November 22, 2022

Jonathan MacDonald, Regional Director (Central)
Nova Scotia Environment and Climate Change
30 Damascus Road, Suite 115
Bedford, NS
B4A 0C1

Dear Jonathan MacDonald:

RE: Otter Lake Compliance Plan (Revised November 4, 2022)

Thank you for your correspondence on November 21, 2022, with respect to the Compliance Plan originally submitted on June 29, 2022, and re-submitted on November 4, 2022, by Halifax Regional Municipality (HRM) and Mirror NS Limited (Mirror NS), joint Approval Holders for the Otter Lake Waste Processing and Disposal Facility (Otter Lake).

Please find below responses to Nova Scotia Environment and Climate Change (NSECC) comments on the Compliance Plan. HRM can confirm that the statistical validity of the Performance Audit results will be continuously evaluated and that NSECC will be briefed periodically on the status of HRM's anticipated strategic review of the solid waste system. Additionally, attached to this letter is the Revised Compliance Plan, dated November 23, 2022.

Please do not hesitate to contact the Approval Holders with any comments or questions in response to this letter.

Sincerely,

[redacted]

Andrew Philopoulos. P.Eng., M.Sc.
Director Solid Waste Resources, HRM
[redacted]

(cc) Andrew Sullivan, Infrastructure Development & Sustainability Manager, Mirror NS

Comment 1

Household Special Waste (HSW) is considered synonymous with Household Hazardous and Special Waste (HHSW) and extends beyond the definition provided in Section 2.1 to include other items that residents commonly bring to HHSW depots, as outlined in Section 3.5. Please provide clarification around the definition of Household Special Waste, including the list of items that are intended to be captured under this definition.

Response

HSW included in the municipality's residential program has been added to the definition of HSW in the Compliance. As such, the definition of HSW in the Compliance Plan includes banned HSW per Schedule "B" – Designated Material Banned from the Destruction or Disposal in Landfills and Incinerators in the Solid Waste-Resource Management Regulations, as well as most items accepted as part HRM's residential HSW program.

The Compliance Plan has been updated in the Executive Summary, Sections 2 and 3.5, and Table 2.3.

Comment 2

Please confirm that HRM will maintain the current 17 mobile HHSW events per year as indicated in Section 3.5 of the Compliance Plan or will provide an alternative approach that can be shown to have an equivalent or greater capture rate of HHSW.

Response

HRM staff can confirm that 17 mobile HSW events have been implemented in 2022/2023 (fiscal year) and will be carried in the 2023/2024 fiscal year budget, subject to the approval of Halifax Regional Council.

HRM staff can confirm that any changes in future years to the HSW program would be intended to increase the capture rate of HSW (e.g., potentially expand the Permanent HSW Depot operation and reduce mobile HSW events in the future), subject to the approval of Halifax Regional Council.

A clarification has been added to the Section 3.5 of the Compliance Plan.

Comment 3

As outlined in Section 4.2 and in Table 5.1, the Compliance Plan includes an expansion in focus for curbside enforcement from operational aspects (e.g., health and safety, number of bags, etc.)

to the content of the bags and appropriate public education. NSECC understands this expansion-in-focus, will be reflected in changes to performance expectations and training/education for haulers as well as changes to performance audits of haulers by HRM's Operations and Education Teams. Please confirm that this is the correct interpretation.

Response

HRM can confirm that NSECC's understanding is correct. The modified procedures include hauler training, audits, and assessment of performance by HRM's Operations Team. Clarifications have been added to Section 4.2, and Tables E.1 and 5.1.

HRM's Education Team is also involved through supporting hauler training initiatives and assessing hauler performance through the Curbside Monitoring Program (as outlined in Section 3.2 of the Compliance Plan).

Compliance Plan

Otter Lake Waste Processing & Disposal Facility

Submitted to NS Environment and Climate Change

Prepared by:

Halifax Regional Municipality
Mirror Nova Scotia

Originally Submitted: June 29, 2022
Revised: November 4, 2022
Revised: November 22, 2022

HALIFAX

Executive Summary

On March 22, 2022 Nova Scotia Environment and Climate Change (NSECC) issued an updated Municipal Approval (2008-065580-07) for the Otter Lake Waste Processing & Disposal Facility (Otter Lake) allowing the Front End Processor and Waste Stabilization Facility (FEP/WSF) to be deactivated upon the submission and acceptance of a Compliance Plan in accordance with the Approval requirements. The Compliance Plan was originally submitted to NSECC on June 29, 2022, with the current version having been updated in response to comments received from NSECC on October 26, 2022 and November 21, 2022.

This Compliance Plan has been prepared to address the following Performance Targets outlined in Approval Condition 12 which states:

12. Performance Targets

a. *The Performance Targets for this Facility include:*
    i. *Compostable waste shall not exceed ten percent (10%) of total amount of municipal solid waste landfilled, by mass;*
    ii. *White Goods and bulky wastes that can be recycled and that can be safely removed from the solid waste delivery vehicle or the RDF tipping face shall be removed and stored in accordance with the approved Operations and Maintenance Manual;*
    iii. *Dangerous/Waste Dangerous Goods/Household Hazardous Wastes that are visible and can be safely removed from the solid waste delivery vehicle or the RDF tipping face shall be removed and stored in accordance with the approved Operations and Maintenance Manual.*
b. *As per Condition 3.a.iii), the Approval Holder(s) shall operate the facility in accordance with any new Standard adopted by the Department regarding compliance with landfill disposal of banned materials.*

In order to characterize the current composition of Compostable Waste in the incoming residential waste stream and to assess compliance with Performance Targets set in the Approval, a standard Performance Audit process was established. The purpose of the audits is to quantify the Compostable Waste banned from landfill disposal being received at the facility. Additionally, as requested by NSECC, the composition of Household Special Waste (HSW) and Small White Goods have also been added to the Performance Audits, starting in November 2022.

The Approval defines Compostable Waste as:

1. Definitions

g. *Compostable wastes means food wastes, perishables, corrugated cardboard, newsprint, leaf/yard wastes, and all other organic wastes listed in Schedule 'B" – Designated Materials Banned from the Destruction or Disposal in Landfills and*

Incinerators in the Solid Waste-Resource Management Regulations, as amended from time to time.

Additionally, the following definitions apply to this Compliance Plan:

- HSW:
    - Includes items listed in Schedule "B" – Designated Material Banned from the Destruction or Disposal in Landfills and Incinerators in the Solid Waste-Resource Management Regulations, as amended from time to time, including lead-acid (automotive) batteries, post-consumer paint products, ethylene glycol, used oil, used glycol, used oil filter, glycol containers, and oil containers.
    - Includes items accepted in HRM's residential HSW program including:
        - lead-acid (automotive) batteries
        - leftover paint
        - corrosive cleaners
        - gasoline
        - used motor oil and fuel
        - solvents and thinners
        - aerosol cans containing hazardous substances
        - propane tanks and cylinders
        - residential fire extinguishers
        - compact fluorescent light bulbs
- Small White Goods: Items such as toasters, microwaves, and coffee makers that would be mostly composed of metal materials that can be disposed of in garbage bags.

Performance Audits were completed in May and August 2022. Representative samples were collected from each of the eight residential curbside collection areas and from condos for each audit (i.e., 18 samples collected and total). Compostable Waste was determined to be 10.81%, slightly above the Performance Target of 10%. It is noted that a minimum of four quarterly Performance Audits are needed to baseline the composition of Compostable Waste, to address sample variation including temporal and seasonal considerations, and to fully assess compliance with the Performance Target. Focusing on reducing the amount of Compostable Waste is key in ensuring long-term compliance with the Performance Targets.

HRM plans to bring awareness to the importance of keeping Compostable Waste out of the garbage stream through public promotion of waste reduction and diversion options. Additionally, a new category will be introduced on the curbside residential collection education rejection stickers specifically related to Compostable Waste in the garbage stream and HRM will work with contracted haulers to inspect for the presence of these banned materials in the garbage stream.

The table on the following page summarizes the activities identified in this Compliance Plan, including timelines, to support meeting all Approval Performance Targets.

Table E.1: Compliance Plan Summary and Timelines

Waste Type	Initiative	New/ Modified Initiative	Details	Timeline
Public Education				
Compostable Waste	Campaign to reduce and divert Compostable Waste (Food Isn't Garbage)	New	Campaign focused on reducing and diverting Compostable Waste. Will include social media, print, radio ads and media interviews.	Start: July 2022 Run: 2022 and 2023
Compostable Waste, HSW, White Goods	Feedback Monitoring by HRM Education Team (i.e., education targeted to individual dwellings)	Modified	Currently complete Feedback Monitoring based on Curbside Monitoring Program[1]. To complete additional feedback monitoring based on Curbside Enforcement and Landfill Operations.	Ongoing
HSW	HSW Promotion/Education	Modified	Campaign addressing HSW disposal options, including for left over paint (including aerosol containers), batteries, propane cylinders, and used motor oil.	Start: July 2022 Run: 2022 and 2023
Curbside Enforcement				
Compostable Waste	Implement new stickering category - Compostable Waste	New	Create new category on education rejection stickers for Compostable Waste. Used for curbside collection enforcement.	Implement by November 7, 2022

[1] To better understand residential waste collection participation rates and set out habits, Curbside Monitoring has been performed annually since 2015. Each year, neighbourhoods in six to eight electoral districts are monitored for an eight-week period by HRM Solid Waste Education Team staff.

Waste Type	Initiative	New/ Modified Initiative	Details	Timeline
Compostable Waste, HSW, White Goods	Curbside Monitoring by HRM Operations Team	Modified	Previous monitoring focused on operational aspects such as health and safety. Modified initiative to periodically audit routes for hauler performance in applying education rejection stickers and verifying separate collection of white goods by HRM's Operations Team. This includes hauler training, audits, and assessment of performance, by HRM's Operations Team, in relation to the modified procedures.	Implement by November 21, 2022
Landfill Operations				
Compostable Waste, HSW, White Goods	Inspection of Incoming Loads/Tipped Loads and Rejections/Issuance of Waste Discrepancy Reports.	Modified	Continuation of inspection program at Otter Lake. Modified to reflect deactivation of the FEP/WSF with loads being directly tipped at the landfill.	Modified procedures to coincide with deactivation of the FEP/WSF
Compliance Plan				

Waste Type	Initiative	New/ Modified Initiative	Details	Timeline
N/A	Provide update to Compliance Plan after four Performance Audits are completed.	New	Performance Audits completed in May and August 2022 showed Compostable Waste to be 10.81%, slightly above the Performance Target of 10%. Four quarterly Performance Audits are needed to fully assess and baseline the composition of Compostable Waste. Within 30 calendar days of completing four Performance Audits, HRM and Mirror NS propose an update to this Compliance Plan be submitted to NSECC, specifically assessing audit results against the Compostable Waste Performance Target of 10% and identifying timelines/milestones to meet the Performance Target (if required).	Performance Audits planned for: May 2022 Aug 2022 Nov 2022 Feb 2023 Update to Compliance Plan to be submitted within 30 calendar days to NSECC upon completing the fourth Performance Audit.

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Section 1 – Introduction

On March 22, 2022 Nova Scotia Environment and Climate Change (NSECC) issued an updated Municipal Approval (2008-065580-07) for the Otter Lake Waste Processing & Disposal Facility (Otter Lake) allowing the Front End Processor and Waste Stabilization Facility (FEP/WSF) to be deactivated upon the submission and acceptance of a Compliance Plan in accordance with the Approval requirements.

This Compliance Plan has been prepared in accordance with Approval Condition 13.a. which states:

13. Site Specific Conditions

a. *Prior to the discontinuation of the use of the FEP and WSF, the Approval Holder(s) shall submit to the Department a Compliance Plan detailing how the facility will achieve its Performance Targets, complete with dates, as stated in Section 12, on or before July 02, 2022, or as amended in writing by the Administrator.*

    i. *At the direction of the Department, the Approval Holder(s) shall revise the Compliance Plan until accepted by the Department.*
    ii. *The FEP and WSF shall continue to be required components of the operation of the Facility until written notification is received by the Approval Holder(s) from the Department confirming acceptance of the Compliance Plan.*

Approval Condition 12 states:

12. Performance Targets

c. *The Performance Targets for this Facility include:*
    i. *Compostable waste shall not exceed ten percent (10%) of total amount of municipal solid waste landfilled, by mass;*
    ii. *White Goods and bulky wastes that can be recycled and that can be safely removed from the solid waste delivery vehicle or the RDF tipping face shall be removed and stored in accordance with the approved Operations and Maintenance Manual;*
    iii. *Dangerous/Waste Dangerous Goods/Household Hazardous Wastes that are visible and can be safely removed from the solid waste delivery vehicle or the RDF tipping face shall be removed and stored in accordance with the approved Operations and Maintenance Manual.*
d. *As per Condition 3.a.iii), the Approval Holder(s) shall operate the facility in accordance with any new Standard adopted by the Department regarding compliance with landfill disposal of banned materials.*

The purpose of the Compliance Plan is to address the requirements of Approval Condition 13.a. including:

- Assessing the current composition of Compostable Waste, Small White Goods, and Household Special Waste (HSW) in the incoming residential stream.
- Assessing current HRM solid waste program and landfill operations measures related to capturing/diverting Compostable Waste, recyclable white goods/bulky waste, and HSW.
- Identifying new measures to improve capturing/diverting materials noted above.
- Providing implementation timelines for activities identified in this Compliance Plan.

Section 2 – Performance Audits

2.1 Background

Performance Audits are to be completed in accordance with Approval Condition 13.e. which states:

13. Site Specific Conditions

e. The Approval Holder(s) shall conduct Performance Audits of the incoming Municipal Solid Waste, noting specifically the volumes at the RDF tipping face, to track compliance with the Facility's Performance Targets and Compliance Plan.

I. The Approval Holder(s) shall conduct Performance Audits at a minimum frequency of once per quarter.

II. The Approval Holder(s) shall conduct the first Performance Audit within ninety (90) days of the effective day of this approval.

III. As per Condition 3.j.) the Approval Holder(s) shall immediately notify the Department of a non-compliance determination from a Performance Audit.

IV. At the direction of the Department, the Approval Holder(s) shall retain the services of a third-party to conduct the Performance Audits.

In order to characterize the current composition of Compostable Waste, Small White Goods, and HSW in the incoming residential waste stream and to assess compliance with Performance Targets set in the Approval, a standard Performance Audit process has been established. The purpose of the audits is to quantify the Compostable Waste and HSW banned from landfill disposal being received at the facility, in addition Small White Goods which are generally not banned from landfill disposal. The Approval defines Compostable Waste as:

2. Definitions

h. Compostable wastes means food wastes, perishables, corrugated cardboard, newsprint, leaf/yard wastes, and all other organic wastes listed in Schedule 'B" – Designated Materials Banned from the Destruction or Disposal in Landfills and Incinerators in the Solid Waste-Resource Management Regulations, as amended from time to time.

Additionally, the following definitions apply to this Compliance Plan:

- HSW:
    - Includes items listed in Schedule "B" – Designated Material Banned from the Destruction or Disposal in Landfills and Incinerators in the Solid Waste-Resource Management Regulations, as amended from time to time, including lead-acid (automotive) batteries, post-consumer paint products, ethylene glycol, used oil, used glycol, used oil filter, glycol containers, and oil containers.
    - Includes items accepted in HRM's residential HSW program including:

    - lead-acid (automotive) batteries
    - leftover paint
    - corrosive cleaners
    - gasoline
    - used motor oil and fuel
    - solvents and thinners
    - aerosol cans containing hazardous substances
    - propane tanks and cylinders
    - residential fire extinguishers
    - compact fluorescent light bulbs
- Small White Goods: Items such as toasters, microwaves, and coffee makers that would be mostly composed of metal materials that can be disposed of in garbage bags.

