



## CASE STUDY

# Gateway Upgrade Project

Brisbane, QLD Australia

RE walls & abutments  
TerraPlus® & TerraTilt®

Owner: Main Roads QLD  
 Consultants: Maunsell Australia Pty Ltd/Smec JV  
 Contractor: Leighton Abigroup Joint Venture, LAJV  
 Construction: South – Mid 2007  
 North – Early 2008

### Background

The Gateway motorway is hailed as the centrepiece of the Australian Trade Coast (incorporating Brisbane airport and port) and surrounding industries.

When the Gateway Bridge opened in 1986, it carried 12,500 vehicles/day. Just over 20 years later the Gateway Motorway is now exceeding capacity, carrying more than 100,000 vehicles/day.

The result: A \$1.88 billion Gateway Upgrade Project - the largest bridge and road project in Queensland's history. It involves

- Construction of a second Gateway Bridge.
- Upgrade of 20 kilometres of the Gateway Motorway from Mt Gravatt-Capalaba Road in the south to Nudgee Road in the north.
- Construction of a new Gateway Motorway deviation, providing a more direct route north of the river and better access to Brisbane Airport.

### Challenge

Duplicating one of Brisbane's most recognisable structures, the Gateway Bridge was never going to be easy. That's why the winning contractor (Leighton Abigroup Joint Venture, LAJV) turned to The Reinforced Earth Company (RECO) to deliver over 15000 m<sup>2</sup> of Reinforced Earth walls on the Gateway Upgrade Project (GUP).

There were three major challenges for RECO to overcome on the GUP:

1. The request for a unique facing pattern on some of the Reinforced Earth walls.
2. Poor foundation conditions.
3. A bridge abutment upgrade adjacent to a heavily trafficked suburban railway.

### Solution

The GUP was broken into two manageable sections North of the bridge and South of the bridge, with each section having approximately equal quantities of walls yet very different engineering, architectural and programming requirements.

LAJV's southern section first approached RECO mid 2007 to supply 5-6 structures in a very short time frame as traffic needed to be transferred onto the new section in time for the Christmas traffic of 2007. Despite the compressed program the client also insisted that no shortcuts were taken, therefore all facets of RECO's supply, the design, manufacture and delivery needed to run concurrently. This was successfully achieved with the commitment of all aspects of the company working seamlessly together.

"One of the biggest challenges lay in the detailing and manufacturing of the numerous



TerraTilt® full height panels are installed for the first time on Australia's east coast, quickly creating a safe working environment adjacent to a heavily trafficked suburban railway line at Gateway South.

Transport infrastructure



Left: Flow, strata and port panel finishes give the Gateway Upgrade Project a unique touch.

Above: Individually detailed panels allow for horizontal and vertical splaying of soil reinforcing strips to accommodate bridge piles that overcome the poor foundation conditions.

unique patterns on the TerraPlus® facing panels”, comments James Bye, RECO’s Operations Manager.

In order to achieve the unique detailing required on the panel facings, RECO worked closely with the project’s architect, EDAW, and with the help of it’s mould fabricator, F&E Moulds, has met the challenge with distinction. “Flow”, “Strata” and “Port” themes were developed for the wall panels on the project, with the latter to reflect the industrial relation with the port nearby.

The panels were precast locally to the project at RECO’s Wacol production plant, south of Brisbane.

In the design office, Chris Lawson’s (RECO Engineering Manager) challenge was to deliver designs to compliment the geotechnical engineer’s extensive use of piling foundations and bridge piles to overcome poor foundation conditions.

“We were able to accommodate the presence of the piles within the Reinforced Earth block with the use of many individually detailed facing panels which allowed horizontal

and vertical splaying of soil reinforcing strips to accommodate these large diameter piles”, comments Mr Lawson.

Another major challenge related to the close proximity of a bridge abutment upgrade to a heavily trafficked suburban railway. In order to quickly create a safe working area RECO’s TerraTilt® system was selected as the most appropriate solution. This was the first time TerraTilt® has been used on the east coast of Australia. TerraTilt had previously only been used in WA where good ground conditions and quality backfill make it a suitable solution.

TerraTilt® comprises precast concrete full height facing panels and steel reinforcing strips which are attached to the back of the panels, and buried in the compacted fill to create the abutment around the columns. Construction of the 442m<sup>2</sup> wall using 8.8m high full height panels took place on a very tight construction timeline. The railway line was shut down over the weekend and construction continued round the clock to minimize impact on rail traffic.

### Project specifications

<b>System</b>	TerraPlus®
<b>Finish</b>	Plain, Flow, Strata and Port
<b>Structure</b>	Retaining Wall
<b>Area</b>	7663m <sup>2</sup> (North) 7416m <sup>2</sup> (South)
<b>Max. Height</b>	12.5m
<b>Design load</b>	25 kPa
<b>Design life</b>	100 years

### Special features/benefits

- At 15 000m<sup>2</sup>, GUP is one of RECO Australia’s largest public infrastructure contracts.
- Unique TerraPlus® finish.
- Many individually detailed facing panels allow horizontal and vertical splaying of soil reinforcing strips to accommodate large diameter piles and overcome poor foundation conditions.
- First use of TerraTilt® full height panels on the east coast of Australia.