



## CASE STUDY

# M2 Motorway Upgrade

Sydney, NSW, Australia

TerraPlus® and TerraTee®  
Reinforced Earth Walls

Owner: RMS/Transurban

Consultants: AECOM

Contractor: Leighton Contractors  
Pty Ltd

Construction: Nov 2010 – May 2012

### Background

The Hills M2 Motorway is a key part of Sydney's Orbital network providing an important road freight and commuter route that connects the north-west region to the lower north shore and Sydney's CBD.

This project aimed to improve access to major growth areas along the motorway and reduce congestion during peak periods. Generally, the upgrade widened the existing motorway between Windsor Road, Baulkham Hills and Lane Cove Road, North Ryde. In addition four new ramps were installed to improve access to the motorway.

The Reinforced Earth Company (RECO) was engaged by Leighton Contractors Pty Ltd to design, supply and assist with the construction of 13 walls with a combined surface area of 14,900m<sup>2</sup> of TerraPlus® and TerraTee® panels. The Reinforced Earth® walls were built to reach up to a height of 12 metres at some places.

These walls ranged from:

- extending existing bridge abutments with piles incorporated into the walls,
- new stand-alone Reinforced Earth® walls,
- and CSS (cement stabilized sandstone) walls.

### Challenges

A major challenge from the outset of this project was that RECO needed to design and cast new Reinforced Earth® walls that matched existing walls that were built in the 1990's.

Another consideration was the collaborative approach needed with the contractor from the outset to deal with the tight budget and construction schedule for a project of this scale.

The site was demanding as The Hills M2 Motorway has an excess of 100,000 vehicles and over 17,000 bus commuters using the road on a daily basis. The RECO operations and design staff communicated often with site engineers in order to keep design, production and deliveries on track as per the client requirements for that given period of the project.

Some of the Reinforced Earth® walls needed to be designed for construction in very confined residential areas with minimal impact. The panels had to be cast and delivered as required as there was a lack of storage and very confined space on site.



**Main picture:** Aerial Photo of M2 Motorway  
**Above first picture:** Onsite supervision  
**Above second picture:** TerraTee® panel  
**Above third picture:** RECO Precast Facility in Tuggerah

Transport infrastructure



**REINFORCED EARTH**  
SUSTAINABLE TECHNOLOGY



**Left:** A completed section of the TerraPlus® panel wall with a vertical rib finish  
**Above:** A completed section of the TerraTee® wall built on difficult terrain.

### Solutions

RECO was engaged to supply two different panel types for the construction of the walls. One panel type was the proprietary TerraPlus® panel. The other a new shaped panel created especially for this project designed to satisfy the architect's requirements. The panel had to replicate the panel shape and finish that was already present in some of the existing bridge abutments on the M2 Motorway. RECO named the new panel TerraTee® which is shaped like the letter T. The panel was completed with a Reckli finish named Kuwait.

Our TerraPlus® panel with a vertical rib pattern finish was the other panel used. TerraPlus® is the square or rectangular, concrete faced Reinforced Earth® retaining wall system. This panel is commonly used for both retaining walls and bridge abutments.

One of the advantages of using our proprietary system is that the structure can be built completely from behind therefore not interfering with access/traffic or

obstacles in front of the wall.

The panels were produced in our precast facility in Tuggerah, NSW. Having the ability to cast our own panels, so close to Sydney, assisted in RECO being able to adjust production to meet the scheduling constraints of this project and the lack of storage space on site for panels.

### Exceptional feedback

"I have now dealt with Reinforced Earth from a contractor's point of view as well as from all three aspects of the project. From design, construction and now completion. RECO has always been very professional to deal with and have gone the 'extra mile' to resolve any issues with unforeseen events and tight construction schedules. They overcame these challenges by responding and acting quickly to solve these issues and to accommodate any changes. This ensured the projects was kept on schedule and resulted in another successful partnership."  
 Fahad Siddiqui (ex) Project Engineer- Leighton Contractors now Regional Manager - Reinforced Earth Pty Ltd

### Project specifications

<b>System</b>	TerraPlus® & TerraTee®
<b>Finish</b>	Vertical Rib, Kuwait Pattern Grey Concrete
<b>Structure</b>	Extending Bridge abutments and new entry/exit ramps
<b>Area</b>	14,900 m <sup>2</sup>
<b>Max. Height</b>	13.6 m
<b>Length</b>	Various (13 walls in Total)
<b>Design Load</b>	25kPa
<b>Design Life</b>	100 years