MUN (ST. JOHN'S CAMPUS) COMPOSTING PILOT PROJECT

NOVEMBER 2015

2014-15 HARRIS CENTRE - MMSB WASTE MANAGEMENT APPLIED RESEARCH FUND

THE HARRIS CENTRE Memorial University

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1. Acknowledgements

We would like to thank the Harris Centre, Multi-Materials Stewardship Board, Aramark, Dean of Arts Office, Sustainability Office and Grounds, Facilities Management, and MUN Botanical Garden for their support and assistance with this project.

2. Executive Summary

The Memorial University Botanical Garden, in partnership with the Sustainability Office (Facilities Management) and Aramark (Memorial's food services provider) implemented a composting program in the main dining hall on the St. John's campus. A three compartment concrete composting platform was constructed at the Botanical Garden to create a three pile static composting system. Raw fruit and vegetable waste from the "back-of-house" kitchen area of the dining hall was transported to the compost pile twice weekly. A 1:1:1 leaf mold/horse manure/sawdust mix was added to the organic matter to aid the composting process. Over 2,300 kg of food waste was diverted from the waste stream between February and May, 2015. Since the end of the project period, composting of food waste from the dining hall has continued.

3. Introduction

3.1 Project Background

Prior to this project, there was no campus-wide composting program or program dedicated to composting food waste from areas which serve food on the St. John's campus. There were composters in the Memorial University Community Garden for garden waste and at the Botanical Garden plant material and small amounts of food waste were composted on site. A campus-wide composting program was established at the Grenfell Campus over three years ago and has successfully diverted over 50 tons of organic waste from landfill.

In July 2013, a meeting was held at the main dining hall to discuss setting up a composting initiative on the St. John's campus to capture food waste. Attendees included: Aramark's Food Service Director, Executive Chef and Residence Dining Manager, MUN's Sustainability Coordinator, Botanical Garden's Horticulturist/Nursery Manager and MUN's Campus Food Strategy Group Coordinator. The outcome of the meeting resulted in some questions:

a) Is there a need for an organic waste and composting program at the dining hall?
b) What types of organic waste are presently produced by the dining hall?
c) Is there an existing site suitable to establish a composting operation?

All agreed that it was worthwhile pursuing a pilot composting project on the campus.

Prior to this pilot, there had been ongoing discussions and several meetings held with representatives from the Multi-Materials Stewardship Board (MMSB) and Memorial University

(Custodial Services, Sustainability Office, Grounds, Campus Food Strategy Group, Graduate Student Union, Biology Department, Housing, Food and Conference Services) to investigate possibilities for composting on campus.

3.2 Rationale

The waste audit conducted in 2011has shown that organic waste accounts for from ten to more than 40% of waste produced on the Memorial University St. John's campus depending on the location. With the dining hall providing dining plans to more than 1100 students, the production of organic waste on campus is growing.
The main dining hall with its high amount of food waste and necessary support from its management and staff was targeted for this project.

A composting program such as this is an important step toward Memorial University of Newfoundland Sustainability Declaration's vision as a "sustainable and progressive university in all areas of operation, education, research and outreach in providing leadership for today and future generations".

3.3 Project Objectives

The purpose of this project was to improve waste management and increase waste reduction at Memorial's St. John's campus by establishing a composting program for food waste from the kitchen of the main dining hall, while realizing a usable end-product (compost) for use at the Botanical Garden and other locations on campus such as the Community Garden.

This was achieved by setting up the process required to collect food waste from the kitchen, transport it the Botanical Garden on Mount Scio Road, and compost it in a newly constructed compost site.

It was hoped that by measuring the amount of organic waste collected we would be able to determine the amount of usable compost produced as an end product and that the procedures used would give insight into the best methods for composting large volumes of kitchen waste in our area.

The information gathered during this project would assist with determining the feasibility of a campus-wide (MUN, St. John's) organic collection and composting program.

3.4 Method

<u>Planning</u>

Prior to the start of this project, a waste audit of the dining hall (MUN, St. John's main campus) was completed by the Multi-Materials Stewardship Board with help from the Sustainability Office. The audit provided data on all types of waste from the dining hall including pre-consumer (kitchen) food waste (raw fruit and vegetables) and other sources of food waste (eg. coffee grinds, salad bar, etc.) that can contribute to this composting project. This information was used to estimate the amount of food waste to be collected for composting on a weekly basis which in turn led to determining the type and size of containers needed and the trucking requirements.

