



# Niagara College Canada Waste Audit Report 2012

Niagara College – Welland and Glendale Campus

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## EXECUTIVE SUMMARY

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A solid non-hazardous waste audit was conducted for the Niagara College Welland Campus located at 300 Woodlawn Road, Welland, Ontario L3C 7L3, and Niagara College Glendale Campus located at 135 Taylor Road, Niagara-on-the-Lake, Ontario L0S 1J0 between February 11<sup>th</sup> and March 5<sup>th</sup>, 2013. The purpose of the audit is to comply with Ontario Regulations 102/94 and 103/94. The regulations stipulate that all educational institutions with more than 350 full time students enrolled at the facility must conduct a solid waste audit on an annual basis. Beyond provincial legislation, a solid waste audit can provide useful information for a facility to reduce the solid waste generated. It can also assist in identifying potential cost savings associated with the disposal of solid waste. Information gathered during the solid waste audit may provide insight into wasteful activities currently taking place at the Welland campus. In fall 2011, Niagara College set a diversion rate target of 65%, consistent with the Niagara Region target.

The Environmental Management and Assessment Post-Graduate students conducted nine waste audits on the facilities at the Niagara College Welland and Niagara-on-the-Lake Campus's as part of their curriculum requirements in their Pollution Prevention course taught by Taryn Wilkinson. The waste audit reports submitted by the students were then combined and consolidated by Taryn Wilkinson, the Environmental Project Coordinator for Niagara College, as well as Gina Pannunzio, the Sustainability Engagement Assistant. Each waste audit group followed a very similar procedure to ensure accuracy and consistency.

Results revealed in 2012, Niagara College generated a total of 772,195.96 kg of solid non-hazardous waste between both campuses. Of this total, 284,815.61 kg was recycled, 150,202.11 kg was composted, 17,743.07 kg was re-used and 319,435.17 kg was sent to landfill. Niagara College Glendale campus generated approximately 362,025.50 kilograms of solid non-hazardous waste on an annual basis. Of this total, 246,135.62 kilograms was recycled, 4,307.40 kilograms was re-used, and 112,140.86 kilograms were composted. A total of 111,582.48 kilograms was sent to landfill, which translates to a diversion rate of 69.18%. The Welland Campus generated approximately 410,170.36 kilograms of solid non-hazardous waste on an annual basis. Of this total, 150,637.38 kilograms was recycled, 13,435.67 kilograms was re-used and 38,409.72 kilograms were composted as organics. A total of 207,852.59 kilograms were sent to landfill. These results indicate that the overall Niagara College diversion rate for 2012 was 58.63%.

Many recommendations are also included and will form the basis of the waste reduction work plan. The waste reduction work plan will outline the recommended initiatives that Niagara College should implement to further reduce solid waste generation to both campus's standing with respect to the provincial waste reduction target. In particular, focus should be given to the practices of managing and disposing Construction and Demolition waste. The waste reduction work plan must be updated on an annual basis once the results of the annual waste audit are completed. The recommendations follow the waste reduction hierarchy: Source Reduction, Recycling (offsite) Treatment and Disposal.

## **1.0 Introduction – Facility Review and Operations**

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A solid, non-hazardous waste audit was completed for the Niagara College Welland campus to ensure compliance with Ontario Regulations 102/94 and 103/94. The facilities included in this audit were located at the Niagara College Welland campus at 300 Woodlawn Road in Welland, Ontario, as well as the Niagara-on-the-Lake campus at 150 Taylor Road in Niagara-on-the-Lake, Ontario. The main scope of the waste audit was to comply with Ontario Regulations 102/94 and 103/94. This regulation stipulates that all educational institutions with more than 350 full time students enrolled at the facility must conduct a solid waste audit on their solid waste stream and that the audit must be conducted on an annual basis. The Ministry of the Environment (MOE) requires that a solid waste audit address three main aspects. These include:

1. The nature, amount and composition of the waste generated in functional areas,
2. The manner in which the waste is generated including any relevant management policies and/or procedures; and
3. The manner in which the waste is managed after its generation

Niagara College has more than 350 students enrolled at the Welland and Niagara-on-the-Lake campus and therefore must comply with Regulation 102/94. The objective of this regulation is to achieve the provincial waste reduction and diversion goal of 60% by the year 2008. This provincial goal acts as a benchmark for institutions to gauge their waste reduction progress.

