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Item No. 5
Halifax Regional Council
June 29, 2021
July 20, 2021

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: Original Signed by
Jacques Dubé, Chief Administrative Officer

DATE: June 18, 2021

SUBJECT: Effectiveness of the Front End Processor and Waste Stabilization Facility

ORIGIN

December 9, 2014 Halifax Regional Council motion (Item 14.1)

MOVED by Councillor Rankin, seconded by Councillor Mason that Halifax Regional Council so moves to:

3. Direct staff to take the necessary steps to maintain the current operating model, including front end processor facility, waste stabilization facility and residual disposal facility other than as directed by Regional Council as a consequence of decisions arising out of the ISWMS Review – Final Report dated January 8, 2014 at the Otter Lake Landfill site. Further, to assess the effects of the system changes currently being implemented, returning to Regional Council, with input from the Community Monitoring Committee, no earlier than March, 2019 with a report and recommendation respecting the effectiveness of the front end processor facility and waste stabilization facilities based on system and other changes since conception including diversion outcomes resulting from the changes currently being implemented.

MOTION PUT AND PASSED UNANIMOUSLY.

LEGISLATIVE AUTHORITY

Solid Waste-Resource Management Regulations* made under Section 102 of the *Environment Act
31(1) No person shall own, construct, manage, operate, alter or modify a landfill without obtaining approval from the Minister.

Halifax Regional Municipality Charter

60 (1) The Council may make policies

> … (b) regulating the use of solid-waste management facilities, providing for times and conditions under which they may be used and setting charges for the use of solid-waste management facilities operated by the Municipality; …

RECOMMENDATION ON PAGE 2

335 The Council may make by-laws respecting solid waste, including, but not limited to,

… (b) regulating the disposal, collection and removal of solid waste;

… (e) prescribing the materials that may or may not be deposited at a solid-waste management facility of the Municipality or in which the Municipality participates;

… (f) prescribing the terms and conditions under which a deposit may be made at a solid-waste management facility of the Municipality or in which the Municipality participates, including the amount and manner of payment of any fees and charges to be paid for the deposit;

… (g) requiring the separation of solid waste prior to collection;

… (j) respecting anything required to implement the integrated solid-waste resource management strategy of the Municipality.

RECOMMENDATION

It is recommended that Halifax Regional Council direct the Chief Administrative Officer:

1. To work with Mirror Nova Scotia Limited to submit a joint application to Nova Scotia Environment to deactivate the operation of the Front End Processor (FEP) and Waste Stabilization Facility (WSF) at the Otter Lake Waste Processing and Disposal Facility (Otter Lake) on the condition that:

    a. The FEP/WSF be maintained in standby mode (i.e., operable state);
    b. Industrial, Commercial, and Institutional (ICI) waste continue to not be landfilled at Otter Lake and continue to be processed through the transfer station and exported to other licensed landfills; and
    c. The Community Monitoring Committee be consulted on any further proposed changes to the operations at Otter Lake.

2. To negotiate an extension to contract timelines with Mirror Nova Scotia Limited as outlined in the Discussion Section (Next Steps) of this report and return to Council with a recommendation.

EXECUTIVE SUMMARY

1995 Strategy

In 1995, the Integrated Waste/Resource Management Strategy (1995 Strategy) was developed by the Community Stakeholder Committee (CSC[1]). At that time, approximately only five percent of waste materials were diverted from landfill disposal. Additionally, there was a public outcry over the environmental challenges caused by the Highway 101 Landfill related to odours, attraction of birds, and groundwater quality. Core aspects of the 1995 Strategy were related to environmental sustainability and community protection including maximizing diversion programs and processing waste materials prior to disposal to mitigate landfill challenges such as odours, attraction of birds, and groundwater quality.

The 1995 Strategy envisioned the establishment of the Front End Processor (FEP) and Waste Stabilization Facility (WSF) as part of a future proposed landfill operation. The original intent of the FEP/WSF was to protect the local community and to mitigate odours, attraction of birds (and/or other vectors), and groundwater quality impairment.

[1] In 1994, Halifax County, supported by the other three area municipalities (City of Halifax, City of Dartmouth, and Town of Bedford) initiated a process to develop a regional waste strategy. This initiative was led by the CSC, on behalf of Halifax County.

The Otter Lake Waste Processing & Disposal Facility (Otter Lake) was commissioned in 1999 and included the FEP/WSF. The FEP consists of mechanical equipment that processes bagged garbage. The main purpose is to separate putrescible containing waste materials (e.g., organics, food waste) and to send to the WSF for biostabilization prior to landfilling. An overview of Otter Lake and the FEP/WSF is provided as Attachment A.

As a result of the 1995 Strategy, HRM significantly improved the solid waste management system including becoming a national leader in diverting waste from landfill disposal. This included implementing a green cart program that was successful at recovering the majority of organic waste (including food waste) generated in HRM and used to produce compost. HRM's commitment to this program is evidenced by the recent decision by Regional Council on December 1, 2020 to invest over $450 million into a new composting facility and operation for the next 25 years.

2014 Strategy Update

On September 20, 2011 Regional Council directed staff to advance the 'next steps' in order to achieve a more fiscally sustainable delivery of the solid waste system. On January 14, 2014 staff presented the Integrated Solid-Waste Resource Management Strategy Review (2014 Strategy Update). Two policy changes made by Regional Council as a result of the 2014 Strategy Update had significant impact on the quantities of waste being processed through the FEP/WSF and disposed of in the landfill at Otter Lake:

- **Clear Bags –** On August 1, 2015 the clear bags policy was implemented for the municipal garbage collection program. This resulted approximately in a 25% reduction in residential garbage processed and landfilled at Otter Lake.

- **Flow Control –** The export ban for Institutional, Commercial, & Industrial (ICI) waste was removed, allowing ICI waste generated within HRM to be exported to licensed landfills outside the boundaries of HRM. Beginning on March 14, 2016 ICI waste began being exported to other licensed landfills via a transfer station established at Otter Lake. This has resulted in annual savings to the ICI sector in the order of $5.2 million per year as a result of the high cost to dispose of waste at Otter Lake.

The total quantity of waste processed through the FEP/WSF and landfilled at Otter Lake has dropped from over 134,000 tonnes (2014/2015) to just over 45,000 tonnes (2016/2017) after one year of both policies being implemented. A trend that has continued to present time.

With respect to the FEP/WSF, staff pursued closure based on advice from Stantec who completed a Waste Resource Strategy Update (2013) on behalf of HRM. On December 9, 2014 Regional Council directed staff to return no earlier than March 2019 to seek amendments to the FEP/WSF. This pause was initiated to assess the impacts of Council's recently approved changes to the solid waste management system which included the introduction of clear bags and the removal of the waste export ban for the ICI sector.

Effectiveness of the FEP/WSF Today

Dillon Consulting (Dillon) prepared a FEP/WSF Closure Review (November 2020), which is included in Attachment C. It is noted that Dillon's conclusions are based on the continued exportation of ICI waste through the transfer station and that only residential waste will be landfilled.

The Dillon report concludes:

> **"Based on the results of this analysis, there does not appear to be any significant benefit to the continued operations of the FEP/WSF. Further, there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated. Therefore, it is recommended that operations at the FEP and WSF be discontinued."**

In general, the findings of the study completed by Dillon supporting deactivating the FEP/WSF can be summarized as follows:

- The amount of waste processed through the FEP/WSF has significantly declined since HRM removed flow control for ICI waste.
- The amount of organics (e.g., food waste) being received at Otter Lake and being stabilized through the WSF has declined over time as diversion programs have matured and that the clear bag policy has also encouraged compliance.
- No off-site impacts were identified (e.g., odours, litter, bird and vector control etc.)
- Some on-site impacts were identified as low to medium risk and included:
    - Health and safety consideration related to truck delivery to the landfill tip face (medium risk)
    - Increased potential for blowing litter at the landfill tip face (medium risk)
    - Attraction of birds (medium risk)
    - Delivery of rodents in waste loads to the landfill tip face (low risk).

  As noted in the Dillon report:

  > "**it is noted that potential on-site issues with material delivery, litter control and bird/vector control present relatively modest risk 'significance' scores and are readily mitigated through the implementation of established best practice and operational procedures**."

Community Monitoring Committee (CMC) and Halifax Waste Resource Society

The Otter Lake CMC was consulted on deactivating the FEP/WSF and placing it in standby mode (i.e., operable state). The CMC was not supportive and has rejected the proposed change to the Otter Lake operation. Based on the documents provided by the CMC, their opposition appears to be based on commitments made by the Municipality to operate the FEP/WSF and concerns over off-site impacts to the local community.

Additionally, staff proposed a phased deactivation plan that included a pilot project. The intent of the pilot project would be to confirm the findings of the Dillon report through a joint oversight committee that would include representatives from all involved parties, including the CMC, HRM, and the operator Mirror Nova Scotia. The CMC did not accept or reject the proposed phased deactivation plan, rather they directed HRM staff to engage with the Halifax Waste Resource Society[2] (Society) directly on the matter. The Society was not supportive of the phased deactivation (including pilot).

All correspondence between staff and the CMC and the Society is included as Attachments C, D, E, and F.

It is important to note that Staff are recommending deactivating the FEP/WSF and placing it in standby mode. This means the FEP/WSF will be maintained in an operable state and can be put back into operations as needed. Though staff believe that Otter Lake can be operated in an environmentally sound manner without the FEP/WSF per the Dillon report, maintaining the facilities in standby mode will serve as a contingency measure.

[2] The Society was established in 1999 to represent the interests of the local community with respect to Otter Lake. As part of developing Otter Lake, HRM entered into an agreement with the Society to establish roles and responsibilities, including the CMC's right to present their position directly to Regional Council with respect to any proposed changes at Otter Lake. The CMC is the working committee of the Society that oversees landfill operations.

Next Steps

Should Regional Council approve pursuing deactivating the FEP/WSF and placing it in standby mode, staff will work with the Otter Lake operator, Mirror Nova Scotia, to submit a joint application to NS Environment to amend the operating approval. It is anticipated that the review of an application will likely take in the order of 2 to 3 months, acknowledging that additional information or public engagement may be requested by NS Environment which may extend this timeline.

Additionally, as outlined in the Discussion Section (Next Steps) of this report, staff will negotiate with Mirror Nova Scotia to extend contract timelines should NS Environment not make a decision on deactivating the FEP/WSF prior to December 31, 2021.

BACKGROUND

The Otter Lake Waste Processing & Disposal Facility (Otter Lake) was commissioned in 1999. Otter Lake currently consists of the following facilities:

- Front End Processor (FEP)
- Waste Stabilization Facility (WSF)
- Residual Disposal Facility (RDF) (i.e., landfill)
- Transfer Station

An overview of the site is provided in Attachment A. The following sections provide an overview of the key strategies related to HRM's solid waste resource system and the operations at Otter Lake, as well as an overview of key stakeholders and operating agreements.

1995 Strategy

In 1995, the Integrated Waste/Resource Management Strategy[3] (1995 Strategy) was developed by the Community Stakeholder Committee (CSC[4]). At that time, approximately only five percent of waste materials were diverted from landfill disposal. Additionally, there was a public outcry over the environmental challenges caused by the Highway 101 Landfill related to odours, attraction of birds, and groundwater quality. Core aspects of the 1995 Strategy were related to environmental sustainability and community protection including maximizing diversion programs and processing waste materials prior to disposal to mitigate landfill challenges such as odours, attraction of birds, and groundwater quality.

The 1995 Strategy envisioned the establishment of a source-separated composting program:

> **"Composting is at the heart of the Strategy. Its success depends on composting. The municipal collection system will be based on collecting compostables in specially designed containers as part of a modified system which also includes recyclables and trash collection."**

Additionally, the 1995 Strategy envisioned the establishment of the FEP and WSF[5] as part of a future proposed landfill operation. The original intent of the FEP/WSF was to protect the local community and to mitigate odours, attraction of birds (and/or other vectors), and groundwater quality impairment.

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[3] March 25, 1995
[4] In 1994, Halifax County, supported by the other three area municipalities (City of Halifax, City of Dartmouth, and Town of Bedford) initiated a process to develop a regional waste strategy. This initiative was led by the CSC, on behalf of Halifax County.
[5] An overview of the FEP and WSF is included in Attachment A

The 1995 Strategy contemplated refinement of the FEP/WSF as diversion improves. The 1995 Strategy indicates:

> **"To ensure the maximum diversion of organic content is achieved prior to the opening of new residuals disposal facilities[6], the Strategy includes front-end processing facilities to divert the remaining 'third stream' mixed wastes. At these facilities, residual organic material will be separated and processed. Beginning with the approved opening of new residuals disposal facilities, these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up. The CSC regards this component as an essential safeguard for the process to ensure the integrity of the whole Strategy and for public acceptance of any new residuals disposal facilities by the local community."**

In 1996, Regional Council adopted a Revised Integrated/Resource Management Strategy (1996 Strategy) which was an update to the to the 1995 Strategy while maintaining the key principals. Similar to the 1995 Strategy, the 1996 Strategy contemplated refinement of the of the FEP/WSF as diversion improves. The 1996 Strategy indicates:

> **"The most important concern of the original strategy was the size and cost of the FEP/WSF. An important goal of the revised strategy was to create time to allow source separation behaviour to take hold in the Municipality. This would in turn divert materials from the mixed waste stream. Processing costs are further reduced by eliminating any reliance on this facility to create incremental diversion."**

2014 Strategy Update

On September 20, 2011 Regional Council directed staff to advance the 'next steps' in order to achieve a more fiscally sustainable delivery of the Halifax solid waste system. On January 14, 2014 staff presented the Integrated Solid-Waste Resource Management Strategy Review (2014 Strategy Update). Ultimately in 2014/2015 Regional Council approved a number of measures, including amending the Solid Waste Resource Collection and Disposal By-Law S-600 on February 3, 2015 for:

- The mandatory use of clear bags (with allowance for privacy bags) as part of the residential garbage collection program.
- The elimination of flow control for Industrial, Commercial, and Institutional (ICI) sector specifically for garbage, thereby allowing ICI garbage to be disposed at landfills outside the boundaries of HRM.

With respect to the FEP/WSF staff pursued closure based on advice from Stantec who completed a Waste Resource Strategy Update (2013) on behalf of HRM. Stantec concluded that the:

> **"FEP and WSF do not function in a manner envisaged in the 1995 Strategy. These facilities were intended to stabilize organic wastes and produce a low-grade compost product. Few organics are now actually processed, and the multiple shredding of the waste prior to disposal may actually increase the generation of landfill gas over the short term in the period before gas collection systems can be installed. This may contribute to additional odours from the site.**

[6] Residual disposal facilities refers to landfill disposal cells

> **Implementation of this recommendation is contingent on HRM implementing a separate collection of white good (stoves; refrigerators) rather than the current practice of loading these items in with the regular curbside waste and then removing the appliances from the waste at the FEP. The annual cost to operate the FEP and WSF is reported to be $8.9 million per year. Most of this amount could be recognized as sustainable savings less any contractual commitments."**

A peer review was conducted by SNC Lavalin who stated:

> **"We support this recommendation because the FEP and WSF have never operated as originally envisioned".**

On December 9, 2014, Regional Council directed staff to return no earlier than March 2019 to seek amendments to the FEP/WSF. This pause was initiated to assess the impacts of Council's recently approved changes to the solid waste management system which included the introduction of clear bags and the removal of the waste export ban for the ICI sector.

Halifax Waste Resource Society / Community Monitoring Committee (CMC)

The 1999 agreement between HRM and the Halifax Waste Resource Society (Society) titled: “Agreement for Community Monitoring of Solid Waste Facilities” (HRWS Agreement) lays out the framework for community monitoring of landfill operations by the Community Monitoring Committee (CMC).

The Society was established in 1999 to represent the interests of the local community with respect to Otter Lake. As part of developing Otter Lake, HRM entered into an agreement with the Society to establish roles and responsibilities, including the establishment of the CMC. The CMC consists of 15 members, 9 of which are appointed by the Society, and 6 of which are appointed by HRM. HRM’s representatives on the CMC include the Mayor and the Councillors from Districts 11, 12, and 13.

The HWRS Agreement stipulates that only ‘Acceptable Waste’ shall be landfilled. Acceptable Waste is defined as “Inert Materials”; “Stable Materials” (i.e. biostabilized though the FEP/WSF); and “Residual Materials” (i.e. minor quantities of putrescible and other banned materials). The HWRS Agreement also provides that the Chair of the CMC is entitled to make representations to Halifax Regional Council concerning any proposed changes at Otter Lake.

HRM-Mirror Agreements

In 1997, HRM entered into an agreement with Mirror Nova Scotia (Mirror) for the design, construction, and operation of the Otter Lake facility (1997 Agreement). The agreement provided a framework for operations at Otter Lake for a period of twenty-five years, with Mirror being responsible for compliance with all applicable laws, insurance, and bonding, inclusive of environmental impairment for thirty years post closure of the site.

Under the 1997 Agreement, Mirror was compensated at a cost-plus 25% model. In 1999, Otter Lake, including the FEP/WSF, were commissioned and began accepting waste materials.

On December 23, 2015 HRM and Mirror renegotiated and executed a 20-year agreement for the continued operation of the Municipality's solid waste facilities at Otter Lake (2016 Agreement), which commenced January 1, 2016. As part of the 2016 Agreement, HRM agreed to pay an all- inclusive processing fee of

$125[7] per tonne to Mirror for solid waste received, processed, and disposed of at Otter Lake. The all-inclusive processing fee includes the construction and closure of landfill cells. Between January 1, 2018 and December 31, 2021, pursuant to the 2016 Agreement, Mirror has the option to provide notice of early of termination in the event that the legal entitlements have not been amended to remove the obligation to operate the FEP/WSF. Should Mirror decide to provide notice of early termination, the all-inclusive processing fee would be increased to $170 per tonne, with the contract expiring on December 31, 2023.

In addition, under the 2016 Agreement, Mirror was allowed to establish a transfer station at Otter Lake to transfer ICI waste to landfills outside the boundaries of HRM for disposal. On March 14, 2016 Mirror commenced operations of the transfer station.

Otter Lake Site Life

HRM staff's current estimates for site life at Otter Lake is as follows:

- If only residential waste is landfilled, it is estimated that Otter Lake will reach capacity in the order of 25 years.
- If residential waste and ICI waste are landfilled, it is estimated that Otter Lake will reach capacity in the order of 10 years.

Several key assumptions include:

- Starting residential tonnage in 2021, is in the order of 45,000 tonnes per year and increases by 1% per year to account for growth.
- Starting ICI tonnage in 2021, is in the order of 90,000 tonnes per year and increases by 1% per year to account for growth.
- Landfill daily cover/aggregate consumes approximately 25% of the landfill working volume; with waste consuming approximately 75% of the working volume.

DISCUSSION

The following sections provide an analysis of the effectiveness of the FEP/WSF and takes into consideration:

- Impact of the 1995 Strategy
- Impact of the 2014 Strategy Update
- Financial Impact of 2014 Strategy Update and 2016 Agreement
- Effectiveness of the FEP/WSF Today
- ICI Sector Waste
- Contingency Measure (FEP/WSF to be Maintained in Standby Mode)
- Next Steps

Impact of the 1995 Strategy

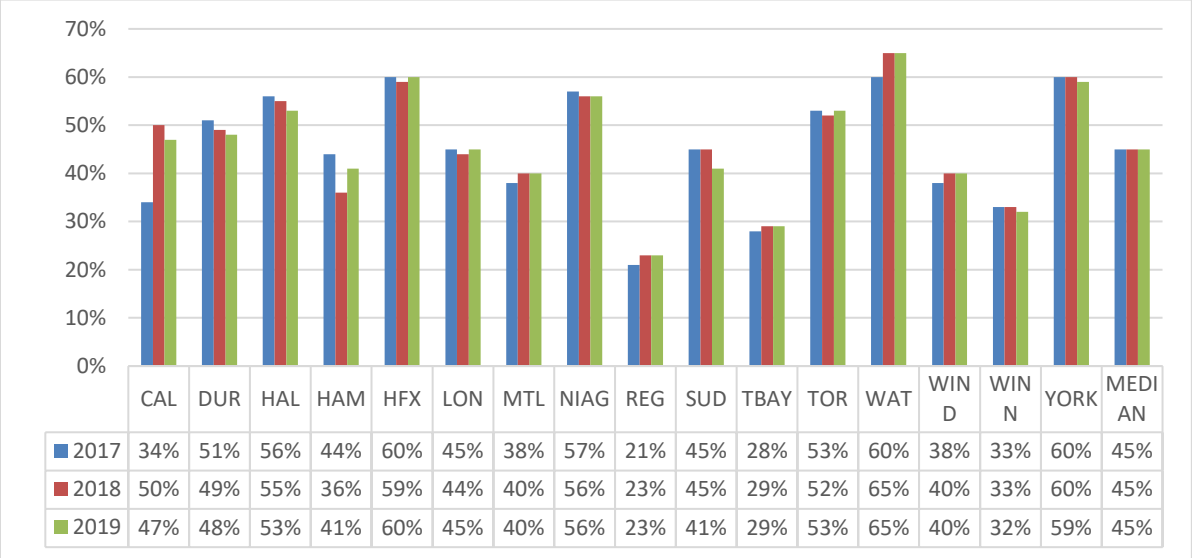
As a result of the 1995 Strategy, HRM significantly improved the solid waste management system including becoming a national leader in diverting waste from landfill disposal. This included implementing a green cart program that was successful at recovering the majority of organic waste (including food waste) generated in HRM and used to produce compost. HRM's commitment to this program is evidenced by the

[7] Adjusted for inflation annually [8] https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/solid-waste-diversion-disposal.html

recent decision by Regional Council on December 1, 2020 to invest over $450 million into a new composting facility and operation for the next 25 years.

The figure below shows the residential diversion rate for cities across Canada. HRM ranks as one of the top three cities, amongst participating municipalities in the Municipal Benchmarking Network, in keeping waste out of landfills.

Figure 1 – Residential Diversion Rate

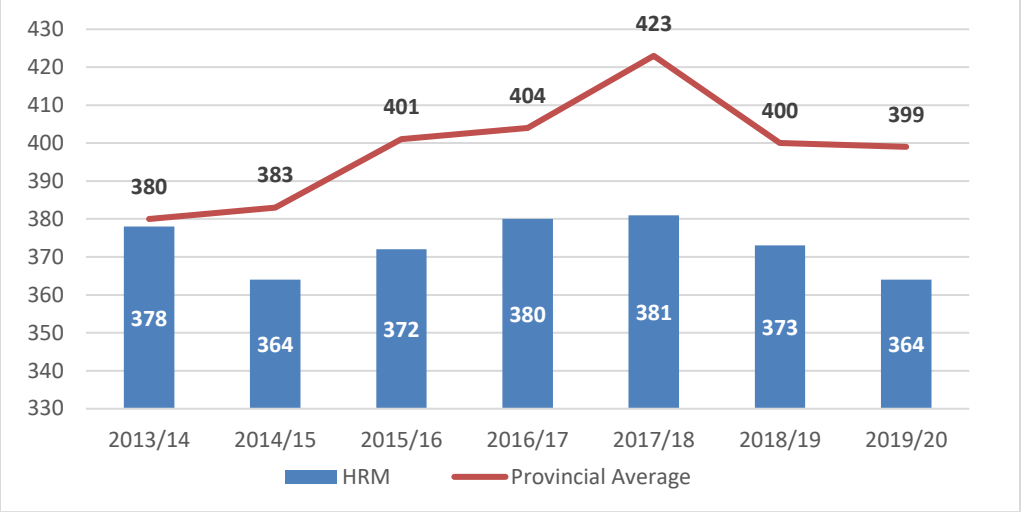


	CAL	DUR	HAL	HAM	HFX	LON	MTL	NIAG	REG	SUD	TBAY	TOR	WAT	WIN D	WIN N	YORK	MEDIAN
2017	34%	51%	56%	44%	60%	45%	38%	57%	21%	45%	28%	53%	60%	38%	33%	60%	45%
2018	50%	49%	55%	36%	59%	44%	40%	56%	23%	45%	29%	52%	65%	40%	33%	60%	45%
2019	47%	48%	53%	41%	60%	45%	40%	56%	23%	41%	29%	53%	65%	40%	32%	59%	45%

Source: Comparison to 2019 Municipal Benchmarking Network Canada Performance Measurement Report

The figure below shows the disposal rate per capita. Disposal rate means all waste landfilled (regardless of location) including residential and ICI sources generated from HRM. The disposal rate per capita for Halifax is approximately half the national average[8].

Figure 2 – Disposal Rate Per Capita (kg/person)



Source: Nova Scotia Environment

[8] https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/solid-waste-diversion-disposal.html

Impact of 2014 Strategy Update

Two policy changes made as a result of the 2014 Strategy Update had significant impact on the quantities of waste being processed through the FEP/WSF and disposed of in the landfill at Otter Lake:
Clear Bags – On August 1, 2015 the clear bags policy was implemented for the municipal garbage collection program.

Flow Control – On March 14, 2016 Mirror commenced operations of a transfer station at Otter Lake where Mirror charges a tip fee to receive and haul ICI waste to landfill(s) outside HRM.

The table below shows the approximate tonnage received at Otter Lake for the eight-year period from fiscal 2012/13 to fiscal 2019/2020 including the ICI garbage that was shipped to outside landfill(s) through the Mirror operated transfer station. As can be seen from the table below:

- The quantity of ICI waste dropped from over 75,000 tonnes (2014/2015) to effectively[9] no ICI waste being landfilled at Otter Lake starting in 2016/2017 as result in the change to the flow control policy.
- The quantity of residential garbage dropped from over 57,000 tonnes (2014/2015) to less than 45,000 tonnes during the first full fiscal year (2016/2017) that the clear bag policy was in place.
- As a result, the total quantity of waste processed through the FEP/WSF and landfilled at Otter Lake has dropped from over 134,000 tonnes (2014/2015) to just over 45,000 tonnes (2016/2017) after one year of both policies being implemented.

