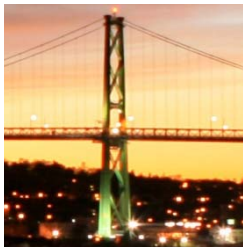




Stantec Report, January 2013 – Presentation and Discussion





Outline

Presentation in three parts:

- | | |
|------------------------------------|-------------------------------|
| 1. Why we're here | Mike Labrecque |
| 2. What we have learned | Mike Labrecque |
| 3. Stantec Report: | James Archibald, P.Eng |
| • Project Objectives | |
| • Methodology | |
| • Findings | |
| • Recommendations | |
| 4. What We Now Know | Mike Labrecque |
| 5. Decisions and Next steps | Mike Labrecque |



Why We Are Here

(Context)

- **July, 2012, Council approved the Waste Resource Strategy Review Project to assess overall system performance based on the Community Stakeholder Committee (CSC) 1995 Strategy objectives:**
 - **Maximize reduction, reuse, recycling**
 - **Maximize environmental, fiscal sustainability**
 - **Foster public stewardship and conservation**
- **The CSC 1995 Strategy established a commitment of waste reduction and environmental and community protection.**
- **August, 2012, Stantec awarded the project with instructions that options must maintain or improve environmental and community protection.**



Why We Are Here

(Context)

Council's Jurisdiction

- The HRM Charter gives Council the authority to manage solid waste, subject to the requirements set out in the Environment Act.
- Council has the authority to make policies (s.60(1)), pass by-laws regulating the business, and any other issues required to implement and administer the solid waste management strategy in the Municipality. (s. 335)
- The Regional Plan governs landfill operations and the determination of the future of Otter Lake. (SU-22)



Why We Are Here

(History)

- **CSC 1995 Strategy Vision: source separate organics, recyclables, and banned materials from garbage to reduce waste and protect the environment from gases, odours, leachate and vectors.**
- **CSC Vision included:**
 - 100 year solution,
 - 88% diversion within 2 years,
 - Dramatic reduction in waste sent to landfill,
 - Program cost reduction, and,
 - Environmental sustainability.



Why We Are Here

- **CSC 1995 Strategy was intended to avoid the negative environmental and community outcomes of a ‘wet’ landfill, like the Sackville landfill.**
- **CSC 1995 Strategy intended source separation and processing waste to create a ‘dry’ landfill to protect the environment and community.**
- **CSC 1995 Strategy intended source separation to provide long-term environmental and community protection.**
- **Council of the day accepted higher processing system costs intending to secure environmental and community protection.**



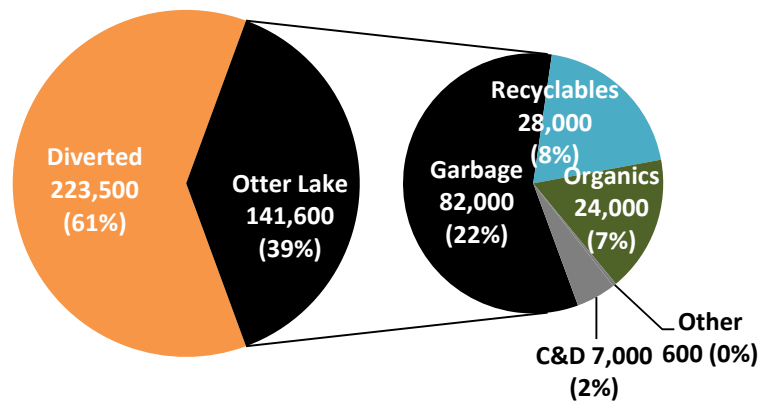
Why We Are Here

- **July 1996, Council approved changes to CSC 1995 Strategy and MIRROR operations plan in order to reduce costs.**
- **Mirror operations plan included:**
 - **All materials would be processed through Front End Processor (FEP) and Waste Stabilization Facility (WSF) prior to landfill.**
 - **Diversion at site would be minimal**
 - **Only processed and stabilized organics would go into the landfill.**
 - **HRM would manage education and behaviour change initiatives.**
- **July 15, 1997, Mirror NS Contract approved.**