As well as achieving compliance with pertinent provincial legislation, a solid waste audit can provide useful information for a facility to reduce the solid waste generated. It can also assist in identifying potential cost savings associated with the disposal of solid waste. Information gathered during the solid waste audit may provide insight into wasteful activities currently taking place at the Welland campus. Recommendations will focus on these activities and will form the basis of the waste reduction work plan. The waste reduction work plan will outline the recommended initiatives that Niagara College should implement to further reduce solid waste generation and improve the Welland campus's standing with respect to the provincial waste reduction target. The waste reduction work plan must be updated on an annual basis once the results of the annual waste audit are completed.

The solid non-hazardous waste audit for Niagara College was conducted between February 11<sup>th</sup> and March 5<sup>th</sup>. The waste audit results for Niagara College have been compiled in section 2.0 and recommendations that will be utilized to formulate the waste reduction work plan are located in section 3.0.

## 2.0 Waste Audit Results

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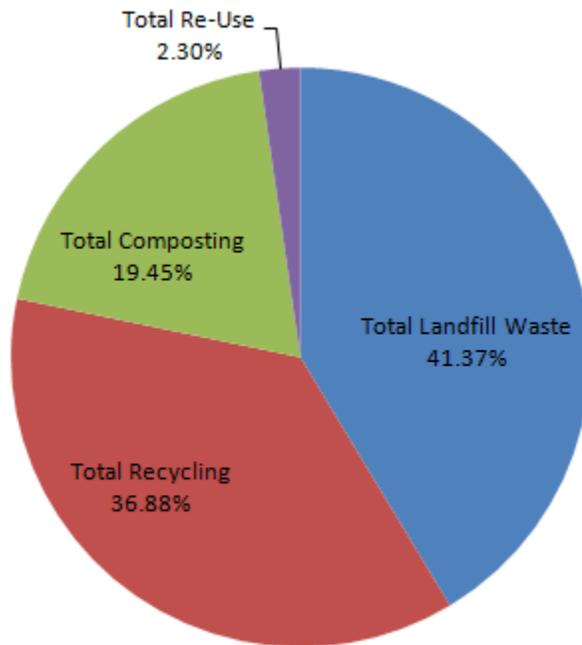
The following sections outline the results for Niagara College as well as the results of the recycling programs. The waste stream composition, recycling stream composition and re-use stream composition are also included in this section.

### 2.1 Niagara College Wide Results

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Results revealed in 2012, that Niagara College generated a total of 772,195.96 kg of solid no-hazardous waste between both campuses. Of this total, 284,815.61 kg was recycled, 150,202.11 kg was composted, 17,743.07 kg was re-used and 319,435.17 kg was sent to landfill. This translates to a diversion rate of 58.63%. Figure 1 and Table 1 summarize the overall waste diversion for Niagara College in 2012.