Several meetings were held with representatives of the Botanical Garden, the Sustainability Office and the food services provider prior to the start of collection to determine the size and location of collection bins, pick up schedule, acceptable materials, communication process, data collection and other project logistics.

As this was a pilot project, the system of collection and locations of bins was assessed and adjusted throughout the project.

Site Preparation

A new compost bin was required at the Botanical garden as the existing compost bin could not accommodate the additional compostable material to be collected during this project. The new compost platform was designed by Botanical Garden staff in consultation with Facilities Management and a suitable site with year round accessibility was chosen in the nursery area of the Botanical Garden. The (10'x30') concrete composting platform was constructed in the fall of 2014 consisting of a three bin open storage platform with a concrete floor, four foot concrete block walls and open front for easy access for delivery and mixing (Appendix 1). The size was determined by the anticipated volume of compostable material collected per semester plus the need for tractor accessibility. The three bin design was chosen to accommodate the composting finishing process providing the opportunity to stop adding new material to one pile and allowing that pile to finish the composting process while continuing to add material to a new pile in the next chamber. Three canvas tarps were purchased to cover each bin individually to protect the compost from the elements, specifically precipitation which can leach valuable nutrients from the finished product.

Compost Collection

Eight compost collection containers were purchased for the dining hall and identification signs were designed and printed for the containers. In consultation with Aramark kitchen staff it was decided that the best sized containers for the project based on available storage space and weight of filled containers would be 40 litre compost collection containers with lids, as these containers were to be lifted and emptied manually.

Four compost collection containers with lids were placed in the loading bay of the dining hall in early February 2015. To better accommodate the quantity of organic material available two containers were added in late February, for a total of six per pickup. Due to space limitations in the loading bay six was the maximum number of bins which could be accommodated at the dining hall site. The containers had to be kept indoors to avoid freezing. Dining hall staff collected raw fruit and vegetable waste from the kitchen area and placed it into the containers. Twice weekly (Tuesdays and Fridays) the containers were transported by Facilities Management staff in the back of a truck to the compost site at the Botanical Garden and a second set of clean containers was transported back to the dining hall after each drop off. Six additional 40 litre bins were procured for backup in the event of damage to existing bins to ensure that the maximum amount of compostable material was collected on each collection day without loss due to unavailability of compost collection bins.

At the compost site, Botanical Garden staff weighed the contents of the bins using a hand held luggage scale and placed this organic material into one of the chambers of the compost platform. The containers were rinsed out and left to dry in the nursery greenhouse in preparation for return to the dining hall on the next collection day.

Each month during the project 45 kg of equal parts leaf mold/horse manure and sawdust was added and mixed using a tractor with the compost material in the bin. This material was added to ensure appropriate carbon content in the high nitrogen compost pile and aid with the composting process. The amount added was determined by previous composting experience of the nursery manager.

4. Results and Discussion

This project focused on a simple, low cost method of composting requiring a low input of labour. It did not attempt to collect all types of food waste, but only those appropriate to this type of composting set-up.

This project collected the following data and information:

- Amount of food waste (raw fruit and vegetable collected in the kitchen of the dining hall) delivered to the Botanical Garden on a twice weekly basis (Feb 13 – May 1, 2015)
- Time required and cost of trucking from the dining hall to the Botanical Garden
- Time and labour required to manage compost at the Botanical Garden
- Amount of other materials added to the food waste for successful composting
- Amount of excess organic kitchen waste from dining hall not diverted from the waste stream due to capacity issues
- Time permitting, information from other areas on campus with high food waste and organizations near the campus that may be interested in composting

The project began with the construction of a 3 compartment compost bin built at the Botanical Garden. The construction of the compost bin took longer than expected due to a back log of project requests at Facilities Management and was completed in the fall of 2014.

Between February and May, 2015, 2,300 kg of food waste produced at the main dining hall, MUN St. John's campus was diverted from the waste stream (Appendix 2). This amount represents the majority of organic food waste from the dining hall during this time. There were times when the collection bins in the dining hall could not accommodate the total amount of organic waste produced. Two additional bins were added to each cycle helping with the collection of the excess organic material produced but there were still times when the increased number of bins was not adequate to collect all the organic waste produced. Due to space limitations in the kitchen area the number of compost collection bins could not be increased further. Changing the bin size was also not an option as the weight of the larger bins would be

too heavy to handle manually. Increasing the number of pick up days was also considered but was not an option as the Facilities Management resources assigned to the project were at maximum available capacity. To ensure that 100% of the organic waste from the dining hall is diverted to compost, the process developed during this pilot project would have to be adjusted. Possible improvements could be one or all of the following: a larger space in the kitchen area of the dining hall to allow for an increased number of compost bins, the number of pickup days increased, and larger collection bins if a mechanical means was available at both sites to load and unload the bins.

