

THE KEELE VALLEY LANDFILL SITE

The Keele Valley Landfill Site is located in the community of Maple in the City of Vaughan. Keele Valley is Toronto's only active sanitary landfill and until recently it fully served the waste management needs of the City of Toronto and the Regions of York and Durham. Since disposal operations began on November 28, 1983, more than 26 million tonnes of waste have been landfilled. The Keele Valley Landfill is scheduled to close in late 2002.

HOW INCOMING WASTE IS MANAGED

There's a lot more to landfilling than just adding garbage to a pile. At Keele Valley, a well-designed plan for accepting, spreading, compacting and covering the waste is used to assist landfill crews in properly maintaining the site. Landfilling operations are adjusted on a daily basis to minimize odour, dust, and blowing litter.

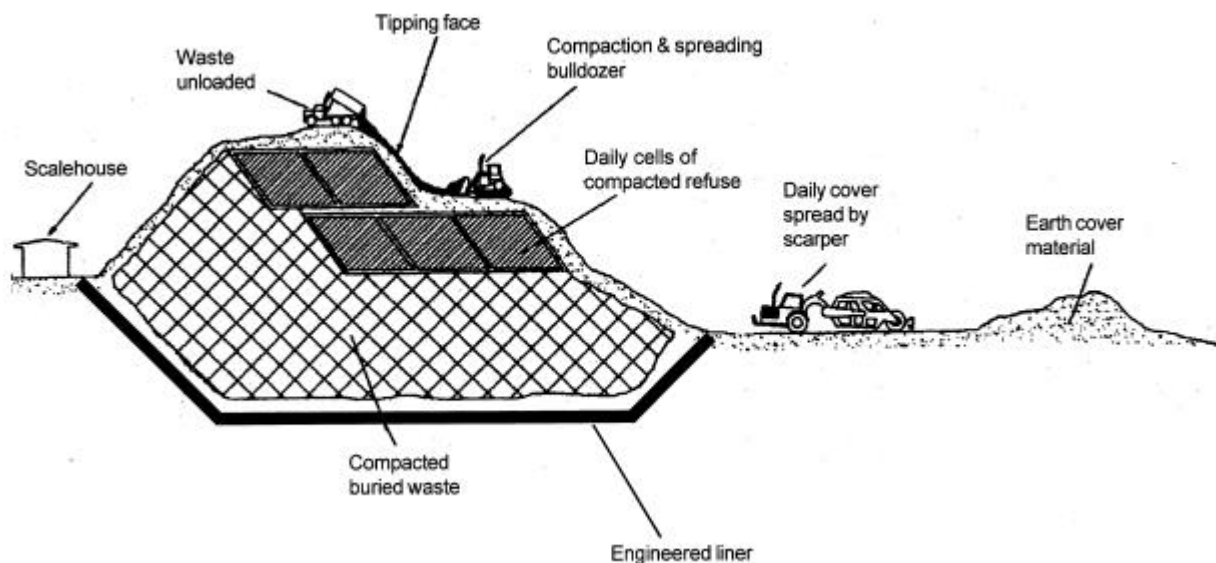
Waste entering the site:

All vehicles entering and leaving the site are weighed by a computerized scale at the **scale house**. The weight of the incoming vehicle and waste is recorded and the vehicle is re-weighed when it leaves the site. Waste tonnage is calculated on the difference of the two weights. Staff record the source and type of waste dropped off. Only non-hazardous solid waste is accepted at Keele Valley Landfill. The current disposal fee is \$57.00 per metric tonne.

Spreading, compacting and covering the waste:

Vehicles are directed to the **tipping face**, a designated (usually sloped) landfill area where waste is unloaded for that day. Bulldozers spread and compact the waste in layers approximately 0.6 metres (2 feet) thick to build a 6-m (20-ft) high **lift**. Before the end of each day, the refuse is covered with a layer of earth creating a **cell**. The daily **earth cover** prevents access to the waste by animals or insects and reduces litter and odour.

OVERVIEW OF LANDFILL OPERATIONS



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Waste identification and acceptance:

Only solid non-hazardous municipal, residential and industrial waste may be disposed of at the Keele Valley Landfill. Materials that are banned from landfill include hazardous, bio-medical and liquid wastes, as well as items that can be recycled such as tires, corrugated cardboard and scrap metal.

City of Toronto Works and Emergency Services staff monitor the disposal of waste from incoming vehicles. If any recyclable materials are found in a load of waste material, a violation notice is issued to the company or individual. After three violations the offender is temporarily suspended and placed on supervised access to the facility.

