

KAWAKAWA BAY LANDSLIDE MANUKAU CITY

RETAINING AND REINFORCED SOIL SYSTEMS

Product: Miragrid GX, Biomac Grasstrike, Bidim Geotextile

Problem

In July 2008, high intensity rainfall events triggered landslips across the North Island. One such slip occurred at Kawakawa Bay in early August 2008. Initially approximately 500m³ of slip debris fell from the top of a cliff face and blocked the Clevedon to Kawakawa Bay Road, with the debris sliding over and exposing the underlying local greywacke base rock.

Tension cracks and a head scarp feature were identified enveloping a house platform 100m back from the cliff face and it very quickly became apparent that a major deep landslide was affecting the whole of the hillside and cliff face. Daily survey of surface monitoring points confirmed that the landslide was active in the then prevailing wet weather conditions with accelerating movement of the order of up to 30mm per day (total displacements of the order of 500mm). Assessments of the potential run-out distances from the very large mass of the landslide (estimated at 400,000m³) indicated that at least five occupied dwellings at the foot of the hillside were potentially at risk of inundation with debris.

Solution

The remedial works were put in place to increase the hill stability which comprised of:

- The removal of 100,000m³ of earthworks to unload the top of the landslide thus reducing the driving force.
- Building a geogrid reinforced soil buttress at the base of the landslide.
- Drainage to lower the ground water pressures beneath landslide
- Ground anchors to restrain movement of the landslide.

Since January 2009 earthworks and drainage have been undertaken under the emergency provisions of the RMA. The drainage has yielded significant volumes of water with a measureable effect on reducing and limiting the pore pressures in the rock. No further movement of the landslide has been detected as a result of rainfall events in 2009.

Client name:

MANUKAU CITY COUNCIL

Main contractor name:

DOWNER EDI WORKS

Engineers name:

TONKIN & TAYLOR

Product used:

MIRAGRID GX40/40, GX80/30, GX160/50,
BIOMAC R300, BIDIM A14

Construction date:

JANUARY - JUNE 2009



The initial site before construction



Building of the reinforced soil slope

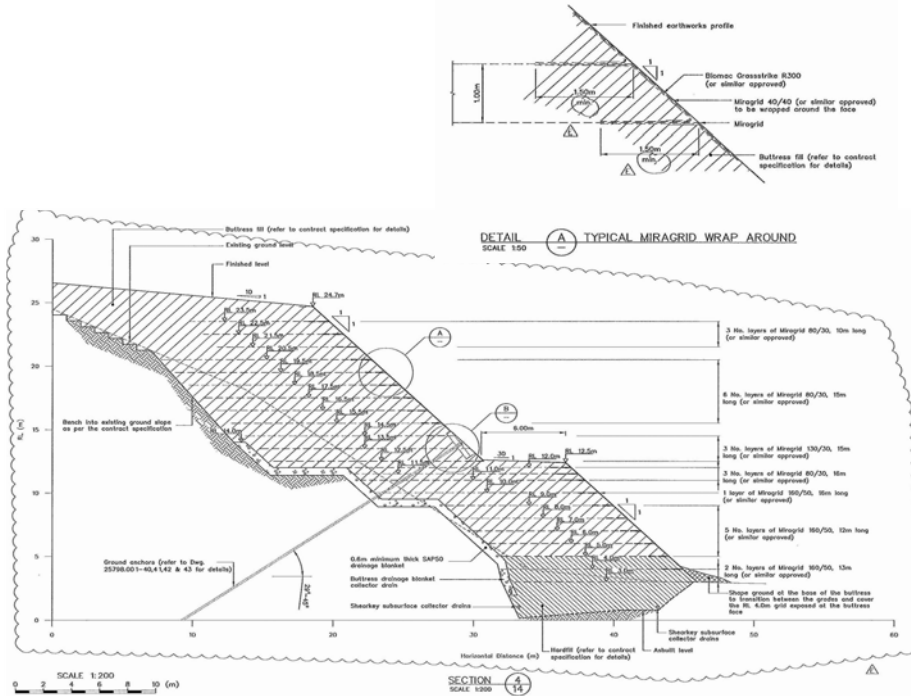


Greening of the reinforced soil slope

Construction

Speed of construction was paramount to stabilise the hill side and stop a further landslide. The Miragrid geogrids met the design requirements and were readily available for the start of construction in late January 2009. With the wide roll widths at 5.2m this enabled the contractor to save time and money with a decrease in installation time. By utilising the biodegradable Biomac Grasstrike in the front face of the wrap around buttress structure a green finish was achieved restoring the hill (as close as possible to its original state).

Typical Buttress Section Details (the source of the drawing details is from Tonkin & Taylor Construction Drawings)



Completed Miragrid & Grasstrike reinforced steep soil slope

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