



# STATE LIBRARY STATION COMMUNITY REFERENCE GROUP

CROSS YARRA PARTNERSHIP  
FRIDAY 9 OCTOBER 2020





## STATE LIBRARY STATION COMMUNITY REFERENCE GROUP

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Construction partner:

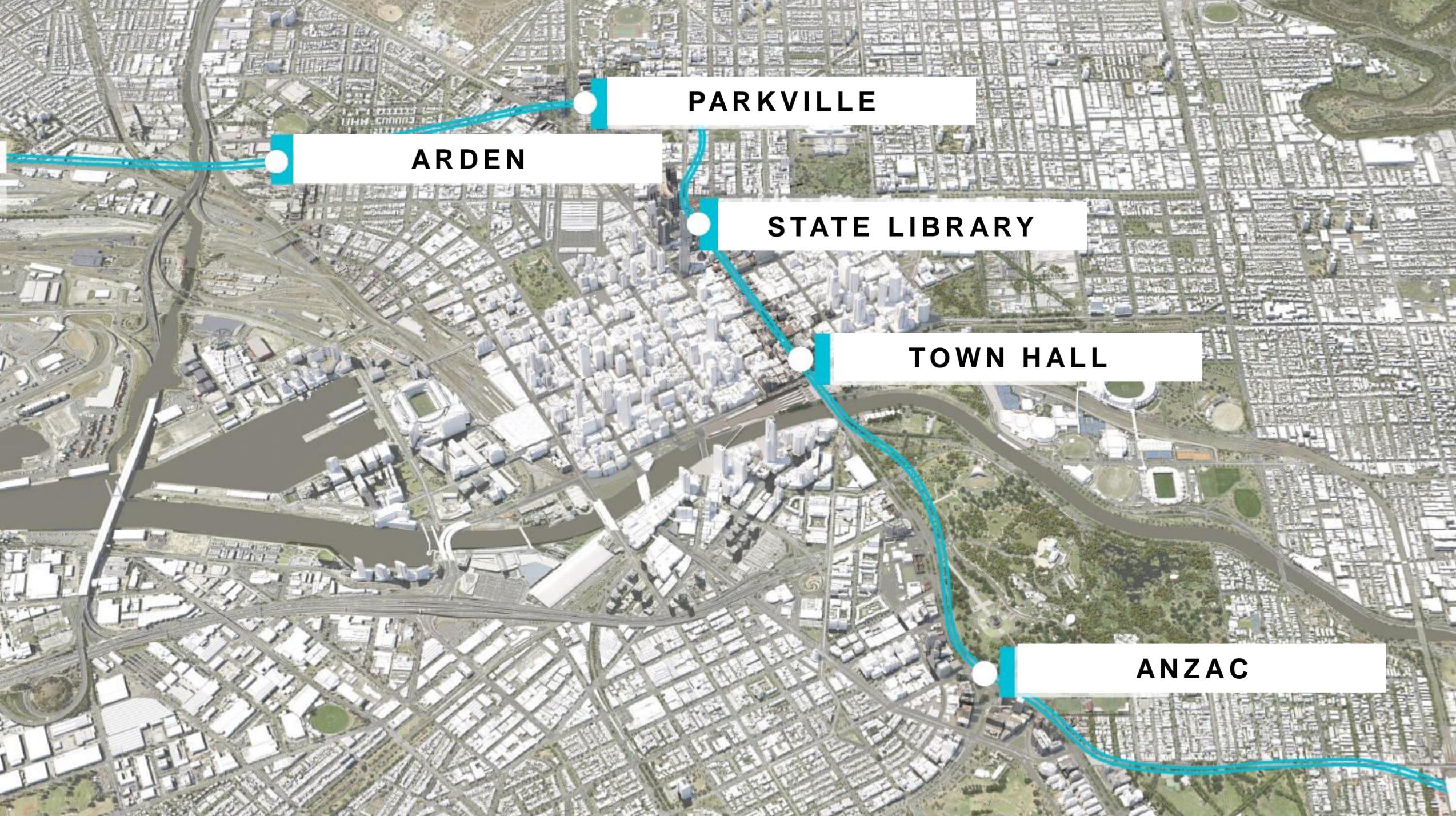


# AGENDA

1. Project overview
2. State Library Station update
3. General feedback and items for future discussion
4. TBM tunnelling update

# PROJECT OVERVIEW





**PARKVILLE**

**ARDEN**

**STATE LIBRARY**

**TOWN HALL**

**ANZAC**

PARKVILLE STATION  
TBM BREAKTHROUGH SEPTEMBER 2020

50%



23 September 2020

# ARDEN

## Arden Station and surrounds

- Construction of the station's inner walls, columns, concourse slab and roof slab are ongoing
- TBM and cross passage construction support is continuing

## Western Portal

- Construction of the egress building is ongoing, with all internal walls below ground now complete
- Construction of the above-ground part of the egress building will commence this month, once the suspended 'roof' slab has been poured



# PARKVILLE



- At the Grattan Street east site, TBM Joan is preparing to be relaunched towards State Library Station
- TBM Meg arrived in Parkville on 19 September and is being transferred through the station box
- Works are also underway to construct the second suspended slab in the station box
- At the Grattan Street west site, excavation was completed in late September. The southern station entrance roof slab will be completed by late October.

# TOWN HALL



- Top-down excavation works beneath the suspended slab will commence at the Flinders Quarter site in October
- Shaft excavation and reinforcement works are continuing at the City Square Site
- Excavation of the central cavern (bench 2) will be completed in mid-October

# ANZAC

- The first tunnelling drives from Domain to Eastern Portal are now complete. Mille broke through into Eastern Portal in mid-September, and Alice broke through last Saturday
- Now the TBMs have broken through, both will be disassembled and transported back to site on St Kilda Road
- Once all the pieces are back to site, the machines will be reassembled and prepared to be launched towards the CBD in early 2021.



