Case Studies of Extreme Weather Performance of Engineered Turf Final Cover System

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INTRODUCTION

A landfill final cover system is designed and constructed to manage and mitigate potential long-term risks that the underlying waste may pose to the environment. The past 10 years have seen a rapid increase in the use of the engineered turf final cover system for closure of municipal solid waste (MSW) and industrial landfills, coal combustion residual (CCR) impoundments, and other waste disposal facilities.

The engineered turf cover consists of, from bottom to top, a structured geomembrane, an engineered turf, and a specified infill. The structured geomembrane serves as a hydraulic barrier to isolate waste from the environment and minimize infiltration of precipitation into the waste. The engineered turf covers the underlying geomembrane and protects it from ultraviolet (UV) radiation exposure and wind uplift. The sand infill provides additional ballast against wind uplift and protection against UV exposure and improves trafficability.

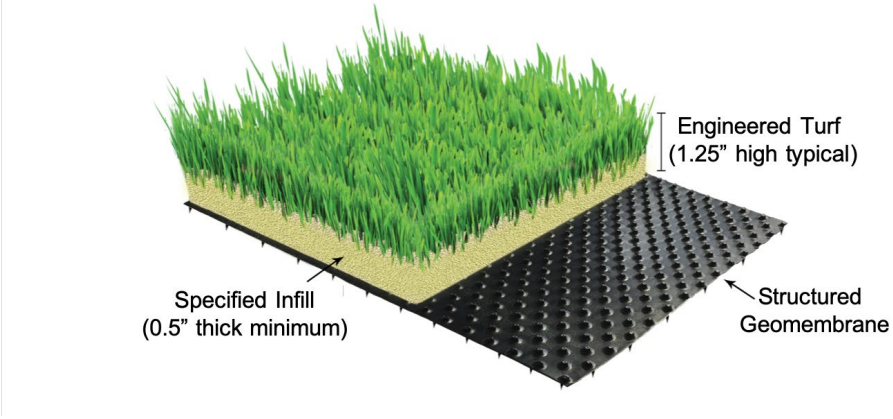


Figure 1. Illustration of Engineered Turf Final Cover System

The engineered turf cover has been developed to be an environmentally friendly and aesthetically pleasing final cover system that mitigates the challenges of traditional soil cover systems associated with veneer instability, soil erosion, and long-term maintenance. Since the first installation on an MSW landfill in Louisiana in 2009, more than 2,000 acres of the engineered turf cover have been installed or are being installed on sites located in a wide assortment of climactic conditions.

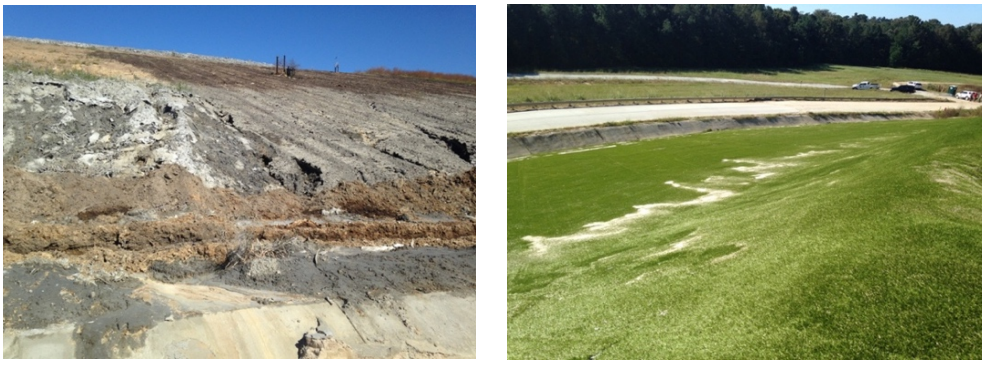
REAL-WORLD PERFORMANCE

A few of the engineered turf final cover sites have experienced significant or even historic weather events. The performance of the engineered turf cover at these sites is evaluated in response to various weather conditions, including UV radiation, freezing temperatures, historic rain events, strong winds, and lightning and fire. In addition, the field performance of the engineered turf cover is compared to traditional soil covers with respect to soil erosion, slope stability, runoff quality, and post-closure maintenance.

Figure 2 compares the stormwater pond water quality before and after the installation of engineered turf final cover system at the Saufley Field Road Landfill located in Pensacola, Florida, which has experienced multiple hurricanes and severe storms since the installation of the engineered turf final cover system in 2013. Figure 3 shows the site conditions after the historic, 1-in-1000-year storm event in October 2015 at the Berkeley County Landfill, South Carolina. The area with the engineered turf final cover system experienced minor sand infill migration that did not require repairs; while the area with the soil cover required significant effort to repair soil erosion caused by the storm.

(a). Before Closure (b). After Closure with Engineered Turf Cover

Figure 2. Comparison of Stormwater Pond Water Quality



(a). Soil Cover Area (b). Engineered Turf Cover Area

Figure 3. Comparison of Cover Erosion after Historic Storm Event

CONCLUSION

The case studies demonstrate that the engineered turf final cover system has outperformed traditional soil covers under some extreme weather conditions.