This project required the input of time from three major groups: kitchen staff at the dining hall, Facilities Management staff, and the MUNBG staff at the compost bin site.
The time cost for the dining hall staff was not determined during the project and was expected not to be significantly different from the disposal of the organic material whether it was to be composted or discarded with other kitchen waste.
The time allotted for the transport of the organic material to the Botanical Garden twice weekly was the maximum amount of time which could be accommodated by Facilities Management at a charge of $1,102 for 30 deliveries between February and May, 2015 (~$40 per pickup/delivery). If the project was to expand in the future an outside transportation provider would need to be hired to provide a more frequent pick up/drop off schedule. We were not able to determine the cost of having an outside contractor transport the organic material during the pilot project due to delays in the tendering process. This cost will have to be investigated further to determine if an expansion would be feasible. The original plan was to have a contractor pick up and transport the compostable materials to the Botanical Garden. Due to a delay in getting a contract put in place and the requirement to start the project, Facilities Management Ground staff was tasked with the twice-weekly pick up of the containers. This created a couple of challenges for the project: it was not determined what the cost of this service would have been if done by a contractor; it was sometimes difficult to stay on schedule for pick up since Facilities Management grounds staff have a priority to snow clear in the winter; the number of pick-ups could not be increased without taking staff away from other tasks.

The time spent by Botanical Garden staff involved with the weighing and dumping of the organic material, the washing of the compost bins and the adding of the carbon rich mixture and the mixing of the compost pile was 15 hrs at a $30/hr ($15 per pickup/delivery)

One major challenge with this project was determining of amount of compost produced. Due to the short timeline of the project it was not possible to measure the usable compost as the composting process is not yet complete. Adding compost to the original pile ceased in May, 2015. At that time there was a rodent problem in the loading bay of the dining hall which may have been caused by the presence of organic material which had spilled from the compost containers. Dunnage racks were purchased and the compost bins were placed on these racks. These racks kept the bins above floor level allowing access for cleanup of spilled organic material. Compost collection resumed in July 2015. The organic material from the subsequent deliveries is being kept separate from the material collected during this project and is being added to another compartment of the compost bin. The original pile of compost will be

monitored on a regular basis to determine the time needed for 2,300 kg of compost to complete the cycle and be ready for use and the amount of usable material produced.

Due to time constraints of the dining hall staff, the excess organic material not diverted during this project was not measured. At times there was excess material and changes were implemented during the project to help reduce this excess material from the waste stream.

5. Implementation Recommendations

The knowledge gained through the hands-on experience of this pilot project will provide the information required for the development of a plan for composting waste from all areas of the St. John's campus in the future.

Since the official end of the project, Facilities Management - Grounds, Aramark, the Sustainability Office and the Botanical Garden have agreed to continue the project providing all staff time in-kind. Dining hall staff will continue to divert the organic waste into the compost bins, Facilities Management continues to provide transportation of the organic material from the dining hall to the Botanical Garden, and Botanical Garden staff will continue to manage on-site operations.

There have been discussions about including composting of the organic waste from the new kitchen area in Hatcher House. The existing entrance does not allow for storage/pick-up of the compost bins and this challenge will have to be overcome before the expansion can occur. Increased transportation needs will also have to be addressed to expand pick-up.

This composting program will, with time, provide a valuable product for amending garden soils at the Botanical Garden or other areas on campus.

6. Knowledge Mobilization

Sustainability Day March 20, 2015 display at St. John's Campus
Compost Week (May 3-9, 2015) display at Botanical Garden (Photos of Project, Appendix 3)
'MUN (St. John's Campus) Composting Pilot Project'. Tim Walsh, Nursery Manager, The Twinflower, Newsletter of the Friends of the MUN Botanical Garden Inc., Summer 2015, p. 6 (Appendix 4)
Committee and other meetings attended by sustainability coordinator throughout the project where project overview/update was presented:

- Food Advocacy Research at Memorial (FARM) – group comprised primarily of faculty interested in food issues, chaired by Dr. Lynne Phillips , Dean of Arts and academic supervisor of this compost project

- Meeting of sustainability coordinator, Aramark (new director), and director of Ancillary Services
- Meeting of Facilities Management, Housing, Ancillary Services on sustainability- related issues and improvements to waste management
- University Sustainability Committee
- University Food Services Committee