# STATE LIBRARY STATION UPDATE



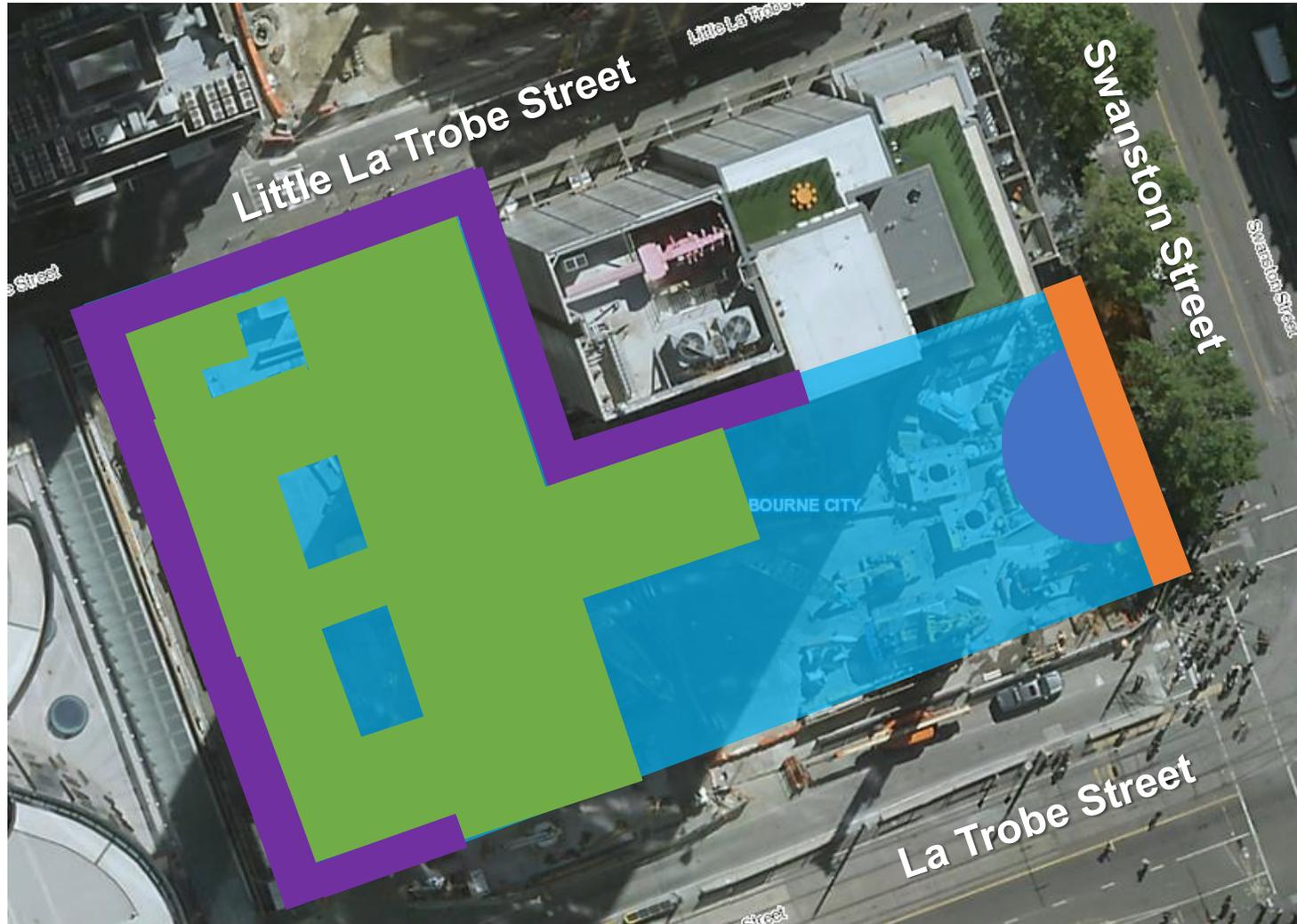
## LA TROBE STREET UPDATE

# PILING COMPLETED



- 172 piles
- 56 plunge columns
- 12 kilometres of holes drilled
- 9000 cubic metres of concrete
- 4000 tonnes of pile cage reinforcement
- 1800 tonnes of steel plunge columns

# LA TROBE SITE UPDATE



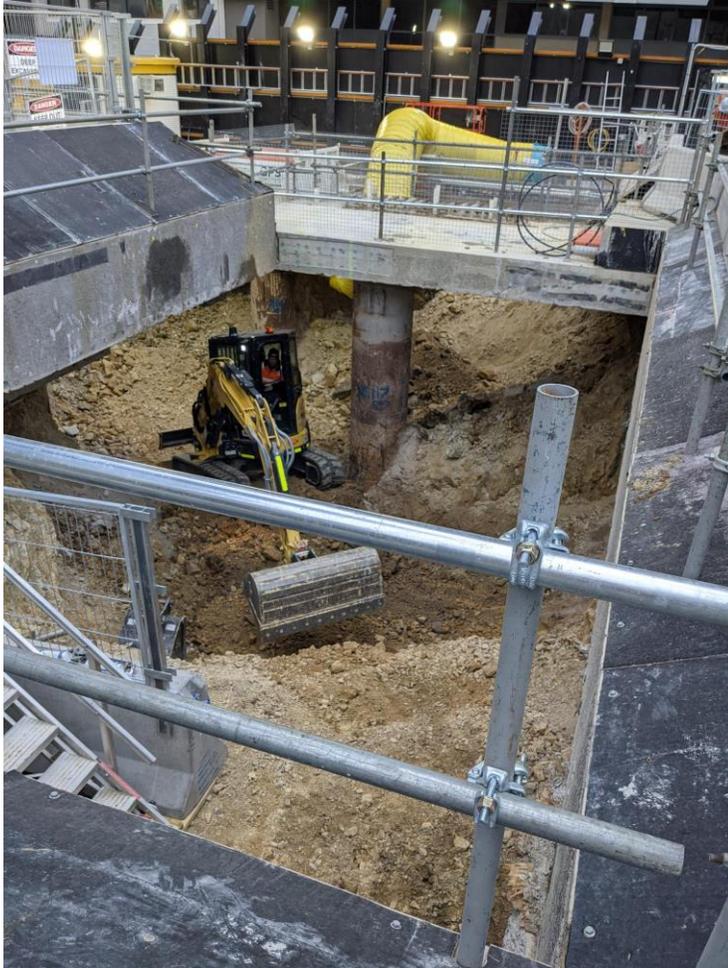
- La Trobe site 
- Pile trimming 
- Slab poured 
- Hoarding relocation works 

# LA TROBE STREET SITE UPDATE

Activity	Location	October	November	December	January	February	March
Hoarding relocation works	Site/Swanston Street	●—●					
Pile trimming	Site		●—●	●—●	●—●	●—●	●—●
Slab works	Site						
Shaft excavation	Site						

Intermittent hammering of plunge piles and temporary shaft

# LA TROBE STREET SITE HOURS



## Standard hours

- Monday to Saturdays, 7am to 6pm

## Concrete pours, formwork and excavation

- Monday to Fridays, 6pm to 10pm

## Concrete finishing works

- Monday to Fridays, 10pm to 6am



**LITTLE LA TROBE STREET UPDATE**

# LITTLE LA TROBE STREET SITE UPDATE

Activity	Oct	Nov	Dec	Jan	Feb	Mar
Site sheds, scrubber and acoustic enclosure installation	—					
Shaft construction	—					





