



KAYTECH CASE STUDY

SLOPE STABILISATION USING REINFORCED SOIL RETAINING STRUCTURE FOR ROAD REALIGNMENT ON THE R56

GEOSYNTHETICS USED

RockGrid® KX 60/20: Geogrid providing tensile reinforcement and distributing loads across the slope while improving overall stability.

bidim® A2: Nonwoven geotextile offering filtration and separation, preventing soil migration behind the retaining structure.

Kaybion®: Galvanised steel facing panels forming the structural wall and interfacing with geogrid reinforcement.

SoilSaver®: Biodegradable erosion control matting protecting topsoil and supporting vegetation establishment for long-term surface stability.



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PROJECT DESCRIPTION

A design realignment at 155.8km on the R56, east of the Mzimvubu River Bridge near Matatiele, required widening an existing road cutting. The cutting comprised a deep weathered dolerite profile with clayey silt overlying sandy silt and silty sand, containing weathered and unweathered dolerite boulders. Excavated material was reused for road construction layers. To maintain a stable 33° vegetated cut batter with a design factor of safety of 1.5, a 4 m high retaining structure was necessary.

A BETTER SOLUTION

The project employed a reinforced soil approach, combining RockGrid® KX 60/20 geogrid layers with compacted fill to form a composite slope that resists lateral pressures and stabilises the embankment. This method minimised large-scale excavation and the importation of high-quality fill, enabling effective reuse of on-site materials while maintaining structural integrity. Finite element analysis using RS2 verified the factor of safety, ensuring the design met long-term performance criteria.

A 4m high Kaybion® facing was anchored with 4m long RockGrid® tiebacks at 1m vertical intervals, positioned perpendicular to the wall to optimise tensile reinforcement. The surface was cleared and levelled prior to installation to prevent tension irregularities. A bidim® A2 geotextile provided filtration and drainage behind the structure, while 15,000m² of SoilSaver® biodegradable matting secured 150mm of topsoil on the upper embankment, supporting vegetation growth. Coordinated geosynthetic layering, careful placement, and controlled compaction ensured uniform load distribution and produced a resilient, long-lasting reinforced soil mass capable of withstanding environmental and structural stresses.

A 230 m long reinforced retaining structure was successfully constructed, supporting the widened road alignment. The reinforced soil system achieved a factor of safety exceeding design requirements while enabling reuse of excavated material. The retained slope was stabilised with 150 mm of topsoil and approximately 15,000 m² of SoilSaver® matting, which was hydroseeded to establish vegetation and provide long-term surface stability.



Existing Mzimvubu cut prior to construction



Construction of reinforced Kaybion® structure underway



Completed 230m Kaybion® wall with SoilSaver® stabilising the embankment

Did you know?



Reinforced Soil Mass

Geogrid layers interact with compacted fill to form a reinforced soil block that behaves as a stable gravity structure.



Vegetation Establishment

Biodegradable erosion control matting stabilises topsoil and supports vegetation growth on newly formed slopes.



Material Reuse

The solution enabled the reuse of excavated cutting material, reducing the need for imported fill and minimising environmental impact.