

PEZZIMENTI TUNNELBORE



Specialising in: **Highly Accurate, Laser-Guided Microtunnels.**

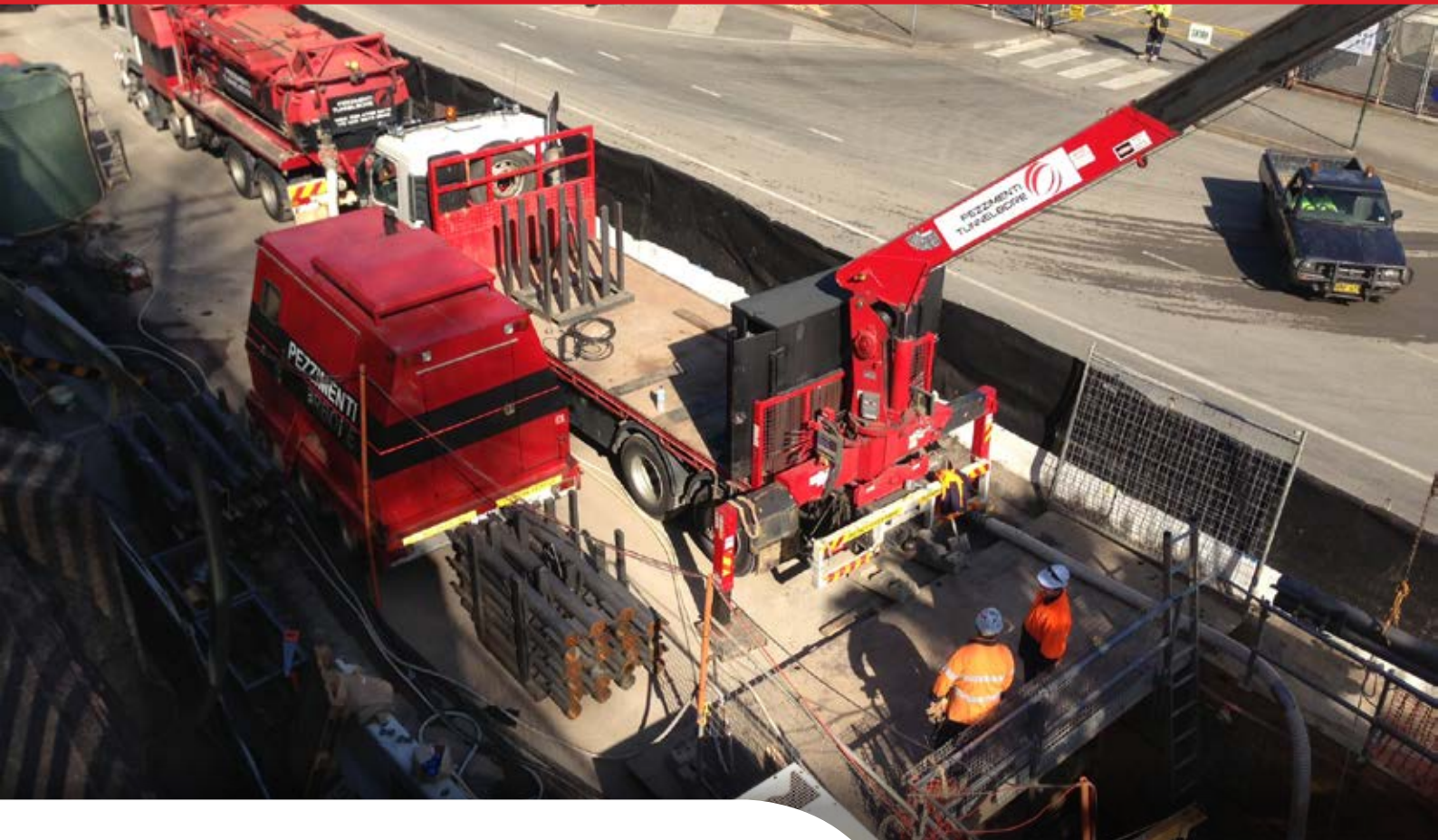
Barrangaroo

650m of Microtunneling on the Sydney Harbour Foreshore



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As part of the multi-billion dollar Barrangaroo development in the city of Sydney, an existing Sydney Water sewerage pumping station had to be eliminated and the sewer carrier diverted in order to allow the reconstruction of the harbour foreshore headland.