Table 2 – Otter Lake Waste Quantities

Fiscal Year	Residential Garbage (Tonnes)	ICI Garbage (Tonnes)	Special Garbage (Tonnes)[1]	Total Processed/ Landfilled at Otter Lake (Tonnes)	ICI Garbage Processed Thru Transfer Station (Tonnes)
12/13	58,872	78,087	2,074	139,033	N/A
13/14	59,146	78,678	1,930	139,754	N/A
14/15	**57,221**	**75,813**	**1,495**	**134,529**	**N/A**
15/16	49,585	49,683	1,161	100,429	3,125
16/17	**44,584**	**0**	**825**	**45,409**	**59,666**
17/18	45,727	0	526	46,253	60,148
18/19	45,318	0	514	45,832	62,335
19/20	46,119	0	530	46,649	71,891

[1] Special tonnage can be of various types – for example bulky items, grits or solids items taken direct to the landfill cell.

Financial Impact of 2014 Strategy Update and 2016 Agreement

HRM has achieved significant savings as a result of the changes made as part of the 2014 Strategy Update, including allowing for the export of ICI waste and the impact of clear bags, as well as the 2016 Agreement (between HRM and Mirror to operate Otter Lake). The table below shows a summary of costs related to operating Otter Lake since 2010, as well as transfers to reserve to fund landfill cells. As a result of 2016 Agreement, HRM pays an all-inclusive processing fee, on a per tonne basis, that includes the construction and closure of landfill cells. The amounts needed to be set aside in a Reserve to fund landfill capital works has therefore been greatly reduced.

[9] As noted on Table 2 there is 'Special Garbage' that is continues to be landfilled at Otter Lake such as bulky items, grits or solids items taken direct to the landfill cell

Table 3 – Summary of Otter Lake Costs

Fiscal Year	Net Operating Costs	Transfer to Reserve to Fund Landfill cells	Total
2010/11	$ 5,072,200	$ 12,328,000	$ 17,400,200
2011/12	$ 3,264,100	$ 20,530,000	$ 23,794,100
2012/13	$ 3,753,600	$ 10,006,000	$ 13,759,600
2013/14	$ 4,100,600	$ 10,006,000	$ 14,106,600
2014/15	$ 4,748,100	$ 10,006,000	$ 14,754,100
2015/16	$ 8,759,200	$ 128,000	$ 8,887,200
2016/17	$ 7,058,500	$ 128,000	$ 7,186,500
2017/18	$ 7,033,000	$ -	$ 7,033,000
2018/19	$ 6,019,600	$ -	$ 6,019,600
2019/20	$ 6,044,500	$ -	$ 6,044,500
2020/21[1]	*$ 6,875,000*	$ -	*$ 6,875,000*

[1]Projected costs

Effectiveness of the FEP/WSF Today

Dillon Consulting (Dillon) on behalf of Mirror NS prepared a FEP/WSF Closure Review. The report was initially prepared in 2018 and was updated in November 2020 to be based on the most recent data available, and is included as part of Attachment C. It is noted that Dillon's conclusions are based on the continued exportation of ICI waste through the transfer station and that only residential waste will be landfilled.

The Dillon report concludes:

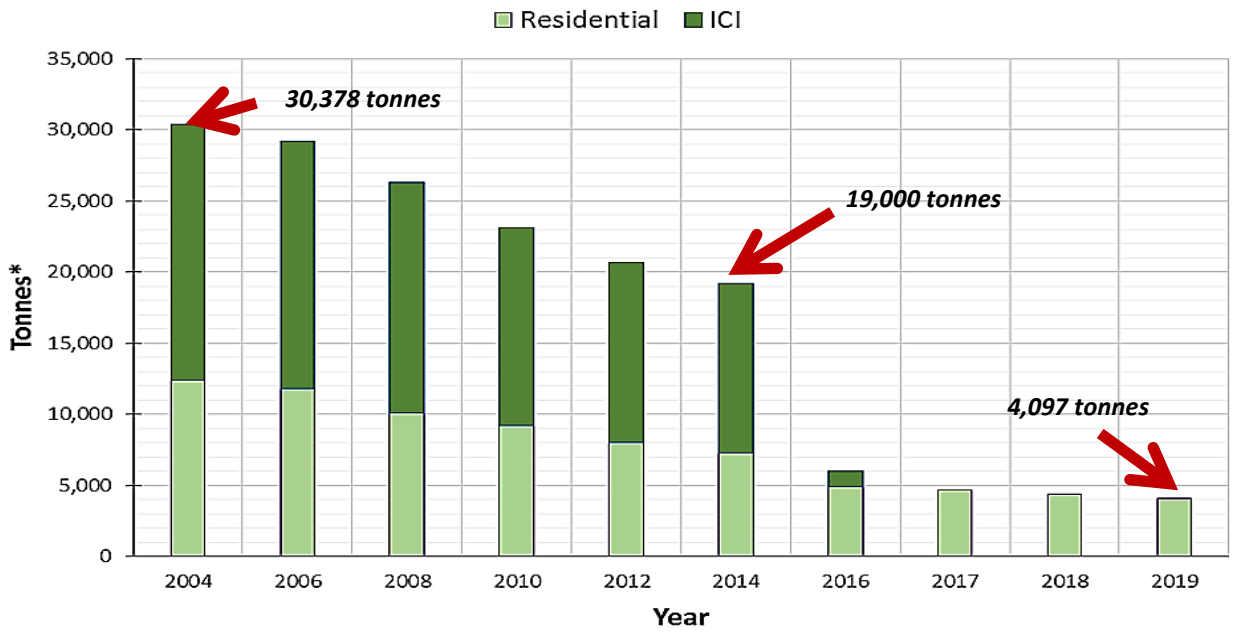
> **"Based on the results of this analysis, there does not appear to be any significant benefit to the continued operations of the FEP/WSF. Further, there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated. Therefore, it is recommended that operations at the FEP and WSF be discontinued."**

In general, the findings of the study completed by Dillon supporting deactivating the FEP/WSF can be summarized as follows:

- The amount of waste processed through the FEP/WSF has significantly declined since HRM removed flow control for ICI waste.
- As shown in the figure below, the amount of organics (e.g., food waste) being received at Otter Lake and being stabilized through the WSF has declined over time as diversion programs have matured and that the clear bag policy has also encouraged compliance. In particular, the residential sector waste contains lower quantities of organics as compared to ICI sector waste. As noted in the Dillon report:

> **"The 4,100 tonnes of putrescible organic materials that arrived at Otter Lake in 2019 is approximately 13.5% of the amount of putrescible material that was received at the FEP/WSF in 2004. This is a significant reduction and calls into question the continued need for the FEP/WSF."**

Figure 3 – Tonnage of Putrescible Organics Delivered to the FEP/WSF



Source: Dillon Consulting FEP/WSF Closure Review (November 2020) included as part of Attachment C.

- No off-site impacts were identified (e.g., odours, litter, bird and vector control etc.)
- Some on-site impacts were identified as low to medium risk and included:
  - Health and safety consideration related to truck delivery to the landfill tip face (medium risk)
  - Increased potential for blowing litter at the landfill tip face (medium risk)
  - Attraction of birds (medium risk)
  - Delivery of rodents in waste loads to the landfill tip face (low risk).

As noted in the Dillon report:

> "**it is noted that potential on-site issues with material delivery, litter control and bird/vector control present relatively modest risk 'significance' scores and are readily mitigated through the implementation of established best practice and operational procedures**."

ICI Sector Waste

As part of the 2014 Strategy Update, the flow control policy for the ICI sector was eliminated thereby allowing ICI garbage to be disposed of at landfills outside the boundaries of HRM. The reasons for the change to the flow control policy included:

- Reductions in costs for taxpayers and business as a result of the high cost of processing and disposing of waste at Otter Lake. **The savings to the ICI sector and to HRM taxpayers has been in the order of 5.2 million per year[10] since the flow control policy was implemented.**
- Increase in competition for waste disposal services.
- Extending the life of existing capital investment and infrastructure related to landfill cells and other site works.

[10] See Attachment B for backup

Since the implementation of the flow control policy on March 14, 2016 with the establishment of a transfer station, essentially no ICI garbage has been landfilled at Otter Lake. The ICI waste has been disposed of at other Nova Scotia second generation landfills with approvals to accept such waste issued by NS Environment.

It is noted that Dillon's conclusions with respect to deactivating the FEP/WSF are based on the continued exportation of ICI waste through the transfer station and that only residential waste will be landfilled. Dillon has noted that ICI sector waste contains more putrescible organic material (in the order of 15% by weight) than residential sector waste (currently in the order of 10-12% by weight).

It is not anticipated for the foreseeable future that ICI waste will be disposed of at Otter Lake as result of the high disposal cost as compared to other provincial landfills.

It is noted that there are a number of initiatives that HRM is undertaking to educate/enforce compliance of the ICI sector including:

- Approximately 1200 proactive visits per year by waste compliance and education staff to businesses, institutions, and apartment buildings including the issuance of approximately 600 Notices to Comply annually with respect to Solid Waste Resource Collection and Disposal By-Law No. S-600.
- Approximately 4500+ hours annually of waste resource education targeting businesses, apartment buildings, institutions, and schools.
- Approximately 115 Waste Discrepancy Reports annually related to improperly sorted waste that is identified at the Otter Lake transfer station. Approximately 50 site visits annually to the ICI sector based on the Waste Discrepancy Reports.
- Developing a course targeting property managements to improve waste management practices in multi-residential sector with planned implementation in 2021/2022.

Contingency Measure (FEP/WSF to be Maintained in Standby Mode)

If approval is granted to deactivate the FEP/WSF, the facilities will be transitioned to standby mode as a contingency measure. This means that the FEP/WSF will be maintained in an operable state and can be put back into operations as needed. Additional information on how the facility will be maintained in standby mode is included in Attachment D[11].

In the future, if further changes are proposed to the status of the FEP/WSF, or if ICI waste is proposed to be landfilled at Otter Lake, staff will present the changes to Regional Council, including any needed mitigative measures. Additionally, the CMC will be consulted and would have the opportunity to present its position directly to Regional Council.

Next Steps

Should Regional Council approve pursuing deactivating the FEP/WSF and placing in standby mode, staff will work with the Otter Lake operator, Mirror, to submit a joint application to NS Environment to amend the operating approval. It is anticipated that the review of an application will likely take in the order of 2 to 3 months, acknowledging that additional information or public engagement may be requested by NS Environment which may extend this timeline.

If it appears that a decision from NS Environment will not be provided before December 31, 2021 staff plan on negotiating with Mirror extending the timelines in the 2016 Agreement as follows:

[11]See Attachment D – correspondence from HRM to CMC, April 8, 2021 – standby mode details are provided as Attachment 1.

- Extending the notice of early termination date of December 31, 2021, related to the legal entitlement to remove the obligation to operate the FEP/WSF, by a maximum of one year.
- In the event that Mirror decides to provide a notice of early termination (i.e., post December 31, 2021), extend the contract expiration date of December 31, 2023, by a maximum of one year.
- Increase the processing fee, commencing January 1, 2021 from $130.79 per tonne[12] to $170 per tonne. Once NS Environment provides its findings (e.g., approves, rejects) on deactivating the FEP/WSF, the processing fee will be reduced to $130.79 per tonne adjusted for inflation.

FINANCIAL IMPLICATIONS

As noted in the Background Section, as part of the 2016 Agreement, HRM and Mirror agreed to:

- An all- inclusive processing fee of $125[13] per tonne to Mirror for garbage received, processed, and disposed of at Otter Lake. The all-inclusive processing fee includes the construction and closure of landfill cells.
- Between January 1, 2018 and December 31, 2021 Mirror has the option to provide notice of early of termination in the event that the legal entitlements have not been amended to remove the obligation to operate the FEP/WSF. Should Mirror decide to provide notice of early termination, the all-inclusive processing fee would be increased to a minimum of $170 per tonne, with the contract expiring on December 31, 2023.

If deactivation of the FEP/WSF is not achieved, Mirror may provide notice of early termination. The financial impact to HRM, if notice of early termination is triggered (i.e., processing fee increases to $170 per tonne), is in the order of $1.84 to 2.04 million annually (net HST included)[14]. Additionally, the 2016 Agreement includes a formula that is applicable at contract termination related to status of each cell (e.g., constructed, capped/closed) as the all-inclusive processing fee includes cell construction and closure. Currently, it is estimated that if the contract was terminated on December 31, 2023 HRM would owe Mirror an additional $1.44 million (net HST included) related to cell construction.

In the event that the 2016 Agreement is early terminated, staff would most likely prepare a public tender for landfill operations commencing January 1, 2024. HRM may need to re-establish securing funding in reserve to construct and close new landfill cells depending on whether or not capital works are included in a new operating agreement. As an example, the construction (completed in 2012) and closure (completed in 2018) of Cell 6 cost approximately $23.56M (net HST included). The planned future development for Otter Lake includes Cell 7B, Cell 8, and Cell 9.

As part of this report, staff are recommending negotiating extending contract timelines with Mirror should it appear that a decision from NS Environment will not be made prior to December 31, 2021 (as noted above in the Next Step section). It is possible that the processing fee will be increased to $170 per tonne commencing on January 1, 2022 with Mirror having up to December 31, 2022 to provide a notice of early termination with the contract expiring by December 31, 2024.

If NSE approves the deactivation plan, additional negotiations with Mirror may be required with respect to the ongoing maintenance of the FEP/WSF in standby mode.

Currently all contracting costs for Otter Lake are charged against Cost Centre R320.

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[12] The original processing in 2016 was $125 per tonne and is adjusted annually for inflation. In 2021 the processing fee is $130.79 per tonne.

[13] Adjusted for inflation annually; in 2021 the processing fee is $130.79 per tonne.

[14] The basis includes includes an increase from the current rate of $130.79 per tonne (2021) to $170/tonne and is based on 45,000 to 50,000 tonnes of residential waste being delivered annually by HRM to Otter Lake.

RISK CONSIDERATION

2016 Agreement (Mirror-HRM)

As mentioned in the Background and Financial Implication sections of this report, there is a possibility that Mirror will elect to terminate the 2016 Agreement if deactivation of the FEP/WSF is not achieved. HRM would then be responsible for procuring an operator of the landfill at Otter Lake commencing January 1, 2024. It is possible that this timeline will be extended one year as noted above.

2013 Resolution of Nova Scotia Legislature

On April 24, 2013 the Nova Scotia Legislature passed a resolution stating that "All members of this House of Assembly direct the Minister of Environment to reject any requested changes to the Otter Lake Waste Management Facility operating permit that would remove the requirement of front end separation and waste stabilization." On the same day, then Minister of Environment, Sterling Belliveau wrote a letter to Mayor Savage advising that the Department of Environment will not approve any requested changes to the Otter Lake waste management facility's operating approval that would affect the FEP or WSF until the current life of the facility (and the approval) expires. There is, therefore, a risk that the current Minister might reject an application to remove the FEP/WSF from the operating permit.

Despite the resolution of the Legislature and the correspondence from the former Minister, the current Minister would be required to consider an application from HRM and Mirror to amend the operating permit in accordance with the requirements of the Environment Act and the regulations thereunder. There is no legislative or regulatory requirement that municipal solid waste must be processed or treated to reduce its potential to generate landfill gas, leachate, and/or odour. Otter Lake is currently the only landfill in Nova Scotia that operates a FEP/WSF.

HRM-Halifax Waste Resource Society Agreement

The Society has indicated it is opposed to deactivating the FEP/WSF.

The HWRS Agreement does not specifically mandate that the FEP/WSF be operated at Otter Lake. It stipulates that only 'Acceptable Waste' (i.e. "Inert Materials"; "Stable Materials"; and "Residual Materials") shall be landfilled. While the FEP/WSF was designed as a mechanism to biostabilize putrescible waste, it provides little if any benefit to the environment. Due to source separation, the exportation of ICI waste to other landfills, and other diversion measures, most of the waste currently delivered to and disposed of at Otter Lake is considered Inert Materials or Residual Materials, such that it does not need to be biostabilized prior to landfilling. Based on current tonnages HRM can therefore remain compliant with its commitments under the HWRS Agreement if the FEP/WSF is deactivated.

COMMUNITY ENGAGEMENT

Staff announced to the Community Monitoring Committee (CMC) at a board meeting on November 19, 2020 that Mirror and HRM were pursuing deactivating the FEP/WSF and requested the opportunity to engage the CMC.

On December 1, 2020 HRM received a letter from the CMC requesting additional information with regards to deactivating the FEP/WSF, including technical data 'beyond commercial and economic benefits' including social, community, and environmental benefits.

On December 7, 2020 HRM responded to the CMC with a letter summarizing staff's position including that the FEP/WSF provides no community protection and continuing to operate the facilities comes at the expense of funding parks, arenas, transit etc. Additionally, the Dillon report: "FEP/WSF Closure Review"

(November 2020) was attached, which provides a comprehensive review of deactivating the facilities, including a risk assessment of on and off site impacts (as noted in the Discussion Section of this report). On January 21, 2021 HRM staff, Dillon, and Mirror met with the CMC to review deactivating the FEP/WSF. Dillon presented a slide deck that summarized the findings of their report. CMC board members asked a number of clarifying questions with respect to the Dillon report which were answered.

On March 7, 2021 the CMC submitted two letters to HRM that summarized the CMC's position including raising a number of concerns. The CMC was not supportive of deactivating the FEP/WSF.

On March 18, 2021 the Society sent a letter to Mayor Mike Savage and provided a copy to staff, indicating that that Society was not supportive of deactivating the FEP/WSF.

On April 8, 2021 HRM staff responded with a letter to the CMC that addressed the concerns raised by the CMC.

On April 19, 2021 staff proposed a phased deactivation plan. As part of the phased deactivation plan, a pilot was proposed. The intent of the pilot was to confirm the findings of the Dillon report through a joint oversight committee that would include representatives from all involved parties, including the CMC, HRM and Mirror. The CMC did not accept or reject the proposed phased deactivation plan, rather they directed HRM staff to engage with the Society directly on the matter. On May 30, 2021 the Society sent a letter to HRM indicating that they were not supportive of the phased deactivation (including pilot) and were only interested in alternatives that were in alignment with the definition of Acceptable Waste in the HWRS Agreement (i.e., alternatives that involved removing putrescibles (e.g., food waste) and/or treating putrescibles in the incoming waste stream).

All correspondence is included as Attachments C, D, E, and F.

Upon receiving an application from Mirror and HRM to deactivate the FEP/WSF, NS Environment may require additional public consultation.

ENVIRONMENTAL IMPLICATIONS

Impact of Deactivating the FEP/WSF on Landfill Operations

As noted in the Discussion Section, the Dillon report concludes:

> **"Based on the results of this analysis, there does not appear to be any significant benefit to the continued operations of the FEP/WSF. Further, there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated. Therefore, it is recommended that operations at the FEP and WSF be discontinued."**

Dillon did not identify any off-site impacts related to deactivating the FEP/WSF (e.g., odours, litter, bird and vector control etc.).

Dillon did identify some potential on-site impact, as result of deactivating the FEP/WSF, that were quantified as low to medium risk and that all identified potential on-site impacts could be mitigated through the implementation of established best practices and operational procedures as follows:

- Potential Impact: Health and safety consideration related to truck delivery to the landfill tip face (medium risk).

  - Mitigative measures include developing site protocols with respect to traffic rules, establishing new signage, and provision of traffic spotters at the active face during peak periods.

- Potential Impact: Increased potential for blowing litter at the landfill tip face (medium risk).
  - Mitigative measures include additional litter fencing and litter collection efforts.

- Potential Impact: Attraction of birds (medium risk).
  - Mitigative measures include enhanced bird and vector control measures (e.g., use of whistler flares and falconer services) and minimizing the active disposal area as well as placement of daily cover to freshly placed waste.

- Potential Impact: Delivery of rodents in waste loads to the landfill tip face (low risk).
  - Mitigative measures include implementation of baiting program for rodents in proximity to landfill tip face.

As noted in the Dillon report:

> "**it is noted that potential on-site issues with material delivery, litter control and bird/vector control present relatively modest risk 'significance' scores and are readily mitigated through the implementation of established best practice and operational procedures**."

Impact of Deactivating the FEP/WSF on Diversion

As a result of deactivating the FEP/WSF small quantities of recyclables and household special waste (HSW) will be landfilled that are currently recovered in the FEP. Additional details are provided in Attachment A.

Small quantities of recyclables are recovered from the FEP, in the order of 1.5 to 2% of incoming waste materials or in the order of 600-1000 tonnes annually that will be landfilled if the FEP/WSF are deactivated.

Some Household Special Waste (HSW) is recovered in the FEP, in the order of 14 to 20 tonnes annually (e.g., camping cylinders, batteries, household chemicals such as paint). By comparison, HRM's HSW program, consisting typically of a permanent depot being operated on most Saturdays through out the year as well as approximately 11 mobile events annually, captures in the order of 500 to 700 tonnes of HSW annually. In addition, there are many other alternatives that capture HSW throughout the Municipality (e.g., paint is accepted at many Enviro-Depots).

Additionally, the WSF does contribute to reducing the quantity of waste landfilled as result of moisture/volume lost. Approximately 4,500 tonnes per year of moisture/volume lost is achieved as a result of treating waste materials via the WSF.

For reference, Figure 1 presented in the Discussion Section shows HRM's diversion rate compared other Canadian cities. For 2019, HRM's diversion rate would drop from 60% to approximately 57% as result of deactivating the FEP/WSF (maintaining HRM's standing as one the top three cities, amongst participating municipalities in the Municipal Benchmarking Network). Additionally, with reference to Figure 2 presented in the Discussion Section, deactivating the FEP/WSF would results in an increase in HRM's disposal rate per capita for 2019 from 366 to 377 kg/capita, still below the provincial average of 399 kg/capita and approximately half of the national average.

Impact of Deactivating the FEP/WSF on Greenhouse Gas Emissions

Deactivating the FEP/WSF is not anticipated to materially change the carbon footprint of Otter Lake. Key considerations include:

- Greenhouse gases generated from the landfill are expected to **increase** marginally over the next 5 years due to organics not being treated in the WSF, in the order of 0 to 1,236 tonnes of CO_2e[15] per year.
- Greenhouse gases are expected to **decrease** by 1,240 tonnes CO_2e per year, as result of the electricity of consumption of the FEP/WSF.

Additional details are provided in Attachment D (see letter from HRM to CMC dated April 8, 2021, starting on pg. 9).

ALTERNATIVES

Regional Council can direct staff to not pursue closure of the FEP/WSF. As a result, this may trigger a notice of early termination by Mirror with respect to the 2016 Agreement with a financial impact to the Municipality as noted in the Financial Implications section. As per the Dillon report, Otter Lake can be operated in an environmentally sound manner without the FEP/WSF and therefore this alternative is not recommended.

Regional Council can direct staff to seek a more cost effective alternative to the FEP/WSF that biostabilizes putrescible organics for the purpose of community protection from landfill operations. Staff are not aware of any landfill in Canada that operates similar facilities as the FEP/WSF for the purpose of protecting a local community from landfill nuisance factors. It is possible that some parts of the FEP/WSF operations could be maintained, however, staff believe the cost savings will be marginal. For these reasons, staff do no recommend this alternative.

ATTACHMENTS

Attachment A – Overview of the Otter Lake Waste Processing & Disposal Facility (including slide deck with photos)
Attachment B – Estimated Annual ICI Sector Savings as a Result of Flow Control Policy Change
Attachment C – CMC's Correspondence from December 1, 2020; and HRM's Response from December 7, 2020 including Dillon Consulting's Report: "FEP/WSF Closure Review" (November 2020)
Attachment D – CMC's Correspondence from March 7, 2021; and HRM's Response from April 8, 2021
Attachment E – Halifax Waste Resource Society Correspondence from March 18, 2021
Attachment F – Phased Deactivation Plan Correspondence: HRM's Correspondence from April 19, 2021; CMC's Response from May 15, 2021 and Halifax Waste Resource Society Correspondence from May 30, 2021.

A copy of this report can be obtained online at halifax.ca or by contacting the Office of the Municipal Clerk at 902.490.4210.

Report Prepared by: Andrew Philopoulos, Director – Solid Waste Resources, 902.864.6833

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[15] Carbon Dioxide Equivalent

ATTACHMENT “A”

Overview of the Otter Lake Waste Processing & Disposal Facility

(including slide deck with photos)

Attachment A – Overview of the Otter Lake Waste Processing & Disposal Facility

The Otter Lake Waste Processing & Disposal Facility (Otter Lake) contains the following facilities:

- Front End Processor (FEP)
- Waste Stabilization Facility (WSF)
- Residual Disposal Facility (RDF)
- Transfer Station

Currently, all residential waste is processed through the FEP. Haulers have their loads weighed at a scale house and then dump their load directly on the tip floor in the FEP. The material is then generally processed by removing oversized and bulky items, some recyclable materials, and some household special waste (HSW); while separating the remaining materials into size fractions. Materials less than 150 mm are sent to the WSF for stabilization (with the intent of biostabilizing organics), while materials greater than 150 mm are sent to the RDF for landfill disposal. The WSF contains 14 channels where materials are aerobically treated for 15-21 days. Materials stabilized in the WSF are sent to the RDF for landfill disposal.

