

Case Study

# Landfill Capping Systems with **BENTOFIX® X**





Fig. 1: Bentofix® as landfill capping system

### Challenge

Townsville city lies on the northeast coast of Queensland, Australia with an estimated population of 200,000. Townsville city council runs three operational landfills that are open to the public. The Townsville Waste Services Department issued documentation for contract in late 2014 for capping and stormwater management of its two largest waste facilities at the Stuart landfill and the Hervey Range landfill. The Stuart landfill has an area of 81 hectares, while the total area of the Hervey Range landfill is approximately 74.6 hectares.

The council engaged Golder Associates to design a landfill cap for both Hervey Range and Stuart Landfill. Hervey Range landfill needed a cap to be installed, while the previous cap of Stuart landfill site required to be extended. As typically 800mm - 1000mm of cover soil is needed above the landfill cap linings, the client was looking for a solution to reduce the amount of cover soil and increase the landfill space. By reducing the cover soil, the lining system is exposed to the increased risk of desiccation, ion ex-

change and root penetration. The long slope length, the relative steepness and the adjacent waterway made the capping on site quite difficult, especially in the Hervey Range landfill.

### Solution

With the help of Global Synthetics, our partner in Australia, the designer carried out several tests, including interface shear strength tests, using on-site soil to determine the most suitable type of geosynthetic clay liner (GCL). After considering different options, a PE-extrusion-coated, multi-component GCL Bentofix® was selected to be used as a single liner. A 500mm cover soil was accepted based on research, test results and previous case studies. Bentofix® X10F also has high frictional properties that improve interface shear on steeper slopes and ensure the stability of the landfill capping.

Bentofix® X10F was designed with the coated surface upward to provide greater protection against bentonite desiccation, ion exchange and root penetration. This enables a single liner solution with only 500mm cover soil as landfill capping.

During installation, Butyl tape was used on the overlaps of GCL layers in order to seal off the capping completely from gas leakage even before hydration.

Surface water penetration is controlled by a composite drainage layer placed on top of the coated GCL. Where necessary, geogrids were used as veneer reinforcement together with a gabion structure at the toe to support the steep slope area. A turf reinforcement mat was used as the final layer to promote vegetation and protect the cover soil.

A total of 100.000m<sup>2</sup> of Bentofix® X10F was supplied to the project site. It is the first and largest project in Australia using this multi-component Bentofix® GCL. The great success of this project resulted in the approval of using frictional coated GCLs for landfill cappings in Australia.

Cover Photo Courtesy of Townsville City Council.



Fig. 2: Butyl tape for the sealing of the overlap

**Project Name:**  
Hervey Range and Stuart Landfill

**Supplier:**  
Global Synthetics Pty. Ltd.

**Consultant:**  
Golder Associates Pty. Ltd.

**Product:**  
Bentofix® X10F BFG5300



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