Landfill Cap Drainage & Gas Venting

Pozidrain, Chelson Meadow Landfill Site, Plymouth, UK

CASE STUDY

Project Information

Client	Plymouth City Council
Contractor	McArdle/May Gurney/Morrison
Product	Pozidrain 6S250D/NW8 & Claymat
Quantity	900,000m² & 450,000m²
Benefits	• High flow capacity in both directions • Excellent geomembrane protection • Large rolls for rapid installation • Adequate frictional performance for slope stability

Project Description

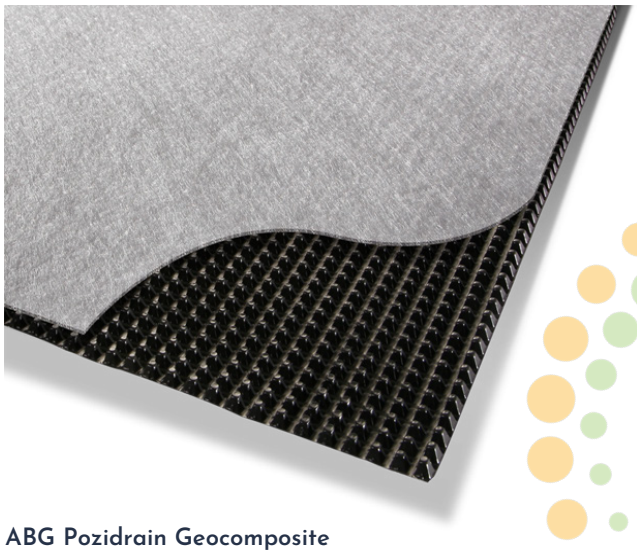
Plymouth Council's Chelson Meadow Landfill Site is located on the land bordering the estuary of the River Plym, in Devon, England, and for more than four decades it was the main landfill site for the Plymouth area.

The Authority approached Pell Frischmann to design a final capping system for this environmentally sensitive location. The site is next to the National Trust's Grade 1 listed Saltram House and the old tip was seen as an eyesore to visitors. The work to return the landfill site to grassland was a legal requirement by the Environment Agency.

The Challenge

An estimated 17,650,000 tonnes of landfill needed to be capped with a permanent geosynthetic capping system and 0.5m of soil cover.

The first capping phase was in 2005 and the site needed to be permanently capped and closed by 2012. The requirement was to eliminate the use of expensive drainage stone and design a cost effective geosynthetic capping solution that would comprise geocomposite drainage and protection layer, impermeable membrane and gas venting geocomposite. A large proportion of the landfill cap was to be constructed on steep slopes where it was necessary to ensure slope stability during construction.



ABG Pozidrain Geocomposite

ABG LTD

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The Solution

The designers worked with ABG to develop a geosynthetic capping solution that would provide adequate drainage, gas venting, membrane protection and frictional performance to ensure slope stability. Pozidrain 6S250D/NW8 geocomposite was specified and installed above and below the Claymat GCL to provide drainage, gas venting and adequate protection. The thickness of the cover soil was 0.5m on all capping phases. Pozidrain geocomposite provided the required flow capacity and interface shear strength to achieve stability on 1 in 3.5 slopes. Gas from the landfill site was harnessed and used to power six gas turbines for generating energy to go back into the national grid. From 2005 to 2012 Chelston Meadow landfill site has been restored and landscaped into an area of grassland with the long-term plan for recreational use.

The ABG Service

ABG provided technical advice and design assistance on this landfill capping project. This included shear box testing, slope stability and flow capacity calculations.

Large Pozidrain rolls enabled rapid installation

Claymat GCL installed between Pozidrain geocomposites

Adequate interface friction ensured slope stability

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