All Institutional, Commercial, and Industrial (ICI) waste is transferred to other Nova Scotia landfills for disposal via the Transfer Station. Haulers have their loads weighed at a scale house and then dump their load directly on the tip floor in the Transfer Station (which is housed in the same building as the FEP). Following inspection of the waste, the material is then placed and compacted into long-haul trailers for transport to other Nova Scotia landfills.

The following sections provides details on the FEP, WSF, and RDF. Following the text is a slide deck containing pictures of the facilities.

Front End Processor (FEP) Detailed Description

1. Tip Floor: Haulers dump their load on the tip floor. The material is spread on the floor by a loader, adjacent to an infeed conveyor. Tip floor sorters remove oversized/ bulky items such as large pieces of recyclable metal and mattresses and remove other items such as stringy items (e.g., ropes, rugs) that may jam mechanical processing equipment. The remaining materials are placed on to a conveyor by a loader and are subsequently transported to the pre-sort area.

2. Pre-Sort Area: Pre-sorting consists of duplicate conveyors that transport material from the tip floor to the bag breakers. Sorters remove items that cannot be processed by the bag breaker such as stringy items, oversized metals, and compressed gas cylinders (e.g., camping cylinders). In addition, HSW is also removed at this stage.

3. Bag Breaker: Duplicate bag breakers rip open garbage bags and convey materials to the trommel screens. The bag breakers consist of rotating and stationary blades that tear bags open to free constrained material to allow for size separation.

4. Trommel Screens: Duplicate trommel screens are used to separate materials into three size fractions. Materials less than 50 mm are conveyed directly to the WSF. Materials between 50 and 150 mm are conveyed on a single line to the pre-shredder sort area (and ultimately to the WSF). Materials greater than 150 mm are conveyed to the final sort area.

5. Pre-Shredder Area: Recyclable metals (e.g., cans and plastic bottles) and any materials that may jam the shredder are removed from the 50-150 mm size fraction by sorters.

6. Shredder: One shredder is used to liberate organics from containers and reduce the particle size of the 50-150 mm size fraction. The material is then conveyed to the WSF, with the less than 50 mm fraction being mixed into the shredder stream (i.e., downstream of the shredder). The shredder consists of rotating knives on a drum that slice open any bags and fragmentize larger material.

7. Final Sort: The greater than 150 mm size fraction is conveyed to the final sort area, where sorters remove recyclable materials such as paper, cardboard, and refundables. The remaining material is sent to a compactor and is then transferred to the RDF for landfill disposal.

Waste Stabilization Facility (WSF) Detailed Description

1. Stockpile Area: Material is conveyed directly from the FEP and is stockpiled on the floor in the WSF. A front end loader manages the stockpile and then loads material into the front of each of the 14 channels, once per day.

2. Channels: There are 14 channels, each containing in-floor static aeration. The materials are moved along the channels using turners running on tracks on the walls between each channel. The turners have a wide rotating conveyor belt with hooks that dig into the material, agitating it and lifting it upwards and forward. This action turns the pile, breaks up pieces, and introduces oxygen into the material. The WSF contains three turners that are used to turn the piles in the 14 channels daily. Each time a turner moves down a channel, it moves the material approximately three metres forward, towards the outflow end of the building where the stabilized waste is collected. This movement forward leaves an empty space at the front of each channel where the front end loader piles fresh material to be stabilized. After a minimum of 15 days in the channels, the turners move the stabilized material onto a walking floor conveyor and into a trailer to be transferred to the RDF for landfill disposal.

Residual Disposal Facility (RDF)

The RDF is a landfill that consists of 9 landfill cells as summarized in the below table. Currently, Cells 1 to 6 has been constructed, filled with waste, and capped/closed. Approximately half of Cell 7 (referred to as Cell 7a) has been constructed and is currently being filled with waste. It is currently estimated that Cell 7a will be full in 2024. As such, construction of the second half of Cell 7 (referred to as Cell 7b) will need to begin in 2023.

Table – Summary of Landfill Cells at Otter Lake

Cell	Year of Construction	Approximate size (hectare)	Approximate Landfill Air Space / Working Volume (m^3)	Year of Closure
1	1997	4.9	946,000	2003
2	1999	5.4		2004
3	2001	5.5	590,000	2006
4	2005	5.3	600,000	2009
5	2008	5.4	812,000	2012
6	2011	5.4	856,000	2017
7	2016	5.6	829,000	TBD
8	TBD	5.6	847,000	TBD
9	TBD	6.5	698,000	TBD

Each landfill cell is designed and constructed in accordance with Municipal Solid Waste Landfill Guidelines

(NS Environment, 2004). Additional infrastructure associated with the landfill include:

- Landfill gas collection and treatment system
- Stormwater management and treatment ponds
- Leachate collection, conveyance, and storage system
- 53 on-site groundwater wells to monitor groundwater quality in the vicinity of the landfill
- 5 surface water stations located on and off site to monitor surface water quality
- 4 underdrains and 6 leak detection sumps to confirm the integrity of the landfill liner system

HRM staff's current estimates for site life at Otter Lake is as follows:

- If only residential waste is landfilled, it is estimated that Otter Lake will reach capacity in the order of 25 years.
- If residential waste and ICI waste are landfilled, it is estimated that Otter Lake will reach capacity in the order of 10 years.

Several key assumptions include:

- Starting residential tonnage in 2021, is in the order of 45,000 tonnes per year and increases by 1% per year to account for growth.
- Starting ICI tonnage in 2021, is in the order of 90,000 tonnes per year and increases by 1% per year to account for growth.
- Landfill daily cover/aggregate consumes approximately 25% of the landfill working volume; with waste consuming approximately 75% of the working volume.

Mass Balance

The below table provides a mass balance of quantities of waste received, processed, and landfilled at Otter Lake. Small quantities of recyclables are recovered from the FEP, in the order of 1.5 to 2% of incoming waste materials.

Table – Otter Lake Mass Balance

Item/Year	**Mass Balance (Metric Tonnes)**		
	2018	**2019**	**2020**
Received			
FEP In	45,904.06	45,786.50	50,681.17
WSF In	13,495.73	14,028.45	14,092.18
Landfilled - Residual Disposal Facility (RDF)			
Direct to RDF	384.13	327.32	591.49
FEP Output	31,761.54	30,907.67	35,902.83
WSF Output	9,357.38	8,744.97	10,153.78
Total Landfilled	***41,503.05***	***39,979.96***	***46,648.10***

Item/Year	Mass Balance (Metric Tonnes)		
	2018	**2019**	**2020**
Recycled			
Metal	646.79	850.38	687.16
Refundables	4.42	7.95	3.55
Paper/Cardboard	29.44	115.69	31.75
Total Recycled	***680.65***	***974.02***	***722.46***
% of Incoming	***1.48%***	***2.13%***	***1.43%***

Some Household Special Waste (HSW) is 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 the below table. By comparison, HRM's HSW program, consisting typically of a permanent depot being operated on most Saturdays through out the year as well as approximately 11 mobile events annually, captures in the order of 500 to 700 tonnes of HSW annually. In addition, there are many other alternatives that capture HSW throughout the Municipality (e.g., paint is accepted at many Enviro-Depots).

Table – Household Special Waste (HSW Recovered in the FEP

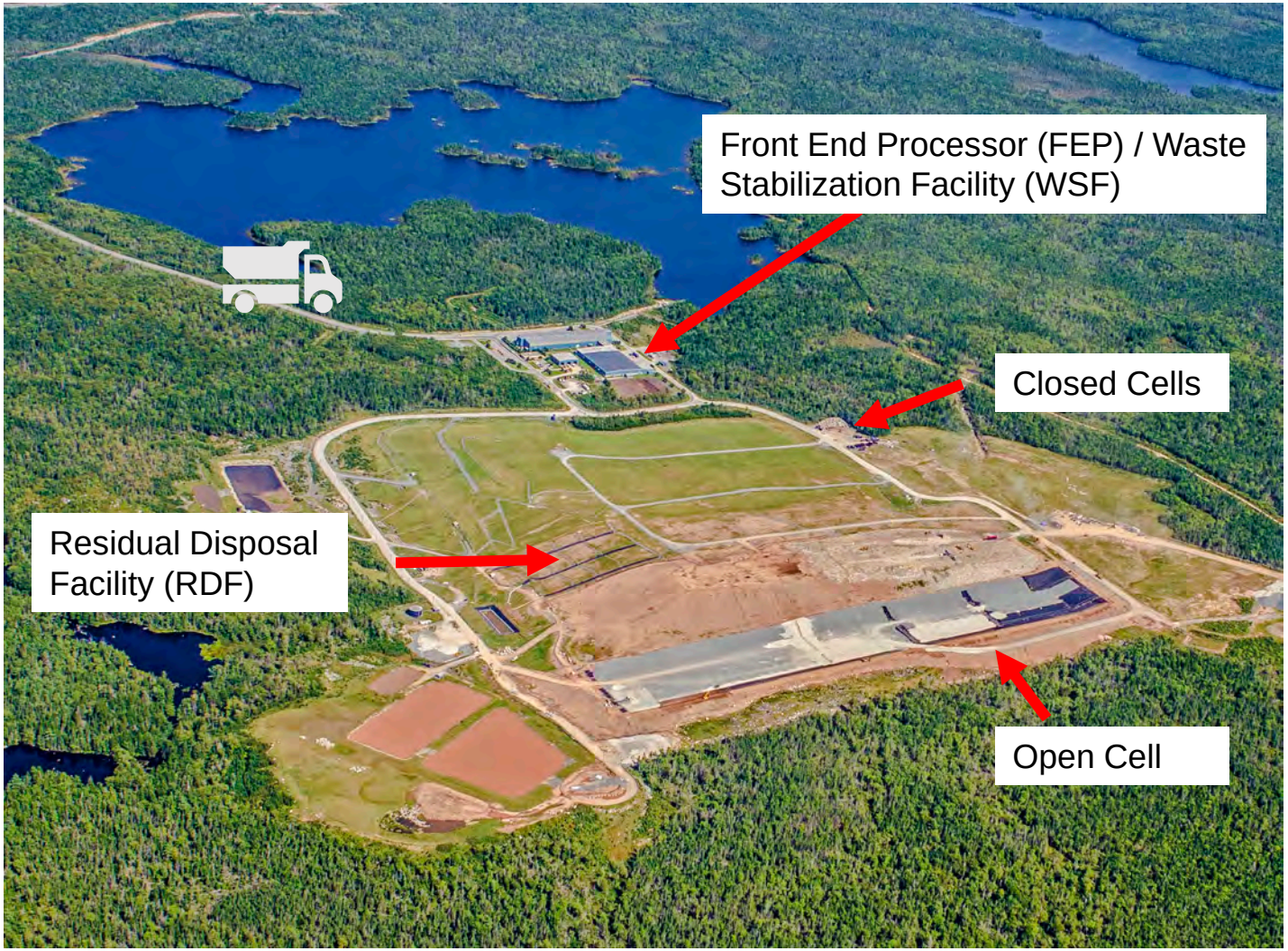
HSW Categories	Quantities of HSW Recovered in FEP (Metric Tonnes)		
	2018	**2019**	**2020**
Cylinders (e.g., camping cylinders)	8.8	10.6	11.1
Batteries	3.3	3.8	4.8
Household Chemicals (e.g., paint, oil, bulbs)	2.5	2.8	4.1
Total	**14.5**	**17.2**	**20.0**

HALIFAX

Overview of Otter Lake Waste Processing & Disposal Facility

April 2021

Otter Lake – Overview



HALIFAX

FEP/WSF – Overview

HALIFAX

FEP – Receiving

FEP – Tip Floor

HALIFAX

FEP – Conveyors

FEP – Sorting Equipment

HALIFAX

FEP – Final Sort Line

WSF – Stockpile Area

HALIFAX

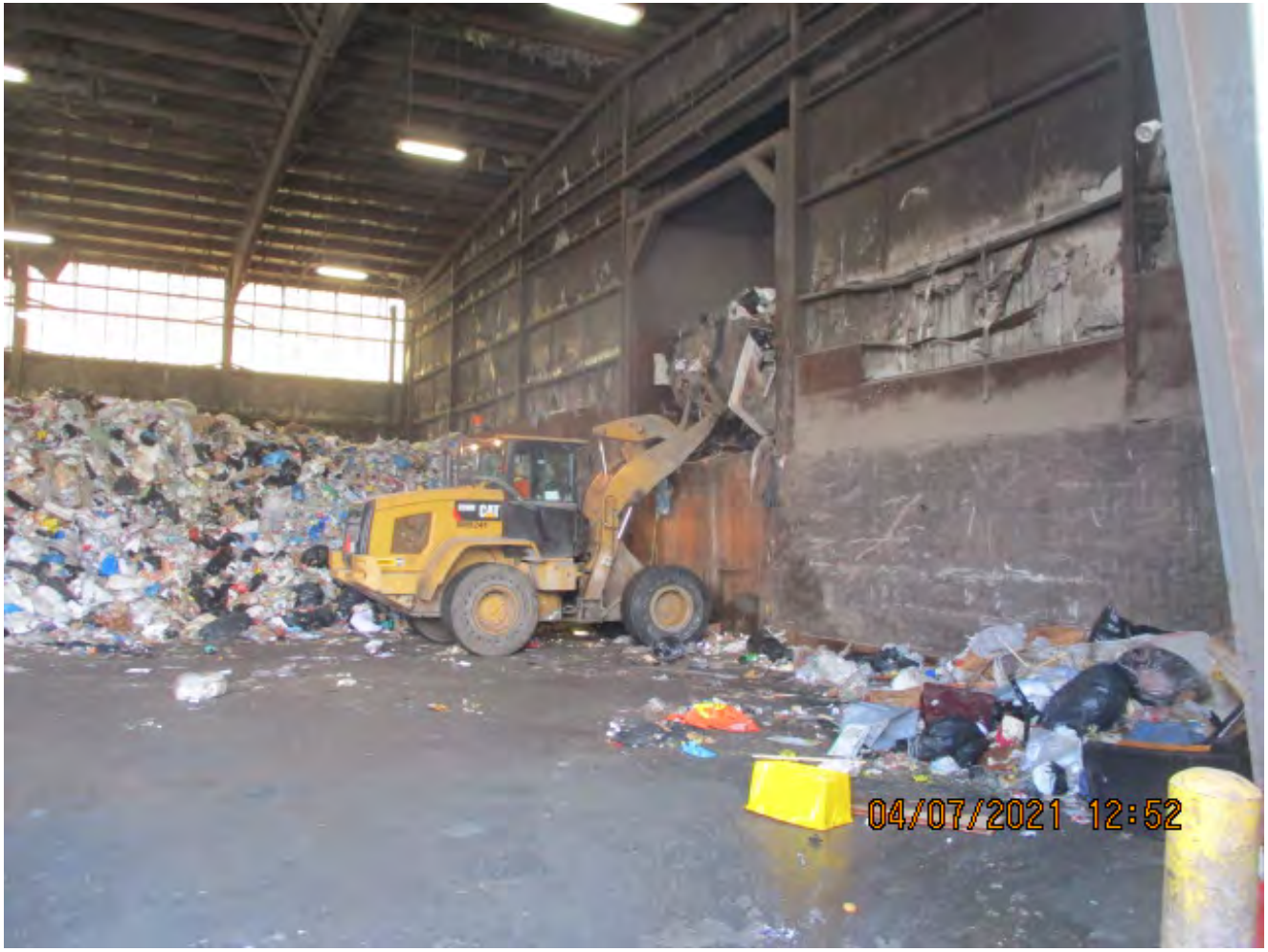
WSF – Channels

WSF – Output

RDF – Cell 7a

Transfer Station (FEP Tip Floor)

Transfer Station (FEP Tip Floor)



ATTACHMENT “B”

Estimated Annual ICI Sector Savings as a Result of Flow Control Policy Change

Attachment B - Estimated Annual ICI Sector Savings as a Result of Flow Control Policy Change

Item	Scenario 1[1]	Scenario 2[2]	
Tip fee to dispose of ICI waste at Otter Lake[1]	$ 130.79	$ 170.00	cost/tonne
Tip fee to transfer ICI waste at Otter Lake	$ 111.00	$ 111.00	cost/tonne
Difference in tip fee to landfill vs transfer ICI waste at Otter Lake	$ 19.79	$ 59.00	cost/tonne
Annual ICI tonnage (assumed)[2]	88,000	88,000	tonnes
Savings	**$ 1,741,520.00**	**$ 5,192,000.00**	

[1]Administrative Order 16 - Respecting Fees for the Use of Solid Waste Management Facilities:
- Currently, as of Jan 1, 2021 the tip fee is $130.79 per tonne, however, the rate has been as high as $170 per tonne. If ICI waste was required to be processed through the FEP/WSF, $170 per tonne is more reflective of the true cost to process and landfill waste at Otter Lake (per the 2014 Strategy Update).

[2]88,000 tonnes is the approximate average of ICI waste generated within HRM from 2016/2017 to 2019/2020

ATTACHMENT “C”

CMC’s Correspondence from December 1, 2020; and HRM’s Response from December 7, 2020 including Dillon Consulting’s Report: “FEP/WSF Closure Review” (November 2020)

Otter Lake Community Monitoring

Delivered via *E-Mail* on December 1, 2020

December 1, 2020

Andrew Philopoulos
Manager, Solid Waste Resource Department
Halifax Regional Municipality
P.O. Box 1749
Halifax , N.S.
B3J 3A5

Dear Andrew,

Subject: Additional Information requested on Proposed removal of the FEP and WSF

The Otter Lake Community Monitoring Committee (CMC) requests additional information from Halifax Regional Municipality (HRM) regarding the proposed removal of the Front-End Processing (FEP) and Waste Stabilization Facility (WSF) at the Otter Lake Landfill Site.

CMC has responded to HRM on September 24, 2018 that the CMC Board rejected the proposal brought forward by MIRROR and HRM on September 6, 2018 to eliminate the FEP and WSF at the Otter Lake Landfill Facility.

You attended the CMC Board meeting held on November 19th , 2020 to provide notification of HRM's intent to pursue approval from Nova Scotia Environment to remove the FEP and WSF at the Otter Lake Landfill Site.

The CMC remains committed to the facts of the contractual obligation from HRM for the siting of the Otter Lake Landfill including the operation of FEP and WSF processes. The contractual obligation was Not predicated on the efficacy of these processes as dependent on the volume or classification of waste received and processed at the Otter Lake Landfill Facility.

CMC requests HRM to provide documentation of additional and compelling information supporting the FEP and WSF removal prior to the scheduling of a meeting to discuss further consultation. CMC requires technical data that supports the removal of the processes beyond commercial and economic benefits. The CMC requests the following information from HRM to satisfy the concerns of the CMC Board:

- Social benefits

- Community benefits
- Environmental benefits.

Upon receipt of this information, the CMC will make themselves available for a meeting to discuss the information and further consultation requirements.

Thank you.

Sincerely, [redacted]

Scott Guthrie
Chair, CMC

Copies:
Directors, CMC
Ken Meech, MIRROR
Harold Johnson, Municipal Group
Jilliana Brown, NSE

December 7, 2020

Scott Guthrie
Chair
Community Monitoring Committee
P.O. Box 213
[redacted]

Dear Scott,

Thank you for your letter as a follow up to the recent Community Monitoring Committee (CMC) meeting held on November 19, 2020.

The 1995 Integrated Waste/Resources Management Strategy and 1996 update (Strategy) contemplated refinement at the Otter Lake Waste Processing and Disposal Facility (Otter Lake) based on the success of HRM's diversion programs. In particular, the Strategy contemplates scaling down the Front End Processor/Waste Stabilization Facility (FEP/WSF) as diversion improves.

The 1995 Strategy document indicates:

"Beginning with the approved opening of new residuals disposal facilities, these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up."

The 1996 Strategy document (update) indicates:

"The most important concern of the original strategy was the size and cost of the FEP/WSF. An important goal of the revised strategy was to create time to allow source separation behaviour to take hold in the Municipality. This would in turn divert materials from the mixed waste stream."

Today HRM is a leader in diversion in Canada. According to the most recent public report published by the Municipal Benchmarking Network Canada[1], in 2018/2019 HRM's residential

[1] http://mbncanada.ca/app/uploads/2019/11/2018-Waste-Management.pdf

diversion rate was 59%, ranking 3rd against other comparable cities across Canada and above the median average of 47%. Additionally, HRM's disposal cost were $175 per tonne, ranking 5th against other comparable cities across Canada, and more than twice the median average of $81 per tonne.

The FEP/WSF were implemented based on the Strategy as a safeguard in the event that the broader HRM community did not embrace source separation at a time when HRM did not have an organics program. Today, HRM's organics program is mature and has significantly changed the composition of waste being sent to Otter Lake, namely a significant reduction in the quantity of putrescible food waste. Additionally, with Regional Council's decision to allow for the exportation of commercial waste outside the boundaries of HRM in 2015, the quantity of waste being disposed of at Otter Lake has been reduced by more than two thirds and is currently generally limited to only residential waste.

At the November 19, 2020 CMC meeting, I indicated that this was a complex issue taking into consideration environmental, social, and economic considerations. HRM remains fully committed to environmental protection. To that end, HRM staff believe that Otter Lake can be operated in an environmentally sound manner, fully compliant with provincial regulations, without the FEP/WSF. This includes no impacts to the local community. Additionally, this measure will help reduce long-term costs to operate Otter Lake.

Attached is an update to the Dillon Report previously provided to the CMC in 2018. This report has been updated in 2020 such that our consultation with the CMC will be predicated on the most up to date data available. The Dillon Report provides a comprehensive review of closing the FEP/WSF and concludes support for closure of the FEP/WSF noting no increased risk to public health or the environment. Key findings include:

1. The analysis of the potential changes in operations at Otter Lake identifies no off-site impacts as a result of the closure of the FEP/WSF. As a confirmation related to the absence of off-site impacts it should be noted that the landfill has only received 6 complaints in the last 8 years.

2. As a result of the success of HRM's organics program and changes to the flow control policy, putrescible organics being landfilled has decreased from approximately 30,000 tonnes in 2004 to 4,100 tonnes in 2019.

3. With respect to leachate quality, the report identifies that despite the presence and ongoing operation of the FEP/WSF, Otter Lake performs at a comparable level to other landfills in Nova Scotia. This demonstrates that the FEP/WSF has provided no additional benefit to leachate management.

4. The FEP and WSF continue to consume a substantial amount of energy. In 2019 the FEP and WSF consumed 1,600,000 kilowatt hours of energy and emitted approximately 1,240 tonnes of greenhouse gases equivalent to approximately 275 passenger vehicles per year. There is no identifiable environmental benefit to offset these emissions. HRM recently adopted HaliFACT (Acting on Climate Together), a policy aimed at significantly reducing the municipalities greenhouse gas emissions in the short term with a transition to a low-carbon economy by 2050.

Continuing to operate a facility which provides no community benefit comes at the expense of programs such as funding parks, arenas, transit etc. Closing the FEP/WSF can be accomplished such that there is no impact to the local community, while benefitting HRM taxpayers and supporting the municipality in delivery other programs that benefit our citizens.

As noted at the November 19, 2020 CMC meeting, HRM and Mirror NS have formally requested a meeting with the Halifax Waste Resource Society/CMC such that we can engage in meaningful discussion with respect to the proposed closure of the FEP/WSF. We remain open to listening to your concerns. As part of the engagement process, HRM is open to listening to any proposals from the Halifax Waste Resource Society/CMC with regards to any social and community benefits you would like to propose.

Andrew Philopoulos, P.Eng., M.Sc.

Manager
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality
Tel 902.864.6833
Email philopa@halifax.ca

Attachment A- Dillon Consulting Report: FEP/WSF Closure Review

DILLON CONSULTING

MIRROR NS

FEP/WSF Closure Review

November 2020 - 20-3561

November 30, 2020

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Attention: Joe Mann
Project Manager

FEP/WSF Closure Review

Dillon Consulting Limited (Dillon) is pleased to submit an update to our 2018 review of potential issues associated with the proposed closure of the Front End Processor (FEP) and Waste Stabilization Facility (WSF) at Halifax Regional Municipality (HRM)'s Otter Lake Waste Processing and Disposal Facility. The update has been prepared to determine if the operations experience gained over the last two years indicates if any of the conclusions and recommendations made in 2018 should be adjusted.

As Dillon has been involved in the ongoing development and operations monitoring of the site since its inception in the 1990s, our firm has a long-standing and detailed understanding of the environmental performance of the Otter Lake Facility.

Yours truly,

DILLON CONSULTING LIMITED

[redacted]

Scott D. Kyle, P.Eng.
Project Manager

SDK:jb
Attachments

Our file: [redacted]

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Executive Summary

Background

Halifax Regional Municipality (HRM)'s Otter Lake Waste Processing and Disposal Facility, originally established in 1999, was unique in that all mixed solid waste delivered to the site (with the exception of select bulky items) passed through a Front End Processor (FEP) and Waste Stabilization Facility (WSF) prior to delivery to a final on-site landfilling location (Residuals Disposal Facility – RDF). In June 2002, in an effort to protect its solid waste infrastructure investments (through the generation of tip fee revenue) and towards meeting the requirements of the Otter Lake Operating Agreement, HRM amended its Solid Waste Resource Collection and Disposal By-Law to prohibit exportation of waste (referred to as "flow control") to facilities outside of the boundaries of the municipality.

In February 2015, HRM Council discontinued the flow control requirement for Industrial, Commercial and Institutional (ICI) generators within the municipality to direct their mixed solid waste (garbage) to the Otter Lake Waste Processing and Disposal Facility. As a consequence, the total quantity of mixed solid waste arriving at Otter Lake for processing and disposal was dramatically reduced, dropping from 140,323 tonnes in 2012 to 45,787 tonnes in 2019. This significant reduction in the quantity of mixed solid waste materials arriving at Otter Lake since 2015 has brought into question the efficacy and necessity of the FEP and WSF.

