



Tunnel boring machine (TBM) Betty in the Rosehill launch box.

# Tunnelling update

The NSW Government is delivering Sydney Metro West, a new underground metro railway which will double rail capacity between Parramatta and the Sydney CBD, linking 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. Sydney Metro has been granted planning approval to construct twin underground rail tunnels between Westmead and Hunter Street in the Sydney CBD for Sydney Metro West.

Gamuda Australia and Laing O'Rourke Consortium (GLC) has been awarded the contract to deliver the Western Tunnelling Package which involves nine kilometres of twin metro rail tunnels between Westmead and Sydney Olympic Park, excavation for two new metro stations, a stabling and maintenance facility at Clyde and a precast facility at Eastern Creek.

## Clyde stabling and maintenance facility

Major construction is underway at the Clyde stabling and maintenance facility, the future operations and control centre for Sydney Metro West.

Tunnel boring machine (TBM) Betty has been launched from the Rosehill Services Facility launch box toward Sydney Olympic Park to excavate the metro tunnels. The TBM is expected to reach Sydney Olympic Park in mid 2024. The TBM will be retrieved and relaunched from Rosehill in late 2024 to commence tunnelling towards Parramatta and Westmead metro stations, arriving in 2025.

GLC is continuing roadheader excavation of connecting tunnels at Rosehill and have recently commenced excavation of the junction caverns. The caverns will enable the metro trains to transition from the mainline tunnel below ground to the surface and access the above ground maintenance and stabling facility. This is expected to continue until early 2024.



Tunnel boring machine (TBM) Betty cutterhead lowering.

## Australia's first autonomous tunnel boring machines

Australia's first autonomous tunnel boring machines (TBMs) will be used to build the twin nine-kilometre rail tunnels between Sydney Olympic Park and Westmead.

The TBMs will use artificial intelligence software, developed by Gamuda, to automatically steer, operate, and monitor several TBM functions. While a human operator remains in overall control, the autonomous system carries out many repetitive tasks of the operator with greater accuracy.

Each TBM weighs over 1,200 tonnes and is as long as two A380 airplanes at around 170 metres in length.

Over a third of the excavated material removed from the tunnels at Clyde will be reused at the site to create the foundation for the stabling and maintenance facility. Any materials not required will be transported by trucks to other sites around Sydney for reuse.

The TBMs will excavate seven metre diameter tunnels at an average depth of 40 metres and remove about 2.5 million tonnes of material via conveyors that run through the middle of the machine. Tunnelling is approved to be carried out 24 hours a day, seven days a week.

