

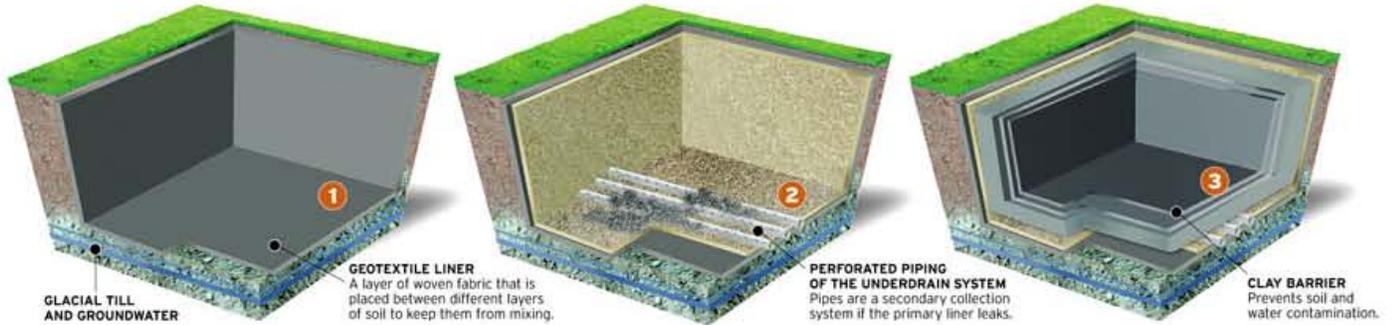
# Exploring the Juniper Ridge Landfill

Maine people and businesses generate tons of waste each day. Disposal is big business and one of the industry's biggest players is Casella Waste Systems Inc., based in Rutland, Vt. Operator of the state-owned Juniper Ridge Landfill, Casella also owns the Pine Tree Landfill in Hampden and many other facilities around the state. Regulators can claim a landfill uses effective containment technology; however, concerns persist about leaks and odors, truck traffic, and the impact on property values.

## Creating a landfill: Why Juniper Ridge?

Six reasons experts feel Old Town's Juniper Ridge is the proper place for a landfill.

- Thick, low-permeability glacial till soils underlie the site, up to 75 feet deep.
- Topography isolates groundwater beneath the site from Routes 43 and 16 and Stagecoach Road residences.
- Groundwater beneath the site moves toward the surface, thereby providing natural protection to groundwater outside the site.
- The landfill foundation soils are very stable.
- Nearest residence is more than 1,500 feet from the boundary of the landfill.
- The waste heap is located within a very large (780-acre) parcel, further isolating it from neighbors.



**STEP 1 PREPARATION**  
The site is excavated and lined to prevent contaminants from seeping into the groundwater.

**STEP 2 THE UNDERDRAIN SYSTEM**  
The underdrain system consists of 12 inches of drainage sand and perforated pipe surrounded by drainage stone wrapped in a feltlike material. The pipe serves as a secondary collection system if the primary liner above it fails.

**STEP 3 THE PRIMARY LINER SYSTEM**  
The liner system consists of 24 inches of compacted clay, another layer of clay sandwiched between synthetic textiles, and a polyethylene plastic liner. The primary liner acts like a giant basin under the waste heap.

### THE JUNIPER RIDGE LANDFILL OLD TOWN, MAINE

The 68 acres of permitted waste disposal land lies within a 780-acre property in Old Town. The fifth of a total of nine allowable cells is being filled, bringing the current height to 325 feet above sea level.



**GAS COLLECTION WELLS**  
Collection shafts are placed across the landfill to gather gas generated by the decomposing waste. Gas from these wells is burned at a candlestick flare located nearby.

**MONITORING SYSTEMS**  
Monitoring systems detect leachate or methane leaks outside the landfill.

**WASTE**

**LEACHATE COLLECTION SYSTEM**

**DRAINAGE GEOCOMPOSITE**

**GEOCOMPOSITE POLYETHYLENE PLASTIC LINER**

**GEOSYNTHETIC CLAY LINER**

**COMPACTED CLAY**

**DRAINAGE SAND, STONE AND PIPES**

**GEOTEXTILE WOVEN LINER**

**GROUNDWATER**

**GLACIAL TILL**  
Compacted native soil.

Not to scale

**LEACHATE COLLECTION SYSTEM**

**THE UNDERDRAIN SYSTEM**

**STEP 5**

**STEP 6 CLOSING THE LANDFILL**  
When the Juniper Ridge Landfill is filled to capacity, a final stabilizing soil layer will be placed over the

**STEP 4 THE LEACHATE COLLECTION SYSTEM**

Water percolates through the waste and soil of a landfill like water percolates through ground coffee in a drip coffee maker, picking up contaminants as it moves. This water is called leachate and is collected through perforated piping, stone, sand and a plastic and textile layer. Leachate is collected off the entire landfill area and is pumped into a storage tank with a 1 million-gallon capacity. It then is transported to an offsite wastewater treatment plant in Old Town.

**THE ACTIVE LANDFILL**

Waste is spread and compacted, with soil or a synthetic layer added daily to prevent waste from blowing and to limit pests. New collection and monitoring wells are installed throughout the active life of the landfill.

compacted waste. A 2-foot-thick clay cap will be added to prevent water from filtering in. A synthetic cap will also be added for additional protection and the landfill will be monitored for leaks. Gases produced by the landfill will be burned for energy production.

Juniper Ridge Landfill site layout, Old Town, Maine



**GAS COLLECTION AND ODOR CONTROL**

Bacteria in the landfill break down the trash, producing landfill gas, a sulfurous-smelling mixture containing approximately 50 percent methane and 50 percent carbon dioxide with small amounts of nitrogen, oxygen and hydrogen sulfide. Because methane can explode or burn, landfill gas must be removed. To do this, an extensive series of pipes are embedded horizontally and vertically within the waste heap, capturing the gas which is then burned off. Other methods of odor control include properly covering the waste and spraying deodorants, enzymes and hydrogen sulfide on the waste. In the future, this gas may be delivered, by a pipeline, to the University of Maine steam plant to be burned to generate heat for campus buildings.

**PROPERTY AREA**

780 acres

**PERMITTED WASTE DISPOSAL AREA**

68 acres (9 cells)

**PERMITTED FINAL ELEVATION**

390 feet or 190 feet above ground surface

**TOTAL PERMITTED CAPACITY**

10.28 million cubic yards

**TONNAGE RATE**

Approximately 50,000 tons/month



Hoover Dam in the Black Canyon of the Colorado River

**DAM THE TRASH?**

The Juniper Ridge Landfill in Old Town has a total trash capacity of 10.28 million cubic yards, enough to build nearly 2 1/2 Hoover Dams if the 726-foot-tall Hoover Dam were built out of trash rather than 4.36 million cubic yards of concrete.

SOURCES: Jeremy Labbe, engineering technician, Casella Waste Systems; Sevee and Maher Engineers; Maine GIS; U.S. Department of the Interior; DE Oracle; University of Maryland University College; HowStuffWorks.com; photos by Kevin Bennett and John Clarke Russ; landfill cutaway photo illustration by Eric Zelt

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