For further clarity, the material sub-categories from the Divert NS 2017[2] Waste Audit and HRM 2016/2017 Waste Characterization reports have been compared and used to define the categories of Compostable Waste to be used in the Performance Audits for the incoming residential waste stream per discussions with NSECC staff, as outlined in the table below.

Table 2.1: Compostable Waste Material Categories and Past Audit Results

Material Type/Sub-category	HRM 2016/17 Characterization	Divert NS 2017 Waste Audit
Organics		
• Whole Perishables	9.92%[1]	0.74%
• Leftover Scraps		7.69%
• Yard Waste	0.62%	2.12%
Fibre		
• Newsprint - Dailies/Weeklies	1.35%	1.83%
• Corrugated Cardboard	0.88%	0.34%
Total Compostable Waste	**12.77%**	**12.72%**

[1]The HRM Characterization included Whole Perishables and Leftover Scraps as a combined category – 'Food Waste'.

2.2 Performance Audit Methodology

The methodology described herein reflects best practices identified in the Divert NS Waste Audit Manual and Field Procedures Guide (2017), as well as site specific processes established by

[2] https://divertns.ca/sites/default/files/researchreportsfiles/2021-09/WasteAudit2017.pdf

HRM. Both Divert NS and HRM methodologies were developed with reference to the Recommended Waste Characterization Methodology for Direct Waste Analysis Studies in Canada by SENES Consultants for CCME (1999). Additionally, the Alberta Provincial Waste Characterization Framework (2005) was reviewed and used to guide the number and weight of the samples to be collected.

Sample Load Identification

Residential curbside collection is divided into eight collection areas in HRM, the geographic descriptions of which are described in the table below. Condominium properties are also considered to be residential and are provided with a commercial style multi-unit collection service.

To establish a baseline, four quarterly Performance Audits consisting of sampling of each collection area and condos will be completed over the first year, to address sample variation including temporal and seasonal considerations, and to fully assess compliance with the Performance Target. Starting in November 2022, additional samples will be collected from several collection areas, with the largest annual tonnages, to ensure a total of 40 samples are collected in the first year[3].

After one year of data has been collected, subsequent quarterly Performance Audits will continue with a similar sample frequency and as shown below in Table 2.2 (i.e., 40 samples to be collected annually).

Table 2.2: Collection Area Descriptions and Minimum Sample Frequency

Collection Area	Area Description	# of Samples
1	Halifax (former city limits), Spryfield	5
2	Dartmouth (former city limits)	5
3	Bedford, Hammonds Plains, Pockwock	5
4	Beechville-Timberlea, Herring Cove and all areas west (Prospect, Peggy's Cove, St. Margaret's Bay to Hubbards)	4
5	Sackville, Beaver Bank, Fall River, Waverley, Wellington, Dutch Settlement	5

[3] The sampling frequency was adjusted for this updated version of the Compliance Plan in response to NSECC comments dated October 26, 2022. Initially 36 samples were going to be collected in the fist year; this has now been increased to 40 samples to be collected in the first year in response to NSECC comments.

Collection Area	Area Description	# of Samples
6	Cole Harbour, Westphal, Cherry Brook, Eastern Passage, Cow Bay and Area	4
7	Porters Lake, Lawrencetown, Chezzetcook, Lake Echo, Prestons and Area	4
8	Middle Musquodoboit, Elderbank, Musquodobit Harbour, Sheet Harbour and Eastern Shore	4
Condos	Multi-residential style properties located in various communities.	4
	Total Minimum # of Samples	40

Based on records of known tip times of vehicles from specific collection areas compared to the scheduled audit time, sample loads will be selected ahead of time by HRM staff. A random number generator will be used to choose which vehicle will be sampled. The selected loads will be visually inspected on the tip floor or at the tip face upon arrival and pictures taken. The following information will be recorded for each load:

- Collection vehicle and route numbers
- Date/Time of arrival
- Date/Time sample taken
- Gross and tare weight of truck (used to establish net weight of material)
- Weight of sample
- The number/type of bulky items observed
- Names of persons taking the sample
- Date/Time of sorting

Sample Size

The SENES methodology suggests a sample size of 90 to 135 kg (198 to 298 lbs) for residential samples, therefore 135 kg will be the target.

Once the load has been emptied from the collection vehicle, multiple sections of the load will be selected to draw a sample that is representative of the load. Each sample should contain a mix of clear and black bags and avoid sections containing significant amounts of construction waste or bulky items.

To ensure an adequate sample weight is taken, all sample material will be weighed using a commercial floor scale.

Material Categories

Samples will be sorted into Compostable Waste categories consistent with Divert NS 2017[4] Waste Audit and HRM 2016/2017 Waste Characterization reports, as shown in the table below. Additionally, HSW and Small White Goods will be sorted as defined below. Materials which do not fall into one of these categories will be sorted, weighed, and categorized as other garbage.

Table 2.3: Waste Sorting Categories

Category /Material Type	Sub-Category	Examples
FIBRE	Newsprint/Paper	Herald, The Coast, Masthead News, The Cobequid/Dartmouth/Cole Harbour Wire, flyers, printed paper, paper plates
	Corrugated Cardboard/Boxboard	Boxes for consumer items (TVs, appliances), storage, filing, shipping (Amazon), boxboard
ORGANICS	Food Waste	Whole vegetables, fruit, meat, fish Leftover food waste, egg shells, peels, oils, bones, fat Food in packaging is included if most of it consists of food
	Yard Waste	Grass clippings, leaves, brush, branches, wood chips, soil
HSW	HSW	Lead-acid (automotive) batteries, post-consumer paint products, ethylene glycol, used oil, used glycol, used oil filter, glycol containers, oil containers, corrosive cleaners, gasoline, solvents and thinners, aerosol cans containing hazardous substances, propane tanks, fire extinguishers, compact fluorescent light bulbs
Small White Goods	Small White Goods	Items such as toasters, microwaves, and coffee makers that would be mostly composed of metal materials that can be disposed of in garbage bags

Sorting Procedures

[4] https://divertns.ca/sites/default/files/researchreportsfiles/2021-09/WasteAudit2017.pdf

The sorting team will consist of two to four people. Staff shall be briefed on sorting protocols, including familiarity with example materials for each sorting category. One person shall be designated as 'Lead' and will be responsible for quality control and data collection. An independent consultant has been retained to act as the Lead and independent observer of the Performance Audits for the first year of baseline data collection.

The audit space will be set up with tables for sorting materials, containers clearly labeled for each of the waste sub-categories and scales for weighing the materials. The containers used for sorting are all weighed prior to starting and recorded on the data sheet.

Each collection areas audit sample (~135 kgs) will be stored in a larger container, moved using a forklift and weighed using a commercial floor scale. A smaller scale will also be utilized for samples weighing less than 1.5 kg (including the container).

To maintain consistency, the Lead shall be designated to weigh and record data on the provided data collection sheets each time a container becomes full.

This process will continue until the sample has been sorted and weighed.

2.3 May and August 2022 Performance Audit Results

Two Performance Audits have been completed to date in accordance with the methodology of the Compliance Plan submitted on June 29, 2022. All future Performance Audits will be completed in accordance with this updated Compliance Plan, including characterizing HSW and Small White Goods.

For both completed Performance Audits, samples were sorted into the respective categories (organics and fiber only) noted in Table 2.4. Strum Consulting acted as the Lead in overseeing the Performance Audit, with Mirror NS staff completing the sampling and sorting activities. HRM representatives also observed Performance Audit activities. Performance Audit reports summarizing both of the audits completed to date are provided in Appendix 1.

The table below presents a summary of Compostable Waste for each sample. Overall, Compostable Waste was determined to be 10.81%[5] based on the results of the first two Performance Audits. These values are weighted based on the annual tonnage received at Otter Lake from each of the collection areas as described in the reports provided in Appendix 1. It is noted that a minimum of four quarterly Performance Audits are needed to baseline the composition of Compostable Waste, to address sample variation including temporal and seasonal considerations, to fully assess compliance with the Performance Target.

[5] The overall composition of Compostable Waste was determined by weighting the sample result based on the tonnage historically collected from a collection area divided by the overall residential tonnage collected. See Attachment 1, August 2022 Performance Audit Report, Table E for calculations.

Table 2.4: Performance Audit Results

Collection Area	Area Description	Three Year Average Waste Received (Tonnes)[1]	May Compostable Waste (%)	August Compostable Waste (%)	Avg Compostable Waste (%)
1	Halifax (former city limits), Spryfield	9,918	15.4	13.09	14.25
2	Dartmouth (former city limits)	6,866	10.44	20.52	15.48
3	Bedford, Hammonds Plains, Pockwock	4,358	3.87	19.32	11.60
4	Beechville-Timberlea, Herring Cove and all areas west (Prospect, Peggy's Cove, St. Margaret's Bay to Hubbards)	5,305	3.27	12.39	7.83
5	Sackville, Beaver Bank, Fall River, Waverley, Wellington, Dutch Settlement	8,372	6.34	12.03	9.19
6	Cole Harbour, Westphal, Cherry Brook, Eastern Passage, Cow Bay and Area	5,130	3.39	5.98	4.69
7	Porters Lake, Lawrencetown, Chezzetcook, Lake Echo, Prestons and Area	2,962	3.96	7.80	5.88
8	Middle Musquodoboit,	3,384	6.9	16.40	11.65

Collection Area	Area Description	Three Year Average Waste Received (Tonnes)[1]	May Compostable Waste (%)	August Compostable Waste (%)	Avg Compostable Waste (%)
	Elderbank, Musquodobit Harbour, Sheet Harbour and Eastern Shore				
Condos	Multi-residential style properties located in various communities.	2,627	10.36	13.20	11.87
Total / %Compostable Waste		48,923	8.01	13.60	10.81 (see note below)
Compostable Waste = 10.81% based on first two Performance Audits. See Attachment 1, August 2022 Performance Audit Report, Table E for calculations[2].					

[1]Residential tonnage from 2019/2020, 2020/2021, and 2021/2022 (April-May fiscal years)

[2] The overall composition of Compostable Waste was determined by weighting the sample result based on the tonnage historically collected from a collection area divided by the overall residential tonnage collected.

Section 3 Current Diversion Measures Related to Performance Targets

HRM's solid waste system includes facilities dedicated to the diversion of organics, recyclables and HSW. Additionally, HRM has a robust education and enforcement program to support diversion initiatives. The following sections will provide an overview of current program elements related to:

- Public Education
- Curbside Monitoring
- Hauler Education / Curbside Stickering Enforcement
- White Goods / CFC Removal Program
- HSW Program

3.1 Public Education

HRM's Solid Waste Resources Department employs five full-time Waste Resource Education Officers, which are funded by Divert NS through a yearly education contract. The Education Team delivers over 4,000 hours of education each year, which includes various programs and initiatives to educate the public and private sectors about proper waste management.

The Education Team has a suite of presentations that are offered to the public and can be delivered both in-person and virtually. A list of presentations that can be requested by residents of HRM through the "3 Rs Online" webpage include topics ranging from a basic "What Goes Where" presentation to in-depth sessions about backyard composting and waste reduction. The primary role of all education initiatives is to reduce the amount of banned materials going to landfill.

For residents that want to go beyond the basics, the Education Team offers the Master Composter Recycler Program, which is a five-week program where participants can get an in-depth understanding of waste programs and facilities in HRM, ways to reduce waste at home, how to make and use their own compost, and diversion initiatives that go beyond Halifax's municipal programs. Since 2019, 137 participants have graduated from the Master Composter Recycler program.

Educators also deliver presentations in schools to discuss the importance of proper sorting and waste diversion. Children are taught from a young age how to participate in proper waste management through in-class workshops, facility tours, and Divert NS lesson plans for classroom engagement.

Residents of HRM can find information about waste programs through the Halifax Recycles App, the Halifax Recycles Facebook page, and the Halifax.ca/Recycle webpage. The app has over 113,000 users who can search items in the waste wizard and receive collection day notices and other important reminders. The Halifax Recycles Facebook page has over 8,600 subscribers and is used to promote the department's education initiatives, share helpful tips, and relay important service updates. Collection calendars and sorting guides (in five different languages) are available for download from Halifax.ca/recycle.

3.2 Curbside Monitoring

To better understand residential waste collection participation rates and set out habits, Curbside Monitoring has been performed annually since 2015. Each year, neighbourhoods in six to eight electoral districts are monitored for an eight-week period by Education Team staff.

Data is collected and evaluated for four solid waste measured categories: participation rates, set out sizes (e.g., number of bags), weekly generation, and set out methods. Participation rates

report the percentage of residences that set out material for collection each week. Set out sizes and frequencies provide further details on household sorting and collection habits. Bag type distributions and receptacle usage show what set out methods are preferred by residents. When evaluated as a complete set, these results provide insights into residential waste behaviours and inform educational initiatives and policy decisions across diverse districts.

Curbside Monitoring results allow the Education Team to identify specific geographical areas that need targeted waste education based on low participation in recycling and organic streams. Educators return to these areas for Feedback Monitoring, wherein they visually inspect set outs for improper sorting or limit exceedances and provide education packages directly to residents. Examples include:

- 17 packages delivered to residents in Oakmount in March 2021 (Collection Area 3)
- 15 packages delivered in Stonington Park in March 2021 (Collection Area 3)
- 11 packages delivered in Woodside in February 2021 (Collection Area 2)
- 55 packages were delivered in Dartmouth in February 2019 (Collection Area 2)
- 54 packages were delivered in Eastern Passage in December 2018 (Collection Area 6)
- 24 packages were delivered in Cole Harbour in October 2018 (Collection Area 6)

Furthermore, the data collected as part of Curbside Monitoring has also been used to identify improvements to the Municipality's stickering enforcement program, which is further discussed below.

3.3 Hauler Education / Curbside Stickering Enforcement

Contracted curbside collection haulers play a role in enforcing proper preparation, source-separation, and placement of residential waste. They issue education rejection stickers when residents do not comply with regulations outlined in HRM bylaws. The rejected material will have a sticker affixed with the reasons for rejections shown on the sticker. Some typical reasons for rejection of materials include improperly sorted waste (e.g., organics in garbage stream, plastics in the green cart), black bags in excess of the one bag limit, garbage bags or bulky items exceeding the allowed limit, and incorrectly bundled or contained items.

The hauler keeps a daily log indicating where education stickers have been placed, the type of education sticker placed (e.g. garbage, organics or recyclables) and why the materials were rejected. The total number of curbside education stickers issued for garbage and reported for all collection areas of HRM in Fiscal 2020/2021 was 13,883; and in Fiscal 2021/2022 was 10,208.

Based on a review of Fiscal 2020/21 and 2021/22 data, the most common reasons garbage is stickered and rejected at the curb are:

- Garbage being over the limit: either in excess of the black bag limit (one bag) or in excess of the limit for total number of garbage bags (e.g., six bags for single detached dwelling).
- Garbage – Other: includes placement of unacceptable items such as car parts or tires, placement of renovation materials that are too big, etc.

- Garbage not contained: loose materials.
- Bulky items over the limit: one large bulky item can be placed curbside with each garbage collection period.

Periodically the stickering data is reviewed to identify program improvements and to reinforce proper use of the education stickers by the haulers. Recent examples have included:

- Educating the hauler staff to more consistently use all the sticker categories (i.e., resulting in less use of the Other categories).
- Training the hauler customer service staff to note late placements in the appropriate area of the daily collection route logs.
- Advertising campaigns such as:
    - "Recycle Right" focused on ensuring recyclable material (such as fibre) is properly recycled.
    - "What Goes Where" Wednesdays posts where proper recycling is emphasized.
    - "What Goes Where" and "Master Composter Recycler" presentations that explain proper recycling stream by stream.

