CANADA WIDE STRATEGY FOR MUNICIPAL SOLID WASTE MANAGEMENT

Environment Canada

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BENGALURU GARBAGE

BENGALURU GARBAGE

BENGALURU: Mandur stench

BENGALURU: Fumes

BENGALURU:

Bingipura dump yard after methane leak

Canada-wide Strategy for Waste Management
Canadian Council of Environment Ministers
[CCME TASK FORCE]

CCME has developed a *Canada-wide Strategy for the Management of Solid Waste*.

- The Strategy articulates the collective agreement reached by the 14 ministers of the environment in Canada to ensure that waste facility owners will have regulatory clarity in managing waste under a harmonized framework that is protective of human health and the environment.

- All facilities achieve minimum National Performance Standards and develop and manage site-specific Solid Waste Management Objectives.

HALTON REGION-ONTARIO

Halton Region is located Southern Ontario, in the southwest part of the Greater Toronto Area.

REGIONAL MUNICIPALITY OF HALTON ONTARIO, CANADA

Halton covers over 967 square km, including a 25 km coast onto Lake Ontario with a population of over 500,000, with a mandate to provide following services:

- Water and Wastewater Treatment and Solid Waste Management;
- Regional Roads and Planning;
- Emergency Medical Services and Public Health;
- Social Assistance;
- Children's and Seniors' Services;
- Social/non-profit Housing;
- Heritage Programs;
- Emergency and Hazards Management and
- Business Development.

WASTE MANAGEMENT HIERARCHY

Reduce

to reduce by as much as possible the amount of material that enters the recycling or the solid waste stream

Reuse

to ensure that materials and/or products are reused as many times as possible before entering the recycling or waste stream. support repair and refurbish.

Recycle

to recycle (collect, sort, render -resource input, sell to secondary market(s))

Recovery

to recover material that cannot be reused or recycled to produce another output, e.g., energy, through the application of technology. Some jurisdictions do not formally recognize a 4th R (i.e., energy recovery is considered on the same level as disposal).

Waste Prevention

preventing - generation of waste in the first place at the manufacturing level.

Put Waste In Its Place

GreenCart

Bread, toast, cereal, baked goods & pizza

Cake, cookies, pie, muffins & candies

Dairy products, cheese & yogurt
No containers

Eggs & egg shells

Fruit
No plastic, elastics or stickers

Coffee grounds & filters, teabags

Fats & oils, lard, gravy, butter & margarine
No containers

Sauces, mayonnaise, salad dressing, syrups, peanut butter, jams & jellies
No containers

Paper cups (No lids), paper plates, paper take-out food containers, paper egg cartons

Pasta, couscous, potatoes, rice, oatmeal, flour & grains

Vegetables, corn cobs & husks, nuts & shells & salads
No plastic, elastics or stickers

Meat, fish & shellfish
Including bones

Other acceptable items include: Dryer lint, feathers, human & pet hair, houseplants, nail clippings, popsicle sticks, sawdust & cold wood ashes (in paper bags), toothpicks, shredded paper, soiled paper towels & soiled facial tissues.

Remember: No plastic, glass, metal, Styrofoam, stickers or elastics.

Line your GreenCart or Kitchen Catcher with paper towels, newspaper/flyers, cardboard, paper bags, paper food waste bags, or certified compostable bags with the Biodegradable Products Institute (BPI) logo:

COMPOSTABLE
Biodegradable Products Institute | US composting council

Blue Box

Clear plastic "clam shell" containers

Black & clear plastic take-out containers

Cardboard cans

Plastic plant pots & trays

Empty metal paint cans
Lids removed

Plastic plates, cups & coffee cup lids
No cutlery

Single-serve plastic food containers
No film or foil

Plastic bottles, tubs & lids
Beverage, soap, cleaning bottles, caps go in garbage; cottage cheese, cream cheese, dips, margarine, yogurt tubs & lids; maximum size 4 litre (1 gallon)

Glass bottles & jars
Clear or coloured, food & beverage glass containers

Boxboard
Cereal, detergent, tissue boxes, etc.; flatten; liners go in garbage

Corrugated cardboard
Tie in bundles no larger than 90 cm x 90cm x 30cm (3 ft x 3 ft x 1 ft)

Magazines & Books
Hard & soft covered books

Newspapers & flyers

Aluminum foil
Aluminum foil, aluminum pie plates & baking trays

Fine paper
Computer paper, writing paper, envelopes (including plastic windows), paper bags

Boxed beverage containers
Tetra Paks®, juice & soup boxes, gable top containers such as milk & juice cartons

Metal food & beverage containers

Remember: no plastic bags, plastic film or Styrofoam.

