

Railway Cutting Gabion Wall

East Maitland, New South Wales



TYPE OF PROJECT

Mass Gravity Retaining Walls

YEAR OF CONSTRUCTION

2005

CLIENT

Australia Rail Track Corporation (ARTC)

CONTRACTOR

Daracon Rail

DESIGNER

Lindsay & Dynan Consulting Engineers

PROD. RELATED

Gabions (248No. 2x1x1 And 62No. 2x1.5x1)

Challenge

The railway cutting between High Street and George Street in East Maitland was showing evidence of surface undulations due to erosion and undercutting. A 124m long, 4m high retaining wall was required to stabilise the batter and provide adequate protection to the badly eroded slope. Due to the proposed wall being located adjacent to the main Northern Railway Line and within a suburban area with historic significance, many considerations such as construction time, access, efficiency of construction, prolonged performance and aesthetic quality were a prerequisite of the chosen solution. Several retaining systems were considered such as concrete walls, spray concrete facia, soil nails with various facings and a mass gravity Gabion wall. A large concrete block wall was also initially considered but the high cost, requirement for imported backfill, complex drainage, a base slab and inability of this system to accommodate potential differential settlements made it unattractive to the contractor.

The client favoured a solution that offered inherent flexibility which is particularly important in rail environments where ground movement and dynamic loading are constant considerations. The system needed to deliver strong environmental benefits, including:

- Reduced embodied carbon footprint compared to concrete
- Better integration with surrounding landscape
- Potential for vegetation growth and long-term carbon sequestration



Before construction - Sep 2005



Packing procedure - Nov 2005

Solution

Maccaferri assisted the designer with preliminary stability assessments and technical advice, resulting in the selection of a woven mesh gabion wall as the preferred system. The gabion wall met all design criteria while also demonstrating a significant economic advantage over the other systems considered. The Galmac (Zn/Al Alloy) + Polymer coated units addressed any potential long term durability concerns as Maccaferri have technical documentation stating that in dry land applications, the polymer coated mesh may be considered to have a life expectancy of 120 years. Their inherent flexibility, permeability and the fact that they don't typically require stringent base preparation, made the Gabion option stand head and shoulders above the others. Due to limited space on site it was a requirement that the Gabion units would need to be pre-filled.

An innovative way of filling the Gabions off-site and lowering them into position was presented by Maccaferri and accepted by the ARTC. The procedure involved the placement of a 1m long PVC pipe within each Gabion compartment. The Gabions were then packed with rock and preformed braces ensured that the Gabions held their shape. Slings were then inserted through the pipes to ensure that the units would be picked up from the bottom to limit deformation. The wall was completed within the time frame allowed and the ARTC stated that they were extremely happy with the outcome and would definitely utilise this procedure on future works.



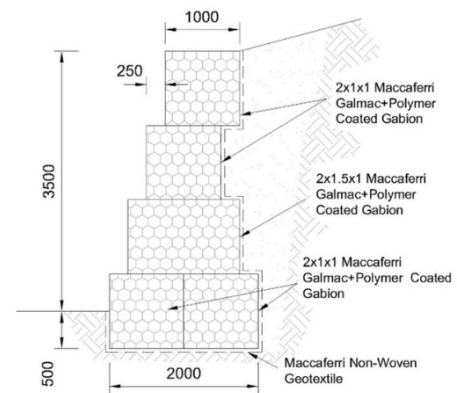
Lifting procedure with slings and frame - Nov 2005



Lifting procedure - Nov 2005



During construction - Dec 2005



The Maccaferri GAWACWIN software was used to verify the stability of the Gabion wall

Project Typical Section



After construction - Mar 2007



After construction - Mar 2026