The sewer diversion required the microtunnelling of 650m in sandstone and diverted sewage flow from the main carrier flowing to the headland SPS to an existing SPS in Hickson Rd.

The Project developer was Lend Lease, the civil contractor was Boulderstone (now a subsidiary of Lend Lease).

Client
Boulderstone / Lend Lease

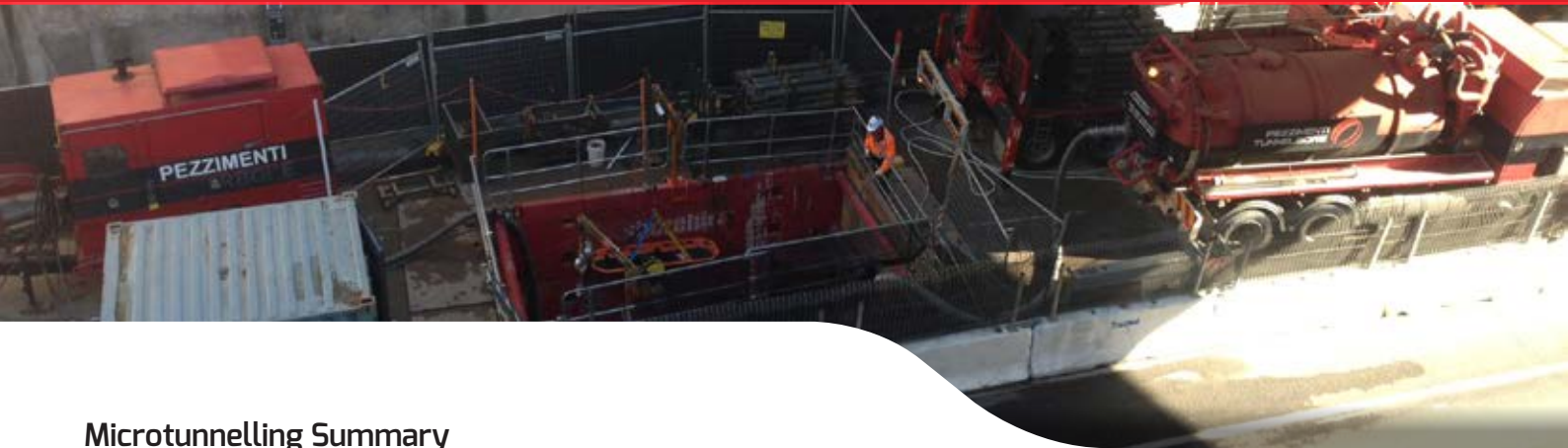
Length
6 Microtunnels Totalling 650m

Bore Diameter
370 / 440mm & 530mm

Jacking Pipe
375 GRP SN10,000 & 225 PVC

Ground
Sandstone

Grade
Varying Grades, flat.



Microtunnelling Summary

Microtunnel	Grade	Description	Diameter / Pipe
1. 107m	0.45%	Drill downhill directly into collecting manhole	Ø530 microtunnel for 375 GRP SN10,000 Pipe
2. 119m	0.45%	Drill downhill under Hickson Rd	
3. 100m	0.45%	Drill uphill Hickson Rd	
4. 139m	4.27%	Drill uphill Under Hickson Road	
5. 137m	0.349%	Drill uphill through the hill under Dalgety Rd	
6. 48m	1.02%	Drill through deep ground	Ø375 / Ø440 for 225 PVC