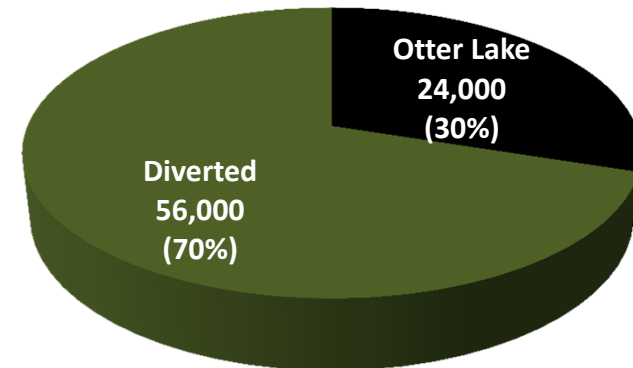


HRM Source Separation

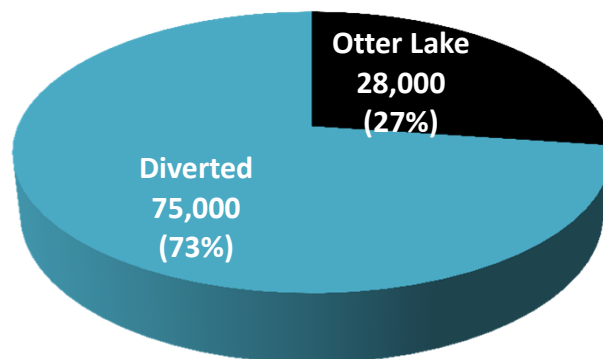
61% Diversion by Overall Weight from Landfill



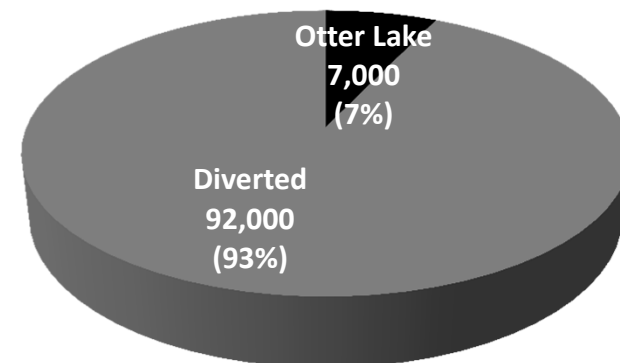
70% of All Organics Source Separated



73% of All Recyclables Diverted



93% of All C&D Diverted





What have we learned?

- **Otter Lake never achieved the intended goal of a 'dry' landfill.**
- **Front End Processor (FEP) and Waste Stabilization Facility (WSF) processing does not capture all organics.**
 - **30% of organics (>8400 tonnes) go into the landfill without going through the WSF**
 - **WSF "stabilizing" only partially dries organics which then become wet again in the landfill**
 - **'Wet' landfill gas generation dates back to 2001**
- **Environmental protection of air, water and land at Otter Lake is achieved by:**
 - **Source separation (before Otter Lake) of organics (70%), recyclables (73%) and C&D (93%)**
 - **Landfill cell operations & gas/odour management**
 - **Of note: From May to December, 2010, no WSF and no complaints**
 - **Landfill cell liner specifications and regulations**



What have we learned?

- FEP/WSF processing results in more rapid green house gas (GHG) production in the active cell than unprocessed waste.
- Fugitive GHG at Otter Lake impacts the environment and requires a temporary gas/odour management system since 2001.
- Opportunity to reduce landfill operating costs from \$170/tonne to \$50/tonne and improve environmental and operational performance.
 - Cost avoidance of \$ 204 M (2013-2024)
 - Cost avoidance of \$ 400 M (2013-2034 through stacking)
 - Cost avoidance of \$ 1 B when project costs to 2058

