



You raise me up! Tunnel boring machine (TBM) retrieval is underway as TBMs complete the breakthrough into the Sydney Olympic Park Station box.

Sydney Olympic Park's latest arrivals

The NSW Government is delivering Sydney Metro West – a new underground metro railway which will double rail capacity between Parramatta and the Sydney CBD, link new communities to rail services and support employment growth and housing supply.

Sydney Metro West stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont, and Hunter Street in the Sydney CBD. Two potential station locations are being investigated west of Sydney Olympic Park, including one at Rosehill Gardens which could support a significant increase in housing.

Acciona Ferroviaria Joint Venture (AFJV) has been awarded the Central Tunnelling Package (CTP) to deliver 11 kilometres of tunnels between the Bays and Sydney Olympic Park and excavate five new metro stations. Gamuda Australia and Laing O'Rourke Consortium (GLC) has been awarded the Western Tunnelling Package (WTP) to deliver nine kilometres of tunnels between Westmead and Sydney Olympic Park and excavate two new metro stations.

Tunnel boring machines breakthrough at Sydney Olympic Park

Two tunnel boring machines (TBMs) constructing the nine kilometre tunnels between Westmead and Sydney Olympic Park arrived at the future Sydney Olympic Park Metro Station site in mid 2024.

TBMs Betty and Dorothy have each built around 4.6-kilometres of metro tunnels between the Clyde launch site and Sydney Olympic Park. They were the first of four TBMs to arrive at the Sydney Olympic Park site for the Sydney Metro West project, and the first two autonomous TBMs (A-TBMs) to be used in Australia.

TBM Betty broke through into the Sydney Olympic Park Station box in late June and TBM Dorothy arrived in late July. Both machines have been retrieved from the station box and returned to Clyde to be relaunched towards Westmead to commence their final 4.4-kilometre journey.

TBMs Beatrice and Daphne broke through into the Sydney Olympic Park station site in early October marking the completion of their 11km journey that started at The Bays station site in April 2023.

What is an autonomous tunnel boring machine (A-TBM)?

TBM Betty and Dorothy are autonomous tunnel boring machines and are the first of their kind in Australia. A-TBMs are a type of twin shield, hard rock style of TBM specifically designed to excavate through sandstone and shale ground conditions on the Western Tunnelling Package, similar to those used on Sydney Metro Northwest and Sydney Metro City & Southwest. The difference is the addition of sophisticated artificial intelligence software to operate the machine.

The artificial intelligence software installed inside the TBM can automatically steer, operate and monitor the machine as it analyses performance data in real time to

deliver optimal results with minimal human input. The algorithm lives in a small industrial computer in the TBM cabin and connects to the Programmable Logic Control – the nervous system of the TBM.

While an operator stays inside the cabin and always remains in control of the TBM, the autonomous algorithm takes on the machine's repetitive tasks. The technology is used as a tool to manage the excavation of the tunnels and allows the TBMs to be more accurate and precise, reducing the time required to excavate the 9-kilometre tunnels.



TBM Dorothy completes the first phase of tunnelling at Sydney Olympic Park.

What work has been completed on site to date?

AFJV has been on site at Sydney Olympic Park since early 2022 constructing the 200-metre-long, 37-metre-wide, and 27-metre-deep station box and is currently continuing surface works and preparing for the arrival of TBMs Beatrice and Daphne in late 2024.

GLC began work at Sydney Olympic Park in December 2023, starting with site establishment construction activities and lining of the tunnel nozzles. Tunnel nozzles are large, 16-metre-long, 14-metre-high and 8-metre-wide caverns constructed to allow for tunnel ventilation above the train line. During construction, the tunnel

nozzles act as the receipt portal for the TBMs as they breakthrough into the station box.

Work on the tunnel cross passages between Sydney Olympic Park and Clyde will continue until later this year with equipment entering the tunnels and excavated material being removed from the Sydney Olympic Park station box. Cross passages are a connection between the two main metro tunnels and are an important safety feature to allow people to move from one tunnel to another in case of an emergency.

Indicative construction timeline

			We are here	
2022	2023	Early 2024	Mid-late 2024	2032
Site establishment and station box excavation	Station box excavation	TBM preparation and form works	TBM breakthrough, disassembly and retrieval	Sydney Metro West opening

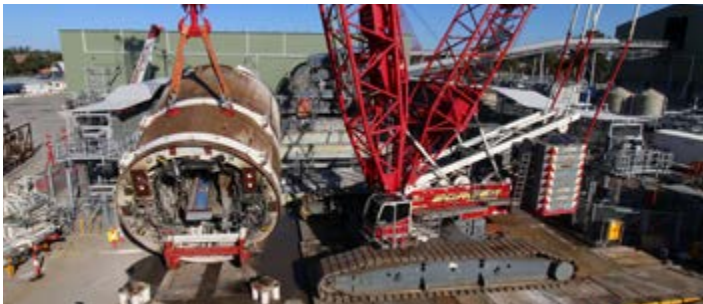


A different kind of face lift! TBM Betty's cutterhead has successfully been retrieved from Sydney Olympic Park metro station site.