**FRANKLIN STREET WEST AND EAST  
UPDATE**

## Hours

- Monday to Sundays, 24 hours

Activity	Location	October	November	December	January	February	March
Tunnelling support works and permanent structure build within the acoustic sheds	Sites						

# STRUCTURES AND LINING MILESTONE



# TUNNELLING WORKS





# STATE LIBRARY STATION

PLATFORM TUNNEL BREAKTHROUGH  
SEPTEMBER 2020

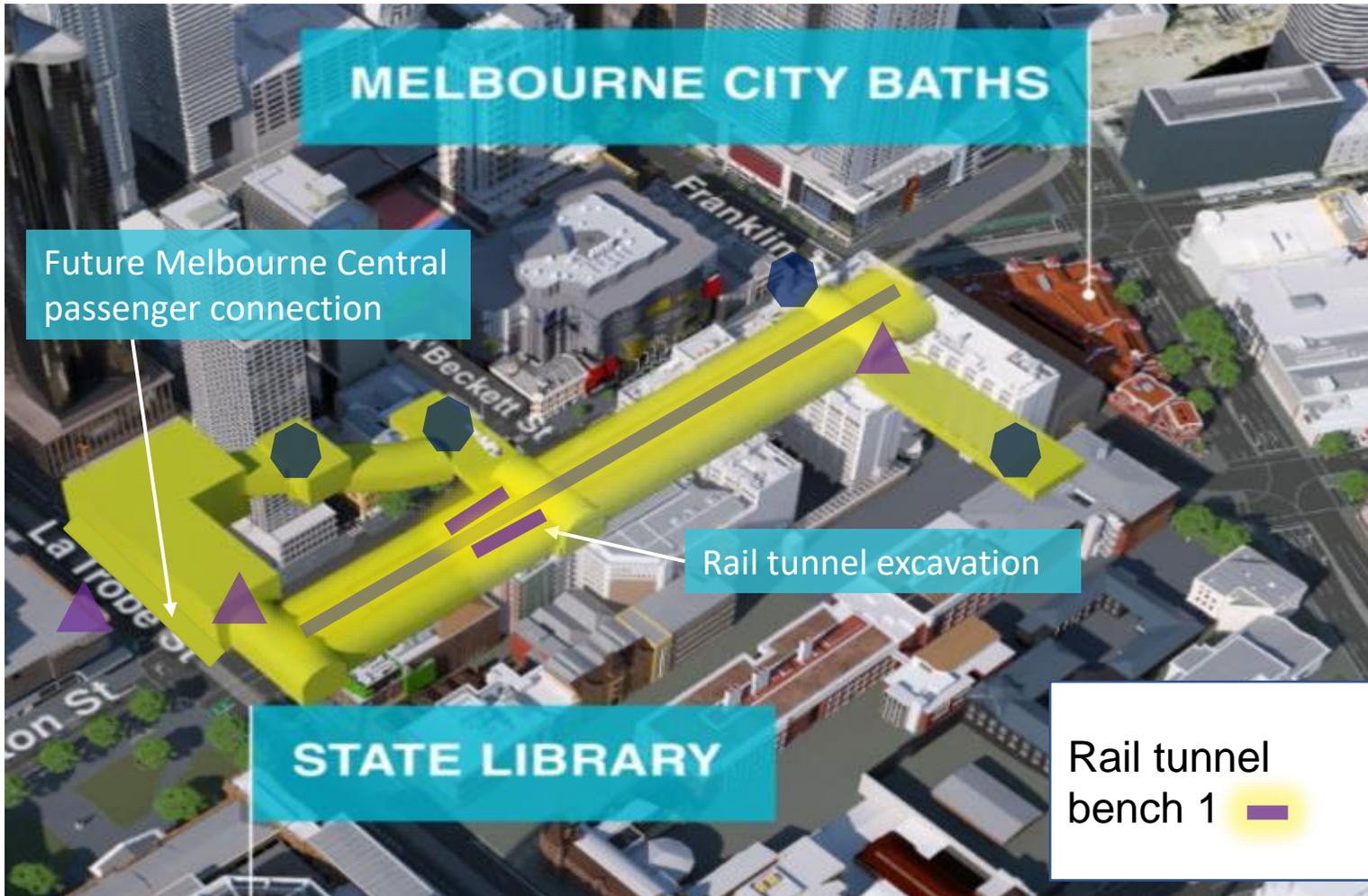


**JOHN  
HOLLAND**









Rail tunnel top heading completed this week



Architectural concrete elements ongoing

Future State Library Station entrance ▲

Future mechanical and electrical ●

## **Tunnelling works**

- Monday to Sundays, 24 hours

## **Excavated material removal**

- Monday to Sundays, 7am to 10pm
- Monday to Sundays, 10pm to 7am (as required)

