OPERATING SOLID WASTE SITES

ANIMAL MANAGEMENT



* COVER WASTE
* INSTALL FENCING (ELECTRIC)
* USE BIRD-DETERRING NOISES
* LIMIT PONDED WATER

BLOWING GARBAGE



* USE COVER
* PUT LIDS OVER BINS
* USE FENCING TO CATCH GARBAGE
* COMPACT WASTE

HOUSEHOLD GARBAGE

HOUSEHOLD HAZARDOUS WASTE

APPLIANCES

SCRAP METAL

CONSTRUCTION & DEMOLITION DEBRIS

SORT WASTE

MANAGE WATER

USE COVER

RECYCLABLES & DIVERTABLES

SALVAGE AREA

ORGANIC MATERIALS

LEACHATE

LEACHATE IS WATER THAT HAS COME INTO CONTACT WITH WASTE AND IS CONSIDERED TO BE CONTAMINATED.

STOP

DRAINAGE KEEPS SURFACE WATER AWAY FROM THE LANDFILL

COVER LIMITS WATER COMING INTO CONTACT WITH WASTE

LINER PREVENTS LEACHATE FROM GETTING INTO THE GROUND

GOOD LANDFILL MANAGEMENT IS IMPORTANT FOR PROTECTING THE HEALTH OF PLANTS, ANIMALS, PEOPLE, AND WATER

EMERGENCY RESPONSE AND CONTINGENCY PLAN

- Ensure staff are properly trained
- Observe and keep note of changes
- If you notice something that could be a hazard, let someone know

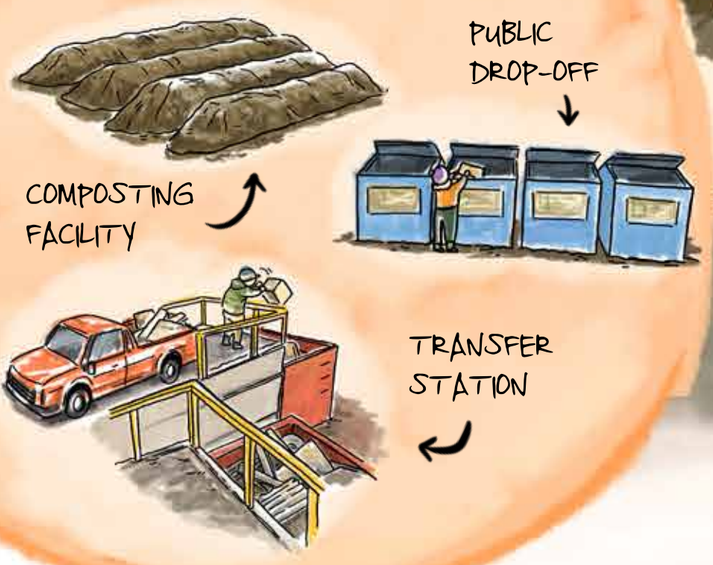
A SMALL CHANGE ABOVE GROUND COULD INDICATE MAJOR PROBLEMS UNDER THE SURFACE!



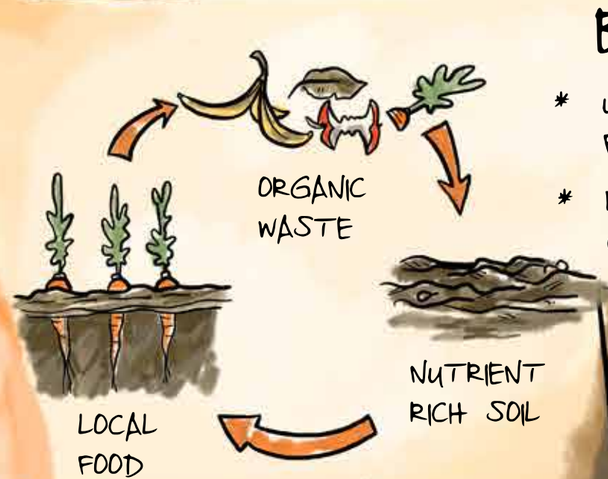
HOW CLIMATE CHANGE MAY IMPACT DIFFERENT SITES



OTHER TYPES OF SOLID WASTE FACILITIES



BENEFITS OF COMPOSTING



* USE EXISTING SITE AND FACILITIES
* EXTEND THE LIFE OF THE LANDFILL
* MAKE COMPOST FOR GROWING FOOD LOCALLY
* REDUCE METHANE GENERATED BY LANDFILL

