

CASE STUDY

DONZI LANDFILL EXPANSION USING STRATAGRID

Innovative site development program increases landfill capacity by more than 3 million cubic yards.

Owner:	APAC-Southeast Atlanta, GA
Site Consulting Engineer:	Hodges, Harbin, Newberry & Tribble, Inc. Macon, GA
Reinforced Structure Design:	Schnabel Engineering Westchester, PA
Contractor:	APAC Construction Atlanta, GA
Geogrid Type:	Stratagrid
Slope Geometry:	Max. Height: 40 Feet 0.5H:1V Reinforced Steep Slope

Background:

The Donzi Lane Landfill in Atlanta, GA had been in use since the 1970's for construction and demolition waste disposal. The site was nearing its capacity and additional landfill space was urgently needed due to the accelerating population growth and waste stream generated by development. Due to the high cost and long lead times for designing, permitting and constructing new landfills, the owners of the Donzi Landfill decided to explore innovative ways to expand the existing capacity. Lateral expansion was not possible and only vertical expansion with steepened slope alternatives was evaluated. However, vertical expansion created an added complication. The high voltage power lines on site would have to be relocated due to overhead clearance concerns. After much review, the StrataSlope System (geogrid-reinforced steep slopes with wire-basket facing) was selected to increase the landfill volume and provide the most cost effective solution to this site



Figure 1. Wire baskets are used for the facing of the



Figure 2. Stratagrid and backfill used along with wire baskets.



STRATASLOPE

VERTICAL EXPANSION GEOTECHNICAL DESIGN

Increases in usable landfill volume can be achieved when side slopes are steepened with geosynthetic reinforcement. Stability analysis was performed using currently available design programs which analyzed internal stability, compound stability, direct sliding and deep seated analysis. Seismic stability analysis was also performed, completing the geotechnical analysis of the site structures.

The foundation conditions and waste currently on-site were competent enough to allow the increase in loading from both the steepened slope and additional waste. Two options were evaluated:

Option 1 1H:IV (45°) Vegetated reinforced steep slope.

Option 2 0.5H:IV (63°) Reinforced steep slope with rock filled wire basket facing

Option 2 was selected and is shown in Figure 2. This solution provided more expansion capacity. It was also the best option for staged construction, which would permit vertical expansion to proceed as additional landfill capacity was needed. The planned finished height of the structures reached 40 feet.

The primary reinforcement layers consisted of Stratagrid SG500 and SG550 with maximum embedment lengths of 26 feet. Vertical spacing of the primary reinforcement varied. The vertical spacing for the initial 6 feet of slope construction was 1.5 feet, while 3 feet vertical spacing was utilized for the remainder of the slope up to the maximum vertical height of 40 feet. The facing detail utilized Stratagrid SG150 for secondary reinforcement and 90-degree welded wire baskets for facing support. Since aesthetics was not an issue and the owner did not want to maintain a vegetated slope, the baskets were filled with stone. This facing detail also provided long-term erosion control.



Figure 3.

High Tension Line Relocation

The existing high tension lines were mounted on transmission supports that traversed the center of the landfill. Height limitations were so severe that dump trucks could no longer lift their beds to discharge waste without interfering with power lines. The lines had to be relocated and raised to allow dump trucks to traverse the site. This was a critical-path activity due to the new power line foundation supports being located within the reinforced fill. The black bands on the power lines shown in Figure 3 indicate the maximum slope height.

In Summary

The design and construction of a Stratagrid-reinforced retaining structure around the existing Donzi landfill provided a safe, highly engineered method of expanding this tightly-restricted landfill. It was constructed with the landfill operator's own crews, and the completed project resulted in more than 3 million additional cubic yards of volume.



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