In June 2018, Dillon Consulting Limited (Dillon) was engaged by the operator of the Otter Lake facility, MIRROR NS (MIRROR), to conduct an evaluation of the potential of discontinuing the operation of the FEP and WSF, with mixed solid waste materials being delivered directly to the RDF for landfilling. In October 2020, Dillon was retained by MIRROR to prepare an updated assessment based on MIRROR's operating experience since the 2018 evaluation.

Objectives and Key Assumptions of the Review

<u>Objectives</u>

- To define the scope of the proposed operational changes at the FEP/WSF;
- To provide background information on the Otter Lake facility and HRM's waste/resource management program relevant to the assessment of the proposed changes;
- To identify potential issues of concern at the Otter Lake facility associated with the proposed FEP/WSF operational changes along with recommended mitigatory actions; and
- To support discussions on the proposed changes at the Otter Lake facility with the Citizen's Monitoring Committee (CMC), Halifax Regional Municipality, Nova Scotia Environment and other identified stakeholders to allow for the definition of necessary revised design, operational, contractual, regulatory and associated documentation.

Key Assumptions

- The existing tipping fee differential between the Otter Lake facility and other provincially-approved MSW management sites in relative proximity to Halifax (e.g., West Hants Landfill and the Kaizer Meadow Solid Waste Management Facility) will continue to exist for the foreseeable future, maintaining the incentive for the export of ICI-generated waste materials out of HRM for final disposal;
- The proposed operational change to be evaluated is to be based on the quantity and composition of waste arriving at the FEP/WSF as of the end of 2019, namely materials from HRM residential generators and (acknowledging future potential changes associated in population growth and per capita waste generation) which amounts to approximately 46,000 tonnes/year. ICI-generated waste materials will continue to be delivered to the existing transfer station component of the Otter Lake facility for hauling to provincially-approved disposal locations outside of HRM;
- All existing Provincially-stipulated design requirements associated with MSW landfills will remain applicable to future cells at Otter Lake's Residuals Disposal Facility (RDF) (e.g., double composite liner system, final cap); and
- A continued commitment by the Owner (HRM) and Operator (MIRROR) of the Otter Lake facility to current levels of environmental and community protection.

Strategy Development and Facility Definition

In 1994, Halifax County (one of four area municipalities prior to amalgamation, along with the City of Halifax, the City of Dartmouth, and the Town of Bedford) initiated a process to develop a regional management strategy, including the identification of siting criteria for new management facilities. Halifax County's effort was led by a Community Stakeholder Committee (CSC) and, following a public engagement process, culminated with the issuing of an *Integrated Waste/Resources Waste Management Strategy* in March 1995.

Founded on the content of the CSC's March 1995 strategy document, Halifax County issued a request for proposals to establish a solid waste/resource system that would deliver the CSC strategy. In consultation with the CSC, and following the selection of MIRROR as the preferred private partner to establish the new solid waste/resource system, HRM (established on April 1, 1996 through the amalgamation of the four municipalities) prepared and issued an updated version of the original strategy document in May 1996. Entitled the *Revised Integrated Waste/Resource Management Strategy*, it provided additional detail to CSC's original plan and maintained its key principles.

A noted element of both the original and revised Integrated Waste/Resource Management Strategies was the expectation that refinements to system components at Otter Lake would occur based on the amount and type of waste materials arriving at the facility.

The March 1995 Integrated Waste/Resources Waste Management Strategy included the following goal with respect to HRM's overall solid waste program:

> ***"Beginning with the approved opening of new residuals disposal facilities, these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up."***[1]

With regard to the FEP/WSF, the May 1996 strategy document stated:

> ***"The most important concern of the original strategy was the size and cost of the FEP/WSF. An important goal of the revised strategy was to create time to allow source separation behaviour to take hold in the Municipality. This would in turn divert materials from the mixed waste stream."***[2]

2013 Review Documents

In January 2013, Stantec Consulting Limited (Stantec) issued a finalized version of a report entitled Waste Resource Strategy Update to HRM, with the document subsequently being posted on HRM's web page on February 5, 2013. Prior to the issuing of the finalized version of the Waste Resource Strategy Update, HRM engaged SNC Lavalin (SNC Lavalin) Inc. to conduct a peer review of the Stantec findings.

In response to a request from MIRROR, Dillon conducted a review of both the Stantec and SNC Lavalin documents. Dillon identified a number of issues of concern with both the Stantec and SNC Lavalin documents. In contrast to positions put forward by both Stantec and SNC Lavalin, Dillon concluded the Otter Lake facility had operated in a manner consistent with its original design objectives and in compliance with contractual and regulatory obligations.

Waste Quantity and Composition

The total amount of waste material received at the Otter Lake site remained relatively stable (average value of 150,214 tonnes per year) between the commencement of flow control restrictions in 2002 through to the year proceeding its discontinuation, 2014. However, immediately following the discontinuation of flow control, as ICI mixed waste materials began to be exported to lower cost management facilities without Otter Lake's pre-processing component, annual tonnages began to drop

[1] An Integrated Waste/Resource Management Strategy for Halifax County/Halifax/Dartmouth/Bedford, dated March 25, 1995.
[2] Revised Integrated Solid Waste/Resource Management Strategy as attached to HRM Solid Waste/Resource Advisory Committee report, dated July 2, 1996.

significantly, decreasing from 140,298 tonnes in 2014 (the last full year of flow control) to 45,390 tonnes in 2017; a drop of 68% over three years. As of 2019, the incoming FEP/WSF tonnage stood at 45,787 tonnes.

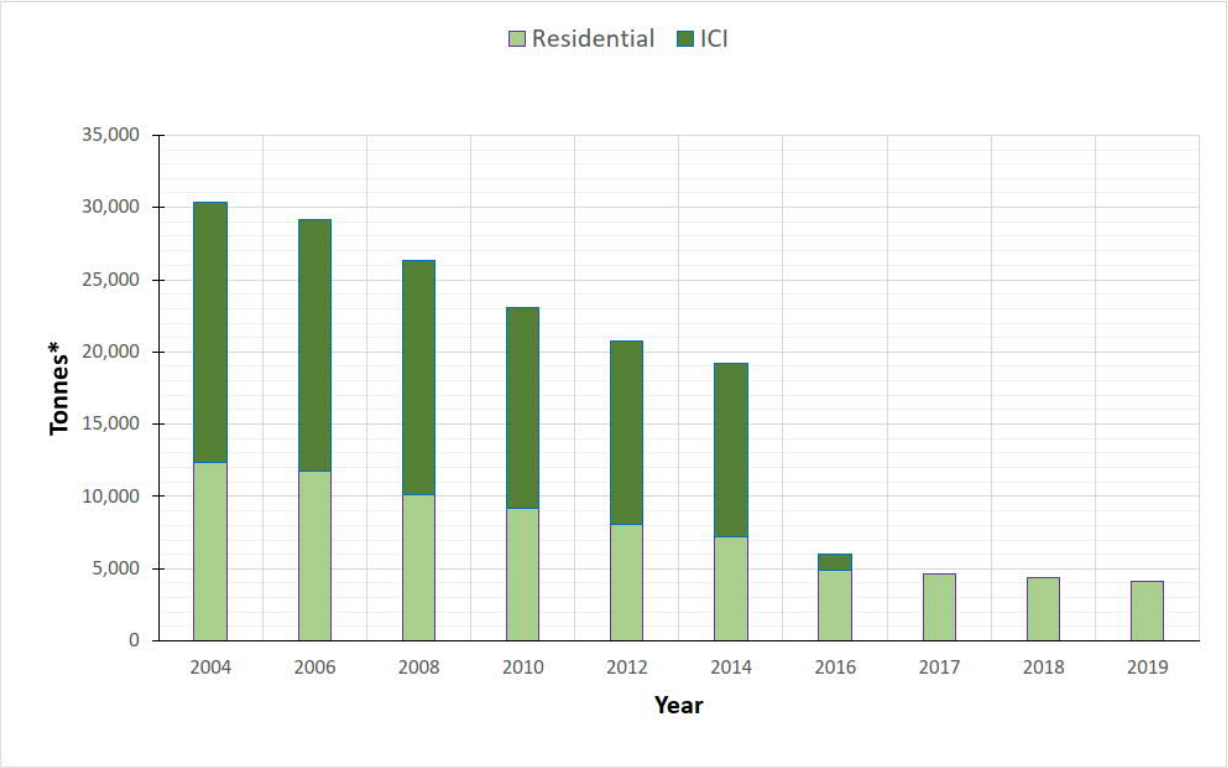
Since 2003/04, 12 characterization audits of HRM's municipal solid waste stream (several as part of province-wide studies) have been completed – of the 12 audits, eight were sponsored or performed by HRM; one by sponsored by the Community Monitoring Committee (CMC); and three sponsored by Divert NS. Four did not include an assessment of HRM's ICI-generated materials. Divert NS sponsored characterization audits in 2011, 2012 and 2017, at municipal waste disposal facilities throughout Nova Scotia (including Otter Lake); however, the categories and material definitions adopted for those studies were inconsistent with those utilized for the majority of the available assessments – most notably with regard to organics and recyclable paper resulting in a much higher "organics" percentage than those presented in other available audit reports. Efforts were made to re-allocate individual items to achieve consistency with the other nine studies, but it was concluded that the definition of recyclable versus compostable paper/fibre used for the Divert NS analysis made adjustment impractical. As a result the Divert NS studies were not included for consideration as part of this review. Notably, the 2017 audit was completed by Bio-Logic Environmental Systems on behalf of the CMC.

By examining the findings of the Otter Lake waste characterization studies since 2003, the following observations can be made:

- In the years from 2003/04 through to 2017, for residential, ICI and combined waste streams, there was an significant decline in the amount of organic (putrescible) material in wastes arriving at the Otter Lake FEP; and
- Over those years, based on the characterization audits analyzed, the percentage of organic materials in residentially-generated wastes was typically lower than that found in ICI sector wastes.

Based on Otter Lake waste audit and weigh scale data, **Figure ES-1** presents the approximate tonnage of putrescible organics that were delivered to the FEP/WSF from 2004 to 2019. The 4,100 tonnes of putrescible organic materials that arrived at Otter Lake in 2019 is approximately 13.5% of the amount of putrescible organic material that was received at the FEP/WSF in 2004. This is a significant reduction and calls into question the continued need for the FEP/WSF.

Figure ES-1: Tonnage of Organics Delivered to the FEP/WSF



*: Yearly putrescible organic tonnages were estimated by using linear trend line regression of the measured waste characterization percentages in combination with the yearly reported tonnages received at the Otter Lake RDF.

Overview of Proposed Revisions

What Will Change

- Operations at the FEP and WSF will be discontinued. Potential alternate uses for the facilities will be evaluated by HRM and MIRROR; and
- Residential waste collection vehicles will no longer deliver their loads to the FEP tipping floor. They will instead proceed directly, via the existing access road network, to the active tipping (disposal) face at the RDF, similar to other MSW landfills in Nova Scotia (e.g., West Hants Landfill, Guysborough Waste Management Facility and Cumberland Central Landfill). Waste materials discharged at the RDF active tipping face will be visually inspected for prohibited materials, with these items being segregated for subsequent appropriate management as required.

What Will Not Change

- The respective ownership (HRM), operator (MIRROR) and community oversight (CMC) roles and responsibilities at the Otter Lake facility;
- MIRROR's obligations related to odour control and management of nuisance issues (i.e., litter and dust) as defined in their operating agreement with HRM;
- Hours and days of operation;

- All waste hauling/collection vehicles arriving at the Otter Lake site will be required to report to the scale house for inspection, weighing, data recording and billing;
- Collection vehicles with ICI wastes will be directed to the Transfer Station tipping floor, with materials subsequently being loaded into a trailer for transport to approved disposal facilities outside of HRM;
- Waste placement, compaction and covering requirements will continue to be facilitated using specialized mobile equipment; and
- All applicable regulatory requirements will remain in place, including design, monitoring, reporting and general performance obligations included within the most current NSE Operating Approval.

Risk Assessment

The proposed operational changes at the Otter Lake facility do, in some instances, present the potential for incremental on-site effects requiring management. When such effects have been identified (e.g., blowing litter, attraction of birds), recommended mitigatory actions, based on design and operational best practice, have been identified. Nevertheless, it is acknowledged that the delivery of unprocessed MSW directly to the RDF does present an incremental degree of risk with regard to objectionable on-site outcomes. It is noted that the review conducted as part of this report did not identify potential off-site (e.g., beyond facility property boundaries) issues of concern.

Risk is commonly defined as the combination of the likelihood of the occurrence of a harm and the severity of that harm. **Tables ES-1** and **ES-2** present on-site and off-site issues risk assessments of the proposed operational changes (incorporating consideration of the proposed mitigatory actions, where applicable) at the Otter Lake facility. The risk assessment matrix used as a basis for the completion of the on and off-site evaluations is presented in **Section 7.0**.

Table ES-1: On-Site Issues Risk Assessment – Proposed FEP/WSF Changes

Operational Activity	Potential Impact/ Issue of Concern	Severity of Impact	Mitigation
6.2 Material Delivery	- Traffic control and worker safety	medium	• Provision of instructions to residential collection contractors regarding site traffic rules and restrictions, including the definition of protocols (e.g., warnings, banning from site) for non-compliance. • Establish directional signage from the Scale House to the active tipping face. • Provision of traffic spotters at the active tipping face, acknowledging peak traffic periods.
6.3 Material Placement and Covering	None identified	-	-

Operational Activity	Potential Impact/ Issue of Concern	Severity of Impact	Mitigation
6.4.1 Litter Control	- Increased potential for blowing litter at the tip face	medium	• Use of additional portable fencing as well as additional litter collection and removal efforts by site personnel.
6.4.2 Bird and Vector Control	- Enhanced attraction of birds	medium	• Enhanced bird and vector control efforts at the general tip face area and at the RDF in general. • Emphasis on minimizing the size of the active disposal area, thorough waste compaction and placement of daily cover at the completion of each working day.
	- Delivery of rodents in waste loads to tip face	low	• Implementation of a baiting program for rodents in proximity to the RDF tip face.
6.4.3 Dust Management	None identified	-	-
6.5.1 Landfill Gas Management	None identified	-	-
6.5.2 Odour Management	None identified	-	-
6.6 Leachate Management	None identified	-	-
6.7 Stormwater Management	None identified	-	-
6.8.1 Monitoring	None identified	-	-
6.8.2 Reporting	None identified	-	-

Table ES-2: Off-Site Issues Risk Assessment – Proposed FEP/WSF Changes

Operational Activity	Potential Impact/ Issue of Concern	Severity of Impact	Mitigation
6.2 Material Delivery	None identified	-	-
6.3 Material Placement and Covering	None identified	-	-
6.4.1 Litter Control	None identified	-	-
6.4.2 Bird and Vector Control	None identified	-	-
6.4.3 Dust Management	None identified	-	-
6.5.1 Landfill Gas Management	None identified	-	-
6.5.2 Odour Management	None identified	-	-
6.6 Leachate Management	None identified	-	-
6.7 Stormwater Management	None identified	-	-
6.8.1 Monitoring	None identified	-	-
6.8.2 Reporting	None identified	-	-

With reference to **Table ES-1**, it is noted that potential on-site issues associated with material delivery, litter control and bird/vector control present relatively modest risk "significance" scores and are readily mitigated through the implementation of established best-practice operational procedures. As illustrated in **Table ES-2**, no off-site risk issues were identified as associated with the proposed closure of the FEP/WSF.

Summary of Proposed Operational Measures

To address potential concerns associated with the proposed operational revisions, the following measures are recommended:

Increase in RDF Vehicle Traffic

- Provision of instructions to residential collection contractors regarding site traffic rules and restrictions, including the definition of protocols (e.g., warnings, banning from site) for non-compliance;
- Establish directional signage from the Scale House to the active tipping face; and
- Provision of traffic spotters at the active tipping face, acknowledging peak traffic periods.

Increased Potential for Blowing Litter

- Use of additional portable fencing as well as additional litter collection and removal efforts by site personnel.

Increased Attractiveness of the Disposal Area to Birds

- Enhanced bird and vector control efforts at the general tip face area and at the RDF in general; and
- Emphasis on minimizing the size of the active disposal area, thorough waste compaction and placement of daily cover at the completion of each working day.

Rodents Arriving at the RDF Tip Face in Collection Vehicles

- Implementation of a baiting program for rodents in proximity to the RDF tip face.

Conclusion

Based on the results of this analysis, there does not appear to be any significant benefit to the continued operations of the FEP/WSF. Further, there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated. Therefore, it is recommended that operations at the FEP and WSF be discontinued.

1.0 Introduction

1.1 Background

Halifax Regional Municipality (HRM)'s Otter Lake Waste Processing and Disposal Facility (see **Figure 1-1**), originally established in 1999, was unique in that all mixed solid waste delivered to the site (with the exception of select bulky items) passed through a Front End Processor (FEP) and Waste Stabilization Facility (WSF) prior to delivery to a final on-site landfilling location (Residuals Disposal Facility – RDF).

Figure 1-1: Otter Lake Waste Processing and Disposal Facility and Surrounding Area

Notes:
3 km - Definition of the required distance between the Residual Disposal Facility (RDF) and "Buildings on a Well Water Supply" as presented in the Documentation Report for the Residuals Disposal Facility, Community Stakeholders Committee, October 1995.
5 km - Definition of the boundary for "Area Residents" as presented in the Agreement for Community Monitoring of Solid Waste Facilities between HRM and the Halifax Waste/Resource Society, February 1999.

In February 2015, HRM Council discontinued the requirement (referred to as "flow control") for Industrial, Commercial and Institutional (ICI) generators within the municipality to direct their mixed solid waste (garbage) to the Otter Lake Waste Processing and Disposal Facility. Through an amendment of By-Law S-600, HRM allowed the export of ICI mixed solid waste to landfills outside of HRM and a transfer station was established at Otter Lake in 2016. As a consequence, the total quantity of mixed solid waste arriving at Otter Lake for processing and disposal was dramatically reduced, dropping from 140,323 tonnes in 2012 to 45,787 tonnes in 2019. In fact, by 2017 and continuing on through to 2020, all ICI-sourced mixed solid waste materials arriving at Otter Lake were transferred to facilities outside of HRM for subsequent disposal with the remaining portion directed to the FEP, WSF and RDF consisting entirely of materials from residential (as defined in Section 5 of HRM By-Law L-600) generators.

This significant reduction in the quantity of mixed solid waste materials arriving at Otter Lake since 2015 has brought into question the efficacy and necessity of the FEP and WSF. In June 2018, Dillon Consulting Limited (Dillon) was engaged by the operator of the Otter Lake facility, MIRROR, to conduct an evaluation of the potential of discontinuing the operation of the FEP and WSF, with mixed solid waste materials being delivered directly to the RDF for landfilling. In October 2020, Dillon was retained by MIRROR to prepare an updated version of the 2018 evaluation in order to determine if the operating experience obtained during the past two years would impact the original assessment's conclusions and recommendations.

1.2 Objectives and Key Assumptions

Objectives

- To define the scope of the proposed operational changes at the FEP/WSF;
- To provide background information on the Otter Lake facility and HRM's waste/resource management program relevant to the assessment of the proposed changes;
- To identify potential issues of concern at the Otter Lake facility associated with the proposed FEP/WSF operational changes along with recommended mitigatory actions; and
- To support discussions on the proposed changes at the Otter Lake facility with the Citizen's Monitoring Committee (CMC), Halifax Regional Municipality, Nova Scotia Environment and other identified stakeholders to allow for the definition of necessary revised design, operational, contractual, regulatory and associated documentation.

Key Assumptions

- The existing tipping fee differential between the Otter Lake facility and other provincially-approved MSW management sites in relative proximity to Halifax (e.g., West Hants Landfill and the Kaizer Meadow Solid Waste Management Facility) will continue to exist for the foreseeable future, maintaining the incentive for the export of ICI-generated waste materials out of HRM for final disposal;
- The operational change to be evaluated is to be based on the quantity and composition of waste arriving at the FEP/WSF as of the end of 2019, namely materials from HRM residential generators and (acknowledging future potential changes associated in population growth and per capita waste generation) which amounts to approximately 46,000 tonnes/year. ICI-generated waste materials will continue to be delivered to the existing transfer station component of the Otter Lake facility for hauling to provincially-approved disposal locations outside of HRM;
- All existing Provincially-stipulated design requirements associated with MSW landfills will remain applicable to future cells at Otter Lake's Residuals Disposal Facility (RDF) (e.g., double composite liner system, final cap); and
- A continued commitment by the Owner (HRM) and Operator (MIRROR NS (MIRROR)) of the Otter Lake facility to current levels of environmental and community protection.

2.0 History of the Otter Lake Waste Processing and Disposal Facility

2.1 Strategy Development and Facility Definition

In 1994, after a series of setbacks to identify a new municipal solid waste facility to allow for the closure of the Highway 101 Landfill, Halifax County (one of four area municipalities prior to amalgamation, along with the City of Halifax, the City of Dartmouth and the Town of Bedford) initiated a process to develop a regional management strategy, including the identification of siting criteria for new management facilities. Halifax County's effort was led by a Community Stakeholder Committee (CSC) and, following a public engagement process, culminated with the issuing of an *Integrated Waste/Resources Waste Management Strategy* in March 1995.

Founded on the content of the CSC's March 1995 strategy document, Halifax County issued a request for proposals to establish a solid waste/resource system that would deliver the CSC strategy. In consultation with the CSC, and following the selection of MIRROR as the preferred private partner to establish the new solid waste/resource system, HRM (established on April 1, 1996 through the amalgamation of the four municipalities) prepared and issued an updated version of the original strategy document in May 1996. Entitled the *Revised Integrated Waste/Resource Management Strategy*, it provided additional detail to CSC's original plan and maintained its key principles including "the disposal of only stabilized and inert materials at the RDF" (Residuals Disposal Facility).

In terms of key operational performance criteria for the FEP/WSF (ultimately designed, built, and operated by MIRROR), the Operations Plan that supports the Otter Lake Facility's current NSE Operating Approval specifies the performance criteria as follows:

- Non-recyclable Inert Materials will be separated and disposed of in the RDF;
- Recyclable materials will be extracted and stored separately on the Site pending removal by MIRROR;
- Materials capable of being rendered into Stable Materials through biostabilization will be processed through the WSF; and
- Hazardous Substances and other Prohibited Materials will be extracted and temporarily stored on the site pending removal by MIRROR through a contractor.

A noted element of both the original and Revised Integrated Waste/Resource Management Strategies was the expectation that refinements to system components at Otter Lake would occur based on the amount and type of waste materials arriving at the facility.

The March 1995 Integrated Waste/Resources Waste Management Strategy included the following goal with respect to HRM's overall solid waste program:

> *"Beginning with the approved opening of new residuals disposal facilities, these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up."*[1]

With regard to the FEP/WSF, the May 1996 strategy document stated:

> *"The most important concern of the original strategy was the size and cost of the FEP/WSF. An important goal of the revised strategy was to create time to allow source separation behaviour to take hold in the Municipality. This would in turn divert materials from the mixed waste stream."*[2]

3.0 2013 System Review

In January 2013, Stantec Consulting Limited (Stantec) issued a finalized version of a report entitled Waste Resource Strategy Update to HRM, with the document subsequently being posted on HRM's web page on February 5, 2013. Prior to the issuing of the finalized version of the Waste Resource Strategy Update, HRM engaged SNC Lavalin (SNC Lavalin) Inc. to conduct a peer review of the Stantec findings. The SNC Lavalin report, entitled A Peer Review of the January 2013 Stantec Report "Waste Resource Strategy Update", dated April 17, 2013, was subsequently posted on HRM's website.

As stated in Section 1.1 of the Stantec document, the focus of their assignment was *"to complete a review of current (waste management) programs and services, and to recommend opportunities for improvement over the next 10-20 years."* Towards that requirement, their report included a review and analysis of all components of HRM waste management system, including the Otter Lake Waste Processing and Disposal Facility, design requirements for landfills with specific consideration of the RDF and opportunities to create a regional waste resource campus. With regards to the SNC Lavalin peer review, its scope was defined as *"a comprehensive assessment of the analysis, advice, options, conclusions and recommendation as provided in the (Stantec) report for Section 3.0 Otter Lake Waste Processing and Disposal Facility, and Section 4.0 Landfill Design."*

In response to a request from MIRROR, Dillon conducted a review of both the Stantec and SNC Lavalin documents. A primary element of the Dillon review was to evaluate assumptions made by both Stantec and SNC Lavalin in support of their analysis, ensuring relevance to the Otter Lake context as well as consistency with actual operating requirements and documented performance results at the FEP/WSF and RDF. In May 2013, and with a focus on the Stantec document, Dillon issued Waste Resource Strategy Update, Document Review Report. Dillon's review of the SNC Lavalin report followed in September 2013 with the submission of Peer Review of the Waste Resource Strategy Update, Document Review Report.

Dillon identified a number of issues of concern with both the Stantec and SNC Lavalin documents. In contrast to positions put forward by both Stantec and SNC Lavalin, Dillon concluded the Otter Lake facility had operated in a manner consistent with its original design objectives and in compliance with contractual and regulatory obligations.

During 2015, and in acknowledgement of the anticipated impacts of the discontinuation of ICI flow control restrictions, an updated contractual agreement between HRM and MIRROR for the operation of the Otter Lake facility was negotiated. This agreement came into effect in April 2016.