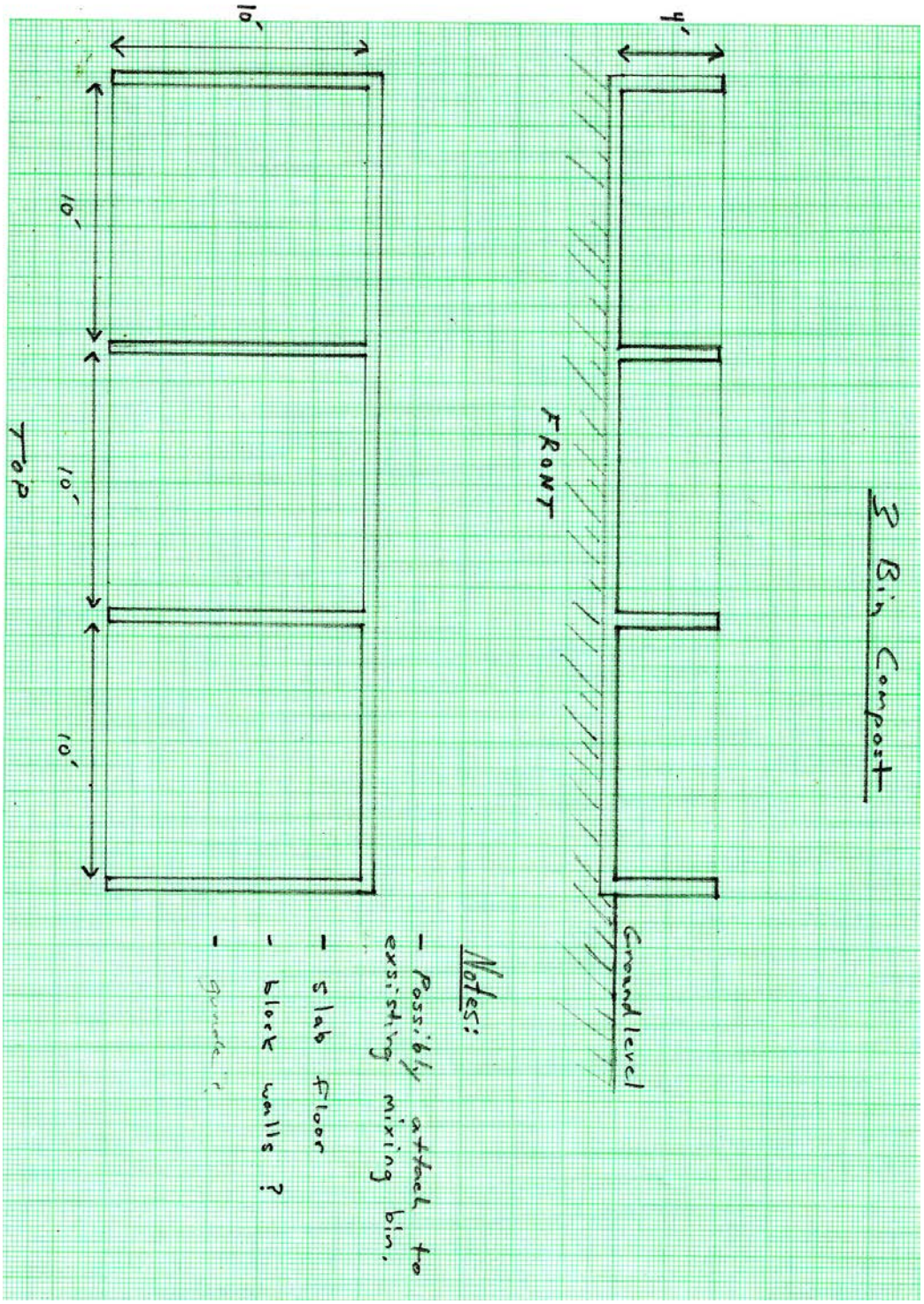
7. Conclusion

Despite the challenges and delays which were encountered at the start of the project, once underway the project ran smoothly with a large amount of compost (2,300 kg) being diverted from the landfill and being recycled to be used as a soil amendment at the Botanical Garden and areas where required on the main Memorial campus (St. John's). The success of the project has encouraged partners to continue this project and hopefully will lead to an expansion of the project in the future.

