

26 May 2009

CLEM7 TUNNELLING COMPLETE WITH FINAL BREAKTHROUGH

Tunnelling on the Clem Jones Tunnel (CLEM7) is complete after the second tunnel boring machine broke through at Woolloongabba today.

The breakthrough represents an important milestone for the CLEM7 with both 4,000-tonne boring machines (named Matilda and Florence) having completed their historic 4.3 kilometre journey from Bowen Hills to Woolloongabba.

RiverCity Motorway Group CEO Flan Cleary said the successful completion of tunnelling on the CLEM7 represented one of Brisbane's greatest ever engineering achievements.

"To tunnel 4.3 kilometres through hard rock under the CBD and Brisbane River with such precision and speed is a great engineering feat," Mr Cleary said.

"The men and women who worked on the tunnelling teams need to be congratulated for their skill and commitment in what are demanding working conditions.

Leighton Contractors and Baulderstone Bilfinger Berger Joint Venture Project Director Graham Olsson said the breakthrough marked the end of a successful mainline tunnelling activity despite difficult conditions, including very hard rock and the river crossing.

"The team have continued to safely manage the challenges throughout the project and are still on track for an early completion. This is a remarkable achievement," Mr Olsson said.

Matilda was officially christened at a special ceremony held on 4 December 2007. The event coincided with Saint Barbara's day and a statue of her was blessed and placed in the entrance to the tunnel to provide good luck and safety to the workers throughout construction.

"I am happy to report that the patron saint of tunnellers watched over the workers during the operation and brought them safely to Woolloongabba." Mr Olsson said.

The 6.8 kilometre CLEM7 will connect Woolloongabba in the south to Bowen Hills in the north, and will be the first section of the new M7 motorway. The CLEM7 will bypass up to 23 sets of traffic lights, reduce travel time by up to 30%, cut fuel costs, lower stress and improve safety.

Matilda Milestone Dates	
29 May 2007	Matilda completes factory acceptance test in Germany
22 Sep 2007	Matilda arrives in Brisbane
4 Dec 2007	Matilda starts tunnelling (Start Up Ceremony)
14 Jan 2009	Matilda breaks through at Shafston Avenue, Kangaroo Point
26 May 2009	Matilda breaks through at Gibbon Street, Woolloongabba

Facts and figures

<i>Diameter of cutter head</i>	12.4 metres
<i>Number of cutters</i>	78
<i>Weight of a single cutter</i>	230 kilograms
<i>Total cutter head power</i>	4,200 kilowatts
<i>Cutter head rotation</i>	Up to 4.5 revolutions per minute
<i>Available hydraulic force to push cutter head</i>	2,400 tonne (you would need approx. 100 Qld Rail locomotives to create the same push)
<i>Total weight</i>	4,000 tonne (this equals about 12 fully loaded and fuelled Boeing 747 or 400 Brisbane city buses)
<i>Total length (at full extension of cylinders)</i>	261 metres
<i>Maximum excavation rate</i>	Up to 2 metres in 30 minutes = 20 tonne of rock per minute (i.e. this would load a semi trailer in a bit more than a minute)

<i>Number of TBM cutter wheels used by the end of the project</i>	1,500
<i>Number of roadheader cutter picks used by the end of the project</i>	100,000
<i>Total amount of shotcrete used in the tunnel</i>	Over 65,000m ³
<i>Total amount of concrete used for smoke ducts and cross passages</i>	30,000m ³
<i>Total amount of concrete used for lining segments</i>	120,000m ³
<i>Total amount of steel used in the tunnel</i>	More than 15,000 tonnes
<i>Total amount of recycled concrete backfill used in the tunnel</i>	100,000 tonnes
<i>Amount of pea gravel used in the tunnel</i>	40,000 tonnes
<i>Peak workforce</i>	1,600 workers (Nov 2008)
<i>Total town water saved across the project</i>	1,500 mega litres

Origins of Matilda

Matilda was the name chosen from 600 entries received from members of the public who attended our tunnel boring machine open day on 4 November 2007.

Operation of the tunnel boring machines

A crew of up to 22 workers was required to keep each tunnel boring machine operating. The crews worked on a shift rotation, working underground for 12 hours at a time. The tunnel boring machine contained worker facilities such as a kitchen and toilets.

The crew contained:

Tunnel boring machine pilot – The pilot is stationed in the operating cabin. He uses a video camera to view all operations and has a computerised console to control the movement of the machine.

3 x ring builders – work behind the cutting face operating the ring erector, creating the permanent lining of the tunnel.

2 x crane operators – assist with the transportation of segments and other material.

5 x pea gravel and grout pump operators – pump pea gravel and grout between the segments and rock face to fill any void, making the tunnel water tight.

5 x culvert crew workers – place the concrete culverts and backfill to create the cable tunnel underneath the road surface.

2 x scabbling machine operators – look after the ventilation within the tunnel. The ventilation system extends as the machines moves along.

3 x service crew – install the pipes, such as water and communications that feed the tunnel boring machine. These pipes also extend as the machine moves along.

At least one floater – provide support, including maintaining supplies.

Disassembly of the tunnel boring machines

It took almost three months to assemble each of the massive 12.4 metre high tunnel boring machines at O'Connell Terrace in Bowen Hills. Now that their work is coming to an end it will take a similar amount of time to disassemble, clean and remove each component from the Gibbon Street worksite.

The majority of the machine components will be transported underground via the completed tunnels to either Ipswich Rd in Woolloongabba or Bowen Hills. The larger sections of the machine, some in excess of 150 tonnes, will be removed via the purpose built shaft at Gibbon Street and packed onto trailers.

In addition work to remove the TBM shed at O'Connell Terrace, spoil handling silos, the conveyor system and other site services are all underway.

For further information please contact Anthony Havers on 0434 567 841.