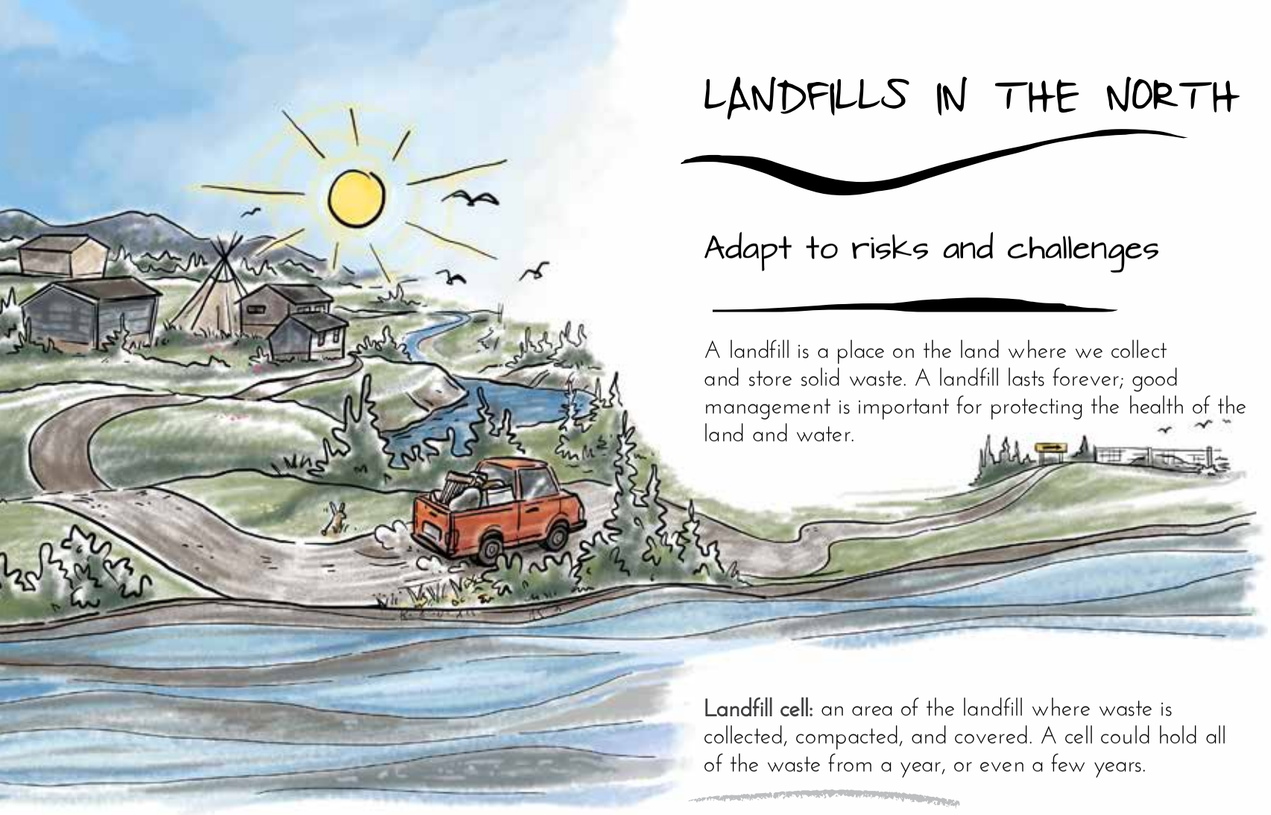
Methane is a potent greenhouse gas. It is produced when food scraps, leaf and yard litter, and other organic materials decompose within a landfill, rather than a compost facility.

OTHER WAYS TO REDUCE METHANE:

- Properly compact and cover waste
- Limit water at site

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ECOLOGY NORTH



This is a user-friendly outline of CAN/CSA R111:20 *Solid waste sites in Northern communities: From planning to post-closure.*

There are many kinds of solid waste site, this guide focuses on landfills. Use this guide to learn best practices for landfill management, gain tools to adapt an existing landfill to climate change, learn how to make a landfill last longer, and manage the landfill when it closes.

Ecology North developed this guide for use by northern communities, but it also contains useful information for facilities like mines or other remote camps.



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Ecology North is a charitable organization, founded in 1971 to support sound environmental decision-making on an individual, community, and regional level.

Contact us or visit our website for information and other guides in this series.

Poster on the inside

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LANDFILLS IN THE NORTH

Adapt to risks and challenges

A landfill is a place on the land where we collect and store solid waste. A landfill lasts forever; good management is important for protecting the health of the land and water.

Landfill cell: an area of the landfill where waste is collected, compacted, and covered. A cell could hold all of the waste from a year, or even a few years.

Leachate: water that has come in contact with landfill or compost waste and is considered to be contaminated.

Permafrost: ground that stays at or below a temperature of 0°C for at least two years in a row.

Erosion: the movement of soils or other surface materials from one place to another, caused by wind, water, or ice.

Hazardous waste: waste that can be corrosive, inflammable, infectious, reactive, or toxic. These materials present a potential harm to human health and the environment.

COVERING WASTE

Protect and contain the waste

Whenever possible, cover material should be placed on top of the waste in a landfill cell. This is one of the most important things that a landfill operator does.