## **Culvert removal works**

- Monday to Sundays, commencing mid-October, 24 Hours



# PLATFORM TUNNEL BREAKTHROUGH – VIDEO



# QUESTIONS



# TUNNELLING

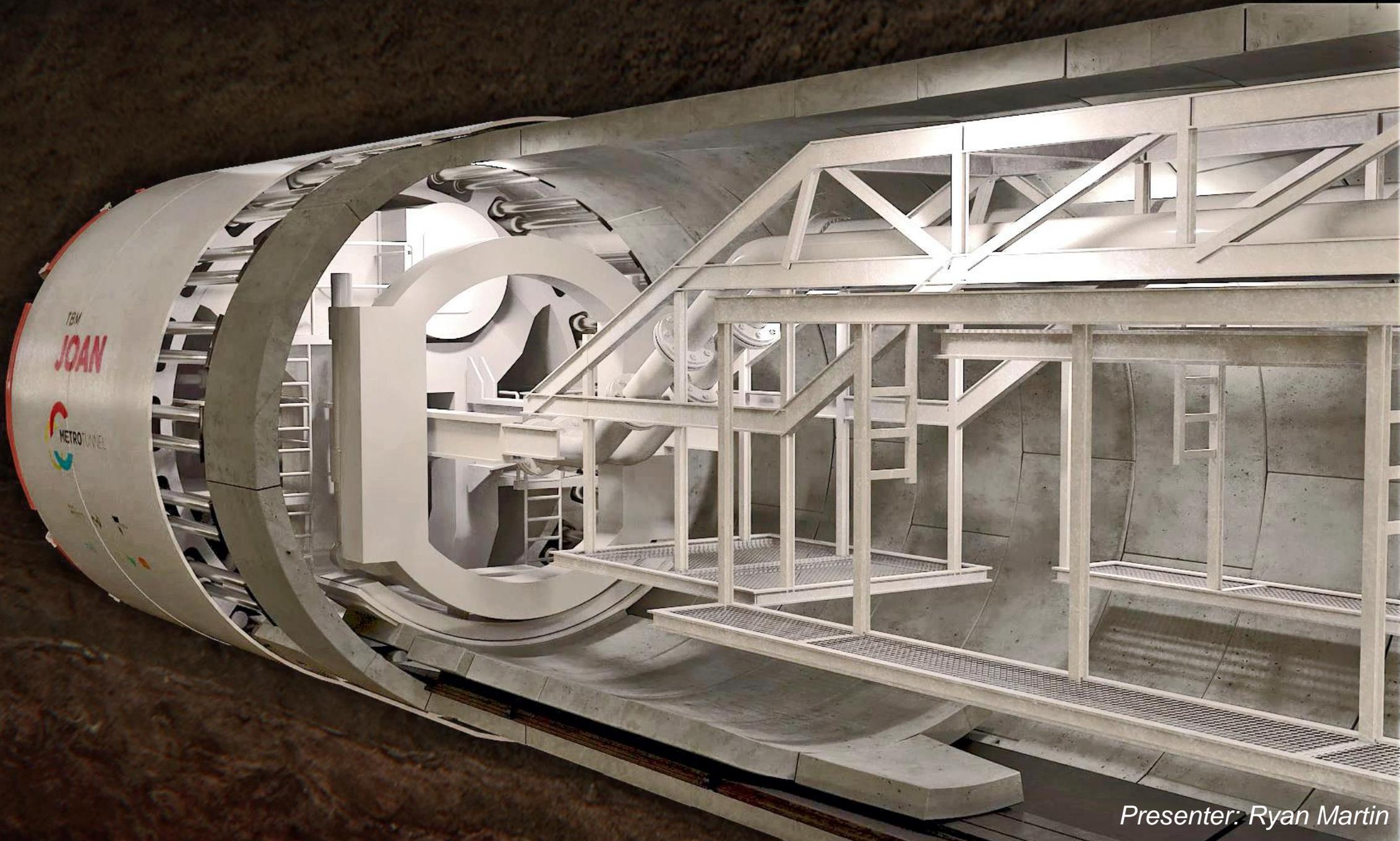
# TUNNELLING TO DATE

- In mid-2019, two tunnel boring machines (TBMs) were assembled at the Arden Station site
- The TBMs commenced tunnelling towards Kensington in 2019 and have now completed both sections of tunnel between the Arden Station site and the western tunnel entrance at Kensington
- The larger TBM components were disassembled and transported back to site in North Melbourne. The back up (gantry) sections were returned to site via the completed sections of tunnel
- TBM 1:
  - - commenced tunnelling towards the Parkville Station site on 13 May
  - - Arrived at Parkville Station on 27 August 2020
- TBM 2:
  - - commenced tunnelling towards the Parkville Station site on 2 June
  - - Arrived at Parkville Station on 19 September 2020

# ARDEN TO PARKVILLE

- The section of the Metro Tunnel between the Arden Station and Parkville Station sites:
  - Eastbound tunnel
    - 1449m long
    - 852 rings
  - Westbound tunnel
    - 1447m long
    - 851 rings
- Tunnel depth:
  - Arden Station box (Laurens Street end) – approx. 18m
  - Dryburgh Street – approx. 15m
  - O'Shanassy Street/Errol Street – approx. 14m
  - Parkville Station box (Royal Parade end) – approx. 17m

