2012 Applications must be submitted to SWANA no later than Friday, April 13, 2012

*** PLEASE NOTE THAT ENTRY REQUIREMENTS HAVE CHANGED ***

Application Checklist (Please make sure the following items are included in your submittal packet)

- Completed release statement (this page), to be scanned and included in digital submission
- Check (made payable to SWANA) or credit card payment for nomination fee (in U.S. dollars) via Excellence Award Nominations
- At least 2 pictures of your operation (may be included in nomination text)
- One copy of your award submittal uploaded using your purchased 2012 SWANA Excellence Awards Application Uploading Instructions
- If you would like to mail your submission, please contact Jesse Maxwell, Program Coordinator, at jmaxwell@swana.org or (240) 494-2237.

Release Statement: I certify that the information provided in this application is accurate and correct to the best of my knowledge. SWANA reserves the right to publish the enclosed information. Nominations become the property of SWANA. My signature gives SWANA the right to reprint or make available for purchase any portion of this submittal.

Signature: [Signature] Date: April 19, 2012
SWANA
2012 Landfill Management Excellence Award Nomination

Halton Waste Management Site

Regional Municipality of Halton Waste Management Services
Executive Summary

The Halton Waste Management Site (HWMS) is a fully integrated Waste Management facility and Halton Region’s one-stop solution for all recycling and disposal services. This state of the art, centrally located Site features progressive design and operational practices that have been implemented to minimize and eliminate environmental impacts.

For 20 years, the HWMS has been committed to providing excellent customer service to over 200,000 residents and 8,500 waste collection vehicles that visit the Site every year. The HWMS is dedicated to managing waste and has implemented numerous diversion and recycling programs to help reach Halton’s goal of 65 per cent diversion by 2016. The Ontario Municipal Benchmarking Initiative recognizes Halton with the highest waste diversion rate in the Province of Ontario!

Opened in 1992 and approved for 7.89 million m$^3$ of waste, the HWMS was expected to reach capacity this year, 2012. Successful landfill management practices, combined with Halton’s progressive diversion programs have extended the Site life until the year 2040.

This 2012 SWANA Landfill Management Excellence Award Nomination provides an overview of how the HWMS is leading the way in landfill management through its innovative operational and environmental management of the Site, in a socially and economically responsible way.
About Halton Region

The Regional Municipality of Halton (Ontario, Canada) serves more than 500,000 residents in the City of Burlington, the Town of Halton Hills, the Town of Milton and the Town of Oakville. Halton Region is committed to meeting the needs of its residents through the delivery of cost-effective, quality programs and services, including water and wastewater; Regional roads and planning; emergency medical services; public health; social assistance; children’s and seniors’ services; social/non-profit housing; heritage programs; emergency management; business development and waste management.

Halton covers over 232,000 acres of land (967 square km), including a 25 kilometre frontage onto Lake Ontario.

The Region is responsible for residential waste management services including solid waste collection and disposal, yard waste collection and processing and household hazardous waste management.

Design and Construction

History and Approvals
Halton Region’s advanced engineered landfill site, the Halton Waste Management Site (HWMS), was opened in September 1992 after an extensive 20 year site search and approval efforts. The HWMS is located at the population centroid of the Region, making it convenient to most of the Region’s residents and a perfect focal point for Halton Region’s waste management and recycling activities.

A public environmental assessment approval hearing process culminated in 194 days of evidence and almost 50,000 pages of transcript that all went into the making of the HWMS. The approval agency identified 140 conditions for the Site’s design and operation to ensure impacts on the environment and neighbours would be minimised. A full-time environmental inspector is required on-site for the sole purpose of monitoring the Site’s compliance and reports directly to the approval agency, the Provincial Ministry of the Environment, at a minimum, monthly.

Since the HWMS was the first major landfill site approved after a lengthy environmental assessment hearing, the operations of the Site have been a focal point for both environmental professionals and the public. The Site has become a prime example of how a properly operated landfill can have a minimal environmental impact.

The Site is approximately 126 hectares (311 acres) in size, of which 53 hectares (131 acres) are approved for landfiling. The rest of the area is used for support facilities and buffer. The Site has a buffer of 100...
metres (328 feet) at the Site boundary and is located in a rural area approximately 4.8 km (3 miles) south of urban Milton.

The Site’s approved capacity is 7.89 million m³ (approximately 5 million metric tonnes of waste), providing approximately 40 years of disposal capacity at current fill rates. The final height of the fill is approximately 23 metres (75 feet).

Today, the HWMS has evolved from a landfill site into a fully integrated waste management facility, providing a complete line of disposal and recycling services to the residents of Halton Region, including: a fully lined landfill, a small load Container Station, a Yard Waste Compost Site, a Reuse Depot, a Household Hazardous Waste (HHW) Depot, a Paint and Stain Reuse Depot, a Paint Collection and Utilization (electricity generation) Facility, a Transfer Station for Source Separated Organics and Blue Box material and Brick and Rubble and Brush Recycling Sites.

The HWMS is open to the public 6 days per week (Monday – Saturday) from 8:00 a.m. to 4:30 p.m.

**Landfill Design and Construction**

As previously mention, the HWMS is the end product of a 20 year process of searching, planning, design and construction. The resulting facility is a state-of-the-art site that has become world renowned for its innovation and attention to environmental safety.

The HWMS was designed and constructed in adherence to the Provincial Environmental Assessment Act, and Environmental Protection Act and in accordance with the Provisional Certificate of Approval.

The landfill is divided into five separate cells for disposal. The Site uses a world renowned hydraulic trap design concept in which a hole is excavated below the groundwater level. Therefore, the outside pressure pushes clean groundwater into the Site preventing leachate migration outward.

The leachate collection system overlays a 1.2 metre (4 feet) thick recompacted clay liner and a gavel subliner or contingency layer which sits on natural till.

**Liner System**

The HWMS was selected because of the quality of the clay in the area including an abundance of very uniform, extremely impermeable clay.

