

Project: Defender Lane Landslide Mitigation
Date: June 2015
Client: SCIRT/Downer
Location: Christchurch



Green Terramesh Embankment

A number of houses located at the foothill of a loess slope near Defender Lane in Christchurch were identified as being at high risk to exposure to seismically induced landslide events.

The engineers URS (now AECOM) was tasked to design a protection structure in conjunction with the Downer delivery team under the Christchurch Rebuild program. The total loess slope landslide volume was estimated to be between 700-1000 cubic metres having an estimated velocity at impact of 5m/s. This landslide mass was treated as debris flow impacting against the protection structure.

Among the products considered was a debris flow fence (which Geofabrics supply) however the final decision was to select the Green Terramesh (GTM) reinforced soil embankment for this site. Ease of maintenance without replacement and long term durability were among the essential benefits in favouring the GTM embankment option with the added advantage of the GTM embankment having the ability to receive multiple impacts without the need for major repair.

Geofabrics assisted with the internal stability analysis of the reinforced soil embankment using MacStars-W software. The analysis assumed a dynamic pressure due to the debris flow impact of approximately 94kPa against the uphill side of the embankment. Internal stability analysis was performed for the reinforced soil mass with consideration given on the impact pressure especially at the upper portion of the embankment with the remaining static load at the lower portion after accumulation of material.

The Green Terramesh embankment took the 6-man construction team approximately 10 weeks to complete. This included the backfilling and compaction of the 1v:2h slope batter on the downhill side along with other drainage and landscape works.



GTM embankment construction (Photo courtesy of Downer)



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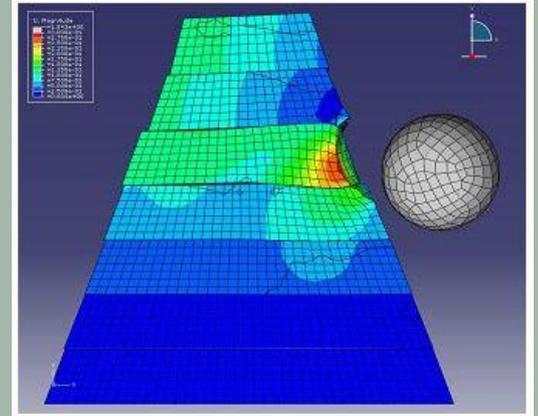


Upon completion of GTM embankment (Photo courtesy of Downer)



Vegetation taking place on GTM face

The ductile nature of a Green Terramesh reinforced soil embankment having a very energy absorption rating was verified in Finite Element Modelling and validated from full scale trials:



For sites with allowable footprint, the benefit of a Green Terramesh embankment over a debris flow or catch fence include:

- Higher durability
- Ease of maintenance
- Localised repair after impact
- Multiple impacts ability
- Use of local construction

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