**Figure 1. Niagara College Overall Waste Diversion**



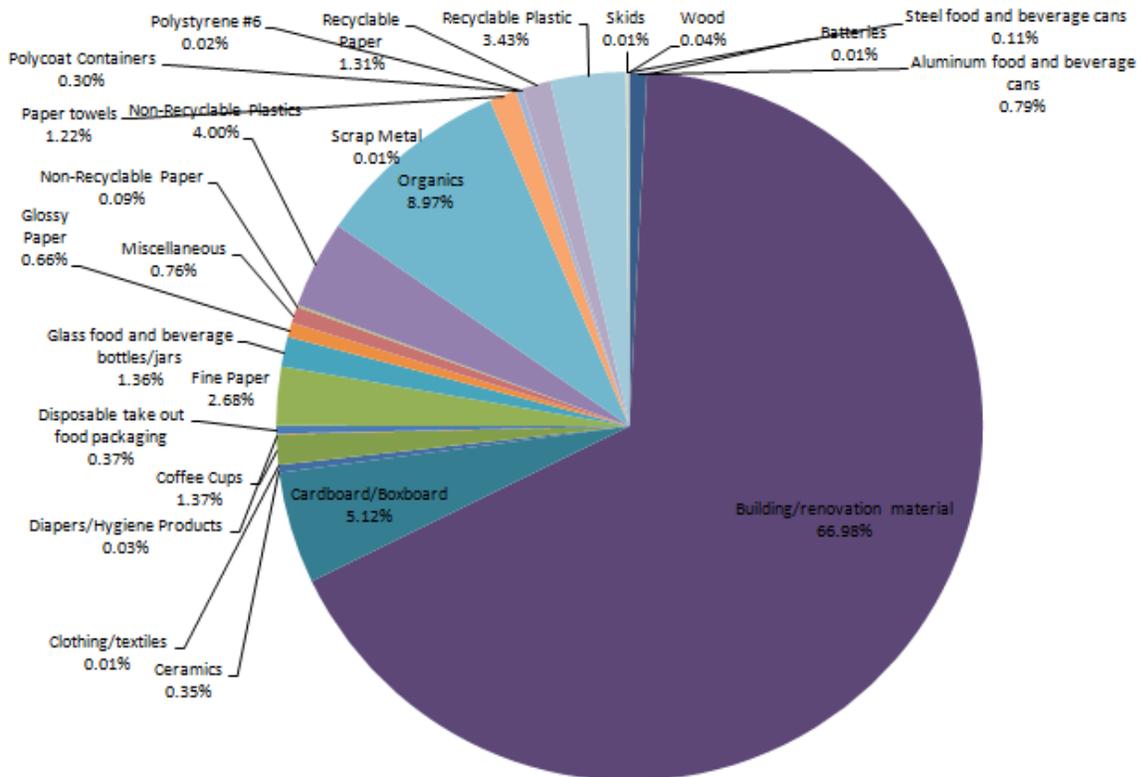
**Table 1. Summary of Niagara College Wide Solid Non-Hazardous Waste 2012**

Waste Stream	Total Waste (kg)	Annual Composition (%)
Total Landfill Waste	319,435.17 kg	41.37%
Total Recycling	284,815.61 kg	36.88%
Total Composting	150,202.11 kg	19.45%
Total Re-Use	17,743.07 kg	2.30%
Total Diverted Material	452,760.79 kg	58.63%
<b>Total Waste Generated</b>	<b>772,195.96 kg</b>	<b>100.00%</b>

## 2.2 Niagara College Wide Overall Landfill Waste Results

Niagara College generated a total of 319,435.17 kg of solid non-hazardous waste, which was sent to landfill. Of this total, the largest portion of the waste was from the Building/Renovation Material stream, comprising of 66.98%. Organics (8.97%), Cardboard/Boxboard (5.12%) and Non-Recyclable Plastics (4.00%) comprised of majority of the material sent to landfill as well. Figure 2 and Table 1 summarize the total regular waste stream composition for Niagara College in 2012.

