

A walk in the park

A planning and design committee has found success in its mission to convert the world's largest landfill into one of New York City's most magnificent parks.

By Adam Redling



For years, Freshkills was not exactly a high-traffic destination for New Yorkers. The 2,200-acre site, which was made up primarily of tidal creeks and coastal marshes along the west bank of the New York City borough of Staten Island, was largely uninhabitable before being converted into landfill space in 1948. Serving as the primary landfill for New York City's household garbage for decades, Freshkills Landfill earned the designation as the world's largest dump site during its operations. At its peak in 1986 and 1987, the landfill received as much as 29,000 tons of waste per day and employed 680 people. By 1991, the site was the city's only landfill accepting residential waste.



Nearing capacity, a state law was passed in 1996 mandating the landfill cease operations by the end of 2001. Anticipating the landfill's closing, the New York Department of City Planning (<https://www1.nyc.gov/site/planning/index.page>), in conjunction with other city organizations, formed the International Design Competition Organizing Committee in 1999 to help chart the course for the site's postclosure future.

The decision was made that the site that topped out at 150 million tons of solid waste would be given a very different second life as a park after more than 50 years as New York's primary dumping ground.

"The landfill closed in 2001. That same year, the Municipal Art Society (MAS) (<https://www.mas.org/>) reached out to Mayor Rudy Giuliani and called for an international design competition for the 2,200-acre site," Eloise Hirsh, Freshkills park administrator for NYC Parks, says. "The consensus was that the highest and best use of the land would be to re-envision it as a park. The competition winner was [New York City-based] Field Operations (<http://www.fieldoperations.net/home.html>), the same landscape architecture firm that later designed the High Line. The team held community meetings from 2003 to 2006, which informed the master planning process that resulted in an illustrative park plan, also known as the Draft Master Plan. In 2006, NYC Parks took over implementation of the project, using the Draft Master Plan as a conceptual guide. The basic framework of the plan integrates three separate systems—programming, wildlife and circulation—into one cohesive and dynamic unit."

The park was designed to hold various public spaces and facilities and include everything from playgrounds and athletic fields to horseback riding trails and large-scale art installations. The redevelopment, which started in 2008, is slated to run through 2036. When all is said and done, Hirsh says the park will be three times the size of Central Park and the largest park developed in the city in more than 100 years.

The scope of the project has forced redevelopers to be strategic in their operations and planning, but the plan is to slowly integrate the site.

"Because the site is so large and complex, the park is being developed from the outside in," Hirsh says. "Community-facing projects are opening first, and the park will become more and more connected over time. Public safety concerns about making the landfill into a park have been addressed through transparency about the regulatory process, both during tours and in informational materials. We hold public events throughout the year, allowing the public to tour the site and learn about the transformation, including the detailed capping process and safety measures."

THE CONVERSION PROCESS

While the closure of any landfill requires intense planning, the work being done to safely cap and redevelop the Freshkills Landfill is predicted on intense oversight. Suffern, New York-based SCS Engineers of New York, PC



Photo: Daniel Avila, NYC Parks

(<https://www.scsengineers.com/>) has been tabbed as the design engineer for the final phase of the Freshkills project, while Los Angeles-based AECOM (<https://www.aecom.com/>) serves as the construction manager and Tully Construction Co., Inc. (Tully Construction Co., Inc.), Flushing, New York, serves as the construction contractor.

"The landfill is regulated by the New York State Department of Environmental Conservation (NYSDEC) (<https://www.dec.ny.gov/>). To meet regulations for landfill closure, NYC Sanitation manages collection and treatment of the landfill's byproducts—landfill gas and leachate," Hirsh says. "They also capped the landfill mounds with layers of soil and geotextiles (a gas venting layer and a drainage layer) as well as a plastic geomembrane."

Hirsh says they also conduct air, surface water and groundwater monitoring on a regular basis to ensure that the landfill infrastructure functions properly.

Sophisticated engineering standards are in place throughout the site to deal with the leachate and landfill gas in a manner that ensures the safety and health of the public, Hirsh says.

