

Piling and Bridges

FACT SHEET JUNE 2013

Artist impression of the new Nerang River Bridge



The Gold Coast light rail will feature five bridges across its 13-kilometre corridor, making bridges and piling a vital construction technique for the project.

McConnell Dowell Constructors (Aust) Pty Ltd (MacDow) will construct five bridges as part of the 13-kilometre Stage one of the Gold Coast light rail.

What is piling?

Piles create a solid foundation to support a bridge by reaching a strong layer of soil or rock in areas where the surface lacks the strength to support a certain structure.

Bored, driven and sheet piles will all be used on the Gold Coast light rail with the method chosen for each area determined by factors including soil type and the load supported by each pile.

Bored piling creates less noise and involves the use of a vibratory hammer to drive a permanent steel liner followed by a mechanical grab to excavate the soil and a drilling rig to penetrate through rock to eventually create a circular hole. A steel prefabricated reinforcement cage (see diagram overleaf) is lowered into the hole and concrete is poured. Once the concrete sets, the bored pile is complete.

Driven piling involves hammering a pre-fabricated concrete pile to a determined depth

using a piling rig. Driven piling has been used on the Macintosh Island North and South bridges as well as the Smith Street viaduct. Sheet piling involves interlocking sheets of metal which are driven using excavators or special vibration machines to form retaining walls during construction.

Sheet piling is often used adjacent to existing structures as it only moves soil, rather than relocating it. This means the support of adjacent buildings is not compromised due to soil movement. Sheet piling can also be used to retain water or soil below the water-table. There are many sites across the project where sheet piling is used for this reason.

What to expect from piling?

Piling can result in increased levels of noise, vibration and dust in surrounding areas. Vibration may be felt in nearby buildings. This is a common technique used in urban areas and if you feel vibration in your property due to construction activity there is no immediate cause for concern. Every effort will be made to minimise construction impacts and monitoring will be carried out during piling works.

Nerang River LRV Bridge and Shared Pedestrian and Cycle Bridge

- Approximately 375 metres long.
- The LRV bridge will be supported by 26 bored concrete piles with steel liners.
- The pedestrian and cycle bridge will feature 15 bored concrete piles with permanent steel liners.
- In the river, a bored rig will be used for piling. The sequence for pile installation is:
 - 1) Vibro hammer used to drive permanent liner to rock level.
 - 2) Grab will be lowered into the pile to lift out soil.
 - 3) Reverse Circulation Drilling equipment will be placed on top of the pile and rock will be drilled.
 - 4) Placement of pile reinforcement cage and concrete to complete the pile.
- Both bridges will consist of 12 spans (the distance between two supports in a bridge structure).

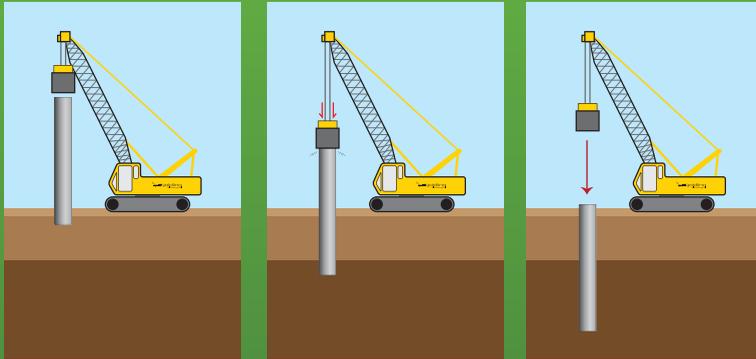
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Sheet Piling



Sheet piling on Macintosh Island north near water and below the water table

Driven Piling



PLACEMENT OF PILE

INSTALLATION OF PILE

REPETITION OF PILE

- 72 precast concrete beams will be used for the LRV, pedestrian and bicycle bridges.
- Each precast concrete beam is an average of 32 metres long, 1.5 metres high and 60 tonnes in weight.
- Two barges named the MDT121 and Leanora are being used to build the bridges.
- A 32-metre long temporary bridge adjacent to the shared pedestrian and cycle bridge will be built to help deliver plant equipment and materials to the barges.

Macintosh Island LRV Bridges

These will include pedestrian and cycle access.

North

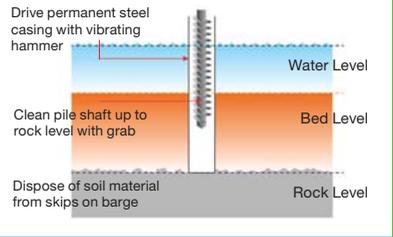
- Approximately 32 metres long.
- Will consist of three spans.
- Supported by 20 driven precast concrete piles.

South

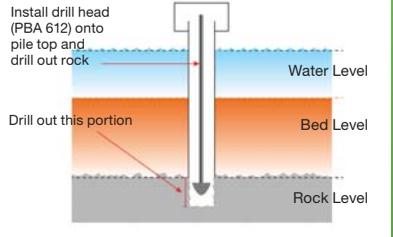
- Approximately 27-metre long LRV section and 43-metre pedestrian and cycle section.
- Three spans for the LRV section and four spans for the pedestrian and cycle section.
- Supported by 22 driven precast concrete piles.

Bored Piling In Water

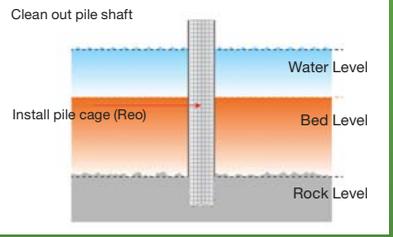
STEP 1



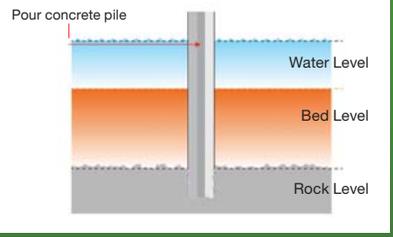
STEP 2



STEP 3



STEP 4



Light Rail Depot & Smith Street Bridge

- Approximately 800 metres long.
- Approximately 13 metres high in some sections.
- Supported by 24 bored piles, 144 driven piles and 48 'Super T' pre-cast concrete girders.



Gold Coast Light Rail in REAL TIME
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Australian Government
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CITY OF
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Queensland Government

Keep up-to-date with the progress of Queensland's first light rail and to sign up for updates visit goldlineq.com.au or call the project hotline on 1800 967 377* *Free call within Australia. Call charges may apply from mobile phones & payphones.