The HRM Solid Waste Education and Operations Teams jointly deliver Hauler Workshops to haulers front-line staff, supervisors, and managers, generally one to two times annually, to reinforce procedural expectations and address collection challenges. Stickering data and findings from Curbside Monitoring are used in support of providing feedback to the haulers. Topics for Hauler Workshops in the past year have included rejections for black bag limit exceedances, the importance of accurate hauler route logs, and health and safety.

Additionally, HRM has provided the haulers a training video on HRM's solid waste program. The training video includes a brief overview of Halifax's Solid Waste Resources Management System, information on collection procedures and limits, stickering procedures, waste processing facilities, and hauler duties and responsibilities. All haulers' staff are expected to complete the training video.

3.4 White Goods / CFC Removal Program

The Education Team has several initiatives to aid the diversion of bulky items (e.g., couches) and white goods (e.g., refrigerators) from the landfill. Reuse culture is a primary educational message that is promoted through presentations, workshops, and social media posts. Many bulky items and white goods that may end up in the landfill can be donated or offered for trade or giveaway. Twice a year, HRM holds a Curbside Giveaway Event, in which residents can place gently used items to the curb for others to claim.

As part of the residential curbside collection program, residents are allowed to place one bulky item or white good out with each garbage collection cycle. Additionally, HRM provides a CFC (refrigerant) removal service from white goods prior to collection at no cost to residents. Residents contact 311 for eligible white goods (e.g., refrigerators, freezers, dehumidifiers, window air

conditioners) and a contractor arranges to remove the CFCs and places a confirmatory sticker on the white good. The resident then places the white good curbside for garbage collection. The hauler then collects the white goods with a separate collection vehicle and delivers the items to Otter Lake where they are unloaded in a dedicated area for metal recycling.

Between 2018 and 2021, approximately 650-1,000 tonnes of metal was recovered and recycled each year, with the majority being white goods collected as part of the residential curbside collection program. Deactivation of the FEP/WSF will not impact the separate collection and diversion of white goods as part of the residential curbside collection program.

3.5 HSW Program

HRM provides a Household Special Waste (HSW) program to capture special wastes that are generated in homes. The program consists of one permanent HSW Depot located at the Materials Recovery Facility (MRF), 20 Horseshoe Lake Drive in the Bayer's Lake Business Park. It is open on most Saturdays from 9:00 am to 4:00 pm. Additionally, the Municipality hosts mobile HSW Depot events each year to service residents in communities across HRM. Mobile events are located in areas of the Municipality that are further away from Bayer's Lake to provide easier access to the program. The Municipality initially rolled out mobile events starting in 2002 with two events. The number of mobile events has increased to 9, 10 and 11 in 2016, 2017, and 2018, respectively. In 2021/2022, Halifax Regional Council increased the number of mobile events from 11 to 17. This increased level of service, or equivalent based on future program changes/improvements, will continue for 2022/2023 and for future years subject to the approval of Halifax Regional Council.

Items that are accepted include (but are not limited to):

- Lead-acid (automotive) batteries
- leftover paint
- corrosive cleaners
- gasoline
- used motor oil and fuel
- solvents and thinners
- aerosol cans containing hazardous substances
- propane tanks and cylinders
- residential fire extinguishers
- compact fluorescent light bulbs

HSW Depots are promoted through the Halifax Recycles App, the Halifax webpage, social media, and print media. Information about the importance of proper disposal of hazardous waste is provided in educational presentations and residential visits. Many items that are accepted at the HSW Depots can be taken to alternative locations for disposal which may be more convenient for residents. These alternative options are provided through the What Goes Where Wizard on the Halifax Recycles App and website.

Some HSW has historically been recovered in the FEP, in the order of 14 to 20 tonnes annually (e.g., camping cylinders, batteries, household chemicals such as paint), as shown in table below. By comparison, HRM's HSW program (i.e., HSW Depots) captures in the order of 500 to 900 tonnes of HSW annually. In 2018, 2019, and 2021 HRM's HSW program captured over 40 times the quantity of HSW captured by the FEP. Due to Covid-19, Mobile HSW Depots were cancelled in 2020, which resulted in a somewhat lower recovery.

Table 3.1: Household Special Waste (HSW) recovered in the FEP and HSW Program

HSW Categories	Quantities of HSW Recovered in FEP (estimated in tonnes)				Quantities of HSW Recovered from HSW Permanent and Mobile Depots (estimated in tonnes)			
	2018	2019	2020	2021	2018	2019	2020	2021
Cylinders (e.g., camping cylinders)	8.8	10.6	11.1	10.0	36.5	36.7	17.2	52.8
Batteries	3.3	3.8	4.8	2.8	8.9	12.6	8.8	28.8
Household Chemicals (e.g., paint, oil, bulbs)	2.5	2.8	4.1	3.1	466.9	503.4	307.5	822.0
Total	**14.5**	**17.2**	**20.0**	**15.9**	**512.3**	**552.6**	**333.5**	**903.6**

Section 4 – New Diversion Measures to Meet Performance Targets

The updated Municipal Approval requires that the Compliance Plan address how the Performance Targets will be met as outlined in Approval Condition 12 which states:

12. Performance Targets

a. *The Performance Targets for this Facility include:*
    i. *Compostable waste shall not exceed ten percent (10%) of total amount of municipal solid waste landfilled, by mass;*
    ii. *White Goods and bulky wastes that can be recycled and that can be safely removed from the solid waste delivery vehicle or the RDF tipping face shall be removed and stored in accordance with the approved Operations and Maintenance Manual;*
    iii. *Dangerous/Waste Dangerous Goods/Household Hazardous Wastes that are visible and can be safely removed from the solid waste delivery vehicle or the RDF tipping face shall be removed and stored in accordance with the approved Operations and Maintenance Manual.*

As noted in Section 2, based on the Performance Audits completed in May and August 2022, Compostable Waste was determined to be 10.81%, slightly above the Performance Target of 10%. It is noted that a minimum of four quarterly Performance Audits are needed to baseline the composition of Compostable Waste, to address sample variation including temporal and seasonal considerations, and to fully assess compliance with the Performance Target. Focusing on reducing the amount of Compostable Waste is key in ensuring long-term compliance with the Performance Targets.

HRM plans to bring awareness to the importance of keeping Compostable Waste out of the garbage stream through promoting waste reduction and diversion options. Additionally, a new category will be introduced on collection education rejection stickers specifically related to Compostable Waste in the garbage stream and HRM will work with contracted haulers to inspect for the presence of these banned materials.

Furthermore, proactive education will continue to be provided for HRM's solid waste program, including for proper disposal of Compostable Waste, white goods/bulky waste, and HSW including using Performance Audits results to inform education initiatives.

4.1 Public Education

HRM plans to build on existing public education diversion initiatives such as the 3 Rs Online, What Goes Where Presentations and Master Composter Recycler Program, to create and promote a new *Food Isn't Garbage* campaign focused on reducing and diverting Compostable Waste. The campaign will be promoted via public webinars, multi-media such as social media,

print, and radio and media interviews on this topic will be pursued. This messaging will also be incorporated into presentations at schools, community events, and our “What Goes Where” Wednesday Posts.

Additionally, existing HSW education and promotion will be enhanced by further promoting disposal options, including related to items typically recovered in the FEP such as left over paint (including aerosol containers), batteries, propane cylinders, and used motor oil. The promotion of this campaign will be conducted through public webinars, social media as well through paid advertising.

The HRM Education Team will also aim to complete more Feedback Monitoring, providing education packages directly to residents based on the results of the Performance Audits, or curbside warnings or rejections, as noted further in the following sections. This will include targeted waste education to specific geographical areas of the Municipality, including providing door to education packages and targeted social media campaigns.

4.2 Curbside Enforcement

A new category will be introduced on collection education rejection stickers specifically related to Compostable Waste in the garbage stream. HRM’s Operations Team will work with contracted haulers to review inspection protocols for the presence of these banned materials in the garbage stream. The Operations Team will complete curbside audits on the performance of the haulers in appropriately rejecting garbage curbside with a focus on Compostable Waste, bag limits, privacy bag limits, and HSW. Furthermore, there will be a focus on ensuring that recyclable white goods are being collected by a separate vehicle (i.e., for the purposes of diversion at Otter Lake).

HRM’s Operations Team will complete hauler training, audits, and assessment of performance in relation to the modified measures.

These collective efforts will also support identifying dwellings where Feedback Monitoring is warranted.

4.3 Landfill Operations

Otter Lake is operated by Mirror NS and accepts both residential and Industrial, Commercial, and Institutional (ICI) waste streams. Following acceptance of this Compliance Plan by NSECC, residential waste will go directly to the Residual Disposal Facility (RDF) tip face and ICI material will continue to be directed to the Transfer Station and removed from the facility. Existing procedures for waste receiving and unacceptable materials identification will remain largely unchanged with some new steps required to inspect residential waste at the RDF tip face. For the purposes of this this Compliance Plan, unacceptable waste is considered as Compostable Waste, white / bulky goods, and HSW.

Mirror NS works diligently to ensure unacceptable wastes are not delivered to the facility, and if they are delivered, that they are handled appropriately and removed from the waste stream if

possible. A sign is maintained at the facility entrance indicating what types of waste are prohibited and regular waste haulers are provided with communications outlining site policy and prohibited wastes. Vehicles containing waste that enter the facility proceed to the scale house where the driver is questioned about the waste source and type. If unacceptable materials are identified at the scale house the load will be rejected or partially rejected (i.e., unacceptable material will not be offloaded).

Waste is also visually inspected once it is unloaded at either the RDF working face or Transfer Station tip floor. Loads containing primarily Compostable Waste (by visual inspection) will be identified and if the waste is segregable the compostable portion may be loaded back into the haulers vehicle for removal from the site. If the Compostable Waste is not segregable, photos and a warning report will be completed. This information will supplement the Compostable Waste information collected during the Performance Audits and allow HRM to complete targeted education (e.g., feedback monitoring) as required.

Visually identified white goods or bulky wastes that can be recycled and that can be safely removed from the working face will be removed with the use of heavy equipment. Materials that are removed will be temporarily stored close to the working face before being transferred to the White Goods Storge Area. Additionally, white goods or bulky wastes that can be recycled that are received at public drop off are directed to a dedicated roll-off container. Once full, the contents of this roll-off container are transferred to the White Goods Storage Area. Visually identified HSW will be removed from the working face if it can be done safely. Materials removed will be temporarily stored close to the working face before being transferred to the Hazardous Waste Storage Area. From there they will be removed from the site by a third-party contractor.

The following are the response procedures to be used after identification of unacceptable materials. If unacceptable materials are declared by the driver of the delivery vehicle:

- The vehicle will be held at the scalehouse.
- The General Manager or Supervisor or trained employee will be contacted to complete Waste Discrepancy Report (WDR) containing:
  - Drivers name and vehicle license number.
  - Drivers name and vehicle license number.
  - Hauling Company name and address.
  - Type and origin of materials as identified by driver.
  - Provide with WDR and reject load.

If unacceptable materials are identified during unloading:

- Unloading will be stopped.
- The Transfer Station Supervisor or RDF Traffic Spotter will complete a WDR as above.
- The driver will be instructed to re-load unacceptable material for its removal from the Facility.
- Where the driver is unable to re-load the unacceptable material, Mirror NS will aid in this function.

- The load will be rejected

It is acknowledged that WDRs are typically generated for ICI loads given current robust protocols for residential waste which is inspected and rejected curbside, as needed, due to HRM service standards for contracted residential haulers. Regardless, any residential loads that are noted to contain unacceptable materials will be identified and communicated to HRM regularly to allow for further targeted education (e.g., Feedback Monitoring).

Section 5 – Compliance Plan Summary and Timelines

The updated Municipal Approval requires the following prior to the deactivation of the FEP/WSF as outlined in Approval Condition 13 which states:

13. Site Specific Conditions

a. *Prior to the discontinuation of use of the FEP and WSF, the Approval Holder(s) shall submit to the Department a Compliance Plan detailing how the facility will achieve its Performance Targets, complete with milestone dates, as stated in Section 12, on or before July 02, 2022, or as amended in writing by the Administrator.*
   i. *At the direction of the Department, the Approval Holder(s) shall revise the Compliance Plan until accepted by the Department.*
   ii. *The FEP and WSF shall continue to be required components of the operation of this Facility until written notification is received by the Approval Holder(s) from the Department confirming acceptance of the Compliance Plan.*

As noted in Section 2, based on the Performance Audits completed in May and August 2022, Compostable Waste was determined to be 10.81%, slightly above the Performance Target of 10%. It is noted that a minimum of four quarterly Performance Audits are needed to baseline the composition of Compostable Waste, to address sample variation including temporal and seasonal considerations, and to fully assess compliance with the Performance Target.

Within 30 calendar days of completing the first four Performance Audits, HRM and Mirror NS propose than an update to this Compliance Plan be submitted to NSECC, specifically assessing meeting the Compostable Waste Performance Target of 10% and identifying timelines/milestones to meet the Performance Target (if required).

The table on the following page summarizes the activities identified in this Compliance Plan, including timelines, to support meeting all Approval Performance Targets.

Table 5.1: Compliance Plan Summary and Timelines

Waste Type	Initiative	New/ Modified Initiative	Details	Timeline
Public Education				
Compostable Waste	Campaign to reduce and divert Compostable Waste *(Food Isn't Garbage)*	New	Campaign focused on reducing and diverting Compostable Waste. Will include social media, print, radio ads and media interviews.	Start: July 2022 Run: 2022 and 2023
Compostable Waste, HSW, White Goods	Feedback Monitoring by HRM Education Team (i.e., education targeted to individual dwellings)	Modified	Currently complete Feedback Monitoring based on Curbside Monitoring Program. To complete additional feedback monitoring based on Curbside Enforcement and Landfill Operations.	Ongoing
HSW	HSW Promotion/Education	Modified	Campaign addressing disposal options, including for left over paint (including aerosol containers), batteries, propane cylinders, and used motor oil.	Start: July 2022 Run: 2022 and 2023
Curbside Enforcement				
Compostable Waste	Implement new stickering category - Compostable Waste	New	Create new category on education rejection stickers for Compostable Waste. Used for curbside collection enforcement.	Implement by October 3, 2022

Waste Type	Initiative	New/ Modified Initiative	Details	Timeline
Compostable Waste, HSW, White Goods	Curbside Monitoring by HRM Operations Team	Modified	Previous monitoring focused on operational aspects such as health and safety. Modified initiative to periodically audit routes for hauler performance in applying education rejection stickers and verifying separate collection of white goods by HRM's Operations Team. This includes hauler training, audits, and assessment of performance, by HRM's Operations Team, in relation to the modified procedures.	Implement by October 3, 2022
Landfill Operations				
Compostable Waste, HSW, White Goods	Inspection of Incoming Loads/Tipped Loads and Rejections/Issuance of Waste Discrepancy Reports.	Modified	Continuation of inspection program at Otter Lake. Modified to reflect deactivation of the FEP/WSF with loads being directly tipped at the landfill.	Modified procedures to coincide with deactivation of the FEP/WSF
Compliance Plan				

Waste Type	Initiative	New/ Modified Initiative	Details	Timeline
N/A	Provide update to Compliance Plan after four Performance Audits are completed.	New	Performance Audits completed in May and August 2022 showed Compostable Waste to be 10.81%, slightly above the Performance Target of 10%. Four quarterly Performance Audits are needed to fully assess and baseline the composition of Compostable Waste. Within 30 calendar days of completing four Performance Audits, HRM and Mirror NS propose an update to this Compliance Plan be submitted to NSECC, specifically assessing audit results against the Compostable Waste Performance Target of 10% and identifying timelines/milestones to meet the Performance Target (if required).	Performance Audits planned for: May 2022 Aug 2022 Nov 2022 Feb 2023 Update to Compliance Plan to be submitted within 30 calendar days to NSECC upon completing the fourth Performance Audit.