**Figure 2. Niagara College Total Solid Waste Composition**



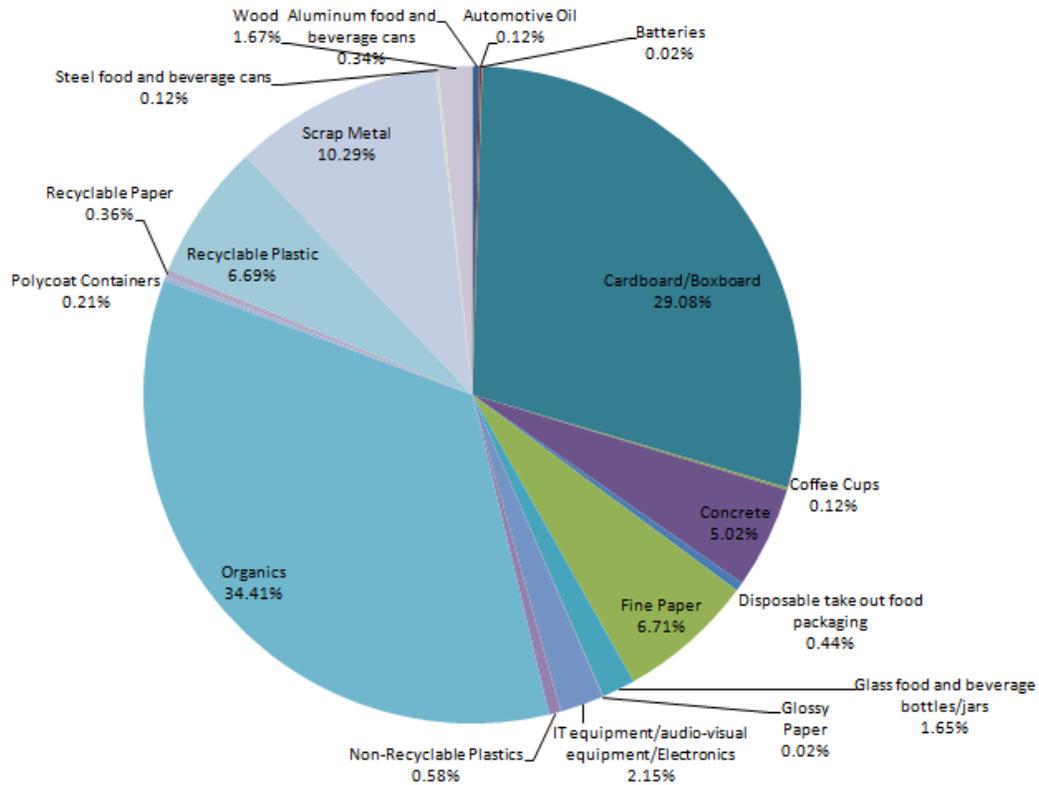
**Table 2. Niagara College Total Solid Waste Composition**

<b>MOE Classification</b>	<b>Niagara College TOTAL (kg)</b>	<b>Annual Composition (%)</b>
Aluminum food and beverage cans	2517.97kg	0.79%
Batteries	45.00 kg	0.01%
Building/renovation material	213956.08 kg	66.98%
Cardboard/Boxboard	16342.04 kg	5.12%
Ceramics	1119.00 kg	0.35%
Clothing/textiles	23.85 kg	0.01%
Coffee Cups	4380.57 kg	1.37%
Diapers/Hygiene Products	106.00 kg	0.03%
Disposable take-out food packaging	1180.31 kg	0.37%
Fine Paper	8568.10 kg	2.68%
Glass food and beverage bottles/jars	4351.00 kg	1.36%
Glossy Paper	2114.42 kg	0.66%
Miscellaneous	2422.26 kg	0.76%
Non-Recyclable Paper	288.36 kg	0.09%
Non-Recyclable Plastics	12784.90 kg	4.00%
Organics	28655.44 kg	8.97%
Paper towels	3907.51 kg	1.22%
Polycoat Containers	959.78 kg	0.30%
Polystyrene #6	52.90 kg	0.02%
Recyclable Paper	4184.28 kg	1.31%
Recyclable Plastic	10959.12 kg	3.43%
Scrap Metal	20.00 kg	0.01%
Skids	23.48 kg	0.01%
Steel food and beverage cans	343.30 kg	0.11%
Wood	129.40 kg	0.04%
<b>TOTAL</b>	<b>319435.07 kg</b>	<b>100.00%</b>

### 2.3 Niagara College Wide Recycling Results

Niagara College diverted Organics (34.41%), Cardboard/Boxboard (29.08%), Scrap Metal (10.29%), Recyclable Plastic (6.69%) and Concrete (5.02%), through the recycling stream. Figure 3 summarizes all of the recycling streams the college used in 2012, and Table 4 summarizes the annual compositions of each stream.

