, Steel Parts and Products
<b>Stir or Chop Sticks</b>	Wooden Stir or Chop Sticks
<b>Tires</b>	Car Tires, Forklift Tires
<b>Tissue Paper</b>	Thin Packing Paper
<b>Wax Paper</b>	Paper for Wrapping or Packaging
<b>Wet Strength Paper</b>	Wet Strength Kraft Paper, Medical Paper
<b>White/ Ledger/ Office Paper</b>	White Paper, Printer Paper
<b>Wood Shavings</b>	Scrap Construction Shavings and Debris
<b>Wooden Crates</b>	Shipping Crates