Attachment 1 – May and August 2022 Performance Audit Reports, Strum Consulting

June 22, 2022

Mr. Steve Copp
Mirror Nova Scotia Limited
600 Otter Lake Drive
Lakeside, NS B3T 2E2

Dear Mr. Copp,

Re: Initial Performance Audit
Otter Lake Waste Processing & Disposal Facility

In May 2022, Strum Consulting was retained by Mirror Nova Scotia Limited (Mirror) to oversee an Initial Performance Audit at the Otter Lake Waste Processing & Disposal Facility (Otter Lake) located at 600 Otter Lake Drive in Lakeside, NS.

The purpose of the Initial Performance Audit is to establish a baseline for future waste auditing purposes. This letter report provides a summary of the Initial Performance Audit completed on May 19, 2022.

Background

In March 2022, Nova Scotia Environment & Climate Change (NSECC) issued an updated Municipal Approval for Otter Lake, allowing the Front End Processor and Waste Stabilization Facility (FEP/WSF) to be deactivated upon the submission and acceptance of a Compliance Plan in accordance with the Approval requirements.

As per the Approval, the Performance Targets for Otter Lake include (but are not limited to) compostable waste not exceeding ten percent (10%) of the total amount of municipal solid waste landfilled, by mass. Prior to the deactivation of the FEP and WSF, the submitted Compliance Plan must include details of how Performance Targets will be achieved. The Compliance Plan also outlines how Performance Audits will be completed as a means to quantify the presence of compostable waste banned from landfill disposal which is being received at Otter Lake.

Given the above, Performance Audits will be completed to characterize the composition of compostable waste in the incoming residential waste stream and to assess compliance with Performance Targets. To establish a baseline for future Performance Audits, an Initial Performance Audit was completed which is detailed in this report.

Methodology

The methodology followed for the Initial Performance Audit reflects best practices identified in the Divert NS Waste Audit Manual and Field Procedures Guide (2017), as well as site specific processes established by Halifax Regional Municipality (HRM), and is summarized below.

Sample Load Identification

Residential curbside collection is divided into eight collection areas in HRM and condominium properties which are also considered to be residential. The geographic descriptions of the various areas are described in Table A, below.

Table A: Collection Area Descriptions

Waste Collection Area	Area Description
1	Halifax (former city limits); Spryfield
2	Dartmouth (former city limits)
3	Bedford; Hammonds Plains; Pockwock
4	Beechville-Timberlea; Herring Cove; Prospect; Peggy's Cove; St. Margaret's Bay to Hubbards
5	Sackville; Beaver Bank; Rall River; Waverley, Wellington; Dutch Settlement
6	Cole Harbour; Westphal; Cherry Brook; Eastern Passage; Cow Bay
7	Porters Lake; Lawrencetown; Chezzetcook; Lake Echo; Preston
8	Middle Musquodoboit; Musquodoboit Harbour; Elderbank; Sheet Harbour; Eastern Shore
Condos	Multi-residential style properties located in various communities

Based on residential curbside collection schedules for each specific collection areas and the scheduled audit date and time, sample loads are selected ahead of time by HRM staff. A random number generator is used to choose which vehicle would be sampled. One sample from each of the eight curbside collection areas and one sample from condos were assessed as part of the Initial Performance Audit.

The selected loads were visually inspected on the top floor upon arrival and photographs were taken as shown in the attached photo log. The following information was recorded for each load:

- Collection vehicle and route numbers
- Date/Time of arrival
- Date/Time sample taken
- Gross and tare weight of truck
- Weight of sample
- Number/type of bulky items observed
- Names of persons taking the sample
- Date/Time of sorting

Sample Size

Once emptied from the vehicle, multiple sections of the load were selected in order to draw a sample that was representative of the load. Each sample was to contain a mix of clear and black bags. Sections containing significant amounts of construction waste or bulky items were avoided. Containers shown in Photo 2 (Attachment 1) were used to collect a sample between 90 and 135 kg. This data, as well as dates/times and categorization of materials, were recorded by Strum staff during the Performance Audit.

Photographs (Attachment 1) of the auditing process, records documenting the identifying information of each vehicle sampled (scale tickets - Attachment 2), and the Performance Audit Record field data sheets (Attachment 3) are attached to this report.

Material Categories

The categories that were used to define the different types of compostable waste are consistent with the Approval and are outlined below in Table B.

Table B: Compostable Waste Sorting Categories

Category	Sub-Category	Examples
Fibre	Newsprint/Paper	The Chronicle Herald, The Coast, Masthead News, The Cobequid/Dartmouth/Cole Harbour Wire, flyers
	Corrugated Cardboard/Boxboard	Consumer boxes (e.g., from appliances, storage, filing, and shipping)
Organics	Food Waste	Whole vegetables, fruit, meat, fish, leftover food waste, egg shells, peels, oils, bones, fat, packaged food if most of if it consists of food
	Yard Waste	Grass, leaves, brush, branches, wood chips, soil

Materials which did not fall into one of the above noted categories were counted, weighed, and categorized as other garbage.

Sorting Procedure

The sorting team consisted of three to five Mirror staff. All staff was briefed on the sorting protocols, including familiarity with example materials for each sorting category. Strum staff was designated as “Lead” and was responsible for quality control and data collection.

The audit space consisted of an open area set up with tables for sorting waste materials, containers clearly labeled for each of the waste categories, and digital scales for weighing the waste materials. The containers used for sorting were weighted prior to commencing the audit and recorded on the data sheets to allow for net sample weights to be determined.

To maintain consistency, the Lead was responsible for weighing and recording the data on dedicated data sheets for each area, each time a container was filled. The process continued for each respective area until the full sample was properly sorted and weighed.

Initial Performance Audit Summary

A summary of the May 2022 Initial Performance Audit completed at Otter Lake is provided below in Table C. As previously mentioned, the Initial Performance Audit field data sheets containing the data collected respective to each waste collection area during the audit are attached to this report as Attachment 3.

Table C: Initial Performance Audit Results

Waste Collection Area	Category Percentage (%)					
	Garbage/ Residue	Fibre - Newsprint/ Paper	Fibre - Corrugated Cardboard	Organics - Food/Putrescible Waste	Organics - Yard Waste	Total Compostable Waste
1	83.97%	1.67%	0.49%	13.07%	0.17%	15.40%
2	88.99%	1.94%	1.41%	7.09%	0.00%	10.44%
3	95.96%	1.07%	1.73%	1.07%	0.00%	3.87%
4	96.37%	0.81%	1.90%	0.56%	0.00%	3.27%
5	93.49%	0.27%	0.14%	5.55%	0.38%	6.34%
6	96.33%	0.73%	1.27%	1.35%	0.04%	3.39%
7	95.67%	0.12%	1.24%	2.60%	0.00%	3.96%
8	92.72%	1.80%	2.30%	2.80%	0.00%	6.90%
Condos	89.64%	0.59%	0.81%	6.80%	2.34%	10.54%

Notes: 1. Total compostable waste percentage based on aggregate of four compostable waste category percentages.

The above-noted data collected during the May 2022 Initial Performance Audit will be utilized to establish a baseline for future waste auditing purposes.

Using the data in Table C above, the total compostable waste percentage ranged from a minimum of 3.27% (Area 4) to a maximum of 15.4% (Area 1), with a mean of 7.12% based on only nine (9) samples being collected during the May 2022 Initial Performance Audit. As additional sampling will be completed during future audits, it is expected that the statistical data will vary as more data becomes available.

Overall Compostable Waste

As shown in Table D below, given the compostable waste percentage per area calculated during the May 2022 Initial Performance Audit and the three year average of waste tonnage per area, the estimated compostable waste tonnage per year has been calculated. Using the totals of the Estimated Annual Compostable Waste (3,918.84 tonnes) and the three year waste average total (48,923.20 tonnes), the Compostable Waste Percentage is calculated to be 8.01%.

Table D: Estimated Annual Compostable Waste

Waste Collection Area	Three Year Waste Average (Tonnes)	Three Year Waste Average (% Total)	Total Compostable Waste % from May 2022 Audit	Estimated Annual Compostable Waste (Tonnes)
1	9918.30	20.27%	15.4%	1527.42
2	6866.42	14.04%	10.44%	716.85
3	4358.45	8.91%	3.87%	168.67
4	5304.70	10.84%	3.27%	173.46
5	8372.02	17.11%	6.34%	530.79
6	5130.17	10.49%	3.39%	173.96
7	2962.13	6.05%	3.96%	117.30
8	3383.67	6.92%	6.90%	233.47
Condos	2627.33	5.37%	10.54%	276.92
TOTAL	48923.20	100.00%	N/A	3918.84
Compostable Waste Percentage = (3918.84/48923.20) X 100 = 8.01%				

Notes: 1. Data used to calculate three year average provided by Mirror and included tonnage from the fiscal years 2019/2020, 2020/2021, and 2021/2022.

By completing a statistical analysis of the data in Table D above, the Estimated Annual Compostable Waste per area ranged from a minimum of 117.30 tonnes (Area 7) to a maximum of 1527.42 tonnes (Area 1), with a mean of 435.43 tonnes and standard deviation of 454.97 tonnes.

At 95% confidence interval, the Estimated Average Annual Compostable Waste tonnage per area is calculated to be between 85.71 tonnes (lower bound) and 785.15 tonnes (upper bound). The confidence interval was calculated by subtracting/adding the calculated 95% confidence level (349.72) from the mean (435.43 tonnes). By dividing the lower bound (85.71 tonnes) and upper bound (785.15 tonnes) of the 95% confidence interval by the Total Estimated Annual Compostable Waste (3,918.84 tonnes), and multiplying the values by 100, the percentage of Estimated Annual Compostable Waste is calculated to be between 2.19% and 20.04%.

The above noted statistical analysis is based on the nine samples collected during the May 2022 Initial Performance Audit. As additional sampling will be completed during future audits, it is expected that the statistical data will vary as more data becomes available. As noted previously, the data collected during the May 2022 Initial Performance Audit will be utilized to establish a baseline for future waste auditing purposes.

Closure

This report was prepared by Danielle Graves, B.E.S., Field Coordinator and reviewed by James Foley, P.Geo., Project Manager. Should additional information become available, Strum requests that this information be brought to our attention immediately so that we can re-assess the conclusions presented in this report.

This Report and any use of the Report is subject to the terms herein (see attached Statement of Qualifications and Limitations).

If you have any questions, please contact us.

Thank you,

[redacted]

Danielle Graves, B.E.S.
Field Coordinator
[redacted]

[redacted]

James Foley, P.Geo.
Project Manager
[redacted]

Statement of Qualifications and Limitations

This Report (the "Report") has been prepared by Strum Consulting ("Consultant") for the benefit of Mirror Nova Scotia Limited ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed in writing by Consultant and Client
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ATTACHMENT 1
PHOTO LOG

Photo 1: Waste collection vehicle unloading waste collected from HRM collection area 1. Photo taken on May 16, 2022.

Photo 2: Waste audit sample collected from HRM collection area 1. Photo taken on May 19, 2022 during waste audit.

Photo 3: Food Waste bin #1 sorted from HRM collection area 1. Photo taken May 19, 2022 during waste audit.

Photo 4: Food waste bin #2 sorted from HRM collection area 1. Photo taken May 19, 2022 during waste audit.

Photo 5: Fiber-OCC sorted from HRM collection area 1.
Photo taken May 19, 2022 during waste audit.

Photo 6: Fiber- Newspaper/Paper bin #1 sorted from HRM collection area 1.
Photo taken May 19, 2022 during waste audit.

Photo 7: Fiber- Newspaper/Paper bin #2 sorted from HRM collection area 1.
Photo taken May 19, 2022 during waste audit.

Photo 8: Garbage/Residue sorted from HRM collection area 1.
Photo taken May 19, 2022 during waste audit.

Photo 9: Waste pile from HRM collections area 2.
Photo collected May 13, 2022

Photo 10: Waste audit sample from HRM collection area 2.
Photo collected May 13, 2022.

Photo 11: Waste audit sample collected from HRM collection area 2.
Photo taken on May 19, 2022 during waste audit.

Photo 12: Food waste bin sorted from HRM collection area 2.
Photo taken May 19, 2022 during waste audit.

Photo 13: Fiber – Newspaper/ Paper bin sorted from HRM collection area 2.
Photo taken May 19, 2022 during waste audit.

Photo 14: Fiber – OCC bin sorted from HRM collection area 2.
Photo taken May 19, 2022 during waste audit.

Photo 15: Weighing of Garbage/Residue bin sorted from HRM collection area 2.
Photo taken May 19, 2022 during waste audit.

Photo 16: Waste audit sample collected from HRM collection area 3.
Photo taken on May 19, 2022 during waste audit.

Photo 17: Waste collection vehicle unloading waste collected from HRM collection area 3. Photo taken on May 12, 2022.

Photo 18: Waste audit sample from HRM collection area 3. Photo collected May 12, 2022.

Photo 19: Food waste bin sorted from HRM collection area 3. Photo taken May 19, 2022 during waste audit.

Photo 20: Fiber – Newspaper/ Paper bin sorted from HRM collection area 3. Photo taken May 19, 2022 during waste audit.

Photo 21: Fiber – OCC bin #1 sorted from HRM collection area 3.
Photo taken May 19, 2022 during waste audit.

Photo 22: Fiber – OCC bin #2 sorted from HRM collection area 3.
Photo taken May 19, 2022 during waste audit.

Photo 23: Weighing of Garbage/Residue bin sorted from HRM collection area 3.
Photo taken May 19, 2022 during waste audit.

Photo 24: Waste audit sample collected from HRM collection area 4.
Photo taken on May 19, 2022 during waste audit.

Photo 25: Waste collection vehicle unloading waste collected from HRM collection area 4. Photo taken on May 13, 2022.

Photo 26: Waste audit sample from HRM collection area 4. Photo collected May 13, 2022.

Photo 27: Food waste bin sorted from HRM collection area 4. Photo taken May 19, 2022 during waste audit.

Photo 28: Fiber – Newspaper/ Paper bin sorted from HRM collection area 4. Photo taken May 19, 2022 during waste audit.

Photo 29: Fiber – OCC bin #1 sorted from HRM collection area 4.
Photo taken May 19, 2022 during waste audit.

Photo 30: Fiber – OCC bin #2 sorted from HRM collection area 4.
Photo taken May 19, 2022 during waste audit.

Photo 31: Weighing of Garbage/Residue bin sorted from HRM collection area 4.
Photo taken May 19, 2022 during waste audit.

Photo 32: Weighing of waste audit sample collected from HRM collection area 5.
Photo taken on May 19, 2022 during waste audit.

Photo 33: Waste collection vehicle unloading waste collected from HRM collection area 5. Photo taken on May 16, 2022.

Photo 34: Waste audit sample from HRM collection area 5. Photo collected May 16, 2022.

Photo 35: Food waste bin separated from HRM collection area 5. Photo taken May 19, 2022 during waste audit.

Photo 36: Fiber – Newspaper/ Paper bin sorted from HRM collection area 5. Photo taken May 19, 2022 during waste audit.

Photo 37: Fiber – OCC bin sorted from HRM collection area 5.
Photo taken May 19, 2022 during waste audit.

Photo 38: Yard waste bin sorted from HRM collection area 5.
Photo taken May 19, 2022 during waste audit.

Photo 39: Garbage/Residue bin sorted from HRM collection area 5.
Photo taken May 19, 2022 during waste audit.

