



CASE STUDY

GOLD COAST RAPID TRANSIT

Gold Coast, QLD, Australia

TerraPlus® and GeoMega®
Viaduct/Railway

Owner: Department of
Transport and Main
Roads

Consultants: GoldLinQ

Contractor: GoldLinQ

Construction: GoldLinQ

Background

The Gold Coast is one of the fastest growing cities in Australia, The Queensland Government's Department of Transport and Main Roads has proposed the construction of a 13 km light rail transport system from Broadbeach to Griffith University due to the increasing need to meet this growth with effective and efficient infrastructure.

This project has been widely considered a nation building initiative that will improve existing traffic congestion and provide a more integrated and sustainable public transport network. Gold Coast Rapid Transit is also set to play an important role in the 2018 Commonwealth Games as the system services a number of important sporting venues, including Gold Coast Aquatic Centre and the Gold Coast Convention and Exhibition Centre.

The Reinforced Earth Company (RECO) was engaged by McConnell Dowell Constructors (Aust) Pty Ltd for the design and supply of TerraPlus® facing panels and GeoMega® inserts for the construction of a viaduct on Smith Street. The viaduct would separate street traffic from train traffic, and minimise interruptions and overlapping congestion in the two systems.

Challenge

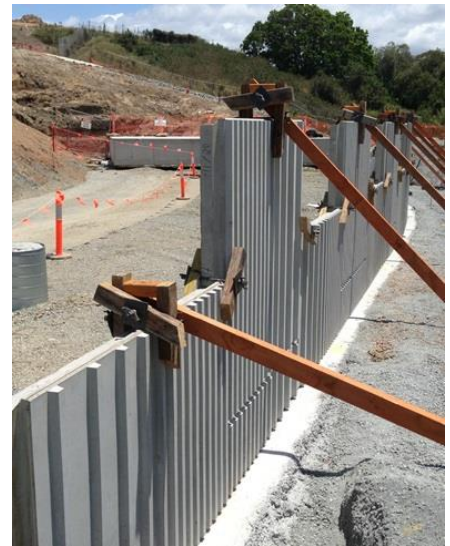
Given the proximity of the light rail system to the ocean, the site for the retaining walls would be prone to flooding from salt water in some areas. The key challenge in those areas was therefore to find a functional material which was able to accommodate a potentially aggressive natural environment and retain durability for the design life of the structures.

Also, the high live loads generated by the railway line would pose a challenge to any adopted system. As such, the system selected would also need to be resilient to the cyclic loading associated with train vibrations.

Solution

RECO's solution combined our standard TerraPlus® concrete facing panels with galvanised steel soil reinforcement in chemically benign areas of the site, and with GeoMega® geosynthetic soil reinforcement in salt water affected areas of the site.

Reinforced Earth® structures are more economical than conventional retaining walls and their inherent strength and flexibility makes them particularly capable of absorbing vibrations and dynamic shocks such as those generated from high-speed rail, or even explosions and earthquakes.



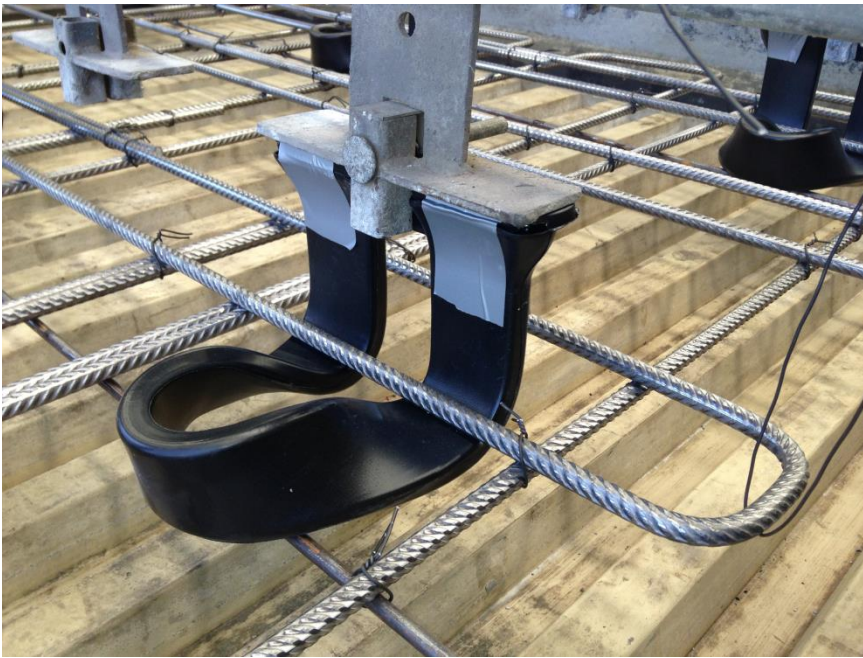
Main: The first TerraPlus® panels being placed on site.

Above: The finish was custom designed as the vertical rib varies in width through the wall.

Rail infrastructure



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY



Left: A close up shot of RECO'S GeoMega® insert being cast into a panel. Once erected, the insert is threaded with a geosynthetic soil reinforcement strip.

Above: The completed TerraPlus® precast panels on site ready for construction.

This combination of engineered fill, soil reinforcement and facing panel creates a robust platform that can withstand very high dead and live loads together with the vibrations generated by rail traffic. Thus it is well suited to the needs of the Gold Coast Rapid Transit project.

In addition the TerraPlus® facing panels which are 2m x 2m square in shape, are a popular modular concrete facing panel characterised by a variety of readily available architectural finishes, ease and speed of construction, adaptability, durability and reliable performance. In this project the panels feature an attractive vertical rib finish all of which were cast at our own precast facility at Sumner.

Our Sumner precast facility, which at the time of writing is relatively new, has overhead craneage capability and ample storage capacity. The yard is capable of producing a wide variety of items including large precast panels and our TechSpan® arch units. Precasting our own panels ensures programs can be adapted and adjusted easily to conform to changing design requirements or other site issues.

GeoMega®

GeoMega® is The Reinforced Earth Company's fully synthetic solution to retaining structures and is ideal for use in salt affected coastal environments. The system includes no exposed metallic elements and allows for a direct connection between the GeoStrap soil reinforcement, which is formed from polyester yarns, and the concrete facing panel. This is achieved with a cast in plastic insert (see above image) through which the strap is threaded. Fully tested and now used on a number of public projects in Qld, and extensively throughout the world, the system increases the range of applications for which a Reinforced Earth® solution is viable.

Conclusion

The Gold Coast Rapid Transit project raised a number of design issues. The immediate vicinity of the ocean, the railway loading, and the associated vibratory forces, required a robust, reliable and durable solution. The Reinforced Earth Company with its cleverly engineered TerraPlus® and GeoMega® systems, was able to meet the challenge.

Project specifications

System	TerraPlus®
Finish	Vertical ribbed finish
Structure	Railway
Area	1615 m ²
Design load	15 kPa
Design life	100 years

Project specifications

System	GeoMega®
Finish	Vertical ribbed finish
Structure	Railway
Area	690 m ²
Design load	15 kPa
Design life	100 years