Garbage

Plastic cutlery, straws & bottle caps

Styrofoam

Diapers

Plastic bags, baggies, & liner bags
(Cereal bags)

Gift wrap, wrapping paper, ribbons & bows

Chip bags, wrappers & cookie bags

Plastic wrap, bubble wrap & film

Household items
(Garden hose, furnace filter)

Pet waste
(Including litter, bedding)

Halton REGION

Access Halton
Dial 311 www.halton.ca

HaltonRecycles
YouTube

PW-13031

Rinse clean and recycle

Home and personal product container
Rinse clean and recycle

Paper, Cardboard Items

Metal items

Household Hazard Waste

WASTE COLLECTION & DROP-OFF

Curbside Collection

Blue Box, GreenCart (weekly)
Garbage (two weeks)
Yard Waste (two weeks)
Bulk Waste (four times/year)
Metal & Appliance Collection (periodically)

Drop-off (Any Time)

Take It Back! Halton
Liquor Containers
Reuse Centres
Electronics
Household Hazardous Waste
Tires
Halton Waste Management Site

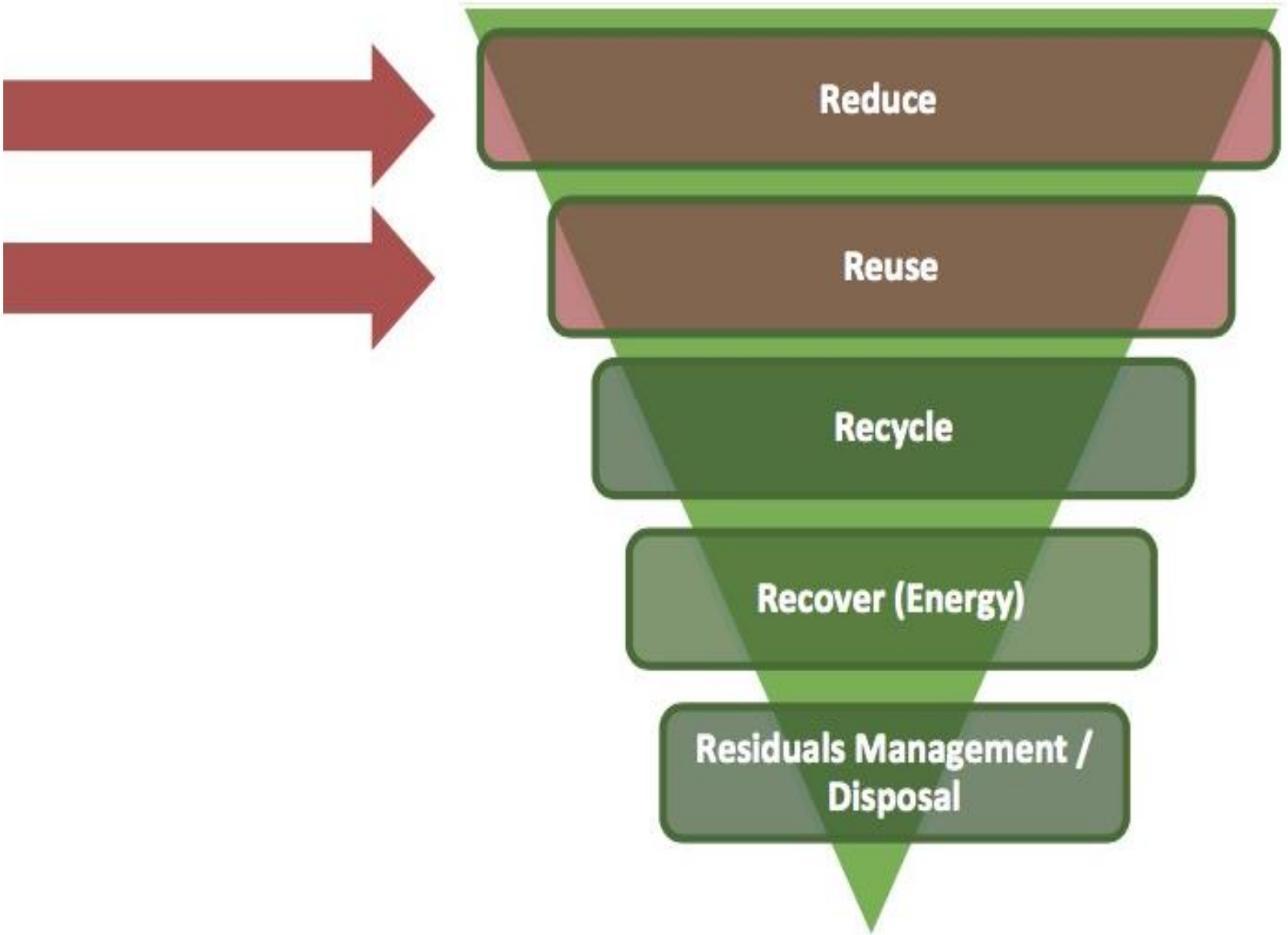
TAKE IT BACK! HALTON

Used batteries, old compact fluorescent light bulbs and expired medications

Take It Back! Halton is a directory of local businesses, non-profit organizations and municipal facilities that take back materials to be reused, recycled or disposed.

5 R's

Exhibit 12: Location of Waste Prevention and Reduction in the Waste Management Hierarchy



HWMS FACILITY

The landfill is divided into five sections called “cells.”

Garbage is currently being buried in the west side of cell three.

A compactor crushes the garbage to help save landfill space. At the end of each day, a large tarp is rolled on top of the garbage to reduce odours and keep animals away.

Approximately 31,000 tonnes of residential and commercial yard waste is composted on site.

Most of the compost issued in potting mix distributed throughout Ontario or by land scapers. Compost can also be picked up by Halton residents at Compost Give-aways.

Groundwater wells are tested to ensure local water supplies are clean.

Rain and snow water from on-site buildings is collected and used on site to clean equipment.

Fences on wheels are moved on windy days to control litter.

Halton Waste Management Site Overview

HWMS

The landfill isn't a "dump!" The landfill has an engineered liner system using clay, gravel, and fabric—plus a feature called a hydraulic trap—to ensure contaminates don't escape, thereby protecting soil and groundwater.

Landfill gas is formed when buried garbage decomposes in a landfill.