The landfill gas system relies on a network of wells and pipes that pump the gas through a vacuum. After collection, this gas is either burned or processed for energy at an on-site recovery facility. Through this process, Hirsh says, emissions, non-methane organic compounds (NMOCs) and other pollutants are reduced by almost 100 percent. This process also helps contain the gas and its odor from entering the atmosphere.



There are four mounds of waste on-site at Freshkills. Two of the four were closed and capped in 1997. The remaining two mounds began to be capped in 2007 and are expected to be completed by the end of the year. The cover placed on the mounds is built out in phases to maximize

hydraulic performance, slope stability and durability of the systems. The landfill cover is being designed to include a soil barrier layer, gas venting layer, impermeable liner, drainage layer, barrier protection layer and planting soil layer. Each layer has a unique design and function to help contain the landfilled waste:

Soil barrier layer: The soil barrier layer is the base layer that is placed on the solid waste, graded and compacted to specification. Before the final cover is placed, this layer may need to be regraded to ensure the slope falls within the minimum and maximum grades of 4 to 33 percent as specified by the NYSDEC to help with stability and drainage.

Gas venting layer: The gas venting layer is made up of a geocomposite material that helps move landfill gas toward vents or extraction wells.

Impermeable liner: The impermeable liner, or hydraulic barrier, is placed on the subbase material and prevents water from reaching the waste. Made of clay or plastic, this layer stops the flow of water and also helps promote storage and drainage in the above layers. This layer is also used to block gas from escaping the former landfill.

Drainage layer: The drainage layer is used in some portions of the cover to provide drainage for the above layer, ensuring that soil doesn't become oversaturated. This layer is also used to prevent slipping and helps reduce the pressure of water on the barrier layer.

Barrier protection layer: The barrier protection layer is comprised of soil and used to protect the impermeable liner from weather conditions that could cause cracking and heaving. With a minimum thickness of 24 inches (greater where trees are located), this layer helps store excess moisture until it can be drained or used by plants and foliage.

Planting soil layer: The planting soil layer, or topsoil layer, has a minimum thickness of six inches. Sandy loam soil is used because of its fertile nature that is conducive for vegetation growth and for its propensity to prevent soil erosion.

With these layers are in place, the leachate management system can work to remove would-be pollutants through collection and treatment of the liquid waste byproduct.

TAKING SHAPE

The vision of Freshkills Park has slowly been coming into focus over the last several years.

In 2012, Schmul Park was finalized on the outskirts of the site, which houses handball and basketball courts along with playground equipment. Owl Hollow Field followed in 2013 and features four soccer fields, a walking path and a parking area—a park house is also being added to the site as part of an ongoing construction effort. In 2015, New Springville Greenway, a 3.3-mile bike path located on the eastern edge of Freshkills Park, was opened. Currently, North Park is in its first phase of development and is slated to be completed in 2020.

When finished, this 21-acre site will connect visitors to different areas of the park through its walking and high-speed paths located among seven acres of native seed plots.

Though the work is just beginning in redeveloping the 2,200-acre site, NYC Parks and the Freshkills Park Alliance (<https://freshkillspark.org/>) have been working with NYC Sanitation to organize on-site events and programs to introduce parts of Freshkills Park to the public.

"These opportunities allow people to explore closed sections of the future park and learn about the project while the transformation is underway," Hirsh says. "In terms of feedback, people are impatient for the park to be completed—once they get to see this great site during a tour or event, they want to visit all the time."

The transformation of Fresh Kills from the largest landfill in the world to one of the city's biggest and brightest park systems can serve as a model for other municipalities during the postclosure landfill planning process, according to Hirsh.

"Creative reuses of landfills can be critical in the quest to add ecological functions and amenities to urban regions," Hirsh says. "When determining the redesign for a landfill, cities could benefit from a similar master planning process informed by community input. With public tours, research and art projects, Freshkills is an example of how multifaceted the reclamation can be."

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