CASE STUDY

Project: Stonefields Housing Development
Date: March 2009
Client: Todd Property Group
Location: Mt Wellington, Auckland

ELCOSEAL

Stonefields is a 110 hectare residential development of the former quarry in Mt Wellington, Auckland designed to provide more than 2,900 dwellings for over 6,500 people. Woods are the engineers responsible for the design and implementation of a comprehensive Stormwater Management Plan which forms part of the sustainability requirements of the project. The key element of this plan is the re-use of stormwater via a ‘third-pipe’ system and an extensive wetland system.

Stormwater detention ponds form an integral part of the Stormwater Management Plan. These ponds required lining as the underlying ground was very permeable. The choice of liner had to take into account a very weak foundation soil with varying CBR strengths down to 1% which can result in differential settlements across the base of the pond.

The 5500m2 pond within the wetland area was designed to be a feature pond in this residential development so retention of the stormwater was paramount. The engineer decided that the use of ELCOSEAL X1000, a geosynthetic clay liner, would be a very effective solution for lining the pond to stop the loss of stormwater into the underlying ground. Traditional HDPE liner was considered for this site however this method of lining requires bringing in specialist installers and the installed cost versus the cost of ELCOSEAL X1000, which can be installed by the earthworks contractor (Hick Bros), was prohibitive.

The engineer was also concerned about the weak sub grade with possible settlement resulting in undue stress on the pond liner and possible loss of integrity. To solve this problem Geofabrics supplied geogrid was laid on the sub grade and a crushed scoria backfill was placed and compacted over the geogrid to a smooth finish prior to installation of the ELCOSEAL X1000 liner.
The use of a fine scoria backfill provided an ideal base for the liner. A 300mm cover layer of a soil/clay mix was then placed over ELCOSEAL X1000 to confine the swelling of the bentonite during the hydration process. Once hydrated under this confining pressure, ELCOSEAL X1000 creates an effective water proof layer for the pond.

The establishment of grass and planted vegetation along the banks of the pond was helped with the placement of Biomac C300, a biodegradable erosion control mat, used to minimise soil loss into the pond and eliminate surface scour during heavy rainfall events.

How ELCOSEAL® GCL’s work.

ELCOSEAL® Geosynthetic Clay Liners (GCL’s) are used as a lining system in landfills and waste containment structures, as well as for liquid containment in effluent ponds, wetlands and canals.

ELCOSEAL® GCL’s consist of a layer of bentonite stitched between two layers of woven and nonwoven geotextiles. This needle-punching process reinforces the bentonite layer with thousands of fibres maximising the shear internal shear resistance of the product. An additional heat treating process called “Thermal Locking” secures the needle-punched fibres, further improving the materials performance.

ELCOSEAL® GCL’s incorporate high-grade Australian sodium bentonite powder which, when hydrated, forms a barrier that prevents seepage and contamination of the surrounding groundwater. The chemical properties of the clay is key to the long term performance of the containment function of the GCL.

ELCOSEAL® GCL’s are used as a replacement to traditional lining systems achieving similar levels of performance to thick (600mm to 1m) natural clay layers.

Geofabrics supports ELCOSEAL® GCL’s with design and installation support tools, and high level support through the Geosynthetic Centre of Excellence, allowing customers to ensure the lining system design is effective with the site specific liquor.