4.0 Applicable Regulations, Agreements and Guidelines

Design and operational requirements of the Otter Lake Waste Processing and Disposal Facility are defined primarily by obligations prescribed in Provincial regulations (and their supporting guidelines), HRM By-Laws and a contractual agreement between MIRROR and HRM. A summary of the highlights of these documents is provided below. It is acknowledged that a municipal solid waste transfer station (to transport ICI-generated materials to approved facilities outside of HRM) was established at Otter Lake in 2016; thus, documents relevant to transfer station operation have been included in the summary.

Federal

- Regulations
  - Migratory Birds Regulations
    - Defining permit requirements to manage migratory birds via scaring devices and restricted culling.

Provincial

- Regulations
  - Solid Waste-Resource Management Regulations (last revised July 2018)
    - Established under Section 102 of the Environment Act.
    - Organized under four divisions; Division I – Solid Waste Reduction, Division II – Disposal of Municipal Solid Waste, Division III – Regional Solid Waste-Resource Management Plans and Division IV – Financial Assistance.
    - With regard to activities at the Otter Lake facility, Division II is of primary relevance, identifying materials banned from disposal (and as presented in Schedule "B" of the regulation) and defining the submission requirements to acquire an approval from NSE to operate a landfill for the disposal of municipal solid waste.
    - The Regulations do not include a requirement to incorporate a front end processing and/or waste stabilization component as part of the development of a municipal solid waste disposal facility in Nova Scotia.
- Guidelines
  - Municipal Solid Waste Landfill Guidelines (October 1997)
    - Defines design and operational requirements for MSW landfills.
    - Identifies the process to obtain an approval from NSE to construct and operate a MSW landfill.
    - Provides a detailed description of all facility elements including the landfill liner, final cover system, leachate management system, landfill gas management system and surface water management system. Front end processing and/or waste stabilization systems are not identified as a required landfill facility element in the guidelines.

- Specifies quality control/assurance requirements for the installation of landfill liner and cap components.
- Defines all operational, environmental effects (e.g., ground and surface water) monitoring, data recording and reporting requirements.
- Identifies the requirement to develop a preliminary and final closure plan.

o Guidelines for the Siting and Operation of Waste Transfer Stations (October 2006)

- Defines design and operational requirements for MSW and organic material transfer stations.
- Identifies the process to obtain an approval from NSE to construct and operate a waste transfer station.
- Provides a detailed description of all facility elements separation distances, surface water management systems, leachate management components and odour control features.
- Defines all operational, environmental effects (e.g., ground and surface water, particulate emissions, sound) monitoring, data recording and reporting requirements.

<u>Municipal</u>

- By-Laws
  - Solid Waste Resource Collection and Disposal By-Law S-600 (last revised August 2015)
    - Defines key items relevant to the management requirements of MSW materials generated within HRM, including waste disposal fee structures as well as “residential” and “industrial/commercial/institutional” waste.

<u>Contractual</u>

- A new operating agreement between HRM and MIRROR was concluded in December 2015 with the agreement coming into effect in January 2016. Highlights of the agreement, which were reviewed with the CMC prior to execution, include the following:
  - MIRROR continues to be responsible for the provision of all the public health and environmental protections included in the original agreement.
  - Municipal Enterprises Ltd. continues to guarantee MIRROR’s obligations.
  - The agreement includes a 12-year extension of the contract to 2035 and two five year extensions possible beyond 2035.
  - A transfer station was authorized to begin operations pending NSE approval. Operations of the transfer station began in April 2016. Haulers of all ICI mixed solid waste generated in Halifax Regional Municipality are authorized to use the transfer station. The ICI waste received at the transfer station is transferred to landfills outside of HRM.
  - In another change to the original contract, MIRROR is now responsible for funding future landfill cell construction and closure works. Prior to this change, Halifax Regional Municipality was responsible for these costs.

- MIRROR continues to be responsible for processing all residential mixed solid waste generated in HRM.
- MIRROR is allowed to terminate this agreement in the event that legal entitlements cannot be amended to remove the obligation to operate the FEP/WSF facilities. The election period starts January 1, 2018 and ends December 31, 2021. The early termination date is December 31, 2023.

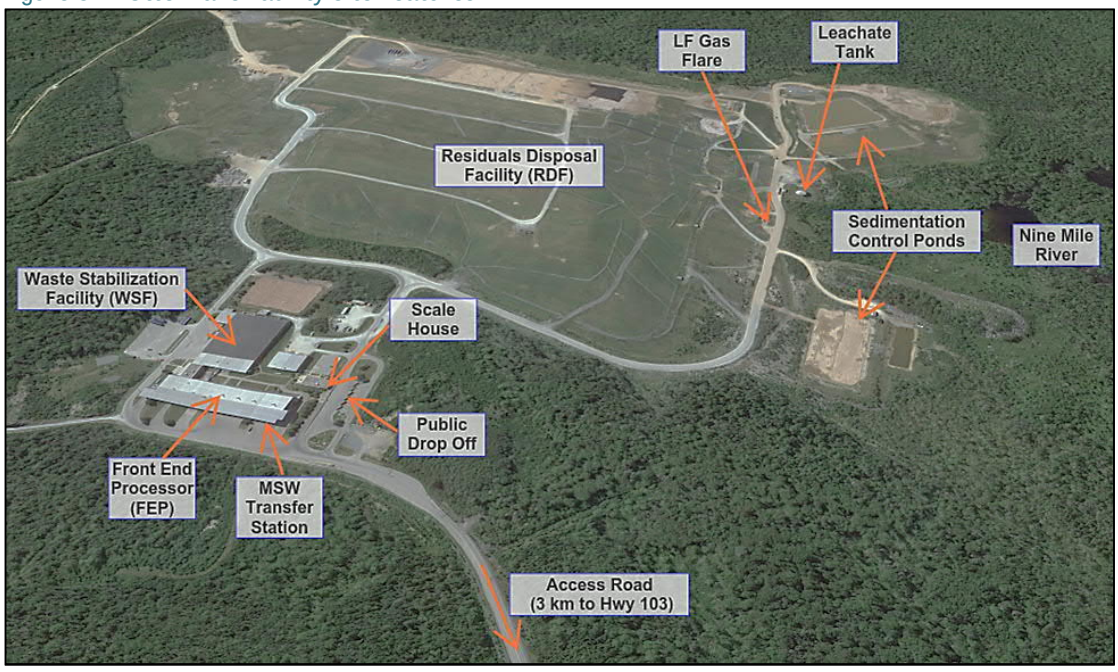
5.0 Current Facility and Waste Stream Status

5.1 Site Infrastructure and Features

The Otter Lake Waste Processing and Disposal Facility is situated on Otter Lake Drive approximately 2.5 km south of the community of Timberlea. As depicted in **Figure 5-1**, the Otter Lake facility includes several key site features:

- Dedicated two lane paved access road (Otter Lake Drive) connecting the site to Exit 3 on Highway 103;
- Scale House;
- Public Drop Off area;
- MSW Transfer Station (for ICI-generated waste materials);
- Front End Processor (FEP);
- Waste Stabilization Facility (WSF);
- Residuals Disposal Facility (RDF);
- Seven cells completed and capped with Cell 7a being currently active;
- Leachate Tank (capturing effluent from the RDF leachate collection system with truck transport off-site for treatment);
- Sedimentation Control Ponds (capturing and treating surface runoff from areas with erodible soil surfaces with ultimate discharge to the Nine Mile River); and
- Landfill Gas Flare (to allow for the flaring of gas captured by the RDF's collection system).

Figure 5-1: Otter Lake Facility Site Features



5.2 Incoming Material Quantity and Composition

Waste Quantity

Table 5-1 provides a summary of the total annual tonnages of waste materials delivered to the Otter Lake Facility from 1999 through to 2019.

Table 5-1: Waste Delivered to Otter Lake, 1999 to 2019

Year		Waste Delivered				Complaints Received	Population[1]
		Industrial, Commercial & Institutional	Residential	Special	Total Received		
		tonne	tonne	tonne	tonne		
1	1999	88,166	26,424	1,113	115,703	-	352,653
2	2000	87,013	47,622	1,701	136,336	-	355,882
3	2001	86,217	57,248	2,193	145,658	-	359,111
4	2002	87,457	60,491	1,487	149,435	2	361,860
5	2003	89,895	64,574	1,956	156,425	37	364,610
6	2004	89,169	66,559	1,890	157,618	9	367,359
7	2005	92,718	68,013	2,969	163,700	11	370,109
8	2006	90,598	68,163	2,669	161,431	24	372,858
9	2007	87,823	64,117	2,440	154,380	1	376,306
10	2008	89,529	62,887	2,266	154,682	0	379,753
11	2009	85,215	62,264	1,890	149,369	2	383,201
12	2010	81,260	62,169	1,812	145,241	0	386,648
13	2011	79,622	60,139	2,074	140,323	26	390,096
14	2012	78,747	59,535	2,041	140,323	1	392,703
15	2013	78,396	59,152	2,011	139,559	0	395,310
16	2014	79,196	59,462	1,639	140,298	0	397,917
17	2015[2]	56,596	50,374	1,221	108,191	2	400,524
18	2016	7,998	44,587	334	52,919	0	403,131
19	2017	0	45,261	129	45,390	2	431,479
20	2018	0	45,687	217	45,904	1	435,906
21	2019	0	45,608	179	45,787	0	440,332
		1,435,615	1,180,336	34,231	2,648,672	118	

Notes:

1. Populations for non-census years estimated based on assumed linear change between each census. Populations for 2017 to 2019 from https://novascotia.ca/finance/statistics.
2. HRM flow control restrictions for ICI generated waste materials discontinued in February 2015.

In June 2002, in an effort to protect its solid waste infrastructure investments and towards meeting the requirements of the Otter Lake Operating Agreement, HRM amended its Solid Waste Resource Collection and Disposal By-Law to prohibit exportation of waste to facilities outside of the boundaries of the municipality. Referred to as "flow control", it ensured that the significant amount of waste from HRM's industrial, commercial and institutional (ICI) generators (along with the associated tip fee revenue) would continue to be directed to HRM waste management facilities, including Otter Lake. Given HRM's obligation to provide collection services to residential generators, delivery of that portion of the overall waste stream to its management facilities was not an area of concern.

As illustrated in **Table 5-1**, the total amount of waste material received at the Otter Lake site remained relatively stable (average value of 150,214 tonnes per year) between the commencement of flow control restrictions in 2002 through to the year proceeding its discontinuation, 2014. However, immediately following the discontinuation of flow control, as ICI materials began to be exported to lower cost management facilities without Otter Lake's pre-processing component, annual tonnages began to drop significantly, decreasing from 140,298 tonnes in 2014 (the last full year of flow control) to 45,390 tonnes in 2017; a drop of 68% over three years. As of 2019, the incoming FEP/WSF tonnage stood at 45,787 tonnes.

The reduction in incoming waste quantity has served to significantly increase the anticipated life expectancy (capacity) of the landfill.

As presented in **Table 5-1**, there have been 118 complaints received in 21 years of operations, including six since 2012. Noting the site currently receives approximately 46,000 tonnes of waste annually, this represents one complaint for every 22,400 tonnes delivered to Otter Lake since 1999 and one complaint for every 119,700 tonnes since 2012.

Waste Composition

While the significance of the reduction in the amount of waste material arriving at the Otter Lake site is clear, another notable aspect of change, as compared to the original design concept for the facility, has been the character of the waste. Since 2003/04, 12 characterization audits of HRM's municipal solid waste stream (several as part of province-wide studies) have been completed – of the 12 audits, eight were sponsored or performed by HRM; one by sponsored by the Community Monitoring Committee; and three sponsored by Divert NS. Four did not include an assessment of HRM's ICI-generated materials. Divert NS sponsored characterization audits in 2011, 2012 and 2017, at municipal waste disposal facilities throughout Nova Scotia (including Otter Lake); however, the categories and material definitions adopted for those studies were inconsistent with those utilized for the majority of the available assessments – most notably with regard to organics and recyclable paper resulting in a much higher "organics" percentage than those presented in other available audit reports. Efforts were made to re-allocate individual items to achieve consistency with the other nine studies, but it was concluded that the definition of recyclable versus compostable paper/fibre used for the Divert NS analysis made

adjustment impractical. As a result the Divert NS studies were not included for consideration as part of this review.

The audits that were examined to develop an understanding of the anticipated character of waste to be affected by the proposed closure of the FEP/WSF are summarized in **Table 5-2**.

Table 5-2: Reviewed Otter Lake Waste Characterization Audits

No.	Audit Year	Report Name	Author	Res, ICI or Both
1	2003/04	Solid Waste Characterization Study Summary Report 2010[1]	SNC Lavalin Environment Inc.	Both
2	2008 (April)	Solid Waste Characterization Study Summary Report 2010[1]	SNC Lavalin Environment Inc.	Both
3	2008 (December)	Solid Waste Characterization Study Summary Report 2010[1]	SNC Lavalin Environment Inc.	Both
4	2009 (August)	Solid Waste Characterization Study Summary Report 2010[1]	SNC Lavalin Environment Inc.	Both
5	2015 (Fall)	HRM Fall 2016 Waste Characterization Studies Report 2010[1]	HRM Solid Waste Resources	Res
6	2016 (Summer)	HRM Fall 2016 Waste Characterization Studies Report 2010[1]	HRM Solid Waste Resources	Res
7	2016 (Fall)	HRM Fall 2016 Waste Characterization Studies Report 2010[1]	HRM Solid Waste Resources	Res
8	2016/17 (December/January)	Otter Lake Waste Audit	Bio-Logic Environmental Systems[2]	Both
9	2017 (Spring)	HRM Spring 2017 Waste Characterization - Audit Results Table	HRM Solid Waste Resources	Res

Notes:
1. Report includes data on earlier characterization studies.
2. The project methodology was based on that used by SNC-Lavalin in the waste characterization studies conducted in 2008/2009 and on the requirements of the Recommended Waste Characterization Methodology for Direct Waste Analysis Studies in Canada prepared or CCME by SENES Consultants Limited in 1999. Completed on behalf of the CMC.

Figures 5-2, **5-3** and **5-4** present the results of the residential (Res), ICI and combined Res and ICI (respectively) characterizations studies. Each horizontal line on the graphs depicts the percentage of one of five sorted materials from the mixed waste arriving at the Otter Lake FEP:

1) Organics – food waste, leaf and yard waste, soiled paper, boxboard (moved to paper in 2015);
2) Recycling – allowable HRM Blue Bag materials, program electronics;
3) Paper – writing/office paper, corrugated cardboard, envelopes, newspapers, flyers;
4) Other – household hazardous waste (HHW), paint, sharps, aerosol cans, program electronics; and
5) Refuse – composite materials, diapers, pet waste, textiles, non-program electronics, coffee/beverage cups, non-recyclable plastics, C&D materials.

A sixth material category and a subset of the overall organics category, putrescible organics (i.e., food waste and leaf and yard waste), has been added to each graph to highlight the percentage of the Otter Lake mixed waste stream that is most directly linked with issues related to odour as well as gas and leachate management. Notably, this sub-category has been on a more rapid decline than the overall "organics" category (which also includes compostable paper/fibre materials that were deemed to be inappropriate for recycling by sorting personnel) since 2003.

Of the studies reviewed, there were small variations in the sub-categories included within each of the five main categories. In those instances, adjustments were made in an attempt to keep the list of items within each main category consistent.

Figure 5-2: Residential Sector – Waste Characterization Study Results

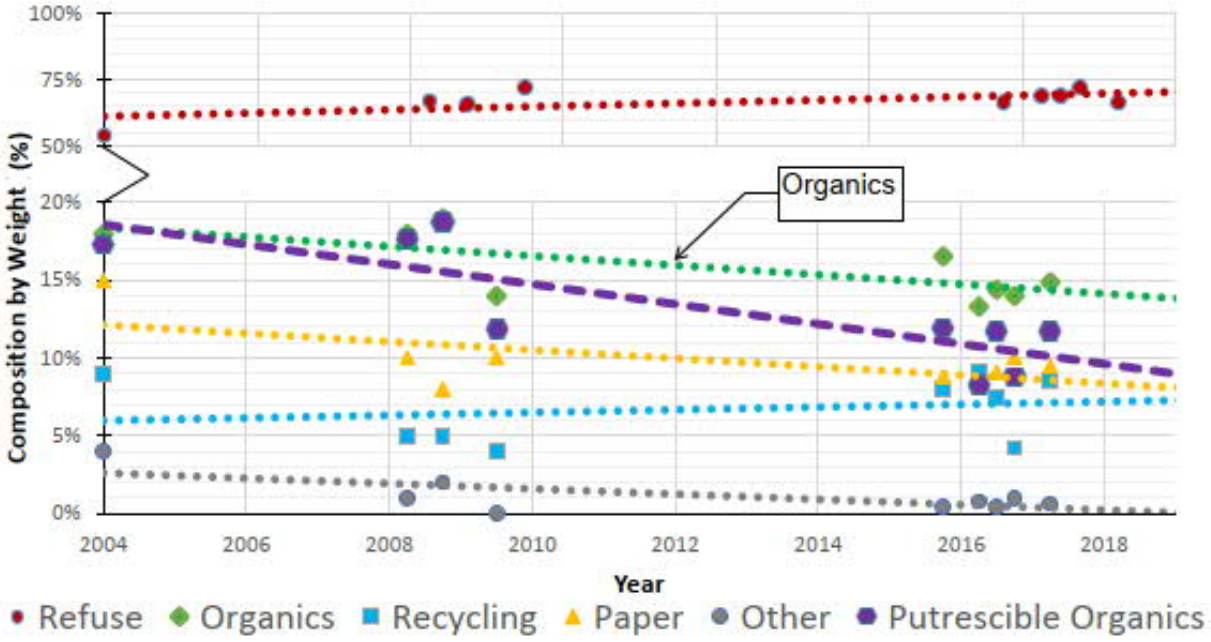


Figure 5-3: ICI Sector – Waste Characterization Study Results

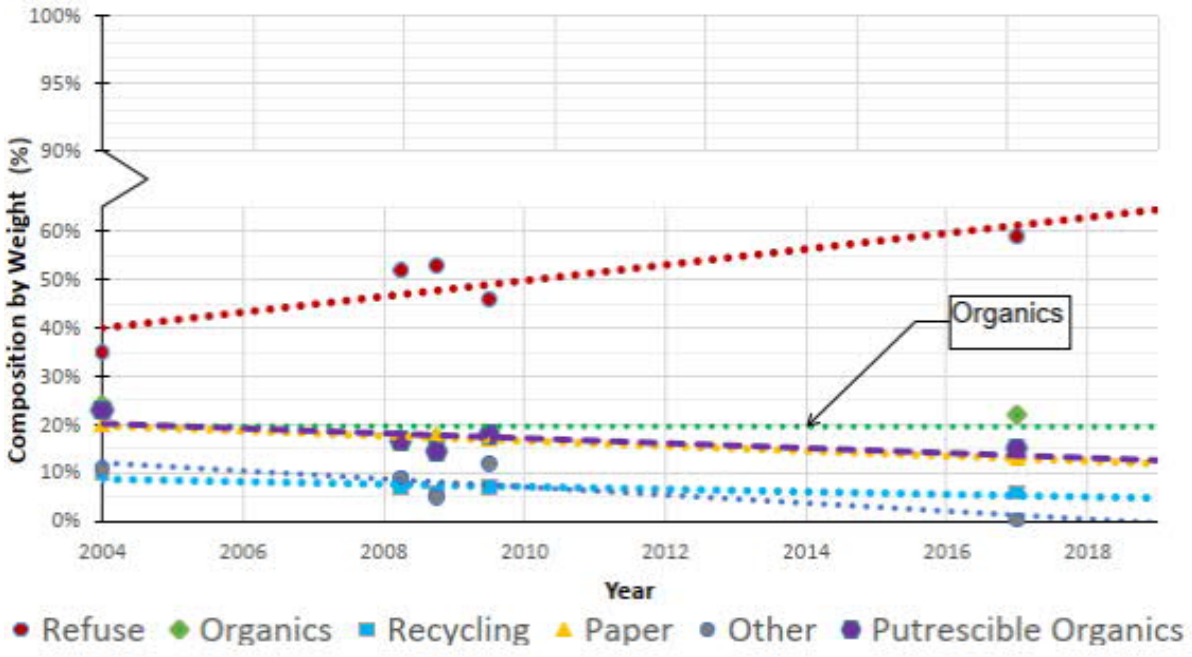
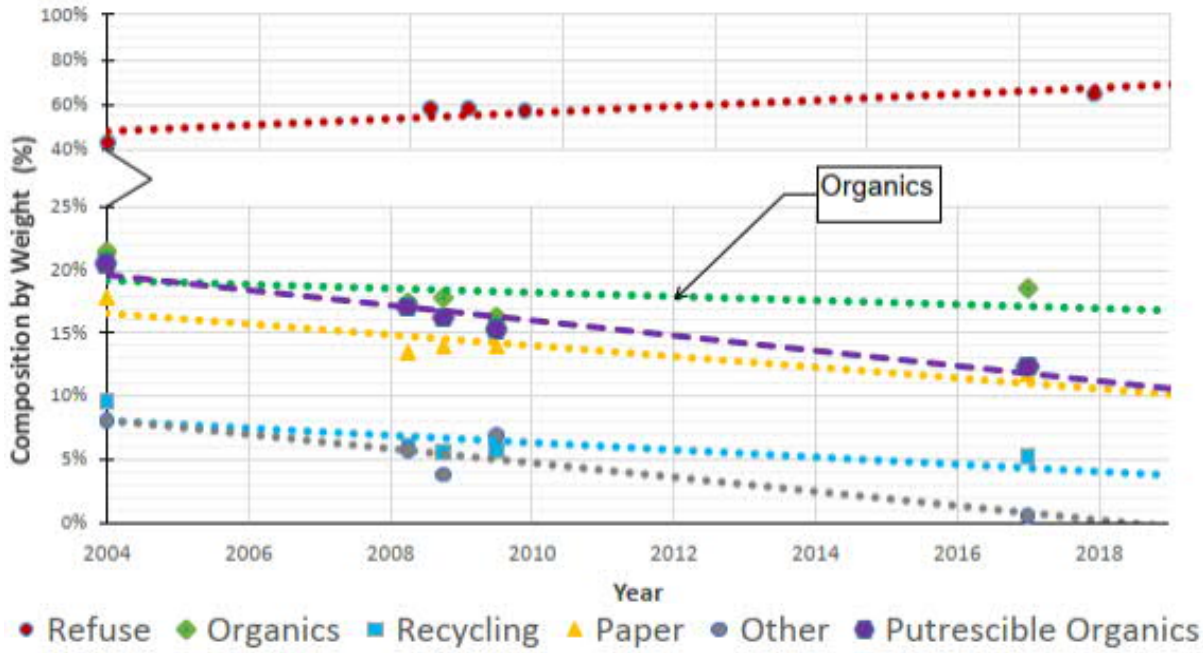


Figure 5-4: Combined ICI and Residential Sector – Waste Characterization Study Results



By examining the findings of the Otter Lake waste characterization studies since 2003, the following observations can be made;

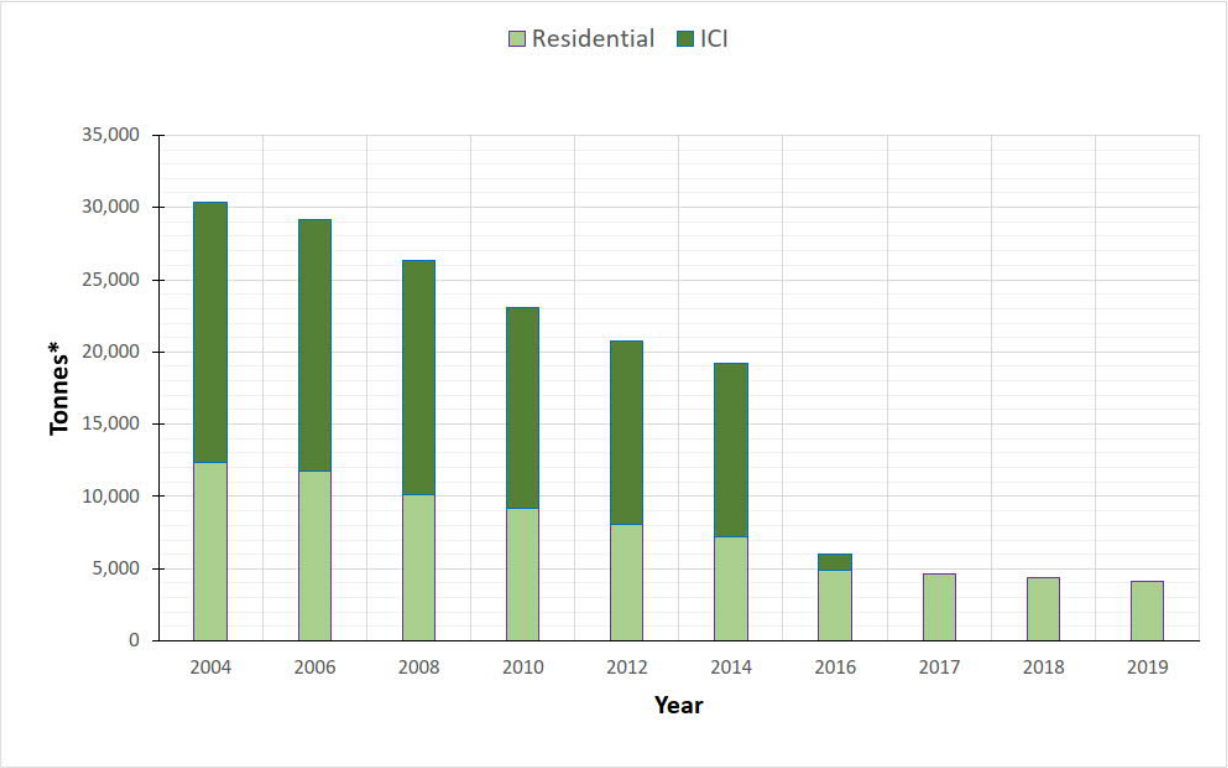
- In the years from 2003/04 through to 2017, for residential, ICI and combined waste streams, there was an significant decline in the amount of organic (putrescible) material in wastes arriving at the Otter Lake FEP; and
- Over those years, based on the characterization audits analyzed, the percentage of organic materials in residentially-generated wastes was typically lower than that found in ICI sector wastes.