Photo 40: Weighing of waste audit sample collected from HRM collection area 6.
Photo taken on May 19, 2022 during waste audit.

Photo 41: Waste collection vehicle unloading waste collected from HRM collection area 6. Photo taken on May 16, 2022.

Photo 42: Waste audit sample from HRM collection area 6. Photo collected May 16, 2022.

Photo 43: Food waste bin separated from HRM collection area 6. Photo taken May 19, 2022 during waste audit.

Photo 44: Fiber – Newspaper/ Paper bin sorted from HRM collection area 6. Photo taken May 19, 2022 during waste audit.

Photo 45: Fiber – OCC bin sorted from HRM collection area 6.
Photo taken May 19, 2022 during waste audit.

Photo 46: Yard waste bin sorted from HRM collection area 6.
Photo taken May 19, 2022 during waste audit.

Photo 47: Garbage/Residue bin sorted from HRM collection area 6.
Photo taken May 19, 2022 during waste audit.

Photo 48: Weighing of waste audit sample collected from HRM collection area 7.
Photo taken on May 19, 2022 during waste audit.

Photo 49: Waste collection vehicle unloading waste collected from HRM collection area 7. Photo taken on May 12, 2022.

Photo 50: Waste audit sample from HRM collection area 7. Photo collected May 12, 2022.

Photo 51: Food waste bin separated from HRM collection area 7. Photo taken May 19, 2022 during waste audit.

Photo 52: Fiber – Newspaper/ Paper bin sorted from HRM collection area 7. Photo taken May 19, 2022 during waste audit.

Photo 53: Fiber – OCC bin #1 sorted from HRM collection area 7.
Photo taken May 19, 2022 during waste audit.

Photo 54: Fiber – OCC bin #2 sorted from HRM collection area 7.
Photo taken May 19, 2022 during waste audit.

Photo 55: Garbage/Residue bin sorted from HRM collection area 7.
Photo taken May 19, 2022 during waste audit.

Photo 56: Weighing of waste audit sample collected from HRM collection area 8.
Photo taken on May 19, 2022 during waste audit.

Photo 57: Waste collection vehicle unloading waste collected from HRM collection area 8. Photo taken on May 12, 2022.

Photo 58: Waste audit sample from HRM collection area 8. Photo collected May 12, 2022.

Photo 59: Food waste bin separated from HRM collection area 8. Photo taken May 19, 2022 during waste audit.

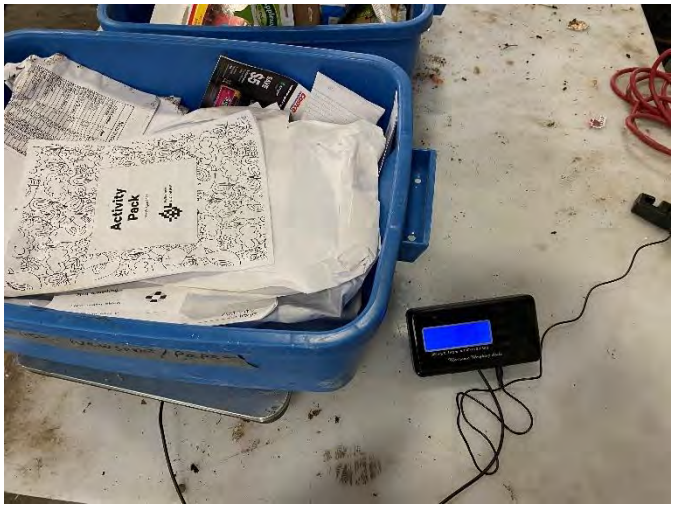

Photo 60: Fiber – Newspaper/ Paper bin sorted from HRM collection area 8. Photo taken May 19, 2022 during waste audit.

Photo 61: Fiber – OCC bin #1 sorted from HRM collection area 8.
Photo taken May 19, 2022 during waste audit.

Photo 62: Fiber – OCC bin #2 sorted from HRM collection area 8.
Photo taken May 19, 2022 during waste audit.

Photo 63: Garbage/Residue bin sorted from HRM collection area 8.
Photo taken May 19, 2022 during waste audit.

Photo 64: Weighing of waste audit sample collected from HRM collection area 9.
Photo taken on May 19, 2022 during waste audit.

Photo 65: Waste collection vehicle unloading waste collected from HRM collection area 9. Photo taken on May 13, 2022.

Photo 66: Waste audit sample from HRM collection area 9. Photo collected May 13, 2022.

Photo 67: Food waste bin separated from HRM collection area 9. Photo taken May 19, 2022 during waste audit.

Photo 68: Fiber – Newspaper/ Paper bin sorted from HRM collection area 9. Photo taken May 19, 2022 during waste audit.

Photo 69: Fiber – OCC bin sorted from HRM collection area 9. Photo taken May 19, 2022 during waste audit.

Photo 70: Yard waste bin sorted from HRM collection area 9. Photo taken May 19, 2022 during waste audit.

Photo 71: Garbage/Residue bin sorted from HRM collection area 8. Photo taken May 19, 2022 during waste audit.

Photo 72: Empty waste audit collection bin. Photo taken May 19, 2022 after successful completion of waste audit waste audit.

ATTACHMENT 2
SCALE TICKETS

Halifax Regional Municipality

Scale Slip: 075699
05/16/2022 11:33:03
Clerk: JLC

Vehicle ID: RE1044
License Plate: 57-424-D
Waste Type: residential
Origin: 1 HALIFAX
Invoice: 0400927
Royal Environmental Group

Gross Weight: 21,910 (kg)
Tare Weight: 16,630 (kg)
Net Weight: 5,280 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 075649
05/13/2022 11:02:24
Clerk: JLC

Vehicle ID: RE2091
License Plate: PR41474
Waste Type: residential
Origin: 2 DARTMOUTH
Invoice: 0400927
Royal Environmental Group

Gross Weight: 23,580 (kg)
Tare Weight: 16,140 (kg)
Net Weight: 7,440 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 075606
05/12/2022 11:57:46
Clerk: JLC

'ehicle ID: RE2105
.icense Plate: 44-096-D
Vaste Type: residential
)rigin: 3 BEDFORD/HAMMONDS PLAINS
ıvoice: 0400927
Royal Environmental Group

Gross Weight: 24,630 (kg)
Tare Weight: 16,070 (kg)
Net Weight: 8,560 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Vehicle ID:	GFL007
License Plate:	45362D
Waste Type:	residential
Origin:	4 WESTERN COUNTY
Invoice:	0402150
	GFL Environmental Inc

Scale Slip:	075656
	05/13/2022 11:56:04
Clerk:	JLC

Gross Weight:	25,600 (kg)
Tare Weight:	16,880 (kg)
Net Weight:	8,720 (kg)

	$0.00
Total:	$0.00

Halifax Regional Municipality

Scale Slip: 075715
05/16/2022 14:40:48
Clerk: JLC

Vehicle ID: RE1035
License Plate: 55-579-D
Waste Type: residential
Origin: 5 SACKVILLE/FALL RIVER
nvoice: 0400927
Royal Environmental Group

Gross Weight: 24,210 (kg)
Tare Weight: 16,530 (kg)
Net Weight: 7,680 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 075700
05/16/2022 12:06:08
Clerk: JLC

'ehicle ID: RE1041
.icense Plate: 57-421-D
Vaste Type: residential
)rigin: 6 COLE HARBOUR/EASTERN PASSAGE
ıvoice: 0400927
Royal Environmental Group

Gross Weight: 26,090 (kg)
Tare Weight: 16,600 (kg)
Net Weight: 9,490 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 075621
05/12/2022 14:48:58
Clerk: JLC

Vehicle ID: MW6830
License Plate: 56483D
Waste Type: residential
Origin: PRESTON/LAWRENCETOWN/LAKE ECHO
Invoice: 0188466
MILLER WASTE SYSTEMS

Gross Weight: 20,590 (kg)
Tare Weight: 19,610 (kg)
Net Weight: 980 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 075626
05/12/2022 15:33:51
Clerk: JLC

/ehicle ID: ES4038
.icense Plate: 48770D
Vaste Type: residential
Origin: 8 EASTERN COUNTY
nvoice: 0028092
EASTERN SHORE CARTAGE

Gross Weight: 20,770 (kg)
Tare Weight: 15,700 (kg)
Net Weight: 5,070 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 075648
05/13/2022 10:56:33
Clerk: JLC

/ehicle ID: MW4117
.icense Plate: 50123D
Vaste Type: residential
)rigin: BEDFORD SACKVILLE CONDOS
nvoice: 0188466
MILLER WASTE SYSTEMS

Gross Weight: 19,660 (kg) MAN WT
Tare Weight: 17,360 (kg)
Net Weight: 2,300 (kg)

$0.00

Total: $0.00

ATTACHMENT 3
FIELD DATA SHEETS

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	1	**SUPERVISOR NAME**	Patrick Avery (Strum)
DATE	Thursday, May 19, 2022		
TIME	9 AM - 9:45 AM	**SORTER NAMES**	George Brown Dez Smith Patrick Barringer

GROSS SAMPLE WEIGHT (KG)	193.50
BIN WEIGHT (KG)	50.00
TRASH SAMPLE NET WEIGHT (KG)	143.50
# OF BULK WASTE OBSERVED	0

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		**NET SAMPLE WEIGHT (KG)**
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	1.) 38.00 2.) 50.00	125.00	83.50	120.50
Fibre - Newsprint/Paper	1.10	2.75	1.85	2.40
Fibre - Corrogated Cardboard	1.10	1.80	N/A	0.70
Food/Putrescible Waste	1.10	16.50	4.45	18.75
Yard Waste	1.10	1.35	N/A	0.25

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	208.50	88.00	120.50	**83.97**
Fibre - Newsprint/Paper	4.60	2.20	2.40	**1.67**
Fibre - Corrogated Cardboard	1.80	1.10	0.70	**0.49**
Food/Putrescible Waste	20.95	2.20	18.75	**13.07**
Yard Waste	1.35	1.10	0.25	**0.17**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.90	**0.63**

FIELD NOTES: One bag had an abundance of food waste. Two different sized empty bins used for garbage/residue.

Weighscale Ticket Information

Truck Number/ID	RE1044
Collection Area	1 Halifax
Date	5/16/2022
Ticket Time	11:33:03
Gross Weight (kg)	21,910
Tare Weight (kg)	16,630
Net Weight (kg)	5,280

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	2	**SUPERVISOR NAME**	Patrick Avery (Strum)
DATE	Thursday, May 19, 2022		
TIME	10:55 AM - 11:15 AM	**SORTER NAMES**	Aaron Deveaux George Brown Dez Smith Patrick Barringer
GROSS SAMPLE WEIGHT (KG)	165.00		
BIN WEIGHT (KG)	51.50		
TRASH SAMPLE NET WEIGHT (KG)	113.50		
# OF BULK WASTE ITEMS	0		

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	50.50	151.00	N/A	101.00
Fibre - Newsprint/Paper	1.10	3.30	N/A	2.20
Fibre - Corrogated Cardboard	1.10	2.70	N/A	1.60
Food/Putrescible Waste	1.10	9.15	N/A	8.05
Yard Waste	1.10	1.10	N/A	0.00

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	151.00	50.50	101.00	**88.99**
Fibre - Newsprint/Paper	3.30	1.10	2.20	**1.94**
Fibre - Corrogated Cardboard	2.70	1.10	1.60	**1.41**
Food/Putrescible Waste	9.15	1.10	8.05	**7.09**
Yard Waste	1.10	1.10	0.00	**0.00**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.65	**0.57**

Weighscale Ticket Information

Truck Number/ID	RE2091
Collection Area	2 Dartmouth
Date	5/13/2022
Ticket Time	11:02:24
Gross Weight (kg)	23,580
Tare Weight (kg)	16,140
Net Weight (kg)	7,440

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	3	**SUPERVISOR NAME**	Patrick Avery (Strum)
DATE	Thursday, May 19, 2022		
TIME	11:18 AM - 11:40 AM	**SORTER NAMES**	Aaron Deveaux George Brown Dez Smith Patrick Barringer
GROSS SAMPLE WEIGHT (KG)	187.00		
BIN WEIGHT (KG)	51.00		
TRASH SAMPLE NET WEIGHT (KG)	136.00		
# OF BULK WASTE ITEMS	0		

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	51.50	182.00	N/A	130.50
Fibre - Newsprint/Paper	1.10	2.55	N/A	1.45
Fibre - Corrogated Cardboard	1.10	2.10	2.45	2.35
Food/Putrescible Waste	1.10	2.55	N/A	1.45
Yard Waste	1.10	1.10	N/A	0.00

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	182.00	51.50	130.50	**95.96**
Fibre - Newsprint/Paper	2.55	1.10	1.45	**1.07**
Fibre - Corrogated Cardboard	2.10	1.10	2.35	**1.73**
Food/Putrescible Waste	2.55	1.10	1.45	**1.07**
Yard Waste	1.10	1.10	0.00	**0.00**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.25	**0.18**

Weighscale Ticket Information

Truck Number/ID	RE2105
Collection Area	3 Bedford/Hammonds Plains
Date	5/12/2022
Ticket Time	11:57:46
Gross Weight (kg)	24,630
Tare Weight (kg)	16,070
Net Weight (kg)	8,560

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	4	**SUPERVISOR NAME**	Patrick Avery (Strum)
DATE	Thursday, May 19, 2022		
TIME	11:40 AM - 12:00 PM	**SORTER NAMES**	Aaron Deveaux George Brown Dez Smith Patrick Barringer
GROSS SAMPLE WEIGHT (KG)	175.00		
BIN WEIGHT (KG)	51.00		
TRASH SAMPLE NET WEIGHT (KG)	124.00		
# OF BULK WASTE ITEMS	0		

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	51.00	170.50	N/A	119.50
Fibre - Newsprint/Paper	1.10	2.10	N/A	1.00
Fibre - Corrugated Cardboard	1.10	2.40	2.15	2.35
Food/Putrescible Waste	1.10	1.80	N/A	0.70
Yard Waste	1.10	1.10	N/A	0.00

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	170.50	51.00	119.50	**96.37**
Fibre - Newsprint/Paper	2.10	1.10	1.00	**0.81**
Fibre - Corrogated Cardboard	4.55	1.10	2.35	**1.90**
Food/Putrescible Waste	1.80	1.10	0.70	**0.56**
Yard Waste	1.10	1.10	0.00	**0.00**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.45	**0.36**

Weighscale Ticket Information

Truck Number/ID	GFL007
Collection Area	4 Western County
Date	5/13/2022
Ticket Time	11:56:04
Gross Weight (kg)	25,600
Tare Weight (kg)	16,880
Net Weight (kg)	8,720

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	5	**SUPERVISOR NAME**	Patrick Avery (Strum)
DATE	Thursday, May 19, 2022		
TIME	10:05 AM - 10:30 AM	**SORTER NAMES**	Frankie Jackson George Brown Dez Smith Patrick Barringer
GROSS SAMPLE WEIGHT (KG)	196.00		
BIN WEIGHT (KG)	50.00		
TRASH SAMPLE NET WEIGHT (KG)	146.00		
# OF BULK WASTE ITEMS	0		

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	50.00	186.50	N/A	136.50
Fibre - Newsprint/Paper	1.10	1.50	N/A	0.40
Fibre - Corrogated Cardboard	1.10	1.30	N/A	0.20
Food/Putrescible Waste	1.10	9.20	N/A	8.10
Yard Waste	1.10	1.65	N/A	0.55

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	186.50	50.00	136.50	**93.49**
Fibre - Newsprint/Paper	1.50	1.10	0.40	**0.27**
Fibre - Corrogated Cardboard	1.30	1.10	0.20	**0.14**
Food/Putrescible Waste	9.20	1.10	8.10	**5.55**
Yard Waste	1.65	1.10	0.55	**0.38**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.25	**0.17**

