



## CASE STUDY

# Roe Highway Stage 7

North WA, Australia

Reinforced Earth Walls  
TerraTilt®

Owner: Main Roads WA  
 Consultant: HGM  
 Contractor: Clough HWE Joint Venture  
 Construction: July 2005

### Background

Roe Highway is a limited access dual carriageway linking Great Northern Highway and Middle Swan Road with Kwinana Freeway. It is one of the key heavy vehicle routes in the Perth metropolitan area in Western Australia.

The "Roe 7" Project, the stage 7, five-kilometer extension from South Street to Kwinana Freeway was completed in 2006. It incorporates three interchanges at South Street, Karel Avenue and Kwinana Freeway.

### Challenge

The bridges at the interchanges required abutment walls and the specification called for full height architectural panels of concrete to be used. Full height concrete panel bridge abutments are a preference for Main Roads WA – mainly for their aesthetic, less busy, appearance and consistency with the majority of freeway bridges around Perth.

Full height panels also provide a great level of architectural flexibility and on this project each interchange was required to have a unique pattern / design to give each interchange an individual identity. Whatever system was to be used for the abutments, it would have to be able to accommodate the artist's vision for the structures.

### Solution

The Reinforced Earth Company's (RECO) TerraTilt® system was selected for the Roe Highway Stage 7 project due to its structural reliability, simplicity and rapid installation. It could also be adapted to include the project artist's requirements.

The TerraTilt® system also has the added advantage of accommodating full height concrete channels that are butted up directly behind the full height panel and used as column formers. This has the major advantage of reducing beam spans to as minimum as is practical as well as further expediting the construction program.

RECO together with its precaster, the Georgiou Group at Malaga, manufactured the precast concrete full height panels with the patterns incorporated. Each abutment and in fact, each panel is unique. During manufacture, the Roe 7 Alliance artist, Anne Neil made daily visits to the precast yard to mark up panel moulds and cut up materials for the blockouts that would form the pattern in the concrete. Up to four panels were poured daily meaning that Anne had to work very quickly to prepare the patterns for the day's pour. This required excellent coordination to ensure that the correct panels were



Main: TerraTilt® at Kwinana Freeway Interchange.  
 Top: TerraTilt® at Karel Avenue Interchange.  
 Center: TerraTilt® at South Street Interchange.  
 Above: Installation of TerraTilt® panels.

Transport infrastructure



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Left: Full height concrete channels, to be used as column formers.  
Above: Making up of panel moulds.

poured on time and that no party was delayed. Fortunately an excellent working relationship developed between Anne, Georgiou Group and RECO and very few delays or problems were experienced.

Each of the individually unique panels was delivered to site at the correct time, in the correct order and lifted straight from truck in to its unique place in the structure. On completion of the TerraTilt® abutment walls, the panels were painted, giving each abutment its own identity that are now recognisable as Perth landmarks.

The successful outcome highlights a harmonious working relationship between all parties involved with the project.

### Special Features / Benefits

RECO has been supplying full height TerraTilt® abutment walls in Western Australia since the year 2000 when eleven bridges were constructed using the system for Thiess at Kwinana Freeway. Since then numerous other projects have been supplied in and around Perth using the system.

The advantages of Reinforced Earth full height panel abutments with bridge support columns include:

- Bridge spans are minimised, allowing economies in the bridge deck design.
- Inclusion of the deck support in the facing avoids possible conflicts between piles and soil reinforcing strips.
- The use of large panels allows efficiencies in precasting.
- Large full height panels allow simple and rapid erection of facing panels.
- Full height panels may be preferred for flexibility in the architectural finish.

### Project specifications

<b>System</b>	TerraTilt®
<b>Finish</b>	Custom-made for each interchange
<b>Structure</b>	False bridge abutment (road-over-road)
<b>Area</b>	1500m <sup>2</sup>
<b>Max. Height</b>	8m
<b>Length</b>	240m
<b>Design load</b>	20kPa
<b>Design life</b>	100 years