A landfill cell is constructed by excavating all overburden clay, with the most suitable clay preserved for the recompacted clay liner. Any sand seams detected in the base are removed and replaced with clay. Based on the results of the hydrogeological study of the Site, it was determined that the native till material at the Site could be removed, remoulded and replaced to form a liner the 1.2 metre thick liner with a very low hydraulic conductivity (1.9 x 10^{-7} m/sec). For added environmental protection, a contingency sub-liner system is placed immediately below the remoulded native till liner system, consisting of 300 mm (12 inches) thick 20 mm (0.78 inch) diameter clear stone layer and a layer of Geo-textile. This layer was designed such that under normal operating conditions it would be saturated and passive. The sub-liner contingency layer in each cell is hydraulically isolated from that of adjacent cells so that each can be
independently monitored and controlled using several pipes which run from the surface and within the contingency layer.

Geotextile is placed over the clay liner before the leachate collection pipes are added, and then 150 mm (6 inches) to 450 mm (18 inches) of clear stone is placed over the liner to form the Leachate Collection System Layer. The depth of stone varies due to the peaks and valleys formed to direct the leachate to the collection pipes. An additional geotextile layer and 150 mm (6 inches) of clear stone is added as the Protective Clear Stone Layer.

Prior to Site construction, more than 100 groundwater monitoring wells were installed to establish local groundwater conditions.

Site Development
The 5 landfill Cells that comprise the landfill are built as needed and in halves (e.g.: Cell 1 West, Cell 1 E, Cell 2 West, Cell 2 East, etc…). Currently, all of Cell 1 has reached its operational capacity and Cell 2 is presently being finished. Construction on Cell 3 West began in spring 2007 and waste disposal in this new part of Cell 3 began in the fall of the same year. During initial Site construction, two storm water detention ponds; one on the east and one on the west side of the waste disposal area were constructed. All storm water that drains from completed landfill areas is directed to the storm ponds.

There are over 215,000 vehicles that visit the HWMS each year. Independent studies have indicated that the HWMS has had little to no impact on the property value of area residences. A premiere international golf course developer opened a multi-million dollar 45 holes private golf club directly across the road from the HWMS, a testament to the Site’s successful integration with and minimal impacts on the surrounding community.

Site Facilities
In addition to the construction of the lined landfill, facilities on the site included:

- Weigh Scales and Scalehouse
- Container Station
- Suspect Waste Holding Area
- Administration Building - 6,500 ft² (603 m²)
- Garage for equipment maintenance and storage - 10,000 ft² (929 m²)
- Storage Building - 1960 ft² (182 m²)
- Transfer Station - 6950 ft² (646 m²) for curbside collected source separated organics and recycling materials
- Household Hazardous Waste Depot (constructed in 1994)
- Yard Waste Composting Facility (constructed in 1994)
- 8 km of security and litter fencing
- Access roads and service roads
- Chipped wood storage area

**Long-term System Availability**
Extending the life of Halton’s landfill is crucial to ensuring it is maintained as a waste disposal resource for Halton residents for many years to come. The total cost to approve and build the landfill was $59.9 million (equivalent to $88 million in 2012). When it reaches capacity, it is estimated to be $120 million. Given the enormity of the investment that went into the development of the HWMS, the implementation of waste diversion programs and systems are essential to maximize the capacity and extend the life of our landfill.

When the landfill opened in 1992, it was projected to reach capacity in 20 years or by 2012. Policy changes at the HWMS, combined with residents’ enthusiastic participation in recycling programs, further expanded the landfill's life to the year 2023. With the construction of the HWMS, Halton Region also implemented a Solid Waste Management Strategy (SWMS) that helped create and put into practice progressive programs and policies aimed at continuously increasing the amount of waste diverted from the landfill. Due to these initiatives, compaction maximization, settling and a decrease in garbage tonnage, the landfill life is now projected to reach 2040, more than double the original life! Should all the initiatives of the current 2012-2016 SWMS be implemented, the landfill life could be further extended.

**After Use Plan**
As per the Site’s Certificate of Approval, after placement of final cover and closure of the Site, the Site is designated to be returned to agricultural use. The parts of the fill area to be used for agricultural following closure of the landfill are required to have at least one metre of topsoil over and above the final compacted cover.

**Environmental Controls**

The great concern for the environment shown in the operation of the HWMS is a tangible extension of a sound waste management philosophy. The core of this philosophy is adherence to the 3Rs – reduce, reuse and recycle. This policy continues to be effective in minimizing the waste generated in Halton.

But there is a 4th “R”, responsible operation, as seen on this Site, which is an important part of our efforts to protect the local environment and keep Halton safe and beautiful for all our residents.

The HWMS handles approximately 300 metric tonnes (330 tons) of mixed solid waste a day, with an additional 100 metric tonnes (110 tons) of recyclable and yard waste material. To ensure proper environmental protection from potential adverse effects of any waste processing activities that take place at the HWMS, progressive design and operational practices have been implemented to minimize or eliminate any environmental impact. These measures include a hydraulic trap design, liner and leachate collection system, landfill gas collection and utilization system, an aggressive monitoring program and reuse and recycling initiatives offered on Site.

**Hydraulic Trap Design**
The Site uses an innovative hydraulic trap design concept in which the cell is excavated below the surrounding groundwater level. This concept relies on the outside pressure to push clean groundwater into the Site to prevent leachate migration. The design calls for a leachate collection system overlying a 1.2 m thick recompacted clay liner. The $10^{-7}$ cm/sec clay liner is constructed on top of a 0.3 m thick gravel...
blanket called “sub-liner contingency layer”. The contingency layer sits on natural clay till. Leachate head is kept at least 0.4 m lower than the hydraulic groundwater head in the natural lower till, which has a hydraulic conductivity of close to $10^{-7}$ cm/sec. The hydraulic trap can be activated early by flooding the contingency layer with water to increase or maintain a high pressure outside.

The “hydraulic trap” is best described as being similar to a boat hull in water. The clay liner is the “boat hull” sitting slightly in the groundwater.

The water pushes in on the boat hull and any groundwater will seep into the boat (landfill) not out.

The approval of the landfill as a hydraulic trap was an industry leading, benchmark decision that lead the way for the proposal and approval of a number of other landfills, which employed the same technology.

**Leachate Collection System**

To prevent leachate from entering the groundwater through the liner, a leachate collection system is installed on top of the liner in each cell. The leachate collection system consists of a 600 mm (2 ft) thick layer of 50 mm (2 inch) diameter clear stone. A series of perforated pipes running through the stone layer captures the leachate. The leachate flows into solid pipes leading to a pumping station. The leachate is then sent through the Region’s sewer system to a wastewater treatment plant for full treatment.