Instead of letting this gas seep out into the air uncontrolled, the methane-rich gas is collected from the landfill and is used to create electricity.

Each day, enough "green" energy is made to power up to 700 homes

Rain and snow water going through the landfill creates leachate.

Leachate is collected in a series of perforated pipes that sit on the liner system, and the leachate is treated at one of Halton's wastewater treatment plants.

ENVIRONMENTAL ASSESSMENT PROCESS

- HWMS design and operation to ensure impacts on the environment is minimal

- Full-time environmental inspector on-site for monitoring of compliance and reports monthly to the Ministry of the Environment.

- HWMS has become a prime example of how a properly operated landfill can have a minimal environmental impact.
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- HWMS is approximately 126 hectares (311 acres) in size, of which 53 hectares (131 acres) are approved for land-filling, remaining area is used for support facilities and buffer.

- HWMS constructed in 1992 and employs state of the art technologies

- HWMS capacity is 5 million metric tonnes, with 40 years of disposal capacity

HWMS: INTEGRATED WASTE MANAGEMENT

HWMS has evolved from a landfill site into a fully integrated waste management facility, providing a complete line of disposal and recycling services:

- 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 Gas 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.

LANDFILL DESIGN AND CONSTRUCTION

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

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

- 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 thick recompacted clay liner and a gavel subliner or contingency layer which sits on natural till.

HWMS DEPOT

1. Container Station 2. Scale house

3. Salvation Army Reuse Depot

4. Household Hazardous Waste Depot

5. Yard Waste Composting Facility

6. Landfill 7. Liner System 8. Landfill Gas Facility

9. Leachate 10. Environmental Monitoring & Protection

HWMS FACILITY

- Vehicles are weighed at the Scale house to determine the tonnage received.
- 73,304 tonnes of garbage was disposed of at the Site in 2012, 41 per cent decrease from 2007.
- The landfill is divided into five sections called “cells.”
- Garbage is currently being buried in the west side of cell three.
- A compactor crushes the garbage to help save landfill space.
- At the end of each day, a large tarp is rolled on top of the garbage to reduce odours and keep animals away.