Weighscale Ticket Information

Truck Number/ID	RE1035
Collection Area	5 Sackville/Fall River
Date	5/16/2022
Ticket Time	14:40:48
Gross Weight (kg)	24,210
Tare Weight (kg)	16,530
Net Weight (kg)	7,680

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA 6
DATE Thursday, May 19, 2022
TIME 10:30 AM - 10:50 AM

SUPERVISOR NAME Patrick Avery (Strum)

SORTER NAMES Frankie Jackson
George Brown
Dez Smith
Patrick Barringer

GROSS SAMPLE WEIGHT (KG) 173.00
BIN WEIGHT (KG) 50.50
TRASH SAMPLE NET WEIGHT (KG) 122.50
 # OF BULK WASTE ITEMS 0

MATERIAL	EMPTY BIN WEIGHT (KG)	GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
		BIN 1	BIN 2	
Garbage/Residue	50.00	168.00	N/A	118.00
Fibre - Newsprint/Paper	1.10	2.00	N/A	0.90
Fibre - Corrogated Cardboard	1.10	2.65	N/A	1.55
Food/Putrescible Waste	1.10	2.75	N/A	1.65
Yard Waste	1.10	1.15	N/A	0.05

MATERIAL	GROSS SAMPLE WEIGHT (KG)	TOTAL WEIGHT OF BINS (KG)	NET SAMPLE WEIGHT (KG)	WASTE (%)
Garbage/Residue	168.00	50.00	118.00	**96.33**
Fibre - Newsprint/Paper	2.00	1.10	0.90	**0.73**
Fibre - Corrogated Cardboard	2.65	1.10	1.55	**1.27**
Food/Putrescible Waste	2.75	1.10	1.65	**1.35**
Yard Waste	1.15	1.10	0.05	**0.04**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.35	**0.29**

Weighscale Ticket Information

Truck Number/ID	RE1041
Collection Area	6 Cole Harbour/Eastern Passage
Date	5/16/2022
Ticket Time	12:06:08
Gross Weight (kg)	26,090
Tare Weight (kg)	16,600
Net Weight (kg)	9,490

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	7	**SUPERVISOR NAME**	Patrick Avery (Strum)
DATE	Thursday, May 19, 2022		
TIME	12:35 PM - 12:55 PM	**SORTER NAMES**	Patrick B. Aaron Deveaux Dez Smith
GROSS SAMPLE WEIGHT (KG)	211.50		George Brown
BIN WEIGHT (KG)	50.00		Frankie jackson
TRASH SAMPLE NET WEIGHT (KG)	161.50		
# OF BULK WASTE ITEMS	0		

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	51.00	205.50	N/A	154.50
Fibre - Newsprint/Paper	1.10	1.30	N/A	0.20
Fibre - Corrogated Cardboard	1.10	2.60	1.60	2.00
Food/Putrescible Waste	1.10	5.30	N/A	4.20
Yard Waste	1.10	1.10	N/A	0.00

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	205.50	51.00	154.50	**95.67**
Fibre - Newsprint/Paper	1.30	1.10	0.20	**0.12**
Fibre - Corrogated Cardboard	4.20	2.20	2.00	**1.24**
Food/Putrescible Waste	5.30	1.10	4.20	**2.60**
Yard Waste	1.10	1.10	0.00	**0.00**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.60	**0.37**

Weighscale Ticket Information

Truck Number/ID	MW6830
Collection Area	Preston/Lawrencetown/Lake Echo
Date	5/12/2022
Ticket Time	14:48:58
Gross Weight (kg)	20,590
Tare Weight (kg)	19,610
Net Weight (kg)	980

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	8
DATE	Thursday, May 19, 2022
TIME	1:00 PM - 1:10 PM
GROSS SAMPLE WEIGHT (KG)	181.00
BIN WEIGHT (KG)	50.50
TRASH SAMPLE NET WEIGHT (KG)	130.50
# OF BULK WASTE ITEMS	0

SUPERVISOR NAME	Patrick Avery (Strum)
SORTER NAMES	Patrick B. Aaron Deveaux Dez Smith George Brown Frankie jackson

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	50.00	171.00	N/A	121.00
Fibre - Newsprint/Paper	1.10	3.45	N/A	2.35
Fibre - Corrogated Cardboard	1.10	2.20	3.00	3.00
Food/Putrescible Waste	1.10	4.75	N/A	3.65
Yard Waste	1.10	1.10	N/A	0.00

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	171.00	50.00	121.00	**92.72**
Fibre - Newsprint/Paper	3.45	1.10	2.35	**1.80**
Fibre - Corrogated Cardboard	5.20	1.10	3.00	**2.30**
Food/Putrescible Waste	4.75	1.10	3.65	**2.80**
Yard Waste	1.10	1.10	0.00	**0.00**
		LOST MASS UPON FINAL WEIGH-IN (KG)	0.50	**0.38**

Weighscale Ticket Information

Truck Number/ID	ES4038
Collection Area	8 Eastern County
Date	5/12/2022
Ticket Time	15:33:51
Gross Weight (kg)	20,770
Tare Weight (kg)	15,700
Net Weight (kg)	5,070

PERFORMANCE AUDIT RECORD

WASTE COLLECTION AREA	Condos	**SUPERVISOR NAME**	Patrick Avery (Strum)
DATE	Thursday, May 19, 2022		
TIME	1:10 PM - 1:30 PM	**SORTER NAMES**	Patrick B. Aaron Deveaux Dez Smith George Brown Frankie jackson
GROSS SAMPLE WEIGHT (KG)	161.50		
BIN WEIGHT (KG)	50.50		
TRASH SAMPLE NET WEIGHT (KG)	111.00		
# OF BULK WASTE ITEMS	0		

		GROSS TOTAL SEPARATED SAMPLE WEIGHT (KG)		NET SAMPLE WEIGHT (KG)
MATERIAL	**EMPTY BIN WEIGHT (KG)**	**BIN 1**	**BIN 2**	
Garbage/Residue	50.50	150.00	N/A	99.50
Fibre - Newsprint/Paper	1.10	1.75	N/A	0.65
Fibre - Corrogated Cardboard	1.10	2.00	3.00	0.90
Food/Putrescible Waste	1.10	8.65	N/A	7.35
Yard Waste	1.10	3.70	N/A	2.60

MATERIAL	**GROSS SAMPLE WEIGHT (KG)**	**TOTAL WEIGHT OF BINS (KG)**	**NET SAMPLE WEIGHT (KG)**	**WASTE (%)**
Garbage/Residue	150.00	50.50	99.50	**89.64**
Fibre - Newsprint/Paper	1.75	1.10	0.65	**0.59**
Fibre - Corrogated Cardboard	2.00	1.10	0.90	**0.81**
Food/Putrescible Waste	8.65	1.10	7.55	**6.80**
Yard Waste	3.70	1.10	2.60	**2.34**
		LOST MASS UPON FINAL WEIGH-IN (KG)	-0.20	**-0.18**

FIELD NOTES: A clean-up of the work area is expected to have caused the additional mass reported.

Weighscale Ticket Information

Truck Number/ID	MW4117
Collection Area	Bedford Sackville Condos
Date	5/13/2022
Ticket Time	10:56:33
Gross Weight (kg)	19,660
Tare Weight (kg)	17,360
Net Weight (kg)	2,300

November 4, 2022

Mr. Steve Copp
Mirror Nova Scotia Limited
600 Otter Lake Drive
Lakeside, NS B3T 2E2

Dear Mr. Copp,

Re: August 2022 Performance Audit
Otter Lake Waste Processing & Disposal Facility

In August 2022, Strum Consulting was retained by Mirror Nova Scotia Limited (Mirror) to oversee a Performance Audit at the Otter Lake Waste Processing & Disposal Facility (Otter Lake) located at 600 Otter Lake Drive in Lakeside, NS.

The purpose of the Performance Audit was to characterize the incoming residential waste stream and assess the percentage of compostable waste in this stream by mass. This letter report provides a summary of the Performance Audit completed on August 30, 2022 and includes a statistical analysis of the performance audit data collected to date.

Background

In March 2022, Nova Scotia Environment & Climate Change (NSECC) issued an updated Municipal Approval for Otter Lake, allowing the Front End Processor and Waste Stabilization Facility (FEP/WSF) to be deactivated upon the submission and acceptance of a Compliance Plan in accordance with the Approval requirements.

As per the Approval, the Performance Targets for Otter Lake include (but are not limited to) compostable waste not exceeding ten percent (10%) of the total amount of municipal solid waste landfilled, by mass. Prior to the deactivation of the FEP and WSF, the submitted Compliance Plan must include details of how Performance Targets will be achieved. The Compliance Plan also outlines how Performance Audits will be completed as a means to quantify the presence of compostable waste being received at Otter Lake.

Given the above, quarterly Performance Audits will be completed to characterize the composition of compostable waste in the incoming residential waste stream and to assess compliance with Performance Targets.

Methodology

The methodology followed for the August 2022 Performance Audit reflects best practices identified in the Divert NS Waste Audit Manual and Field Procedures Guide (2017), as well as site specific processes established by Halifax Regional Municipality (HRM), and is summarized below.

Sample Load Identification

Residential curbside collection is divided into eight collection areas in HRM and condominium properties which are also considered to be residential. The geographic descriptions of the various areas are described in Table A, below.

Table A: Collection Area Descriptions

Waste Collection Area	Area Description
1	Halifax (former city limits); Spryfield
2	Dartmouth (former city limits)
3	Bedford; Hammonds Plains; Pockwock
4	Beechville-Timberlea; Herring Cove; Prospect; Peggy's Cove; St. Margaret's Bay to Hubbards
5	Sackville; Beaver Bank; Rall River; Waverley, Wellington; Dutch Settlement
6	Cole Harbour; Westphal; Cherry Brook; Eastern Passage; Cow Bay
7	Porters Lake; Lawrencetown; Chezzetcook; Lake Echo; Preston
8	Middle Musquodoboit; Musquodoboit Harbour; Elderbank; Sheet Harbour; Eastern Shore
Condos	Multi-residential style properties located in various communities

Based on residential curbside collection schedules for each specific collection area and the scheduled audit date and time, sample loads are selected ahead of time by HRM staff. A random number generator is used to choose which vehicle would be sampled. One sample from each of the eight curbside collection areas and one sample from condos were assessed as part of the August 2022 Performance Audit.

The selected loads were visually inspected on the tip floor upon arrival and photographs were taken as shown in the attached photo log. The following information was recorded for each load:

- Collection vehicle and route numbers
- Date/Time of arrival
- Date/Time sample taken
- Gross and tare weight of truck
- Weight of sample
- Number/type of bulky items observed
- Names of persons taking the sample
- Date/Time of sorting

Sample Size

Photographs of the auditing process are provided as Attachment 1. Once emptied from the vehicle, multiple sections of the load were selected in order to draw a sample that was representative of the load. Each sample was to contain a mix of clear and black bags. Containers shown in Photo 2 (Attachment 1) were used to collect a sample between 90 and 135 kg.

Records documenting the identifying information of each vehicle sampled (scale tickets - Attachment 2) and the Performance Audit Record field data sheets (Attachment 3) are also attached to this report.

Material Categories

The categories that were used to define the different types of compostable waste are consistent with the Approval and are outlined below in Table B.

Table B: Compostable Waste Sorting Categories

Category	Sub-Category	Examples
Fibre	Newsprint/Paper	The Chronicle Herald, The Coast, Masthead News, The Cobequid/Dartmouth/Cole Harbour Wire, flyers
	Corrugated Cardboard/Boxboard	Consumer boxes (e.g., from appliances, storage, filing, and shipping)
Organics	Food Waste	Whole vegetables, fruit, meat, fish, leftover food waste, egg shells, peels, oils, bones, fat, packaged food if most of if it consists of food
	Yard Waste	Grass, leaves, brush, branches, wood chips, soil

Materials which did not fall into one of the above noted categories were counted, weighed, and categorized as other garbage.

Sorting Procedure

The sorting team consisted of several Mirror staff. All staff was briefed on the sorting protocols, including familiarity with example materials for each sorting category. Strum staff was designated as “Lead” and was responsible for quality control and data collection.

The audit space consisted of an open area set up with tables for sorting waste materials, containers clearly labeled for each of the waste categories, and digital scales for weighing the waste materials. The containers used for sorting were weighted prior to commencing the audit and recorded on the data sheets to allow for net sample weights to be determined.

To maintain consistency, the Lead was responsible for weighing and recording the data on dedicated data sheets for each area, each time a container was filled. The process continued for each respective area until the full sample was properly sorted and weighed.

Previous Assessments

To establish a baseline for future Performance Audits, an Initial Performance Audit was completed in May 2022 as detailed in the Initial Performance Audit report (dated June 22, 2022). Using the data collected during the May 2022 Performance Audit, the total compostable waste percentage ranged from a minimum of 3.27% to a maximum of 15.4%, with a mean of 7.12%.

Further details of the May 2022 Performance Audit are provided in the above-noted report.

August 2022 Performance Audit Summary

A summary of the August 2022 Performance Audit completed at Otter Lake is provided below in Table C. As previously mentioned, the August 2022 Performance Audit field data sheets containing the data collected respective to each waste collection area during the audit are attached to this report as Attachment 3.

Table C: August 2022 Performance Audit Results

Waste Collection Area	Category Percentage (%)					
	Garbage/ Residue	Fibre - Newsprint/ Paper	Fibre - Corrugated Cardboard	Organics - Food/Putrescible Waste	Organics - Yard Waste	Total Compostable Waste
1	86.51%	5.14%	3.97%	3.84%	0.14%	13.09%
2	79.26%	5.04%	5.26%	8.81%	1.41%	20.52%
3	80.68%	1.55%	5.15%	11.07%	1.55%	19.32%
4	87.31%	0.54%	1.62%	7.77%	2.46%	12.39%
5	87.65%	5.26%	2.55%	2.15%	2.07%	12.03%
6	93.75%	1.25%	2.32%	2.41%	0.00%	5.98%
7	92.20%	1.63%	2.37%	3.73%	0.07%	7.80%
8	83.14%	1.18%	2.04%	4.47%	8.71%	16.40%
Condos	87.50%	4.70%	3.10%	5.40%	0.00%	13.20%

Notes: 1. Total compostable waste percentage based on aggregate of four compostable waste category percentages.

Using the data in Table C above, the total compostable waste percentage ranged from a minimum of 5.98% (Area 6) to a maximum of 20.52% (Area 2), with a mean of 13.41% based on only nine (9) samples being collected during the August 2022 Performance Audit.

Average Total Compostable Waste Percentage

A summary of the Total Compostable Waste percentage for the May 2022 and August 2022 Performance Audit completed at Otter Lake is provided below in Table D. Using this data, the Average Total Compostable Waste percentage was calculated for each area.

Table D: Average Total Compostable Waste Percentage

Waste Collection Area	May 2022 Total Compostable Waste	August 2022 Total Compostable Waste	Average Total Compostable Waste Per Area
1	15.40%	13.09%	14.25%
2	10.44%	20.52%	15.48%
3	3.87%	19.32%	11.60%
4	3.27%	12.39%	7.83%
5	6.34%	12.03%	9.19%
6	3.39%	5.98%	4.69%
7	3.96%	7.80%	5.88%
8	6.90%	16.40%	11.65%
Condos	10.54%	13.20%	11.87%

Notes: 1. Average total compostable waste percentage per area based on May 2022 and August 2022 Waste Audit Total Compostable Waste percentages.