HOW WASTE IS CONTROLLED INSIDE THE LANDFILL

The Keele Valley Landfill Site is located in a previously mined-out sand and gravel pit. The total size of the site is 376 hectares (929 acres) with 100 ha (245 a) designated for landfilling. It would take an adult approximately one hour to walk around the site. Buried within and below the waste are engineered systems that control leachate and landfill gas.

Leachate collection and control:

Leachate is a liquid that forms when rainwater or melting snow seeps through the landfill and mixes with the waste. To prevent leachate from seeping down into the underlying soil, a **clay liner** is constructed at the base and sides of the landfill. This 1.2-m (4-ft) thick liner is monitored to ensure it is functioning properly.

The liner's performance is monitored using devices installed above, within and below the liner. These devices include **vibrating wire piezometers** which measure the height of the leachate on top of the liner within the landfill; **lysimeters** which monitor the rate of leachate movement through the liner; **conductivity sensors**, which are placed at various depths in the liner and provide information about the depth of the leachate movement in the liner; and **sub-liner water samplers**, remotely operated devices that monitor the groundwater underneath the clay liner.

In addition to these monitoring devices, a blanket of coarse stone surrounding **perforated pipes** is constructed on top of the liner to drain off the collected leachate. This leachate collection system drains into a **pumping station** that discharges the leachate into the York-Durham sanitary sewer system for treatment at a sewage treatment plant.

Landfill gas collection, control and utilization:

Decomposition of buried waste, which occurs in the absence of oxygen, produces landfill gas. The landfill gas consists of methane, carbon dioxide, water vapour and other trace components such as hydrogen sulphide and mercaptans. The methane component in the gas is combustible.

To collect the landfill gas within the site, gas collection **pipes** are placed in **trenches** and **wells** dug directly into the waste. The pipes are attached to fans that draw gas to the **incineration complex**. By-products are destroyed and a carbon dioxide and water residue is released into the atmosphere. Since May 1995, the energy contained in the landfill gas has been used to produce electricity. Currently, 30 megawatts of power are produced and sold to the Ontario electrical grid.

Kyoto recognition:

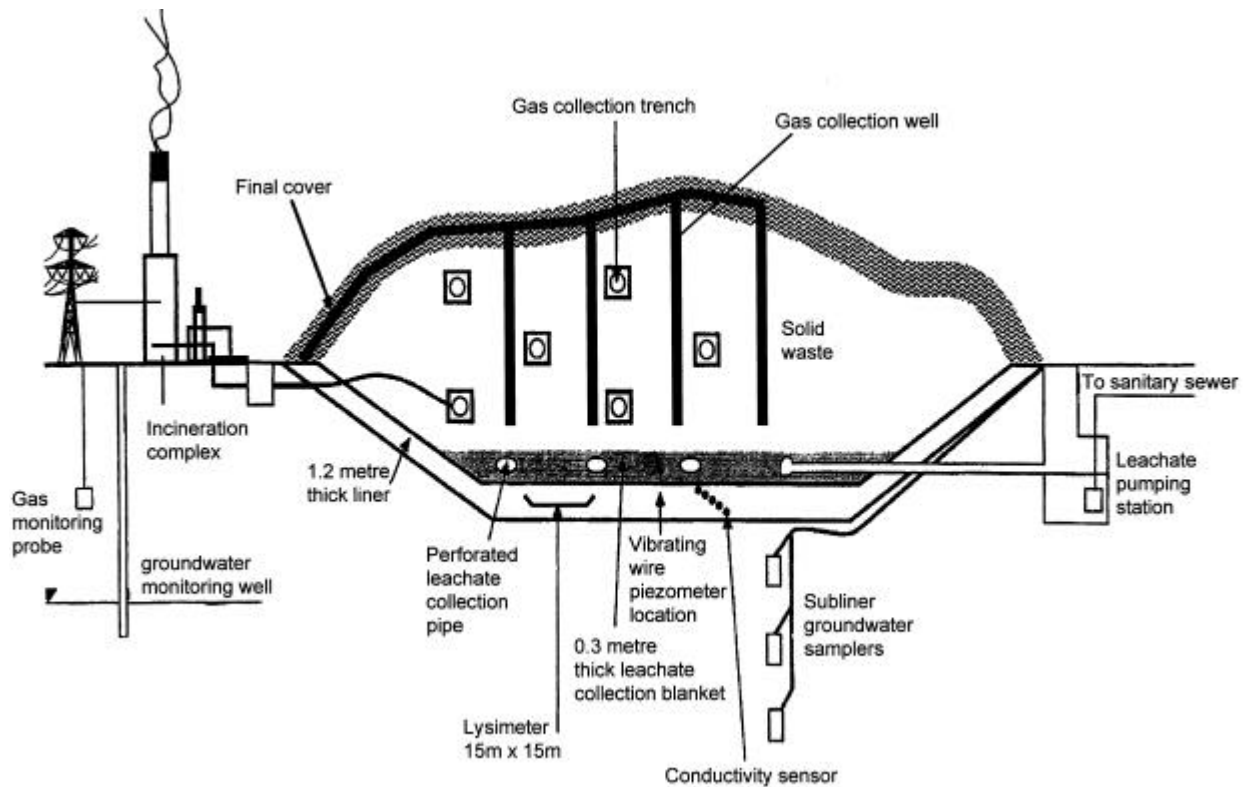
At the 1997 Kyoto Conference on greenhouse gases, Toronto was cited as a world leader in greenhouse gas reduction due to its successful methane gas recovery from landfill facilities.