**Landfill Gas Collection Flaring and Utilization System**

In December 2006, the collection of landfill gas at the HWMS began. The Landfill Gas Collection System draws the methane-rich gas away from the landfill which also reduces odours in the Site. The collected gas is either flared off or used as a fuel in large reciprocating engines to generate electricity, which has the benefit of reducing greenhouse gas emissions and use of non-renewable fuels. By using this renewable resource that would otherwise be lost (vented into the atmosphere), Halton, in partnership with Oakville Hydro, is able to generate green power to currently power up to 2,000 residential homes. As more waste is deposited in the landfill, it is possible that up to 5 MW of electricity will be generated (enough to power approximately 5,000 homes).

The collection field consists of thirty-nine vertical wells and five horizontal trench collectors placed within the landfilled waste. The vacuum applied to the well field is derived from multi-stage blowers with variable speed drives. Real-time measurement of gas quality indicates a methane content of 50% in the collected landfill gas; this medium BTU value fuel is suitable for use in the generation of electricity.

**Monitoring Programs**

The HWMS has an extensive monitoring control program in place to measure any environmental impacts on surface water, ground water and the air.
Monitoring consists of sampling surface and groundwater, sampling of leachate generated at the Site, sampling of landfill gas generated at the Site, maintenance of the monitors and dedicated sampling tubes, interpretation of the sampling results and preparation of reports (annually) including any recommendations for submission to the Provincial Ministry of the Environment, or any combination of the preceding.

Currently, more than 150 groundwater wells are located around the Site to evaluate local groundwater conditions. Groundwater, stormwater and landfill gas monitoring and testing are done on a regular basis. Monitoring is performed by professional hydrogeology consultants. Annual reports are sent to the regulatory authority, the Ministry of the Environment, for review. Over the 20 years the Site has been in operation, no off-site environmental impacts have been detected.

**Surface Water**

Retention ponds and surface water ditches collect clean water for release into natural streams. Water that has not come in contact with garbage is still monitored and diverted into two retention ponds. These ponds are monitored regularly and should any adverse contaminants be detected, valves can be closed so water does not enter the surrounding streams. To date, the valves have never needed to be closed.

All stormwater drainage was designed for a one hundred-year storm. The Site has the two large stormwater ponds plus a flood event storage pond. The pond water is used for dust control, liner construction, fire fighting and equipment washing.

**Waste Inspection and Screening**

Several aspects of daily operations also serve to protect the environment. The quality control of waste through inspection both at a suspect waste holding station and at the tipping face helps eliminate hazardous waste from entering the Site, and helps to keep the concentration of chemicals in the leachate under control.

The Site has one of North America's first permanent suspect waste holding stations. The station has a concrete floor, concrete push walls and a chain-link fence. The station floor has an isolated sump tank to capture any hazardous liquid which may escape from the waste.

**Private Water Well Survey**

Surveys and testing of private water wells around the Site are done to collect background data every time a new cell is constructed or upon request.

**Public Participation in Household Hazardous Waste (HHW) Reuse and Recycling Programs**

The conveniently located HHW Depot on the Site helps divert hazardous waste from disposal in the landfill and from the sewers. Currently over 40,000 residents use this facility each year.

Halton also encourages the public to divert items from disposal by participating in the reuse and recycling programs offered at the HWMS. This is done by offering free drop-off of reusable HHW items and electronics, blue box items and tires for recycling.
Regulatory Compliance

The HWMS operates under the terms of the Certificate of Approval provided by the Province of Ontario’s Ministry of the Environment.

The HWMS has been in operation for almost 20 years and in that time, has ensured and succeeded in maintaining environmental compliance with all conditions in the Site’s Certificate of Approval and provincially regulated reporting requirements. No Ministry order has ever been issued against the Site.

Environmental Inspector
As per the Site’s Certificate of Approval, the Ministry of the Environment included multiple conditions to ensure environmental compliance of the HWMS. To enforce these conditions, the Certificate of Approval requires that a full time Environmental Inspector be employed at the Site for the sole purpose of monitoring the Site’s compliance. The Environmental Inspector is also responsible for monitoring the installation of all works and on going Site management and operations throughout the life of the Site, reviewing monitoring program data and preparing written inspection reports for submission to the Ministry of the Environment on a monthly basis, as well as, an annual inspection report.

Reporting
In addition to the monthly inspection reports submitted to the Ministry of the Environment, Halton Region is also required to submit Regulation 127/National Pollutant Release Inventory (NPRI) Air Emissions Report; Gas Utilization Facility Air Report; Compost Site Operations Report; Household Hazardous Waste Operations Report; Transfer Station Operations Report and quarterly data to the Province’s Hazardous Waste Information Network.

Site Advisory Committee
The HWMS has an Advisory Committee mandated by a condition of the Site's approval. The Committee’s mandate is to monitor any off-site impacts from the landfill and waste hauling practices and make recommendations on these areas. The Committee meets several times a year and is comprised of citizens and Regional and Municipal Councillors.

A Fully Integrated Waste Management System

The HWMS is Halton Region’s “one-stop solution” for the 3Rs (reduce, reuse, recycle), yard waste composting, the safe disposal of household hazardous waste, and of course, garbage disposal.

Halton Region encourages the public to divert items from disposal by participating in the reuse and recycling programs offered at the HWMS. The following are a summary of the waste reduction initiatives that have been implemented at the HWMS to help achieve diversion rates and promotion of the 3Rs:

Container Station
The Container Station provides a public drop-off area for residents and small businesses to dispose of and recycle their waste material.
Items such as wood, scrap metal, drywall, appliances, electronics, yard waste, paper, cans and bottles, cardboard, plant pots and tires can be brought to the Site for recycling. The material is collected in 50 yard bins and then transferred to recycling facilities. There are also bins for small items such as cell phones, eye glasses, printer cartridges, natural corks, hockey sticks and skis. In addition, Halton partners with a local charity to collect mobility assisting devices such as crutches and walkers to assist developing countries, such as Haiti after the recent earthquake. Bikes that are in good condition are set aside for removal and refurbishing by a charity group.