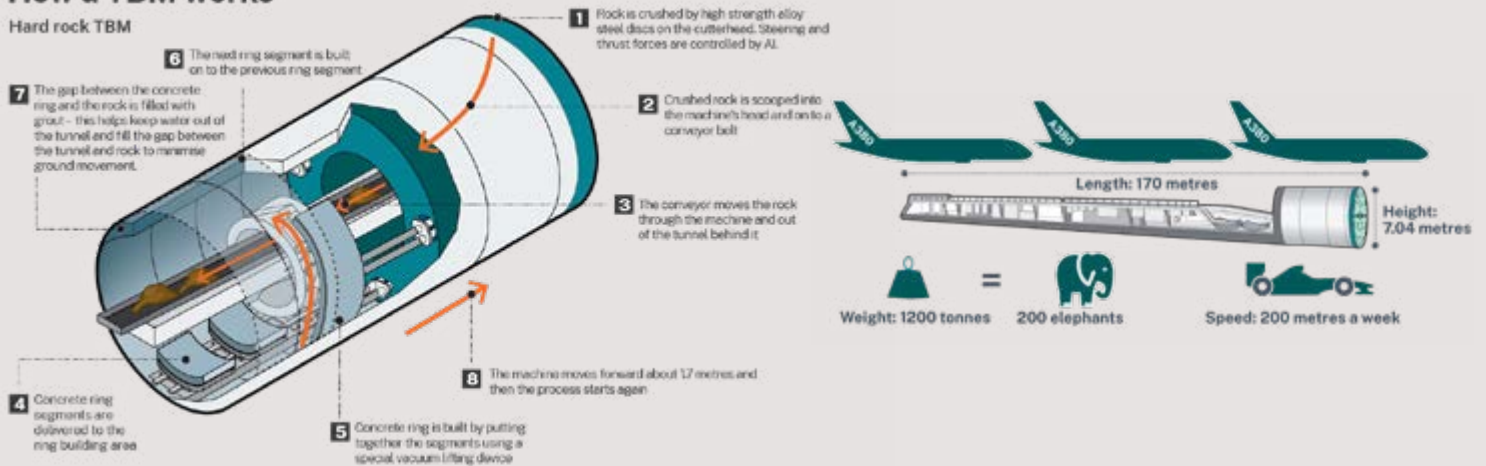
### Cross passages

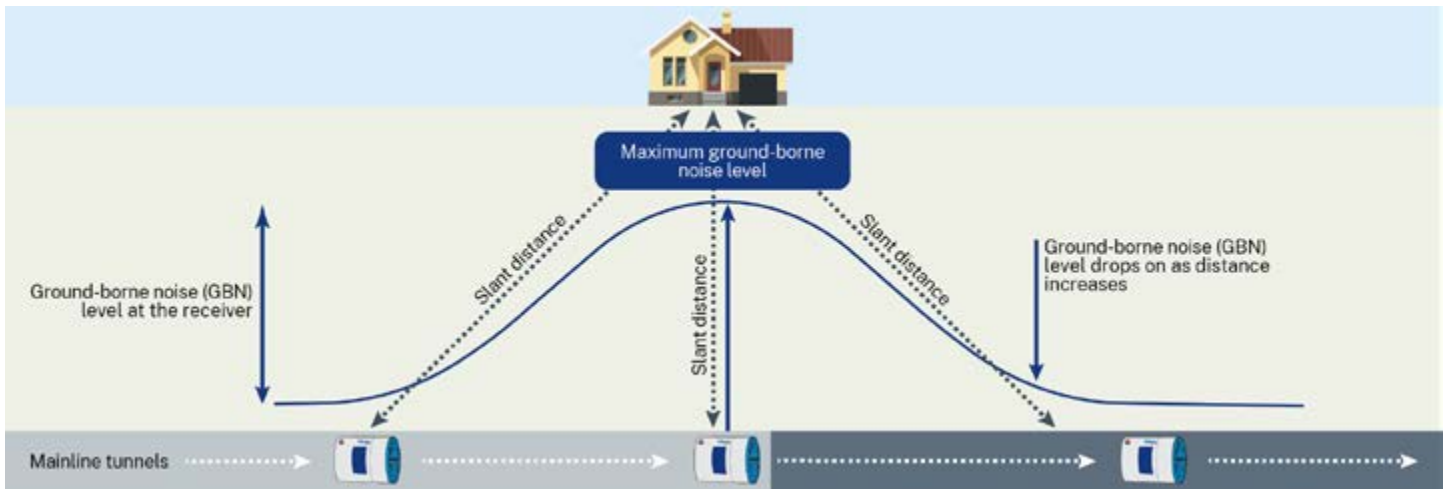
Pedestrian cross passages will be constructed every 240 metres between the twin metro tunnels, providing safe access between the tunnels in the unlikely event of an emergency.

Construction of cross passages will occur below ground within the mainline tunnels after the TBMs have passed through the area. An excavator with a rock breaking hammer will be used to excavate the passages. Cross passage tunnelling is approved to be carried out 24 hours a day, seven days a week.

### How a TBM works

#### Hard rock TBM





## Vibration

Residents and businesses along the tunnel alignment may experience some vibration during tunnel excavation.

The level of vibration is dependent on the area's geology, the tunnel depth and the construction type of a building. People are able to 'feel' vibration at levels far lower than those which may cause even superficial damage to the most susceptible building. An individual's perception of or response to vibration depends very strongly on previous experience and expectations. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

The Project's Conditions of Approval require equipment and work methods that keep vibration well below levels that may cause cosmetic or structural damage to properties.

## Ground-borne noise

Tunnelling work may cause some ground-borne noise. Ground-borne noise results from vibration being transmitted through the ground and 'regenerated' as noise into a building. It typically has a low frequency 'rumbling' sound due to the low frequency of the vibrations.

Like vibration, ground-borne noise is more noticeable when the TBM is closest to a property, increasing on approach and reducing as it moves away. It usually takes about two days for a TBM to pass under a property.

Ground-borne noise is more likely to be heard at night when background noise levels are lower and is not expected to cause disturbance during the day.

