



CASE STUDY

Kapooka Bridge – Olympic Highway Realignment

Wagga Wagga, NSW, Australia

Reinforced Earth® Bridge Abutments
with TerraPlus® Concrete Facing
Panels, Structural Precast Products

Owner: RMS NSW
Consultants: RMS NSW
Contractor: BMD Constructions
Pty Ltd
Construction: Dec 2014–June 2016

Background

The Kapooka Bridge on the Olympic Highway crosses the main Sydney – Melbourne railway line 7.5km south of Wagga Wagga, NSW. Roads and Maritime Services NSW proposed in 2012 to realign the Olympic Highway and to replace the existing Kapooka Bridge. The original bridge, built in 1880, had two ninety degree bends on the approaches and was notorious for road traffic accidents. The new structure will remove the only remaining weight constrained bridge on the Olympic Highway, opening up an extra 315km for more productive freight trucks. The \$55 million Olympic Highway Realignment Project was jointly funded by the NSW State Government's 'Bridges for the Bush Program' and the Australian Government.

BMD Constructions was awarded the construction contract which included a new four lane road-over-rail bridge to the north of the existing bridge. The Olympic Highway was realigned to improve the poor curve to the north of the bridge and remove the crest to the south of the bridge. The scope of works includes the bridge, the new alignment, intersection improvements, footpaths, bicycle ways, utility adjustment works and improvements to the existing highway.

Challenge

The Reinforced Earth Company (RECO) was engaged to design and supply 1847sqm of Reinforced Earth® piled bridge abutment walls, 84 precast parapet barriers, and 264Lm of precast concrete capping units for this project. The Reinforced Earth® walls overall length is 272Lm and they reach a height of 10m.

The new bridge is a high skewed bridge with a skew angle of 53 degrees which carries four lanes of traffic crossing the Sydney to Melbourne rail line. The length of the bridge is 99m with three 33m spans which was constructed using Bulb-T girders placed between each section. The girders weigh around 69T and were installed using a 750T Leibherr crane.

The bridge girders were placed on top of the Reinforced Earth® piled abutment walls. The walls utilize a unique design which features TerraPlus® wall panels behind the abutment. The south abutment piles were built prior to the wall installation and were encased in vertical steel tubes to separate them from the Reinforced Earth® block. This bridge is the first to utilize an additional wall positioned behind the abutments which provided for a slender design and improved constructability.



Main: Front view of the Reinforced Earth® TerraPlus® concrete facing panels with capping units

Above first picture: Reinforced Earth® Retaining wall behind the Bridge Abutment wall

Above second picture: Reinforced Earth® Abutment wall



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY

Transport infrastructure



Above: Construction of the Reinforced Earth® bridge abutment walls begin.

Solution

In addition to its primary advantages of flexibility, speed of construction, and economy, a Reinforced Earth® structure requires very little space. This is an important consideration when building walls parallel to a railway. Structures are not deeply founded, require no footings beyond the front face and as a result, excavations do not encroach upon rail line beds. The bearing function of continuous span bridges is assumed by the piles while the Reinforced Earth® structure retains the backfill supporting the bridge approaches. The abutment will be founded at a shallow depth enabling construction to go ahead outside the area influenced by the railway and thereby avoids compromising the stability of the track bed. The construction of overpasses using combinations of Reinforced Earth® abutments and bridge decks of

prefabricated girders creates a minimum of inconvenience for train traffic.

The TerraPlus® precast concrete panels and structural precast products were manufactured at our RECO Precast Facility located in Albury, NSW. It is located less than 2 hours from the site making the monitoring of production, supply and delivery of the precast elements timely and efficient.

Conclusion

The new Kapooka Bridge was officially opened on 14th June, 2016. The new bridge and highway upgrade will improve road safety along this important stretch of the highway to reduce crash risk, reduce travel times and improve interstate freight transport efficiency.

Project specifications

System	Reinforced Earth® with TerraPlus® Concrete Facing Panels, Structural Precast Products
Finish	Smooth Concrete Finish
Structure	Bridge Abutment Retaining Walls, Parapet Road Barriers
Area	1894m ² (total)
Max. Height	10m
Length	272Lm (total)
Design load	20kPa
Design life	100 years



Left: Reinforced Earth® bridge abutment walls
Above: Installation of the precast parapet road barriers