# THE TBMS AND SUPPORT NETWORK



Presenter: Ryan Martin

# TUNNEL LINING SEGMENTS



Concrete lining segments



Multi-service vehicle (MSV) carrying lining segments

# TBMS



Multi-service vehicle (MSV) carrying lining segments



TBM Meg tunnelling – Arden to Western Portal

# SLURRY TREATMENT PLANT



# TUNNELS

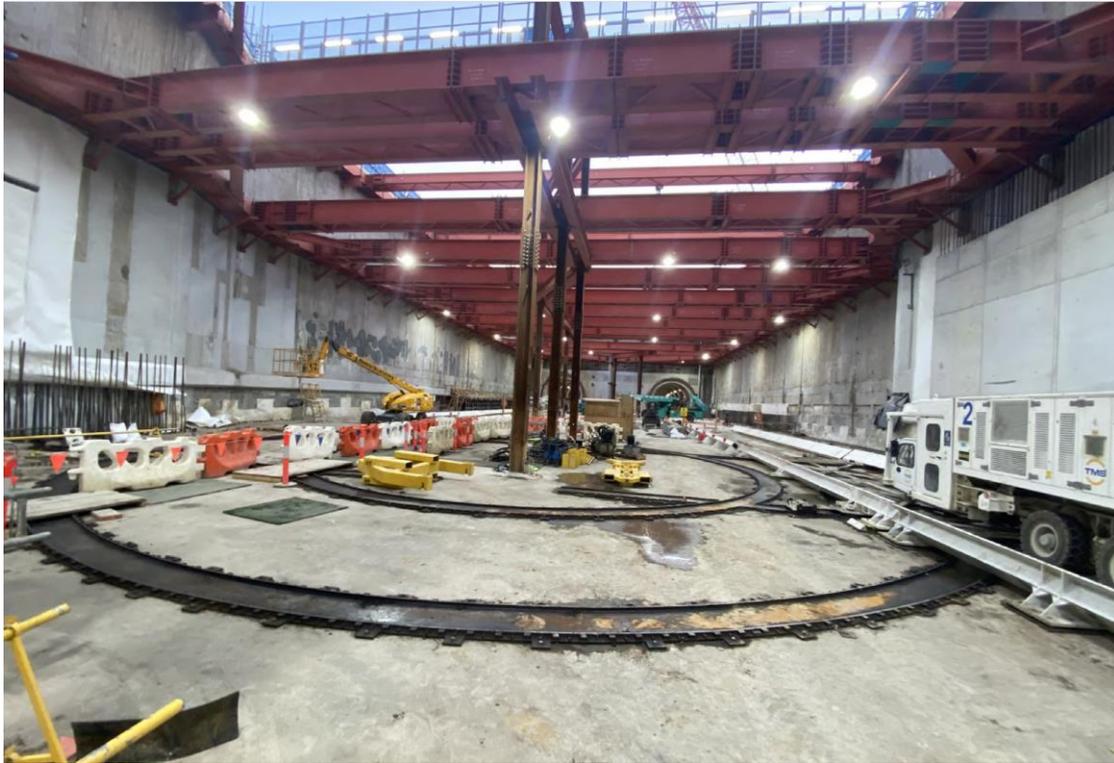


Westbound tunnel – Arden to Western Portal



Westbound and eastbound tunnels – Arden to Western Portal

# TBM RETRIEVAL AND REASSEMBLY

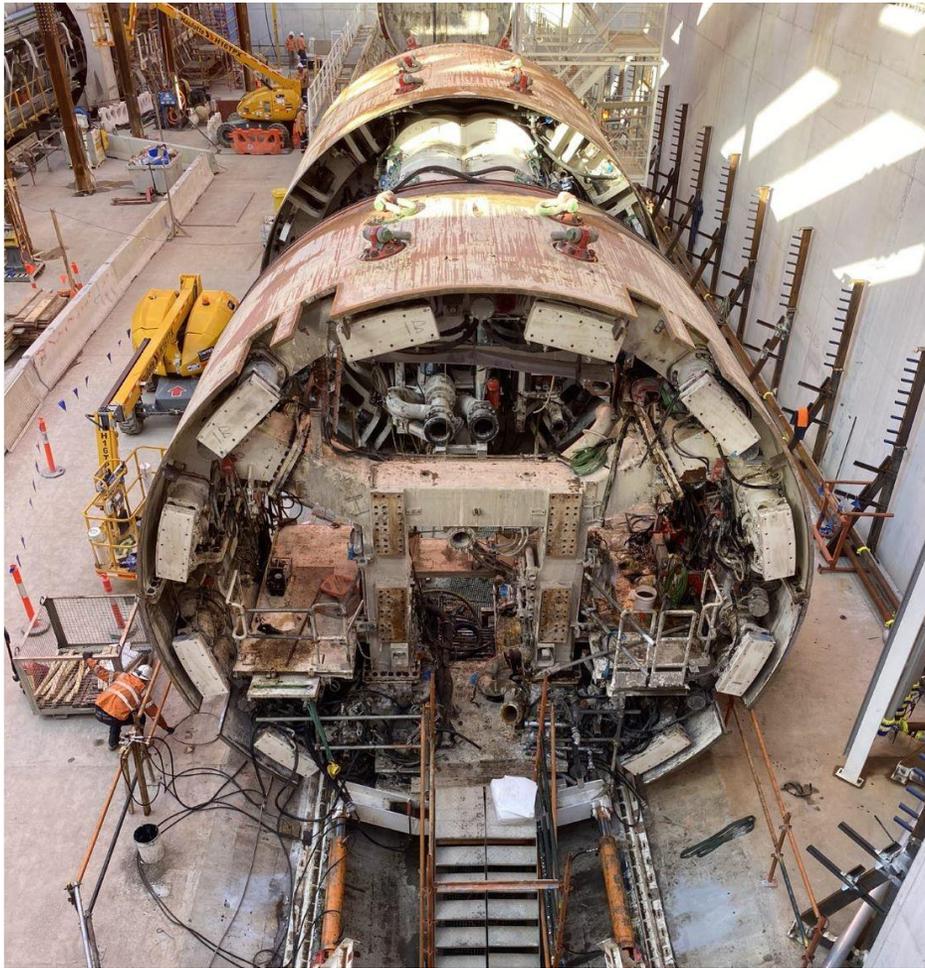


TBM gantry retrieval rotational device



Steel bell

# TBM REASSEMBLY AND RELAUNCH



TBM Meg being reassembled at Arden



TBM Joan being relaunched from Arden to Parkville

# PARKVILLE TBM BREAKTHROUGHS

- TBMs mill slowly through the fibreglass 'soft eye' of the station box
- The 'soft eye' is designed to minimise impacts of the breakthrough
- Reduced confinement pressure to maintain slurry flow and ensure maximum amount of spoil/debris is pumped back to the Arden Station site slurry treatment plant (STP)
- Process to contain slurry in the station box after breakthrough

# PARKVILLE TBM BREAKTHROUGH (TBM JOAN)



Breakthrough process ongoing



Breakthrough complete

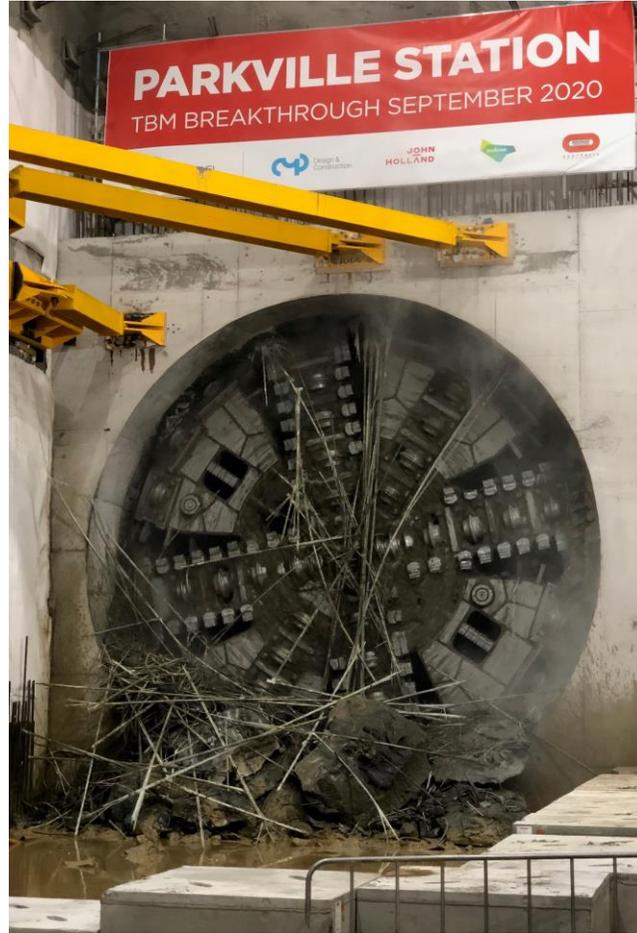


Monitoring TBM operations remotely

# PARKVILLE TBM BREAKTHROUGH (TBM MEG)



Breakthrough process ongoing



Breakthrough complete



Communicating with the crew

# MANAGING NOISE AND VIBRATION



# MODELLING PROCESS

TBM Ground-borne Noise and Vibration Model Process:

1. Model for potential noise and vibration exceedances
2. Validate with attended monitoring
3. Update model with attended monitoring data

Consultation will be progressively undertaken with potentially affected residents and stakeholders prior to TBM arrival

# TBM NOISE AND VIBRATION EPRS

## **NV8 – Vibration Guideline Targets for Structures (PPV)**

External vibration targets for infrastructure to ensure the integrity is not affected by construction generated vibration

## **NV11 – Vibration Dose Values (VDVs) Human Comfort**

Vibration dose values that are appropriate for the protection of personal amenity