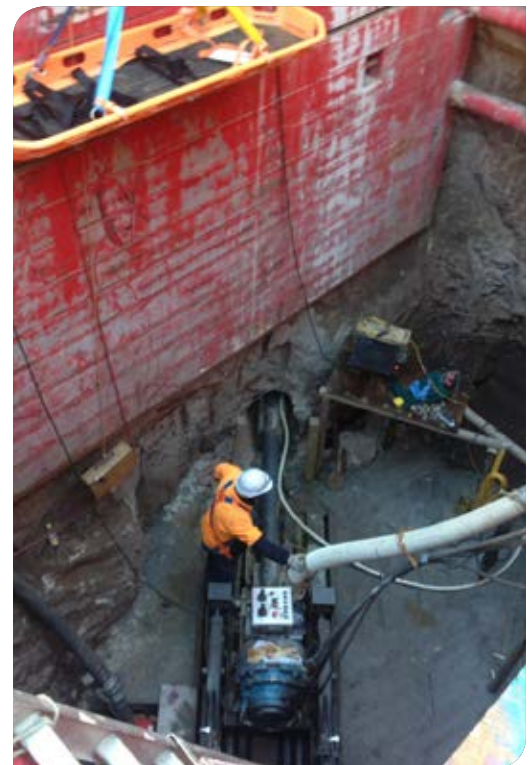


+ Ground Conditions

The geotechnical investigation revealed the microtunnel was to be fully located in stable sandstone.

The presence of stable, self-supporting sandstone allowed for the use of **freeboring** and the elimination of the need for any outer encasing pipes for ground support. This design saved considerable cost and time.

The presence of the sandstone also allowed the design to be optimised to drill under Dalgety Rd rather than be located in Towns Place. The designers were initially hesitant of locating a microtunnel under a hill where the depths to invert were up to 15m. Their concern was that should the microtunnelling head become jammed during drilling, there was no way it could be retrieved by excavation from the surface. The Towns PI design would have caused considerable disruption to the newly landscaped area and made pipe laying extremely costly in fill ground located close to the Sydney Harbour and subject to high seawater inflow rates. After submissions to the designer and a log of previous projects successfully completed by Pezzimenti Tunnelbore, the design was amended to the Dalgety Rd route, eliminating disruption to Towns Place and saving considerable cost.





• The Luna Park Fault Line

The geotechnical investigations also revealed the presence of the Luna Park fault line. The fault line ran in the same alignment as the microtunnel under Dalgety Rd. The information available showed there was a vertical displacement across the fault of some 600mm. There was the real possibility of very high sea water inflow if the fault linked the microtunnel alignment to the harbour. As it turned out, the fault had no adverse effects on the microtunnelling and the 137m bore

+ Contaminated Ground at the SPS

The presence of contaminated ground was well known and researched for the project. The contaminated ground was known to be present in the upper layers of soil around the existing SPS in Hickson Rd. Excavation of this contaminated ground was not allowed. Investigations showed the contaminated ground did not extend to the depths of the microtunnel. The construction methodology used was

1. Bypass flow into the SPS
2. Microtunnel directly into the collecting manhole at the SPS.
3. Push pipes
4. Form the grout retaining bulkheads and pour the grout.

+ Pipes

The Ø400mm pipes were conventional GRP pipes supplied by Global. The pipe joint was a rubber ring jointed collared pipe **not a jacking pipe**. The collared pipe is a less expensive pipe. The pipes were held central in the microtunnel by timber spacers and were sliplined into the freebore without incident.

+ Progress

Microtunnelling commenced in July 2013 and was completed by the end of September 2013 including pipe insertion and grouting.



PEZZIMENTI TUNNELBORE



For all inquiries – including Job Inspections,
Quotations and Project Feasibilities –
please don't hesitate to contact Pezzimenti
Tunnelbore. We are confident we'll hit the
mark on your next microtunneling project.

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When Accuracy Matters.