Over 8,000 tonnes of recyclables are collected at the Container Station each year. On a busy Saturday, approximately 1,600 cars visit the Container Station!

To accommodate the increasing demand on the Container Station, in 2009 an expansion project was conducted to provide additional bays at the Station for both recycling and waste disposal bins. An additional 1000 m² was added to the Station, allowing for 4 additional bays.

**Household Hazardous Waste Depot**
The Household Hazardous Waste Depot offers residents an easy, clean and safe way to dispose of materials such as paint, oils, solvents, batteries, pesticides and pool chemicals. In the past, many of these materials have been improperly disposed of privately with very harmful environmental consequences.

Each year, over 788,000 litres of household hazardous waste is diverted from the landfill, and of that, approximately 75 per cent is recycled. This is equivalent to 30 large tanker trucks each year. Commercial hazardous waste is not accepted.

**Paint & Stain Reuse Depot**
Paint and stains in good condition collected at the Household Hazardous Waste Depot are put in the Paint & Stain Reuse Depot. From spring to fall, residents can collect free paint to be reused, thereby, assisting residents of Halton but also keeping disposal costs down.

**Reuse Depot**
Halton Region has a partnership with the Salvation Army to operate a Reuse Depot at the Site. Usable items that are in good condition and fit for resale may be dropped off free of charge. The Depot is operated by a Salvation Army staff member to conduct quality control on the material being dropped off. The items are transferred to the Thrift Stores operated by the Salvation Army. The Reuse Depot assists with diverting reusable items from landfill, while also providing a revenue source for the Salvation Army’s community work.

**Yard Waste Composting Pad**
Approximately 30,000 tonnes of yard waste is received each year at the Site for composting. Yard waste is composted in open windrows. Every year, Halton Region gives away some of the finished compost for free to residents during special events at the Site. The remainder...
is used as a soil amendment by local landscapers and plant nurseries.

**2011 Statistics**

- Approximately 73,000 tonnes of waste was landfilled, representing a reduction in garbage disposal of 42 per cent compared to 2008 volumes. Volume reduction is a direct correlation to curbside and Site diversion programs.
- Over 788,000 litres of household hazardous waste was diverted from the landfill.
- Approximately 30,000 tonnes of yard waste was received at the landfill for the compost facility.
- Approximately 19,000 tonnes of construction rubble was collected, and was recycled or reused at the Site.
- 8,103 tonnes of recyclables were collected at the Container Station, which contributes to Halton’s waste diversion target.
- Over 205,000 customers visited the Site; 131,906 to the Container Station.

**Planning, Operations & Financial Management**

**Daily Operations**

The Site is now in its 20th year of operation. The HWMS handles approximately 300 metric tonnes of solid non-hazardous waste per day. The Site’s D7R Caterpillar Dozer opens the tipping face every morning by removing daily cover soil or an alternative daily cover, such as reusable tarps, from the previous day, uses its ripper to scratch the tipping floor at the toe of the slope to create hydraulic connection and prepares the tipping face access road. The tipping face generally is limited to a maximum of 4 truck widths to minimize litter and odour. The tipping slope is typically set at 5:1 or flatter. The dumping location of the day is recorded using a GPS based Landfill Management System.

The most important piece of landfill equipment, the 826H Caterpillar Compactor, weighing 40 tonnes, spreads the waste into 0.3 m thick layers and performs at least four to six passes. Earth moving equipment hauls daily cover soil or an approved alternative, such as woodchips or residue from composting operations, to the tipping face to prepare for closing. A 5-day emergency supply of woodchips is on hand for use as daily cover.

The loader moves portable litter fences into place depending on wind direction.

At the end of the day, the dozer unrolls an alternative daily cover (large tarp) or places a 6 inch (0.15 m) thick layer of cover material (usually soil) over the waste. The 2011 apparent waste compaction density was 678 kg/m³ of space used. The occupied space included waste and daily cover.

**Alternative Daily Cover**

The HWMS uses an automatic tarping machine, the “Tarpomatic” as an alternative to landfill daily cover. The device is self-contained unit that attaches to heavy equipment and uses a hydraulic drive motor and engaging system to unwind and rewind heavy duty tarps onto a spool with variable speed control and is equipped with a remote control so the worker can operate the unit from the cab of the compactor or dozer.

The HWMS has two spools; each spool has two lengths of tarp, 12 metres x 30 metres. The four tarps will cover approximately 1440 square metres of waste and potentially reduces the need for clay cover by more than 210 cubic metres. This space savings means an additional 210 cubic metres of waste can be placed in the landfill each time the four tarps are used. Using
the tarps also improves the hydraulic connection between each daily cell and saves money by reducing the amount of clay that needs to be hauled from the storage area to the tipping face. It is estimated that by using the tarps at the Site it has opened up space for an additional 8,500 tonnes of garbage per year.

Bird Control
Two types of environmental impacts that are common to landfill areas are litter and birds. Both of these are very visible from a distance so they are often a source of complaint from the communities surrounding a landfill. The HWMS has been very successful controlling both of these problems.

The HWMS was one of the first landfills in North America to have a successful gull control program. The Site is within 25 km of the Hamilton Harbour, one of the largest gull nesting areas in Canada, and is also within 4 km, as the seagull flies, of a private airport.

Conditions in the Provincial Certificate of Approval for the Site require the control of the gull population. The Site has a full-time bird control contractor who uses birds of prey, pyrotechnics and distress signals to control gull population at the Site. Visitors will see few or zero gulls on a normal working day.

All the control methods used at the Site are approved by Environment Canada.

Planning and Financial Management
The 2012-2016 Solid Waste Management Strategy (SWMS) is a strategy approved by Regional Council designed to protect and conserve the capacity of Halton’s landfill site and meet a target of diverting 65 per cent of its waste away from landfill, by striving to cost-effectively maximize waste reduction and diversion programs. Halton’s residential diversion rate is currently just under 60 per cent. Although the landfill life has already been more than doubled, by achieving a 65 per cent diversion rate by 2016, it is estimated that the landfill lifespan will be further extended from reaching capacity.