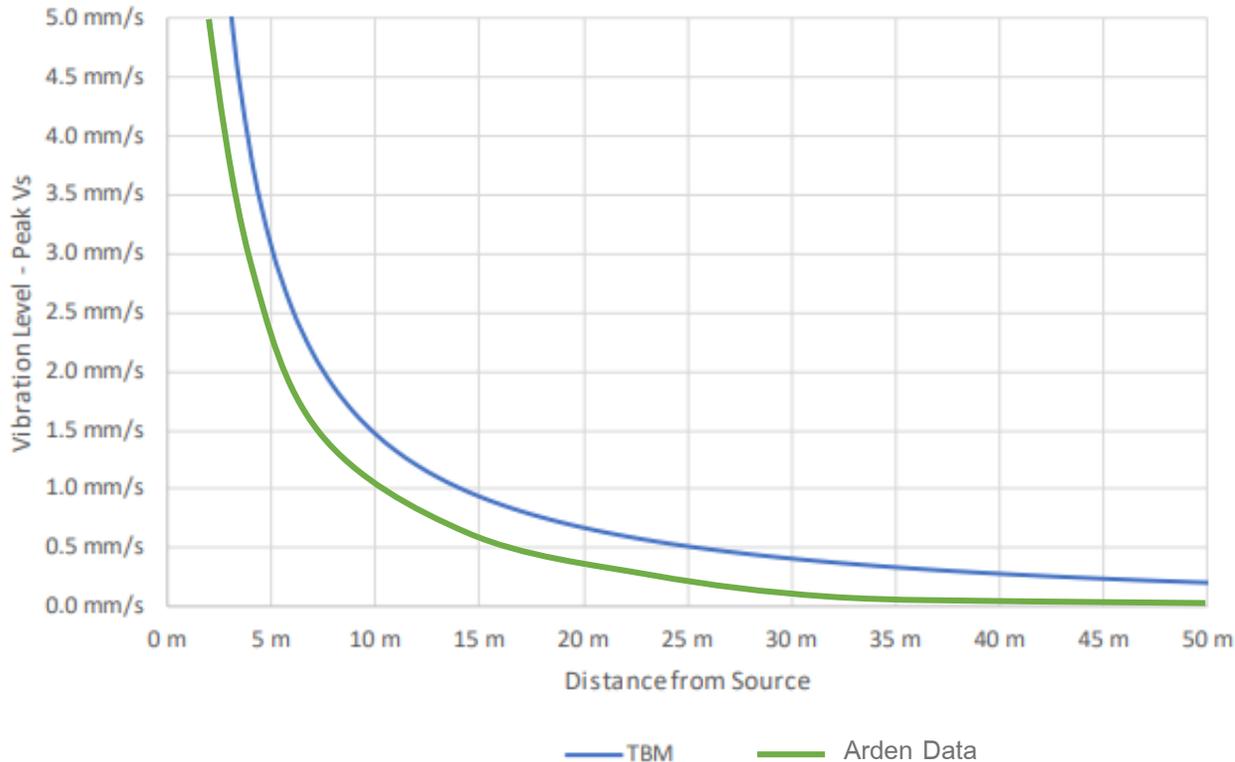
## **NV12 – Sensitive Equipment Guideline Targets**

Vibration levels on sensitive equipment through PKV and CBD North

## **NV13 - Ground-borne (Internal) Noise Guidelines for Amenity**

Regenerated noise, or ground-borne noise, is an associated effect of the small vibration related displacement that occurs on hard surfaces within buildings

# TBM MODELLING – NV8 VIBRATION (STRUCTURES)



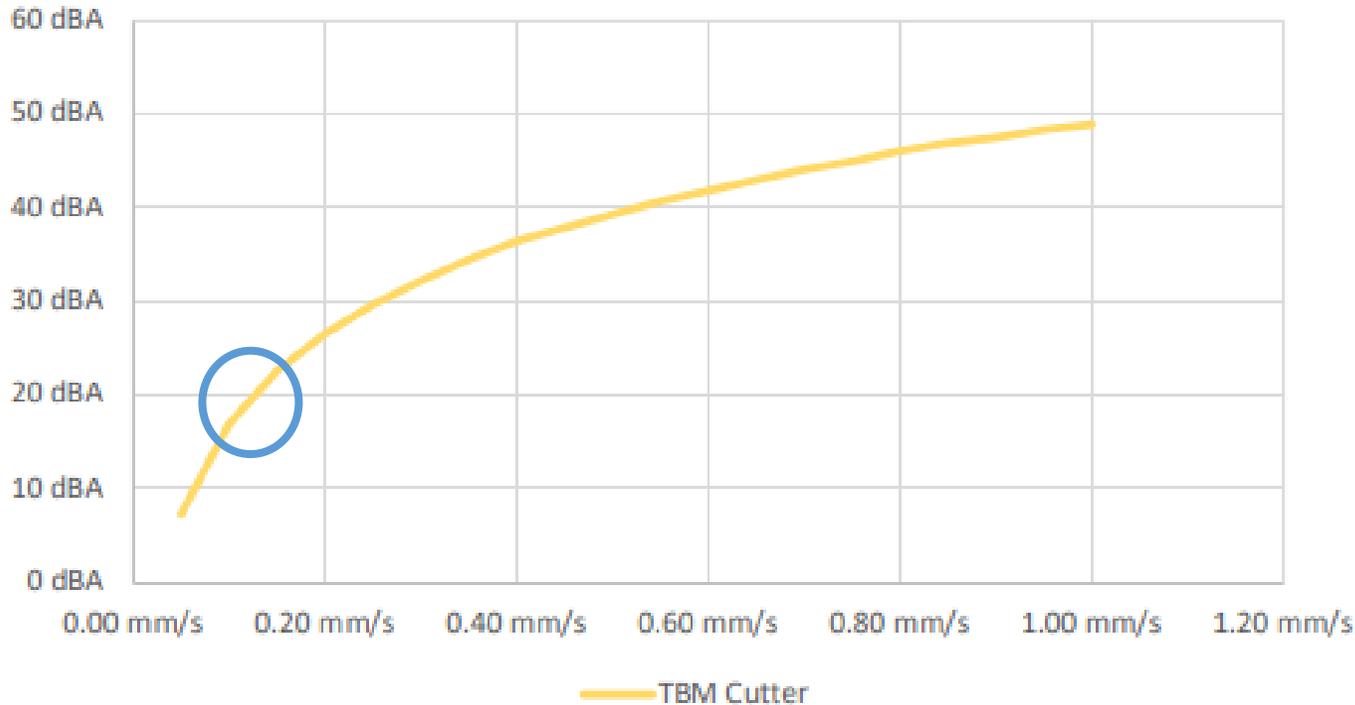
Estimated level of vibration as a function of distance from the TBM cutter head

