

# Bentofix® Carbofol® Secudrain®

Modern sealing systems in landfill  
engineering

**Project name**  
Ennigerloh central landfill, North Rhine-Westfalia

**Designer**  
iwa Ingenieurgesellschaft für Wasser- und Abfallwirtschaft mbH & Co. KG, Münster

**Landfill operator**  
Abfallwirtschaftsgesellschaft des  
Kreises Warendorf mbH (AWG)

**Installation of sealing system**  
Naue Sealing GmbH & Co. KG

**Design support**  
BBG Bauberatung Geokunststoffe GmbH & Co. KG

**Products**  
Bentofix® NSP 4900 (LAGA)  
Carbofol® HDPE 2.5 MF/MF  
Secudrain® RZ 331 WZ 701 RZ 201





Fig. 1: Installation of the capping sealing system

### Challenge

Sealing systems made of mineral components and geosynthetic materials are used as technical barriers in landfills. As a base seal, these engineered systems prevent polluted liquid seepage into groundwater. As a landfill cap, they prevent the infiltration of precipitation into the landfill while also preventing leachate from percolating out and polluting surface waters.

The Ennigerloh landfill in North Rhine-Westfalia, Germany, exemplifies how these barrier systems succeed. The operator of this landfill continuously invests in the extension of the site’s technical barriers. These investments not only cause legal requirements to be fulfilled but also minimise leachate generation.

Leachate can require complex treatment before it is considered clean enough for discharge. It can add considerable operational cost to landfills during active fill stages and in post-closure care.

In 2019, the landfill capping system was expanded for section IVa. The cap involved a surface area of 50,000m<sup>2</sup>, both on the plateau and on the slopes 1 : 3 (V : H).

### Solution

The use of geosynthetics as technical functional layers in the sealing system proved to be the most economical alternative for the sealing system. Bentofix® geosynthetic clay liner (GCL) was used as the mineral component of the sealing system. A Carbofol® geomembrane serves as polymeric barrier for the sealing system.

Secudrain® drainage composites were used above the sealing components to manage water in the soil cover layer. This prevented the harmful water accumulation in the soil cover, which could otherwise impose mechanical stress on the geomembrane or lead to cover soil weakness and erosion that would impair proper surface recultivation.

Where applicable, all products installed were approved for landfill use by the Federal Institute for Materials Research and Testing (BAM) in accordance with German waste regulations. The Bentofix® GCL fulfilled the LAGA certificate of suitability requirements for German landfill classes I and II.

For the landfill operator it was of huge benefit to receive a full service from one single company. This included the design, the supply and the installation services. Naue was able to deliver this package for their entire barrier system just as successful as in previous sections of Ennigerloh landfill.

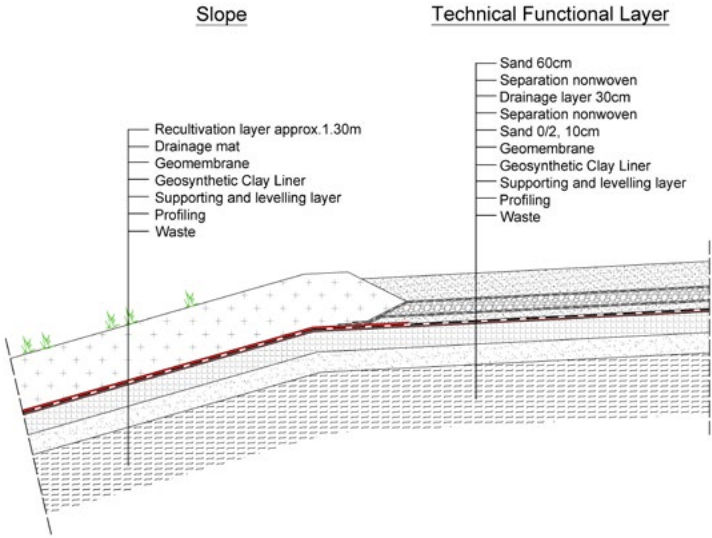


Fig. 2: Structure of the sealing system, section IVa