CASE STUDY

CAVAL RIDGE MINE

Central Queensland, Australia

TerraPlus® Dump Structure

Owner:	BHP Billiton Mitsubishi Alliance (BMA)
Contractor:	Abigroup
Engineer:	Bechtel
Construction:	January 2013 – December 2013

Background
The BHP Billiton and Mitsubishi Alliance (BMA) Bowen Basin Coal Growth Project is an initiative to expand and develop BMA's coal mining operations in Queensland, Australia. The Caval Ridge Mine is one of the primary components of this project, alongside a new coal handling and preparation plant. Situated in Central Queensland, south-east of Moranbah and south-west of Mackay, Caval Ridge is an open-cut hard coking coal mine expected to produce up to 5.5 million tonnes per annum.

The Reinforced Earth Company (RECO) engaged with Abigroup and Bechtel very early on in the process to ensure we gained a thorough understanding of the requirements of the project and also to convey the specific considerations of Reinforced Earth® walls to the client. This ultimately led to the award by Abigroup for the design and supply of two dump structures (North and South ROMs) to RECO.

Design, supply and construction of Reinforced Earth® dump walls
RECO was originally awarded the design and supply of two 17.3m high Reinforced Earth® dump structures. Unfortunately, shortly after the award, significant falls in the price of coal caused BMA to review the project, and one of the structures was shelved. Thus RECO ultimately supplied one structure only.

Dump structures provide a robust platform from which a loaded truck can dump excavated materials into a hopper for crushing before it is conveyed to the next stage of treatment. In this case the dump wall geometry formed a slot arrangement (refer to plan view drawing on the next page) which would allow the option of using rear dumps to dump from the top of the walls or, alternatively, to place a bridge across the top of the slot to allow for a belly dump arrangement.

In the case of a bridge set up, the opposing Reinforced Earth® walls across the slot needed to be designed to carry the dead load from the bridge beams, the entire live load of the trucks, and associated horizontal loads as the trucks moved across the bridge.

Though this represents a significant load, Reinforced Earth® walls are robust and quite capable

Main picture: TerraPlus® Dump walls near completion. Photograph courtesy of Retaining Solutions Pty Ltd
Above first picture: Placement of the galvanized steel reinforcement strips.
Above second picture: The slot arrangement at the centre of the dump walls.

Mining infrastructure

REINFORCED EARTH
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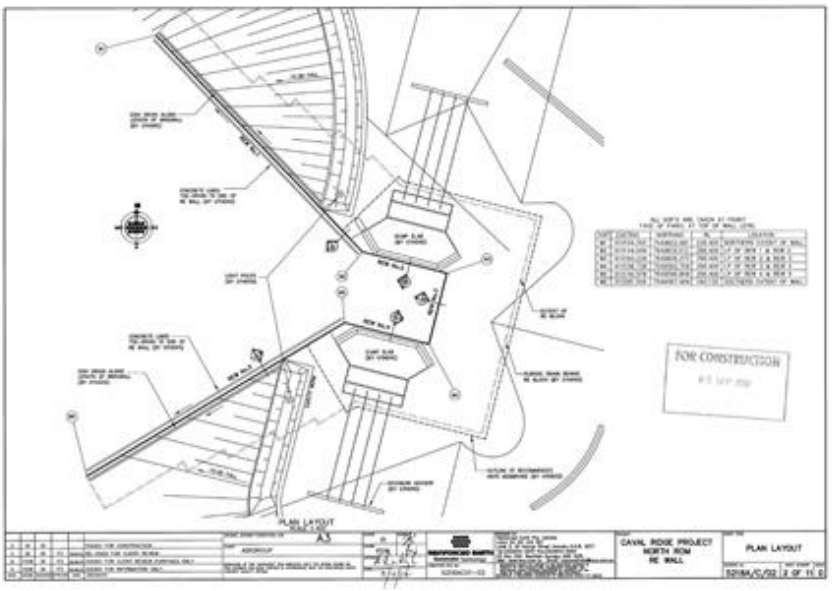

Left: Plan layout showing the unique geometry of the design.
Above: The TerraPlus® panel finish of the left side of the Reinforced Earth® Dump Structure. Photograph courtesy of Retaining Solutions Pty Ltd

of carrying this and heavier loads. The mining department of our business is often required to supply some of the tallest and most heavily loaded structures throughout the world.

As Caval Ridge is a coal mine, the Reinforced Earth® walls use concrete facing panels. Concrete panels ensure long term durability in the corrosive coal environment. Likewise to ensure the galvanised steel straps would also remain durable for the life time of the structure (30 years), an HDPE membrane is placed to the top of the structures to prevent ingress of contaminated water to the Reinforced Earth® block.

Construction of the project was undertaken by RECO's very good business partner and competent specialist wall builder Retaining Solutions Pty Limited. Construction commenced in January 2013, and was completed in December 2013. RECO made regular visits to the site to oversee construction progress.

Challenges and Solutions
Meeting the requirements of an evolving design required close coordination between all parties. Attendance at the regular design meetings at Bechtel's offices in Brisbane were critical to the successful completion of the design process.

The remoteness of the mine's location also proved to be challenging. While RECO has its own precast facility in Brisbane, due to high workload at our facility as well as the relative logistical efficiency, RECO engaged Stresscrete in Rockhampton to manufacture the concrete facing panels. Stresscrete is familiar with RECO's systems and has made panels and arches for RECO before.

Conclusion
The project was successfully completed on time and in accordance with contractual obligations. At the time of writing, moves are afoot to restart work on the second dump structure and we hope to be involved in the supply of this in 2014.

Project specifications

System	TerraPlus®
Finish	Plain Grey Smooth
Structure	Dump Structure
Area	4601 m²
Max. Height	17 m
Length	165 m
Design load	348 t
Design life	30 years

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