Table NV8-1: Short-term vibration on structures

Type of structure	Vibration at the foundation, mm/s (Peak Component Particle Velocity)			Vibration at horizontal plane of highest floor at all frequencies
	1 - 10 Hz	10 - 50 Hz	50 - 100 Hz <sup>1</sup>	mm/s (Peak Component Particle Velocity)
Type 1: Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 - 40	40 - 50	40
Type 2: Dwellings and buildings of similar design and/or occupancy	5	5 - 15	15 - 20	15
Type 3: Structures that have a particular sensitivity to vibration e.g. heritage buildings	3	3 - 8	8 - 10	8

EPR NV8 Criteria

# TBM MODELLING – NV13 GROUNDBORNE NOISE

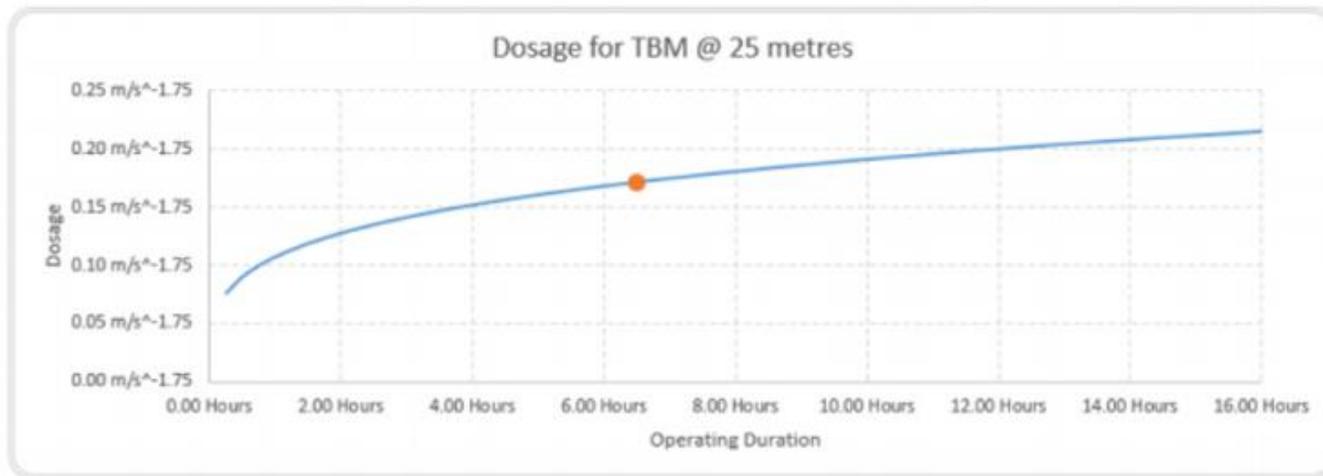


Estimated range of groundborne noise levels depending upon source vibration characteristics

Time Period	Internal $L_{Aeq,15min}$ , dB
Evening, 6pm to 10pm	40
Night, 10pm to 7am	35

EPR NV13 Criteria

# TBM MODELLING – NV11 HUMAN COMFORT (VDV)



Example of the dosage calculations for estimating dosage based upon the peak vibration level in mm/s and the TBM operating schedule

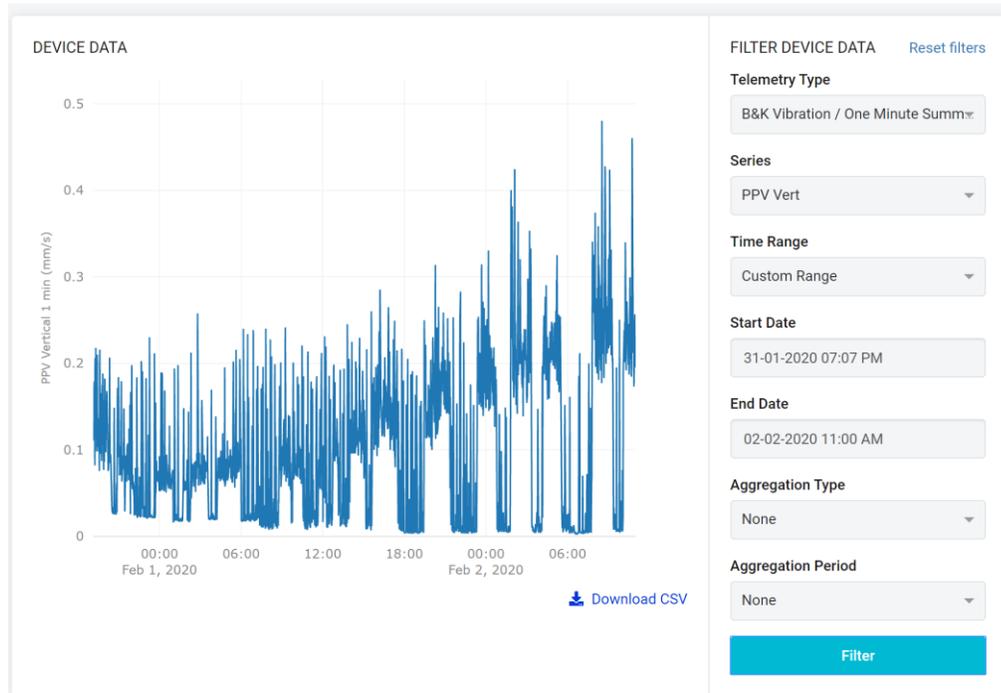
Location	VDV (m/s <sup>1.75</sup> )			
	Day 7:00am to 10:00pm		Night 10:00pm to 7:00am	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Residences	0.20	0.40	0.10	0.20
Offices, schools, educational institutions, places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