Waste Resource Strategy Update

Halifax Regional Municipality



Presenter: James Archibald, P.Eng
Stantec

Project Objectives

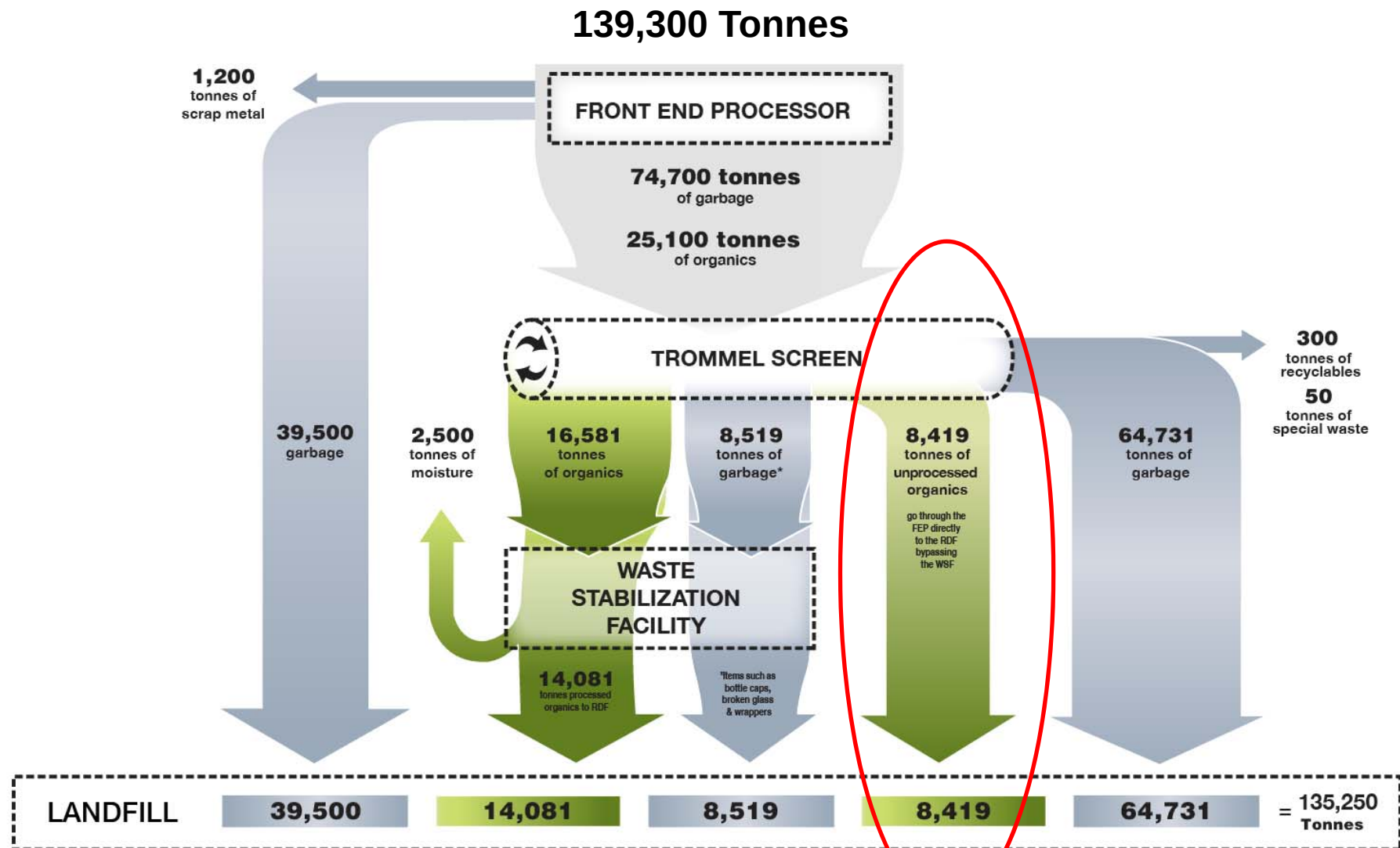
- Strategic high-level assessment
 - How is HRM doing based on strategy/system objectives?
 - How is HRM doing compared with other North American municipalities?
- System performance assessment
 - Based on system key performance indicator of diversion
- Project constraint - CSC Strategy Principles*:
 - Reduce, reuse and recycle
 - Maximize environmental stewardship and minimize costs
 - Foster stewardship and a conserver society values
- Project Instruction – Options to maintain environmental protection