<table>
<thead>
<tr>
<th>Strategy Initiative</th>
<th>Diversion Impact</th>
<th>Cumulative (baseline 2010 57.4%)</th>
<th>Annual Cost Impact (per $100,000 CVA)</th>
<th>Year of Implementation</th>
<th>Total Additional Cost 2012-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease Bag Limit</td>
<td>3.0 %</td>
<td>60.4 %</td>
<td>$1.03</td>
<td>2013-2016</td>
<td>$2,804,303</td>
</tr>
<tr>
<td>Expand Blue Box Materials &amp; Capacity</td>
<td>1.6 %</td>
<td>62.0 %</td>
<td>$0.44</td>
<td>2013-2014</td>
<td>$1,874,100</td>
</tr>
<tr>
<td>Enhanced Promotion &amp; Education</td>
<td>1.5 %</td>
<td>63.5 %</td>
<td>$0.29</td>
<td>2012-2016</td>
<td>$900,800</td>
</tr>
<tr>
<td>Enhanced Multi-Residential Diversion</td>
<td>1.0 %</td>
<td>64.5 %</td>
<td>$0.67</td>
<td>2012-2016</td>
<td>$2,831,600</td>
</tr>
<tr>
<td>Textile Reuse Communications</td>
<td>0.3 %</td>
<td>64.8 %</td>
<td>$0.00</td>
<td>2012</td>
<td>$0</td>
</tr>
<tr>
<td>Expand HHW Events</td>
<td>0.2 %</td>
<td>65.0 %</td>
<td>$0.04</td>
<td>2012</td>
<td>$133,400</td>
</tr>
<tr>
<td>Total</td>
<td>7.6%</td>
<td>65.0%</td>
<td>$2.47</td>
<td></td>
<td>$8,544,203</td>
</tr>
</tbody>
</table>

On November 16, 2011 Halton Region Council approved the 2012-2016 Solid Waste Management Strategy. The following initiatives can be implemented between 2012 and 2016 and together would increase Halton’s waste diversion to 65 per cent and increase the lifespan of its landfill an additional four years.
In total, the financing plan as set out in the table on Page 11, identifies net program costs. The total cost for when all six of these initiatives of the SWMS are implemented is estimated at $2.47/$100,000 Current Value Assessment. It is also estimated that the landfill lifespan will be extended an additional four year as a result of these initiatives. In 2012, the approved Waste Management Budget is $37.5 million, and of that, $9.5 million is allocated to Landfill operations/management.

Cost Effectiveness
The 2012 tipping fee for the HWMS is a flat fee of $5 for loads between 0-50 kg, $10 for loads between 51-150 kg and for loads greater than 150 kg, $143 per tonne (weighed from “0 kg”). The tipping fee covers costs including:

- Landfill Operation
- HHW Program
- Drop-off Stations
- Maintenance of several Closed Landfills
- Future disposal site approval and construction costs

Cost Savings Programs

Product Stewardship
Halton Region participates in several province-wide product stewardship programs, including electronics, tires and household hazardous waste that allow Halton to recoup 90 to 100 per cent of operating costs for these programs. Costs are covered by stewards and first importers of the designated products.

Tarpomatic
By employing the use of the alternative daily cover machine, the Tarpomatic, Halton estimates a cost savings of over $12,000 per year in equipment related costs for the haulage of soil/clay for cover purposes. Through the space savings achieved by the Tarpomatic, an additional 8,500 tonnes (approximately) of waste can be placed in the landfill each year. At the current tipping fee of $143/tonne, that is potentially an additional $1,216,000 in revenue each year.

GPS
The Site recently install a first class computer based system that uses Global Positioning System (GPS) satellites with a ground based correction to aid operators in optimizing compaction and associated space savings, and construct the Site to design specifications among other functions. The system consists of in-cab displays which indicated the compactor’s and bulldozer’s position and elevation to 1-inch accuracy. The operator watches colours on the screen change from red to yellow to green when optimum compaction has been reached. Grades can also be set by the operator and all information is sent to a base station in the Site office. Design drawings can be sent from the office to the machine for construction by the operator. Machine movements and data, such as fuel consumption, are also tracked. It is estimated that the system should pay for itself in 1-2 years due to increased waste compaction and machine usage optimization.

Road Building Material
Since the Site first opened in 1992, the HWMS has had a rubble diversion program in place to accept loads of asphalt, stone, bricks and concrete for reuse at the Site. Approximately 20,000 tonnes of material is accepted each year, which the Site uses for pad and road building purposes. The HWMS also accepts larger construction loads of milled asphalt grindings. For example, in 2009, Halton accepted over 66,000 tonnes of asphalt grindings, a saving of approximately $540,000 if Halton had to purchase this material. An additional cost savings of $200,000 was achieved through the rubble diversion program.

The Waste Management Services Team – Leading the Way
There are approximately 30 full time equivalent staff employed in Halton’s Waste Management Services division. These employees are divided into three working groups: planning, collections and landfill operations. Waste Management managers organize formal team development sessions, regulatory
compliance training and encourage staff training from external industry organizations to develop staff skills. Regular section Team meetings are also held. In 2007, the division also formed a Wellness Committee to promote and encourage healthier lifestyles and foster social relationships between employees. The Committee has organized a number of employee events such as fishing derby, driving range, badminton tournament, bocce tournament, paint ball, ski nights and rock climbing (all after work hours and paid by the employees).

**Staff Training and Safety**
Staff training is a high priority for the Site's efficient and safe operation.

The HWMS is the first landfill site in Canada which brought in Solid Waste Association of North American (SWANA) training experts to provide landfill operation and waste screening training to its staff.

All full-time landfill employees receive (at a minimum) the following training to enhance their ability to effectively serve our customers and work safely:

- **SWANA** Landfill Basics (SWANA trainers were brought on-site to provide training when Site opened)
  - Periodic refresher courses continue to take place.
- **SWANA** Waste Screening Training (SWANA trainers were brought on-site to provide training when Site opened)
- **SWANA** Manager of Landfill Operations (MOLO)
- Health Safety and the Law
- Generic WHMIS (Annual)
- Job Specific WHMIS Training (2-day training)
- Confined Space Safety
- Gas and Dust Mask Usage
- Transportation of Dangerous Goods
- Hazards Recognition
- Accident Investigation
- First Aid (Every 3 years)
- Fire Extinguisher Training
- Customer Service Training
- Effective Communications
- Cold & Heat Stress Training
- Accessibility Training
- Explosives Training

To ensure safe operations at the tipping face, the HWMS employs a dedicated full time Traffic Control and Waste Inspector on Site who is responsible for guiding customer and contractor traffic into and within the tipping face area and to restrict access (if traffic volumes warrant) to ensure a safe and orderly work location. Materials unloaded for disposal at the tipping face are inspected by the Waste Inspector for hazardous or banned materials. The Waste Inspector also ensures approved hard hats, safety vests and green patch safety boots are worn by contractors and employees at all times when outside of vehicles.