Organic materials tend to be the source of most nuisance issues at MSW management facilities, serving as a basis for odour and pest attraction concerns. With ICI residual materials now being (almost entirely) exported to disposal facilities outside of HRM, it is anticipated that wastes arriving at Otter Lake for the foreseeable future will consist of those originating from residential generators. Thus, in comparison to the years prior to the discontinuation of ICI flow control restrictions, it is projected that the composition of waste arriving at Otter Lake will have a primarily residential character (as depicted in **Figure 5-1**), offering reduced concerns typically associated with organic materials.

Based on Otter Lake waste audit and weigh scale data, and using regression analysis of the available information, **Figure 5-5** presents the approximate tonnage of putrescible organics that were delivered to the FEP/WSF from 2004 to 2019. The 4,100 tonnes of putrescible organic materials that arrived at Otter Lake in 2019 is approximately 13.5% of the amount of putrescible organic material that was received at the FEP/WSF in 2004. This is a significant reduction and calls into question the continued need for the FEP/WSF.

Operation of the FEP/WSF also consumes significant amounts of electricity; approximately 1,633,000 kWh at a cost of $239,000 in 2019. Acknowledging Nova Scotia's current electrical energy sources (and using an emission factor from the National Inventory Report (NIR) for Nova Scotia), 2019's kWh total for the FEP/WSF represents an annual GHG generation impact of approximately 1,240 tonnes of CO_2e.

Figure 5-5: Tonnage of Organics Delivered to the FEP/WSF



*: Yearly putrescible organic tonnages were estimated by using linear trend line regression of the measured waste characterization percentages in combination with the yearly reported tonnages received at the Otter Lake RDF.

The noted decline in the amount of organic materials (as well as recyclable containers/packaging and paper) in the mixed waste stream can be attributed to several factors, including:

- Improved separation efforts by generators as a result of sustained educational and enforcement efforts;
- A "generational" attitudinal change associated with a mature diversion program; and
- The impacts of HRM's clear bag program (initiated in 2015), providing an additional incentive for generators to properly segregate their organic materials, as well as recyclables.

It is anticipated that the proposed establishment of HRM's new organics processing facility (to replace existing operations in Burnside and Ragged Lake), will provide a foundation for further education and promotion of the appropriate segregation of compostable materials from the mixed waste stream.

6.0 Proposed Operational Revisions and Associated Management Considerations

6.1 Overview of Proposed Revisions

With reference to **Section 1.0** of this document, and under the headings of "What Will Change" and "What Will Not Change", a description of proposed operational revisions at the Otter Lake Waste Processing and Disposal Facility are summarized as follows:

What Will Change

- Operations at the FEP and WSF will be discontinued. Potential alternate uses for the facilities will be evaluated by HRM and MIRROR; and
- Residential waste collection vehicles will no longer deliver their loads to the FEP tipping floor. They will instead proceed directly, via the existing access road network, to the active tipping (disposal) face at the RDF, similar to other MSW landfills in Nova Scotia (e.g., West Hants Landfill, Guysborough Waste Management Facility and Cumberland Central Landfill).

What Will Not Change

- The respective ownership (HRM), operator (MIRROR) and community oversight (CMC) roles and responsibilities at the Otter Lake facility;
- MIRROR's obligations related to odour control and management of nuisance issues (i.e., litter and dust) as defined in their operating agreement with HRM;
- Hours and days of operation;
- All waste hauling/collection vehicles arriving at the Otter Lake site will be required to report to the scale house for inspection, weighing, data recording and billing;
- Collection vehicles with ICI wastes will be directed to the Transfer Station tipping floor, with materials subsequently being loaded into a trailer for transport to approved disposal facilities outside of HRM;
- Waste placement, compaction and covering requirements will continue to be facilitated using specialized mobile equipment; and
- All applicable regulatory requirements will remain in place, including design, monitoring, reporting and general performance obligations included within the most current NSE Operating Approval.

6.2 Material Delivery

Current Approach

- All waste collection vehicles arriving at Otter Lake, after reporting to the Scale House, proceed to either the FEP tipping floor (residential collection vehicles) or the Transfer Station tipping floor (ICI collection vehicles);

- Materials delivered to the Transfer Station (including items from the Public Drop Off area) are subsequently transported via tractor trailer to approved disposal facilities outside of HRM;
- Residential waste materials on the FEP tipping floor are visually inspected (bulky and hazardous items removed) and are then directed to the FEP process line for sorting and removal of recyclables. An organic component is removed using a trommel system and is directed to the WSF for bio-stabilization. The non-divertable residual component is collected at the end of the sort line and directed to the RDF;
- Select bulky items (e.g., mattresses, furniture) are transferred from the FEP tip floor for disposal;
- Following the completion of the biostabilization process at the WSF, the material is transported via on-site tractor-trailer to the RDF active face (approximately three trips per day); and
- Currently, on average, a total of approximately 18 to 28 waste vehicles deliver materials from the FEP/WSF to the RDF per day.

Potential Issues of Concern

On-Site

- Slight increase in vehicle arrivals (estimated at four to nine per day) at the active tip face and associated issues with traffic control and worker safety; and
- Vehicle arrivals tending to be more concentrated at certain times of day (consistent with residential collection schedules) as compared to current conditions.

Off-Site

- None Identified

Recommended Mitigatory Actions

- Provision of instructions to residential collection contractors regarding site traffic rules and restrictions, including the definition of protocols (e.g., warnings, banning from site) for non-compliance;
- Establish directional signage from the Scale House to the active tipping face; and
- Provision of traffic spotters at the active tipping face, acknowledging peak traffic periods.

Proposed Approach

- Consistent with the Current Approach, but with the following changes:
  - All waste collection vehicles arriving at Otter Lake, after reporting to the Scale House, proceed to either the RDF active tipping face (residential collection vehicles) or the Transfer Station tipping floor (ICI collection vehicles). Based on recent records for residential collection vehicle arrivals at Otter Lake, this will equate to approximately 25 to 30 vehicle trips to the RDF per day.
  - Residential waste materials discharged at the RDF active tipping face are visually inspected for prohibited materials, with these items being segregated for subsequent appropriate management as required.

6.3 Material Placement and Covering

Current Approach

- The working face is kept as small as possible to ensure the maximum compaction, reduce cover material requirements and to limit the amount of exposed waste;
- The maximum working face does not exceed 30 m in width;
- Residual materials are deposited in lifts and compacted by multiple passes of the landfill compactor before additional material is spread in order to achieve the maximum practical density;
- Each lift does not exceed about 2.5 m in height and the working face is inclined to be no steeper than the practical working limits of the spreading and compacting equipment, about 1.5 (horizontal) to 1 (vertical);
- At the end of each working day, the compacted residuals are covered with daily cover. Daily cover is defined as:
  - About 150 mm of soil or Construction and demolition debris mix as approved by NSE.
  - Other natural material required for on-residue travel roadways.
  - Plastic tarping or other sheet material used at the working face which is removed at the commencement of the next day's operations.
  - Other materials as approved by NSE.
- Daily cover will be placed over the compacted material during and at the end of each working day. Depressions and low spots in the surface will be filled and the soil surface graded to encourage positive drainage, thus reducing leachate generation;
- Intermediate cover is required to protect residual material already placed and compacted in areas of the RDF which will remain dormant for a period of six months or more. Intermediate cover consists of providing an additional layer of soil above daily cover to create a thickness of about 300 mm; and
- Prior to commencement of filling, as much intermediate cover as possible, typically 225 mm, will be scraped back and stockpiled for reuse when filling is to resume over the same area.

Potential Issues of Concern

On-Site

- None identified.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Consistent with the Current Approach.

6.4 Nuisance Control Measures

6.4.1 Litter Control

Current Approach

- Inspection of the site will be conducted for evidence of litter when the facility is in operation. Litter will be collected on a daily basis from all areas of the site, particularly from fences, on-site roads, and entrance area; and
- Fixed fences are installed as needed on exterior berms. Portable fences are installed at or near the working face to catch windblown materials. The fencing is cleaned as necessary, typically on a daily basis. Additionally, higher fencing is installed beyond the portable fencing as necessary to catch further wind-blown material.

Potential Issues of Concern

On-Site

- Given the unprocessed nature of the waste (discharged directly from collection vehicles), there is an increased potential for blowing litter at the tip face.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Use of additional portable fencing as well as additional litter collection and removal efforts by site personnel.

Proposed Approach

- Consistent with the Current Approach.

6.4.2 Bird and Vector Control

Current Approach

- The homogenous, processed character of the residual materials delivered to the RDF tip face is of limited attractiveness to birds, rodents and other vectors;
- Acknowledging that seagulls and crows are attracted to open areas without vegetation (e.g., a cultivated field), several bird management measures are conducted in proximity to the active disposal face, including whistler flares, a falconer and culling (consistent with Federal regulations); and
- Regular baiting programs for rodent control are conducted in proximity to the FEP/WSF.

Potential Issues of Concern

On-Site

- The delivery of unprocessed waste directly to the tip face increases the potential to attract birds (due to the increased availability of food as compared to current conditions) and to increase the number of rodents at the tip face area (arriving within collection vehicles).

Off-Site

- None identified.

Recommended Mitigatory Actions

- Enhanced bird and vector control efforts at the general tip face area and at the RDF in general;
- Implementation of a baiting program for rodents in proximity to the RDF tip face; and
- Emphasis on minimizing the size of the active disposal area, thorough waste compaction and placement of daily cover at the completion of each working day.

Proposed Approach

- Consistent with the Current Approach.

6.4.3 Dust Management

Current Approach

- All vehicles delivering waste to the TS/FEP travel on paved roads. Therefore, the accumulation of mud on tires (as potential source for dust) is not considered a concern. Any errant mud that does accumulate is periodically removed using on site equipment;
- The perimeter access road around the RDF and leading to the active tip face is granular. The road circulating the FEP/WSF compound is paved. Minimization of mud build-up on the circular road is accomplished by implementing the following practices:
    - The route from the working face to the public road is long enough to facilitate removal of occasional mud from vehicle tires.
    - Length of travel along the granular access road helps to jar mud loose from vehicle tires and bodies before leaving the facility.
    - Site ditches are maintained to ensure adequate drainage.
    - Access roads are maintained with a good crown on the road to quickly shed rainfall.
    - Additional stone is placed on aggregate surfaced roads as required to maintain separation from underlying soil surfaces.
    - Additional dust suppression measures include the use of water trucks and the annual application of Tembec ®, a biodegradable and non-toxic dust control product.

Potential Issues of Concern

On-Site

- None identified.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Consistent with the Current Approach.

6.5 Landfill Gas and Odour Management

6.5.1 Landfill Gas Management

Current Approach

- Through to the completion of Cell 5, landfill gas generated from within the RDF waste mass was collected using negatively-pressured vertical extraction wells in combination with a piped header system. Wells were typically installed as a cell reached its final design elevation and as a component of the construction of the final composite cap. Gas was then directed to an on-site blower/flare station. The characteristics of the processed waste material from the WSF (with landfill gas being generated more quickly after waste placement than what is typically experienced at a traditional unprocessed waste site) created a need for the use of an interim collection system with the gas being directed to the flare;
- Beginning with Cell 6, horizontal wells began to be utilized in lieu of the interim collection system following a system assessment by Dillon and SCS Engineers;
- For the currently-active portion of the RDF, Cell 7a, the use of horizontal wells (installed as the cell is filled) and vertical wells (once the final design height is reached) is planned; and
- The original blower/flare station continues to be in operation, but a new blower/flare skid unit near Cell 7 (constructed in 2015) offers an alternate location for the combustion of collected landfill gas.

Potential Issues of Concern

On-Site

- None identified.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Placement of unprocessed waste (versus processed material from the WSF) may necessitate some refinements to the current gas system installation protocol. As noted, there is a potential that gas generation and associated odour issues may not manifest themselves as quickly after waste placement as what has historically been experienced at the RDF. Regardless, the primary driver for the timing of installation of landfill gas collection components will continue to be MIRROR's commitment to effective odour management at the site.

6.5.2 Odour Management

Current Approach

- Since the commissioning of the Otter Lake facility in 1999, MIRROR has adopted a "presence/absence" approach to odour monitoring and control requirements at the facility. If a complaint is received, or if MIRROR staff identify an on-site odour issue deemed to have the potential for off-site detectability, MIRROR records the incident and takes immediate action to identify the source and mitigate the issue. At Otter Lake, the threshold for reporting and mitigation is reported (or anticipated) off-site detectability;
- Consistent with the presence/absence protocol, MIRROR conducts daily on-site inspections to assist in early detection of odour issues. On-site inspections will focus on identification of odourous areas, as well as localized surface water ponding and/or surface water drainage problems. It is also noted that MIRROR conducts regular "odour patrols" of the communities that surround the Otter Lake site, with any noted concerns being recorded and brought to the immediate attention of site management personnel;
- MIRROR performs specific off-site odour inspections upon receipt of an off-site odour complaint. Such off-site odour inspections take into account prevailing wind speed and direction, and focus inspections on locations downwind of the RDF and at the location of the complaint. Inspections to investigate the cause of complaints received are conducted as soon as practicable after receipt of the complaint. Where odours related to the RDF are detected during such inspections, MIRROR undertakes appropriate actions to abate off-site odours, including:
    - Application of a low permeability cover (e.g., soil or other cover material that serves to inhibit the release of landfill gas) in a timely manner.
    - Application of immediate soil cover over waste loads that are particularly odorous.
    - Use of waste acceptance and rejection procedures as outlined in the FEP/WSF Operations plan and herein.
    - Modification of waste placement operations as necessary to minimize odour emissions.
    - Operation and maintenance of the LFG collection system, including the following:
        - Regular expansion of the LFG collection system with waste placement.

- Adjust the LFG wellfield on a minimum monthly basis with the following operational goals at individual wellheads:
  - Methane: 40-50 percent
  - Oxygen: <1 percent
  - Static pressure: <0.0 inches-water column (in-w.c.)
  - Temperature: <125°F
- Prompt repair or replacement of LFG collection system components as needed.

Potential Issues of Concern

On-Site

- None identified.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Consistent with the Current Approach.

6.6 Leachate Management

Current Approach

- In an effort to minimize the amount of precipitation entering the landfill waste mass, the working face is kept as small as possible (e.g., <30 m in width) to ensure the maximum compaction, reduce cover material requirements and to limit the amount of exposed waste;
- Liquids originating from within the RDF percolate down through the waste mass and are collected within the leachate collection layer of the landfill cell liner. Perforated and solid wall HDPE pipes direct the leachate to collection sumps at where it is subsequently pumped to a leachate storage tank;
- Leachate from the storage tank is transferred to a tanker truck as required for transport to an approved treatment facility (currently Halifax Water's Mill Cove WWTF). In cases of high flows a temporary holding pond, located near Cell 4, can accept leachate; and
- Regular monitoring of site groundwater and surface water, along with associated reporting to NSE, will continue to allow for validation of the effectiveness of leachate management infrastructure and operations at the site.

Potential Issues of Concern

On-Site

- To determine if there was a potential for changes in leachate quality at the RDF associated with the acceptance of unprocessed municipal solid waste (as compared to residuals from the WSF), leachate data from three "second-generation" (composite-lined) municipal solid waste landfills in Nova Scotia was reviewed with a summary of the data presented in **Table 6-1**. Along with the RDF, leachate analytical data for the following sites was assessed:
  - Colchester Balefill
    - Established in 1995.
    - MSW is baled prior to placement in the landfill.
    - Acceptance of MSW from Colchester County and the Town of Stewiacke.
    - Current incoming waste quantity of approximately 13,000 tonnes per year.
  - Guysborough Landfill
    - Established in 2005.
    - Acceptance of MSW from Region 1 (Cape Breton Region) and 2 (Eastern Region).
    - Current incoming waste quantity of approximately 68,000 tonnes per year.
  - Landfill "A"
    - Request from the Owner that details on this regional MSW landfill not be presented in our report.
    - In operation for over 10 years.
    - Current incoming waste quantity of between 80,000 and 120,000 tonnes per year.

Table 6-1: Landfill Leachate Data Summary

Parameter	Otter Lake RDF		Colchester Balefill		Guysborough Landfill		Landfill "A"	
	Range	Average	Range	Average	Range	Average	Range	Average
pH	6.20-8.61	7.91	6.97-8.50	7.55	7.20-8.72	7.61	6.66-7.56	7.05
TDS	648-8170	4483	1007-6489	3693	1730-6480	3733	1340-25000	4849
Hardness	120-3400	729	52.26-1450	670	577-1060	815	370-3000	936
Chloride	15-1800	938	80-2700	846	147-1440	647	270-13000	1777
Sodium	15-1800	935	94-1340	709	-	-	254-8800	1320
Ammonia	4.20-630	289	0.42-1860	348	1.27-1810	729	34-290	137
Alkalinity	45-4580	2116	286-5200	2587	799-4110	2303	560-2900	1587
Manganese	0.087-10.6	1.8	0.05-11100	2400	4-5970	1099	3.6-14	6.1
Nitrate	0.04-290	26.36	0.05-13.57	3.31	0.05-31.9	4.50	0.058-1.5	0.36
Nitrite	0.01-190	15.72	0.08-1.93	0.98	-	-	0.017-0.15	0.06
BOD	-	-	-	-	20-3370	281	12-150	42
COD	-	-	-	-	86-3230	955	150-2700	605
Zinc	0.056-2.5	0.39	0.008-1.27	0.12	76-328	180.86	0.0079-0.20	0.06

- As noted in **Table 6-1**, significant differences (e.g., in terms of an obligation to collect and treat the effluent) in the character of the leachate amongst the four reviewed facilities were not identified. Where differences are noted for specific parameters, it is believed that they are associated with differences in the periodic acceptance of select residuals and/or specific operational activities at individual sites. The provincially-specified liner system, complete with a dedicated leachate collection system with transfer to the on-site storage tank (and subsequent transport to an off-site treatment facility) will continue to be utilized at Otter Lake. Thus, changes in leachate management requirements at the RDF are not expected should unprocessed waste begin to be landfilled at this location.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Consistent with the Current Approach.

6.7 Stormwater Management

Current Approach

- The stormwater management system serving the RDF and surrounding area includes ditch, swale, pipe and pond infrastructure intended to ensure that the site drains freely and that operations and vehicle movement is not impeded during frequent rainfall events;
- The completed RDF (Cells 1 to 5 and Cell 6 are surrounded by perimeter ditching that collects runoff from the surface of the landfill cells. These perimeter ditches are directed toward one of two retention structures, the North and South Sedimentation Ponds;
- Runoff generated from the covered landfill areas is transported to the ponds both as overland and channelized flow. Runoff from Cells 1 and 2 generally remain as overland flow over the vegetated cover material until entering the perimeter ditches and flowing to the North Sedimentation Pond. Runoff from the top of Cells 3, 4 and 5 and portions of 6 are directed towards a series of geomembrane-lined “chutes” (five in total) located along the western slope of the landfill. Flow entering these chutes is deposited into collection ditches along the western toe of slope and ultimately discharge to the South Sedimentation Pond;
- Both the North and South Sedimentation Ponds direct their final discharge to the Nine Mile River;
- A recirculation system is also used to add a flocculent solution and recirculate treated effluent upstream before discharging to the environment. SternPac is the primary flocculent solution used, however a proprietary additive has been used to enhance the flocculation and suspended sediment removal during winter conditions. The additive is now used year round to enhance the flocculation and settlement of suspended sediments in both the North and South Ponds;

- A vegetated cover (similar to existing) provides adequate erosion protection of the landfill cover material. Temporary erosion protection (erosion protection blankets, etc.) are periodically required during the establishment of vegetation; however, this can be mitigated through the use of sod, or seed along with some form of temporary erosion control measures (erosion control blankets and/or coir coconut husk fibre mats);
- Monthly inspections are undertaken to ensure that pipes and ditches are free of obstructions and that there is no visible damage to the system. The culverts are inspected to ensure that there are no blockages. If the culvert has been crushed, it is be repaired or replaced. The on-site roadside ditches are periodically regraded to prevent standing water and ensure adequate capacity. If sediment has accumulated in pipes or inlets, they are cleaned out in an appropriate manner. After each storm event, the erosion and sedimentation control devices are inspected, and, if found to be damaged, they are repaired or replaced as soon as possible; and
- Regular monitoring of site surface water, along with associated reporting to NSE, will continue to allow for validation of the effectiveness of stormwater management infrastructure and operations at the site.

Potential Issues of Concern

On-Site

- None identified.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Consistent with the Current Approach.

6.8 Monitoring and Reporting

6.8.1 Monitoring

Current Approach

- Monitoring requirements (location, parameters and frequency of collection) for the Otter Lake facility are detailed in its current NSE Operating Approval. As defined by NSE, all sampling and analysis procedures associated with monitoring activities are conducted using standards and methods approved by the regulator. With a focus on the RDF, monitoring and data collection at the Otter Lake facility includes the following:
  - Incoming waste data - customer, quantity, waste type.

- Surface Water - collection of samples and laboratory analysis for targeted parameters, including total suspended solid (TSS) and pH.
- Leachate quantity and quantity.
- Leachate head depth on the cell liner - maximum 300 mm.
- Groundwater - hydraulic head level and collection of samples and laboratory analysis for targeted parameters, including general inorganic chemistry and trace metals.

- Odour monitoring efforts are described in **Section 6.5.2**.

Potential Issues of Concern

On-Site

- None identified.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Consistent with the Current Approach.

6.8.2 Reporting

Current Approach

- Reporting requirements (document content and submission frequency) for the Otter Lake facility are detailed in its current NSE Operating Approval;
- An operations report and an environmental monitoring report for the Otter Lake facility is prepared annually and submitted to NSE annually. The report covers the 12-month period preceding each anniversary of the site opening. The annual report includes the following:
  - Any changes to the approved facility design, the reasons for, and NSE approval of such changes.
  - A summary of the volume and weight of all wastes handled at the site.
  - A summary of any waste rejection notices issued and the reasons for issuance.
  - A periodic review of contingency plans and measures.
  - A summary of complaints received during the past year.
  - A description of significant environmental and operational issues encountered during the past year, and any mitigative actions taken.
  - A statement as to the compliance with all conditions of the operating permits.
- The environmental monitoring report (prepared by a qualified, specialist firm) includes the results of an interpretive analysis of all monitoring data collected and will include any deviations from the proposed monitoring program and reasons for such deviations.

Potential Issues of Concern

On-Site

- None identified.

Off-Site

- None identified.

Recommended Mitigatory Actions

- Not applicable.

Proposed Approach

- Consistent with the Current Approach.

7.0 Risk Assessment Matrix

As described in **Section 6.0**, the proposed operational changes at the Otter Lake facility do, in some instances, present the potential for on-site effects requiring management. When potential effects have been identified (e.g., blowing litter, attraction of birds), recommended mitigatory actions, based on design and operational best practice, have been identified. Nevertheless, it is acknowledged that the delivery of unprocessed MSW directly to the RDF does present a degree of risk with regard to objectionable on-site outcomes. It is noted that the review conducted in **Section 6.0** did not identify potential off-site (e.g., beyond facility property boundaries) issues of concern.

Risk is commonly defined as the combination of the *likelihood* of the occurrence of harm and the *severity* of that harm. An assessment of risk can be completed through the use of a risk matrix, similar to the one presented in **Table 7-1**.

Table 7-1: Risk Assessment Matrix

	Severity of Impact				
Likelihood	Incidental (1)	Minor (2)	Serious (3)	Major (4)	Catastrophic (5)
Frequent (5)	medium	high	very high	very high	very high
Occasional (4)	medium	medium	High	very high	very high
Seldom (3)	Low	medium	high	High	very high
Remote (2)	Low	low	medium	High	high
Unlikely (1)	Low	low	medium	Medium	high

With reference to the headings and supporting text presented in **Section 6.0** and using the severity and likelihood numerical scores presented in **Table 7-1**, **Tables 7-2** and **7-3** present an on-site and off-site issues risk assessment of the proposed operational changes (incorporating consideration of the proposed mitigatory actions, where applicable) at the Otter Lake facility.

With reference to **Table 7-2**, it is noted that potential on-site issues associated with material delivery, litter control and bird/vector control present relatively modest risk "significance" scores and are readily mitigated through the implementation of established best-practice operational procedures. As illustrated in **Table 7-3**, no off-site risk issues were identified as associated with the proposed closure of the FEP/WSF.