Using the data in Table D above, the average total compostable waste percentage ranged from a minimum of 4.69% (Area 6) to a maximum of 15.48% (Area 2), with a mean of 10.27% based on a total of 18 samples being collected during the May 2022 Performance Audit and the August 2022 Performance Audit.

Overall Compostable Waste

August 2022

As shown in Table E below, given the August 2022 total compostable waste percentage per area and the three year average of waste tonnage per area, the estimated compostable waste tonnage per year has been calculated. Using the total of the Estimated Annual Compostable Waste (6653.31 tonnes) and the three year waste average total (48,923.20 tonnes), the Compostable Waste Percentage is calculated to be 13.60%. Supporting data is provided as Table 1 (Attachment 4).

Table E: Estimated Annual Compostable Waste based on August 2022 Data

Waste Collection Area	Three Year Waste Average (Tonnes)	August 2022 Total Compostable Waste	Estimated Annual Compostable Waste (Tonnes)
1	9918.30	13.09%	1298.31
2	6866.42	20.52%	1408.99
3	4358.45	19.32%	842.05
4	5304.70	12.39%	657.25
5	8372.02	12.03%	1007.15
6	5130.17	5.98%	306.78
7	2962.13	7.80%	231.05
8	3383.67	16.40%	554.92
Condos	2627.33	13.20%	346.81
TOTAL	**48923.20**	**N/A**	**6653.31**
Compostable Waste Percentage = (6653.31/48923.20) X 100 = 13.60%			

Notes: 1. Data used to calculate three year average provided by Mirror and included tonnage from the fiscal years 2019/2020, 2020/2021, and 2021/2022.

Based on the data in Table E above, the Estimated Annual Compostable Waste per area ranges from a minimum of 231.05 tonnes (Area 7) to a maximum of 1408.99 tonnes (Area 2), with a mean of 739.26 tonnes.

May and August 2022

As shown in Table F below, given the average (May and August 2022) total compostable waste percentage per area and the three year average of waste tonnage per area, the estimated compostable waste tonnage per year has been calculated. Using the totals of the Estimated Annual Compostable Waste (5,287.45 tonnes) and the three year waste average total (48,923.20 tonnes), the Compostable Waste Percentage is calculated to be 10.81%. Supporting data is provided as Table 2 (Attachment 4).

Table F: Estimated Annual Compostable Waste based on May and August 2022 Data

Waste Collection Area	Three Year Waste Average (Tonnes)	Three Year Waste Average (% Total)	Average Total Compostable Waste % Per Area	Estimated Annual Compostable Waste (Tonnes)
1	9918.30	20.27%	14.25%	1413.36
2	6866.42	14.04%	15.48%	1062.92
3	4358.45	8.91%	11.60%	505.58
4	5304.70	10.84%	7.83%	415.36
5	8372.02	17.11%	9.19%	769.39
6	5130.17	10.49%	4.69%	240.60
7	2962.13	6.05%	5.88%	174.17
8	3383.67	6.92%	11.65%	394.20
Condos	2627.33	5.37%	11.87%	311.86
TOTAL	**48923.20**	**100.00%**	**N/A**	**5287.45**
Compostable Waste Percentage = (5287.45/48923.20) X 100 = 10.81%				

Notes: 1. Data used to calculate three year average provided by Mirror and included tonnage from the fiscal years 2019/2020, 2020/2021, and 2021/2022.

Based on the data in Table F above, the Estimated Annual Compostable Waste per area ranges from a minimum of 174.17 tonnes (Area 7) to a maximum of 1413.36 tonnes (Area 1), with a mean of 587.34 tonnes.

Descriptive Statistics

A descriptive statistical analysis was completed on the Estimated Annual Compostable Waste tonnage calculated per area from the May 2022 Performance Audit and the August 2022 Performance Audit. The statistical analysis was completed using the Microsoft Excel Analysis ToolPak Descriptive Statistics analysis tool. Supporting data for the statistical analysis is provided as Tables 3 and 4 (Attachment 4).

At 95% confidence interval, the Estimated Average Annual Compostable Waste tonnage per area is calculated to be between 359.94 tonnes (lower bound) and 814.74 tonnes (upper bound). The confidence interval was calculated by subtracting/adding the calculated 95% confidence level (227.40) from the mean (587.34 tonnes).

By dividing the lower bound (359.94 tonnes) and upper bound (814.74 tonnes) of the 95% confidence interval by the Total Estimated Annual Compostable Waste (5,287.45 tonnes), and multiplying the values by 100%, the percentage of Estimated Annual Compostable Waste is calculated to be between 6.81% and 15.41%.

The above noted statistical analysis is based on a total of 18 samples collected during the May 2022 Performance Audit and August 2022 Performance Audit. As additional sampling will be completed during future audits, it is expected that the statistical data will vary as more data becomes available.

Closure

This report was prepared by James Foley, P.Geo., Project Manager. Should additional information become available, Strum requests that this information be brought to our attention immediately so that we can re-assess the conclusions presented in this report.

This Report and any use of the Report is subject to the terms herein (see attached Statement of Qualifications and Limitations).

If you have any questions, please contact us.

Thank you,

[redacted]

James Foley, P.Geo.
Project Manager
[redacted]

Statement of Qualifications and Limitations

This Report (the "Report") has been prepared by Strum Consulting ("Consultant") for the benefit of Mirror Nova Scotia Limited ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

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- as required by law
- for use by governmental reviewing agencies

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the prior written consent of Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

ATTACHMENT 1
PHOTOGRAPH LOG

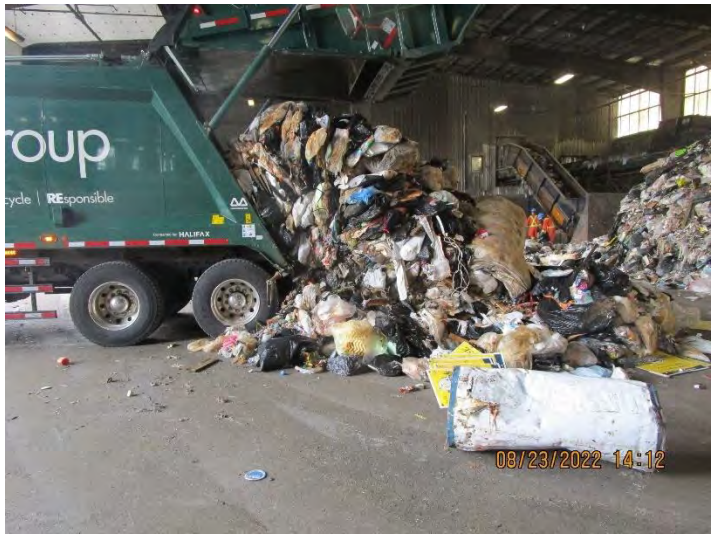

Photo 1: Waste collection vehicle unloading waste collected from HRM collection Area 1. Photo taken on August 23, 2022.

Photo 2: Waste audit sample collected from HRM collection Area 1. Photo taken on August 30, 2022 during waste audit.

Photo 3: Sorting process of HRM collection Area 1. Photo taken August 30, 2022 during waste audit.

Photo 4: Food waste bin sorted from HRM collection Area 1. Photo taken August 30, 2022 during waste audit.

Photo 5: Waste pile from HRM collections Area 2.
Photo collected August 18, 2022

Photo 6: Waste audit sample from HRM collection Area 2.
Photo collected August 18, 2022.

Photo 7: Waste sample collected from HRM collection Area 2 following sorting.
Photo taken on August 30, 2022 during waste audit.

Photo 8: Newsprint/ paper bin sorted from HRM collection Area 2.
Photo taken August 30, 2022 during waste audit.

Photo 9: Waste collection vehicle unloading waste collected from HRM collection Area 3. Photo taken on August 19, 2022.

Photo 10: Waste audit sample from HRM collection Area 3. Photo collected August 30, 2022 during waste audit.

Photo 11: Waste audit sample from HRM collection Area 3 following sorting. Photo collected August 30, 2022 during waste audit.

Photo 12: Fiber OCC sorted from HRM collection Area 3. Photo taken August 30, 2022 during waste audit.

Photo 13: Waste collection vehicle unloading waste collected from HRM collection Area 4. Photo taken on August 18, 2022.

Photo 14: Waste audit sample from HRM collection Area 4. Photo collected August 30, 2022 during waste audit.

Photo 15: Food waste bin sorted from HRM collection Area 4. Photo taken August 30, 2022 during waste audit.

Photo 16: Yard waste bin sorted from HRM collection Area 4. Photo taken August 30, 2022 during waste audit.

Photo 17: Waste collection vehicle unloading waste collected from HRM collection Area 5. Photo taken on August 22, 2022.

Photo 18: Waste audit sample from HRM collection Area 5. Photo collected August 22, 2022.

Photo 19: Fiber OCC waste bin separated from HRM collection Area 5. Photo taken August 30, 2022 during waste audit.

Photo 20: Waste sample from HRM collection Area 5 following sorting. Photo taken August 30, 2022 during waste audit.

Photo 21: Waste collection vehicle unloading waste collected from HRM collection Area 6. Photo taken on August 23, 2022.

Photo 22: Waste pile from HRM collection Area 6. Photo collected August 23, 2022.

Photo 23: Food waste bin separated from HRM collection Area 6. Photo taken August 30, 2022 during waste audit.

Photo 24: Waste sample from HRM collection Area 6 following sorting. Photo taken August 30, 2022 during waste audit.

Photo 25: Waste collection vehicle unloading waste collected from HRM collection Area 7. Photo taken on August 19, 2022.

Photo 26: Waste audit sample from HRM collection Area 7. Photo collected August 19, 2022.

Photo 27: Fiber OCC bin separated from HRM collection Area 7. Photo taken August 30, 2022 during waste audit.

Photo 28: Waste sample from HRM collection Area 7 following sorting. Photo taken August 30, 2022 during waste audit.

Photo 29: Waste collection vehicle unloading waste collected from HRM collection Area 8. Photo taken on August 28, 2022.

Photo 30: Waste audit sample from HRM collection Area 8. Photo collected August 18, 2022.

Photo 31: Yard waste bin separated from HRM collection Area 8. Photo taken August 30, 2022 during waste audit.

Photo 32: Waste sample from HRM collection Area 8 following sorting. Photo taken August 30, 2022 during waste audit.

Photo 33: Waste collection vehicle unloading waste collected from HRM collection Area 9 (Condos). Photo taken on August 22, 2022.

Photo 34: Waste audit sample from HRM collection Area 9 (Condos). Photo collected August 22, 2022.

Photo 35: Food waste bin separated from HRM collection Area 9 (Condos). Photo taken August 30, 2022 during waste audit.

Photo 36: Waste sample from HRM collection Area 9 (Condos) following sorting. Photo taken August 30, 2022 during waste audit.

ATTACHMENT 2
SCALE TICKETS

Halifax Regional Municipality

Scale Slip: 078967
08/23/2022 14:19:57
Clerk: Shelley

/ehicle ID: RE1037
.icense Plate: 56-926-D
Vaste Type: residential
)rigin: 1 HALIFAX
nvoice: 0400927
Royal Environmental Group

Gross Weight: 25,510 (kg)
Tare Weight: 16,520 (kg)
Net Weight: 8,990 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 078842
08/18/2022 13:30:02
Clerk: JDT

Vehicle ID: RE2082
License Plate: 44-088-D
Waste Type: residential
Origin: 2 DARTMOUTH
Invoice: 0400927
Royal Environmental Group

Gross Weight: 22,800 (kg)
Tare Weight: 16,210 (kg)
Net Weight: 6,590 (kg)

$0.00
Total: $0.00

Halifax Regional Municipality

Scale Slip: 078883
08/19/2022 12:57:49
Clerk: Shelley

/ehicle ID: RE1031
.icense Plate: 55-319-D
Vaste Type: residential
)rigin: 3 BEDFORD/HAMMONDS PLAINS
nvoice: 0400927
Royal Environmental Group

Gross Weight: 25,050 (kg)
Tare Weight: 16,460 (kg)
Net Weight: 8,590 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 078852
08/18/2022 15:56:44
Clerk: JDT

/ehicle ID: GFL011
.icense Plate: 45355D
Vaste Type: residential
)rigin: 4 WESTERN COUNTY
ıvoice: 0402150
GFL Environmental Inc

Gross Weight: 24,260 (kg)
Tare Weight: 16,800 (kg)
Net Weight: 7,460 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 078936
08/22/2022 14:46:13
Clerk: Shelley

ehicle ID: RE2083
cense Plate: 44-075-D
/aste Type: residential
rigin: 5 SACKVILLE/FALL RIVER
voice: 0400927
Royal Environmental Group

Gross Weight: 22,360 (kg)
Tare Weight: 15,890 (kg)
Net Weight: 6,470 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 078980
08/23/2022 17:34:13
Clerk: Shelley

/ehicle ID: RE1041
.icense Plate: 57-421-D
Waste Type: residential
Origin: 6 COLE HARBOUR/EASTERN PASSAGE
nvoice: 0400927
Royal Environmental Group

Gross Weight: 22,380 (kg)
Tare Weight: 16,450 (kg)
Net Weight: 5,930 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 078898
08/19/2022 15:51:09
Clerk: Shelley

Vehicle ID: MW9524
License Plate: 56246D
Waste Type: residential
Origin: PRESTON/LAWRENCETOWN/LAKE ECHO
Invoice: 0188466
MILLER WASTE SYSTEMS

Gross Weight: 27,860 (kg)
Tare Weight: 17,030 (kg)
Net Weight: 10,830 (kg)

$0.00

Total: $0.00

Halifax Regional Municipality

Scale Slip: 078839
08/18/2022 13:11:24
Clerk: JDT

Vehicle ID: ES8183
License Plate: 51811D
Waste Type: residential
Origin: 8 EASTERN COUNTY
Invoice: 0028092
EASTERN SHORE CARTAGE

Gross Weight: 22,810 (kg)
Tare Weight: 16,690 (kg)
Net Weight: 6,120 (kg)

$0.00
Total: $0.00

Halifax Regional Municipality

Scale Slip:	078927
	08/22/2022 13:08:15
Clerk:	Shelley

'ehicle ID:	MW2422
icense Plate:	43-098-D
Vaste Type:	residential
)rigin:	BEDFORD SACKVILLE CONDOS
ıvoice:	0188466
	MILLER WASTE SYSTEMS

Gross Weight:	14,250 (kg)
Tare Weight:	13,870 (kg)
Net Weight:	380 (kg)

	$0.00
Total:	$0.00

ATTACHMENT 3
FIELD DATA SHEETS

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 1 **# of Sorters** 8

Weighscale Ticket Information

Truck Number/ID	RE1037	
Collection Area	1	
Date	23-Aug-22	
Ticket Time	14:19	
Gross Weight	25,510	KG
Tare Weight	16,520	KG
Net Weight	8990	KG

Weigth of Gross Sample 196.5 KG

Weight of Tote Bin 50.5 KG **Date of Audit of Sample** Aug 30. 2022

Net Sample of Trash 146 KG **Sample Audit Time Started** 9am

Number of Bulkies Observed - **Sample Audit Time Completed** 9:35am

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)
		1	2	
Garbage/Residue	50.50	176.80	-	126.30
Fibre - Newsprint/Paper	4.00	2.00	2.40	7.50
		2.80	4.30	
Fibre - OCC	2.00	3.40	4.40	5.80
Food/Putrescible Waste	2.00	2.60	5.00	5.60
Yard Waste	1.00	1.20	-	0.20

Material	Gross Sample (KG)	Total Weight of Bins (KG)	Net Sample (KG)	Net Waste Percentage (%)
Garbage/Residue	176.80	50.50	126.30	86.51
Fibre - Newsprint/Paper	11.50	4.00	7.50	5.14
Fibre - OCC	7.80	2.00	5.80	3.97
Food/Putrescible Waste	7.60	2.00	5.60	3.84
Yard Waste	1.20	1.00	0.20	0.14
Lost or Gained Mass	-	-	145.40	0.41