EPR NV11 Criteria

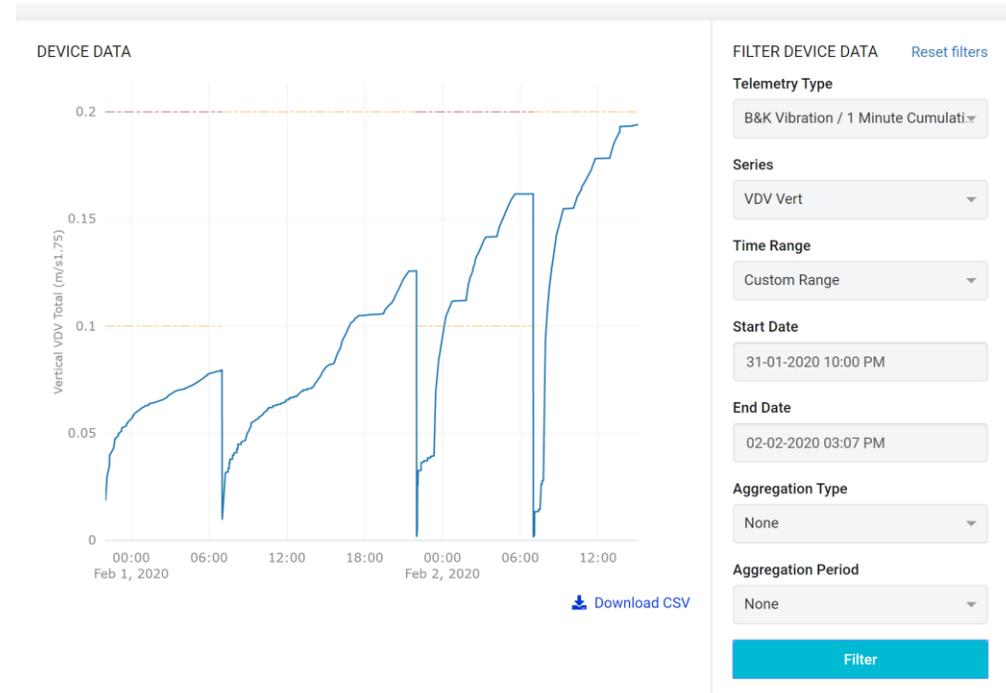
# TBM MONITORING

- Attended monitoring to be completed during the launch of both TBMs
- Unattended real time monitoring will be installed along the alignment as the TBMs progress

Example of live data from Kensington



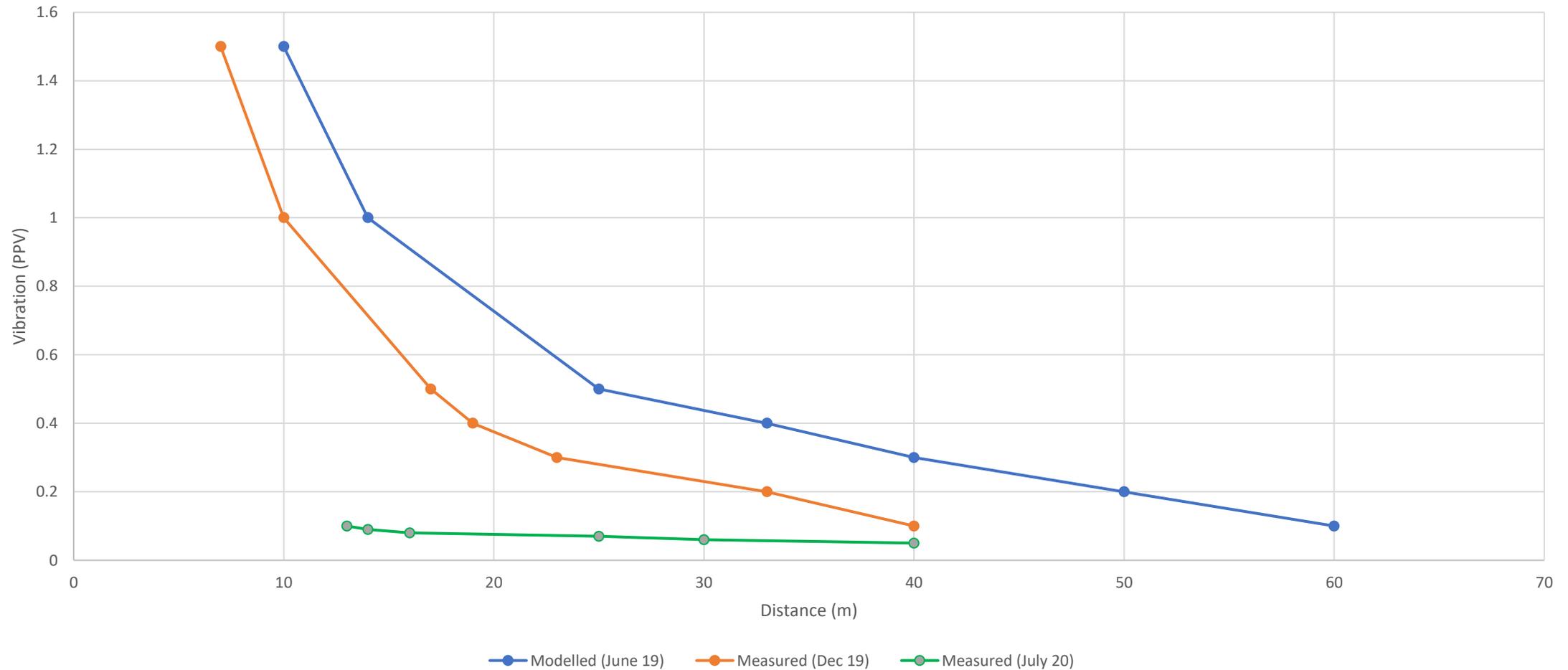
Vibration (PPV)



Vibration Dose Value

# TBM MONITORING – WESTERN PORTAL TO PARKVILLE

Vibration (PPV) as a Function of Distance



# PROPERTY CONDITION SURVEYS

- Pre-condition survey invitation letters will be distributed in stages
- Letters will be sent to the registered property owner/s or their nominated representative (e.g. managing agent)
- All survey bookings to be made directly between the property owner and the independent provider
- In response to Coronavirus (COVID-19) the Project has put in place new procedures for undertaking property condition surveys, consistent with best practice health and safety guidelines
- Property condition surveys will be undertaken by an independent specialist who will be in good health and:
  - - will be wearing gloves and a mask for the duration of the appointment
  - - will maintain a distance of 1.5 metres where possible
  - - will not touch or move any belongings
- Dates for booking of appointments will be based on Government health advice
- A copy of the property condition survey report, including photographs, will be provided to the property owner or their nominated representative (e.g. managing agent).



# COMMUNICATIONS AND ENGAGEMENT

# COMMUNICATIONS AND ENGAGEMENT

- **Communications to potentially impacted properties**

- TBM arrival four week out letter
  - Provision of 'noise and vibration from TBM tunnelling' fact sheet; tunnel depth and alignment map
- TBM 1 arrival letter (includes approx. dates TBM is expected to pass a specific property)
- TBM 2 arrival letter (includes approx. dates TBM is expected to pass a specific property)
- Information sessions, as required
  - *sessions being held online due to COVID-19 restrictions*
- One-on-one phone calls/video briefings, as required
- Project Information Line (1800 105 105) and [CYP@metrotunnelcyp-dc.com.au](mailto:CYP@metrotunnelcyp-dc.com.au)
- Regular updates to Metro Tunnel website and social media



**QUESTIONS?**