Table 7-2: On-Site Issues Risk Assessment – Proposed FEP/WSF Changes

Operational Activity	Potential Impact/ Issue of Concern	Severity (A)	Likelihood (B)	Significance* (A)x(B)	Severity of Impact	Mitigation
6.2 Material Delivery	- Traffic control and worker safety	4	1	4	medium	• Provision of instructions to residential collection contractors regarding site traffic rules and restrictions, including the definition of protocols (e.g., warnings, banning from site) for non-compliance. • Establish directional signage from the Scale House to the active tipping face. • Provision of traffic spotters at the active tipping face, acknowledging peak traffic periods.
6.3 Material Placement and Covering	None identified	-	-	-	-	-
6.4.1 Litter Control	- Increased potential for blowing litter at the tip face	1	4	4	medium	• Use of additional portable fencing as well as additional litter collection and removal efforts by site personnel.
6.4.2 Bird and Vector Control	- Enhanced attraction of birds	2	4	8	medium	• Enhanced bird and vector control efforts at the general tip face area and at the RDF in general. • Emphasis on minimizing the size of the active disposal area, thorough waste compaction and placement of daily cover at the completion of each working day.
	- Delivery of rodents in waste loads to tip face	1	3	3	low	• Implementation of a baiting program for rodents in proximity to the RDF tip face.
6.4.3 Dust Management	None identified	-	-	-	-	-

Operational Activity	Potential Impact/ Issue of Concern	Severity (A)	Likelihood (B)	Significance* (A)x(B)	Severity of Impact	Mitigation
6.5.1 Landfill Gas Management	None identified	-	-	-	-	-
6.5.2 Odour Management	None identified	-	-	-	-	-
6.6 Leachate Management	None identified	-	-	-	-	-
6.7 Stormwater Management	None identified	-	-	-	-	-
6.8.1 Monitoring	None identified	-	-	-	-	-
6.8.2 Reporting	None identified	-	-	-	-	-

*: highest potential Significance score = 25.

Table 7-3: Off-Site Issues Risk Assessment – Proposed FEP/WSF Changes

Operational Activity	Potential Impact/ Issue of Concern	Severity (A)	Likelihood (B)	Significance* (A)x(B)	Severity of Impact	Mitigation
6.2 Material Delivery	None identified	-	-	-	-	-
6.3 Material Placement and Covering	None identified	-	-	-	-	-
6.4.1 Litter Control	None identified	-	-	-	-	-
6.4.2 Bird and Vector Control	None identified	-	-	-	-	-
6.4.3 Dust Management	None identified	-	-	-	-	-
6.5.1 Landfill Gas Management	None identified	-	-	-	-	-

Operational Activity	Potential Impact/ Issue of Concern	Severity (A)	Likelihood (B)	Significance* (A)x(B)	Severity of Impact	Mitigation
6.5.2 Odour Management	None identified	-	-	-	-	-
6.6 Leachate Management	None identified	-	-	-	-	-
6.7 Stormwater Management	None identified	-	-	-	-	-
6.8.1 Monitoring	None identified	-	-	-	-	-
6.8.2 Reporting	None identified	-	-	-	-	-

*: highest potential Significance score = 25.

8.0 Summary of Proposed Revisions

Based on the results of this analysis, there does not appear to be any significant benefit to the continued operations of the FEP/WSF. Further, there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated.

To acknowledge the significant reduction in incoming waste tonnages at the Otter Lake Waste Processing and Disposal Facility since 2015, and thus the efficacy of the FEP/WSF, the following operational revisions are proposed:

- Operations at the FEP and WSF should be discontinued. Potential alternate uses for the facilities will be evaluated by HRM and MIRROR; and
- Residential waste collection vehicles will no longer deliver their loads to the FEP tipping floor. They will instead proceed directly, via the existing access road network, to the active tipping (disposal) face at the RDF, similar to other MSW landfills in Nova Scotia (e.g., West Hants Landfill, Guysborough Waste Management Facility and Cumberland Central Landfill).

To address potential on-site issues associated with the proposed operational revisions, the following measures are recommended.

<u>Increase in RDF Vehicle Traffic</u>

- Provision of instructions to residential collection contractors regarding site traffic rules and restrictions, including the definition of protocols (e.g., warnings, banning from site) for non-compliance;
- Establish directional signage from the Scale House to the active tipping face; and
- Provision of traffic spotters at the active tipping face, acknowledging peak traffic periods.

<u>Increased Potential for Blowing Litter</u>

- Use of additional portable fencing as well as additional litter collection and removal efforts by site personnel.

<u>Increased Attractiveness of the Disposal Area to Birds</u>

- Enhanced bird and vector control efforts at the general tip face area and at the RDF in general; and
- Emphasis on minimizing the size of the active disposal area, thorough waste compaction and placement of daily cover at the completion of each working day.

<u>Rodents Arriving at the RDF Tip Face in Collection Vehicles</u>

- Implementation of a baiting program for rodents in proximity to the RDF tip face.

ATTACHMENT “D”

CMC’s Correspondence March 7, 2021; and HRM’s response from April 8, 2021

Otter Lake Community Monitoring

The Community Monitoring Committee's case against the removal of the FEP/WSF from the Otter Lake Landfill facility.

- **HRM staff have conducted a nine-year campaign to eliminate the Front End Processor (FEP) and Waste Stabilization Facility (WSF).**
- **The CMC will consult the Province which has steadfastly rejected past efforts to remove FEP/WSF.**

It appears once again that in its ongoing campaign to sideline or remove the front end processor and waste stabilization facility from the Otter Lake landfill, HRM staff continues to put monetary considerations ahead of the public good.

The Nova Scotia government enacted a landfill ban for all organic waste, beverage containers, and select plastics and much more in 1998. The commitments to the surrounding communities during the site selection for the Otter lake Landfill were based on these Solid Waste-Resource Management Regulations.

HRM council committed to the communities of Timberlea, Goodwood, Beechville, Lakeside, Lake of the Woods and Prospect adjacent to the Otter Lake facility a distinct urban landfill with the FEP/WSF stabilizing organics before being landfilled. This contractual commitment made in 1999 assured that only inert, residual waste or stabilized organics would be stored within the landfill.

In the past 20 years significant residential development has occurred adjacent to the Otter Lake landfill. This development, which includes some commercial ventures, occurred based on HRM's guarantees for the ongoing controls to limit organics, vectors and litter at the site.

In its previous attempts to remove this equipment the public has been overwhelmingly against such a move. This has not deterred HRM staff.

In 2019, after yet another attempt to remove FEP/WSF by landfill operator MIRROR, with HRM's consent, Scott Guthrie, Chair of CMC and HWRS board of directors, reminded Mayor Savage that in 2007 the Halifax Waste Resource Society "stood alongside HRM before the NS Supreme Court of Appeal. The HWRS won its case benefitting the citizens of Halifax.

"If we can possibly help it, let's not ever meet in Court as adversaries which does not benefit our citizens."

Many of the recent arguments for removal of this equipment by HRM staff are based on the present reduced volumes of garbage at the landfill at about 40,000 tons per year of residential waste. But HRM, which voted in late 2014 to allow the export of industrial and institutional (ICI) garbage outside the municipality, has the authority, at any time, to take back to Otter Lake the 100,000 tons per year of industrial and institutional waste.

In a report to CMC in 2018, HMJ Consulting Ltd., concluded:

- The Otter Lake operation can be made financially sustainable by stopping the export of ICI waste and ICI tipping fees to restore tonnage to Otter Lake at the original mutually agreeable tonnage.
- Allowing HRM's proposal to remove FEP and WSF would undermine public confidence in provincial regulations and HRM's commitments made to adjacent communities.
- HRM should begin to deal with the ICI-residential component effectively and enforce bans, to reduce organics going to landfills.
- The legal and social contract that HRM entered into with host communities must be upheld.

The report notes that should export of ICI waste continue then the lifespan of Otter Lake at 42,000 Tonnes/year of residential waste would be 60 years, assuming the continued operation of the FEP and WSF.

Assessing the risk to public health and the environment, the HMJ consultants found potential risk of noxious liquids, gases and solids from the facility.

"Closure of the FEP and WSF will increase risks to public health and the environment in any scenario of throughput rates, as they act to reduce undesirable effects compared to not having them, notwithstanding their level of significance."

In its latest closure review to the city in 2020, Dillon consulting concedes that with the discontinuation of the FEP and WSF, residential waste collection vehicles would proceed directly along existing access roads to the tipping face with the following results:

- **Increased vehicular traffic**
- **Increased blowing litter**
- **Increased bird numbers at the site and more rodents**

Area residents will no doubt experience the results of a landfill site where human error and inattention can create problems such as has been seen in other parts of Nova Scotia and Canada.

We now have an operation that is the envy not only of many parts of our country, but also internationally as witnessed by the many delegations that have come to see how efficiently the Otter lake facility has operated. By removing this equipment there is no doubt that efficiency will be reduced and problems will ensue so eventually it will become just another problem-plagued dump.

The Otter Lake Landfill was sited based on a commitment for a unique landfill built and continuously operated at the highest level of modern controls. This included construction of the composite liner and the implementation of the FEP/WSF processes.

This is an urban landfill and as such needs greater environmental restrictions than rural landfills, mainly because of population density.

The Dillon study, based on only the current residential waste, is convinced that based on its analysis "there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated." The public may well ask why take the chance.

Consultants often conclude that no harm will come if only we take their advice and remove certain equipment. In this case the communities were assured the FEP/WSF would be part of a safe and efficient landfill operation. Even Dillon acknowledges that there have only been six public complaints over the last 25 years. That's an enviable record and another example of how scrupulously this facility has been run.

In its presentation to CMC in January, 2021, HRM staff claims that continuing to operate a facility which provides no community benefit comes at the expense of programs such as funding parks, arenas, transit and other good things. Closing the FEP/WSF can be accomplished so that there is no impact to the local community "while benefiting HRM taxpayers and supporting the municipality in delivery of other programs that benefit our citizens."

The fact is that this equipment was installed with the approval of the public at the time it was built. It has served the communities well and despite arguments that times and circumstances have changed it must remain intact to safeguard the integrity of this facility. To remove it would be taking a gamble that the overwhelming majority of those polled in 2013 rejected at a cost to HRM of $450,000 in consulting fees.

"We have no guarantee that Chester or other jurisdictions will continue to take diversions of ICI waste from HRM," says CMC director Maureen Yeadon. "If the volumes currently exported were reintroduced to our landfill without the protection of FEP/WSF, I believe our communities would rightfully be concerned about negative impacts..."

Otter Lake plays an integral part in HRM's Integrated Waste/Resource Management Strategy (IWRMS) which is based on maximizing the 3Rs (reduce, reuse, and recycle). The IWRMS stated that the material had to meet several important conditions before it could be deemed acceptable for disposal at the Otter Lake Landfill facility. The material cannot include recyclable material, hazardous waste and organic material that has not been stabilized. The current way for Otter Lake to meet these objectives is to perform three distinct functions in three facility units: material sorting in the FEP, organic material stabilizing in the WSF and residual material disposal in the RDF.

Should this latest attempt to remove or change the current operational requirements end up in court this step may not be necessary because it appears the final arbiter, the parties in the Nova Scotia legislature, are prepared to oppose any attempt to alter the commitments made to the public in a resolution passed by the legislature in 2013.

[redacted]

Scott Guthrie, Chair, CMC Date

Appendix: CMC Environment Report on the proposed removal of FEP/WSF (Attachment)

CMC Response to Dillon report – Environmental Section

The Nova Scotia Government enacted a landfill ban for all organic waste, beverage containers, select plastics and much more in 1998. The commitments to the surrounding community during the site selection for the Otter Lake Landfill were based on these Solid Waste-Resource Management Regulations**.**

HRM promised the community adjacent to the Otter Lake Facility a distinct landfill with the Front End Processing (FEP) and Waste Stabilization Facility (WSF) stabilizing organics before being landfilled. This commitment was required both for compliance to the Nova Scotia Solid Waste Resource Management regulations as well as to accommodate a landfill in an urban setting.

The contractual commitment between HRM and Halifax Waste/Resource Society assured that only inert, residual waste or stabilized organics would be stored within the landfill. It states that only Acceptable Waste will be authorized for disposal in the RDF, and that Acceptable Waste does not include any elements which are readily putrescible. The main purpose of the FEP is to sort out organics and send them to the WSF for stabilization before they get landfilled as an inert dry fluff.

<u>Reduction of Community Nuisance of Vectors, Rodents and Litter</u>

The stabilization of the organics is imperative to reduces smells and adequately remove concerns about vectors, such as insects, rats, and birds. There have only been 6 complaints about the landfill since 2012. If the FEP/WSF are removed, more birds and rodents are likely to be attracted to the smell and availability of food sources. As well it is likely that the odour levels will increase and initiate more complaints. Dillon Consulting outlined the benefits of the FEP/WSF in their 2013 report for Mirror NS:

> *"Another benefit of the FEP/WSF system absent from the Stantec analysis is the significant reduction in nuisance impacts at the disposal cell. The content of the CSC's original Integrated Waste/Resource Management Strategy was directly influenced by the legacy of the Highway 101 Landfill. As stated in the Executive Summary of that document; "The Highway 101 Landfill in Upper Sackville has damaged the local community and environment…We can no longer afford to make the same mistakes." The CSC's requirement for the FEP and WSF was founded on an objective to reduce the traditional impacts associated with raw waste landfills, including blowing litter and the attraction of birds. After over 14 years of operation, the processed material that arrives at the RDF has proven to be of limited interest to seagulls and crows. Ongoing litter management is required in active portions of the RDF, but at a reduced level of intensity as compared to a raw waste landfill. The orderly scene at the tipping face of the RDF stands in dramatic comparison to the clouds of gulls, paper and plastic bags that were typically encountered at Sackville's Highway 101 site and from other landfills where raw unprocessed organic material is disposed."*[1]

While this 2013 report was based on higher annual volumes of waste disposal including ICI at Otter Lake, the benefit remains the same based on percentages by weight of composition of organics and paper in the Residential waste. The identification of three areas of focus in the current Dillon Report for revisions

[1] Waste Resource Strategy Update Document Review Report, May 2013 – Mirror NS, Prepared by Dillon Consulting

to the operational requirements are evident of the risk that blowing litter, vectors and rodents nuisances will increase without the FEP / WSF remaining in operation.

Significant residential development has occurred adjacent to the Otter Lake Landfill area during the past 20 years, including Brunello Estates and others. This development occurred based on the commitments to the ongoing controls to limit organics, vectors, and litter at the site. The modification to these operating conditions may have a significant impact on these adjacent residential developments.

Potential Inclusion of Recyclable Plastics in the Landfill

Discussions between Halifax Solid Waste staff and the CMC commenced in the Fall of 2020 for the temporary storage of recyclable plastics at the Otter Lake Landfill due to lack of market to divert these materials. The discussion included the possibility of landfilling recyclable plastics at the RDF in the near future in the event that lack of market continued.

The CMC believes that a discussion of the closure of the FEP / WSF cannot be contemplated in isolation without the consideration of the potential addition of recyclable plastics at the RDF. In addition to recyclables that are currently removed at the FEP, other plastics would be delivered to the RDF from the Halifax Materials Recycling Centre (MRC) facility.

HRM provided details of the Dillon Consulting Report dated January 28th, 2021 addressing the CMC's concerns regarding the effects of the temporary recyclable plastic storage at the landfill. The results show no groundwater impacts from initial few months of temporary plastic storage. This report provides a baseline in the event that the storage area remains in place longer than anticipated.

The CMC requested the details of alternate solutions HRM had pursued for the disposal of film and mixed plastics prior to determining landfilling as the sole solution. Alternate solutions they should have explored may include, but are not limited to, recycling (i.e., Goodwood Plastics, international markets), incineration, or repurposing (i.e., Sustane). HRM provided in their most recent 2021 report Opinion on Plastic Waste Storage that they are currently searching for end markets for the bales of plastic waste that are currently being stored at the landfill, no further information was provided about other alternate solutions or an end date of the storage.

Recycling these plastics would not only reduce GHG emissions but it would reduce the need to extract new resources from the earth, which greatly reduces the energy required to process and manufacture new goods.

The CMC are concerned about the long-term environmental impacts of the plastic storage at the landfill. Dillon Consulting tested water from three surrounding monitoring wells for BTEX, VOCs, semi-VOCs, petroleum hydrocarbons and phthalates, the results they provided were the current levels after only a few months of having the plastic stored at the landfill. The run-off from the bales have yet to be tested.

Storage of plastics within a landfill, even if temporary, can cause the release of carcinogenic chemicals and microplastics due to degradation from heat and sun and ongoing exposure to wet weather events. Current research continues to provide evidence of the extent of how harmful Microplastics are to the environment. The downward drainage from soils creates the potential for microplastics and harmful chemical additives to leach into the groundwater aquifers. These microplastics are very likely to be

retained in soils for long periods of time due to factors such as vertical transport that draw the particles away from the surface, hindering degradation. If microplastics reach the groundwater aquifers, there is the potential that they will eventually end up in the ocean and cause harm to many different marine ecosystems.

The 2021 Dillon report indicated that microplastics are found in significant quantities sourced from everyday life. However, CMC continues to be committed to the diversion of recyclable plastic from the Otter Lake Landfill to not contribute to the quantities of microplastics in the environment.

Leachate Levels

The 2020 Dillon report indicated that leachate levels from the Otter Lake Landfill are currently similar to other landfills in the province. It is important to note that even the best available technology and diligent operations of a landfill do not entirely eliminate the possibility of harmful emissions and leachate escaping the landfill. It is appropriate and important to ask what the accumulated long-term effect to the leachate will be from adding readily putrescible waste as well as film and mixed plastic to the landfill.

The Otter Lake Landfill was sited based on a commitment for a unique landfill built and continuously operated at the highest level of modern level controls. This included construction of the composite liner and the implementation of the FEP / WSF processes.

Regular monitoring of the groundwater is necessary if plastics are to be stored within the landfill, as stated previously, there will be many negative effects to the environment if microplastics or carcinogenic chemicals reach the groundwater.

Greenhouse Gas Emissions

Putrescible waste breaks down anaerobically in a landfill producing methane, which has approximately 25 times greater heat trapping capabilities than carbon dioxide, meaning that it is much more detrimental to the Earth's atmosphere. Organics that end up in the landfill will take significantly longer to break down than if processed through the FEP/WSF.

To date, HRM, Mirror NS and Dillon have not provided any supporting data that shutting down the FEP/WSF would reduce Green House Gas (GHG) emissions either through reduced consumption of electricity generated with significant GHG emissions or the reduction of trucking from the WSF to the RDF. The only reference to date has been an economic savings on the cost of the electricity to run the FEP/WSF. The CMC is concerned about the increase in GHG emissions that would occur from unprocessed organics placed in the landfill.

Preservation of FEP / WSF equipment

Discussion with Mirror NS and HRM indicated that instead of dismantling the FEP / WSF equipment, it would instead be "mothballed" to ensure it is available if the volumes of waste increase with the return of ICI waste. There was no discussion of the details of this activity within the Dillon report.

Conclusion

Otter Lake Landfill plays an integral role in HRM's Integrated Waste/Resource Management Strategy (IWRMS), which is based on maximizing the 3Rs (reduce, reuse, recycle). The IWRMS stated that material had to meet several important conditions before it could be deemed acceptable for disposal at the Otter Lake Landfill Facility. The material cannot include recyclable material, hazardous waste and organic material that has not been stabilized. The only current way for Otter Lake Landfill to meet these objectives is to perform three distinct functions in three facility units: material sorting in the FEP, organic material stabilizing in the WSF and residual material disposal in the RDF.

The decision to begin storing putrescible waste within the landfill should not be rushed. As well, the subsequent consideration to begin landfilling recyclable plastics or continuing the temporary storage must also be considered from all angles. When the health of the environment and surrounding community have the potential to be at risk, no matter how small the possibility is, the decision should not be taken lightly.

The province has previously declined HRM's proposition to remove these facilities. In 2014, the Provincial Environmental Minister Sterling Belliveau wrote that the HRM will not be allowed to close the FEP/WSF and is supported in this by leaders of the opposition parties. A motion that the FEP/WSF must remain was unanimously passed in the Nova Scotia Legislature that same year. HRM must obtain authorization from the Department of Environment before it can implement changes.

April 8, 2021

Scott Guthrie
Chair
Community Monitoring Committee
P.O. Box 213
Lakeside, NS B3T 1M6
[redacted]

Dear Scott,

Thank you for facilitating the consultation session between Halifax Regional Municipality (HRM), Mirror Nova Scotia, and the Community Monitoring Committee (CMC) on January 21, 2021. Additionally, thank you for your comments submitted on March 7, 2021.

HRM's staff review of the future status of the Front End Processor (FEP) and Waste Stabilization Facility (WSF) has taken into account environmental, social, and economic considerations. HRM remains fully committed to environmental protection. To that end, HRM staff believe that the Otter Lake Waste Processing and Disposal Facility (Otter Lake) can be operated in an environmentally sound manner, fully compliant with provincial regulations, with the FEP/WSF deactivated and placed in standby mode. This includes no impacts to the local community. Additionally, this measure will help reduce long-term costs to operate Otter Lake.

One of the key aspects of HRM's proposed plan is to deactivate the FEP/WSF and place in standby mode as a contingency measure. This means that the facility will be maintained and can be put back into operations as needed. Additional information on how the facility will be maintained in standby mode is included as Attachment 1.

In the future, if further changes are proposed to the status of the FEP/WSF, or if Institutional, Commercial, and Industrial (ICI) waste is proposed to be landfilled at Otter Lake, the CMC will be consulted and have the opportunity to present its position directly to Regional Council.

The following sections provides HRM's responses to the comments presented by the CMC in the documents submitted on March 7, 2021.

Document 1 – The Community Monitoring Committee's case against the removal of the F

EP/WSF from the Otter Lake Landfill facility.

CMC Comment 1:

It appears once again that in its ongoing campaign to sideline or remove the front end processor and waste stabilization facility from the Otter Lake landfill, HRM staff continues to put monetary considerations ahead of the public good.

HRM Response 1:

As acknowledged by HRM staff at CMC meetings on both November 19, 2020 and January 21, 2021 the challenge around the future status of the FEP and WSF is complex and requires consideration of environmental, social, and economic considerations. HRM staff are responding to a motion from Regional Council on Dec 9, 2014 that stated:

"Direct staff to take the necessary steps to maintain the current operating model, including front-end processor facility, waste stabilization facility and residual disposal facility other than as directed by Regional Council as a consequence of decisions arising out of the ISWMS Review – Final Report dated January 8, 2014 at the Otter Lake Landfill site. Further, to assess the effects of the system changes currently being implemented, returning to Regional Council, with input from the Community Monitoring Committee, no earlier than March 2019 with a report and recommendation respecting the effectiveness of the front-end processor facility and waste stabilization facilities based on system and other changes since conception including diversion outcomes resulting from the changes currently being implemented."

At the CMC meeting on January 21, 2021, Dillon Consulting (Dillon) presented a review of the FEP/WSF and proposed putting the FEP/WSF into standby mode. Dillon's presented the following conclusion:

> **Based on the results of this analysis, there does not appear to be any significant benefit to the continued operations of the FEP/WSF. Further, there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated.**

CMC Comment 2:

Many of the recent arguments for removal of this equipment by HRM staff are based on the present reduced volumes of garbage at the landfill at about 40,000 tons per year of residential waste. But HRM, which voted in late 2014 to allow the export of industrial and institutional (ICI)

garbage outside the municipality, has the authority, at any time, to take back to Otter Lake the 100,000 tons per year of industrial and institutional waste.

HRM Response 2:

It is acknowledged that currently only residential waste is generally being landfilled at Otter Lake and that the composition of putrescible organics in residential waste is less than ICI waste as presented by Dillon to the CMC on January 21, 2021. Dillon noted that there has been a 78% reduction in putrescible organics delivered, processed, and landfilled at Otter Lake since 2014. The reduction in putrescible organics forms the basis for the reason why stabilization of organics via the WSF is no longer needed as form of community protection.

It is not anticipated for the foreseeable future that ICI waste will be disposed of at Otter Lake as result of the high disposal cost as compared to other provincial landfills. Additionally, the FEP/WSF will be deactivated and placed in standby mode and could be used in the future if needed. Should conditions change and ICI waste be proposed to be landfilled at Otter Lake, the CMC will be consulted and have the opportunity to present its position directly to Regional Council.

CMC Comment 3:

The report [HMJ] notes that should export of ICI waste continue then the lifespan of Otter Lake at 42,000 Tonnes/year of residential waste would be 60 years, assuming the continued operation of the FEP and WSF.

HRM Response 3:

HRM staff's current estimates for site life at Otter Lake is as follows:

- If only residential waste is landfilled, it is estimated that Otter Lake will reach capacity in the order of 25 years.
- If residential waste and ICI waste are landfilled, it is estimated that Otter Lake will reach capacity in the order of 10 years.

Several key assumptions include:

- Starting residential tonnage in 2021, is in the order of 45,000 tonnes per year and increases by 1% per year to account for growth.
- Starting ICI tonnage in 2021, is in the order of 90,000 tonnes per year and increases by 1% per year to account for growth.
- Landfill daily cover/aggregate consumes approximately 25% of the landfill working volume; with waste consuming approximately 75% of the working volume.

CMC Comment 4:

In its latest closure review to the city in 2020, Dillon consulting concedes that with the discontinuation of the FEP and WSF, residential waste collection vehicles would proceed-directly along existing access roads to the tipping face with the following results:

- *Increased vehicular traffic*
- *Increased blowing litter*
- *Increased bird numbers at the site and more rodents*

HRM Response 4:

For clarify Dillon did not identify any off-site issues related to deactivating the FEP/WSF as part of the FEP/WSF Closure Review report (November 2020).

Dillon did identify some potential on-site impacts that were quantified as low to medium risk and included:

- Health and safety consideration related to truck delivery to the landfill tip face (medium risk).
- Increased potential for blowing litter at the landfill tip face (medium risk)
- Attraction of birds (medium risk)
- Delivery of rodents in waste loads to the landfill tip face (low risk).