What's next for TBMs Betty and Dorothy?

While building the tunnels between Clyde and Sydney Olympic Park, TBMs Betty and Dorothy excavated a combined total of 857,500 tonnes of material and installed over 32,600 concrete precast segments to line the tunnels as they passed through.

Following the breakthroughs at Sydney Olympic Park, Betty and Dorothy were disassembled and retrieved using a 600 tonne crane that lifted sections of the TBMs out of the station box. Each section was then loaded onto a truck and returned to the Clyde launch site.



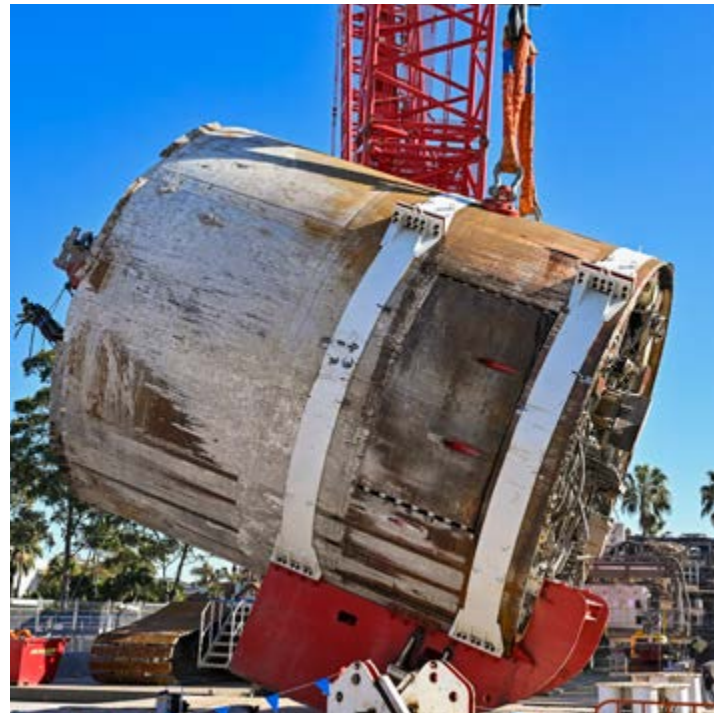
On the road again: TBM parts are lowered back into the launch box at Clyde to be reassembled ahead of stage two of tunnelling.

The transport of each TBM consisted of over 60 heavy vehicle loads, the largest of which was the TBM gripper shields, each weighing 210 tonnes and measuring 7.2-metres-wide x 5.2-metres-high x 4.6-metres-long. Transporting these machines required extensive planning, stakeholder management and communication.

Once at Clyde the TBM segments are lowered back into the launch box to be reassembled, and the mechanical and electrical connections completed. The TBMs are then

powered on, and following testing and commissioning, relaunched towards Westmead. TBM Betty has successfully relaunched, with TBM Dorothy expected to recommence tunnelling in the coming weeks.

Once TBMs Betty and Dorothy have completed tunnelling they will again be disassembled and retrieved ready to be reused on future tunnelling projects.



You spin me right round – TBM Betty's gripper shield, a cover of the internal mechanisms of the machine, retrieved and rotated ahead of its transportation back to Clyde.



TBMs Beatrice and Daphne.

What's next for TBMs Beatrice and Daphne?

AFJV have set up a temporary tower crane which, along with a crawler crane that has been set up on the surface, will be used to dismantle TBMs Beatrice and Daphne and remove them from site by loading them onto various sized trucks over the coming months.

As TBMs are specifically designed for the environment of the tunnels they excavate, AFJV is working with the TBM manufacturer to ensure components that can be reused in other TBMs are returned to the manufacturer, adjusted and repurposed.

Six-month look ahead and out-of-hours work activities

Activity	Location	Noise impact	October 2024	November 2024	December 2024	January 2025	February 2025	March 2025
Concrete deliveries and spoil (excavated material) removal	Via Herb Elliott Avenue	Low	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
Tunnelling, excavation, lining and invert concreting, and cross passage excavation	Underground	Low to medium	● ● ●	● ●	● ● ●	● ● ● ●	● ● ●	● ● ●
Nozzle headwall, steel fixing and concrete works	Station box	Low	● ●	● ●	● ●			
TBM disassembly and OSOM equipment removals	Station box and via Herb Elliott Avenue	Low to medium	● ●	● ●	● ●	● ●	● ●	● ●
Demobilise water treatment plant and complete hardstands	Station box	Low	● ●	● ●	● ●	● ●		
Office and shed demobilisation	Surface level	Low				● ●	● ● ●	● ●

- GLC works ● AFJV works
- Standard construction hours ● 24 hour work activities

Contact us

If you have any questions or would like more information please contact our project team:

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