**Figure 3. Niagara College Recycling Waste Composition**



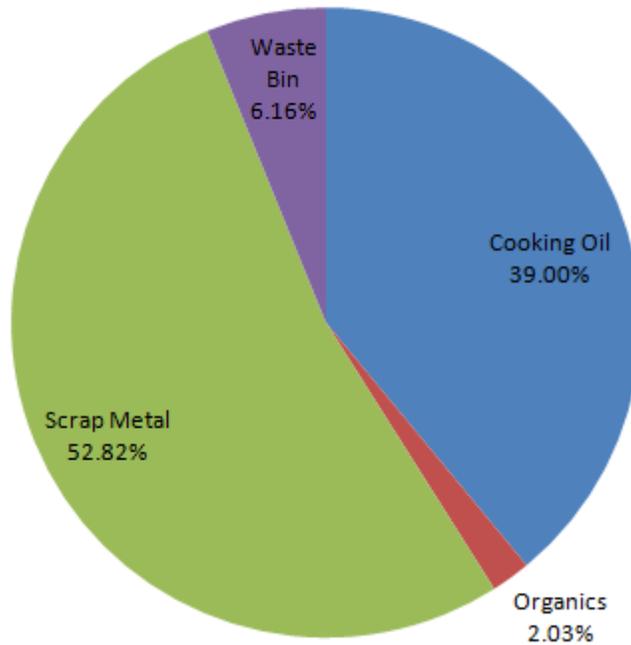
#### 4. Niagara College Recycled Waste Composition Summary

<b>MOE Classification</b>	<b>Niagara College Overall Recycling</b>	<b>Annual Composition (%)</b>
Aluminum food and beverage cans	1477.17 kg	0.34%
Automotive Oil	505.30 kg	0.12%
Batteries	95.50 kg	0.02%
Cardboard/Boxboard	126493.57kg	29.08%
Clothing/textiles	40.00 kg	0.01%
Coffee Cups	513.47 kg	0.12%
Concrete	21827.00 kg	5.02%
Disposable take-out food packaging	1900.61 kg	0.44%
Fine Paper	29177.14 kg	6.71%
Glass food and beverage bottles/jars	7161.21 kg	1.65%
Glossy Paper	84.29 kg	0.02%
IT equipment/audio-visual equipment/Electronics	9343.18 kg	2.15%
Miscellaneous	47.70 kg	0.01%
Non-Recyclable Plastics	2512.19 kg	0.58%
Organics	149688.64 kg	34.41%
Polycoat Containers	909.19 kg	0.21%
Recyclable Paper	1559.07 kg	0.36%
Recyclable Plastic	29111.61 kg	6.69%
Scrap Metal	44783.36 kg	10.29%
Steel food and beverage cans	530.04 kg	0.12%
Wood	7257.48 kg	1.67%
<b>TOTAL</b>	<b>435017.72 kg</b>	<b>100.00%</b>

## 2.4 Niagara College Overall Re-Use Waste Composition

The re-use program consisted of four waste streams, and Scrap Metal (52.82%) was the largest contributor, due to the old chiller sent away from the Welland Campus in 2012. Additionally, Cooking Oil was a significant stream, consisting of 39.00% of the re-use program. Figure 5 and Table 3 summarize all material that was re-used at Niagara College in 2012.