Many different materials can be used as effective cover, including salvaged waste materials. The cover material needs to be approved by the landfill regulator.

WHY COVER WASTE

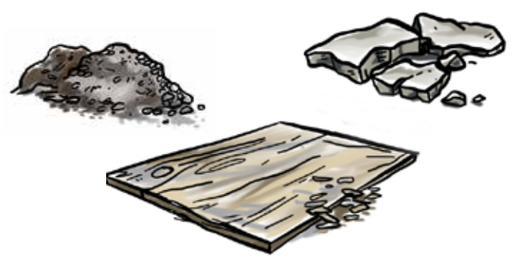
* Stop garbage from blowing around
* Limit the creation of leachate
* Keep animals away

MATERIALS TO USE

* Soil or gravel
* Tarps or geotextiles
* Plywood or wood chips
* Crushed concrete
* Salvaged waste materials







CLIMATE CHANGE

Plan for the impacts

Impacts of climate change can have serious and damaging effects on a landfill—new or old.

NORTHERN CLIMATE CHANGE IMPACTS

* Thawing permafrost
* More intense rain, snow, and snowmelt events
* More flooding
* Eroding coastlines
* Stronger winds
* Shorter winter road season

Many communities built a landfill before we understood the impact of climate change. If climate change is severely impacting a landfill, it might be better to close the site and build a new one, rather than try to fix 'old' problems.



EXTENDING SITE LIFE

Use less space for storing waste

COMPACT WASTE

Compacted waste needs less space. A landfill in a larger community may have a special machine to compact waste. A smaller community landfill could use a bulldozer or other heavy equipment.

REUSE COVER MATERIALS

When adding new waste, the day-to-day cover can be removed and stored nearby, then used again. If the reused material contains too much garbage for use as cover, it can be used to fill gaps in the waste before new cover is added.

DIVERT WASTE

Recycling programs, composting programs, and salvage areas are three good ways to divert or redirect materials—to change them from 'waste' to 'useful'. Community support is important for the success of these programs.



NEW LANDFILLS

Start with a good location and design

This work requires input from qualified professionals and approval from regulators. Plan for the worst-case scenario of climate change.

PLACES TO AVOID

* Thaw-sensitive permafrost
* Rivers or coastal areas that might erode
* Areas near bodies of water
* Neighbourhoods and airstrips
* Sensitive areas for animals or plants
* Cultural or archaeological sites

FEATURES TO HAVE

* Drainage directing water away from the site
* Nearby sources of cover material
* Enough room for many years of landfilling
* Year-round access
* Fencing to keep animals away
* Signs that show sorting areas, emergency numbers, and tipping fees

CLOSURE AND MONITORING

Make a plan to close the landfill

When a landfill gets 'full' it must be closed. The work to close and monitor a landfill is just as important as the work to design and open one. This work requires input from qualified professionals and approval from regulators.

CLOSURE PLAN

* Make a schedule to complete the process
* Design the final cover
* Identify ways to control erosion
* Restore surface water drainage
* Monitor groundwater and landfill gases
* Plan for climate change

Some work needs to continue even after a landfill site is closed. Inspection and monitoring are important to make sure that the landfill is following the plan, so that it doesn't create problems for the community.

POST-CLOSURE CONSIDERATIONS

* Maintain the final cover
* Repair the cover if it gets damaged
* Keep water out of the landfill
* Monitor the surrounding environment

SORTING WASTE

Manage different types of waste separately

Materials arriving at the solid waste site need to be sorted to remove materials that don't belong in a landfill. Each type of waste should have its own location at the solid waste site, with signage for the different categories.

Only household garbage goes into the landfill and gets covered. Some waste items can be reused or recycled. Other types of waste have contaminants that do not belong in the landfill.

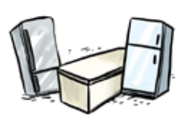
A community might have to store and then ship out some types of contaminated waste or other waste types.



MIXED WASTE



SCRAP METAL



APPLIANCES



HOUSEHOLD HAZARDOUS WASTE

Other potential categories include construction and demolition debris, salvage areas, recyclables and divertibles, and organic materials for composting.

MANAGING SURFACE WATER

Limit the creation of leachate



Leachate is water that has been in contact with waste, or is created from rotting waste. Some impacts of climate change are causing more water in landfills, resulting in the creation of more leachate. Landfills might need a plan to reduce, treat, and dispose of leachate, even if this hasn't been necessary in the past.

DIRECT WATER AWAY FROM SITE

Water should flow AWAY from the landfill so that it doesn't become contaminated. Manage ice and snow so it does not flow to the landfill when it melts.

COLLECT AND MANAGE WATER

Contaminated water should be collected, treated, and tested before being released into the environment.

PREVENT WATER FROM PONDING

Ponded water can make permafrost thaw faster and can destabilize the landfill site. It can also attract pests and cause bad smells.

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