As noted in the Dillon report such risks can be effectively mitigated:

> **"it is noted that potential on-site issues with material delivery, litter control and bird/vector control present relatively modest risk 'significance' scores and are readily mitigated through the implementation of established best practice and operational procedures."**

Document 2 – CMC Response to Dillon report – Environmental Section

CMC Comment 1:

HRM promised the community adjacent to the Otter Lake Facility a distinct landfill with the Front End Processing (FEP) and Waste Stabilization Facility (WSF) stabilizing organics before being landfilled. This commitment was required both for compliance to the Nova Scotia Solid Waste Resource Management regulations as well as to accommodate a landfill in an urban setting.

HRM Response 1:

As per Dillon's FEP/WSF Closure Review report (November 2020) ('Dillon Report'), it is noted that there has been a 78% reduction in putrescible organics delivered, processed, and landfilled at Otter Lake since 2014 and a 87% reduction since 2004. The reduction in putrescible organics forms the basis for the reason why stabilization of organics via the WSF is no longer needed as form of community protection.

The operation of an FEP/WSF is not a requirement in any provincial legislation including the Solid Waste-Resource Management Regulations and no other landfill in the Province operates an FEP/WSF. Dillon did not identify any off-site issues related to deactivating the FEP/WSF and noted:

> **"Based on the results of this analysis, there does not appear to be any significant benefit to the continued operations of the FEP/WSF. Further, there does not appear to be any increased risk to public health and the environment if the FEP/WSF operations are terminated. Therefore, it is recommended that operations at the FEP and WSF be discontinued."**

When Otter Lake was developed in the late 1990s, the municipality did not have a green cart program for the diversion of organics from landfill disposal. Today, HRM has a successful green cart program and is national leader with respect to landfill diversion. HRM's commitment to the green cart program and diverting organics from landfill disposal is evidenced by the recent decision by Regional Council on December 8, 2020 to invest over $450 million into a new composting facility and operation for the next 25 years.

Additionally, the 1995 Integrated Waste/Resources Management Strategy and 1996 update contemplated refinement at Otter Lake based on the success of HRM's diversion programs. In particular, the Strategy contemplates scaling down the Front End Processor/Waste Stabilization Facility (FEP/WSF) as diversion improves.

The 1995 Strategy document indicates:

> ***"Beginning with the approved opening of new residuals disposal facilities, these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up."***

CMC 2 Comment:

The stabilization of the organics is imperative to reduces smells and adequately remove concerns about vectors, such as insects, rats, and birds. There have only been 6 complaints about the

landfill since 2012. If the FEP/WSF are removed, more birds and rodents are likely to be attracted to the smell and availability of food sources. As well it is likely that the odour levels will increase and initiate more complaints. Dillon Consulting outlined the benefits of the FEP/WSF in their 2013 report for Mirror NS:

> *"Another benefit of the FEP/WSF system absent from the Stantec analysis is the significant reduction in nuisance impacts at the disposal cell. The content of the CSC's original Integrated Waste/Resource Management Strategy was directly influenced by the legacy of the Highway 101 Landfill. As stated in the Executive Summary of that document; "The Highway 101 Landfill in Upper Sackville has damaged the local community and environment…We can no longer afford to make the same mistakes." The CSC's requirement for the FEP and WSF was founded on an objective to reduce the traditional impacts associated with raw waste landfills, including blowing litter and the attraction of birds. After over 14 years of operation, the processed material that arrives at the RDF has proven to be of limited interest to seagulls and crows. Ongoing litter management is required in active portions of the RDF, but at a reduced level of intensity as compared to a raw waste landfill. The orderly scene at the tipping face of the RDF stands in dramatic comparison to the clouds of gulls, paper and plastic bags that were typically encountered at Sackville's Highway 101 site and from other landfills where raw unprocessed organic material is disposed."*

While this 2013 report was based on higher annual volumes of waste disposal including ICI at Otter Lake, the benefit remains the same based on percentages by weight of composition of organics and paper in the Residential waste. The identification of three areas of focus in the current Dillon Report for revisions to the operational requirements are evident of the risk that blowing litter, vectors and rodents nuisances will increase without the FEP / WSF remaining in operation.

HRM Response 2:

As noted previously, the Dillon Report did not identify any off-site issues related to deactivating the FEP/WSF. Dillon did not identify any potential issues of concern for on-site or off-site impact related to the landfill gas collection system or with respect to odour management.

Dillon did note that the potential for odour issues associated with the Residual Disposal Facility (RDF) may be exacerbated by operating the FEP/WSF. The reason is that the WSF stabilization process 'kicks starts' the microbiological treatment process that continues once the material is landfilled. Once the 'stabilized' material is landfilled, the production of landfill gas (including

odorous H_2S) is quicker at Otter Lake than a traditional landfill.

Regardless, mitigative measures with respect to odours will continue regardless of whether the FEP/WSF is operated, including:

- Maintaining the landfill active face as small as possible
- Applying daily landfill cover to freshly placed waste
- Maintaining a landfill gas collection and treatment system
- Proactive monitoring for site odours

Dillon did identify some potential on-site impacts, as result of deactivating the FEP/WSF, that were quantified as low to medium risk and that all identified potential on-site impacts could be mitigated through the implementation of established best practices and operational procedures as follows:

- Potential Impact: Health and safety consideration related to truck delivery to the landfill tip face (medium risk).
    - Mitigative measures include developing site protocols with respect to traffic rules, establishing new signage, and provision of traffic spotters at the active face during peak periods.

- Potential Impact: Increased potential for blowing litter at the landfill tip face (medium risk).
    - Mitigative measures include additional litter fencing and litter collection efforts.

- Potential Impact: Attraction of birds (medium risk).
    - Mitigative measures include enhanced bird and vector control measures (e.g., use of whistler flares and falconer services) and minimizing the active disposal area as well as placement of daily cover to freshly placed waste.

- Potential Impact: Delivery of rodents in waste loads to the landfill tip face (low risk).
    - Mitigative measures include implementation of baiting program for rodents in proximity to landfill tip face.

CMC Comment 3:

The CMC are concerned about the long-term environmental impacts of the plastic storage at the landfill. Dillon Consulting tested water from three surrounding monitoring wells for BTEX, VOCs, semi-VOCs, petroleum hydrocarbons and phthalates, the results they provided were the current levels after only a few months of having the plastic stored at the landfill. The run-off from the bales have yet to be tested.

Storage of plastics within a landfill, even if temporary, can cause the release of carcinogenic chemicals and microplastics due to degradation from heat and sun and ongoing exposure to wet weather events. Current research continues to provide evidence of the extent of how harmful Microplastics are to the environment. The downward drainage from soils creates the potential for

microplastics and harmful chemical additives to leach into the groundwater aquifers. These microplastics are very likely to be retained in soils for long periods of time due to factors such as vertical transport that draw the particles away from the surface, hindering degradation. If microplastics reach the groundwater aquifers, there is the potential that they will eventually end up in the ocean and cause harm to many different marine ecosystems.

HRM Response 3:

HRM has temporarily stored approximately 1,170 tonnes of bales mixed plastic and film plastic generated from HRM's Material Recycling Facility (MRF) at Otter Lake. Groundwater sampling was completed in December 2020 that showed no groundwater impairment from the temporary storage pile with the results being provided to the CMC on January 28, 2021. Additionally, efforts will continue to be made to monitor the condition of the bales and clean any litter, as well as monitoring activities consisting of planned future surface water (Spring 2021) and groundwater (Fall 2021) sampling to confirm no environmental impacts as result of the temporary storage pile.

The status of the FEP/WSF has no impact in relation to community protection with respect to the temporary storage area.

CMC Comment 4:

The 2020 Dillon report indicated that leachate levels from the Otter Lake Landfill are currently similar to other landfills in the province. It is important to note that even the best available technology and diligent operations of a landfill do not entirely eliminate the possibility of harmful emissions and leachate escaping the landfill. It is appropriate and important to ask what the accumulated long-term effect to the leachate will be from adding readily putrescible waste as well as film and mixed plastic to the landfill.

HRM Response 4:

The Dillon Report did not identify any issues with respect to leachate management in relation to status of the FEP/WSF (i.e., the FEP/WSF does not provide any community protection with regards to leachate management and mitigating groundwater impairment). Additionally, the Dillon Report shows how the quality of leachate produced in the RDF is similar to other NS landfills (none of which operate an FEP/WSF).

Leachate management measures will continue regardless of the status of the FEP/WSF and include:

- Double containment system as part of the landfill design and as required by provincial legislation.
- Leachate collection system with on-site storage tank (with subsequent transport to an off-site treatment facility)

- Environmental monitoring program consisting of quarterly monitoring on annual basis that includes:
    - Monitoring water characteristics at 53 on-site groundwater monitoring wells to confirm no impairment to groundwater quality.
    - Monitoring 5 surface water stations located on and off site to confirm no impairment to surface water quality.
    - Monitoring water quality at 4 underdrains and 6 leak detection sumps to confirm the integrity of the landfill double containment system.
    - Monitoring leachate quality from the leachate storage tank.

It is noted that there are no indications of any off-site impacts to either groundwater or surface water quality related to site operations or construction activities. Annual environmental monitoring findings are submitted to NS Environment and copies are provided to the CMC.

CMC Comment 5:

Putrescible waste breaks down anaerobically in a landfill producing methane, which has approximately 25 times greater heat trapping capabilities than carbon dioxide, meaning that it is much more detrimental to the Earth's atmosphere. Organics that end up in the landfill will take significantly longer to break down than if processed through the FEP/WSF.

To date, HRM, Mirror NS and Dillon have not provided any supporting data that shutting down the FEP/WSF would reduce Green House Gas (GHG) emissions either through reduced consumption of electricity generated with significant GHG emissions or the reduction of trucking from the WSF to the RDF. The only reference to date has been an economic savings on the cost of the electricity to run the FEP/WSF. The CMC is concerned about the increase in GHG emissions that would occur from unprocessed organics placed in the landfill.

HRM Comment 5:

The FEP/WSF does not have an effect on the decomposition potential of the incoming waste material. The WSF does partially treat (decompose/stabilize) materials and therefore can reduce the amount of greenhouse gases generated in the RDF.

According to Environment and Climate Change Canada's National Inventory Report Volume 2 (2020), the following waste types generate methane in anaerobic conditions in a landfill:

- Paper and Cardboard Products
- Textiles
- Food Waste
- Wood
- Garden and Park Waste
- Diapers/Nappies
- Rubber and Leather

The FEP separates materials that are smaller than 150 mm in size and conveys to the WSF for treatment, however, other methane-generating materials are greater than 150 mm in size and are not treated in the WSF. As such, greenhouse gases are not anticipated to greatly increase by

deactivating the FEP/WSF as food waste only makes up a portion of the methane-generating waste deposited in the landfill.

The below table shows the captured landfill gas (via the landfill gas collection and treatment system) and emitted landfill gas for 2016-2020 in tonnes of CO_2e (carbon dioxide equivalent), as well as the estimated effects of deactivating the WSF in comparison to current conditions. Preliminary estimates by HRM show that there will be a relatively small increase in emitted carbon dioxide from the landfill by 2027 (~5.2%) due to organics not being treated in the WSF, assuming a landfill gas collection system efficiency of 75% (i.e., 75% of generated landfill gas collected and treated and 25% emitted to the atmosphere). It is noted that landfill gas emissions are projected on a declining trend for 2022 to 2027. This is as a result of the decline in tonnage landfilled at Otter Lake related to ICI waste being exported to other NS landfills (landfill gas emissions are related to cumulative tonnage landfilled, with emissions being generated over a number of years).

Year	Landfill Gas Collected and Treated via Flare (Tonnes of CO2e)[1]		Landfill Gas Emitted to Atmosphere (Tonnes of CO2e)[2]		
	WSF Open	WSF Standby Mode	WSF Open	WSF Standby Mode	Change (WSF Standby vs WSF Open)
2016	98,875	-	22,700	-	-
2017	92,628	-	26,044	-	-
2018	92,095	-	22,212	-	-
2019	77,600	-	33,492	-	-
2020	78,535	-	34,000	-	-
2021*	108,864	-	27,216	-	-
2022*	106,461	106,461	26,615	26,615	0
2023*	104,467	104,467	26,117	26,117	0
2024*	102,183	103,501	25,546	25,875	329
2025*	100,041	102,620	25,010	25,655	645
2026*	98,034	101,821	24,509	25,455	946
2027*	96,157	101,100	24,039	25,275	1,236

* Estimates

[1] Landfill gas collected and treated for 2016-2020 is based on actual site flow and methane concentration measurements. Projected estimates for 2021 to 2027 are modelled based on Environment and Climate Change Canada methodology (Part 2 of the National Inventory Report) and are based on a 75% collection efficiency.

[2]Landfill gas emissions to the atmosphere are modelled based on Environment and Climate Change Canada methodology (Part 2 of the National Inventory Report) and are based on a 75% collection efficiency.

Dillon has calculated that the effect of closing the WSF on greenhouse gases from electricity to be a decrease of 1240 tonnes of CO2e per year, which helps offset the increase noted above. Further, any changes to the greenhouse gas footprint from traffic changes are considered to be nominal as the difference between heavy vehicles taking waste from the WSF to the landfill cell, or collections vehicles taking waste directly to the landfill cell are negligible.

CMC Comment 6:

Discussion with Mirror NS and HRM indicated that instead of dismantling the FEP / WSF equipment, it would instead be "mothballed" to ensure it is available if the volumes of waste increase with the return of ICI waste. There was no discussion of the details of this activity within the Dillon report.

HRM Response 6

Please see Attachment 1 which provides additional details on deactivating the FEP/WSF and maintaining in standy mode. Additionally, the slide presented by Dillon at the January 21, 2021 CMC meeting is also included for reference.

[redacted]

Manager
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality
Tel 902.864.6833
Email philopa@halifax.ca

CC: Brad Anguish, Executive Director, Transportation & Public Works
Harold Johnson, Vice-President, Municipal Enterprises Limited
Scott Kyle, Partner, Dillon Consulting Limited

Attachment 1

FEP/WSF Deactivation/Standby Mode Details

Maintaining the FEP/WSF in Deactivated/Standby Mode

These facilities and their related processes will no longer be required as residential waste will be delivered to the Residual Disposal Facility (RDF) and ICI-generated waste will continue to be handled by the Transfer Station (TS). Active operations at both buildings and the biofilter will be discontinued by deactivating the equipment and supporting infrastructure. The equipment and buildings will be maintained through the development and implementation of a protective maintenance and monitoring plan. The plan would consist of inspections of structural, electrical and mechanical items to establish existing conditions and identification of procedures for the deactivation and preservation of equipment. Items to be addressed, but not limited to, would include:

- General:
  - Removal of waste materials.
  - Cleaning floors.
  - Inspection of structural members and equipment support members.

- Mechanical Equipment:
  - Removing/flushing/draining/purging of tanks/piping.
  - Cleaning equipment/supports.
  - Filling all lubricants/seal systems.
  - Removing/replacement of existing fluids.
  - Applying external vapour corrosion inhibitors to equipment and supports.
  - Inspecting of fire suppression system piping, pressure, supports.
  - Developing periodic energizing/rotation schedule.

- Electrical Equipment:
  - Application of desiccants and vapour phase inhibitors in panels/cabinets.
  - Motor heaters' activation.
  - Provide heaters inside panels where condensation might be an issue.
  - Thermal imagery of electrical circuits to remain energized.

- Biofilter:
  - Removal and landfilling of media.
  - Transfer of leachate to leachate storage tank.
  - Flushing clear stone and transfer to leachate storage tank.
  - Placing geomembrane lined notch in berm to limit depth of stored precipitation.
  - Connection of biofilter to Stormwater ditching system

- Installing perimeter fencing.

Additional activities include, but are not limited to:

- Access Control - doors and access points locked and/or regularly checked.
- Security of site maintained.
- Areas free of debris or stored materials.
- Structures are maintained wind and water tight.
- Fire doors and Exit lighting are maintained.
- Regular walkthroughs are conducted and documented.
- Dry Sprinkler System is maintained and air pressure monitored as required.
- Annual inspections of fire suppression equipment and systems, alarm systems and hydrants maintained.
- Propane system disconnected.
- WSF water piping drained and/or winterized.
- Ventilation minimized but maintained.
- Machinery shutdown (locked and tagged out) – ongoing inspections – may include additional lubricants, dust coverings, regular energizing, etc.
- Electrical equipment serviced and desiccants installed to panels.
- Pest control program maintained.
- Modification of the biofilter to minimize collection of water and removal of media.

Proposed FEP/WSF Next Steps

- ***Mothballing*: Deactivation and preservation of equipment and buildings**

- **FEP/WSF Transitioned to Standby**
  - Cleaning
  - Lubricant Change-out
  - Rustproofing
  - Regular inspections

- **FEP/WSF Biofilter Transitioned to Standby**
  - Remove wood media and cleaning
  - Connect to existing stormwater ditching

DILLON CONSULTING

ATTACHMENT “E”

Halifax Waste Resource Society
Correspondence from March 18, 2021

Halifax Waste-Resource Society

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

Via E-Mail
[redacted]

March 18, 2021

Mayor Mike Savage
Halifax Regional Municipality
Halifax, N.S.

Dear Mayor Mike Savage,

On March 7,2021, CMC submitted a report in response to HRM Staff's proposal to remove the FEP & WSF. The Halifax Waste-Resource Society (HWRS) fully endorses CMC's position to continue current processing operations at the Otter Lake Landfill using the Front-End Processor (FEP) & Waste Stabilization Facility (WSF) for the reasons outlined in the report.

The legally binding Agreement between the HRM and the HWRS clearly and unequivocally states,

> "Acceptable **Waste** " , means in part , only 'Stable Materials ...that are substantially free of readily putrescible elements after having undergone Biostabilization ...".
>
> And the form of Biostabilization presently used at the Otter Lake Landfill is through the FEP & WSF as identified in both the Agreement and Operating Approval (Permit).

Based on a legal review of the Agreement, HWRS, maintains that any changes to this standard of ' Acceptable Waste ' can only be changed through mutual negotiations that are agreed to by both parties to this legally binding Agreement.

HWRS will accept only changes to the operations that achieve the same level of "Acceptable Waste" that the FEP & WSF presently accomplishes and maintains.

If HRM is interested in exploring an alternative procedure to achieve Acceptable Waste, we invite any proposals you may have for HWRS's consideration. Proposals must be based on the residential garbage volumes currently received at the Otter Lake Landfill (in the range of 40,000 tons per annum). Such procedures must also include changes to the volume of waste in the event that the export of Industrial, Commercial (ICI) waste should return to the Otter Lake Landfill (in the range of approximately 90,000 tons per annum).

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

In a joint meeting on January 21, 2021, MIRROR and HRM Staff submitted a report to CMC and HWRS Directors, but offered no alternative options to replace what the FEP and WSF achieves in producing acceptable waste. More importantly, MIRROR nor HRM staff could provide any assurance that if the current processing system is removed, residents in the surrounding communities would not suffer from offensive odours, and problems with vermin and or sea gulls.

We were disappointed to learn that in the Spring of 2020, HRM staff verbally requested the Nova Scotia Department of Environment consider waving consultation with the community on a potential application from HRM to remove the FEP & WSF. If true, this clearly is not in the spirit or legal commitment of the Agreement made to the residents and community surrounding the Otter Lake Landfill. This span includes three municipal districts, all with newly elected councillors.

For historical background, we would also point out that on December 4, 2013, Environment Minister, Randy Delorey stated in the House of Assembly that ...
"no changes will occur with respect to the front-end processing and waste stabilization facility, "and "... it is the position of the Department of Environment and government that we will not entertain modifications to the existing approval."
(HANSARD, December 4, 2013, page 313)

We would also like to reference Council's motion in December, 2014 which was a direction to staff to ' **review**' the efficacy of the FEP/WSF anytime after March 31, 2019. This motion is not to be interpreted as a directive to **remove** the FEP/WSF.

The HWRS would encourage alternative approaches to the work of the FEP & WSF that will achieve acceptable waste for burial at the Otter Lake Landfill but in the absence of an efficacious alternative, removal of the FEP & WSF is irresponsible and unacceptable.

As for the HWRS, we will be considering next steps, if we deem necessary, to stop this continual attempt by HRM staff to remove the current regulations, as stipulated in both the Agreement and your Operating Permit, requiring ' **acceptable waste** ' presently achieved by the FEP & WSF.

Should a proposal to remove the FEP & WSF without an alternative acceptable to the HWRS be put forward, we are requesting that HWRS be invited to present to Council.

Sincerely,

[redacted]

Copy: Jonathan MacDonald, NSE & Directors, Halifax Waste Resource Society

ATTACHMENT “F”

Phased Deactivation Plan Correspondence:

HRM’s Correspondence from April 19, 2021; CMC’s Response from May 15, 2021 and Halifax Waste Resource Society Correspondence from May 30, 2021.

Philopoulos, Andrew

From: Philopoulos, Andrew
Sent: Monday, April 19, 2021 12:09 PM
To: Reg Rankin
Subject: Alternative Approach

Hello Reg,

Thank you for the discussion this morning to review an alternative approach to handling the status of the FEP/WSF.

Below is a preliminary proposed Phased Deactivation Plan – as discussed, these are high level thoughts as to how we could utilize a pilot test to demonstrate the findings of the Dillon Report.

I am happy to meet to further explore this alternative approach with the CMC Exec. Please let me know if there is a day/time that works - I am available Thursday towards the end of day/evening, I have some availability Friday, and my days are open next Monday/Tuesday (I can also meet in the evening).

Thanks,
Andrew

Phased Deactivation Plan will consist of:

- Oversight/Technical Committee
    - Each Party's Technical Consultant (e.g., Colleen & Scott)
    - Rep from Mirror, HRM, CMC
    - Meet every one to two months
    - Review findings of Pilot (see Pilot Section)
    - Review any challenges and determine corrective action
- Pilot
    - Objective: Demonstrate findings of Dillon reports (i.e., proof of concept)
    - Monitoring program to be developed to confirm Dillon's findings:
        - Establish baseline
        - Focus on off-site impacts - e.g., birds, litter, and odour
        - Monitoring Program TBD – can utilize photos to document conditions as well as complaint data
        - Routine reporting to Oversight/Technical Committee (e.g., monthly or bi-monthly report)
        - Pilot deactivation of the FEP/WSF for long enough period to allow for "proof of concept", including allowing time for seasonality and to work through any challenges that may arise, as well as regulatory considerations to deactivate the FEP/WSF (long term) and place in standby mode (see Deactivation below)
            - Timeline: 18 to 24 months
    - Will need approval from Regional Council and NSE
- Deactivation
    - Review findings before end of pilot (e.g., after 12 to 18 months), to allow for time to obtain approvals.
    - If Dillon's findings are confirmed with input from the CMC, application to be submitted to NSE to deactivate the FEP/WSF and place into standby mode.

- If a consensus is not reached with the CMC, return to Council for direction, affording the CMC the opportunity to present their position directly to Regional Council.

ANDREW PHILOPOULOS, P. ENG., M.SC.
DIRECTOR | SOLID WASTE RESOURCES
TRANSPORTATION & PUBLIC WORKS

HALIFAX
PO BOX 1749
HALIFAX NS B3J 3A5
[redacted]

philopa@halifax.ca

Otter Lake Community Monitoring

To: **Andrew Philopoulos , HRM**

Date: May 15, 2021

Extract of the approved **Motion** , as is provided below, from the Minutes of the **Community Monitoring Committee** (Virtual) Meeting held on May 13, 2021; as is relative to the Proposal received on April 19, 2021 from A. Philopoulos, HRM regarding the status of the Otter Lake Landfill FEP/WSF :

" Motion to refer this Proposal back to the Halifax Regional Municipality to allow HRM negotiate with the Halifax Waste-Resource Society as the Party to the 1999 Agreement with HRM. "

I certify this above Motion was approved by the CMC at our CMC meeting on May 13, 2021:

Scott Guthrie, Chair, Community Monitoring Committee

P.O. Box 213, Lakeside, N.S. B3T 1M6

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

Via E-Mail

May 30, 2021

Mr. Andrew Philopoulos,
Director, HRM Solid Waste Resources

Good Morning Andrew,

You asked The Society on May 19th. 2021 to consider the Proposal you had originally sent to CMC on April 19th. 2021.

We cannot accept this Proposal as it does not ensure for the continuance of only Acceptable Waste permitted for its disposal at the Otter Lake Landfill cells . And the list of Acceptable Waste materials is the prescribed standard of operation outlined in your Operating Permit , beginning in its first year of operation in 1999; and as is clearly defined in the 1999 Agreement between the Society and HRM as only " Stable Materials ...that are substantially free of readily putrescible elements after having undergone biostabilization... . ''

An important detail of any forthcoming proposal is provision for the proper processing of the approximate 90,000 tons of Industrial, Commercial, Institutional Waste which is currently exported outside of HRM but could return in any year.

In our letter to Mayor Savage on March 18th. 2021, we emphasized the critical importance of Acceptable Waste being an essential part of any new proposal received from HRM. We repeat this position today that The Society ' would encourage alternative approaches to the work of the FEP & WSF that will achieve waste for burial at the Otter Lake landfill but in the absence of an efficacious alternative, removal of the FEP & WSF is irresponsible and unacceptable. ''

In this joint effort, we stand ready to consider any proposal with this aim. It should, of course, be understood that there is no changes permitted to the contractual Agreement of 1999 unless there is approval from both the HRM Council and the Halifax Waste-Resource Society.

[redacted]
HWRS

Copies: Mayor Mike Savage
Jonathan Mac Donald, NSDOE