**Figure 5. Niagara College Re-Use Waste Composition**



**Table 3. Niagara College Re-Use Waste Composition**

MOE Classification	TOTAL(kg)	Annual Composition (%)
Cooking Oil	6919.00 kg	39.00%
Organics	360.00 kg	2.03%
Scrap Metal	9371.67 kg	52.82%
Waste Bin	1092.40 kg	6.16%
<b>TOTAL</b>	<b>17743.07 kg</b>	<b>100.00 %</b>

### 3.0 Recommendations

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The following list of recommendations may provide the basis of the waste reduction work plan. Recommendations will be made in order or priority according to the Environmental Management Hierarchy:

1. Source Reduction
2. Recycling (offsite)
3. Treatment
4. Disposal

Top priority is always given to source reduction initiatives since it is through these that resource consumption is minimized. It is also where the most significant cost savings occur for a facility. Money is not only saved in the reduction of disposal costs but also in the purchasing and consumption of those resources as well. Recycling is the second priority because it still involves the consumption of that resource to a certain extent. Money is saved in disposal costs when recycling opportunities are maximized but it still requires the replenishment of resources in the end.

#### 6.1 Source Reduction Recommendations

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1. A considerable amount of Coffee Cup and Disposable Take-Out Food Packaging waste can be prevented from entering the solid waste stream by encouraging the use of reusable food containers and travel mugs. Students and employees can be engaged to participate in a source reduction campaign by increasing awareness of source reduction principles, and provide an incentive such as a discount for those who provide their own food containers and travel mugs.
2. To address the amount of paper found in the waste stream, an increase in the use of Blackboard and other electronic resources should be promoted and encouraged by all employees and students to reduce a significant amount of paper being used at the college. Educational resources and engagement tools should be used to promote these reduction and prevention practices.
3. A number of non-recyclable plastic food containers were discovered in the waste streams that are derived from both on and off campus food establishments. It is recommended that the food establishments on campus stop offering non-recyclable packaging, and consolidate all material types in relation to the material available from CFWI. This material is recyclable and compostable, and when properly disposed of, will not enter a landfill.
4. In addition to introducing more recyclable and compostable take-out containers on campus, this material can also be established within the Residences, in replacement of non-recyclable or non-compostable materials. It was found within the Residences that a lot of take-out material enters the landfill, and by switching to more sustainable options, this material could potentially be diverted from the landfill.
5. A considerable amount of Paper Towels were found in some of the Washrooms at Glendale Campus such as CFWI, Brewery and Winery. To eliminate the need for

Paper Towels, the college should continue to install hand driers in the washrooms.

6. While conducting the weighing and sorting, there were a number of garbage bags within other bags with very little waste in them. It is recommended that bins with little to no garbage be left until they are more than halfway full or emptied into another bin to avoid disposing of more garbage bags than necessary. In particular, the washrooms have small garbage bins due to the small volume of waste produced, which can be carried out in other waste generating areas as well, as needed.

## 6.2 Recycling Recommendations

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1. By increasing either the number of four-tier waste collection bins, or adding individual composting bins alongside single stream bins that are found within Offices, Washrooms, Hallways, and other areas can increase the amount of organics and recyclable materials captured, contributing to the recycling programs at the college.
2. During the audit process, it was found that a large portion of solid waste generated within the Residence buildings was organic food waste from culinary students. There are currently no available compost containers within the Residences, and it is recommended to implement this program as soon as possible, to further increase organics capture rates, and diversion from the landfill.
3. In addition, recycling containers and accompanying guides should be provided to all students living in the Residences. Larger recycling multi stream receptacles should be also located on each floor and in common areas of the Residence, as students can use these receptacles to empty the recycling boxes from their rooms and sort them into the necessary categories. An adjustment to the collection system would have to accommodate for the additional containers, and an increase in capture rates and diversion rates should be noticed immediately.
4. Engagement strategies should be implemented to modify the recycling habits and increase awareness on campus in an effort to divert more recyclable materials away from the waste stream. Engagement strategies can include volunteers guiding students and employees on waste disposal, increase signage with photos of waste materials, have information available electronically for those who would like to see the information displayed in a guide and provide resources for faculty in the classrooms to provide to their students.
5. To further enhance the effectiveness and importance of campus engagement, focus on waste management, and the available waste streams is critical to a successful program. Employees and students should be made aware constantly and consistently about the various waste streams that are on campus. In particular, students should know that there are electronics and battery collection programs available.
6. During times of renovation, demolition or construction, proper disposal and separation of the material entering the landfill should be taken. As Building Renovation material comprised of a large portion of waste from the Welland

campus, taking time to evaluate what is going to be land filled or separated can allow Niagara College to dispose of building material more responsibly.