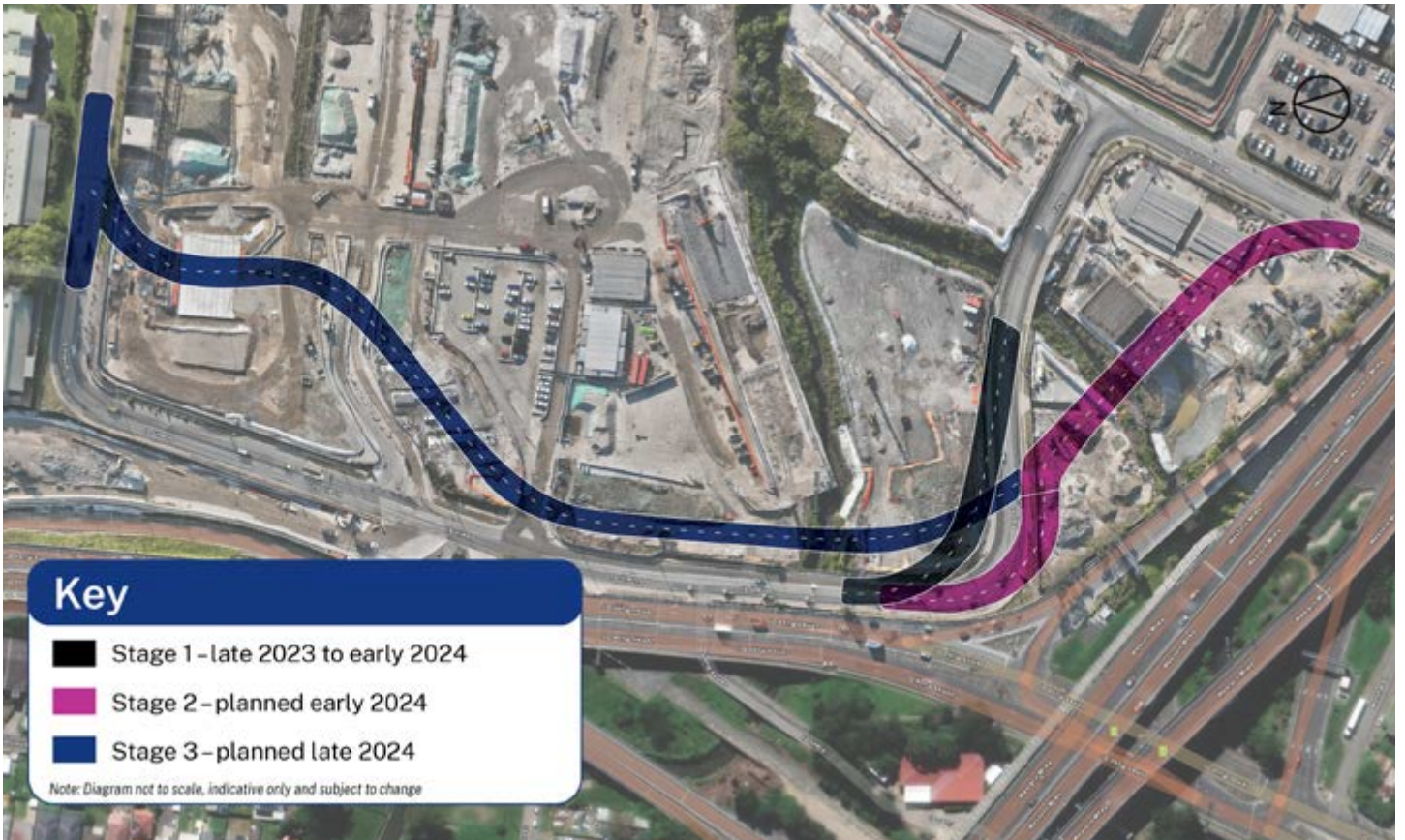
Residents will be notified ahead of the TBMs approaching their property for each of the tunnels and then again before cross passage excavation starts.

GLC has undertaken extensive noise and vibration modelling to predict the likely impacts of tunnelling and to ensure they are within acceptable limits. Regular monitoring will continue throughout the project to ensure noise and vibration is within the expected levels. For further information, please review GLC's Detailed Noise and Vibration Impact Statement which is available online at [gamuda.com.au/wp-content/uploads/2023/06/WTP\\_DNVIS\\_-\\_Westmead\\_Tunnel-Support-Activities\\_REVC\\_Final-1.pdf](http://gamuda.com.au/wp-content/uploads/2023/06/WTP_DNVIS_-_Westmead_Tunnel-Support-Activities_REVC_Final-1.pdf)

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

Activity	Noise impact	December 2023	January 2024	February 2024	March 2024	April 2024	May 2024
Utility upgrades and installations	Low to medium	● ●	● ●	● ●	● ●	● ●	● ●
Unwin Street realignment including construction of bridges over A'Becketts Creek and Duck Creek	Low	● ●	● ●	● ●	● ●	● ●	● ●
Tunnelling from Clyde Dive and Rosehill Services Facility, including removal of excavated material.	Low	●	●	●	●	●	●
Constructing a retaining wall within site boundaries along the Western Motorway (M4) embankment	Low	● ●	● ●	● ●	● ●	● ●	● ●
Delivery of machinery, materials and equipment	Low	●	●	●	●	●	●

● Standard construction hours ● 24 hour work activities ● Out-of-hours work



Map of Unwin Street realignment work.

## Unwin Street realignment

As part of construction of the Clyde Stabling and Maintenance facility, Unwin Street in Clyde will be realigned to facilitate the construction of a metro rail underpass. The realignment of Unwin Street will include construction of a road bridge over A'Becketts Creek and Duck Creek, minor road realignment of Unwin Street and construction of a shared path to accommodate pedestrians and cyclists.

The realignment will be delivered in a staged approach. GLC will continue to consult with businesses in the area during this work.

**Stage 1 – Late 2023 to early 2024:** Traffic travelling between Unwin Street and Wentworth Street will be diverted onto a new section of road toward the east of site.

**Stage 2 – Early 2024:** Traffic travelling between Unwin Street and Wentworth Street will be diverted onto a new permanent section of road alignment. Kay Street will no longer be accessible.

**Stage 3 – Late 2024:** Traffic will be diverted to the permanent Unwin Street alignment.

## Indicative construction timeline

		We are here		
2021 to 2022	Mid 2022 to early 2023	Early 2023 to mid 2024	Late 2023 to mid 2025	Late 2025
Site investigations and demolition	Site establishment	Construction of connecting tunnels and caverns	Launch of TBMs and construction of twin metro tunnels	Site handover for control centre construction

### Contact us

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

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