Violation Notices are handed out to those person(s) who fail to comply with the Rules and Regulations
governing the use of the HWMS and loads may be rejected depending on the severity of the contamination or unacceptable waste material in the load. A notice is also placed on the customers file in the computerized Scalehouse weighing and accounting system.

Waste inspections are also conducted at the Site’s public drop off areas, the Container Station, HHW Depot and Reuse Depot to ensure banned materials are not accepted and that the proper materials are being placed in the correct bins for recycling.

Several independent studies have been completed during the Site’s life to monitor employee health. Studies have indicated air emissions do not pose a health risk to employees, customers or residents near the Site.

**Utilization of Equipment /Systems and Technologies**

To manage the HWMS integrated waste management system, the Site relies on state of the art equipment and systems to effectively manage the daily operations.

**Site Equipment and Systems**

Major equipment and systems utilized and maintained at the HWMS include:

**Landfill Equipment**

- 1 D7R Caterpillar Dozer for opening and closing tipping face (to be replaced in 2012 by a new hybrid diesel/electric dozer for greater fuel efficiency and operations and emissions reduction), daily cover, pushing scraper, etc.
- 1 826H Caterpillar Compactor for compacting waste
- 1 Scaper for daily cover
- 1 “Tarpomatic” for daily cover
- 1 Custom built water flusher truck for dust control and road washing
- 1 Rubber tired loader for Site maintenance
- 1 Backhoe-loader, also for Site maintenance
- 1 Forklift for offloading deliveries and transporting pallets for shipment
- Emergency lights with power generator and 4 emergency generators (Note: The Scalehouse, onsite fuelling station and certain Administration Building functions can be powered by the generators)
- 40 Portable litter fence units
- 1 Tow-behind magnet for bi-weekly site passes to pick up sharp metal objects
- 2 Off-road all-terrain type vehicles for Site accessibility (1 electric and 1 diesel powered)
- 5 Pickup trucks for Site maintenance activities, includes 3 plow blades and 1 salting unit for winter operations
- 1 Passenger Van for Site tours

**Container Station**

- 20, 50 yard containers for recycling and waste drop off
- 1 Cardboard compactor
- 2 – 3 Roll-off trucks for transportation of full bins to either recycling destinations or for landfiling

The Container Station services are contracted out and the Contractor is responsible for all repairs and maintenance as per the service agreement.

**Scalehouse**

The Scalehouse building is self-contained, housing two work stations complete with computer terminals, kitchen facilities, washroom facilities, lockers and storage. The scales consist of two (2) on-grade truck scales
(one inbound and one outbound) manufactured by Toledo. The Scalehouse processes over 203,000 transactions annually.

Yard Waste Composting
Processing of yard waste is a contracted service. Supply and maintenance of the equipment is enforced through contract agreements.

Routine Maintenance and Back-up Systems
Maintenance protocol requires daily inspection of each machine and vehicle. Periodic services are all done in accordance with manufacturer’s specifications. Major equipment such as the dozer and compactor have long term service contracts with suppliers. All equipment is stored inside the 10,000 ft² (929 m²) garage for security and to minimize exposure to weather. The Maintenance Building also contains a wash bay which utilizes rain water and snow melt (grey water) collected from the building roofs and stored in an underground cistern, which is used to keep the vehicles clean.

In the event that any of the Site equipment or vehicles require down time for maintenance purposes, Halton has backup procedures in place to provide uninterrupted service. Both the compactor and dozer service agreements stipulate that after 15 consecutive hours of down time, a replacement machine shall be supplied. In the event that any of the other Site vehicles require downtime, Halton is able to borrow replacement vehicles from other departments until service is complete on the down vehicle. Arrangements for replacements can be conducted with 24 hour notice or less.

Staff Training
Staff that operate a Regional vehicle or equipment are required to receive training prior to use. The following is list of mandatory training required:

- Equipment specific training for each type of equipment (e.g. power washer, back hoe, dozer, lift truck, snow plows, etc.). Training duration depends on vehicle application.
- Lock-out Training
- Defensive Driving Course – One day in class and 2 hour in vehicle driving test
- WHMIS

Public Acceptance, Appearance and Aesthetics

Appearance and Aesthetics
Litter Control
To limit the impact on the surrounding community, the HWMS goes to great lengths to ensure that residents are not affected by Site operations.

Litter control is a high priority at the Site. The Site has three levels of defence against wind-blown litter.

Portable litter fence units provide the first line of defence at the tipping face. Dozens of portable fences on rubber tires are used to allow easy control of litter at the landfill. The fence units (approximately 4 metres tall and 11.5 metres long) can be towed easily by pickup trucks or a front-end loader. It takes less than 45 minutes to line up 10 portable fence units, totalling 91m.

3 kilometres of tall semi-permanent fabric fence surrounds each cell. The fence poles can be pulled out from the underground casing for quick re-installation when a new cell begins to accept waste in a different location. In addition, the entire Site is encircled by a 5 kilometres of tall chain-link fence.
To assist with preventing wind from blowing litter around the Site and surrounding area, a 1,000 m long, 8 m high earth berm was constructed on the windward side of the Site. Prior to the berm’s construction, a wind tunnel study was performed to assess and enhance the berm’s ability to divert the prevailing westerly wind over the planned landfilling areas. Once constructed, the berm proved to be highly effective at reducing blown litter.

**Vicinity Patrol & Customer Complaints**
Vicinity patrols are performed daily, where crews patrol the immediate vicinity of the Site and pick up any litter or illegally dumped materials. The Site also abides by strict complaint procedures, which requires staff to immediately investigate any customer or neighbour complaints. Reports of litter or illegal dumping activities near the Site are investigated and cleaned up immediately. Bagged garbage dumped along the roadside is opened and contents inspected to trace ownership. Dumping at the entrance gate is exceptionally rare.