HWMS FACILITY

Each year, almost 700 tonnes of paints, propane, batteries, CFL bulbs, and other household hazardous waste are dropped off by over 38,000 vehicles for recycling or safe disposal. Drop off is free of charge for Halton residents (20 litres maximum).

Residents can drop off tires, electronics, appliances, drywall, wood, scrap metal, yard waste, and Blue Box and Green Cart materials, for recycling and reuse, as well as garbage for disposal. Between 500 and 1,500 vehicles visit the Container Station each day.

Over 200 tonnes of clothing, bedding, and small furniture items is dropped off for reuse. Drop off is free of charge for Halton residents.

HWMS FACILITIES

1. Container Station

3. Salvation Army Reuse Depot

2. Household Hazardous Waste Depot

4. Scale house

8. Landfill Gas Facility

7. Liner System

9. Leachate

6. Landfill

5. Yard Waste Composting Facility

10. Environmental Monitoring & Protection

LINER SYSTEM

- HWMS location 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 1.2 metre thick liner with a very low hydraulic conductivity (1.9 x 10-75 m/sec).

- For added environmental protection, a contingency sub-liner system is placed immediately below the remoulded native till liner system, consisting-300 mm thick 20 mm diameter clear stone layer and a layer of Geotextile fabric. This layer was designed such that under normal conditions it would be saturated and passive.

- The sub-liner contingency layer HWMS is divided into five separate cells for disposal. At current fill rates, the Site should reach capacity, 7.89 million m3 (approximately 5 million tonnes of waste) by 2040.

THE SUB-LINER CONTINGENCY LAYER

- 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.

HYDRAULIC TRAP DESIGN

HWMS uses an innovative hydraulic trap design concept

- 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 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

HYDRAULIC TRAP

The Hydraulic Trap Concept has been integrated into the landfill liner design.

ENVIRONMENTAL CONTROLS

- 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.

- Groundwater wells are tested to ensure local water supplies are clean.

- Rain and snow water from on-site buildings is collected and used on site to clean equipment.

- Fences on wheels are moved on windy days to control litter.

BIRD CONTROL

- Environmental impacts that are common to landfill areas are litter and birds often a source of complaint from the nearby communities
- PCA requires control of bird population.
- Full-time bird control contractor who uses birds of prey, pyrotechnics and distress signals to control gull population
- Visitors will see few or zero gulls on a normal working day.
- HMWS control methods are approved by Environment Canada.
- HWMS was one of the first landfills in North America to have a successful gull control program.
- HWMS is within 25 km of the Hamilton Harbour, one of the largest gull nesting areas in Canada.

BIRD CONTROL

Uses birds of prey, pyrotechnics, distress signals to control gull

REGULATORY COMPLIANCE

HWMS operates under the terms of the Certificate of Approval by MOE

HWMS for 20 years has ensured environmental compliance

Environmental Inspector monitors the installation, site management, operations and reviews and prepares inspection monthly and annual reports to MOE

Also prepares 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 Hazardous Waste Information Network.

HWMS has an Advisory Committee whose mandate is to monitor off-site impacts from the landfill and waste hauling practices and make recommendations.

The Committee meets several times a year and is comprised of citizens and Municipal Councillors

2012 STATISTICS

- 73,000 tonnes of waste was landfilled, 42 per cent reduction in 4 years.
- Reduction is due to diversion programs.
- 778,000 litres of HHW was diverted from the landfill.
- 31,000 tonnes of yard waste was received at the compost facility
- 23,000 tonnes of construction rubble was recycled or reused
- 7,210 tonnes of recyclables were collected at the Container Statio
- 206,000 customers visited the Site; 126,704 to the Container Station.

SPECIAL PROTOCOL TO MANAGE HAZARD WASTES

BIO-MEDICAL WASTE

E-WASTE AND USED BATTERIES

UNUSED PHARMACETICAL DRUGS

HAZARDS INDUSTRIAL WASTE

BULK CONSTRUCTION AND DEMOLITION MATERIAL

Thank You

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