* From 'Integrated Waste/Resource Management Strategy', Community Stakeholder Committee, March 25, 1995

Project Research Approach

- General Assessment by Project Team
- Approach used for comparisons
 - Canada and US
 - Private and public sectors
- Development of options for Consideration
 - System is now highly integrated
 - Options impact other programs
- Decisions required in sequence

What happens to the materials sent to Otter Lake?



* TONNAGES FROM CALENDAR YEAR 2011

Findings: Otter Lake Cell Operations

- Residual Disposal Facility (RDF) cell design and operations provide the site's environmental protection:
 - **Ground Water:** cell liner, leachate collection system, ground water monitoring;
 - **Land:** litter netting, site cleanups, rodent/pest control measures;
 - **Air:** daily landfill cover, falconry, GHG & odour control measures.
- Despite the fact that FEP/WSF's intended purpose was to create a dry landfill, gases from organics presented as early as 2001 requiring the temporary gas/odour management system to protect the environment and community from GHG and odours.

Findings: FEP/WSF Processing*

- Approximately 135,250 tonnes (97%) of materials sent to Otter Lake go into the landfill.
- 16,581 tonnes (2/3) of organics gets shredded and partially dried in the waste stabilization facility (WSF) before going to landfill.
- 8,419 tonnes (1/3) of organics received at Otter Lake goes into the landfill without passing through the WSF for partial drying.
- When placed in the landfill, partially dried materials become wet again when exposed to the weather.
 - This contributes to the generation of GHG escaping into the environment
 - Based on SNC Lavalin lab tests, the WSF only partially dries organics which then absorbs moisture once in the landfill and exposed to the elements, becoming re-saturated. (SNC Lavalin, pg. 18, section 5.1)
- During the 8 month WSF closure (May to Dec 2010) there were no environmental impacts or community complaints.

*Validated by SNC Lavalin Report

Findings: FEP/WSF Processing*

(cont'd)

- Processing waste (shredding and partially drying) produces fugitive Green House Gas (GHG) emissions much faster than traditional landfill operations.
- FEP/WSF processing requires ongoing temporary gas/odour management operations at the active cell to manage GHG costing \$725,000 per year, 6-8 staff.
- FEP and WSF are serving no practical purpose and contribute to GHG impacts on the environment at a significant cost (>\$8,000,000/year).

Findings: Current Cell Height Implications

- Construction plan calls for cells 7, 8 & 9, costing \$66 million in forecasted capital costs, to be built and filled by 2024.
- Better compaction and increasing cell height by up to 15m could delay Council's next cell construction decision from 2015 out as far as 2034.
 - Increased cell height results in improved environmental and operational performance with no community impact.
- Cell development operational changes could delay Council's decision of the next landfill beyond 2060.
- Otter Lake landfill cell operations are over 3 kilometers from the nearest residence, which is very isolated compared to many municipalities across Canada. (Bedford Basin – widest point)

Landfill Operations Cost Comparison

RDF (Landfill cells) - Cost Comparison

\$170

PER TONNE

\$75

PER TONNE

\$50

PER TONNE

**Status Quo at
Otter Lake**

**Typical Canadian
Landfill cost**

**With operational
changes at Otter Lake**
(Improved Environmental
& Operational Performance)

What happens to organics in HRM?

		
Over 5,000 tonnes (est.) goes into backyard composting	51,338 tonnes source separated by generators gets processed in compost plants 35,244 tonnes residential green carts 16,094 tonnes business green carts	25,000 tonnes of organics still goes to Otter Lake Over 1/3 (8419 tonnes) goes into the landfill without being partially dried

Findings: Organics Program

- Current green bin organics collection exceeds compost plant processing capacity.
- Current compost plant processing does not consistently meet regulatory requirements.
 - HRM required to submit organics plan to Province by January, 2014 to meet regulatory requirements
- Addition of new technology (Anaerobic Digestion) could assist in meeting regulatory requirements.
- High-rise apartments and business sectors represent a significant opportunity to increase organics diversion.