**Mud and Dust Control**
A water flusher truck is used to flush mud off the road and to wet areas prone to dusty conditions. The Site has 4 km of on-site roads, which have been paved to help control mud tracking. Water collected on the on-site water ponds is used.

**Odour Control System**
An odour control system has been installed on the Site and is activated if unacceptable odours are detected. The system sprays small amounts of a pleasant smelling, non-toxic odour neutralizing chemical into the offending area.

**Trees and Landscaping**

More than 4,000 trees were planted before the Site was opened. The Site is bound and screened by a series of earth berms from 5 m to 8 m high around the Site. High profile grass areas are cut and maintained regularly.

An ongoing tree planting and maintenance program is also in place, where the local conservation authority works with Halton Region to plant 50 to100 trees per year and tree maintenance services for the Site.

To further promote proper landfill management and raise environmental awareness, Halton Region partners annually with Scouts Canada to carry out tree planting projects at the Site.

**Road Maintenance**
Annual service of all roads and paved parking areas includes crack sealing, line painting and resurfacing if necessary. Paved speed bumps have been constructed to slow down vehicular traffic.

**Scalehouse**
In order to process customers as quickly as possible through the Scalehouse, and protect workers safety, a small kiosk was placed (100 m) in front of the Scalehouse to allow small, flat rate loads to be processed.
without going over the Scales. This kiosk was designed to be quickly disconnected from power and moved if large equipment needs access.

Signage
Easy to follow, colour coded signs and painted arrows on the roads are used to guide customers to the proper disposal area(s). An electronic sign is used to provide customers with up to date information on the site and upcoming events.

Construction of a Golf Course
The best tribute to the Site’s overall good operation was the development of a high end, international 45-hole private golf club on private land directly across from the landfill entrance, after the HWMS was in operation.

Public Acceptance and Outreach

Public Tours
The Site conducts educational tours for schools, community groups, post-secondary institutions, waste management professional, industry associations and visiting dignitaries. To date, more than 10,000 visitors have toured the site.

To name only a few, past delegations have come from:
- Venezuela
- Philippines
- Japan
- Eastern Europe

Public Education and Outreach
Halton Region’s award winning waste diversion education program visits schools, community groups, multi-residential buildings and businesses, teach about Halton’s waste management programs. All educational workshops include a component about the HWMS. Since 2006, Halton has delivered over 1,100 workshops to over 135,000 people.

Communications & Customer Service
The HWMS is committed to exceptional customer service supported thorough communication plans that promote the 3Rs and Site information to all Halton residents. Public outreach is conducted through the following means:
- Waste Management Guide and Collection Calendar, delivered to all 150,000 households once each year
- WasteLess News, a print newsletter delivered to all 150,000 households twice each year
- Regular Site and Waste Management Program Advertisements in six local newspapers
- Halton’s website, www.halton.ca highlights all of Halton’s programs and services
- Social media including Twitter @haltonrecycles and blog www.haltonrecycles.ca
- Brochures and flyers promote programs such as the Household Hazardous Waste Depot and Electronics recycling
- Children’s Activity Book
- Videos on the Halton Waste Management Site operations; Landfill construction; and the Landfill Gas Collection & Utilization Facility
- On-site electronic sign messages

Customer Service Survey
Customer service surveys are also conducted to gain feedback on the level and quality of customer service being provided and overall customer satisfaction. Surveys are conducted every 2 years. In 2010, the survey found that over 90 per cent of respondents felt satisfied with the customer service levels and hours of operation at the HWMS.
University and Government Studies
Two independent university studies have been done by undergraduate and graduate students on the social-economic impact of the landfill on its neighbours. The studies indicate that neighbours had great anxiety about the landfill before the Site was opened and that once they saw how the landfill was operated, their concern for health and environmental impacts subsided significantly.

Environment Canada, the federal environment ministry, has used the Site for many research studies, such as air quality, mercury emission determination (none found), sediment transport in surface water, chemical bioaccumulation and insect tracking.

Food Grains Project
The Site had a partnership with the Canadian Foodgrains Bank, which grew crops on the land currently unused for landfilling. The crop sale proceeds were used to help fund projects in developing countries. One crop was sold for $9,000 and after the Canadian International Development Agency added a “top-up”, $45,000 directly related to this Site went for aid. Presently, availability of local farmers able to donate their time and equipment has not allowed the program to continue.

Community Events
Compost Give Away
Halton Region hosts two annual Compost Give Away events at the HWMS in the spring and fall of each year, offering compost to Halton residents free of charge. Residents are permitted to take up to seven (7) garbage bags (or equivalent) of compost per household per event. Residents must bring their own bags and shovel. Residents are responsible for shovelling and bagging their own compost.

During the Compost Give Away, Halton Region coordinates a food drive to support food banks within the community. Residents are encouraged to make a donation of non-perishable food items or cash.

Since the events first began collecting for the local food banks in the fall of 2000, residents of Halton have donated over 105 tonnes of food and just under $115,000 in monetary donations to the local food banks.

Tire Amnesty Day
For twelve years the HWMS hosted an annual Tire Amnesty Day, where residents could drop-off up to eight (8) passenger vehicle tires (rims included), free of charge. Over the twelve years that the event was held, Halton residents contributed to the diversion of over 28,000 tires from the landfill, saving valuable landfill space, resources and reducing potential breeding grounds for mosquitoes which could carry West Nile Virus. This event also provided the opportunity for Halton residents to donate a total of 6.2 tonnes of food and $5,244 (cash collections began in 2002) to Halton food banks!

In 2010, a province-wide product stewardship program for tire recycling was implemented. Through this program, residents are now permitted to drop off up to five tires per trip free of charge, making the Tire Amnesty Day unnecessary.
Pesticide Exchange
From 2003 to 2009, Halton Region hosted an annual Pesticide Exchange Program, which encouraged residents to turn in old or unused pesticides to the Household Hazardous Waste Depot in order to be Naturally Green and grow a healthy lawn without the use of pesticides. In exchange for their old or unused pesticides, residents were awarded free garden giveaways and information on reducing pesticide use.

In 2009, a province-wide cosmetic pesticide ban was implemented, making the Pesticide Exchange unnecessary.