Notes: 0.3 kg added to garbage waste (bag of dog poop) was in yard waste

Several concrete bags with some residue influencing higher Fibre- Newsprint/paper mass

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 2 **# of Sorters** 7

Weighscale Ticket Information

Truck Number/ID	RE2082	
Collection Area	2	
Date	18-Aug-22	
Ticket Time	13:30	
Gross Weight	22800	KG
Tare Weight	16210	KG
Net Weight	6590	KG

Weigth of Gross Sample 186 KG

Weight of Tote Bin 51 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 135 KG **Sample Audit Time Started** 9:38am

Number of Bulkies Observed - **Sample Audit Time Completed** 10:30am

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)
		1	2	
Garbage/Residue	51.00	158.00	-	107
Fibre - Newsprint/Paper	3.00	3.00	4.20	6.80
		2.60	-	
Fibre - OCC	3.00	2.40	1.80	7.10
		5.90	-	
Food/Putrescible Waste	1.00	12.90	-	11.9
Yard Waste	1.00	2.90	-	1.9

Material	Gross Sample (KG)	Total Weight of Bins (KG)	Net Sample (KG)	Net Waste Percentage (%)
Garbage/Residue	158.00	51.00	107.00	79.26
Fibre - Newsprint/Paper	9.80	3.00	6.80	5.04
Fibre - OCC	10.10	3.00	7.10	5.26
Food/Putrescible Waste	12.90	1.00	11.90	8.81
Yard Waste	2.90	1.00	1.90	1.41
Lost or Gained Mass	-	-	134.70	0.22

Notes:

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 3 **# of Sorters** 8

Weighscale Ticket Information

Truck Number/ID	RE1031	
Collection Area	3	
Date	19-Aug-22	
Ticket Time	12:57	
Gross Weight	25050	KG
Tare Weight	16460	KG
Net Weight	8590	KG

Weigth of Gross Sample 154 KG

Weight of Tote Bin 51 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 103 KG **Sample Audit Time Started** 10:30am

Number of Bulkies Observed - **Sample Audit Time Completed** 10:55am

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)
		1	2	
Garbage/Residue	51.00	134.10	-	83.10
Fibre - Newsprint/Paper	1.00	2.60	-	1.60
Fibre - OCC	3.00	2.00	2.90	5.30
		3.40	-	
Food/Putrescible Waste	2.00	11.00	2.40	11.40
Yard Waste	1.00	2.60	-	1.60

Material	Gross Sample (KG)	Total Weight of Bins (KG)	Net Sample (KG)	Net Waste Percentage (%)
Garbage/Residue	134.10	51.00	83.10	80.68
Fibre - Newsprint/Paper	2.60	1.00	1.60	1.55
Fibre - OCC	8.30	3.00	5.30	5.15
Food/Putrescible Waste	13.40	2.00	11.40	11.07
Yard Waste	2.60	1.00	1.60	1.55
Lost or Gained Mass	-	-	103.00	0.00

Notes: 0.1kg subtracted from yard waste - added to garbage (dog poop)

- Addressed sorters on animal waste proper sorting.

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 4 **# of Sorters** 8

Weighscale Ticket Information

Truck Number/ID	GFL011	
Collection Area	4	
Date	18-Aug-22	
Ticket Time	15:56	
Gross Weight	24260	KG
Tare Weight	16800	KG
Net Weight	7460	KG

Weigth of Gross Sample 181 KG

Weight of Tote Bin 51 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 130 KG **Sample Audit Time Started** 10:55am

Number of Bulkies Observed - **Sample Audit Time Completed** 11:25am

		Total Separated Sample Weights (KG)		Net Sample (KG)
Material	**Empty Bin Weight (KG)**	**1**	**2**	
Garbage/Residue	51.00	164.50	-	113.5
Fibre - Newsprint/Paper	1.00	1.70	-	0.7
Fibre - OCC	2.00	1.80	2.30	2.10
Food/Putrescible Waste	2.00	10.00	2.10	10.1
Yard Waste	2.00	2.40	2.80	3.2

Material	**Gross Sample (KG)**	**Total Weight of Bins (KG)**	**Net Sample (KG)**	**Net Waste Percentage (%)**
Garbage/Residue	164.50	51.00	113.50	87.31
Fibre - Newsprint/Paper	1.70	1.00	0.70	0.54
Fibre - OCC	4.10	2.00	2.10	1.62
Food/Putrescible Waste	12.10	2.00	10.10	7.77
Yard Waste	5.20	2.00	3.20	2.46
Lost or Gained Mass	-	-	129.60	0.31

Notes:

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 5 **# of Sorters** 7

Weighscale Ticket Information

Truck Number/ID	RE2083	
Collection Area	5	
Date	22-Aug-22	
Ticket Time	14:46	
Gross Weight	22360	KG
Tare Weight	15890	KG
Net Weight	6470	KG

Weigth of Gross Sample 175 KG

Weight of Tote Bin 49.5 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 125.5 KG **Sample Audit Time Started** 11:25qm

Number of Bulkies Observed - **Sample Audit Time Completed** 12pm

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)
		1	2	
Garbage/Residue	49.50	159.50	-	110
Fibre - Newsprint/Paper	2.00	7.30	1.30	6.6
Fibre - OCC	2.00	2.30	2.90	3.2
Food/Putrescible Waste	1.00	3.70	-	2.7
Yard Waste	1.00	3.60	-	2.6

Material	Gross Sample (KG)	Total Weight of Bins (KG)	Net Sample (KG)	Net Waste Percentage (%)
Garbage/Residue	159.50	49.50	110.00	87.65
Fibre - Newsprint/Paper	8.60	2.00	6.60	5.26
Fibre - OCC	5.20	2.00	3.20	2.55
Food/Putrescible Waste	3.70	1.00	2.70	2.15
Yard Waste	3.60	1.00	2.60	2.07
Lost or Gained Mass	-	-	125.10	0.32

Notes:

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 6 **# of Sorters** 5

Weighscale Ticket Information

Truck Number/ID	RE1041	
Collection Area	6	
Date	23-Aug-22	
Ticket Time	17:34	
Gross Weight	22380	KG
Tare Weight	16450	KG
Net Weight	5930	KG

Weigth of Gross Sample 161.5 KG

Weight of Tote Bin 49.5 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 112 KG **Sample Audit Time Started** 12:30pm

Number of Bulkies Observed - **Sample Audit Time Completed** 12:50pm

		Total Separated Sample Weights (KG)		Net Sample (KG)
Material	**Empty Bin Weight (KG)**	**1**	**2**	
Garbage/Residue	49.50	154.50	-	105
Fibre - Newsprint/Paper	1.00	2.40	-	1.4
Fibre - OCC	2.00	2.10	2.50	2.6
Food/Putrescible Waste	1.00	3.70	-	2.7
Yard Waste	0.00	0.00	-	0

Material	Gross Sample (KG)	Total Weight of Bins (KG)	Net Sample (KG)	Net Waste Percentage (%)
Garbage/Residue	154.50	49.50	105.00	93.75
Fibre - Newsprint/Paper	2.40	1.00	1.40	1.25
Fibre - OCC	4.60	2.00	2.60	2.32
Food/Putrescible Waste	3.70	1.00	2.70	2.41
Yard Waste	0.00	0.00	0.00	0.00
Lost or Gained Mass	-	-	111.70	0.27

Notes:

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 7 **# of Sorters** 5

Weighscale Ticket Information

Truck Number/ID	MW9524	
Collection Area	7	
Date	19-Aug-22	
Ticket Time	15:51	
Gross Weight	27860	KG
Tare Weight	17030	KG
Net Weight	10830	KG

Weigth of Gross Sample 197.5 KG

Weight of Tote Bin 50 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 147.5 KG **Sample Audit Time Started** 12:50pm

Number of Bulkies Observed - **Sample Audit Time Completed** 1:10pm

		Total Separated Sample Weights (KG)		Net Sample (KG)
Material	**Empty Bin Weight (KG)**	**1**	**2**	
Garbage/Residue	50.00	186.00	-	136
Fibre - Newsprint/Paper	2.00	1.80	2.60	2.4
Fibre - OCC	2.00	2.20	3.30	3.5
Food/Putrescible Waste	2.00	4.20	3.30	5.5
Yard Waste	1.00	1.10	-	0.1

Material	**Gross Sample (KG)**	**Total Weight of Bins (KG)**	**Net Sample (KG)**	**Net Waste Percentage (%)**
Garbage/Residue	186.00	50.00	136.00	92.20
Fibre - Newsprint/Paper	4.40	2.00	2.40	1.63
Fibre - OCC	5.50	2.00	3.50	2.37
Food/Putrescible Waste	7.50	2.00	5.50	3.73
Yard Waste	1.10	1.00	0.10	0.07
Lost or Gained Mass	-	-	147.50	0.00

Notes:

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 8 **# of Sorters** 7

Weighscale Ticket Information

Truck Number/ID	ES8183	
Collection Area	8	
Date	18-Aug-22	
Ticket Time	13:11	
Gross Weight	22810	KG
Tare Weight	16690	KG
Net Weight	6120	KG

Weigth of Gross Sample 177 KG

Weight of Tote Bin 50.5 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 127.5 KG **Sample Audit Time Started** 1:10pm

Number of Bulkies Observed - **Sample Audit Time Completed** 1:40pm

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)
		1	2	
Garbage/Residue	50.50	156.50	-	106
Fibre - Newsprint/Paper	2.00	1.70	1.80	1.5
Fibre - OCC	2.00	2.20	2.40	2.6
Food/Putrescible Waste	1.00	6.70	-	5.7
Yard Waste	2.00	7.30	5.80	11.1

Material	Gross Sample (KG)	Total Weight of Bins (KG)	Net Sample (KG)	Net Waste Percentage (%)
Garbage/Residue	156.50	50.50	106.00	83.14
Fibre - Newsprint/Paper	3.50	2.00	1.50	1.18
Fibre - OCC	4.60	2.00	2.60	2.04
Food/Putrescible Waste	6.70	1.00	5.70	4.47
Yard Waste	13.10	2.00	11.10	8.71
Lost or Gained Mass	-	-	126.90	0.47

Notes:

Performance Audit Record

Date August 30, 2022 **Name of Supervisor** **Patrick Avery**

Area 9 **# of Sorters** 8

Weighscale Ticket Information

Truck Number/ID	MW2422	
Collection Area	9	
Date	22-Aug-22	
Ticket Time	13:08	
Gross Weight	14250	KG
Tare Weight	13870	KG
Net Weight	380	KG

Weigth of Gross Sample 150.5 KG

Weight of Tote Bin 50.5 KG **Date of Audit of Sample** 30-Aug

Net Sample of Trash 100 KG **Sample Audit Time Started** 1:40pm

Number of Bulkies Observed - **Sample Audit Time Completed** 2:10pm

		Total Separated Sample Weights (KG)		Net Sample (KG)
Material	**Empty Bin Weight (KG)**	**1**	**2**	
Garbage/Residue	50.50	138.00	-	87.5
Fibre - Newsprint/Paper	2.00	4.60	2.10	4.7
Fibre - OCC	2.00	2.80	2.30	3.1
Food/Putrescible Waste	1.00	6.40	-	5.4
Yard Waste	0.00	-	-	0

Material	**Gross Sample (KG)**	**Total Weight of Bins (KG)**	**Net Sample (KG)**	**Net Waste Percentage (%)**
Garbage/Residue	138.00	50.50	87.50	87.5
Fibre - Newsprint/Paper	6.70	2.00	4.70	4.7
Fibre - OCC	5.10	2.00	3.10	3.1
Food/Putrescible Waste	6.40	1.00	5.40	5.4
Yard Waste	0.00	0.00	0.00	0
Lost or Gained Mass	-	-	100.70	-0.7

Notes:

ATTACHMENT 4
SUPPORTING DATA

Table 1: Total Compostable Waste Percentage Per Area (August 2022) *Project # 22-8641*

Waste Collection Area	% Organics From August 30, 2022 Waste Audit	Average Based On Previous Three Fiscal Years (Tonnes)	Estimated Annual Compostable Waste (Tonnes)
1	13.09%	9918.30	1298.31
2	20.52%	6866.42	1408.99
3	19.32%	4358.45	842.05
4	12.39%	5304.70	657.25
5	12.03%	8372.02	1007.15
6	5.98%	5130.17	306.78
7	7.80%	2962.13	231.05
8	16.40%	3383.67	554.92
Condos	13.20%	2627.33	346.81
	TOTAL	48923.19	6653.31

Average	13.41%	-	739.26
Min	5.98%	-	231.05
Max	20.52%	-	1408.99

Compostable Waste Percentage	(6653.31/48923.19)*100% = 13.60%

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Table 2: Average Total Compostable Waste Percentage Per Area (May and August 2022) *Project # 22-8641*

Waste Collection Area	% Organics From May 19, 2022 Baseline Audit	% Organics From August 30, 2022 Waste Audit	% Organics Average	Average Based On Previous Three Fiscal Years (Tonnes)	Estimated Annual Compostable Waste (Tonnes)
1	15.40%	13.09%	14.25%	9918.30	1413.36
2	10.44%	20.52%	15.48%	6866.42	1062.92
3	3.87%	19.32%	11.60%	4358.45	505.58
4	3.27%	12.39%	7.83%	5304.70	415.36
5	6.34%	12.03%	9.19%	8372.02	769.39
6	3.39%	5.98%	4.69%	5130.17	240.60
7	3.96%	7.80%	5.88%	2962.13	174.17
8	6.90%	16.40%	11.65%	3383.67	394.20
Condos	10.54%	13.20%	11.87%	2627.33	311.86
			TOTAL	48923.19	5287.45

Average	10.27%	-	587.49
Min	4.69%	-	174.17
Max	15.48%	-	1413.36

Compostable Waste Percentage	(5287.45/48923.19)*100% = 10.81%

Table 3: Estimated Annual Compostable Waste Per Area *Project # 22-8641*

Audit	Waste Collection Area	% Organics	Average Waste Based On Previous Three Fiscal Years (Tonnes)	Estimated Annual Compostable Waste (Tonnes)
May 2022 Initial Performance Audit	1	15.40%	9918.30	1527.42
	2	10.44%	6866.42	716.85
	3	3.87%	4358.45	168.67
	4	3.27%	5304.70	173.46
	5	6.34%	8372.02	530.79
	6	3.39%	5130.17	173.96
	7	3.96%	2962.13	117.30
	8	6.90%	3383.67	233.47
	Condos	10.54%	2627.33	276.92
August 2022 Performance Audit	1	13.09%	9918.30	1298.31
	2	20.52%	6866.42	1408.99
	3	19.32%	4358.45	842.05
	4	12.39%	5304.70	657.25
	5	12.03%	8372.02	1007.15
	6	5.98%	5130.17	306.78
	7	7.80%	2962.13	231.05
	8	16.40%	3383.67	554.92
	Condos	13.20%	2627.33	346.81

Average	10.27%	-	587.34
Min	3.27%	-	117.30
Max	20.52%	-	1527.42

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Table 4: Descriptive Statistics ***Project 22-8641***

Column1	
Mean	587.3426074
Standard Error	107.7828698
Median	438.797034
Mode	#N/A
Standard Deviation	457.283989
Sample Variance	209108.6466
Kurtosis	-0.321863367
Skewness	0.943581426
Range	1410.117207
Minimum	117.30048
Maximum	1527.417687
Sum	10572.16693
Count	18
Confidence Level(95.0%)	227.4019778
Upper CI	814.7445852
Lower CI	359.9406295