



CASE STUDY

Northlink WA Stage 1 - Southern Section Perth, WA, Australia

Reinforced Earth® TerraTilt®
Abutment & Retaining walls

Owner: Main Roads WA

Consultants: Aurecon

Contractor: John Holland Pty Ltd

Construction: Nov 2016 - Jan 2018

Background

The \$1.02 billion NorthLink WA Project, jointly funded by the Federal and State Government, takes traffic off local roads and onto the Tonkin Highway. This means local roads will be used for local traffic and those who live and work locally will experience a safer, more peaceful environment. It also provides an efficient alternative freight route, taking about 80 per cent of trucks away from the Great Northern Highway.

The southern section of Northlink WA provides a freeway-standard, free-flowing link from Collier Road through to Reid Highway via Tonkin Highway.

Works included:

- Grade separations at Benara Road, Morley Drive and Collier Road
- 4m wide shared path along Tonkin Highway from Guildford Road to Reid Highway

The Reinforced Earth Company (RECO) was awarded the design and supply of the abutment walls at the Morley Drive and Benara Road intersections as well as additional retaining walls. The total of Reinforced Earth® walls supplied for the project was 4788m².

Challenges

- Re-design an in-situ counterfort retaining wall to a Reinforced Earth® wall that can accommodate large horizontal traffic barrier loads.
- Large horizontal bridge loads
- Architectural finish, circle pattern
- Curved abutment panels with architectural finish, circle pattern

Solutions

RECO was able to develop a modified traffic barrier and Reinforced Earth® wall interaction that restrained any horizontal loads from the traffic barriers being transferred to the wall itself.

The system incorporates a column and capping beam that the traffic barrier is cast on top of. The capping beam has soil reinforcement connected to it and it is this, along with the columns, that restrain the horizontal loading.

Due to traffic barrier loads not being transferred to the wall, we were able to use our standard TerraTilt® panel design with optimised thickness and reinforcement. Overall, this optimisation significantly reduced the client's costs for the wall, especially when comparing it to the original design of an in-situ counterfort wall.



Main: Reinforced Earth® TerraTilt® walls at Morley Drive Intersection
Above first picture: Columns for the traffic barriers were formed using a spiral duct
Above second picture: Capping beam setup for the traffic barriers
Above third picture: Reinforcement of the columns extending into the capping beam for the traffic barriers



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY



Above on the left: Reinforced Earth® TerraTilt® walls at Benara Road after completion

Above on the right: Reinforced Earth® TerraTilt® walls at Benara Road showing curved wingwall and straight abutment, both with matching pattern

Significant design checks were carried out to ensure the capacity of the column and capping beam soil reinforcement system was adequate for restraining the traffic barrier loads.

Similarly, soil reinforcement was connected to the capping beams at each bridge abutment to restrain the large horizontal loading caused by braking vehicles.

To achieve the architectural finish, patterns were laser cut out of steel plate and welded to 12m flat casting beds. This resulted in an accurate, identical pattern across all of the panels.

The architectural finish on the curved wingwalls of the Benara Road abutments was achieved using a steel mould that was fabricated specifically for the project to ensure the radius of the required curve was met as well as the positioning of the circular pattern across this curve.

Conclusion

By removing the traffic lights and creating the grade separations along Tonkin Highway, traffic flow has improved, leading to safer and quicker journeys for commuters, residents and the freight industry.

Project specifications

System	TerraTilt®
Finish	Circular architectural finish on both flat and curved panels
Structures	6 x Reinforced Earth® Bridge abutments, 3 Reinforced Earth® retaining walls
Area	4,788 sqm (total)
Max. Height	9.8 m
Design load	20kPa surcharge Horizontal Bridge Loading Traffic Barrier loads
Design life	100 years

Below: Reinforced Earth® walls at Morley Drive



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