Halton Waste Management Site 15th Birthday
To celebrate the 15th anniversary of the Halton Waste Management Site’s opening, a “birthday party” took place on Saturday, September 29, 2007. Over four hundred residents attended this event, which included free bus tours of the landfill, a reuse craft, the opportunity to sit in collection and landfill vehicles, and to learn more about Halton’s Waste Management programs. There was a cake cutting, and residents sang “Happy Birthday” to the landfill.

The Site will soon be celebrating its 20th Birthday (September 29, 2012) with similar activities planned.

Innovation and Creativity

Weather Station
The Site has a permanent weather station, which records information including wind direction, velocity, rainfall, temperature and barometric pressure. The wind data is used for litter control and odour complaint investigation. The rain data is used for water balance calculation to estimate leachate generation and collection system efficiency.

Suspect Waste Holding Station
The Site has one of North America's first permanent suspect waste holding stations that allows for random and detailed inspection of selected loads to deter hazardous waste from entering the Site. The station has a concrete floor, concrete push walls and a chain-link fence. The station floor has an isolated sump tank to capture any hazardous liquid which may escape from the waste.

Visual Improvements: Designed to Blend into the Environment
All buildings were designed in the shape of farm buildings in order to blend into the agricultural environment. A natural grey colour is used.

An ongoing tree planting and maintenance program takes place using many native species. Approximately 50 trees are planted annually, with more than 4,000 trees planted before the Site opened.

The Site is surrounded and screened by a series of earth berms from 5 m to 8 m high with plantings of trees. High profile grass areas are cut and maintained regularly.

Rubberized Asphalt
The 4 km of on-site access roads were paved with rubberized asphalt, which used approximately 35,000 scrap tires.
Precipitation
Rainwater and snow melt from building roofs and the Site’s east surface water retention pond is collected and used for equipment washing and other non-potable uses, thereby conserving potable water use and saving money as the Site tucks in its potable water.

West Nile Virus
A monitoring program designed to reduce the risk for HWMS employees and customers both on and off Site, from potential adverse health effects as a result of exposure to the West Nile Virus. Through the program potential mosquito breeding grounds are identified and measures are taken to reduce mosquito populations.
Supplementary Material

Letter from the Ontario Ministry of Environment on Environmental Compliance

March 8, 2012

SWANA
Technical Programs Department
1100 Waynes Ave. Suite 700
Silver Springs, MD.
20910

Re: Application for the SWANA Excellence Award for Halton Waste Management Site, Region of Halton, Ontario.

To Whom It May Concern:

I am an inspector with the Ministry of the Environment, Ontario and have been given an opportunity to comment on the above-mentioned application. I have been inspecting the site and dealing with its management team since 2003.

Our electronic data system which came into effect in 2001 lists six inspections for this site. Three of those were inspections which focused on compliance with the site approval. The approval which is issued by this ministry is extensive and deals with all aspects of design and operation of the landfill. Conditions on the approval include requirements for the design, function and layout of the landfill, installation and maintenance of pollution control systems, employee training, nuisance control (dust, odour, birds, vermin and blowing garbage), site security, capacity limits, site inspection, maintenance and documentation.

The Region of Halton also has an approval for discharges to the atmosphere from the landfill gas flare. The system was inspected in 2007. The leaf and yard composting operation was inspected in 2007 and the household hazardous waste depot was inspected in 2008.

The Region has passed all inspections. There are no environmental incidents such as spills or complaints registered in the system and no abatement or enforcement actions have been taken by this ministry. I wish the Region of Halton the best of luck with this application. If I can be of any further assistance, please call me at 905-319-1417.

Regards,

Scott Thompson
Senior Environmental Officer
Halton Peel District Office
Ministry of the Environment
4145 North Service Road, Suite 300
Burlington, On. L7L 6A3
scott.g.thompson@ontario.ca
Halton Waste Management Site Overview
Awards and Achievements

Achievements
- The first landfill site in North America that brought in SWANA training experts in January of 1993 to provide on-site landfill operation training and on-site waste screening to its staff.
- The first landfill in North America that in 1992, constructed a permanent and dedicated Suspect Waste Holding Station for random inspection and holding of suspect waste loads, which is complete with concrete pad, push wall, litter fence, drainage sump tank and hazardous waste container.
- The first landfill in Canada that employed wind tunnel technology in site design to minimise wind-blown litter.
- The first landfill in Canada that employed the "hydraulic trap" design concept to control leachate migration.
- The first landfill in Canada that used rubberised asphalt to pave all on-site access roads (35,000 scrap tires were used in the process).
- The first landfill in Ontario that had an on-site Household Hazardous Waste (HHW) Depot open 6 days per week.
- The first landfill in Canada that used annual compost give-away to promote the HHW program.
- The first landfill in Ontario to grind concrete and asphalt rubble into high value aggregate.
- The largest user of geotextile in Canada during construction of each cell.
- The first major landfill in Ontario that hired a heavy equipment training company to certify all its landfill equipment operators.
- One of very few landfills in Ontario that hired a professional industrial hygienist to provide staff with "job specific Workplace Hazardous Materials Information System (WHMIS) and chemical training". Ongoing WHMIS training is maintained.
- One of very few landfills in Canada that installed more than 100 monitoring wells before the landfill was constructed; (now have approximately 150 wells).
- One of the first landfills in North America to have a consistently successful bird control program using a full-time falconer and bird of prey.
- One of the first landfills in Canada to have more than 1200 ft (40 screens, 30 ft. each) of rubber-tired portable litter fence units that can be set up quickly in a location that is down wind of the garbage each day.
- One of very few landfills in Ontario that was used by the Ministry of Environment for training of provincial inspectors.
- The only active landfill in Canada where an international golf course developer has constructed a multi-million dollar 45-hole private club across from the landfill entrance.
- The only known landfill to donate future waste cell land for planting of crops to be used as a fund raiser to assist developing countries.

Awards
- 2009: Bronze Solid Waste Systems Excellence Award, SWANA.
- Received award in 2006 for school tour program.
Examples of Communication Materials Available to Halton Residents

Examples of Promotional Give Away Materials

Additional Website Information:
Halton Waste Management Site Virtual Tour
Landfill Gas, Site Construction and Waste Operations
General Information about the HWMS
2012-2016 Solid Waste Management Strategy