Findings: Material Recovery Facility (MRF)

- Existing MRF nearing single shift capacity.
- Current MRF site cannot be expanded.
- MRF nearing end of operational life expectancy.
- A larger MRF is required for HRM's long-term needs.

Findings: Collection Program

- HRM's collection program is cost effective.
- There are opportunities to realize further efficiencies in the collection system through collection re-zoning, automated collection, single-stream recycling, and separate whites goods collection.
- There is potential for even further efficiency through co-collection if a centralized waste processing campus was developed.
- There are opportunities to generate greater diversion through more frequent collection of organics, reduced garbage bag limits, expanded multi-family units sector collection.

Recommendations:

HRM's Overall Solid Waste System

Stantec Recommends the following to evolve HRM's solid waste system:

- Remain at Otter Lake and:
 - Close the FEP/WSF (not functioning as intended & impacting environment at very high cost);
 - Increase landfill cell heights;
 - Create a centralized waste processing campus;
 - Petition NSE for modifications to the Landfill Leak Detection Layer.
- Increase compost processing capacity by repurposing WSF, develop secondary site to control final curing and marketing of compost.

Recommendations:

HRM's Overall Solid Waste System (cont'd)

- Utilize Anaerobic Digestion to process ICI organics to meet regulatory requirements.
- Develop a new MRF at the campus site.
- Increase organics and recyclables collection frequency, and implement a waste stream container system rather than bags.
- Expand diversion initiatives and education to increase diversion of recyclables and organics.

Recommendations: Add Program Measures to Improve Environmental Protection

- Separate appliances {whites} collection
- Expanded special handling and Household Hazardous Waste program
- Increased diversion load inspections at the landfill cell
- Separate leaf & yard waste collections

*Estimated cost of new measures = \$1M per year

* Supported by SNC Lavalin peer review



What Was Confirmed

- Organics are not stabilized at Otter Lake, the costly FEP/WSF only partially dries organics, which then become wet again once placed in the landfill cell.
- Over 110,000 tonnes (approximately 1/3 yearly) of organics has gone into the landfill without passing through the WSF since operations began.
- Otter Lake generates GHG more quickly than a wet landfill requiring more active gas/odour management operations.
- Source Separation and Otter Lake landfill cell design and operations are providing the environmental and community protection.
- Critical Strategy goals are not being achieved
 - Landfill is not dry – Reason Council of the day approved higher costs.
 - Long-term (100 year) solution – Decisions needed on the way ahead.



Conclusions

- **FEP /WSF does not work as intended:**
 - organics only partially dried in the WSF before getting wet again in the cell, and
 - 1/3 of organics go into the landfill without being partially dried in WSF
- **Stantec Options identify \$1 Billion in potential cost avoidance savings (now to 2058) with improved environmental and operational performance**
- **Stantec Options savings can more than adequately fund all future system development requirements**
- **Stantec Options enables achievement of the CSC 100 year solution**



System Decisions Needed

- **Fall 2013 – Future of Otter Lake**
- **Fall/Winter 2013/2014 – Collection Contracts**
- **January, 2014 - HRM's Organics Processing Compliance Plan to the Province {not funded}**
- **Spring 2015 – Cell 7 Construction {Programmed}**
- **January, 2016 – Recycling Facility {not funded}**



Community Engagement Process And Timelines



- Includes town hall meetings with local community and other consultation events/tools
- Engaged on all of the Stantec findings/recommendations, CSC's history and how it helped develop the waste management strategy, the siting criteria for the Otter Lake facility, the purpose of the FEP/WSF, and the commitments to the local community.
- CMC will participate in all events as a key representative for the local community.
- Businesses, apartment building owners, institutions and contracted service providers will be engaged on how to evolve the waste management system.



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