Solid Waste Association of North America (SWANA) recognition:

In 1999, SWANA, under its Excellence in Solid Waste Management Awards program, recognized Keele Valley with a Gold award for its significant accomplishments in landfill gas control.

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DESIGN FEATURES



CONTROL OF OFF-SITE IMPACTS

Common neighbourhood concerns with landfills are that they can create odours, dust and blowing litter. At Keele Valley, staff operate this site to minimize any off-site impacts. Landfilling operations are tightly controlled and monitored on a daily basis to ensure that potential for these situations are kept to a minimum.

Odour control:

Gas collection pipes are installed to control landfill gas, the primary source of landfill odour. Waste is covered daily with soil. Odour-suppressing spray is used when garbage is excavated during construction.

Litter control:

A 6-m (20-ft) high fence surrounds the site to catch wind-blown litter. On windy days, a portable fence is erected near the tipping face to contain blowing litter. Landfill crews gather litter trapped at the fence and any litter along the hauling routes daily. Trucks must cover their waste loads and are restricted to only certain access roads to the site.

Dust control:

Keele Valley's access roads are watered down regularly on dry, windy days, to control dust. A large mechanical sweeper is used to brush and vacuum paved on-site roads and parking lots.

Comments or concerns are welcomed; neighbours can contact staff directly at (905) 832-0682 during normal business hours.

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MORE THAN JUST A LANDFILL

The Keele Valley Landfill Site is more than just a place to dispose of waste. In addition to landfill operations, other waste management services, such as recycling and composting, are located on-site:

- **Household hazardous waste depot:** Small quantities of household hazardous waste (such as paint, batteries, pesticides and cleaning agents) can be dropped off at Keele Valley for environmentally-safe storage and disposal.
- **General recycling depot:** Residents and businesses can drop off white goods (such as refrigerators, stoves, washing machines, etc.), corrugated cardboard, drywall, scrap metal and tires to be recycled.
- **Outdoor composting:** Leaves and yard waste are composted on a site north of the landfill. This natural composting process takes place in large outdoor windrows. When completed, the nutrient-rich finished compost is available free in limited amounts to residents at various transfer stations in Toronto, the Keele Valley Landfill and at special events in the summer. The finished compost is also used by local residents in their home gardens.

KEELE VALLEY'S ENVIRONMENTAL SAFETY CHECKS

Today, sanitary landfills are an environmentally safe way of disposing of solid waste. Approximately 1,000 water samples are taken and analyzed each year to investigate the groundwater quality below and around the Keele Valley Landfill Site. In addition, two officers from the Ministry of the Environment (MOE) are assigned to Keele Valley on a full-time basis. They inspect the waste disposed of at the site, review analyses of materials for disposal and ensure that Keele Valley is meeting its operating standards as outlined in its "Certificate of Approval". The Certificate is issued by the MOE and outlines how the site is to operate and manage its waste.

WHEN KEELE VALLEY CLOSES

Toronto will continue to monitor and care for the Keele Valley Landfill Site when it is closed. The landfill will be capped with soil and vegetation to blend in with the surrounding topography. To date, a final cover has been placed on 65 per cent of the landfill.

TOUR THE KEELE VALLEY LANDFILL SITE

Works and Emergency Services offers free tours of Keele Valley Landfill. It's a great way to see what happens to your garbage once you've thrown it away. Call 416-392-9652 for more information.

For more information on waste management visit our website: www.city.toronto.on.ca/garbage

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