



CASE STUDY

GREAT NORTHERN HIGHWAY REALIGNMENT

Port Hedland, WA, Australia

Reinforced Earth® Retaining Walls
TerraPlus®

Owner: Main Roads WA

Consultants: BG&E

Contractors: Macmahon & John
Holland

Construction: Dec 2012 – Jun
2014

Background

Port Hedland is located in the Pilbara region, 1765 km north-west of Perth, Western Australia. It is the highest volume port in Australia and continues to grow in line with increased mining activity in the area. This growth in activity created conflict between heavy haulage vehicles servicing the port and local traffic from the towns of Port Hedland, South Hedland and the Wedgefield industrial area. The amount of traffic on the Port to South Hedland link grew by 25% over three years and led to delays at major intersections.

Main Roads WA, after consultation with local industry, stakeholders and the community, developed a design concept for this project to make heavy vehicles bypass built-up areas around the town. They realigned the Great Northern Highway between Port Hedland and South Hedland around the Wedgefield Industrial precinct.

The Reinforced Earth Company (RECO) designed and supplied 3,200sqm of Reinforced Earth® abutment walls for 3 bridges included in the scope of works.

The bridges include:

- A 40m long bridge structure over the Great Northern Highway at the Broome turnoff, part of a major interchange enabling uninterrupted flow for local traffic over the highway
- A new 55m road bridge over the BHP Billiton rail line
- A four lane road bridge over the railway crossing on Wallwork Road to improve traffic flow between Port Hedland and South Hedland. The new Wallwork Bridge was added to the projects scope of works in mid-2013 at the request of the Town of Port Hedland.

Challenges

The Reinforced Earth® abutment walls were designed to support the bridge from within embankments of between 12 and 14 metres above the original ground level.

Laying the foundations was a big challenge for the construction teams. The new highway was being built in an area which was not ideal for road construction as sections of the site are in tidal areas. 1.3 million cubic metres of backfill needed to be imported onto site. In order to provide a stable foundation for the



Main: Completing the road surface of the Great Northern Highway under the interchange bridge

Above first picture: Completed abutment wall at Interchange Bridge

Above second picture: Side view of the interchange bridge over the new section of the Great Northern Highway

Transport infrastructure



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY



Above: Reinforced Earth® Bridge Abutment, part of the Interchange Bridge

Above Left: Aerial view of the Wallwork Road Bridge

road embankment, the construction teams used geotextile materials normally used in swamp areas to increase the bearing capacity of the existing ground. Reinforced Earth® structures combine selected granular, engineered backfill with steel reinforcements and a modular facing system. This combination creates a durable, mass gravity retaining wall. Reinforced Earth® structures are capable of supporting their own weight together with the ability to adapt to deformations in the subgrade. They are perfect structures to adapt to this environment.

Solutions

The RECO team in Perth had to work towards a strict time frame and rely on their experience with supplying materials in a logical and timely fashion to sites that are a vast distance away. The Reinforced Earth® TerraPlus® concrete facing panels and capping units were cast at our precast facility in Landsdale, Perth. Seventeen moulds were utilised so

that the concrete was poured and cured in a timely fashion ready to be delivered for construction by the site teams.

Conclusion

The new alignment was opened to the traffic in mid-June 2014 and was officially opened on 23 July 2014 by Deputy Prime Minister Warren Truss and Pilbara MLA Brendon Grylls. The project will deliver many benefits to the Port Hedland community including: reduced road train incidents with local traffic; improved road safety; improved access to new port and harbour areas; and improved traffic flows between Port and South Hedland

Project specifications

Systems TerraPlus®

Finish Plain

Structures 6 Reinforced Earth® abutment walls for 3 bridges

Area 3, 200 sqm (total)

Max. Height 12.5 m

Design load 20kPa

Design life 100 years



Above: Aerial View of the road bridge over the BHP Billiton Railway Line



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