8. Appendices

Appendix 1 Design drawings of the compost platform
Appendix 2 Compost weight data table
Appendix 3 Project photos
Appendix 4 'MUN (St. John's Campus) Composting Pilot Project'. Tim Walsh, Nursery Manager, The Twinflower, Newsletter of the Friends of the MUN Botanical Garden Inc., Summer 2015, p. 6

Appendix 1


3 Bin Compost
4'
FRONT
Ground level
10'
10'
10'
10'
Top
Notes:
- possibly attach to existing mixing bin.
- slab floor
- block walls ?

Appendix 2

MUN (St. John's Campus)Composting Pilot Project

Weight (lbs) of Compost Delivered from MUN (main campus) Dining Hall

DATE	BIN #1	BIN #2	BIN #3	BIN #4	BIN #5	BIN #6	BIN #7	BIN #8	TOTAL
2015									
13-Feb-15	48.0	51.0	50.0	40.0					189.0
17-Feb-15	25.0	30.0	42.0	31.0					128.0
23-Feb-15	45.0	45.0	45.0	45.0					180.0
24-Feb-15	46.0	29.0	33.0	30.0					138.0
27-Feb-15	45.0	52.0	47.0	47.0	47.0	43.0			281.0
03-Mar-15	61.0	46.0	38.0	38.0	25.0	36.0			244.0
06-Mar-15	40.0	35.0	34.0	36.0	40.0	39.0			224.0
10-Mar-15	46.0	32.0	52.0	44.0	54.0	42.0			270.0
13-Mar-15	54.0	51.0	39.0	41.0	52.0	49.0			286.0
17-Mar-15	45.0	55.0	47.0	50.0	45.0	54.0			296.0
20-Mar-15	65.0	52.0	37.0	38.0	50.0	27.0			269.0
24-Mar-15	57.0	31.0	58.0	45.0	49.0	37.0			277.0
27-Mar-15	39.0	40.0	42.0	9.0	44.0	43.0			217.0
31-Mar-15	53.0	51.0	40.0	52.0	53.0	50.0	`		299.0
02-Apr-15	44.0	46.0	47.0	45.0	43.0	25.0			250.0
07-Apr-15	42.0	39.0	37.0	44.0	56.0	37.0			255.0
10-Apr-15	43.0	50.0	54.0	47.0	54.0	40.0			288.0
14-Apr-15	55.0	52.0	43.0	49.0	62.0	67.0			328.0
17-Apr-15	42.0	38.0	33.0	58.0	33.0	26.0			230.0
21-Apr-15	56.0	42.0	42.0	51.0	37.0				228.0
24-Apr-15	33.0	13.0	38.0						84.0
01-May-15	44.0	33.0	33.0						110.0
								Total:	5071.0
								convert to kg	**2300kg**

Appendix 3

#1 – Compost platform floor construction

#2 - Compost platform wall construction

#3 - Finished collection bins of the compost platform

#4 - Collection Bins

#5 - Dining Hall Staff filling collection bin

#6 - Joey Connors of MUN Botanical Garden Grounds Maintenance emptying bin

#7 – Compost Project display at Botanical Garden (Courtney MacDonald and Anna Tilley of MUNBG Visitor Services)

Appendix 4

MUN (St. John's Campus) Composting Pilot Project

By Tim Walsh, Nursery Manager

On April 2014 the Botanical Garden entered into new and yet very familiar territory. With help from a grant from the Harris Centre, MMSB Waste Management Applied Research Fund and in partnership with Memorial's Sustainability Office, the MUN (St. John's Campus) Composting Pilot Project began. The purpose of this pilot project is to establish a composting program within Memorial's St. John's campus by collecting and composting organic food wastes from the kitchen of the main dining hall located at MUN's main campus.

In cooperation with campus dining services Aramark Canada Foods, organic kitchen waste from the dining hall is collected in specially marked bins and trucked to the Botanical Garden twice weekly by Facilities Management staff.

A three-bin concrete composting platform was constructed in the fall of 2014 and the first delivery was made February 2015. To date more than 2200 kgs (4850 lbs) has been delivered to the site.

While diverting organic food waste, the project will result in a usable end-product (compost) for use at the Botanical Garden and other locations on campus such as the Community Garden. The pilot project will continue until June 30th 2015.

Top left: The compost bins being used at Aramark Canada—what can and cannot be used.
Middle left: Rod Brace from Aramark puts compostable material into the bins.
Lower left: Joey Connors, our grounds maintenance student, empties the bins into the compost area.
Top right: The compost area in the Garden constructed for the project.
Lower right: Courtney MacDonald and Anna Tilley, visitors services students, with our compost display during National Compost Week May 4-10, 2015