Case Study

Multi-component sealing of a rainwater retention pond with the use of BENTOFIX® X and SECUGRID®

NAUE

Geosynthetic clay liners have been one of the most dynamically evolving solutions in geotechnical engineering. From the late 1980s, when NAUE innovated the needle-punching process to enhance GCL performance, the material class has seen steady advances in manufacturing and barrier application use.

The composite nature of GCLs has enabled them to regularly extend performance and project relevance. Each component of a GCL can be improved to suit site- and application-specific challenges. For example, the durability and frictional characteristics of geotextile cover and carrier layers can be increased. Reinforcing scrims can be added. Coatings can be applied to enhance performance against specific fluids, mitigate root penetration risks, further protect against desiccation, etc.

This exceptional adaptability has helped GCLs extend into containment and seepage control designs of all sorts and on all scales: landfills, coal ash closures, mining, environmental remediation, and many other containment sectors. One of the growing markets for multi-component GCLs is rainwater retention basins.

Multi-component GCLs are varieties of GCLs with additional surface or bentonite treatments. NAUE's Bentofix® X geosynthetic clay liners utilise an extruded polyethylene coating for greater service life durability and performance against challenging liquids.

The planning work of Ingenieurbüro Dipl.-Ing. Gröticke & Partner GmbH exemplifies the growing importance of multi-component GCLs in infrastructure. The company was engaged to design a rainwater retention pond for the community of Allendorf (Eder), which boasts of a history that extends back into the early 12th century. The permanent storage capability required of the new basin was 1,350 m^3.

The basin design also demanded slope reinforcement to satisfy the site's available footprint and ensure stability with the fluctuating heads that would be placed on the system.

Bentofix® X10F BFG 5300 with self-sealing overlaps was specified for the containment. The traditional Bentofix® construction, with its highly durable geotextile outer layers and core of high-swelling sodium bentonite, provided the uniform, multi-directional, shear-resistant, hydraulic barrier required for the application. The use of an "X" type multi-component GCL, with its extruded polyethylene coating, added the enhanced chemical compatibility performance, long-term durability, and root barrier protection desired for the project.

Basin slopes were stabilised with Secugrid® 40/20 R6 geogrids. The geogrid is engineered with stretched, monolithic flat bars and welded joints for high-strength soil reinforcement.

The combination of these geosynthetics has given Allendorf an exceptional new basin with a long-term design life. The very low hydraulic conductivity of the multi-component GCL guards against leakage, thus allowing basin operators to tightly control stormwater release cycles and mitigate flood risk.

Project Name:
Rainwater Retention Basin "Am Homberg", Allendorf (Eder)

Engineer:
Ingenieurbüro Dipl.-Ing. Gröticke & Partner GmbH, Twistetal

Installation Contractor:
Joh. Wachenfeld GmbH & Co. KG, Korbach

Contracted Installation Company:
Enig GmbH, Arnstadt

Products:
Bentofix® X10F BFG 5300
Secugrid® 40/20 R6

NAUE GmbH & Co. KG
Gewerbestr. 2
32339 Espelkamp
Germany

Phone +49 5743 41-0
Fax +49 5743 41-240
info@naue.com
www.naue.com