### 6.3 Treatment Initiatives

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1. Upon the implementation and success of the Greenhouse Composting program, avoiding material that may contain pathogens originally will allow for the composting program to get established without the fear of pathogens in compost materials. The composting program could be reassessed in the future once it is established to determine if including other forms of organic waste from the culinary building and food generation areas would be environmentally, socially and economically viable.
2. In order to decrease the amount of organic contamination within both the waste and recycling streams, students in Residence should be encouraged to rinse out bottles and containers, and separate the caps into the waste bins. Information resources such as signage can be created as a reminder and placed within communal disposal areas such as within the kitchen and common areas on each floor.
3. In order to treat more cardboard, a recommendation to install a cardboard bailer within the CFWI space can open up an opportunity to eliminate the use of two waste hauler companies, consolidating the pick-up to campus wide, and creating a revenue stream.

### 6.4 Initiatives in Disposal of Waste

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1. Ensure waste is being placed in the proper receptacle through educational campaign and other interactive and available engagement strategies. In particular, a large portion of the organics generated (including Coffee Cups) were found within the solid waste stream. It would be a very valuable initiative to focus on Organics diversion from the landfill, by promoting the new organics streams, and provide educational resources surrounding this practice. Also provide education on what can and cannot be placed in the blue and grey bins through educational signs and campaigns throughout the school.

### 6.5 Other Initiatives

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1. It is strongly recommended that Niagara College Glendale Campus continue to ensure that a solid waste audit is conducted on an annual basis. This will help monitor progress and provide new opportunities for better waste management practices in the future. In addition, a Waste Reduction Work Plan should be updated annually to reflect information gathered during the audit. Completion of these activities will ensure compliance with Regulation 102/94 and 103/94.
2. It would also be beneficial to develop a more detailed classification system to use for future waste audits. A more comprehensive understanding of Niagara College waste streams was gained since last year's audit, and focus on the variety of streams should take place. There were a number of classes that were combined that could be kept separate to help identify specific materials that can be targeted in the waste stream. For example separate classifications for fine paper and newspaper could be

used which could help identify where recycling receptacles should be placed. As well as if other initiatives would be more effective, such as web-based news instead of newspapers. Other classifications may include:

- a. Vegetation and Food Waste
  - b. Coloured Glass and Clear Glass
  - c. Specific metal types (iron, aluminum, tin etc.)
  - d. Plastic types (#1 -7)
  - e. School disposable containers and off-campus containers
  - f. Water bottles
3. It is also recommended that communication between upper management, staff and faculty and the students within the school improves. There was some difficulty conducting the waste audit and if communication improved it would help speed the process along. It is also important to communicate to custodial staff the importance of waste audit compliance and the labelling process. This will streamline the waste audit process in the future. The results of this waste audit should be shared with the students and campaigns should be introduced that can help to increase the diversion rate.
  4. Additionally, a non-divertible waste category was included in the student Glendale and Welland audit. This category is not typically included in waste audits, particularly when the amount weighed in this category is more than five percent of the total weight for the building. Measures to make the students aware of this for next year will be taken, to increase the amount of sorting they need to do to collect representative data.
  5. A clothing donation collection container implemented within the Residences, as well as in the Main Building can encourage students to bring in gently used clothing they no longer want or need. The college can donate these items to a charity within the Niagara Region, which promotes sustainable principles, a re-use program and prevention of clothing entering the landfill.
  6. Another re-use program that the college can implement, could be hosting a Residence moving-out swap/sale during the last week of school, to encourage students to not throw out their unwanted items in the general waste stream that the college would be responsible for.